THE IMPACT OF ENERGY DEVELOPMENT ON NORTHWESTERN NEW MEXICO

HEARING

BEFORE THE

SUBCOMMITTEE ON ECONOMIC DEVELOPMENT

OF THE

COMMITTEE ON PUBLIC WORKS

UNITED STATES SENATE

NINETY-FOURTH CONGRESS

SECOND SESSION

MARCH 12, 1976—FARMINGTON, N. MEX.

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THE IMPACT OF ENERGY DEVELOPMENT ON NORTHWESTERN NEW MEXICO

FRIDAY, MARCH 12, 1976

U.S. SENATE,
COMMITTEE ON PUBLIC WORKS,
SUBCOMMITTEE ON ECONOMIC DEVELOPMENT,
Farmington, N. Mex.

The subcommittee met at 10:25 a.m., pursuant to call, in the San Juan Branch College Theatre, Hon. Joseph M. Montoya (chairman of the subcommittee) presiding.

Present: Senator Montoya.

OPENING STATEMENT OF HON. JOSEPH M. MONTOYA, U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator MONTOYA. The committee will be in order.

This morning we start a hearing here in Farmington to try to gain information on different aspects of economic development which have aroused our interest in Washington as well as the interest of people in the State of New Mexico.

I am sorry that I am late this morning. We had engine trouble and we had to get another airplane. I want to explain what happened last night.

I left Washington with the idea of going to Shiprock to listen to the Navajo people there about their problems, and we had a plane departure scheduled for 4 yesterday afternoon.

We had been in touch with the Weather Bureau, the tower, in Albuquerque, and we were told that the weather would be all right. We left at 4 by plane, and about 20 or 25 miles from Albuquerque we received a radio instruction to turn back, that we could not land in Farmington and that if we went around through Gallup, we still could not approach Farmington last evening.

So we had to return to Albuquerque and waited there for the weather to clear, hopefully. The weather did not clear. So we called our people here to communicate with the people at Shiprock that it had been impossible for us to arrive for the meeting.

I regret this very much. If I had been able to make it by car, I certainly would have done it. But with that time limitation, it would have been impossible for me to do so.

I intend to return to Shiprock and to discuss the problems that these people face, or try to elicit from them their opinion on different economic questions which have arisen in this part of the State.

The story was full of some implications in the Albuquerque Journal this morning, and I want to say to those quoted in the story that I need no credentials from anyone here insofar as my love, dedication, and work on behalf of Navajo people of this State, and including those in Arizona.

My name is imprinted on every piece of legislation dealing with the Navajo irrigation project, with Navajo Indian health, with clinics on the Navajo Reservation, with the Navajo College on the Navajo Reservation.

I have dedicated my public life to helping the Navajo people. I don't need any credentials from somebody who might impune my motives in being here in Farmington today.

I did not come here to tell the Navajos to give their land. I came here to listen to the people here and to listen to the Navajo people who might want to come before this committee. This is their forum. I want that perfectly understood by everyone.

I will go before the Navajo people at Shiprock as soon as my schedule will permit to discuss all problems with them. I want a good cross-section of the Navajo people to be there because I want to listen to them and I want to accord them the constitutional right of using the right of petition before their elected officials.

So now that I have said that, I want to welcome before this committee the mayor of Farmington, Mr. Webb, for a few preliminary statements, if he wishes to make any.

STATEMENT OF HON. MARLO WEBB, MAYOR, FARMINGTON, N. MEX.

Mr. Webb. Senator Montoya, Mr. Mizell, distinguished guests, ladies and gentlemen: It is indeed a pleasure to have you in Farmington again, Senator. We always welcome your visits.

Senator Montoya. Thank you.

Mr. Webb. We hope now that the specialists have been brought in, we can move in to effect a cure. We are beginning to feel the patient might die from lack of proper treatment.

It is not from lack of interest, because we have been studied and committeed to death, Senator. We have often felt that those outside of the community were more interested in studying the symptoms than effecting the cure.

We hope as a result of this hearing today that we can move forward and start filling the needs of this community both now and in the future.

Again we welcome you and wish you success in your hearing.

Senator Montoya. Thank you for the welcome, Mayor.

I might say by way of preliminary foundation to what we are going to do here today that we did not come here to tell the city of Farmington what to do. We merely want to find out what they are doing and how we can implement and offer our help, if it is wanted.

I know you have been studied to death here. But so have the Navajo people been studied to death for many years. Finally we are trying to do something about it.

The Navajo Indian irrigation project was a study of 40 years. It didn't come to fruition until I introduced a bill in the House of

Representatives. It took me only 2 years to pass the Navajo irrigation project after 40 years of planning, thinking, promising and so forth. So I hope that I can continue my batting average now that I have returned to Farmington so that we can do something affirmatively and not just give the people here rhetoric.

Dr. Henderson, president of the college here, I certainly want to thank you for allowing us to use this wonderful facility. This is a fine example of what spirited and dedicated people can do to bring educational opportunity to different areas of this country. You certainly exemplify that kind of leadership.

Dr. Henderson, would you care to say something?

STATEMENT OF JAMES HENDERSON, PRESIDENT, SAN JUAN BRANCH COLLEGE

Mr. HENDERSON. Thank you, Senator. Mr. Mizell, distinguished guests, all of our friends from the San Juan County area: We are certainly delighted to have you here today. We are most honored.

We feel that this is most appropriate in the year of the Bicentennial to have the distinguished Senator appear here to hold a hearing, and particularly we feel that this will be advantageous to our students to be able to come in during the course of the day and observe government firsthand.

We think this is a real opportunity to have you people here. It would be very difficult for these people to observe something like this due to the miles. But for you to bring it here we are most delighted. We think it will be most beneficial.

Again, I want to welcome you. We certainly make our facilities available to you. We are delighted to have you. Thank you.

Senator MONTOYA. Do you have a Navajo Club here?

Mr. HENDERSON. Yes, sir.

Senator MONTOYA. Who is the president of the Navajo Club?

Mr. HENDERSON. Ray Frost.

Senator MONTOYA. Is he here?

Mr. HENDERSON. Mr. Ray Frost, the president, will be here later in the day and would like to make a few comments, I am sure.

Senator MONTOYA. I would like to have a representative of the Navajo students sit right here with me during part of the hearings; so if you will make a choice.

Mr. HENDERSON. We will do that. Thank you.

Senator MONTOYA. Now we will proceed with the business of the hearing. I want to welcome everybody here. Your presence is indeed most welcome and gratifying.

I wish to say thanks to all of you who have come here, some at a personal sacrifice, I am sure. We have a busy day before us, and an important day.

For some time I have wanted to come to this important part of New Mexico to hear firsthand the problems and the opportunities that are confronting you.

I am chairman of this Subcommittee on Economic Development, which is a subcommittee of the U.S. Senate Committee on Public Works. During the last 2 days I have been in meetings with the Public Works Committee presenting a public works bill, which came out last night out of the committee, and will be presented to the Senate for enactment within the next week.

It carries over $2 billion in authorization for public works, and carries a section which deals with grants to Indian tribes, without the necessity of matching.

This will be a great step forward in trying to alleviate the unemployment situation in this country. The committee has had great concern over the years with unemployment. We are becoming aware of the serious problems of dislocation or adjustment that affects communities either when a major facility closes down—such as a military base—or when a major expansion of employment opportunities brings unrestrained growth, as may be the case here.

We have witnessed the rapid growth in northwest New Mexico in recent years. It brings the blessings of employment and payrolls; but, sadly, it sometimes brings serious problems of insufficient facilities and services to meet the needs of the new citizens.

People I have talked to say that the Navajo irrigation project—in the early stages of planned expansion—will have a tremendous impact on northwest New Mexico. Others point out that expenditures by the large coal-burning generating plants nearby to meet environmental standards will create a great number of new jobs. And, of course, we have heard that there is a possibility that one or two or more coal gasification plants may be constructed on the land of the nearby Navajo Nation.

I know that you have all had plenty of planning, as the mayor has stated. Many of you are quite certain about what needs to be done. The question is: Who is going to do it? And that means, who is going to pay for it?

Those questions have brought this hearing to Farmington today.

We want to know in Washington what the Federal role is. Assistant Secretary Mizell—you perhaps remember him as Vinegar Bend, the great pitcher in the major leagues—is here with us today. He will have thoughts on these things.

Governor Apodaca is coming here to discuss the State role. The Navajo leaders will have thoughts about the meaning of these developments and the life of the Navajo—and the Navajo role. Some of your elected officials will speak to the important role of local governments. And there will be others, I hope.

We will not hear everyone who should be heard. The day is too short. But I know we will make a useful permanent record that will be available to all of us in the coming months. I know it will be useful to other committees in Congress, because the problems of too-rapid growth are occurring in other places.

For myself, I am anxious that something get started here now, before we wake up one morning and discover it is too late.

So we will have as our first witness the Assistant Secretary for Economic Development, Mr. Wilmer, Vinegar Bend, Mizell, who has been the Administrator of the Economic Development Agency under the Department of Commerce.

He is a former Congressman. I might say that he has done a very good job in recognizing the needs of the State of New Mexico, and I want the record to show that I commend him very highly for the fine manner in which he has conducted himself in this job.

We welcome him here to Farmington. He will have a presentation to make before this committee, Secretary Mizell, would you proceed.

STATEMENT OF HON. WILMER MIZELL, ASSISTANT SECRETARY OF COMMERCE FOR ECONOMIC DEVELOPMENT, ACCOMPANIED BY WILLIAM HENKEL, JR., DEPUTY ASSISTANT SECRETARY FOR OPERATIONS; WILLIAM F. CLINGER, JR., GENERAL COUNSEL; RAY TANNER, INDIAN OFFICE; AND JOE SWANNER, REGIONAL DIRECTOR

Mr. MIZELL. Thank you, Mr. Chairman. Let me say that I am delighted to be in your State, the great State of New Mexico. Also, I am delighted to be in Mayor Webb's city, the city of Farmington.

I have with me today my Deputy Assistant Secretary for Operations, Mr. Bill Henkel, on my right. I also have my General Counsel with me, Mr. Bill Clinger.

Also in the audience is my Indian officer, Mr. Ray Tanner, from the Washington Indian desk. I also have our Regional Director, Mr. Joe Swanner, with me today.

Senator MONTOYA. May I extend a welcome to all of these gentlemen, too. I have worked with Mr. Joe Swanner for many years, since his Washington days. He also has been very sympathetic to New Mexico's needs.

You may proceed.

Mr. MIZELL. Having served 6 years in the House of Representatives on the counterpart to the Economic Development Subcommittee of the Public Works Committee in the Senate, having served in the House, I know of the long and deep interest of Senator Montoya in economic development.

It was interesting, Mr. Chairman, when I reached back and lifted out some of the figures on the investments that have been made in New Mexico under economic development.

In public works grants, there has been about $52.5 million of investments under the public works program of EDA. Under technical assistance, we have invested over $1.5 million. Under business development loans, there has been almost $4 million of direct business development loans; working capital guarantees of $1,110,000; and administrative and planning grants of $1,741,000.

This does not include the investments that EDA has made on the Navajo Reservation in which you are interested. I don't have it broken out to just those made in New Mexico.

But altogether in this period of time directed to these developments there has been $26 million invested on the Navajo Reservation.

I know of not only your interest in that portion which is in New Mexico but all of the Navajo Reservation. You could add 40 percent to this immediately, especially those in New Mexico, because of the local matching funds that would have been invested as well, directed toward economic development.

But this in no way measures the private investments that have occurred following the economic development investments that are directed toward long-term economic development and job creation in this area.

I just wanted to share those with you this morning and also with the people who are here at this hearing this morning. I think the indication of those who are accompanying me here today is an indication of the importance to which we at EDA attach to these hearings that you have set up and are holding here today, Mr. Chairman.

We certainly welcome the opportunity to come and appear here today before your committee and to testify on the impact of energy development on surrounding communities, and particularly in the Four Corners region.

In the Department of Commerce, the Economic Development Administration has provided assistance for several projects related to the impact on communities of energy development.

These projects have received assistance under Title IX of the Public Works and Economic Development Act of 1965. As you know, title IX was also intended to deal with actual or threatened severe unemployment or low-income problems by providing grants to States, local units of government, and Indian tribes.

These recipients may then redistribute these grants in the form of loans, loan guarantees, grants and other appropriate assistance to public entities and, except for grants, to private profitmaking operation.

Title IX projects have provided funds primarily to help overcome existing or expected chronic unemployment or low-income problems. Additionally, some projects have also been helpful to the communities in adjusting to the impact of energy development.

These funds have been used for constructing a water storage tank to meet a rapid population increase in Beulah, N. Dak; a planning team for Gillette, Wyo., to meet the problems of a boom-town situation resulting from nearby resource development; another project to fund the preparation of an environmental impact statement because of increased mining activity in two counties in Utah; still another project financed a study to examine alternative methods of financing facilities in areas of Colorado that have experienced or will experience rapid energy development.

Any large-scale development in a geographical area results in short-term burdens on the surrounding communities. While many such burdens are easily carried by the private sector, many must be supported by the State or local units of government.

The present national effort to achieve greater productivity from its energy resources is the most recent example of the impact of large-scale development efforts. While we are fortunate to have these energy resources in many parts of our great country, their development also brings social and economic problems to these numerous areas.

These problems range from planning for social and economic impacts to the creation of public facilities to accommodate the needs of what is often a community that will be 30 to 100 percent greater in population.

Inadequate housing, overloaded hospitals, crowded jails and a near crippling labor turnover are but some of the drastic results in boom-town areas.

Right now these communities often have half their population in mobile homes, with the water systems at or near the point of being overloaded. Some water supply facilities do not meet State health standards.

The Four Corners Regional Commission has worked with EDA on these energy impact problems. They were instrumental in concurring with our expected project for the Price River Water Improvement District in Carbon County, Utah.

Boomtown problems do not stop with construction of public water systems. Health and recreation facilities, schools and libraries, and public safety facilities are also the most obvious needs of a booming area.

In the Gillette, Wyo., EDA funded project I mentioned earlier, the planning grant was concerned with the coordination and planning by the city of mental health care, law enforcement, social work, and public administration agencies.

EDA has extensive experience in assisting States and local units of government. For more than 10 years we have been working with every State and about one-third of all of the communities in the country.

This has led us to observe the capability of the various levels of government to cope with boomtown problems. It is our belief that the States and local governments should determine the type and location of the public facility. This has been a major principle of our agency since its inception, and it has proven very effective.

We would strongly advise that it be applied to any legislation dealing with energy impact problems.

EDA also believes that determinations in and administration of these problems should have the least Federal involvement. Federal regulations should be kept to a minimum and state the program as simply as possible.

Whenever possible, Federal assistance for public facilities for impact areas should be in the form of loans with forgiveness or loan guarantees.

We realize that several communities may at present lack the adequate tax base to finance the new demand for public services and facilities. Also, since many of the proposed public facilities are not revenue generating, revenue bonds are not available to these communities or the demands may be beyond current local statutory debt limits.

In addition, some States are severely restricted by their constitution from borrowing any meaningful amount of funds. All these factors contribute to the problems for impacted communities.

But we believe the key problem is the short-term one of front-end financing, not the lack of sufficient revenues over a lengthy time. Energy development, after all, will significantly increase both State and local tax bases.

We further believe that this problem can be solved through a combination of Federal, State, and local cooperation and assistance.

Besides these financial concerns, there are planning and administrative problems that small units of local government may have difficulty solving. Some of these problems could be answered by technical assistance or planning grants. Others may need the more traditional assistance of the type that is provided in our title I public works program.

A third observation is that there must be adequate planning. The problem of overcrowded hospitals should not be solved with an excess of bed space because sufficient factors were not initially considered.

Finally, a Federal reply to the impact problem should provide consistent treatment to all geographical regions. Dividing the Federal approach among several agencies not only duplicates personnel and appropriations but also increases the possibility of having different requirements for and answers to basically similar problems.

The burden is on the Federal Government to be direct and simple in responding to the Nation's problems. The Federal response in meeting problems of Federal concern should be sharply focused rather than fragmented and diffuse. Certainly in the case of energy impact areas it seems to us advisable that one agency implement the congressional intent.

We have already mentioned EDA's role in energy impact areas. The various projects we outlined for you indicate the wide range of assistance title IX is capable of in these impacted areas.

Nevertheless, one prime purpose of title IX is to help avert or to correct severe and chronic unemployment problems as well as providing assistance for boomtown problems.

EDA's concern with energy impact problems has not been limited to title IX projects. We have funded three planning projects under title III of PWEDA. An initial study completed in September 1975 outlined some implications resulting from rising energy costs.

This study has resulted in our currently processing a follow-up study to more particularly identify and then measure the regional impacts.

Another title III planning project will study the relationship of available energy resources and regional economic development. It will also create a method to project data to 1985 and provide other methods to continuously update the projections.

In summary, it is our opinion that the national interest in creating alternate and increased energy resources warrant planning and financial assistance for those communities which might need such assistance because of the impact of the development and processing of such resources.

Federal determinations, and administration of projects, should be flexible so as to permit the maximum local capabilities to be realized.

Mr. Chairman, that concludes my formal statement. I would certainly welcome any questions that you might have.

Senator MONTOYA. Thank you very much, Mr. Secretary.

At this point we will insert the summary of the grants and the different categories, including loans which have been made by your agency to the State of New Mexico. It will be made a part of the record at this point.

[The information referred to follows:]

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LISTING BY STATE CONGRESSIONAL DISTRICT & FISCAL YEAR
DISPLAYING OBLIGATIONS FOR EACH EDA PROGRAM
(EXCLUDES GUARANTEES, COLLATERAL PROTECTION, GRANTS TO STATES,
ADVANCES FROM OTHER AGENCIES, TITLE V & RESEARCH)
DOLLAR AMOUNTS ARE IN THOUSANDS OF DOLLARS
DATA AS OF 05-21-76

STATE ABBR	CONG DIST CODE	TOTAL OBLIGATN $000	PROJ CNT	APPROVED PROJECT $000	FY OF OBLG	PUBLIC WORKS ---REGULAR-- OBLIG	CNT	--P.W.I.P.-- OBLIG	CNT	TITLE X OBLIG	CNT	BUS. LOANS OBLIG	CNT	PLANNING GRT OBLIG	CNT	TECH ASST OBLIG	CNT	ECO ADJ ASST OBLIG	CNT
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NM	1	1203	24	1612	67	952	4	0	0	0	0	0	0	44	1	207	19	0	0
NM	1	5105	17	6787	68	5006	13	0	0	0	0	0	0	0	0	99	4	0	0
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******	SUBTOTALS FOR - STATE ABBR = NM																		
		62365	238	86492		49486	90	5240	30	874	5	3948	7	1831	47	987	59	0	0

* Congressional District

** Statewide projects which cross district lines.

Senator MONTOYA. Could you, Mr. Secretary, explain the difference between a title IX development grant and an implementation grant?

Mr. MIZELL. Mr. Chairman, when the Congress and administration gave us the title IX tool to work with communities in trying to solve their problems, because of the flexibility the title had and because in many cases the magnitude of the problem that it was to address, we felt it essential that there also be a development or planning process established to identify those needs so that the strategy could be put together on how to address those needs.

So the development grant is one in which first of all the need is identified and then the strategy is developed on how to address that need.

Then from that would come the application for the implementation grant, with which we put the dollars in to address those problems that have been identified.

Senator MONTOYA. Does the development grant plan have to be completed before you put the implementation money out?

Mr. MIZELL. In most cases it is desirable that we get the planning done first. But we don't necessarily have to wait until a development grant is in place to maybe provide assistance under title I, for example. Maybe a portion of the problem could be addressed immediately and we would try to move forward with that.

Senator MONTOYA. In other words, you have enough flexibility that you can go either route?

Mr. MIZELL. Maybe my response earlier might have been a little misleading. But it is desirable that we get the development grant and that the planning be done first, and then come with the implementation grant. But we are able to respond to maybe a critical need, an emergency need, before we get the complete planning done.

Senator MONTOYA. San Juan County—this is the county where we are now—has a surprising 9.5- to 10-percent unemployment rate today. It is presently an EDA redevelopment area. That means it is eligible for other EDA programs under the law.

Mr. MIZELL. Yes, sir.

Senator MONTOYA. Could you explain how the eligibility would apply and in what categories?

Mr. MIZELL. Yes. In an EDA redevelopment area, as is San Juan County with the unemployment rate that it has, they are eligible to apply for assistance under all of our program areas, which includes title I public works grants. That could be used for an industrial park or water and sewer. These types of needs can be addressed.

We also have the business development program where we have not only the ability to make direct loan to businesses that are unable to get financing elsewhere that will create jobs, but also the guarantee authority that the Congress has given to us now so that we can also participate in guarantee funding—money being made available from the private sector, with the EDA guarantee to go along with it.

We also have the planning money that is available, and there is no doubt San Juan County or the district here has participated in the planning program and has received funding under that program to help them carry on a continual planning and development strategy to address their long-term economic needs in the area.

Senator MONTOYA. I understand that a title IX application is pending before your agency. It was submitted by Governor Apodaca dealing with economic planning for San Juan and McKinley Counties. McKinley is the adjoining county, of which Gallup is the county seat.

Can you give us any inkling of your thinking about the propriety and nearness of granting and approving such an application?

Mr. MIZELL. Mr. Chairman, we don't have an application in hand from the Governor's office. There have been discussions of all that has been going on with Mr. Joe Swanner in the regional office.

We have met with the Governor's representative. I say we; Bill Henkel and some of the personnel in EDA, just this past week, prior to leaving Washington, met with Mr. O'Leary, the Governor's representative. So it has been discussed a great deal.

There was certainly some exchange of thoughts and ideas as to just what an official proposal should contain before it is actually submitted to EDA. That is where we are right now.

We intend to continue to work with the Governor's office and the other interested parties in trying to get together an acceptable development grant that we think will be effective in addressing the energy development problem out in this area.

Senator MONTOYA. How soon do you think you can give this plan your approval, assuming that the application is proper in every respect?

Mr. MIZELL. I can assure the chairman that it will be handled expeditiously because we recognize the magnitude of the problem out here in developing these energy resources.

Mr. Chairman, in naming the program tools of EDA, if I got back to Washington and didn't mention another very valuable tool we have, our technical assistance program which also has the flexibility of being able to make funds available to communities to try to address a number of different problems from feasibility studies to, well, you can just about have any problem that we can address under that, my technical assistance chief wouldn't let me forget it.

Senator MONTOYA. Thank you.

The Interior Department has floated a bill in Congress that would give Department authority in energy-related growth situations to provide Federal funds for needed community facilities through grants to States.

Two questions come to mind. Wouldn't you agree with me that EDA is much more experienced in assisting a community to plan and provide community facilities than the Interior Department?

Mr. MIZELL. Mr. Chairman, I think from EDA's conception its involvement with local communities and working with them to try to address their problems and also to provide the development funds for them, that we are the agency that has the experience in this field to provide all of the different types of assistance a local community might need that, first of all, doesn't have the infrastructure itself to address these problems. Certainly not for the magnitude of the problem that they are going to be confronted with, and the diversity of the problems of the impact communities from energy development.

Senator MONTOYA. Of course, you have your economic development districts in the different areas throughout the country, and you have good liaison with the Governors of the different States and the county commissioners at the local and county level and the mayors at the municipal level, which the Department of Interior has not established as yet.

Then you have your field men, regional and State, in the particular areas that might be concerned with such serious problems.

Of course, I personally don't feel that the Department of Interior is the proper vehicle for unfolding this kind of Federal Government participation in economic development.

Mr. MIZELL. Mr. Chairman, you know, maybe I am a little more modest than I should be in behalf of EDA in response to this question, but Dizzy Dean in baseball used to have a saying when he would talk about the things that he was going to do when he got on the pitcher's mound. People would say, "Dizzy, you are bragging." He would say, "If you can do it, it is not bragging."

And there is no question in my mind, Mr. Chairman, but what with the total assistance and the many facets of assistance that the communities need, EDA has the most experience in this field, and I think that we can provide the assistance and also the implementation of the different needs of those communities better than anyone else.

Senator MONTOYA. This bill I am referring to which would invest in the Department of Interior this authority has been referred to the Senate Committee on Interior and Insular Affairs. We are going to make an effort to try to gain jurisdiction over the bill so we can really give it some new concept and new direction.

Mr. MIZELL. The chairman is well aware of the normal procedure where if an agency is given the primary responsibility for any program area, then of course our role at EDA, as well as other agencies, is to refer to those agencies with the primary responsibility those problem areas or those applications that they might address, at least until we know whether they have the capacity to address them or not.

Senator MONTOYA. You came in yesterday, Mr. Secretary, to this area, and we have a large Indian population here, and what affects any part of this region affects the Indian population also.

I want your views as to whether or not you think it proper that the Indians in this area should participate in any planning. What is your thinking on this?

Mr. MIZELL. Mr. Chairman, as you know, we came out on the same flight with you from Washington the other night. Our purpose for coming a day early was to spend yesterday on the Navajo Reservation.

We went to Window Rick, and we had the privilege, which I think is a little unusual, of being able to attend the council session yesterday as they listened to their council, and also to tour many of the areas of the reservation.

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I might also add we experienced some of the same problem you did last evening as far as trying to get from one point to the other. We finally drove up last evening.

I must say that your weather out here makes it very interesting; not a dull moment—from beautiful sunshine to snow, to a very peaceful day to winds gusting up to 50 miles an hour, and coming over the pass to snow about 6 inches deep, coming down this side and in 10 minutes being in the desert and a dust storm, to arriving here. But it has been a very enjoyable trip to me, as well as a very enlightening one.

Senator MONTOYA. I am sorry that the promises of good weather that I made to you weren't borne out. But, unfortunately, we have had a dry spell, and over in the Rio Grande Valley the Pueblo Indians were dancing for rain and for moisture.

Mr. MIZELL. Chairman, in response to your question, now having been out there—not only having been able to read and to gather as much information as we could on what the possible impact of development of this energy could be—but to be out in the area now, you know, you are even hit more with the magnitude of the problems that could occur and probably will occur with the development of this energy.

I am even more convinced that it is important for all of the impacted areas to work together to try to address the total problem.

The energy is on the Navajo Reservation that we are trying to develop. There has got to be some development that takes place out there. We need to know what that impact will be. We need to try to be out in front of that impact.

Mayor Webb and the city of Farmington—again by some of our past experiences in the last year and a half dealing with some of the impacted communities—we know of the problems he is going to be confronted with, as well as the other communities that are going to be impacted.

We think that it is essential that all of the areas work together to try to develop a total strategy on how to address this problem. I believe it is of great advantage to them; not only for the role that EDA can play and the role that we should play in the areas of implementation grants, but also in identifying what the needs are going to be in the way of health, education, housing, and all of these areas that will have to be addressed as well, if the job is to be done properly.

The other element I think is essential is the input from the State as well. I think this is another ingredient that is important. And if the job is done right, I think the Federal assistance that will be available will be far greater than it would on trying to do it by individual community or by an individual area, Mr. Chairman.

So this is what I would hope to see, and this is the type of cooperation and coordination that I would like to see. I think it would be of great advantage to everyone if this could be done.

Senator MONTOYA. I personally think that we should get a little closer involvement among the State government, the local political subdivisions, and the Indian tribes or reservations.

I think that it is most essential to have an orderly, coordinated economic development mosaic built, through proper planning, of course.

Mr. MIZELL. Mr. Chairman, you summed up in just a minute what it took me 5 minutes to say, and you did it very well.

Senator MONTOYA. I know that EDA has a good record with its Indian program. Could you tell me what you have been doing in the past 12 months, and also what activities do you have going with the Navajo Nation at the present time?

Could you have your man testify to that? Do you have a list of those projects?

If you don't have them, will you submit them for the record?

Mr. MIZELL. I will be glad to submit them, Mr. Chairman. I hesitate to begin to name them because you are bound to miss some.

[The information referred to appears at p. 17.]

Mr. MIZELL. But we are greatly involved with the reservation in trying to address some of the problems, even in assisting some of the planning that they have already been trying to do to address some of the problems they see, as well as considering at the present time —and it is not official as yet—the possibility of establishing a skill center for job training that will be available to train people for the type of jobs that are going to be coming into the area because we think it is very desirable to do so, first of all, because of the unemployment we have in the area. The more of the local unemployed that can be put to work, the better it is. So this is under consideration.

Senator MONTOYA. How would you establish those skill centers; under what program? Under the grant program?

Mr. MIZELL. It would be under the title I program, and it would be a grant approach, Mr. Chairman.

Senator MONTOYA. EDA has done a magnificent job in the State of New Mexico in making grants for the construction of vocational schools in Espanola, in Las Vegas, in Bernalillo, in Albuquerque, and in other areas. I can't recall them right now.

To Santa Fe you made a grant of $1 million; to Espanola, $750,000. In the Espanola school right now we have 1,500 students, including adults attending night classes. This is as a result of the EDA grants for the building of vocational schools there.

I have advocated throughout the years the building of vocational and technical facilities as an appendage to the high schools, and even the junior colleges.

I am really hopeful, Mr. Secretary, that you and your staff will look upon the possibility of making grants and telling your people here to process applications here in the State of New Mexico where we can train some people for the economic development that is unfolding in the tomorrows, so that we will have proper facilities.

Bernalillo has been able to teach skills to many people who are now working in the Albuquerque area, and also even in jewelry—not Indian jewelry, but the other type of jewelry, processing. I think that the future labor markets will utilize all of this skill and enable these people to be productive citizens, productive taxpaying citizens.

Without vocational training or technical training, I am afraid if they don't go to college and further prepare themselves, we are just placing them in a plateau which can be classified as the plateau for deprived Americans.

EDA can play a very catalytic role in trying to bring to these people the kind of opportunity that will enable them to better support their families and insure for themselves a better future.

Mr. MIZELL. Mr. Chairman, I couldn't agree with you more. The record in the vocational and technical schools is tremendous. We think this should be provided early on in the educational process.

When we talk about a skill center, you know, we are talking about a level of unemployment where they don't have the opportunity of the vocational-technical training right now. But yet, it has been demonstrated that they can be brought in and they can be trained to do highly skilled work and labor. So there is a need for this type of a facility as well.

But I completely endorse the need and the thrust for vocational and technical training.

Senator MONTOYA. Thank you, Mr. Secretary, for appearing here this morning. I wish we could ask you more questions, but we have a long list of witnesses.

Mr. MIZELL. Mr. Chairman, I want to congratulate you, as well as the Economic Development Committee, for taking the time and setting up a hearing such as this, because this is essential in this great country of ours if we are going to really have what I know you and I desire to see, Mr. Chairman, and many of the other elected officials in this country, and that is the participation and the input from the local level that gets the greatest results, Mr. Chairman.

So thank you for inviting us. We are delighted to come, and we know that out of these hearings are going to come some real directions on how to address the energy development in this country that is essential for the national development as well, not just this area. Thank you, Mr. Chairman.

Senator MONTOYA. We are going to send you a transcript.

Mr. MIZELL. Thank you, sir. We will be looking for it.

[The information regarding EDA Indian programs requested by Senator Montoya follows:]

EDA INDIAN PROGRAM
INDIAN RESERVATION DATA
FISCAL YEAR 1976

AS OF: March 31, 1976

INDIAN RESERVATIONS/TRUST LANDS DESIGNATED BY EDA	188
Percentage of Indian population on designated reservations against the total population	96%

TOTAL INDIAN POPULATION:

Area	Designated Population	Non-designated Population	Total
FEDERAL RESERVATIONS	391,110	11,556	402,666
STATE RESERVATIONS	8,441	6,144	14,585
STATE OF ALASKA	65,844	--	65,844
STATE OF OKLAHOMA	86,265	2,110	88,375
Grand Totals:	551,660	19,810	571,470

INDIAN INDUSTRIAL PARKS FUNDED BY EDA	42
TOTAL EDA FUNDS TO CONSTRUCT INDUSTRIAL PARKS	$16,666,945
NUMBER OF INDIANS EMPLOYED BY INDUSTRIES LOCATED IN INDIAN INDUSTRIAL PARKS	1,213
INDIAN TOURISM AND RECREATION PROJECTS FUNDED BY EDA	56

10 museum/arts & crafts; 13 motels; 15 campgrounds;

5 marinas; 13 other T/R facilities

TOTAL EDA FUNDS	$59,805,209
EDA INDIAN NEIGHBORHOOD FACILITIES (100%)	98
TOTAL EDA FUNDS (100%)	$26,443,309
EDA (25%) AND HUD (75%) CO-FUNDED INDIAN NEIGHBORHOOD FACILITIES	33
TOTAL EDA FUNDS (25%)	$ 3,793,626

EDA INDIAN PROGRAM
EDA APPROVED PROJECTS ON INDIAN RESERVATIONS
FISCAL YEARS 1966 - 1976

AS OF: March 31, 1976

FISCAL YEAR 1966		
Public Works - Regular Program	$ 1,860,000	
Business Loans	2,208,000	
Technical Assistance	130,935	$ 4,198,935
FISCAL YEAR 1967		
Public Works - Regular Program	12,242,783	
Business Loans	4,742,000	
Planning Grants - Area	98,000	
Technical Assistance	407,512	17,490,295
FISCAL YEAR 1968		
Public Works - Regular Program	12,835,800	
Business Loans	1,117,567	
Planning Grants - Area	462,900	
Planning Grants - District	91,630	
Technical Assistance	230,000	14,737,897
FISCAL YEAR 1969		
Public Works - Regular Program	15,238,235	
Business Loans	583,885	
Planning Grants - Area	753,526	
Planning Grants - District	95,560	
Technical Assistance	707,087	17,378,293
FISCAL YEAR 1970		
Public Works - Regular Program	15,443,371	
Business Loans	2,516,500	
Planning Grants - Area	516,102	
Planning Grants - District	59,081	
Technical Assistance	841,610	19,376,664
FISCAL YEAR 1971		
Public Works - Regular Program	17,759,027	
Business Loans	871,850	
Planning Grants - Area	811,390	
Planning Grants - District	88,163	
Technical Assistance	795,553	20,325,983
FISCAL YEAR 1972		
Public Works - PWIP Program	4,149,225	
Public Works - Regular Program	17,356,547	
Business Loans	24,117	
Planning Grants - Area	771,244	
Planning Grants - District	99,938	
Technical Assistance	1,282,353	23,683,424

EDA INDIAN PROGRAM, APPROVED PROJECTS, FISCAL YEARS 1966 - 1976

As Of: March 31, 1976

FISCAL YEAR 1973		
Public Works - PWIP Program	$ 4,678,500	
Public Works - Regular Program	25,014,175	
Business Loans	1,868,625	
Planning Grants - Area	2,872,018	
Planning Grants - District	99,457	
Technical Assistance	1,470,047	$36,002,822
FISCAL YEAR 1974		
Public Works - PWIP Program	6,710,888	
Public Works - Regular Program	22,480,882	
Planning Grants	1,221,668	
Technical Assistance	1,319,065	31,732,503
FISCAL YEAR 1975		
Public Works - PWIP Program	1,132,700	
Public Works - Regular Program	26,463,573	
Business Loans	37,500	
Planning Grants	3,194,565	
Technical Assistance	1,635,980	32,464,318
FISCAL YEAR 1976		
Public Works - PWIP Program	547,800	
Public Works - Regular Program	9,725,200	
Business Loans	1,557,660	
Planning Grants	3,217,221	
Technical Assistance	974,323	
Title IX	(3,000,000)	
Title X	(6,583,840)	16,022,204 *
		$233,413,338 *
SUMMARY (As of: March 31, 1976)		
Public Works - PWIP Program	17,219,113	
Public Works - Regular Program	176,419,593	
Business Loans	15,527,704	
Planning Grants - Area	13,918,634	
Planning Grants - District	533,829	
Technical Assistance	9,794,465	
Title IX	(6,583,840)	
Title X	(3,000,000)	$233,413,338 *

*Does not include Title IX or Title X funding.

EDA INDIAN PROGRAM
APPROVED PROJECTS LISTING
FISCAL YEAR 1976
AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
ATLANTIC REGIONAL OFFICE (01)					
01-01-01202-01	Maine	Passamaquoddy	Campgrounds	$ 100,000	PW
01-05-15050-02	Maine	Penobscot/Passamaquoddy	Planning grant	37,000	PG
01-06-01369	Massachusetts	Wampanoag	Aquaculture (Scallops)	70,000	TA
01-05-15052-02	New York	St. Regis	Planning grant	35,000	PG
01-05-15053-01	New York	Seneca	Planning grant	37,600	PG
SOUTHEASTERN REGIONAL OFFICE (04)					
04-05-15026-01	Florida	Miccosukee	Planning grant	35,000	PG
04-31-01398	Florida	Miccosukee	Construction of sidewalks	50,000	X
04-31-02016	Florida	Miccosukee	Improvements to water system	185,000	X
04-05-15025-02	Flordia	Seminole	Planning grant	50,000	PG
04-31-01399	Florida	Seminole	Construction of sidewalks	50,000	X
04-05-15028	Mississippi	Choctaw	Planning grant	29,170	PG
04-01-01420	Mississippi	Choctaw	Construct 2 multi-purpose buildings	275,000	PW
04-01-01427	North Carolina	Cherokee	Industrial building	152,800	PW
04-05-15003-07	North Carolina	Cherokee	Planning grant	50,000	PG
04-31-01376	North Carolina	Cherokee	Construction of sidewalks	113,140	X

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
ROCKY MOUNTAIN REGIONAL OFFICE (05)					
05-05-15006-04	Colorado	Southern Ute	Planning grant	$ 43,000	PG
05-05-15051-02	Colorado	Ute Mountain	Planning grant	43,000	PG
05-19-01619	Montana/NDakota/ SDakota	Indian Cattlemen's Association	Economic adjustment program	3,000,000	IX
05-05-15002-07	Montana	Blackfeet	Planning grant	50,000	PG
05-05-15004-06	Montana	Flathead	Planning grant	45,850	PG
05-05-15003-07	Montana	Ft. Peck	Planning grant	45,850	PG
05-06-01618	Montana	Northern Cheyenne	Develop model irrigation farm	2,488	TA
05-31-02018	Montana	Northern Cheyenne	Timber thinning program	350,000	X
05-06-01635	Mt., ND., SD.	Multi-state	Preliminary Agricultural study	4,500	TA
05-06-01651	Mont., SD.	Multi-state	Agricultural survey of 10 reservations	150,000	TA
05-31-02014	Nebraska	Omaha	Development of park and campsites	308,000	X
05-05-15014-04	Nebraska	Inter-Tribal Council	Planning grant	55,000	PG
05-31-02015	Nebraska	Winnebago	Overnight campground & cultural ceremonial facility	300,000	X
05-05-15056-02	North Dakota	Ft. Berthold	Planning grant	52,100	PG
05-05-15054-02	North Dakota	Ft. Totten	Planning grant	32,100	PG
05-01-01623	North Dakota	Ft. Totten	Tribal utilities building	282,000	PW
05-05-15055-02	North Dakota	Standing Rock	Planning grant	45,850	PG
05-05-15051-02	North Dakota	Turtle Mountain	Planning grant	59,000	PG
05-31-02023	North Dakota	Turtle Mountain	Develop recreational area & pow wow site	200,000	X
05-05-15009-06	South Dakota	Cheyenne River	Planning grant	45,850	PG

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
05-05-15019-04	South Dakota	Crow Creek	Planning grant	$ 32,100	PG
05-31-02026	South Dakota	Lower Brule	Development of recreation areas	250,000	X
05-05-15052-02	South Dakota	Lower Brule	Planning grant	35,850	PG
05-05-15007-06	South Dakota	Pine Ridge	Planning grant	60,000	PG
05-31-02025	South Dakota	Pine Ridge	Timber Clearing	252,900	X
05-06-01615	South Dakota	Pine Ridge	Feasibility of 3 mini-market shopping centers	15,000	TA
05-05-15001-05	South Dakota	Rosebud	Planning grant	41,700	PG
05-05-15011-05	South Dakota	Sisseton	Planning grant	29,200	PG
05-31-02024	South Dakota	Sisseton	Multi-purpose buildings (7)	260,000	X
05-05-15015-03	South Dakota	Yankton	Planning grant	43,000	PG
05-05-15053-02	Utah	Uintah & Ouray	Planning grant	35,000	PG
05-31-02029	Utah	Goshute	Community center	348,800	X
05-05-15050-02	Wyoming	Wind River	Planning grant	45,850	PG
05-01-01570	Wyoming	Wind River	Expansion of water system	756,000	PW
05-01-01473-01	Wyoming	Wind River	Community Center	83,000	PW
MIDWESTERN REGIONAL OFFICE (06)					
06-31-02025	Michigan	Hannahville	Land clearing for livestock operation	100,000	X
06-05-15052-02	Minnesota	Chippewa Tribe	Planning grant	175,000	PG
06-31-02045	Minnesota	Fond du Lac	Improvements to recreation area	150,000	X
06-31-02046	Minnesota	Grand Portage	Improvements to campgrounds; hiking, skiing, etc. trails	250,000	X

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
06-31-00597	Minnesota	Leech Lake	Expansion of marina/campgrounds	$ 100,000	X
06-01-01282	Minnesota	Mille Lacs	Campground/roads	365,000	PW
06-31-02047	Minnesota	Nett Lake	Clearing; reopen trails & access roads	200,000	X
06-31-00596	Minnesota	Red Lake	Improve roads & clearing of lake front & recreation area	200,000	X
06-05-15054-02	Minnesota	Red Lake	Planning grant	39,425	PG
06-06-01248	Wisconsin	Bad River	Study to determine the feasibility of establishing a fish hatchery	11,266	TA
06-31-02064	Wisconsin	Bad River	Erosion control; expansion of mobile home park; road improve; fire lane	250,000	X
06-06-01252	Wisconsin	Lac du Flambeau	Study to determine the feasibility of establishing fish rearing ponds	20,000	TA
06-31-00556	Wisconsin	Lac Courte Oreilles	Development of recreation area	100,000	X
06-05-15006-07	Wisconsin	Great Lakes ITC	Planning grant	75,000	PG
06-31-00324	Wisconsin	Menominee	Rebuild sawmill	150,000	X
06-31-02065	Wisconsin	Mole Lake	Sidewalks & improve ceremonial park	100,000	X
06-06-01289	Wisconsin	Oneida	Study to determine feasibility of establishing a printing press	30,000	TA
06-31-02063	Wisconsin	Winnebago	Improve buildings & tribal pow wow grounds	200,000	X
WESTERN REGIONAL OFFICE (07)					
07-05-15031-02	Alaska	Arctic Slope	Planning grant	41,700	PG
07-06-01525-01	Alaska	Aleute League	Hydrological data collection for aquaculture site	5,000	TA
07-05-15037-01	Alaska	Bristol Bay	Planning grant	50,000	PG
07-11-01586-01	Alaska	Hydaburg	Municipal building	83,000	PWIP
07-06-01644	Alaska	Kenai	Wildwood management & industrial development program	100,000	TA

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
07-01-01418-01	Alaska	Ketchikan	Multi-purpose community building	$ 199,200	PW
07-06-01646	Alaska	Kotzebue	Industrial park feasibility study	19,700	TA
07-05-15035-02	Alaska	Mauneluk Association	Planning grant	41,670	PG
07-05-15022-02	Alaska	Metlakatla	Planning grant	40,000	PG
07-01-01581-01	Alaska	Metlakatla	Health complex	47,000	PW
07-05-15038-02	Alaska	Tanana Chiefs	Planning grant	33,400	PG
07-05-15032-02	Alaska	Tlingit-Haida	Planning grant	61,000	PG
07-06-01585	Alaska	Tlingit-Haida	Study to determine feasibility of cold storage & freezer faclty SE Alaska	19,000	TA
07-01-01396-02	Arizona/Calif.	Cocopah	Cultural building	20,000	PW
07-31-00598	Arizona	Ft. Mojave	Farm land clearing	170,000	X
07-01-01699	Arizona	Gila River	Expansion of industrial park	646,000	PW
07-06-01637	Arizona	Gila River	Study to determine feasibility of establishing historical parks	15,000	TA
07-31-02006	Arizona	Havasupai	Range fencing and water tanks	202,000	X
07-05-15020-05	Arizona	IDDA	Planning grant	93,300	PG
07-05-15020-06	Arizona	IDDA	Planning grant	193,031	PG
07-01-01328-01	Arizona	Kaibab	Visitors center	14,000	PW
07-01-01718	Arizona	Kaibab	Community center	263,000	PW
07-31-02008	Arizona	Navajo	Fencing for irrigation project	212,000	X
07-03-01671	Arizona	Papago	Loan to help Empire Machinery Co. expand and build plant	1,557,660	BL
07-01-01700	Arizona	Papago	Improve and expand industrial park	411,000	PW

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
07-31-00279	Arizona	San Carlos	Repair and construct cattle range fencing	$ 269,000	X
07-31-00271	California	Chemehuevi	Trash removal and planting trees	120,000	X
07-01-01713	California	Grindstone Creek	Renovate Community center	93,000	PW
07-05-15018-02	California	Hoopa	Planning grant	29,200	PG
07-11-01443-01	California	Ft. Independence	Campground	50,000	PWIP
07-05-15017-02	California	Inter-Tribal Council	Planning grant	150,000	PG
07-11-01450-01	California	La Jolla	Campground development	50,000	PWIP
07-05-15026-02	California	Owens Valley	Planning grant	43,000	PG
07-01-01703	California	Owens Valley	Site preparation; maintenance building	259,000	PW
07-01-01682	California	Rincon	Community center	316,000	PW
07-01-01687	California	Round Valley	Community center	260,000	PW
07-01-01616-01	California	Tuolumne	Community center	37,000	PW
07-06-01448-01	Idaho	Coeur d'Alene	Resource development program	88,467	TA
07-01-01710	Idaho	Coeur d'Alene	Farm buildings	472,000	PW
07-05-15024-02	Idaho	Nez Perce	Planning grant	17,500	PG
07-05-15025-02	Idaho	Coeur d'Alene	Planning grant	35,000	PG
07-01-01689	Idaho	Kootenai Tribe	Community center	114,000	PW
07-31-00415	Nevada	Duck Valley	Range improvement program	170,000	X
07-01-01606-01	Nevada	Duck Valley	Shelters, campsites & tourist facilities	60,000	PW
07-01-01712	Nevada	Fallon	Multi-purpose bldg., & training center	384,000	PW
07-06-01536	Nevada	Ft. McDermitt	Water resource study	68,000	TA

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
07-05-15003-06	Nevada	Inter-Tribal Council	Planning grant	$ 85,000	PG
07-01-01369-01	Nevada	Moapa	Cattle feed lot operation	20,000	PW
07-31-02038	Nevada	Pyramid Lake	Repair and replace livestock fencing	250,000	X
07-31-02039	Nevada	South Fork	Repair & replace range fencing, water tanks and reservoirs	100,000	X
07-01-01702	Oregon	Burns-Paiute	Tribal administration bldg. & cultural center	218,000	PW
07-05-15028-02	Oregon	Umatilla	Planning grant	35,000	PG
07-06-01681	Oregon	Warm Springs	Shopping center feasibility study	5,000	TA
07-05-15016-02	Oregon	Warm Springs	Planning grant	39,425	PG
07-06-01537	Washington	Colville	Study to determine the feasibility of expanding farming operations	31,600	TA
07-06-01594	Washington	Colville	Study to determine the feasibility of fruit production	21,298	TA
07-05-15029-02	Washington	Colville	Planning grant	35,000	PG
07-11-01470-01	Washington	Colville	Community center	200,000	PWIP
07-05-15027-02	Washington	Lummi	Planning grant	32,100	PG
07-06-01683	Washington	Lummi	Reconstruction of accounting records	5,000	TA
07-31-02050	Washington	Lummi	Renovate bldgs; restore dikes and add fish pens to Lummi sea ponds	325,000	X
07-05-15019-02	Washington	Quileute	Planning grant	35,000	PG
07-05-15030-02	Washington	Quinault	Planning grant	41,700	PG
07-31-02054	Washington	Skokomish	Renovate tribal center	70,000	X
07-06-01480-01	Washington	Skokomish	Management assistance and training for fish processing plant	5,000	TA

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
07-05-15014-02	Washington	Spokane/Kalispel	Joint planning grant	$ 32,100	PG
07-05-15015-02	Washington	STOWW	Planning grant	45,850	PG
07-05-15021-02	Washington	Swinomish	Planning grant	43,000	PG
07-05-15039-01	Washington	Tulalip	Planning grant	32,100	PG
07-11-01496-01	Washington	UIATF	Cultural center	62,000	PWIP
07-05-15034-02	Washington	Yakima	Planning grant	45,850	PG
07-01-01359-01	Washington	Yakima	Water/sewer system	135,000	PW
SOUTHWESTERN REGIONAL OFFICE (08)					
08-11-01579-01	Louisiana	Chitimacha	Crafts workshop building	15,000	PWIP
08-11-01662	Louisiana	Coushatta	Rehabilitate railroad passenger terminal for use as cultural center	24,800	PWIP
08-01-01165-01	New Mexico	All Indian Pueblo Cncl.	Cultural center	360,000	PW
08-05-15025-02	New Mexico	Eight Northern Pueblos	Planning grant	50,000	PG
08-31-00606	New Mexico	Eight Northern Pueblos	Training program in the production of adobe brick	100,000	X
08-06-11165-01	New Mexico	Indian Pueblo Cultural Center, Inc.	Job development program	56,000	TA
08-11-01515-01	New Mexico	Acoma	Commercial complex	25,000	PWIP
08-05-15026-02	New Mexico	Acoma	Planning grant	29,200	PG
08-05-15031-02	New Mexico	Isleta	Planning grant	35,800	PG
08-01-01658	New Mexico	Isleta	Construction of a commercial center	211,200	PW

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
08-05-15027-02	New Mexico	Jicarilla	Planning grant	$ 35,000	PG
08-01-01737	New Mexico	Jicarilla	Improve & expand tourist facilities	295,000	PW
08-05-15032-02	New Mexico	Laguna	Planning grant	35,000	PG
08-05-15004-04	New Mexico	Mescalero	Planning grant	43,000	PG
08-01-00929-01	New Mexico	Mescalero	Dam/lake	376,000	PW
08-01-01087-02	New Mexico	Mescalero	Tourism complex	779,000	PW
08-01-01105-02	New Mexico	Mescalero	Recreational complex	845,000	PW
08-01-01731	New Mexico	Santa Clara	Construction of water system	326,000	PW
08-01-01649	New Mexico	Santo Domingo	Construction of multi-purpose center	303,000	PW
08-05-15029-02	New Mexico	Six Sandoval Pueblos	Planning grant	37,500	PG
08-06-01711	New Mexico	New Mexico Arts Commission	Crafts marketing proposal	2,000	TA
08-05-15010-04	New Mexico	Zuni	Planning grant	21,000	PG
08-11-01615-01	Oklahoma	Comanche	Community center	28,000	PWIP
08-05-15028-02	Oklahoma	Five Civilized Tribes	Planning grant	35,000	PG
08-05-15033-01	Oklahoma	Inter-Tribal Council, Inc.	Planning grant	26,300	PG
08-01-01721	Oklahoma	Tonkawa	Cultural center	258,000	PW
08-05-15030-02	Oklahoma	UITWOK	Planning grant	60,000	PG
08-06-01573-01	Oklahoma	UITWOK	Industrial feasibility analysis	5,000	TA
08-31-00602	Texas	Tigua	Completion of tourism complex	128,000	X

APPROVED PROJECTS LISTING, AS OF: March 31, 1976

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
NATIONAL (99)					
99-06-09512	Alaska	Mauneluk Corp.	Snowmobile garages in villages	$ 7,865	TA
99-06-09510	Arizona	University of Arizona	Conference on the use of guayule in rubber products	4,800	TA
99-06-09520	Arizona	University of Arizona/ BIA	Evaluation of the feasibility of guayule	1,950	TA
99-06-19511	Arizona	San Carlos	Water resource study	2,500	TA
99-06-09523	Montana, NDakota SDakota	National American Indian Cattlemen's Association	Indian cattle resource development pgm.	50,000	TA
99-06-19414-01	Utah	Uintah & Ouray	Environmental impact assessment	7,889	TA
99-06-09500	Washington, DC	Americans for Indian Opportunity	Training program for Indian leaders in the development of natural resources on Indian reservations	75,000	TA
99-05-15051-02	Washington, DC	CENA	Planning grant	75,000	PG
99-05-09527	Washington, DC	United Indian Planners Association	Professional organization for planners	75,000	TA
				$16,022,204*	

*Does not include Title IX or Title X funding.

Project Symbols:
- BL - Business Loan
- PG - Planning Grant
- PW - Public Works (regular)
- PWIP - Public Works Impact Program
- TA - Technical Assistance
- IX - Title IX
- X - Title X

EDA INDIAN PROGRAM
APPROVED PROJECTS LISTING
FISCAL YEAR 1975
AS OF: June 30, 1975

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
ATLANTIC REGIONAL OFFICE (01)					
01-05-15050-1	Maine	Penobscot/Passamaquoddy	Planning Grant	$ 37,000	PG
01-06-01306	Maine	Penobscot	Furniture Plant Study	7,500	TA
01-05-15052-1	New York	St. Regis	Planning Grant	23,500	PG
01-01-01321	New York	St. Regis	Community Building	300,000	PW
01-01-01316	New York	Seneca	Campgrounds	450,000	PW
01-05-15053	New York	Seneca	Planning Grant	17,000	PG
SOUTHEASTERN REGIONAL OFFICE (04)					
04-01-01266	Florida	Miccosukee	Imp. to Community Building	31,318	PW
04-01-01312	Florida	Miccosukee	Library Addition	152,000	PW
04-06-01314	Florida	Miccosukee	Mapping Project	2,500	TA
04-01-01265	Florida	Seminole	Aquaculture (Brighton)	101,000	PW
04-06-01083-2	Florida	Seminole	Aquaculture Study (catfish farming)	50,311	TA
04-01-01310	Florida	Seminole	Library (Big Cypress)	51,000	PW
04-05-15025-1	Florida	Seminole	Planning Grant	25,000	PG

APPROVED PROJECTS CONTINUED, AS OF: June 30, 1975

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Southeastern Regional Office cont.					
04-01-01309	Florida	Seminole	Swimming Pool (Brighton)	$ 51,000	PW
04-01-01315	North Carolina	Cherokee	Community Bldg. (Snowbird)	137,500	PW
04-05-15003-6	North Carolina	Cherokee	Planning Grant	50,000	PG
04-01-01183-1	North Carolina	Cherokee	Museum/Cultural Center	210,000	PW
04-06-01202	North Carolina	Cherokee	Ski Market & Financial Feasibility Study	22,460	TA
ROCKY MOUNTAIN REGIONAL OFFICE (05)					
05-01-01490	Colorado	Southern Ute	Renovate 2 Tribal Bldgs.	500,000	PW
05-01-01490-1	Colorado	Southern Ute	Renovate 2 Tribal Bldgs.	50,000	PW
05-05-15006-3	Colorado	Southern Ute	Planning Grant	29,000	PG
05-06-01531	Colorado	Southern Ute	Tourism/Recreation Study	25,000	TA
05-05-15051-1	Colorado	Ute Mountain	Planning Grant	36,000	PG
05-05-15058-1	Montana	Bear Paw Develop. Corp.	Planning Grant	20,900	PG
05-06-01520	Montana	Blackfeet	Beef Plant Study	7,500	TA
05-06-01520-21	Montana	Blackfeet	Beef Plant Study	10,000	TA
05-05-15002-6	Montana	Blackfeet	Planning Grant	50,000	PG
05-01-01547	Montana	Crow	Improve. to Sun Lodge	45,000	PW

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Rocky Mountan Regional Office cont.					
05-05-15004-5	Montana	Flathead	Planning Grant	$ 46,000	PG
05-01-01571	Montana	Flathead	Tribal Center (Pablo)	555,000	PW
05-05-15003-6	Montana	Fort Peck	Planning Grant	46,000	PG
05-01-01535	Montana	Fort Peck	Renovate Industrial Bldg.	224,000	PW
05-01-01577	Montana	Fort Peck	Railroad Spur	322,000	PW
05-01-01561	Montana	Rocky Boy's	Farming Enterprise	506,000	PW
05-06-01548	Montana	Northern Cheyenne	Coal Study	2,500	TA
05-01-01559	Montana	Northern Cheyenne	Tribal Center	550,000	PW
05-05-15014-3	Nebraska	Inter-Tribal Council	Planning Grant	50,000	PG
05-01-01557	Nebraska	Omaha	Community Center	576,000	PW
05-01-01527	North Dakota	Fort Berthold	Improv. to Community Center	540,000	PW
05-01-01456-1	North Dakota	Fort Berthold	Roping Arena	47,000	PW
05-05-15056-1	North Dakota	Fort Berthold	Planning Grant	29,500	PG
05-01-01455-1	North Dakota	Fort Berthold	Utilities Building	18,000	PW
05-05-15054-1	North Dakota	Fort Totten	Planning Grant	37,000	PG
05-06-09452-4	North Dakota	N.D. State University	Center for Economic Development	56,256	TA
05-05-15055-1	North Dakota	Standing Rock	Planning Grant	50,000	PG
05-01-01554	North Dakota	Standing Rock	Warehouse	332,000	PW

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Rocky Mountain Regional Office cont.					
05-01-01460-1	North Dakota	Standing Rock	Youth Facility	$ 118,000	PW
05-05-15057-1	North Dakota	Turtle Mountain	Planning Grant	60,000	PG
05-01-01523	North Dakota	Turtle Mountain	Renovate Warehouse	100,000	PW
05-01-01523-1	North Dakota	Turtle Mountain	Renovate Warehouse	20,000	PW
05-01-01526	North Dakota	Turlte Mountain	Water & Sewer Improvements	709,000	PW
05-06-01563	North Dakota	United Tribes of N.D.	Lignite Manpower Study	104,833	TA
05-11-01517	South Dakota	Cheyenne River	Water Supply System	84,000	PWIP
05-05-15009-5	South Dakota	Cheyenne River	Planning Grant	50,000	PG
05-06-01566	South Dakota	Crow Creek	Irrigation Study	7,500	TA
05-05-15019-3	South Dakota	Crow Creek	Planning Grant	23,500	PG
05-05-15052-1	South Dakota	Lower Brule	Planning Grant	36,000	PG
05-06-01515	South Dakota	Crow Creek	Tourism/Recreation Study	16,780	TA
05-01-01524	South Dakota	Crow Creek	Winterize Tourism/Recreation Complex	50,000	PW
05-01-01538	South Dakota	Pine Ridge	Community Improvements	500,000	PW
05-05-15007-5	South Dakota	Pine Ridge	Planning Grant	60,000	PG
05-01-01543	South Dakota	Rosebud	Irrigation System for Tribal Farm	135,000	PW
05-06-01564	South Dakota	Rosebud	Mini-Shopping Center Study (Winnebago & Rosebud)	20,000	TA

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Rocky Mountain Regional Office cont.					
05-05-15001-4	South Dakota	Rosebud	Planning Grant	$ 37,500	PG
05-05-15011-4	South Dakota	Sisseton	Planning Grant	29,500	PG
05-01-01462-1	South Dakota	Yankton	Community Building	66,000	PW
05-06-01529	South Dakota	Yankton	Meat Processing Study	31,865	TA
05-05-15015-2	South Dakota	Yankton	Planning Grant	36,000	PG
05-05-15053-1	Utah	Uintah & Ouray	Planning Grant	17,500	PG
05-05-15050-1	Wyoming	Wind River	Planning Grant	25,000	PG
MIDWESTERN REGIONAL OFFICE (06)					
06-01-01241	Michigan	Bay Mills	Fish Processing Plant	393,000	PW
06-01-01247	Michigan	Hannahville	Swine Farm	127,000	PW
06-05-15053-1	Michigan	Inter-Tribal Council	Planning Grant	41,500	PG
06-01-01246	Michigan	Isabella	Campgrounds	314,000	PW
06-01-01242	Michigan	Keweenaw Bay	Campgrounds	427,000	PW
06-06-01146	Minnesota	Grand Portage	Harbor Study	7,000	TA
06-13-01238	Minnesota	Grand Portage	Working Capital Loan (Motel)	37,500	BL
06-01-01088-1	Minnesota	Grand Portage	Motel Overrun	376,000	PW
06-01-01244	Minnesota	Minnesota Chippewa Tribe	Cattle Farm (White Earth)	359,000	PW
06-05-15052-1	Minnesota	Minnesota Chippewa Tribe	Planning Grant	146,000	PG

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Midwestern Regional Office cont.					
06-01-01170-1	Minnesota	Nett Lake	Sawmill	$ 24,000	PW
06-05-15054-1	Minnesota	Red Lake	Planning Grant	32,700	PG
06-05-15006-6	Wisconsin	Great Lakes Inter-Tribal Council	Planning Grant	100,000	PG
06-01-01166	Wisconsin	Lac du Flambeau	Scenic Park	189,000	PW
06-01-01245	Wisconsin	Oneida	Multi-Purpose Building	251,000	PW
06-01-01184	Wisconsin	Potawatomi	Logging Operation	468,000	PW
WESTERN REGIONAL OFFICE (07)					
07-06-01525	Alaska	Aleut League	Aquaculture/Hydrologic Study	25,500	TA
07-01-01626	Alaska	Angoon	General Purpose Dock	600,000	PW
07-06-01520	Alaska	Anchorage OIC	Project Hire	76,543	TA
07-06-01477-1	Alaska	Athna Tanah Ninnah Cooper River Native Association	Investment Study	45,968	TA
07-05-15031-1	Alaska	Arctic Slope	Planning Grant	29,500	PG
07-01-01571	Alaska	Bethel	Improvement to Cooperative Barge (Kuskokwim Fishermen, Inc.)	277,000	PW
07-01-01384-1	Alaska	Hydaburg	Dock	72,300	PW
07-11-01586	Alaska	Hydaburg	Municipal Building	278,000	PWIP
07-11-01567	Alaska	Kotzebue	Streets	200,000	PWIP
07-05-15035-1	Alaska	Mauncluk Association	Planning Grant	42,000	PG

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Western Regional Office cont.					
07-01-01581	Alaska	Metlakatla	Health Clinic	$ 319,000	PW
07-06-01584	Alaska	Metlakatla	Tourism/Recreation Study	2,500	TA
07-05-15022-1	Alaska	Metlakatla	Planning Grant	27,000	PG
07-05-15038-1	Alaska	Tanana Chiefs	Planning Grant	40,000	PG
07-05-15032-1	Alaska	Tlingit/Haida	Planning Grant	56,000	PG
07-01-01605	Alaska	Unalaska	Enlarge Water System	800,000	PW
07-01-01396-1	Arizona	Cocopah	Community Building	30,000	PW
07-06-01555	Arizona	Ft. Apache	Shopping Center Study	2,500	TA
07-01-01011-3	Arizona	Gila River	Industrial Park	1,355	PW
07-01-01610	Arizona	Hopi	Village Restoration	504,000	PW
07-05-15020-4	Arizona	IDDA	Planning Grant	280,000	PG
07-06-01424	Arizona	Kaibab	Hydrology Study	30,000	TA
07-01-01607	Arizona, New Mexico & Utah	Navajo	Community Center (Canoncito)	188,000	PW
07-01-01591	Arizona, New Mexico & Utah	Navajo	Farming Operation	835,000	PW
07-01-01591-1	Arizona, New Mexico & Utah	Navajo	Administrative Headquarters	98,000	PW
07-01-01353-1	Arizona, New Mexico & Utah	Navajo	Machine Plant/Equipment	1,885,000	PW
07-06-01526	Arizona, New Mexico & Utah	Navajo	Skill Center Study	30,000	TA
07-05-15013-3	Arizona, New Mexico & Utah	Navajo	Planning Grant	125,000	PG

APPROVED PROJECTS CONTINUED, AS OF: June 30, 1975

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
07-05-15013-4	Arizona, New Mexico & Utah	Navajo	Planning Grant	$ 150,000	PG
07-01-01405-1	Arizona, New Mexico & Utah	Navajo	Wool-Mohair Processing Plant	703,000	PW
07-01-01572	Arizona	Quechan	Greenhouse Operation	350,000	PW
07-01-01570	Arizona	Yavapai	Commercial Park	225,000	PW
07-01-01319-1	Arizona	Papago	Livestock Complex	59,000	PW
07-01-01319-2	Arizona	Papago	Livestock Complex	139,000	PW
07-01-01609	Arizona	Papago	Tribal Center	664,000	PW
07-11-01285-1	Arizona	Salt River	Recreation Center	60,000	PWIP
07-06-01643	Arizona	White Mountain	Noise Abatement Control Study	2,500	TA
07-06-01538	California	Hoopa	Management Assistance	20,000	TA
07-01-01342-1	California	Hoopa	Shopping Center	235,000	PW
07-01-01343-1	California	Hoopa	Water/Sewer System	56,000	PW
07-05-15018-1	California	Hoopa	Planning Grant	29,500	PG
07-05-15017-1	California	Inter-Tribal Council	Planning Grant	104,500	PG
07-05-15026-1	California	Owens Valley	Planning Grant	29,500	PG
07-05-15026-21	California	Owens Valley	Planning Grant	1,400	PG
07-02-01356-1	California	Owens Valley	Community Building (Bishop)	94,500	PW
07-11-01469-1	California	Tule River	Renovation of Tribal Store	4,700	PWIP

ROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
estern Regional Office cont.					
7-05-15030-1	Washington	Quinault	Planning Grant	$ 42,000	PG
7-06-01554	Washington	Skokomish	Fishing Development Study	2,500	TA
7-05-15014-1	Washington	Spokane/Kalispel	Planning Grant	46,000	PG
7-06-01521	Washington	Squaxin Island	Aquaculture Program	35,385	TA
7-06-01521-21	Washington	Squaxin Island	Aquaculture Study	5,000	TA
7-05-15015-1	Washington	STOWW	Planning Grant	46,000	PG
7-01-00731-1	Washington	Swinomish	Industrial Park	313,000	PW
7-05-15021-1	Washington	Swinomish	Planning Grant	32,500	PG
7-06-01482-1	Washington	Swinomish	Management Assistance for Fish Processing Plant	5,000	TA
7-05-15039	Washington	Tulalip	Planning Grant	18,000	PG
7-06-01640	Washington	Tulalip	Soils Spoils Disposal Study	2,430	TA
7-05-15034-1	Washington	Yakima	Planning Grant	42,000	PG
OUTHWESTERN REGIONAL OFFICE (08)					
8-11-01579	Louisiana	Chitimacha	Craft Workshop	50,000	PWIP
8-06-10165	New Mexico	All Indian Pueblo Council	Management Assistance	50,000	TA
8-05-15025-1	New Mexico	Eight Northern Pueblos	Planning Grant	42,000	PG

APPROVED PROJECTS CONTINUED, AS OF: June 30, 1975

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
Southwestern Regional Office cont.					
08-05-15029-1	New Mexico	Six Sandoval Pueblos	Planning Grant	$ 42,000	PG
08-05-15026-1	New Mexico	Acoma	Planning Grant	29,500	PG
08-01-01633	New Mexico	Cochiti	Community Center	352,000	PW
08-01-01657	New Mexico	Isleta	Arts/Crafts Building	158,000	PW
08-05-15031-1	New Mexico	Isleta	Planning Grant	32,500	PG
08-01-01652	New Mexico	Jemez	Community Center	152,000	PW
08-05-15027-1	New Mexico	Jicarilla	Planning Grant	29,500	PG
08-06-10930	New Mexico	Jicarilla	Management Assistance (Stone Lake)	32,000	TA
08-05-15032-1	New Mexico	Laguna	Planning Grant	35,000	PG
08-05-15004-3	New Mexico	Mescalero	Planning Grant	36,215	PG
08-01-01627	New Mexico	Nambe	Addition to Community Center	150,000	PW
8-01-01631	New Mexico	Picuris	Campgrounds	51,000	PW
8-01-01632	New Mexico	Pojoaque	Addition to Community Center	92,000	PW
8-01-01651	New Mexico	San Felipe	Community Center	165,000	PW
8-01-01626	New Mexico	San Juan	Addition to Community Center	153,000	PW
8-11-01497-1	New Mexico	San Juan	Community Building	30,000	PWIP
8-01-01650	New Mexico	Santa Ana	Community Building	172,000	PW
8-01-01624	New Mexico	Tesuque	Community Center	102,000	PW

?ROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
;outhwestern Regional Office cont.					
)8-01-01648	New Mexico	Zuni	Campgrounds	$ 187,000	PW
)8-05-15010-4	New Mexico	Zuni	Planning Grant	50,000	PG
)8-01-01384-1	Oklahoma	Cherokee	Industrial Park	196,200	PW
)8-01-01596	Oklahoma	Cheyenne/Arapaho	Museum Restoration	297,000	PW
)8-01-01512-1	Oklahoma	Cheyenne/Arapaho	Recreation Vehicle Park	150,000	PW
)8-01-01643	Oklahoma	Chickasaw	Multi-Purpose Building	515,000	PW
)8-11-01615	Oklahoma	Comanche	Community Building	158,000	PWIP
)8-05-15028-1	Oklahoma	Five Civilized Tribes Foundation	Planning Grant	29,500	PG
)8-05-15033	Oklahoma	Inter-Tribal Council	Planning Grant	20,000	PG
)8-01-01654	Oklahoma	Potawatomi	Community Center	305,000	PW
)8-01-01510-1	Oklahoma	Quapaw	Industrial Park	60,000	PW
)8-01-01655	Oklahoma	Sac & Fox	Recreation Vehicle Park	394,000	PW
)8-01-01636	Oklahoma	Seminole	Site Development for Mekusukey Mission	350,000	PW
)8-06-01665	Oklahoma	United Indian Tribes of Western Oklahoma & Kansas	Job Development Study	75,000	TA
)8-05-15030-1	Oklahoma	United Indian Tribes of Western Oklahoma & Kansas	Planning Grant	50,000	PG
)8-01-01597	Oklahoma	Wichita, Caddo, and Delaware Enterprises	Water Storage Facility	165,000	PW
)8-01-01634	Texas	Tigua	Arts/Crafts Center & Stagecoach Renovation	140,000	PW

PROJECT NO.	STATE	RESERVATION	DESCRIPTION	EDA FUNDS	TYPE
NATIONAL PROJECTS (99)					
99-06-09391	Colorado	American Indian Travel Commission	Tourism/Recreation Assist.	$ 266,425	TA
99-06-09321-2	Colorado	American Indian Travel Commission	National Indian Tourism Development	37,215	TA
99-06-09321-3	Colorado	American Indian Travel Commission	National Indian Tourism Development	16,036	TA
99-06-09396	Montana	Blackfeet	Technical Assistance to Blackfeet Writing Co.	4,700	TA
99-06-09412	New Mexico	American Indian Management Institute	Management Training	125,000	TA
99-06-09323-1	Washington, D.C.	American Indian National Bank	Management Assistance	89,000	TA
99-05-15051-1	Washington, D.C.	Coalition of Eastern Native Americans	Planning Grant	37,500	PG
99-05-15051-21	Washington, D.C.	Coalition of Eastern Native Americans	Planning Grant	18,750	PG
99-06-09418	Washington, D.C.	National Folklife Festival	Folklife Festival	2,480	TA
99-06-09406	National	American Indian Arts & Crafts Promotion	Arts & Crafts Show	7,000	TA
99-06-19414	Utah	Uintah & Ouray	Environmental Impact Study	26,228	TA
				$32,459,318	

Senator MONTOYA. Our next witness will be Mr. Stanley Womer, Federal Cochairman of the Four Corners Regional Commission. Mr. Larson is the Executive Director. I want to welcome all of you gentlemen before this committee.

Before you proceed, Mr. Chairman, I want to commend your people here. Mr. Arch Penrod is one of the best property getters in the country, and the excess property program has been most successful. He has enabled many of our vocational schools to receive equipment without cost.

I also want to commend Keith Datson who was in State government before. He has done a fine job in the Four Corners Commission.

I want to welcome all of you.

STATEMENT OF STANLEY WOMER, FEDERAL COCHAIRMAN, FOUR CORNERS REGIONAL COMMISSION, ACCOMPANIED BY CARL LARSON, EXECUTIVE DIRECTOR; ARCH PENROD; AND KEITH DATSON

Mr. WOMER. Mr. Chairman, I do appreciate your kind words, and I do agree with you. Keith has done a marvelous job since joining the Commission staff, particularly as a monitor and advisor in the areas of energy.

You are correct; Arch Penrod has developed a reputation as being the best excess property officer of the seven title V commissions.

It is a privilege to be here.

Senator MONTOYA. You may proceed, Mr. Womer. You have a statement here. Would you care to submit it for the record and then proceed to summarize it?

Mr. WOMER. I would be very happy to submit it for the record.

Senator MONTOYA. It will be made a part of the record. (See p. 81.) Mr. Womer, you may proceed to summarize it and tell us of your problem here in the Four Corners area, and also what you think we might be able to do by way of legislation or by way of congressional direction towards a better program.

Mr. WOMER. First I would like to touch on some of the work that is done here in the San Juan Basin on projects in the area of energy development.

In 1974, the Commission funded a project for the State of New Mexico to establish the first planning office in energy for the State. More recently, joining the Old West Commission, we have participated with them in the creation of the Western Governors' Regional Energy Policy Office, with a board of directors composed of governors of the ten mountain states. The office was set up to formulate and adopt regional approaches for coal strip mining, oil shale exploration, and environmental preservation.

Specifically here in New Mexico we established in 1973 the fund for the State Science and Energy Advisor. That was followed the following year with funds for the energy coordination study which developed position papers, some 18 of them, for the benefit of the legislature and the Governor's office to develop policy alternatives in the development of each State's major energy resources.

Based upon this work, stretching over the last 3 years, the State has now developed the action task force for energy development here in the Basin for Northwest New Mexico.

This is an ad hoc organization composed of key State officials, local officials, working together to develop a strategy to meet the socioeconomic impact that will likely fall upon the communities here in the San Juan Basin, primarily as a result of the coal and coal gasification developments.

Senator MONTOYA. When do you expect this grant to be made?

Mr. WOMER. The action task force, We do not as yet have an application for funds for the action task force.

Senator MONTOYA. You say here it is probable a grant will be made to assist the task force. Is it your anticipation that a grant will be made?

Mr. WOMER. I anticipate that we will receive an application. I can't anticipate the time because we have to depend upon others to file the application.

Senator MONTOYA. All right. Proceed.

Mr. WOMER. Of course, that is the Governor's business and not mine.

Senator MONTOYA. I am sure if he knows of your friendly attitude, that he will file an application.

Mr. WOMER. I think so, too, sir.

Some of the things we have done in the Four Corners, for instance, since 1973, we funded the Navajo manpower training study. This was to determine the training needs and the curricula requirements for the Navajo irrigation projects; what kind of skills would be required for the employees on the irrigation project as well as the electrical generating plants of APS and New Mexico public service companies.

Then a year later, in 1974, we granted $152,000 to help train welders and pipefitters for the power plants and for the irrigation project. This was in conjunction with CETA, the tribe, industry, and the labor unions.

A year later we granted $26,000—and I think this is extremely important—for a planning study for the tribal economic development officials to develop a demographic model which would provide the labor force estimates as well as the descriptions of the occupational skills that will be needed not only in the irrigation project and the coal gasification plants but all of the other areas in which the Navajo people can be employed. That, of course, covers the entire reservation, not only the San Juan Basin area.

The tribal officials have indicated that this particular project is extremely important to them. They have put first priority on it. They urge completion of this project before the consideration of any specific site selection for energy development. They want to know how many Navajos can be employed, where, and what can be done in preparation for this employment.

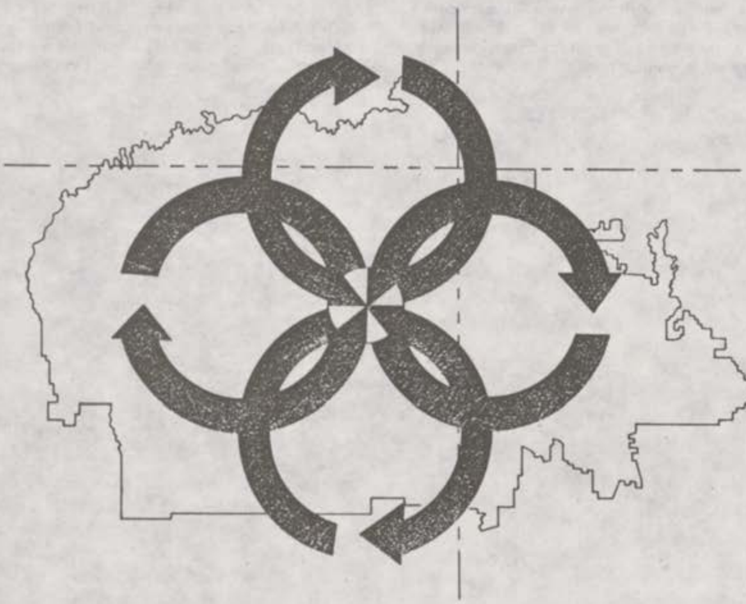
Senator MONTOYA. As a result of the study which you funded in 1974, do you have any report on that study indicating what the skill needs or what labor force might be needed in the immediate future?

Mr. WOMER. That study is not yet completed.
Senator MONTOYA. You haven't completed that study?
Mr. WOMER. No.
Senator MONTOYA. When do you expect to complete it?
Mr. WOMER. This is being done under the supervision of Eric Natvig at Window Rock, with technical assistance he receives from the University of Utah.
Senator MONTOYA. Can you give me a date on that?
Mr. LARSON. Within the next 60 days the first phase will be completed.
Senator MONTOYA. Will you send me a copy of that?
Mr. LARSON. Yes, sir.
[The study referred to was received and is retained in the committee's files. The following has been excerpted from that study:]

THE NAVAJO ECONOMIC - DEMOGRAPHIC MODEL:

NED

A Method for Forecasting and Evaluating Alternative Navajo Economic Futures



A Technical Description of the Model

71-333 O - 76 - 4

PREFACE

In April 1975, the Four Corners Regional Commission extended a grant to the Navajo Tribe, through its Office of Program Development, to develop an increased planning and decision-making capability by producing the capacity of projecting the consequences of alternative Navajo economic futures. With this grant, the Tribe retained the Division of Technical Services of the Utah Office of the State Planning Coordinator who developed, in the form of the Navajo Economic-Demographic (NED) Model, a method of forecasting and evaluating the employment and population effects of those alternative futures. Some data and technical assistance were secured from the University of New Mexico Bureau of Business Research and the Arizona Office of Economic Planning and Development. Tribal staff work was supported by a planning grant from the Economic Development Administration.

This report has been prepared to document the development of the Navajo Economic-Demographic Model and to provide for Navajo planners and analysts a technical description of the NED Model. This technical description should enhance the understanding of the ways in which elements of the Navajo population and economy interact.

The report is the first in a series designed to be Navajo planning reference guides. A companion volume, published simultaneously, is a computer programmer's guide for those employing the model to test alternative futures. Other volumes, currently under preparation, will follow: (1) an employment base analysis of the Navajo economy; (2) the Navajo alternative economic futures—forecasts and evaluations; and (3) a computer produced data dictionary of the economic and demographic inputs and outputs.

ACKNOWLEDGEMENTS

Several persons participated in the initial conceptualization and development of the Navajo Economic-Demographic Model. It is therefore appropriate to recognize their contributions. James Chalmers, of Arizona State University, first suggested the notion of a Navajo impact model along the lines of those currently in operation in the region. Craig Bigler, then Utah Associate State Planning Coordinator, provided the impetus for the Navajo Tribe's selecting Utah staff as the consultants to develop impact and planning coordination tools for Navajo. Of course, the Navajo Tribe owes a considerable debt to Stanley Womer and Carl Larson of the Four Corners Regional Commission, who financially supported the project and who have included Navajo as an equal participant in discussions of regional socio-economic impacts and planning. Funds were also provided by the Seattle Regional Office of the Economic Development Administration.

David Redhorse, Director of Planning for the Navajo Tribe, provided assistance in conceptualizing the model. Robert Murphy, the Tribe's Chief of Physical Planning, provided significant criticisms which refined early versions of the model. Ronald Faich, of the Tribe's Research and Statistics Center, assisted with the organization and collection of demographic data. Special note should be made of the research assistance of Stella Saunders, Lee Bitsui, and Elvira Burnside in developing much of the economic and demographic base data. Henry Tso produced the maps appearing in this report. Francis Chischilly prepared the cover design of this volume and its companion volumes.

Martin Wistisen and Annette Larson of Brigham Young University's Center for Business and Economic Research offered the benefits of their considerable knowledge about regional and Navajo data and relationships. Larry Adcock of the University of New Mexico's Bureau of Business Research provided basic demographic data. Special acknowledgement is due Charles Lehman, Manpower Economist for the State of New Mexico who provided extremely useful notions and helpful suggestions. Robert Beeman of the Arizona Office of Economic Planning and Development provided information and technical assistance from Arizona.

The utilization of the NED Model as a tool for comprehensive planning and improved project decision-making has only just begun. The ideas and suggestions of Peter Deswood, Emmett Francis, and John Brown, all of the Navajo Office of Program Development, to whom much of the task of integrating NED into the planning process falls, have been most helpful in this regard.

Bruce H. Stowell, Dwight E. Ellingwood and Robert L. Catlin of the Office of the Utah State Planning Coordinator deserve special recognition for their role in NED's development and implementation. Dr. Stowell participated extensively in the model design and is responsible for the development of the NED computer program and related software. Mr. Ellingwood also participated in model design and has directed data acquisition and model calibration activities. Mr. Catlin has been extensively engaged in these latter activities. Extensions, improvements, and refinements of the Model will surely involve more and more people in the project in the future.

CHAPTER I. INTRODUCTION

A. Introduction

The Navajo Economic and Demographic (NED) Model is a computerized system which projects the economic and demographic impacts of major developments on or near the Navajo Reservation. The Model makes these projections based upon the dynamic relationships that cause changes in Navajo population and employment. Its purpose is to aid Navajo planning and decision-making by providing the Navajo Nation with information about possible alternative Navajo futures. The futures are comprised of combinations of potential major economic events which may occur over the next 15 years. The Model has been designed to be interactive. In other words, Navajo planners and decision-makers can constantly update information and test impacts of combinations of new events, now unforeseen. NED thus provides a routine, low cost ability to change the assumptions and parameters upon which those impacts are calculated and to analyze the resultant potential impacts.

As it has been designed, the Navajo Economic and Demographic Model is not a decision-making or optimizing model in the sense that it *does not* attempt to maximize a given objective function subject to given constraints. Its results *do not* say what should be done in a particular choice situation, *nor does it* presume to usurp the powers and responsibilities of the Navajo people or their representatives in the area of policy formulation and decision making.

1. Planning and Decision Making

Decision making involves choosing among alternative courses of action within the context of physical, institutional, legal, financial, and ideological constraints. Each course of action, whether in response to events which may be outside the decision makers' control or whether for the purpose of initiating or promoting an event or development, will tend to have multiple consequences. These consequences, in addition to the consequences of the event itself, can be economic, demographic, social, political, and/or environmental in nature and will generally involve the realization of multiple benefits and the imposition of multiple costs. Evaluation of the relative merits of each alternative course of action and the choice among these alternatives will reflect the value judgments embodied in the goals and objectives and the specific policies established by the decision making body and will require value judgments in comparing noncommensurate costs and benefits. In this context, the function of NED is to provide information relating to the economic and demographic consequences of potential economic events and alternative policies and decisions. It is intended that this information be useful in the activities of planning, decision making, and policy implementation, particularly as these relate to the use and development of Navajo resources. However, the enormous tasks of establishing goals and objectives, specifying policies, evaluating the desirability or undesirability of these consequences, and deciding upon specific courses of action properly remain with the Navajo people and are not, and should not be, delegated to an automatic, impersonal device. It is hoped that the information generated by NED will enable Tribal leaders to make more informed evaluations and better decisions and thus allow the Navajo people to more fully participate in the benefits of the use and development of their resources.

2. How It Will Be Used

As a decision making tool in a project-specific context, the Model will help decision makers (the Tribal Council) to know the consequences of alternative courses of action in a decision whether or not to approve a project. The importance of this information is clearly shown by the magnitude of the anticipated (in 1976) impacts of the Navajo Indian Irrigation Project and proposed coal gasification plants upon the lives of the Navajo people. In order to decide whether or not to approve proposed developments, the Tribe must clearly understand the full extent of their potential impacts upon employment and population to be able to project more accurately the social, cultural, and environmental impacts upon those who will be affected.

In a comprehensive planning context, the Model will show in economic and demographic terms, alternative Navajo futures. By eliciting a consensus from Navajo leaders of the more desired futures, planners will obtain a knowledge of implicit Navajo goals and objectives. In terms of realities, such as economic and environmental trade-offs, they will achieve an increased knowledge of what is possible and what is not. This will set the stage for the preparation of a detailed comprehensive plan which would present and analyze program and project-specific alternatives and the desirability trade-offs entailed. This then would provide the Navajo with a guide to their future, and a technical vehicle whereby coordinated planning can be integrated into programs and projects responsive to the needs of the Navajo people.

In this program planning context, the ability to predict cumulative employment and population impacts and the changing spatial pattern in which they take place will allow Tribal planners to better plan for the future. Manpower and economic planners will, as a result, obtain information that will allow them to test training and import substitution policies and time-phase developments to optimize Navajo participation. Similarly, social and health planners, with a better understanding of shifting demographic patterns, ought to be able to more efficiently develop new programs and delivery systems, while physical planners would gain a better knowledge of Navajo infrastructure needs.

One of the major benefits expected from the development of the NED Model is the use of a common planning data and projection base by the various agencies which plan for and provide governmental service to the Navajo people. Historically, the absence of such a coordinated information base has been a major impediment to effective, rational planning and decision making. To date, the Model has a vehicle for the bringing together of various functional planning groups. A number of meetings and presentations have taken place to integrate the NED Model into a process for comprehensive planning and planning coordination.

The remainder of this report is organized as follows. Section B of this chapter further discusses why the NED Model was developed. Chapter II discusses in general terms what the Model does and how it does it and makes recommendations for future refinements, extensions, and improvements of the Model. Chapter III presents a detailed technical description of the Model. It is organized into Sections describing the data elements and mathematical relationships of the Model's various submodels. In the Appendices are presented a data dictionary, a summary of the Model's mathematics and a description of the Alternative Futures.

B. Why the Model Was Developed

1. Response to Energy Impacts

The Navajo Nation has many characteristics which make it comparable to a developing nation. The Navajo are a traditional society being forced for economic reasons to adapt to the technologically advanced society which surrounds them. The Reservation is characterized by high unemployment, a low skilled labor force with low substitutability of skills across employment sectors, and a land tenure system which serves to make the labor force geographically immobile—to restrict intra-Reservation migration. In addition, there are no Reservation communities with sufficient infrastructure capacity to absorb new population.

The Reservation is rich in natural resources. All important energy minerals—oil, natural gas, coal and uranium—are found in substantial quantities under Reservation land. The national energy crisis has driven up the price of fossil fuels and other energy resources so that Reservation mineral resources, previously not profitably developable, are now in great demand. At least 20 major energy-producing firms are negotiating for rights to mine and process Navajo energy resources. The pace of the outside incursion is now rapidly accelerated.

2. Tribal Government Capacity Building

Developing simultaneously with these increased outside influences, is a growing sense of "nationalism," expressed in terms of Tribal sovereignty and self-determination. To put this into context, the Tribal government (Council) was established in 1923 to provide a vehicle whereby resource-rich lands could be legally alienated for the payment of mineral royalties. Over the years, the Tribe has developed administrative capabilities to deliver services. However, the real governing authority exercised over the past hundred years has been federal policy enacted through the Bureau of Indian Affairs, which has been, and continues to be, very much a nineteenth century colonial institution.

Several pieces of Congressional legislation have been passed over the past five years showing increased recognition of the need for Tribal governments to function more as general purpose governments rather than as narrowly based administrative mechanisms. The General Revenue Sharing Act, the Housing and Urban Development Act, and the Comprehensive Employment and Training Act, among others, are major initiatives which legislatively recognize the status of Indian Tribes as equivalent to state and local governments. In addition, a number of administrative rulings have accorded similar recognition to the growing importance of tribal governments in the management of the affairs of their people. In January 1975, the Congress, with the passage of the "Indian Self-Determination and Education Assistance Act," made selfdetermination national policy and the cornerstone future Indian policy in this country.

However, while all these developments offer the potential of real self determination for Navajo, as well as other Tribes, this potential can only be realized to the extent that the Navajo Tribe has the requisite capabilities to take advantage of the opportunities offered. The Tribe, the legislative and executive branches, must now develop a real capacity to govern: to weigh trade-offs, to make policy, rather than simply to administer outside programs developed with a non-Navajo agenda. This includes both the ability of the Chairman to recommend and of the Tribal Council to consider, policy and budget decisions which reflect national planning considerations, and the ability of the Chairman and Executive Branch to implement these policies.

3. Adapting Regional Tools

In order to improve its planning and management capabilities, and to develop appropriate responses to energy development impacts, the Tribe has been adapting regional and "developing nation" models to the context of Navajo planning and decision making. In 1972, the Navajo Tribe created the Office of Program Development as an arm of the executive branch of Tribal government. The Office was charged "to initiate, develop, implement and evaluate all programs relative to economic development, and all other activities related thereto."[1] Since its inception, furthur mandates have added to the Office the responsibility for comprehensive planning. The Office has become the Tribe's major vehicle for effecting institutional change—both within the Tribe and between the Tribe and state and federal government.

Along with increased planning and management capabilities, and closely related to them, have been the development of Navajo-specific planning and analytic tools by this Office.

Some of the best analytic tools for the evaluation of policy alternatives affecting both economic and demographic conditions had been developed under the auspices of the Four Corners Regional Commission. The Commission had previously supported economic research in Utah, Arizona, New Mexico and Colorado, the purpose of which was to develop computerized models as tools to aid decision making. Because of vast differences in economic and social structures, and difficulty in gathering data, the Navajo Reservation had not been included in any state modeling efforts. It was not, therefore, possible to extract Navajo impact information from state models.

However, both the Commission and the Tribe agreed that since large scale investments were imminent on the Reservation, and vice versa, in ways that were not fully understood, it was necessary that the Tribe be included in the ongoing

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[1] *Navajo Nation Overall Economic Development Program*, Navajo Tribe Office of Program Development, Window Rock, Arizona, Navajo Nation; July, 1974.

modeling efforts. The Tribe needed to develop analytical tools of its own to define alternative futures concurrent with the growing importance of the Tribal government's management of the affairs of its people. An additional benefit would result, it appeared, in that the effort, through achieving an increased understanding of Reservation economic relationships, would enhance the current state models in Arizona, New Mexico and Utah. Increased Tribal-state planning coordination would ensue.

The original intent of the project was to provide the Navajo with a working program of the Utah Process Economic and Demographic Impact (UPED) Model, calibrated to provide Alternative Future/impact projections for the Navajo Nation by Agency (the Navajo political subdivision). Early on, the decision was made that UPED inadequately reflects the unique conditions on the Reservation, especially with respect to land tenure, migration, and employment preference policies, and the problem of low substitutability of existing labor force skills across employment sectors. Thus a new model, the Navajo Economic-Demographic (NED) Model, was designed.

4. Design Considerations

In the process of designing the Navajo Economic-Demographic Model a number of special concerns and issues were raised. In general, these related to special conditions within and characteristics of the Four Corners area. Within the limitations imposed by time and resources, an attempt was made to incorporate within the Model, either in the form of relations or parameters, means of relating economic structure, social structure, and Tribal policies or changes in structure and policy to economic and demographic behavior. In particular it was recognized that the Navajo Reservation has strong inter-relationships with the surrounding border areas in Colorado, Utah, Arizona and New Mexico, and that together they form a larger regional economic system. Because of these strong inter-relationships the number of potential job opportunities available to Navajo is not limited to developments on the Reservation but rather is closely tied to alternative developments in the entire Four Corners area. Consequently, it was decided to make NED a regional economic model of the immediate Four Corners area incorporating both Navajo and non-Navajo areas. This feature permits the Navajo Reservation to be treated not as an isolated system but rather as part of the larger regional economy and thus allows the protection of on-reservation impacts resulting from off-reservation developments and vice versa.

Additionally, it was recognized that Navajo job opportunities can be affected by Tribal economic development policies, policies to alter economic structure through import substitution and by altering discriminatory or preferential hiring policies and practices on and off the Reservation. On the other hand, it was recognized that Navajo participation in available economic opportunities is not unrestricted. This participation is limited by the size and composition of the Navajo population, their willingness to participate in the labor force, their willingness and ability to migrate and commute, and their willingness and ability to change occupations. Labor force participation and mobility (geographically or occupationally) are in turn influenced by social structure, the land tenure system, and by manpower training, income maintenance, and housing availability. The attempt to incorporate these considerations within the Model has met with considerable success, the result being that NED has the important feature of allowing alternative assumptions concerning economic structure, hiring preference policies, manpower training policy, and alternative assumptions concerning labor force participation and geographic and occupational mobility as these may be affected by policy or changes in the social system.

CHAPTER II. OVERVIEW OF THE NAVAJO ECONOMIC-DEMOGRAPHIC MODEL

A. What the Model Does

1. Areas

As it has been designed and calibrated, the NED Model produces a wide variety of economic and demographic information (see Data Dictionary, Appendix II) for each of the five Navajo Agencies (Shiprock, Eastern Navajo, Chinle, Fort Defiance, and Tuba City) and for each of four off-reservation border areas in Arizona, New Mexico, Colorado, and Utah. The Hopi Reservation is not included as an area in the NED Model. The off-reservation areas are defined in geographic terms by compass-points; for data collection purposes they are defined as aggregations of Census County Divisions. By way of explanation, the Southwest Border Area is defined as the area from the Grand Canyon to St. Johns; the Southeast Border Area is the Gallup-Grants area; the Northeast Border Area is the area defined by the Durango-Cortez area, exclusive of the Ute Reservations, and San Juan County, New Mexico, exclusive of the Navajo Reservation; the Northwest Border Area consists of southeastern Utah immediately adjacent to the Reservation and includes Page, Arizona. A tenth area, for which no forecasts are generated, is the aggregation of major western metropolitan areas. This area is a source of Navajo and non-Navajo labor supply, when demand is not filled from the areas described above.

2. Alternative Futures

The economic and demographic information generated by NED is impact projections of various combinations of major economic events occurring on and near the Navajo Nation. These projections are referred to as "Alternative Futures," each of which represent a different plausible scenario of future developments to which Tribal planning must be responsive.

Two kinds of futures are projected. One is the projected set of basic employment events which is viewed to be most likely to occur during the projection period (1975-1990), along with total employment and population levels projected to result from these events. Called Alternative Future Zero, this Future provides a baseline projection against which other Alternative Futures can be measured.

The second kind of Future incorporates various combinations of events, which while perfectly plausible, are not considered to be as likely to occur as are Future Zero events. These combinations, however, can be assembled to test the impacts of single events in isolation, or they can be constructed to determine the feasibility in, economic and demographic terms of, what might be called "idealized futures." Subtracting the numerical forecasts of Alternative Future Zero from other Alternative Futures yields each Future's economic and demographic "impacts."

For purposes of illustration, a first round identification of the combination of events comprising Alternative Future Zero and other Alternative Futures is included as an Appendix. Further elaboration of how the Alternative Futures are composed will be presented in an upcoming volume on the projections and implications of the Alternative Futures.

3. Projections/Outputs

Projections are made at five-year intervals with 1975 serving as the base period. Initially, projections will be made to 1990. The demographic outputs include both Navajo and non-Navajo population by five-year age, sex and broad occupational cohorts for each of the nine areas and the components of population change—births, deaths, and migration—for each cohort and area.

The migration component has two basic divisions, namely, that related to differential job opportunities among areas or employment related migration and non-employment related migration, such as student and military migration, etc. Other demographic outputs are the number of households by age, sex and occupational level of head and school age population by age, sex and educational level.

NED economic outputs relate to labor supply, job opportunities and employment both before and after migration and commuting for each five-year period and each area. In the area of labor supply, NED produces projections of Navajo labor force by age, sex and broad occupational cohort. Potentially, labor force projections can be produced on a before and/or after migration basis and before and/or after an assumed manpower training policy has been implemented. Also projected are the number of Navajo who are engaged in productive activity but who are not available for wage work and hence are not subject to labor market pressures for migration and commuting. In addition, the commuting labor force is also projected.

Both basic and residentiary job opportunities by industry and occupation are projected. Basic jobs provide employment to those who produce goods and services for export out of the area, while residentiary jobs provide employment to those who supply the population of the area. The level of industrial and occupational detail of these projections is variable and depends upon calibration. It is currently anticipated that occupational categories will be quite detailed while the industry sectors will be classified at the two-digit Standard Industrial Classification level. Again, projections of job opportunities can be made both before and after migration.

Employment projections (before and after migration) are also made. Navajo employment is given by industry and broad occupational group. Non-Navajo employment is projected by industry sector only.

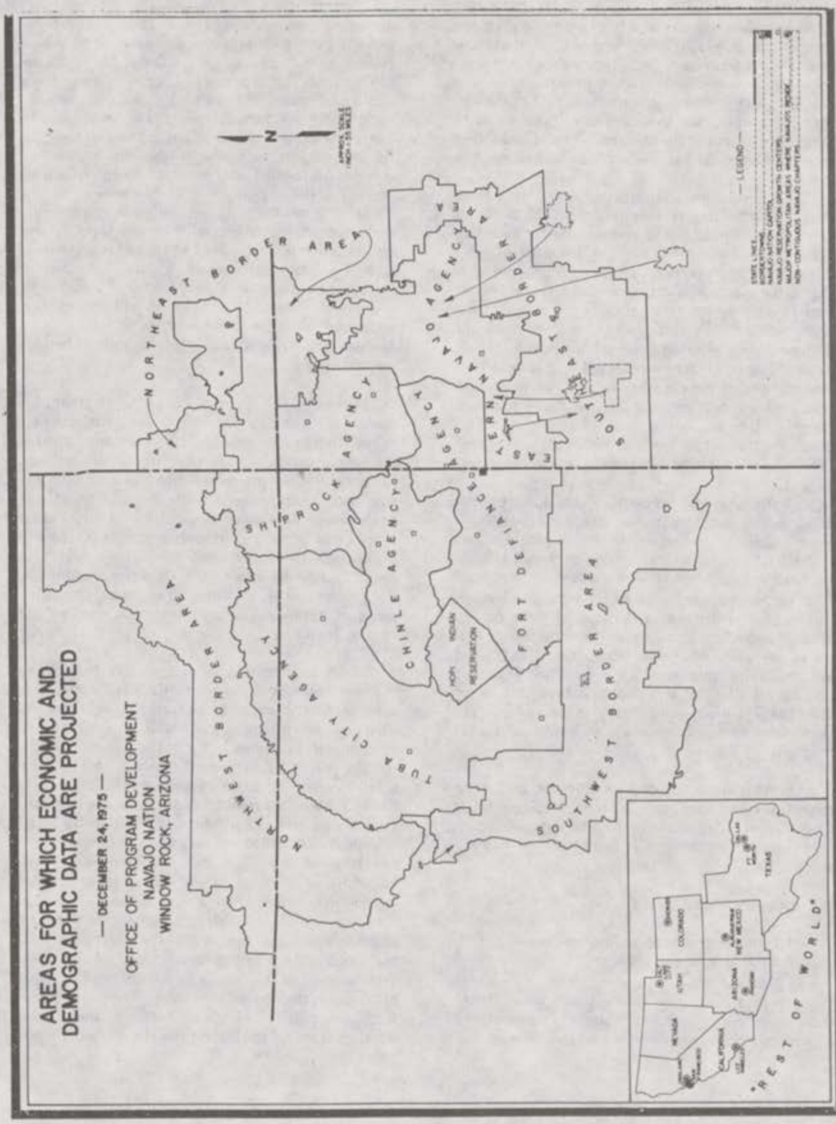
B. How the Model Works

1. Theoretical Methodological Bases of the Model

In form, NED is a synthesis of a three-component cohort survival population model and an economic base employment model. The central operating assumption is that the demand for exports from each area is the driving force behind economic and demographic change. Methodologically, NED incorporates a comparative static approach combined with a complex systems method. By using the former, it is assumed that the five-year projection period is sufficient time for full adjustment to occur in response to assumed changes in export demand, economic structure, and/or various policies and behaviors. In the model, the equilibrating mechanism is an ethnically polarized labor market with excess supplies and demands for labor by area and broad occupational category inducing various types of responses. Navajo responses take the forms of geographic movements through migration and commuting and/or of movements between occupations. Non-Navajo adjustments are affected solely through migration.

By using the systems approach, the attempt is made to model the complex causal interconnections between population and employment through a series of iterative direct and feedback relationships. As the model operates generally, the size and composition of the population affects both the supply and demand for labor. Excess supplies of and excess demands for labor result in pressures for out-migration and in-migration respectively. Migration, in turn, alters the population, labor market conditions, and thus, through a series of iterations, an equilibrium population and employment level is achieved.

Two important advantages result from using the methodology adopted in the NED Model over using what has come to be called an econometric approach based, regression-correlation-extrapolation technique. First, the logical inconsistencies as regards a coherent causal system that are often found in large numbers of statistically derived predictive relationships are avoided. This in turn allows the relationships in NED to be based on and reflect theoretical understandings of the operation of economic and demographic systems. In short, the emphasis in NED is on causal connections rather than temporal associative connections which are often epiphenomenal. The second advantage relates to the condition that most econometric models yield only single forecasts arrived at by projection into the future of historically derived relationships. They are, therefore, incapable, without violating their own internal logic, of projecting the impacts of changes


AREAS FOR WHICH ECONOMIC AND DEMOGRAPHIC DATA ARE PROJECTED
— DECEMBER 24, 1975 —
OFFICE OF PROGRAM DEVELOPMENT
NAVAJO NATION
WINDOW ROCK, ARIZONA
NORTHEAST BORDER AREA
SHIPROCK AGENCY
EASTERN NAVAJO AGENCY
SOUTHEAST BORDER AREA
CHINLE AGENCY
FORT DEFIANCE AGENCY
HOPI INDIAN RESERVATION
TUBA CITY AGENCY
NORTHWEST BORDER AREA
SOUTHWEST BORDER AREA
N
— LEGEND —
NEVADA
UTAH
COLORADO
CALIFORNIA
ARIZONA
NEW MEXICO
TEXAS
"REST OF WORLD"

which represent significant deviations from past trends. For small regions especially, historical experience is an insufficient basis for projecting the future since a single event can cause sudden and significant departures from that experience. Econometric methods using the cross-sectional approach of similar experiences in other areas to project impacts are also disadvantaged in that they must be able to find a similar experience elsewhere and it is difficult to account for one area's unique social and economic structural characteristics when another area's structure is arbitrarily imposed on the impacted area. NED does not suffer from these disadvantages since departures from past experience can be accounted for simply by altering basic employment assumptions or assumptions relating to economic structure, policy, or behavior. Thus, NED is not limited to a single projection, but rather is capable of producing as many as necessary, given impact information requirements.

The NED Model can properly be called an impact model since it produces conditional projections of both population and employment levels and impacts. Each conditional projection is based on the assumption that one or a set of potential economic events occurs or one or a set of other well defined economic or demographic adjustments occurs. In general, at the time of projection, the occurrence of each of these events will be problematical or uncertain, but each will be of interest in that it will have the potential of significantly altering courses and conditions in the area(s). Given the assumption of occurrence, NED projects the associated population and employment levels for all areas. The population and employment impacts of each conditional projection are produced by comparing the projected levels of each with a baseline projection which does not include the events assumed. It should be noted that properly done, this baseline projection is not an extrapolation of past trends in the projected categories, nor is it necessarily based on the assumption of a continuation of past trends in exogenous variables. Rather, departures from past trends in independently projected variables are assumed if they are viewed as certain to occur. Also, in the case where no historical trends can be identified, specific assumptions about future directions for these variables are made.

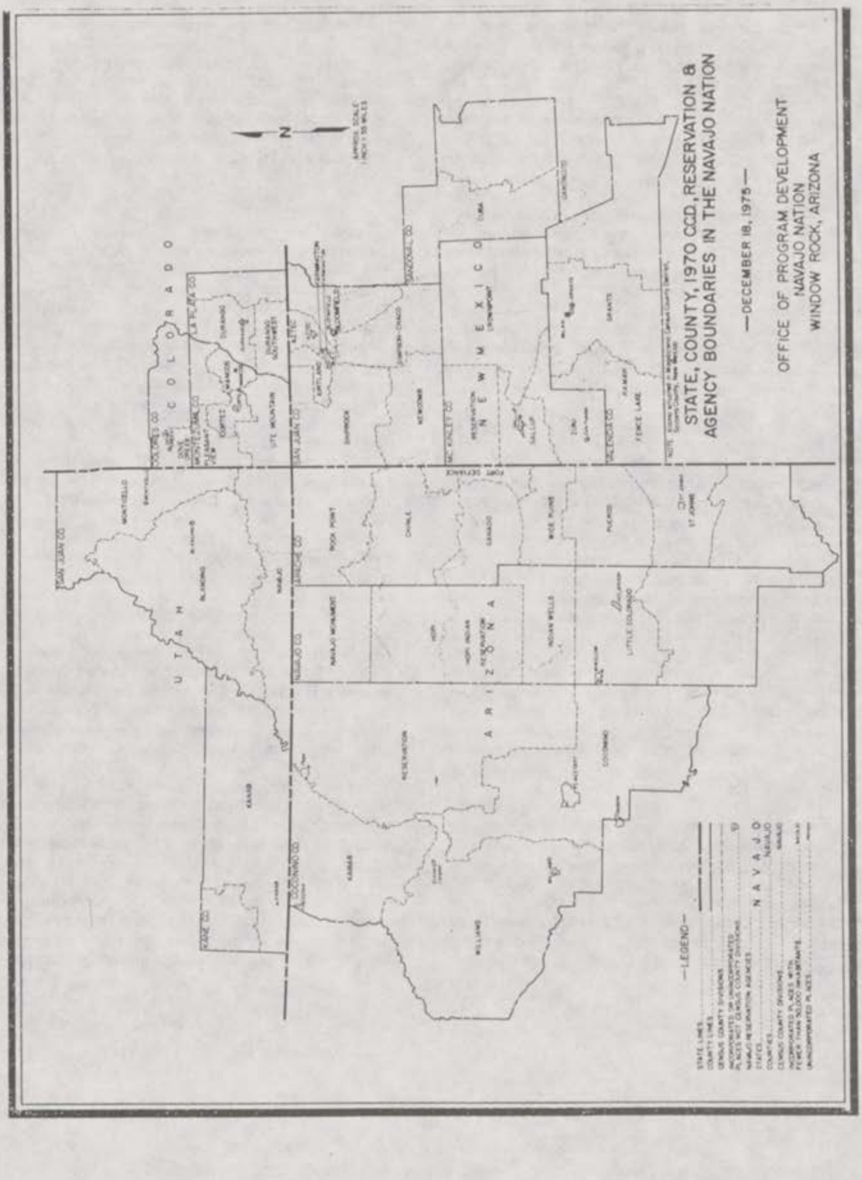
2. NED Components and Procedures

Figure 1 is a general flow chart of the NED Model and is used in the following discussion. The elements within the boxes represent Model variables while the arrows represent operations on those variables. A more detailed discussion of NED is the subject of Chapter III.

a. "demog"

NED is composed of two sub-models, "demog" and "econ." In demog (A in the chart) the base period population in each area (POP^t, where POP is population and t refers to the base period) is adjusted to get a permanent resident population by subtracting the number of people who are temporarily present and adding those who are temporarily absent at time t. This resident population is then aged and survived by applying five-year survival rates to each demographic cohort and advancing each cohort to the next age group. The number of births are then projected by applying five-year birth rates to the appropriate female cohorts. In this way two components of population change, births and deaths, are accounted for in the Model. The result of these calculations is the projected natural increase, or before migration, population of the permanent resident population at time $t+5$.

Next the non-employment related migration component of population change is projected. In-migration in this category is projected independently of the Model, while the number of out-migrants is functionally related to the size and composition of the natural increase population. Included in this component are student and military migration, migration for reason of retirement, and any other category which may be significant within each area but is not influenced by relative employment opportunities. After subtracting the out-migrants and adding the in-migrants to the natural increase population, a before employment related migration population is projected. This population is then used in the second sub-model of NED, "econ," as $ECPOP^{t+5}$, the economically effective population. At this point it should be noted that the temporarily present non-residents for the subsequent five-year projection period are



STATE, COUNTY, 1970 CCD, RESERVATION &
AGENCY BOUNDARIES IN THE NAVAJO NATION
—DECEMBER 18, 1975—
OFFICE OF PROGRAM DEVELOPMENT
NAVAJO NATION
WINDOW ROCK, ARIZONA
U T A H
C O L O R A D O
N E W M E X I C O
A R I Z O N A
—LEGEND—

functionally related to, though not identical with, the non-employment related in-migrants of the current period.

b. "econ"

Employment related migration of the Navajo and non-Navajo populations and Navajo labor force commuting are projected in "econ," the second sub-model, which includes operations B through F in the chart. The conceptual basis of "econ" is that ECPOP, the economically effective population, supplies labor services and demands goods and services. Demands for goods and services are satisfied through imports and residentiary, or population dependent, production, i.e., local production for local consumption. The demand for labor services within each area (B) is derived from the export demand for goods and services as well as from this residentiary demand. In the Model, the number of job opportunities available to Navajo, NED (Navajo Employment Demand) in the flow chart, and the number available to non-Navajo, NNED (non-Navajo Employment Demand), are computed through a series of equations which incorporate important structural, behavioral, and policy parameters. The most important structural parameters are the residentiary employment relatives for each industry sector which relate the area's population to the number of residentiary jobs in the area. These parameters reflect regional differences in demand conditions which are based on income and taste differences between the area and the nation as well as on comparative costs of production. By altering these parameters the impacts of import substitution policies can be projected since they serve to divide demand between import and residentiary demand.

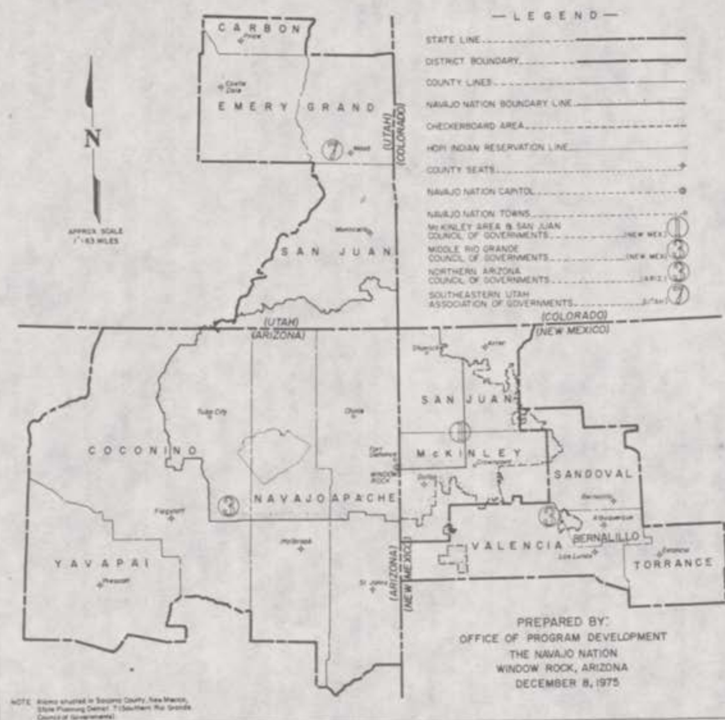
Behavior parameters in the demand component of "econ" relate age, sex, and ethnic characteristics of the population to the demand for labor. Consequently, changes in the size and composition of the population affect the residentiary demand. The principal policy variable in this section of NED relates to preferential or discriminatory hiring policies and practices, by industry and occupation, for each area. These policies and practices may be *de jure* or *de facto* or they may be the result of contract negotiations between the Navajo Nation and the developers of Navajo resources. The impacts of alternative policies and practices concerning hiring can be projected by altering these parameters.

Labor services (C and D) are supplied to the area of residence as well as to other areas through migration and commuting. NNES, the number of jobs sought by non-Navajo, is derived by applying age and sex specific labor force participation and double job holding rates to the non-Navajo economically effective population. NES is the number of jobs sought by Navajo by broad occupational groups in each area. It is computed by subtracting from ECPOP those Navajo who are economically active in traditional pursuits but who are not part of labor force (PRODNEM). Then the number of Navajo trained or retrained by manpower training programs are added and subtracted from the appropriate occupational categories. Navajo labor force participation and double job holding rates are then applied to produce NES. By varying the appropriate parameters the impacts of various manpower training policies and different behaviors with respect to labor force participation can be projected.

Pressures for migration, commuting, and occupational changes through on-the-job training are generated by labor market conditions (E and F). Areas with excess demands for labor services (where the demand for labor services exceeds the supply) attract Navajo and non-Navajo in-migrants and Navajo commuters whereas areas with excess supplies (high unemployment) are the sources of these migrants and commuters. Occupational categories with high unemployment (excess supply) are the source of the occupationally mobile Navajo who meet excess demands in other occupations. Depending on the structure of projected excess demands and supplies, occupational changes may or may not be associated with geographical movements between areas.

In the Navajo labor market analysis, NIM, net Navajo in-migration, NOM, net Navajo out-migration, and COMLABPOP, the commuting labor force, are projected using a gravity technique where the attractive and repelling forces are excess jobs available to Navajo and the number of unemployed Navajo who are willing to migrate, commute, or make occupational changes, respectively. Calibration of the impedence functions reflects the willingness, ability, and costs of making a move in a spatial and occupational context. These, of course, can be expected to differ between source and destination occupations and areas. Non-Navajo labor force migrants are then attached to the labor force migrants to get total

STATE PLANNING DISTRICTS WITHIN THE NAVAJO NATION



PREPARED BY:
OFFICE OF PROGRAM DEVELOPMENT
THE NAVAJO NATION
WINDOW ROCK, ARIZONA
DECEMBER 8, 1975

Navajo employment related migration by age, sex, and occupational group. If, after Navajo migration, commuting, and occupational changes have been projected, there remain unfilled jobs which are available to Navajo, LONED, these are then added to NNED to get total jobs available to non-Navajo. Non-Navajo in-migration, NNIM, and non-Navajo out-migration, NNOM, are projected in (F) by comparing the jobs available to non-Navajo with the number of jobs sought by non-Navajo and applying age- and sex-specific migration propensities to the resulting difference. This procedure allows for age and sex differences in migration for employment reasons and is identical to that employed in the Utah Process Economic and Demographic Impact (UPED) Model.

After employment related migration, commuting and occupational changes have been projected, a new ECPOP (G) is calculated. This new population then produces, through the feedback loops, a new set of labor service supplies as well as a new set of demands for labor services (B, C, and D) which alter labor market conditions (E and F), and hence produce additional migration, commuting and occupational changes. This iterative process continues until equilibrium in the labor market is achieved. The final ECPOP becomes the projected population at time t + 5 and the base population (POP') for the next five-year projection period. Employment related migration is computed by taking the difference between the initial and final values of ECPOP. At this time employment projections are made at t + 5 for each industry sector in each area.

C. Proposed Model Improvements, Refinements, and Extensions

Suggested NED Model improvements, refinements, and extensions are as follows:

1. Non-Navajo commuting—Non-Navajo taking jobs in any area need not reside in that area. The impact of such job holders and their families will be located primarily in their areas of residence. This consideration is likely to be especially important in case of commuting onto the Reservation from border areas. The Model should be extended to deal with this phenomenon.

2. Recession reverse migration—Currently in the case of a recession Alternative Future, NED would leave those projected as migrants in earlier expansionary periods in the areas they migrated to. It is more likely that they would return to their original home areas. The Model should be modified to reflect this type of behavior.

3. Household behavior—Labor force participation, migration, and commodity demand are more realistically viewed as household than as individual behaviors. NED should be modified accordingly.

4. Interareal interdependencies—The attempt here would be to incorporate interareal residentiary employment demand interdependencies.

5. Military employment alternative—Leaving the Reservation to enter the military as a (probably less desirable) employment alternative should be built into NED.

6. Dynamic KOE matrix—The industry-occupation (KO) matrix component of NED could be made to depend upon projected conditions. A dynamic occupation-earnings (OE) matrix would be used to improve demand projections as well as to provide useful projections *per se*.

7. Dynamic labor force participation rates—Labor force participation rates should be made dependent upon projected economic conditions.

8. Improve migration trigger—Employment supply and demand conditions should be complemented with other indicators, especially relative income levels, as migration inducement indicators.

9. Refinement of off Reservation areas by defining them in terms of Census Enumeration Districts rather than the larger Census County Divisions.

10. Data base improvements.

Mr. WOMER. It is interesting perhaps to note the training project we had at Window Rock for the pipefitters and welders, that 73 young Navajo men were accepted out of a total of 272 applications.

Senator MONTOYA. Where is this training being conducted?

Mr. WOMER. At Window Rock in one of the buildings close to the fairgrounds. Eighteen of those young men out of the first 25 were placed as journeymen welders at salaries or wages ranging from $9.75 an hour to $14.82 an hour. They are doing well. They are very proud of this particular little project.

In addition to that, night classes were held for other than this particular group for welders who wanted to upgrade their skills so that they could earn more. This is the kind of thing which needs to be done, where there is a need and where these people can find immediate employment to use the skills that they have learned.

Senator MONTOYA. Have you ever thought of the idea of sending them to an already established vocational and technical school?

Mr. WOMER. Yes.

Senator MONTOYA. Would that be more reasonable?

Mr. WOMER. In this instance, we had the opportunity to take advantage of the participation of the steamfitters and welders unions from both Arizona and New Mexico, and they taught the classes.

It is only through their personnel teaching of classes, certifying as to the ability of these young people, that we were able to get them employment at that kind of wage. They went right in as journeymen.

Senator MONTOYA. Would you list the number of applications made by the Navajo tribe which are still pending; and, if you cannot supply this information, would you ask EDA to do so?

Mr. WOMER. Certainly.

[The information requested follows:]

Per Senator Montoya's request, listed below, are the projects for which Navajos are seeking Four Corners Regional Commission funding:

Establishment of Wildlife Management Program—$291,691.

Domestic Water Supply for the North East Corner of the Navajo Reservation—$31,000.

Navajo Community College Outdoor Theatre—$59,150.

Alamo Minerals Reconnaissance—$10,000.

Comprehensive Natural Resource Training Program—Phase I—Planning: Training Needs and Resource Inventory—$10,022.

NIIP and Related Operations Training—$121,760.

Proposal to Study the Navajo Economy—$99,252.

One Year Demonstration Project—Radio—Navajo—$9,270.

Multi-Tribal Communications System—$181,000.

Since the Senator's Economic Development Subcommittee, Senate Public Works Committee Hearing held in Farmington on March 12, the Four Corners Regional Commission has funded the following two projects:

Peabody Coal Mine Training Program—$65,280.

The Calibration and Application of Navajo Economic and Demographic Model—$159,162.

Senator MONTOYA. You mentioned here that you are also considering other proposals; among them training programs for uranium and coal miners. I know that there is a shortage of uranium and coal miners. What progress is this application making through channels?

Mr. WOMER. These applications came up for consideration about 30 days ago; the coal miners, of course, sometime prior to that. We had participated in a coal mining school up at Price, Utah, for the last 2 years.

When we received these other applications from the State of Colorado, from the Navajo Tribe, and another for oilfield workers from the State of New Mexico, we established an advisory committee to assist us in determining where these schools should be built, what kind of curriculum, what other assistance from the private sector, as well as public, we should obtain before the schools are established.

But we are moving very rapidly. I hope there will be a determination by summer.

Senator MONTOYA. You indicate that the Four Corners Commission has been particularly active in working with San Juan Basin communities to improve their water systems. Water system improvement and expansions were approved for Bloomfield in 1973, for Aztec in 1975, and for Fruitland-Kirtland in 1976. Have you other applications pending in this area?

Mr. LARSON. Not at this time. There is some preliminary work being done but not ready to be acted on at this particular time.

Senator MONTOYA. Are there applications pending in other areas for jurisdiction in the Four Corners jurisdiction?

Mr. LARSON. Yes.

Senator MONTOYA. Do you have any application for the South Valley, south Albuquerque?

Mr. LARSON. We do not have one at this time. There have been some discussions with them earlier, Senator, but we do not have a good application from them right now.

Senator MONTOYA. Would you send part of your staff over there to converse with those people, because they have been trying to get some kind of leadership to develop a proper application. Would you do that?

Mr. LARSON. Yes; we will.

Mr. WOMER. Yes; we will. We did make one grant for a water system.

Senator MONTOYA. In fact, that was the subject of one of our hearings in Albuquerque.

Mr. WOMER. That is right.

Senator MONTOYA. I would like for you to explore the idea of helping those people south of Albuquerque.

Mr. WOMER. Fine.

Senator MONTOYA. They have a bad water system. You did make a grant to the San Juan Vocational Center at Farmington, and you also obtained some training equipment. What was the size of that grant and what is the value of the training equipment which was obtained for this center?

Mr. LARSON. As a matter of fact, we made two grants to the college—one for $100,000-some and one for $90,000. I would have to let someone else speak to the amount of the actual property.

Mr. PENROD. The San Juan branch here in Farmington received $157,105 in excess property for training.

Senator MONTOYA. What was the grant for the construction, $100,000 and then $90,000?

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Mr. LARSON. The first one worked with the curriculum and developing the curriculum. The other one was furnishing equipment; not construction, it was the equipment.

Senator MONTOYA. Have you any kind of economic survey for energy development? Have you contracted out any research project to develop this data?

Mr. WOMER. Nothing more than the work with the Navajo Reservation, the demographic model. That, incidentally, includes more than just the reservation because the impact of employment for the Navajos goes off the reservation. This is the eastern sector, which includes Farmington, and is included in that model, as is Flagstaff on the other end of the reservation.

Senator MONTOYA. How might government excess property be used to assist communities with an influx of temporary workers?

Mr. WOMER. When temporary workers come into a community, it is imperative that roads be constructed for their use. We are able to acquire the kinds of equipment that are used for the construction of roads.

Senator MONTOYA. I held some hearings just 3 days ago on the road problems of this area and how BIA can help to construct access roads to the Navajo irrigation project and to the area where these coal gasification plant developments may occur.

Mr. WOMER. Yes.

Senator MONTOYA. We also, Senator Domenici and I, introduced a bill which was enacted into law, an authorization bill, providing for the expenditure of funds for the building of roads.

I conducted some hearings also, the day before yesterday, and inquired of BIA officials who appeared before my subcommittee as to why the authorizations had not been implemented with funding and why OMB had not requested these.

Senator Domenici also transmitted inquiry to OMB as to why there was no funding request in the budget estimate submitted.

Yesterday Senator Domenici received word from OMB and he transmitted this to me that there has been a revised budget request for $10 million to start a road program in this particular area.

Mr. WOMER. I am very happy to hear that.

Senator MONTOYA. Under the existing authorization, that is. So this is under the authorization in Public Law 94-643. I am sure that this budget estimate will be approved. I sit on the committee for Interior appropriations.

Mr. WOMER. I know you do, sir.

Senator MONTOYA. So I want to acknowledge here the presence of Mr. Charles Gentry of Senator Domenici's office. I should have done this at the beginning of the hearing, and I am sorry I didn't, but it was not intentional. Mr. Gentry, will you stand up?

Mr. GENTRY. Thank you, sir.

Senator MONTOYA. He is a very able staff member of Senator Domenici.

Also, we will submit for the record a memorandum from Richard Grundy of the staff of the Public Works Committee to myself.

[The memorandum follows:]

United States Senate
COMMITTEE ON PUBLIC WORKS
WASHINGTON, D.C. 20510

March 9, 1976

MEMORANDUM

TO: Senator Joseph Montoya, Chairman
Subcommittee on Economic Development

FROM: Richard D. Grundy
Senior Professional Staff

RE: Background Paper: Coal Gasification Development in the Four Corners Region, New Mexico

As you requested, this memorandum was prepared on the national and regional policy issues raised by the two proposed coal gasification facilities in the Four Corners area.

SUMMARY

Two coal gasification facilities presently are planned for sites in the Four Corners area near Burnham, New Mexico. The synthetic gas would be of pipeline quality (or high Btu) to help offset recent and anticipated natural gas shortages.

Both the El Paso Gas Company and the Western Gasification Company (WESCO) have undertaken plans for coal gasification plants. Each facility would use approximately 25,000 tons of coal per day to produce

250 million cubic feet of synthetic natural gas per day. The WESCO project is a joint venture of the Texas Eastern Transmission Corporation and the Pacific Lighting Corporation. The El Paso venture has no partners as of this writing.

The WESCO project entails the gasification facility in San Juan County, New Mexico, as well as a 67-mile pipeline to the existing Transwestern pipeline system and related facility. The authorization for the interconnection was sought in February 1973 from the Federal Power Commission. The most important issues pending before the Commission is how to price the coal gas in a manner which provides applicants the necessary financing to construct and operate the project so as to both ensure a just and reasonable price for the synthetic gas, and protect the consumers against imprudent and improper expenses.

The El Paso coal gasification complex will be on the Navajo Indian Reservation near Burnham, New Mexico, and would be connected to its Southern Division (Pipeline) System. While El Paso in 1972 sought a certificate of public convenience and necessity from the Federal Power Commission, no decision will be forthcoming until the Commission is informed of El Paso's coal lease arrangements.

The coal for these projects is to come from leases on land in the Navajo Nation. The water is to be diverted from the San Juan River, which flows through the Navajo lands.

The coal is to be mined by Utah International, Inc. (UII), which now has a lease for 31,000 acres of Navajo land holding more than 1.1 billion tons of coal accessible by strip mining. UII presently provides coal to a direct coal-fired power plant at Four Corners. But UII still has large uncommitted reserves and has been seeking other contracts and uses for the coal.

In addition to the coal for these ventures, UII is to provide the water as well. However, difficulties arose in negotiations by UII with the Bureau of Reclamation over purchase and diversion of water from the San Juan River because of objections from the Navajo Nation.

In addition to the availability of water, there are several other potential inhibitors to development of these synthetic gas plants near Burnham, New Mexico. The other major issues involve Federal regulation of synthetic natural gas, capital availability, and the environmental impacts and socio-economic impacts of the projects on local communities. Often these issues are interconnected: for example, the financing depends on regulatory decisions and the water availability and use determines, in part, the severity of environmental impacts.

Since these problems still remain unresolved, neither of these coal gasification ventures has advanced beyond a conceptual design phase. These attendant issues are discussed briefly herein, followed by a review of legislative proposals affecting synthetic fuels development.

WATER AVAILABILITY AND USE

Competition for water and the socio-economic impacts of these proposed coal gasification facilities comprise the principal issues raised by the Navajo regarding these ventures. The February 20, 1976, testimony of Harris Arthur, Executive Director of the Shiprock Research Center highlights these issues (see attachment).

For the Indians, the major competitor for water from the San Juan River is the Navajo Indian Irrigation Project, authorized in 1962 by the Congress (P.L. 87-483). That statute authorizes a yearly diversion of up to 508,000 acre-feet of water for the irrigation project; the average figure would be an estimated 371,186 acre-feet. While eventually 110,560 acre-feet will be returned to the river from the irrigation project by ground water flow, this process is expected to take several decades to establish. Therefore for some time to come the entire

371,176 acre-feet should be considered as completely lost to the irrigation project.

It is anticipated that the WESCO and El Paso Natural Gas Company coal gasification facilities, along with the already established direct fired electric generating facility, will require the consumption of 100,000 acre-feet per year. However, until the return flow from the Irrigation Project is established, such consumption levels would result in an overdraft on the region's water allocations from the Upper Colorado River. Or worse, and more likely the case from the Navajo's point of view, this could produce a curtailment of water for the Navajo Indian Irrigation Project.

By treaty and by ruling of the U.S. Supreme Court, Indian Nations have prior and paramount rights to the water that flows through or adjacent to their lands. However, the Supreme Court of the State of New Mexico recently ruled that the State now has jurisdiction over the adjudication of Indian water rights; this opinion no doubt will be appealed to the U.S. Supreme Court.

SOCIOECONOMIC IMPACTS

The December 1975 Interagency Task Force's "Recommendations for Synthetic Fuel Commercialization Program" describes the anticipated regional socio-economic impacts of synthetic gas development as follows:

> "If recent experience with accelerating energy resources development is a guide, such rapid growth would be accompanied by certain adverse socio-economic impacts or 'costs', at least in the short run. These include disruption of local labor markets, severe and chronic housing shortages, extraordinary inflation (particularly in the cost of public services), and abnormally high rates of alcoholism, accidents, employee absenteeism, and turnover, divorce, delinquency, mental illness, child abuse, and suicide. Significant redistribution of income will also result."

Concern has been expressed by State and local governments that there be programs to alleviate these socio-economic impacts as an integral part of any commercial synthetic fuels project or Federal program. On behalf of the National Governors Conference, Governor Richard Lamm set forth the following six recommendations in testimony before the House Committee on Science and Technology --

> --The Congress should require that prior to the issuance of a loan guarantee, the Energy Research and Development Administration lay each individual project before the Congress for a period of 90 days, after which time unless either house of Congress had disapproved the guarantee, it shall be finalized. We feel there should however be the exception that if the amount being guaranteed by the Federal government exceeds $300 million dollars, then affirmative approval by the Congress shall be required prior to finalizing the guarantee.

> --The Congress should require all loan guarantee projects be made subject to State and local laws regarding health, land use, land reclamation, water rights, taxation and environmental protection.

--The Congress include in any loan guarantee legislation a requirement similar to that found in P.L. 93-627 (Sec. 9 of the Deep Water Port Act of 1974) concerning the concurrence of each affected State. The Governor of each State should be allowed to utilize whatever state mechanisms he feels appropriate to render such concurrence.

--In any synthetic fuels legislation, Congress should provide a structure whereby the states and local governments affected will be involved as partners with the Federal government in the planning process. This should include project selection and evaluation and the review and monitoring of construction and operation of the guaranteed project.

--The Congress require in any loan guarantee legislation that all application for such guarantees shall include a description of the costs of public service, impact upon local employment, and the availability of funds for private developments. The application should recite the sources of such funds concerning guarantees where the loans may be a high risk. Further, no loans or price supports should be approved without assurances from the federal government that adequate funds are available to meet the community impact needs.

--Care should be taken within the guarantee legislation to see that synthetic fuels opportunities are developed throughout the country. We feel strongly that Federal incentives should maximize the competition between various technologies while fulfilling the goal of demonstrating the commercial viability of synthetic fuel production.

The importance of State and local input and shared control in government decisions on synthetic fuels development is clear. As pointed out by Richard G. Jones in testimony before the House Committee on behalf of the National Conference of State Legislatures --

> The environmental, socio-cultural, and resource depletion impacts are potentially massive, particularly in the rural areas most likely to experience the brunt of the development.

In general, the solutions to socio-economic concerns will require an assumption by State government of expanded planning and decision-making authority with respect to the nature and extent of commitment of State resources to energy development.

The problems for Indian territories are somewhat different and aggravated by the lack of a local tax structure. These are described in Mr. Arthur's statement (see attachment) --

> At the present time, little if any planning for people has been done; the engineering specifications for the plants and mines have been completed, to the last detail. But consideration of where people will live; where their children will go to school; who will provide police and fire protection; who will pay for the roads, sewers, water treatment plants and other infrastructural requirements; and all the other concomitant changes in the social fabric of the Navajo people has been conspicuously absent.

The projects proposed for the Burnham area by WESCO and El Paso envision population increases of between 15,000 and 59,000, many of them non-Navajos in the first five years of construction and operation at Burnham where approximately 300 families now live.

The Congressional responses to these socio-economic concerns are reviewed later, herein.

ENVIRONMENTAL IMPACTS

There are several potential environmental impacts associated with coal gasification plants. First, there is the traditional potential degradation associated with surface mined land in the fragile desert ecosystem.

Although air pollution will be reduced compared to direct coal fired electric plants, it still must be considered. The carcinogenic nature of coal conversion byproducts, while known for over 100 years, is poorly understood. In addition, control and safety procedures have veen far from foolproof.

Perhaps the most critical environmental impact relates to water use. Water is needed in coal gasification processes for the generation of steam, in the initial partial combustion stage, and as a source of hydrogen (for the methanation process). Water also is needed for cooling purposes. An estimated two tons of water are needed for every ton of coal gasified. Unlike water used for irrigation where some of it returns to its source via ground water seepage, the water used in coal gasification is consumed by the process or vented to the atmosphere.

FINANCIAL ISSUES

The present cost estimates for construction and start up of a typical plant for the production of synthetic natural gas from coal average about $1 billion. By comparison, most natural gas and gas transmission companies have assets of less than $2 billion. In addition, some (like Columbia Natural Gas which serves the Middle Atlantic states) have statutory limits to their indebtedness. In order to obtain financing for $1 billion coal gasification projects such companies almost certainly will require the formation of consortiums. Even then, given the present regulatory framework into which these facilities must fit, their financial soundness is far from guaranteed.

In this regard, both WESCO and El Paso began negotiations for the two subject plants before establishment by the Ford Administration of the Synthetic Fuel Commercialization Program in ERDA. Nevertheless, these companies now concur that government incentives are vital to realization of these plants. In fact, El Paso asserts that its project will not be built without Federal participation. On the other hand, WESCO proposes that Federal participation is necessary to cover all residual exposure (i.e., risk of possible costs overruns, plant shutdowns and extended operations at abnormally low load factors which remain after the assumption of certain specific, ascertainable and acceptable risks by the applicants and the consumers). In addition, WESCO wants the Federal government to guarantee that if the project is not completed for any reason, construction lenders and investors will recoup their investment.

FPC REGULATORY JURISDICTION

Under the Natural Gas Act, the Federal Power Commission is empowered to regulate interstate natural gas supplies so as to maintain reasonable prices for the consumer and a reasonable rate of return on investment for the producers and suppliers.

The FPC presently interprets its jurisdiction to include only synthetic natural gas that is mixed with interstate natural gas. The court agreed with the Commission's jurisdictional analysis and concluded that under the Natural Gas Act, the Commission does not possess any jurisdiction over any aspects of synthetic or artificial gas until such gas is comingled with natural gas.

Unfortunately, this means that companies such as WESCO and El Paso are not assured that the highly capital intensive gasification plants can be included in their rate base. El Paso and WESCO insist that unless this is possible the financial viability of their proposals will be seriously affected. This uncertainty also cast sufficient doubt on the financial soundness of such plants to make it difficult to obtain construction and start up capital.

Meanwhile, applications still are pending before the Federal Power Commission from the El Paso Natural Gas Company (November 15, 1972) and WESCO (February 7, 1973).

LEGISLATIVE INITIATIVES

The Congressional response to the aforementioned socio-economic concerns was first voiced last year in the House-Senate agreement on Section 103 of H.R. 3474 (the FY 76 ERDA Authorization bill). Although this provision was defeated on the floor of the House of Representatives, the measure has been reintroduced as S. 2589, the Synthetic Fuels Act of 1976, which is cosponsored by the five Senators: Jennings Randolph (D.-W.Va.), Henry M. Jackson (D.-Wash.), Joseph M. Montoya (D.-N.M.), Pete V. Domenici (R.-N.M.) and Walter Huddleston (D.-Ky.). In addition, the Ford Administration has proposed S. 3007, the Federal Energy Development Impact Assistance Act of 1976.

S. 2589, The Synthetic Fuels Act of 1976

The Synthetic Fuels Act of 1976 authorizes Federal loan guarantees for up to 75 percent of the cost of construction and operation of commercial-sized demonstration plants to convert coal into synthetic fuels and to generate power or heat in commercial quantities utilizing as their energy source, direct solar, wind, ocean thermal gradient, bioconversion, or geothermal resources. The measure authorizes $6 billion for this new program.

In the absence of the experience about the economic viability, the effect on the environment, and the impact on communities and States of synthetic fuels facilities, this measure gives the public, through ERDA, the States, local political subdivisions, and Indian tribes, a say in how, when, and where the first of these plants will be built.

Once ERDA has ascertained where a proposed demonstration facility is likely to be located, ERDA must promptly notify the appropriate State and local governmental officials. Before ERDA can approve any such application, ERDA must give the Governor of the State where the facility will be located an opportunity to make a recommendation thereon.

If the Governor recommends against making the guarantee for the facility, the ERDA must refrain from doing so unless the Administrator finds that there is an overriding national interest and sets forth his reasons for this finding in writing to the Governor.

In addition, the measure provides for several forms of financial assistance for local communities to cover essential capital expenditures directly resulting from the proposed commercial demonstration facility for facilities including, but not limited to, public safety, health, education, roads, sewer, and water.

The measure authorizes ERDA to extend up to a maximum of 100 percent guarantees of a local community's obligations for financing such essential public facilities or of the tax revenue stream which is expected from the new commercial demonstration facility. In the former case, the Administrator would guarantee the obligations issued by State, local jurisdictions or Indian tribes to finance essential public facilities. In the second situation, the Administrator would guarantee to the community the amounts of anticipated tax revenues from the energy demonstration facility.

The total outstanding indebtedness to finance community developments cannot exceed $850 million. This amount would be included within the total authorization of $6 billion established for outstanding obligations to guarantee financing of energy demonstration facilities under this measure.

S. 3007, Federal Energy Development Impact Assistance Act of 1976

The purpose of the Federal Energy Development Impact Assistance Act of 1976 is to establish the Federal Energy Development Impact Assistance Fund from which planning grants, loans and loan guarantees can be made to assist affected States and local governments in providing public facilities.

S. 3007 establishes a fund of $1 billion to be administered by the Secretary of the Interior. Assistance from the fund will be allotted to the States by the Secretary using a formula based on the additional employment and population growth projected for Federally owned extractive energy resources developed under Federal approvals such as coal mining plans approved by the Secretary.

The Governor of a State receiving an allotment from the fund would be given broad discretion to determine the manner of its use and the jurisdictions and projects to receive assistance. Up to 10 percent of the allotted assistance may be taken in the form of grants from the fund for community facilities planning and for the planning, design and management of construction of the facilities to be financed from the fund. The Governor may take the allotted assistance as loans or loan guarantees from the fund directly to the State or to units of local governments.

Assistance under the bill must be used for public facilities serving residents of areas expected to experience population growth as a result of Federal energy resource development. Eligible facilities include water supply, storm water drainage and sewer systems, waste treatment facilities, roads and related improvements,

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health care facilities, schools, libraries, public safety facilities and facilities for recreational participation.

The measure is intended to meet the recognized needs of States and localities without placing a heavy burden on the Federal taxpayer and without undue Federal intrusion into the management of State and local affairs. The bill would encourage State and local jurisdictions to place the State and local public costs of Federal energy resource development upon the population increases and new economic activities generated by that development.

Mr. Womer. It may be of interest to know our excess property program has supplied a number of the buses, vans which are converted to buses, that are currently transporting employees from Farmington out to the irrigation project every day. That came from excess property, as well as other work vehicles that are on the job every day, and they came through Arch to the project.

Senator Montoya. I guess you people looked into the possibility of getting some excess mobile homes from GSA. I happened to sit on the committee when we were taking care of people who were homeless under Hurricane Agnes, and we appropriated about $600 million. There are a lot of trailers around. Maybe we can get them as temporary homes for some of the people in this area.

Mr. Womer. Yes.

Senator Montoya. I will be glad to help you.

Mr. Womer. We have taken some of the trailers. As a matter of fact, the school at Kit-sa-lee. Every building there has a mobile home or trailer which we acquired for the establishment of that Navajo school, as well as the compressor and all the rest of the equipment required by the school. It all came through the Four Corners Commission.

Senator Montoya. The new authorities which the Congress provided in this particular area, will they help you a little more than the help that you were getting previously under the old law?

Mr. Womer. All the difference in the world. This is a great law that enables us to work directly with the local community in satisfying their needs.

It is true that we can't always find exactly what they are looking for. We have to use some ingenuity to do so. Our want lists are always longer than what we are able to accomplish.

Senator Montoya. Would you, Mr. Womer, and your staff try to concentrate a little more on the need for vocational and technical training and how you can put some applications together for some of these schools in strategic areas so that they can receive some kind of funding from Washington?

Mr. Womer. Yes. We have participated, as you know, in a number of them. Our problem, of course, as you know, Mr. Chairman, is that we can do the preliminary studies and the work, but our funds are so limited that even as a supplemental grant it does not go very far toward——

Senator Montoya. No. I am speaking of formulating applications for these people so they can submit them to Washington, not to the Four Corners Commission.

Mr. Womer. All right, sir.

Senator Montoya. If they don't get enough, we will come to you for supplemental grants out of what you get from the regional commission.

Mr. Womer. Fine.

Senator Montoya. We did that on previous occasions.

Mr. Womer. Yes, I know.

I do want to take this opportunity to thank you for your support on the new legislation which was signed into law, and the new authorities which were given the title V commissions which the President signed in the last day of 1975.

We are extremely gratified and particularly pleased with the new authorities we have in energy and transportation and health as well. It enables us to do some things which had been rather restricted.

We can do one demonstration in one State, but how long can you demonstrate? But that is overcome. We can now move ahead.

Senator MONTOYA. We are going to try to improve on that law as we go along.

We just passed out a bill last night out of the Public Works Committee that we have been conferring about for the last week. We hope it will please the President and he will not veto it. But it is a more conservative bill than the one that we previously passed.

Mr. Womer, and members of your staff, I certainly want to thank you for appearing here. I am very grateful to you for the good work you have been doing.

Mr. WOMER. Thank you, Senator. I want to thank you for all the great support that you have given all title V commissions and, most particularly, the Four Corners Commission. It is genuinely appreciated, and it would be hard to get along without you. Thank you very much.

Senator MONTOYA. Thank you very much.

[Mr. Womer's prepared statement follows:]

STATEMENT OF STANLEY WOMER, FEDERAL COCHAIRMAN
FOUR CORNERS REGIONAL COMMISSION
BEFORE THE
ECONOMIC DEVELOPMENT SUBCOMMITTEE, SENATE PUBLIC WORKS COMMITTEE
FARMINGTON, NEW MEXICO
March 12, 1976

Mr. Chairman and members of the Committee, it is a privilege to appear before you today and to testify on the work accomplished, ongoing, and proposed by the Four Corners Regional Commission related to energy development and its socio-economic impacts in Northwest New Mexico.

Within the last year, the Commission has taken two major policy steps which relate to energy development and its impacts. The Commission's long-range Development Plan, approved in early 1972, did not define energy resource development as a Regional priority. The national energy crisis occurred two years later.

Nevertheless, the members of the Commission have devoted increasing amounts of time and program money to energy projects since 1974, and in late 1975, directed that the Commission's long-range Plan be completely revised. Along with other imperatives, we wanted a Plan that would deal with immediate and long-range energy resource activities. The State Members of the Commission are on record in declaring that energy resources must be a high priority element in our Regional work from this point forward.

The State Members have also joined with the Governors of the Old West Regional Commission in an important inter-Regional effort, the Western Governors' Regional Energy Policy Office, an organization very ably chaired by New Mexico Governor Jerry Apodaca in this its first year. Jointly funded by Four Corners and Old West, the Energy Policy Office had as its main purpose the formulation and adoption of regional approaches to coal strip mining, oil shale exploitation, environmental preservation, socio-economic impacts of energy exploitation, and other major policy issues likely to be affected by Federal and State actions. So in both a Regional and an inter-Regional sense, the Commission is functioning as a policy and coordination organization.

Four Corners Regional Commission has worked closely with State officials in New Mexico to deal with this critical issue. In 1973, New Mexico, pioneering in the energy field asked the Commission to fund a State Science and Energy Advisor. The Commission did so and the State Energy Office inventoried energy resources available, made estimates of energy demand requirements and the effects of such demand on the resources and tried to determine the probable environmental repercussions of likely energy development.

As a follow-up to the first year's work, New Mexico asked in 1974 that the Commission provide funds for an Energy Coordination Study which developed position papers and policy alternatives for each of the State's major energy resources, and then coordinated these recommendations for the various resources into an overall energy policy for the State. This work, in part, led to the creation of the Energy Resource Administration in the State of New Mexico as the statutory agency to deal with all problems of energy development.

Based on these studies, the State of New Mexico has now developed an Action Task Force for Energy Development in Northwest New Mexico. This Ad-Hoc organization composed of key State and local officials is working to develop a strategy to meet the socio and economic impacts likely to fall upon communities in the San Juan Basin because of coal and coal gasification activities here.

Because most of the energy activity underway or likely to take place in the San Juan Basin is on the Navajo Reservation, our staff is working closely with Tribal officials, especially in the area of manpower and occupational training. For example: in 1973, Four Corners funded a Navajo Manpower Training Study to determine the training needs and curricula for the Navajo Indian Irrigation project and for the employees of the electrical generating plants operated by the Arizona and New Mexico Public Services Companies.

In 1974, Arizona and New Mexico utilized Commission money ($152,000) to help train welders and pipefitters for the power plants and the irrigation project. A year later, the Commission granted $26,000 to aid Tribal economic development officials in completing a Navajo Nation Demographic Model which will provide labor force estimates as well as descriptions of the occupational skills needed for Navajo economic growth.

Tribal officials indicate to us that completion of this work is the priority first step which must be carried out before the Tribe will consider the development of any specific energy site on the Reservation. We want, therefore, to aid and expedite this project in every way possible.

The Four Corners Commission is also considering a number of other proposals by the Navajo Tribe, among them training programs for uranium and coal miners, a design study for housing energy-related workers on the Reservation, and proposals to train the operational workers for the gasification plants projected by El Paso Natural Gas and WESCO.

The Commission has been particularly active in working with San Juan Basin communities to improve their water system. Water system improvements and expansions were approved for Bloomfield in 1973; for Aztec in 1975; and for Fruitland-Kirtland in 1976. A water system expansion feasibility study has just been funded for the City of Farmington.

As a part of our vocational education Regional program, construction grants were given to the San Juan Vocational Center at Farmington in 1972 and 1975 and training equipment valued at $517,000 was obtained for that school through our Government Excess Property Program.

There is a compelling need for improved transportation in the corridor where El Paso and WESCO propose to develop gasification plants. The Commission provided funding for a design study on the most essential of these highways, Route 371 from Farmington to Crownpoint, New Mexico. This project would service both gasification plants and be the north-south link for development activities on the Eastern Navajo Reservation.

As the magnitude of the energy shortages became more apparent to the Nation, and the development of Western energy resources became more imperative, the Commission grew concerned about the proliferation of research and technical assistance work being done in this field. To achieve better coordination, eliminate overlap and duplication of these efforts, we are working (through the cooperation of Los Alamos Laboratory) on the capability to retrieve information on all energy research and development projects in the inter-Mountain West.

Commission staff personnel were also assigned to coordinate all ongoing energy research activity with the Old West Commission, the Western Governors' Energy Policy Office, and the four State Universities. We believe this work will insure a maximum research effort for minimum program dollars.

Because our State Members have stressed their concern for energy conservation and environmental enhancement, we have a number of projects in this area. A bio-gas conversion project using cattle manure to produce methane gas gives promise of great utility for farm and ranch size generating plants to meet all the energy needs of an average Regional livestock agricultural unit.

The Commission has completed work on the first phase of a demonstration project to use fly ash, the solid residue from the Four Corners electrical power plants for insulating material and construction blocks. Some 4500 tons of fly ash are now produced daily at the Four Corners units, and our Study shows that wall and roof construction materials fabricated from fly ash are much superior in insulating qualities than conventional concrete blocks now in use. Furthermore, building block fabricated from fly ash is lighter and has more tensile strength than regular concreteblock. The second step of our fly ash research to be funded this Spring will involve a feasibility study for a plant to produce building blocks and panels from the Shiprock Plant fly ash.

All of these activities are having either direct or secondary effects on energy resource work under way or projected in Northwest New Mexico. This Four Corners portion of our Region is heavily involved in energy exploitation, with coal and uranium development in Southwest Colorado between Cortez and Pagosa Springs, similar coal and uranium work between Blanding and Aneth in Utah, expansion of coal extraction on Black Mesa in Arizona, and coal, uranium and coal gasification activities projected for San Juan, Sandoval, and McKinely counties in New Mexico.

I should like to direct my remaining remarks to the coal gasification plant proposed for the San Juan Basin. If such a plant were built, it would involve an estimated peak construction force of 4000 workers and a permanent operations-mining force of about 1000. The main impact would be likely to fall on the communities of Farmington, Fruitland-Kirtland, and Shiprock. It appears likely that some form of front-end money would be adequate to meet the impacts produced by the 1000 workers who will operate the plant and mine the coal, for they will be stable long-term members of the community.

As for the special impact of the temporary construction work force, communities will need to provide adequate schools, health care, public utilities, and public safety facilities and services implied by such rapid growth and equally rapid contraction. It is the judgement of our State members that because a naticnal priority is involved, Federal grants or some other sort of financing should be available to meet these emergencies.

The Commission has a special program which could drastically reduce these short term costs. The Excess Property Program of our Commission will this year provide several millions of dollars in government excess property to communities and Tribes in the Region. The range of material and equipment available is very wide and can be adapted to many purposes. We have provided equipment for vocational schools, health care units, and Tribal industrial enterprises. Material grants have also been made of classroom buildings for schools, shell buildings for community use, and tanks converted to use for water storage. We believe that are few limits to the usefulness of this Program..... the only real limitation being our ingenuity and ability to match need with equipment.

The Four Corners Regional Commission is prepared to help the people of the San Juan Basin meet the socio and economic impacts of proposed energy development through its regular grant and technical assistance programs, its Excess Property Program, and by encouraging the assistance of other Federal programs in the effort.

We want to continue working with Navajo Tribal officials, the communities in the Basin, and El Paso Natural Gas and WESCO Gasification officials in bringing about a use of these important material resources consonant with the aims and desires of all the people sharing in these crucial ventures and, particularly, as they impact a national priority for energy self-sufficiency!

Senator MONTOYA. We have with us today the Governor of the State of New Mexico, Hon. Jerry Apodaca.

Is Governor Apodaca available at the present time? Would you call him and see if he is ready to make his presentation?

We will be in recess for 5 minutes.

[Brief recess.]

Senator MONTOYA. The committee will be in order.

We have with us today Hon. Jerry Apodaca, Governor of New Mexico.

Governor, we certainly want to welcome you. Since you have been Governor, you have been communicating with us in Washington directly and through your different State committees. I certainly want to commend you for the fine cooperation which you have given us in the Congress and for the wealth of information that you have supplied us which has enabled us to better consider the economic problems of New Mexico.

So, Governor, you may proceed with your statement and implement it any way you wish as you go along.

STATEMENT OF HON. JERRY APODACA, GOVERNOR, STATE OF NEW MEXICO

Governor APODACA. Thank you very much, Mr. Chairman.

First of all, I would like to thank you, Senator Montoya, for bringing your Subcommittee on Economic Development to a very appropriate area in New Mexico—certainly one that we consider to be of tremendous importance to the whole question of energy growth and energy potential in our State.

I want to thank you for inviting me here today to discuss how we in New Mexico are dealing with the social, economic, and environmental impacts of energy development. I welcome this opportunity. I can think of no other subject that could be more timely, and no other subject that could be more critical to the future well-being of our State and of our people.

The northwest portion of New Mexico is already experiencing problems caused by the expansion of energy activities. We must address those problems now before it is too late. We will need the help of the Congress and the administration. Frankly, I believe that this hearing is a sign of your willingness to respond to this need that we have here in this area, and we are eager to work with you and your committee.

A year ago at this time I presented testimony in Washington before this same subcommittee. What I said then is even more true today. We in New Mexico realize our responsibility to help the Nation meet its energy needs. But we are also determined that in meeting these needs that any resource development in our State also serves the best interests of our citizens.

We must have the cooperation and the assistance of the Federal Government to achieve such a goal. We are pleased that channels of communication are opening up among Federal, State regional and local governmental levels. As Governor of our State, it is my duty to strengthen and expand these lines of communication wherever I can.

Recently I took what hopefully is a major step in this direction. On February 17 of this year I created, by executive order, the New Mexico Energy Impact Task Force. The members of this group include: Fabian Chavez, director of the department of development; Harry Wugalter, public school finance chief; Steve Reynolds, the State engineer; Charles Becknell, director of the criminal justice planning council; Graciela Olivarez, State planning officer; Lee Zink, chairman of the council on economic advisors; Nick Franklin, legal advisor; and, John O'Leary, administrator of the energy resources board. Mr. O'Leary, who is here with me today, will serve as chairman of the task force. We think, Mr. Chairman, that the broad representation of interests in this task force will clearly give State government some idea of what the impacts may be in the area of energy growth.

This group will coordinate the energy-related actions of our own State agencies. We need to anticipate the impact of energy-related development in the Four Corners area. As I said before we want to make certain that the energy development occurs in the best interests of the people who live and work here in this area.

The task force will work closely with the local communities. The task force will not interfere with the traditional duties and responsibilities of local officials. Its role will be one of assistance. It will help to insure that affected local governments have the means at their disposal to deal effectively with energy-impact problems.

The responsibilities and wisdom of the State legislature in this area will be acknowledged by the task force. The legislative Interim energy committee will be advised on a continuing basis of the group's efforts. Mr. Ed Grisham, staff director of the committee, will as an ex-officio task force member.

I am pleased to see Peter MacDonald, chairman of the Navajo Tribal Council, is here to testify to your committee. His office of program development has been involved in energy-impact studies and is now completing a major project on energy alternatives.

Most of the current and projected coal development in this State lies on Navajo land. Thus the views and recommendations of the Navajo Nation are of dual significance in any planning efforts. First, any development has a direct effect on Navajos living in the area. Second, the ultimate decision regarding additional energy activities on the reservation rests with the tribal government. I earnestly hope Mr. MacDonald will agree to be an advisor and active participant in the work of our task force.

Mr. Chairman, I am aware of your considerable role in the development of the Public Works and Economic Development Act. New Mexico, which has enjoyed the dubious honor of being 49th in the Nation in per capita income at the close of 1974, appreciates your efforts to create programs which can help States to move out of the ranks of the disadvantaged and economically depressed.

Title IX of the act offers us a timely opportunity to do this. This title makes funds available for helping local communities cope with the growth problems caused by rapid energy development.

As you know, Senator Montoya, New Mexico has recently submitted an application to the Economic Development Administration for $150,000 of title IX funds.

We are certain that with this financial assistance, the task force and the local communities will be able to develop a viable growth management framework for the northwest portion of our State. We appreciate any and all of your efforts to help us in our pursuit of this grant.

Senator MONTOYA. Governor, I might say before you came in, we had Secretary Mizell as a witness, and I was asking him about this grant. He informed me that he had been in conversation with your people and that he certainly will look with great favor, provided everything was in order.

Governor APODACA. Thank you, Mr. Chairman, I visited with Secretary Mizell prior to his departure, and I was very pleased with the discussion that we had.

I hope that while he was here he had a chance to see the massive energy activitis that are already underway and to hear from many of the representatives of the local area about the dimensions of the community development problems that those activities have created. We will be anxiously looking forward to the economic development administration's favorable consideration of our proposal.

At the regional level, Mr. Chairman, the Western Governors' Regional Energy Policy Office, commonly called WGREPO, continues to give high priority to the socioeconomic impact of energy development.

This organization, Mr. Chairman, which was formed about a year ago, is made up of 10 Governors of the Northern Great Plains and Rocky Mountain States that share very common problems.

Last fall the organization pushed, in conjunction with the Natural Resources Council of the National Governors' Conference, for the inclusion of Federal impact assistance funds in the synthetic fuel legislation.

While we were finally successful in getting provisions for such funds in the bill in December the entire synfuel demonstration measure was rejected by the House. We have now recommenced our efforts to see that impact funds be a part of whatever synfuel bill emerges this session.

As you know, Representative Teague's recently introduced bill includes $350 million in impact funds. We also support a similar proposal to the Senate which you cosponsored yourself.

The Western Governors are also supporting provisions in the Federal Mineral Leasing Act, now ready for Senate-House Conference, which would raise the coal royalties returned to the States from 37.5 percent to 60 percent. The measure would allow those revenues to be used for energy-impact planning and capital facility projects.

The President's Energy Resources Council is now working with the National Governors' Conference Energy-Impact Committee on common interests. Their goal is to develop a comprehensive impact assistance bill which will take care of the needs of both the interior coal and oil shale States and those coastal States to be impacted by offshore oil and gas development.

The approach now preferred by the administration would set up a $1 billion revolving fund from which loans, loan guarantees and small planning grants would be made available to energy-impacted

States. While this effort may not be a cure-all to our problems, it is a start and, most importantly, demonstrates that the Administration is acknowledging its responsibility in this area.

Mr. Chairman, it is obvious that the time has arrived for all of us at the policymaking level to recognize our responsibilities in the energy-impact area. At the State and local level we must work together to identify who does what, where, when, and with what resources. The State needs to be aware of the impact which energy developments will have on housing, education, human services, and the quality of the environment in local communities.

Existing State finance mechanisms and industry may offer some relief to these problems. Still, many of these impacts will translate into needs, which can only be met by outside financial assistance. In these instances we may find ourselves making State proposals for assistance, as the one now before EDA. Where infrastructure needs are imminent the localities may wish to apply to the Federal agencies on an individual basis for Federal capital facility project funds.

From a regional standpoint we may use organized groups such as the Nation Governors' Conference and WGREPO as the mechanisms for pushing in Washington for remedial legislation, or perhaps new agency initiatives.

This will be a new learning experience for all of us, Mr. Chairman, requiring much cooperation and hard work from those involved. I feel sure as we strive for energy self-sufficiency we can also meet the socioeconomic impact challenge.

Too much is at stake if we don't: our fragile environment and western way of life, and the economic health of our western communities. Most importantly, we must keep alive the cherished idea of a unified country where all levels of government are responsive to the needs of their people.

This seems a particularly appropriate challenge to take on in 1976, our Bicentennial year. As Ben Franklin said of the Declaration of Independence, "Either we will all hang together, or we'll surely hang separately." I think the energy question, Mr. Chairman, can only be solved by working together.

Once again, Senator Montoya, I appreciate the opportunity of testifying before you today. We look forward to working closely with you, as we have in the past, in trying to mutually solve the energy problems, not only for New Mexico but for the rest of the country.

Mr. Chairman, that concludes my formal testimony.

Senator MONTOYA. Thank you very much, Governor Apodaca, for a very splendid statement.

I have kept pace with what you are doing with respect to this energy picture, and you have appointed the task force and your development committee at the State level. You have also become very active in the WGREPO organization. I think you are the chairman of that organization.

Governor APODACA. I was until just a month ago, Senator.

Senator MONTOYA. Of course, you organized it under your chairmanship.

Governor APODACA. Yes, sir.

Senator MONTOYA. We have been very concerned about the capital needs by municipalities and political subdivisions, especially in this particular area.

Of course, we have other areas in the State of New Mexico that might face the need for capital funds for sewage treatment plants, sewage collection, and water systems, schools, hospitals, and what have you.

I know that there is a mechanism for the flotation of tax-exempt bonds by the State and by the municipalities concerned, but I also know the limitations under our constitution as to what these municipalities can float by way of bond issues, and also the reluctance of many people to vote favorably on proposed bond issues.

What can the State government do to substitute for such funding needs in the event any of these contingencies come into play?

Governor APODACA. Mr. Chairman, one of the things that I was discussing with Secretary Mizell before he left, very informally and very briefly, was that in all frankness, up until recently, the State of New Mexico in my judgment was not adequately organized to itself deal with the energy questions, to even come close to answering to ourselves what our role would be. But in the last 12 months or so we have done a number of things to establish the most appropriate role.

Last year the WGREPO Governors cohosted an energy conference on finance. We recognized that we could talk about energy needs and energy requirements, but unless somebody could identify where the necessary funds will come from, we really could not accomplish a great deal.

One of the things that we are now looking to, Mr. Chairman, is ways in which some of our funds that are identified either in our permanent fund or elsewhere can be properly utilized under our constitution, and under the restrictions of our statutes, to invest in the energy-impact field.

In this last session of the legislature, Mr. Chairman, we were successful in passing some legislation that hopefully is a beginning to show the interest that the State of New Mexico has in developing ways in which to encourage investment and growth.

But I think it is a very clear fact that if New Mexico is going to provide energy requirements for the people of the rest of the country, the people of the rest of the country somehow need to share in the added costs.

Let me use an example, Mr. Chairman. Without any question the highway from Farmington to Albuquerque is—I won't say the worst because I happen to be in the area—but certainly one of the worst in the State. The thing that is making the need for the improvement of that highway so apparent is the increased traffic because of the activity in this area. One can say that the need for improvement of that road is almost totally related to the energy growth of the Four Corners region.

It seems to me that the cost of such an improvement has to be shared by the rest of the people of this country because we are providing them with some of their needs. But hopefully we are looking for ways, Mr. Chairman, that we can improve our own investment to benefit our communities and the people here in New Mexico.

Senator MONTOYA. There have been statements made, such as the one that you have made, that the Federal Government is not assuming sufficient responsibility in helping the States cope with all this and other related problems, such as roads, for instance, and access roads in addition thereto.

I think this is a very valid criticism, and I think the States are bursting at the seams because they have so many responsibilities today, and within their revenue structures they cannot cope with all the needs that exist at the State level.

Of course, we have an austerity tent over Washington these days, and the Office of Management and Budget is looking in terms of dollars and constricting spending in vital programs; and, of course, we in the Congress are there to represent the people also, but we are differing in many respects with the Office of Management and Budget and trying to shift priorities within the fiscal structure which they have presented to the Congress.

Access roads for New Mexico are most important. We are tackling these problems in different committees. I mentioned here before that we have finally convinced the Office of Management and Budget to present a revised budget estimate of $10 million for access roads in this particular area of New Mexico.

We are also trying to get the Bureau of Indian Affairs in its funding to provide for more money out of its $60 million road funding in its budget to provide more money for carrying on the completion plans for many of these highways in this particular area of New Mexico.

I held hearings on this subject just 2 days ago in Washington. So I am hopeful that we can develop a proper mosaic of approach and activity so that we can keep pace with the unfolding panorama of industrial activity that is taking place here in this part of New Mexico.

Governor APODACA. Mr. Chairman, if I might cite two examples. Let me cite one first in the area of highways.

We can operate on the assumption that there is a limited number of dollars, obviously, for highway improvement. One can see at least from a distance that a great deal of priority continues to be the improvement of the Interstate System throughout the country. At the same time, the improvement of that facility clearly consumes energy; and yet, we continue to pump literally billions of dollars into that project, which is worthwhile, without any question, but at the other extreme, we have virtually nothing in economic assistance to improve highways whose ultimate goal is not to consume energy but to develop more.

I think that somehow Congress and the administration must rearrange their priorities of highway construction.

A moratorium was recently imposed on the city of grants for the extension of natural gas connections. It seems ironic that a city that is growing only because of the uranium requirement of the country is now falling into a situation where it cannot grow and, consequently, cannot produce the uranium that is required by the various industries.

Someone, Mr. Chairman, hopefully through cooperation with State government and local communities, must come to grips with the rearranging of priorities in many of these distributions of funds.

Senator MONTOYA. I think the Western Governors can present a very feasible plan to the Congress for our consideration so that we can, through Federal legislation, come to grips with these problems, Governor; and that is one of the purposes of hearings such as this.

I wish I had the time to conduct more hearings throughout the country, but I have too many assignments in the Congress at the present time.

But if one raises the questions or problem areas, the list would go something like this, Governor: water, divided between agriculture and energy development; two, controlled growth in communities and what is the maximum for a community, 5 or 10 percent per year, and what financial resources are needed to cope with this kind of growth; funding for new community facilities and services, including replacement of obsolescense—now the feasibility of new towns has to come into play also—and then, of course, roads and the quality of life for the citizens of the communities to try to bring about a proper social adjustment; and then of course we have to be very concerned—as this unfolds—we have to be primarily concerned with the environment, because I know that you and many of us are most desirous of preserving a good environment here in New Mexico.

I know that you are looking at these problems, and I know that in cooperation with the legislature you have given consideration to many of these problems.

But what do you envision for the future here in New Mexico by way of economic development, and what kind of impact will it have on our way of life here?

Governor APODACA. Mr. Chairman, in my remarks I alluded to the fact that at the conclusion of 1974, New Mexico by national economic standards, ranked 49th in per capita income. Economists can argue the merits of such a figure, but nevertheless, that story was pretty well told. In an October publication in one of the national magazines it was indicated that in the first 6 months of 1975, in the area of per capita income growth, New Mexico ranked third only to Washington, D.C. and the State of Alaska. Another publication indicated New Mexico ranked first in per capita income growth in the West and Rocky Mountain States. I think if one were willing to accept that these percentages are accurate, one may ask the question: What could cause this kind of apparent growth from the 49th per capita income to that kind of per capita income growth?

I think it is very clear that it is energy-related. I hope what we can do in New Mexico, Mr. Chairman, is not to become a colony, in a sense: produce the energy resource and then, once the natural resource is gone, be left with ghost towns. We have got to encourage the private sector to look at New Mexico as a permanent solution. We would also hope that New Mexico would be more than just a research State where the Federal Government attempts to find solutions and then develops the solutions somewhere else.

So, in addition to requesting your support in securing Federal energy-impact funds we would be asking for your assistance as we have in the past few months, Senator Montoya in encouraging private industry to look at New Mexico as a permanent facility for the development and processing of energy resources.

Coal gasification here in the Four Corners is obviously an issue of great importance. Should the coal gasification plants be developed, I am confident that the industries involved will be concerned with spin-off activities so that their facilities will still serve useful purposes when gasification plant operations cease.

I think that is the kind of planning that we need to do in New Mexico, Mr. Chairman, and hopefully we are developing viable ways to achieve that objective.

The creation of the Energy Resource Board, which Mr. O'Leary now administers, has been most helpful in this area. We are also trying to make sure, Mr. Chairman, as we develop our energy resources that our tax base is adequate and that our resources are not depleted without adequate compensation.

So I am very optimistic, Mr. Chairman, that with well-organized, effective planning at the State level and with the proper guidance and incentives from the Federal Government and from Congress, New Mexico will have a most positive role to play in the whole question of economic growth and energy production for this country.

Senator Montoya. Thank you very much, Governor, for being with us and for giving us your constant advice.

Governor Apodaca. Thank you, Mr. Chairman.

Senator Montoya. Our next witness will be Mr. Peter MacDonald, Chairman of the Navajo Tribal Council.

I welcome you before this committee, Chairman MacDonald.

STATEMENT OF PETER MacDONALD, CHAIRMAN, NAVAJO TRIBAL COUNCIL

Mr. MacDonald. Thank you, Senator.

Senator Montoya. Do you have a prepared statement?

Mr. MacDonald. Yes, I do.

Senator Montoya. Do you have any copies?

Mr. MacDonald. I don't have extra copies, but I will make them available.

Senator Montoya. Will you leave your copy with us after you get through?

Mr. MacDonald. Yes.

Senator Montoya. How long is your statement?

Mr. MacDonald. About seven or eight pages.

Senator Montoya. Fine. You may proceed, Chairman MacDonald.

Mr. MacDonald. I would like to thank the members of this subcommittee, particularly Senator Montoya, for your invitation to speak today on behalf of the Navajo Nation.

I would also like to take this opportunity to extend an invitation and hear firsthand from the Navajo people themselves.

The recent acceleration of interest in energy development has to you, Senator, to visit the Navajo Nation while you are here to see focused a great amount of attention on the mineral wealth of the Navajo Nation. This insatiable demand for energy raw materials is the result of this country's quest for energy selfsufficiency, more popularly known as "Project Independence."

The Navajo Nation has been long involved in their own project independence. But this, the Navajo "Project Independence," is the struggle for survival and a comparable standard of living and opportunity that so many of you take for granted.

This is an economic "Project Independence," and it is just as real and it is just as imperative as the energy "Project Independence" for America.

Without even considering the additional demands of increased energy development, the Navajo Nation has faced in the past and continues to face today the terrible specter of inadequate and substandard schools, housing, roads, and health facilities.

We have faced these problems for over 100 years, and each year the Navajos lag further and further behind the rest of the country.

We need to have an enormous program of assistance just to catch up, much less be subjected to further demands on meager financial resources because of energy and other resource development.

We have estimated that it will require $3.8 billion of Federal expenditures over the next 10 years to significantly make up the deficits in our health, education and economic conditions that stem from these last 100 years of Federal neglect and irresponsibility to the treaty obligations and other commitments made to the Navajo people.

The Navajo people do not want to just barely exist on Federal handouts. We do want a comprehensive commitment that will bring us out of the past history of substandard living conditions and into the future of true economic independence.

Energy development is nothing new to the Navajos. After all, we have been producing oil and gas for over 50 years. In fact, the first Navajo Tribal Council was formed in 1923 to approve oil and gas leases.

Today we supply significant amounts of energy raw materials for the vitally needed requirements of the entire Nation. In 1975, the Navajo Nation produced 10,300,000 barrels of crude oil, 5.5 billion cubic feet of natural gas, and over 13 million tons of coal.

The largest coal mine in the United States is located just southwest of here on the Navajo Reservation. In 1976 substantial uranium production will begin from the Church Rock area of the Navajo Nation.

When we review this prior energy development, there is the inescapable conclusion that we have been the victims of the worst kind of exploitation. This assault upon our mineral wealth has been ruthlessly accomplished by industry, with the assistance of the Federal Government.

Industry selected the commodity and the area, while the Federal Government determined the terms and conditions. This indiscriminate leasing did not provide the Navajos with adequate resource protection nor fair compensation. It did not protect our environment, nor did it provide for our cultural beliefs. It did not provide for meaningful Navajo employment opportunities. It did not provide for Navajo participation, utilization, or management in the extraction of these valuable energy minerals.

Because we lacked the experience and expertise in dealing with this highly complex and sophisticated business, we were constantly put into the position of either passively accepting this condition or reacting to proposals without the necessary tools for a critical evaluation. Our trustee, the Federal Government, did little to assist us in this area.

These prior leases and agreements lack the very fundamental elements of resource protection. They lack strong environmental safeguards and sound conservation procedures. We must protect the health and safety of our people, and we must protect the air, water and land that form their very existence. We must insure that future generations of Navajo people will have adequate resources to develop if that is their choice.

Compensation to the Navajo Nation from these prior agreements is far from equitable in comparison to their value. A royalty of 15 cents per ton for coal in this day and age is a national disgrace. The United Mine Workers receive several times this amount, and it is not even their coal.

By Federal regulations and policy, we have been subjected to outdated and discriminatory practices of payment. We have been told to accept royalty without participation.

This procedure does not give us any control of the development, provides only a token payment, and does not allow the Navajos to participate in the profits of their own resources; nor does it allow us to gain the knowledge and expertise that is needed for the Navajo Nation to develop our own resources in the future.

An even greater blow to our dignity is the fact that the meager royalties that are paid are paid to the Federal Government.

Senator MONTOYA. May I interrupt you there, Chairman MacDonald.

Just 2 days ago I held some hearings in Washington on Indian self-determination policy, and there is a budget request for $30 million to implement the Indian self-determination policy for next year.

I am just wondering whether the different agencies in the Government, in Washington, and most noticeably the Interior Department, are doing anything administratively at the present time to really implement this policy by giving and providing for the Indians of this country an opportunity for input in the policy decisions that are made with respect to trust lands and other affairs within the Indian community.

Mr. MACDONALD. Very little. Any initiative that is being made now is purely on the part of Indian tribes themselves. But the trustee, the Federal Government, as has always been in the past, either by design or what have you, always wants to remain aloof and is more concerned about what kind of regulations and policies to draw up on these appropriations that the Congress had intended for Indian self-determination. So it is more.

If there are any initiatives for making sure that Indians participate in this decisionmaking, it is purely on the part of the Indians and no help whatsoever from the Federal Government, or our trustee.

Senator MONTOYA. I can promise you one thing, that I will continue to pursue questioning which is directed at trying to unleash more attention to the concept of Indian self-determination on the part of bureaucrats in Washington.

The Congress enacted this policy, and we are hopeful that it will be carried out and that the Indians will make their own decisions with respect to their properties, trust lands, that the Federal Government has trust for the Indian people, and also in the determination of policy with respect to their own affairs, internal affairs.

Mr. MACDONALD. Right. I think that is very critical. When the Government is talking about Indian self-determination, they have a different connotation than when the Indians are talking about they want self-determination.

Senator MONTOYA. Give me both connotations.

Mr. MACDONALD. The Indian concept of self-determination is we want to do our own thing in our own way in our own time and in the context of our own belief and our own culture. You give us the wherewithal, the money, to do this with. This is our concept.

In other words, if we want to build schools, health facilities, whatever the priorities that the tribes have, that is what we want to do in our own way.

Now, the Federal Government's philosophy of Indian self-determination is that we will make money available for you, but you have to use this money in these narrow concepts. Now if you don't do it in these narrow concepts, that is called policy, regulations, and what have you, then you can't have the money.

So in the end, the Government is then, by these various regulations and policies, guiding the Indians as to where they should go.

That is not self-determination.

Worse than that, they want to evaluate what you do internally as to how you do these things, and they want to be the judge and give you a score, whether you did right or you did wrong or how badly you did.

This to me and to most Indian leaders is highly questionable as to whether the U.S. Government really wants Indians to be self-determined. They still want to guide us.

How would it have been back in 1776 if England continued to tell the U.S. Government exactly by what regulation they should establish shoeshine stands or U.S. Steel or what have you? You would never have independence.

By the same analogy, Indian Nations will never have that freedom if they are constantly being watched for any little movement they make that has been established by an outside force.

It has to be developed from within. We are entitled to make our own mistakes, we believe. We haven't had our own Boston Tea Party yet.

Senator MONTOYA. You have been having too many tope parties.

Mr. MACDONALD. May I go on?

Senator MONTOYA. Yes.

Mr. MACDONALD. As I have said, the revenues from these developments of our energy resources have not gone to the Navajos. As a matter of fact, the Federal and the State government already receive much more than the Navajos on our minerals in the form of various taxes, including income, severance, ad valorem, and property taxes.

This whole system of payment for our minerals makes absolutely no sense to the Navajos.

A Navajo who herds his sheep under a maze of power transmission lines and over buried petroleum and natural gas pipelines does not understand why he must go back to his hogan that is heated by a wood stove, if he is lucky enough to find wood, and lighted by a lantern, if he is rich enough to buy one.

All of our energy resources are being exported to provide a better way of life for millions of Americans, while we lack even the barest essentials.

Our coal feeds power plants that provide electricity all over the Southwest. Our petroleum is transported to Texas and California so they will have gasoline for Sunday drives, and our natural gas will heat swimming pools in Phoenix and Los Angeles.

Just 1 year alone of energy production from the Navajo Nation is sufficient to supply the energy requirements of New Mexico for 16 years.

With what I have told you, Senator, is it any wonder that the Navajo Nation does not welcome increased energy development with open arms?

The projected energy development programs that have been proposed for the Navajo Nation can only create havoc and destroy us unless these projects conform to the goals and policies of the Navajo people and the Federal Government accepts their responsibilities and obligations.

Responsible Navajo leaders have recognized that proper energy development can be a means of assisting the Navajo Nation in its struggle for economic freedom and opportunity. But this development will have to be accomplished under Navajo goals, objectives, priorities and policies.

We have implemented a positive program of energy resource management to save our remaining mineral wealth. This does not necessarily mean resource development. It does mean management and control.

Although large areas of coal and uranium resources have been leased under these deplorable conditions and our petroleum reserves are being depleted at a rapid rate, the Navajo Nation still has many areas that contain excellent energy resource potential.

For example, we have estimated the Navajo Nation has a total coal potential of over 50 billion tons. There are 2.5 billion tons of strippable coal on the four existing coal leases, and our estimates indicate that there is at least another 6 billion tons of potential strippable coal that is not under lease.

There are at least geologic indications that there may be potential uranium reserves not yet leased that will rival the reserves of Ambrosia Lake which now produces nearly half of the uranium production of the United States.

The Navajo Nation will consider energy development only if it is truly for the benefit of the Navajo people and receive assurance that it will not destroy neither our environment nor our culture.

As a part of our resource management policy during the past few years, we have implemented a series of positive action programs that would develop energy resources in concert with our goals or participation and control, and with strong environmental protection safeguards.

These programs are designed to provide revenue, employment opportunities, and Navajo utilization of the resources.

There are plans to take our royalty oil in kind, refine this oil and distribute petroleum products within the Navajo Nation. Other programs initiated by the Navajo Nation include possible joint ventures with qualified companies to develop coal and uranium.

No longer are we content to allow companies to extract our energy resources with the Navajos taking a minority interest. Other longer range programs include investigation of alternate methods of extracting coal and increasing productivity of our petroleum reserves. There are programs to assess the applicability of solar and geothermal resources.

Despite our negative reaction to prior energy development, we have taken positive steps to insure that any future development will be in our own best interests.

In another aspect we are attempting to renegotiate those prior leases that do not contain adequate protection nor fair compensation. We are trying to right the wrongs of the past.

Coal gasification is not the result of Navajo resource planning. These projects are the result of industry attempting to utilize Navajo resources.

WESCO would utilize coal from the Utah lease, while the El Paso project would utilize coal from their coal lease near Burnham that they hold in conjunction with Consolidation Coal Co.

Together these two coal leases contain over 2 billion tons of coal that were leased under considerably less favorable conditions to the Navajos.

At the present time, we are still evaluating the gasification proposals for plant site leases. The enormity of these projects is awesome. Before any action can be taken by the Navajo Nation, there are many aspects that must be examined in detail. I am sure that is one of the reasons your committee is here.

First, we had to get an education in coal gasification technology in order to even begin to evaluate the project. Our trustee has been of little help in this endeavor, but we have learned by bitter experience not to rely on his expertise.

We have to assure ourselves that these plans do not constitute danger to our people and our environment. We will apply our own environmental standards and not the State of New Mexico. We have many conflicting reports, but we will decide that aspect for ourselves.

We must also insist that the Navajo tribe receive fair compensation for the utilization of our resources and land. Again, both the Federal and State Government will receive more revenue from the operation of these plants and the utilization of tribal resources than the Navajos.

We must insist on meaningful employment opportunities in all phases of the project, including technical professional and management phases.

We are also going to insist that if this proposal is accepted, that approval of the construction and operation of these plants will be on a plant-by-plant basis in order that we may evaluate and review the results before the next plant is started.

One of the greatest problems in the construction and operation of these plants is the heavy burden the Navajo tribe must carry on its already overtaxed financial resources.

The feasibility of establishing a new town on the Navajo Reservation to service these gasification projects is also currently under study. We must weigh the benefits and the costs of both the projects and the proposed town.

We do not want to keep making Farmington richer at the expense of the Navajo people, as we have done in the past. But neither do we want to go broke supporting a development that overtaxes our resources.

All of the feasibility studies done thus far were done by Anglos who envision an Anglo-type community. We need a feasibility study done by Navajos that will reflect a Navajo culture and objectives of a new town.

Senator MONTOYA. How much do you think that study would cost?

Mr. MACDONALD. We project $150,000 to $200,000.

Senator MONTOYA. Have you made any application for such a grant?

Mr. MACDONALD. We have not, no.

Senator MONTOYA. Do you intend to?

Mr. MACDONALD. Yes.

Senator MONTOYA. With whom; EDA?

Mr. MACDONALD. Right. We have on our own, with our own Office of Program Development, made a cursory look at what the new town might involve. But in order to have an intensive study to study the impact and the actual projected costs and support for the continuation of these facilities and services that will have to be made available, we will need a more indepth study.

I don't need to review for you, Senator, the terrible cost of providing such public services as health, housing, sanitation, roads, utilities, law enforcement, fire protection, and all facilities and services that are required.

The demands for services and facilities for this magnitude of project are staggering. The capital cost alone is over $400 million.

To date, we have not received any answer from any agencies or government as to who is going to underwrite this cost. Our own inquiries to the Federal Government as to assistance in financing this new town, if this new town should appear to be, have thus far fell on deaf ears.

In fact, public statements by representatives of the Federal Government have indicated that they are not interested in assisting communities that are beset by huge energy developments.

The States, as we have heard from Governor Apodaca, have had difficulty even thinking about financing the necessary facilities, if we are going to have such a new town.

If you approach industries, again they say they don't have any money to assist in that area. Of course, the tribe doesn't have any money. So the whole question is who is going to underwrite all the services that are going to be required if such a project is to become a reality.

We cannot assess our interest in these energy developments unless we, the Navajo people, have first commitments of the vast financial assistance needed for this type of a project.

If the government is asking us that the Navajos must first make a commitment, let me say here and now that this is unacceptable, because we have a long history in learning not to trust the Government.

So what we are saying is the Government must produce first before we give you an assessment of how we really feel about all of this potential development only under the following conditions:

That energy development is for the benefit of the Navajo people and it conforms with Navajo goals, Navajo needs, and Navajo priorities;

That sufficient water will be available for energy development without imperiling other uses, such as agriculture, livestock, domestic and other industry;

That the products of energy development will be available for use within the Navajo Nation by Navajos; and

That the Navajo Nation will participate in and control all energy development.

How can the Federal Government and this committee in particular assist the Navajo tribe in obtaining economic independence?

Well, number one, by a full commitment to our 10-year plan which was designed to bridge the gap created by 100 years of neglect and piecemeal programs that have kept the Navajo far behind the rest of the Nation.

This plan is created by Navajos to address Navajo problems, and full commitment by the Federal Government is mandatory if we are to gain the same opportunities that are enjoyed by the majority of Americans.

Second, financial assistance in specific problems dealing with energy development. This assistance must be pledged wholeheartedly at the onset of these projects. Financial aid for our own energy development project is just as important as those initiated outside the Navajo Nation.

Here let me say that the adequacy of the benefits we shall insist upon receiving from mineral developments now, if we are to forego benefits that are larger in the future, must be measured against the costs we shall have to incur if we are to establish for ourselves a viable Navajo economy.

I know I need not spend much time elaborating on these costs to Senator Montoya for he has been a friend and participant in the Navajo economic development for years.

It was, after all, the Economic Development Administration which financed the plans of our Navajo Forest Products Industries at Navajo, N. Mex., and our warehousing programs in Navajo and other parts of the reservation; and the new headquarters of our Navajo Agriculture Products Industries here just south of Farmington, and a dozen more.

But for those of you who are less familiar with the magnitude of economic development efforts that lie before us, let me provide one illustrative example.

We now estimate that to properly capitalize the farming operations of the Navajo Agriculture Products Industries just south of town here, just that project alone, we shall need between $100 million and $180 million. So financial assistance at the onset of our needs by the Federal Government is necessary.

Finally, we also need the support of the lawmakers in creating realistic laws and regulations that will allow all Indian tribes to protect their resources and manage their own resource development.

Under existing laws and policy, this is now virtually impossible to accomplish.

The Navajo Nation is not asking for charity from the Federal Government. That attitude has inhibited Navajo advancement for far too many years. We are asking that you respect Navajo goals, understand our needs, and live up to your treaty obligations.

Thank you very much.

Senator MONTOYA. Thank you, Chairman MacDonald.

Would you have time to come back after lunch, Mr. Chairman?

Mr. MACDONALD. Yes.

Senator MONTOYA. I would like to ask you a few questions, and I had an engagement at 12:30, and it is now 1. So if you will bear with us and come back, say, about 2.

We will be in recess until 2.

[Whereupon, at 12:55 p.m., the subcommittee recessed, to reconvene at 2 p.m. this same day.]

AFTER RECESS

[The subcommittee reconvened at 2:15 p.m., Senator Joseph M. Montoya, chairman of the subcommittee, presiding.]

Senator MONTOYA. The committee will be in order.

Chairman MacDonald, I want to say that your statement was very comprehensive, very succinct, very precise, very definite, and unequivocal. I know that you are representing the interests of your people, as you should do, and I want to commend you for your statement.

Mr. MACDONALD. Thank you.

Senator MONTOYA. I know in looking at statistics yesterday morning, that there is more unemployment among the Indian population of this country than among any other group. That disturbs me very much.

What is the unemployment rate among the Navajo people?

Mr. MACDONALD. It is 45 percent right now.

Senator MONTOYA. That is very distressing. What do you think the Federal Government can do to try to help you and your people turn over resource management to the benefit of your people? What Federal action do you think is necessary to bring about this effort and to attain this objective?

Mr. MacDonald. One of the Federal actions that is certainly needed to have the Navajo manage their own resources and have control over them basically falls in two areas.

One is to change and amend some of the laws that now make it impossible for Navajos to make their own decisions without being overruled by the Federal Government or being delayed or hindered by Federal actions, or even down to the State level.

I think that the Federal Government is going to have to play a key role as to what the Navajos' relationship is going to be with the State because, after all, the tribe's relationship primarily is with the Federal Government through treaties, not with the State so much.

But there is a big question there that I would leave, that the Federal Government can clarify a lot of these in favor of the Navajo.

The second aspect of having the Navajos do their own thing requires an economic program that is based on the Navajos' needs and the goals that they will set for themselves—now and in the future.

That requires capital and money. That is where we are talking about a 10-year economic development program that was developed by the tribe which is going to take a great deal of funding in order to not only catch up but then to begin to turn over the economic development process that will begin to effect self-sufficiency for today's generation as well as generations to come.

So in two areas: law, and the money necessary to do the job. Without these two, we will continue to be subject to getting further and further behind, and we cannot help but continue to be supported by welfare and other piecemeal assistance that we get as it is today.

Senator Montoya. Do you presently have a management of resources plan?

Mr. MacDonald. Yes.

Senator Montoya. Is it a complete plan or is it subject to periodical implementation?

Mr. MacDonald. It is subject to periodic review. As a matter of fact, this management resource plan is not completed in itself because we are still reviewing it. We still require further review of it because in order to do this on a long-range basis, we must know what the economic potential is for further development of these resources and how it will benefit the Navajo in the future generations.

Those are the key things. That is where I am saying that in order to get the technical side of these things, we need a great deal of assistance, not only with funds that will require us to have the expert review but we would also need educational programs.

Senator Montoya. Who would conduct the review for this comprehensive planning if a grant was made to you?

Mr. MacDonald. We are just going to have to——

Senator Montoya. You would have to contract it out, would you?

Mr. MacDonald. We would have to contract it out, but with the provision it is always monitored and subject to the Navajo people.

Senator MONTOYA. Sure. How do you plan to turn your income from Navajo coal into future productive use?

Mr. MACDONALD. As I told you before, we project that we have about—let's talk about coal alone; we have oil, gas, and uranium—but on coal alone, we have about 50 billion tons of coal we believe on the reservation.

At the present time, the four leases that we have—Peabody Coal, Utah, National, and El Paso—all of these leases together that had already been made approximate about 2 billion tons. So 48 billion.

Senator MONTOYA. 2 billion. Is that the commitment under those contracts?

Mr. MACDONALD. Right.

Senator MONTOYA. What return do you get out of this coal?

Mr. MACDONALD. Hardly anything at all.

Senator MONTOYA. Can you mention that? Fifteen cents a ton?

Mr. MACDONALD. On one, 15 cents a ton, and the maximum is 25 cents a ton with Peabody Coal.

Senator MONTOYA. Who entered into these contracts?

Mr. MACDONALD. These were negotiated back in the sixties, mostly by the Bureau of Indian Affairs and then on behalf of the Navajo tribe.

Senator MONTOYA. Did the Navajo Tribe have any input into these contracts?

Mr. MACDONALD. Hardly any, except to be asked to review it and vote on it.

Senator MONTOYA. What is the going rate on extraction of coal in the country?

Mr. MACDONALD. Well, they are selling as high as $4.50 to $6.50 a ton.

Senator MONTOYA. But I mean on a leasehold like this. What do companies usually pay in the private sector, other than the Indian sector?

Mr. MACDONALD. The private sector who owns the coal, I imagine some of them, I understand for lack of coal, they are getting $6, $10 a ton.

Senator MONTOYA. I mean supposing somebody owns a mine and then one of these mining companies comes in and says, "We want your coal." What do they pay those people, ordinarily? What is the average?

Mr. MACDONALD. I think our various studies indicate they run as high as $1 and $2 a ton.

Senator MONTOYA. That is in comparison with the 20 cents and 15 cents?

Mr. MACDONALD. Right. These 15 cents and 25 cents a ton remain fixed for the remainder of the coal, for the next 15, 20 years.

Senator MONTOYA. That is really what you are complaining about now?

Mr. MACDONALD. Yes. We don't want that to happen anymore, for any more activities, and I think that we have put on the brakes. We say no, no, no; and that is our position.

Senator MONTOYA. What about these revenues? Are they being used in the general tribal funds? Are they being mixed with the general tribal funds for all the uses to which you apply these tribal funds, or are these moneys being earmarked for certain reservations?

Mr. MacDonald. These funds that we receive on royalties from oil, gas, uranium, and coal, all go into the tribal general fund. That tribal general fund is appropriated each year to help alleviate the poverty condition that exists on the reservation.

Here again we feel that the money that is received from royalties is again being used to supplement those services that should have been provided by the Federal Government and State government.

So actually the royalty money that is due us to do further development with is not being used for development but, rather, to support the State and the Federal Government do their job which they should have been doing all along, if they were to really commit themselves with additional funds of money.

With the tribal fund we are buying clothes for our students. We are providing 10-day public works projects with these funds and some of the scholarships. These are the services that should have been provided by treaty commitment and by State constitution to the Navajo Tribe.

Yet, we are continuing to use these moneys for those services. And we believe that for the Navajos to benefit, these moneys ought to be invested for future generations and future needs.

Senator Montoya. I remember I read the treaty once in the House of Representatives when we were debating the Navajo irrigation project. I read all the pertinent provisions of the treaty where Uncle Sam had obligated himself to do certain things for the Navajo Indians, and here we had been waiting for a long time and nothing had been done.

But I think the Government has been doing very well lately, and I know it should do more by way of better educational programs for the American Indian and also the delivery of health care for the American Indian and more sanitation facilities and so forth, and road facilities.

Of course, as you know, I have been trying to do my best to implement the treaty and take away its rhetoric and put some letter and spirit and meaning into it. You know that, Mr. Chairman.

I will ask you now, will the irrigation project bring many Navajo people from the west to the eastern part of the reservation; and, if so, will many of these people live here in San Juan County?

Mr. MacDonald. Yes. There is definitely going to be a migration of people from the west to the eastern part of the reservation when the project begins to go into full production.

Each year as more land is added for production, there are going to be more and more people coming in. Again, there we will be facing the same kind of problem that I have talked about this morning: making provision for facilities that these people will need as they come to the project area for employment and other manpower requirements that we will be asking for.

So the question of how to finance this, as I mentioned to you before, the Navajo irrigation project, by the time we finish with the 110,000 acres of land, put all that under irrigation, it will take about $180 million or more to provide the necessary facilities.

Again, I am sure it is going to be very difficult for anybody, for that matter, to come up with that kind of financing. If we don't come up with that kind of financing, the impact will be such that we are going to have a situation where people will be without adequate water, without adequate housing, without proper school and health planning that will be needed here, and will be again suffering the worst kind of lack of development than even exists on the reservation today.

One of the things that I said this morning is we don't want to go along with any development just on a promise that the Government is going to do this or that, even though it may be in writing.

What I said is that the Navajo Tribe is willing to talk business if the promise to do something is delivered and done.

One of the reasons I say that is that in the irrigation project itself, the Government, as you know, in the sixties by legislation promised the tribe that they were going to give the tribe over 500,000 acre-feet of water to make the irrigation project a feasible project.

Senator MONTOYA. Is that in danger?

Mr. MACDONALD. Yes.

Senator MONTOYA. How many acre-feet of water are you expecting?

Mr. MACDONALD. We are asked to consider a little bit better than 250,000 acre-feet of water.

Senator MONTOYA. For the 110,000 acres?

Mr. MACDONALD. Right. The reason for that was that somehow the bureaucrats began to interpret the intent of the legislation that the water that was committed in the legislation was for irrigation only and not for drinking water or for anything else.

Therefore, we didn't have any water to drink on the project area. We didn't have any water to do any processing or other activities that will go along with the project, such as the feedlot operation or cannery operation or even to provide water to communities that might be developed in the project area, which will also require water.

Senator MONTOYA. You will not be using the 250,000 acre-feet of water in the next few years, until you complete the 110,000-acre complex?

Mr. MACDONALD. That is right.

Senator MONTOYA. So your anxiety is over the long-range period. But they are not prohibiting you from allocating part of that allocation for domestic use, are they?

Mr. MACDONALD. Yes; they are.

Senator MONTOYA. How do they expect you to launch any economic development in that particular area, which might be attuned to your farm operation, how can they expect you to do that without any water?

Mr. MACDONALD. I have no idea.

Senator MONTOYA. This is the first I have known about this.

Mr. MACDONALD. The Bureau of Reclamation of the Department of Interior, their solicitors maintain that we will do the irrigation project, and the water should be used only to sprinkle water on the crops, and we can't even drink it.

Senator MONTOYA. You write me a letter in Washington and I will change that law.

Mr. MACDONALD. I appreciate that very much.

Senator MONTOYA. I sure will.

Mr. MACDONALD. Because we feel we are entitled to that over 500,000 acre-feet of water; and whatever we can use that water for, up to that limit, should be at the discretion of the tribe so long as we don't exceed it for that project.

But they keep saying that whatever water we use for the project, whatever is saved should all revert back to the Government.

That is why I am saying that we don't even trust the Government, even when they put it in the law, that they are going to do something, because they always remake on these things.

Now what we are saying is we are not going to do anything until you deliver, it is here. Then we are ready to do business.

Senator MONTOYA. Will they let you water your horses? Will they let you put water in the tractors?

Mr. MACDONALD. There again I imagine we will be used——

Senator MONTOYA. You write me a letter to Washington and give me their interpretation, and I will see if that law can be changed, if it has to be changed. But I don't think it has to be changed by legislation. It has to be changed by regulation.

Mr. MACDONALD. As a matter of fact, they wanted us to sign a contract stating that we would not use any more water than that, and we made a stand. We said no.

The dedication of the first 10,000-acre project is scheduled next month, April 10. We decided to go ahead and do that dedication, even if we are going to have just nothing but tumbleweed in a dry area without any water.

Senator MONTOYA. I am going to be there, and be sure to have some water there from Farmington.

Mr. MACDONALD. OK.

So, Senator, those are the kinds of things that really bother us. Those are the kinds of things that have caused the Navajo to be very suspicious of any promise on the part of the Federal Government for his delivery of what they say they are going to do and also their stand and action as trustee of the tribe.

Senator MONTOYA. Will you describe the process of allocating San Juan River water? There are those who say there won't be enough water to go around for the irrigation project, for the energy development, and for municipal use. How do you look at that picture?

Mr. MACDONALD. I believe that is true, that the present demand on the San Juan River is overtaxed.

Senator MONTOYA. What do you think is the solution?

Mr. MACDONALD. The solution is to let the Navajos have however much water they want and should have, and then the rest is up for grabs between you guys.

Senator MONTOYA. Then we fight over the crumbs.

Mr. MACDONALD. That is right.

Senator MONTOYA. I don't live here. I live over in the Rio Grande where we don't have that question.

Mr. MacDonald. That is the San Juan Channel. Some of that water is going over to the Rio Grande, too.

Senator Montoya. What is the status of your 10-year plan? When was it launched?

Mr. MacDonald. It was launched back in 1973, and during that early period we started to work with the administration, the BIA, and during that time they had the BIA take over and they had an unsettled situation. So it didn't go anywhere.

Then of course once it kind of settled down, we had our own election a year and a half ago. So we kind of put it down and had a new council a year and a half ago. We introduced to the new council, and they voted on it last year, to move forward with that new plan, with an update on it.

Our program development office made an update on that. We established a special committee and a task force up in the Navajo Tribal Council to follow up on the 10-year plan, to meet with the Senators, the House of Representatives, and with the administration, and also the various departments of the Government to begin to implement that 10-year plan of the tribe.

Senator Montoya. I am going to introduce the plan into the hearing record.

Mr. MacDonald. I appreciate that very much.

[The Navajo 10-year plan appears in appendix A, p. 215.]

Senator Montoya. You have submitted it. So that it will be part of the archives dealing with New Mexico's economic development.

Mr. MacDonald. Thank you.

Let's not leave it in the archives. Let's make it active.

Senator, you as Chairman of the Economic Development will be a moving force behind making that a Navajo Nation No. 1 project.

Senator Montoya. Don't you think I have been a good implementer of your aspirations?

Mr. MacDonald. Definitely. I want to commend you for your position as Senator to tackle those sensitive issues of American Indians, and I hope you will continue to stand fast and fearless even though some of your colleagues who are so conservative, they would rather cut funds from the Indian tribe to make funds available elsewhere.

I want you to know that as long as you stand fast on those sensitive and critical issues pertaining to Indian tribes, you have no trouble having support from us.

Senator Montoya. Thank you very much. That is a good bargain.

Give me some demographic figures about your people on the Navajo Reservation that might be pertinent, such as life expectancy and the death rate and the illiteracy problem and many of the other statistics which will give us a better picture of the sacrifice and suffering of your people still in this land of plenty.

Mr. MacDonald. Yes. I know much more detailed statistics are in the 10-year program which you just placed into the record, but I will just sort of give you some of the highlights of those demographic figures that you asked for.

No. 1, which is very critical, is that the Navajo Nation today consists of close to 150,000 Navajos. That population is increasing twice the rate of that of America; which means that the Navajo is gaining in population about 5,000 Navajos, new Navajo members, each year. So the population is growing by leaps and bounds.

Consequently, the leadership of the tribe is very concerned as to how we are going to continue to keep pace with the demands of the 5,000 additional people added to the roll every year. That is the reason that the 10-year program is very critical, because all of that is incorporated in it.

In the meantime, the catchup plan so that—unemployment, as I said, is over 45 percent. The education level of the whole Navajo is still somewhere better than the eighth grade level. The average income of the Navajo is still around $800 per capita per year, which is far less than that of America, which is close to $3,000 per capita per year.

So these are the hard figures that you need to be aware of. Then again, with the land of plenty where people have water just to sprinkle, spraying out in the courtyards and what have you, still many of our people have to go 2 or 3 miles to haul water by barrels or by buckets or what have you. While the people in America take for granted just to turn the thermostat down to 68 or 70 degrees, we still have to go out and get the wood, regardless of how stormy it is, chop it, and bring it to the home and be warmed by that.

These are today's situations which greatly bother us. That is the reason that the Navajos today are driving a very hard bargain. As a matter of fact, it is almost to the point where we are making a stand that unless these issues are first addressed and are first amended, that comes before we are going to participate in the larger sense of the demands upon our mineral wealth and be a part of the program of energy production.

Senator MONTOYA. Your illiteracy in the English language is very high, isn't it?

Mr. MACDONALD. Well, no. The literacy in the English language is not that high at all.

Senator MONTOYA. I mean here in your plan you say one-third of the Navajo adults do not even speak English.

Mr. MACDONALD. Right. Illiteracy is high. The life expectancy for the Navajo is still around 49 years of age, or 47.

Senator MONTOYA. The national average is about 71 now.

Mr. MACDONALD. So there is a wide gap there.

Senator MONTOYA. I notice that you have in your 10-year plan, as it states, that there is no skill center and only minimally equipped technical, paraprofessional and skilled trades training programs for Navajo Indians.

The day before yesterday, I exhorted the BIA people, including Commissioner Thompson, to start a survey of all BIA schools in the country and to report to us how many had adequate technical and vocational programs.

I know that the ones I have listed here in New Mexico hardly have any technical and vocational programs, except for the Vocational Institute in Albuquerque, which is new.

What can you tell me about the BIA schools within the Navajo Reservation? Is that observation true?

Mr. MacDonald. Yes, to a great extent it is true. What the Navajo need and how they would like to see the need implemented is quite different from some of the programs that have been developed supposedly to meet the needs of the Navajos.

As I have stated before, and what the Navajo has continually asked, is that in order for Navajo self-determination and self-sufficiency to take hold, we must have our people, our young people, educated in all fields—the professional field, like medicine, nursing, law, engineering, and all aspects that pertain to various skills—and the technology, the scientists and technicians that would be needed to review and to make plans in the context of what the Navajos really want.

That is a great priority so far as we are concerned. Yet no one is responding to that in the magnitude that we wish it to be responded to.

BIA, they get involved in this English as a second language and how it is if you put the Navajo kids in one corner, they will learn better than if they are sitting in another corner. This kind of experimentation is still going on; while the basic need of these various hard programs that are going to lead the young people into these various professions like law, engineering, medicine, nursing, and various technological and scientific professions, these are not taking place.

Those cannot happen on chance. Those programs have got to be designed as to how the Navajos want that in a time frame. How many doctors should we have at the end of 5 years, at the end of 10 years? How many engineers should we have at the end of 5, 10 years? What kind? How many mining engineers? How many civil engineers? How many metallurgists are needed to deal with some of the minerals we have?

All of this has to be programed. It requires money. It requires coordination. It requires the understanding of the educational institutions and requires the commitment on the part of the government and the tribe and the States and private industry.

So those are not happening, and everybody is sort of going around and trying to justify the existing system that has been there over the past 100 years.

Senator Montoya. Of course, in the last few years we have been appropriating money in the Congress for Indian scholarships to enable every Indian who wants to go to college to do so. You know of that program, don't you?

Mr. MacDonald. Yes.

Senator Montoya. Of course, we have had to add money to what the President requests every year. But the result has been that there has been adequate funding for these programs for all Indians. I think they will continue.

But the only problem we have with respect to your objective is that many of the Indians who start in high school do not finish; and those who do finish, very few of them want to go on to college. That is where the problem lies, right?

Mr. MacDonald. Well, partly. There are a great deal in number that want to go to college.

Senator MONTOYA. Of course, another problem is the stringent requirements of the different professional schools in this country today where a person who has received an education which is not on a par with the national average quality of education, that person will suffer in the entrance examinations and thus not be admitted. That is another problem.

Mr. MACDONALD. Yes. I think that is one of the big problems. As I made my rounds through various universities and talked with university officials and students, one of the obstacles is the admission requirement and the status of the students in the university.

When I went to school, and still today I know it is being practiced, they bring in foreign students from Korea, from Japan, from Pakistan, everyplace else, and they waive the entrance requirements for these students and put them into special programs; and yet, at the end, they still get a degree from these universities with special permission.

Now, they don't want to do that for native American students. I believe that kind of concept should be tried, because again, as I said, if the preparation at the local level is not strengthened by the public schools or by the BIA schools, then there is a need for that.

I believe that the young people of the Navajo and Indian people have the capability of pursuing these courses if they are given the opportunity to do so and are recognized as special students.

Senator MONTOYA. I agree with you very much. They just have to have that opportunity. I have been advocating that our universities have special tutoring to bring deprived Americans on a par with others who have had the opportunity for quality education.

I think that is one of the vacuums in the educational spectrum today, that the entrance requirements are gaged to high quality education and do not take into consideration the deprived conditions that have existed in many of the school districts in America, such as perhaps not sufficiently qualified teachers or teachers who may not be dedicated or school systems that are underfunded or school plans that are not meeting today's requirements for administering educational needs to the children.

Of course, this is a long process and requires a lot of money. The Indians are at the end of the line, so to speak. It is up to the BIA schools, which are the immediate dispensers of education for Indians, to upgrade themselves through a meaningful and aggressive Government program.

I just hope that all of America becomes cognizant of this dire need that exists and that you, the Indian leaders, will continue to holler in Washington, in all forms, that we should do something about it. I am trying to do something about it, but I am just one voice in Washington.

Mr. MACDONALD. Well, that is better than no voice.

Senator MONTOYA. You remember what happened to the Navajo College funding. They were trying to reduce it to approximately one-third of what Haskell was receiving on a per student basis. They tried to give your people one-third of the funding. I had to raise it last year. You remember that.

Mr. MACDONALD. I know. You sort of caught hell for that.

Senator MONTOYA. That is right.

Mr. MACDONALD. But we appreciate your stand. Continue to stand fast and don't be afraid.

Another thing I was going to say is the reason I say don't be afraid is because I remember you also fought very hard for Taos.

We commend you for that, because very shortly we are going to ask you to do the same thing for the Navajos on the eastern part of the reservation. We have about 2 million acres of land we need to get back to the Navajo Nation. So brace yourself.

Senator MONTOYA. I am going to carve myself out into three Joe Montoyas so I can do all of this work.

Mr. MACDONALD. Right.

Senator MONTOYA. I think that is all we have right now, Chairman MacDonald. We want to thank you for your frank answers and the contributions which you made to this hearing.

Mr. MACDONALD. Thank you, Senator. Again, it is our privilege that you have listened to us. We continue to respect all those who are in Washington who listen to us and respect our needs and our wishes.

Thank you for other economic development projects that have come to the reservation. We hope you will continue to be a friend of the Navajos.

Senator MONTOYA. We certainly will.

Mr. MACDONALD. Thank you.

Senator MONTOYA. Thank you very much. We have a statement here by Mr. Lewis Etsitty who is a councilman of the Navajo Nation, and the statement will be made a part of the record at this point. He had to leave. He was here in person until a few minutes ago.

[The statement follows:]

Statement by Lewis Etsitty
Before the Subcommittee on Economic Development
Senator Joseph Montoya, Chairman
March 12, 1976

Senator Montoya, Officials of the Federal, Tribal and State Governments, Ladies and Gentlemen:

I am Lewis Etsitty, the Tribal Councilman from Nenahnezad Chapter of the Navajo Nation. I am sorry that the meeting planed for Shiprock last night had to be cancelled for it is a rare occasion when we see a U.S. Senator on the Navajo Nation - especially one there to listen instead of talk.

The people of Nenahnezad are not strangers to development: we have the Four Corners Power Plant and the Navajo Mine - America's largest strip mine - within our Chapter. And maybe that is why we are so concerned with the problems of development and so called progress. Development on the Navajo Nation in the past, and continuing today, does not seem to have been in the best interest of the Navajo people. We need jobs and I think we have been too willing to sell our abundant resources to large corporations in order to gain a few jobs - without the control over these developments that is necessary for the <u>long range</u> developments of the Navajo Nation. We send electricity, gas, and oil from our coal to other parts of the country even though many of our people have no electricity and must haul water many miles.

The problems of development are not new to the Navajo People, you need to go no farther than Shiprock to see the history of resource exploitation on the Navajo Nation - there you will see the abandoned uranium processing plant and the rusting remains of the helium plant. What did these developments bring us? Prosperity and jobs for a while and then unemployment. The decision to close those plants was not made on the Navajo Nation, it was made in the corporate boardrooms of New York or Tulsa or wherever. If past experience has taught us anything it is that the time has come that Navajo resources - our coal, land, oil, uranium and water - be used to benefit the Navajo people first - not just for a few years and not just for a few jobs but for the generation's of my children and grandchildren. And those resources which are the birthright and heritage shared equally by every Navajo must not be wantonly consumed now to satisfy the demands of California or Arizona, with no real attention to the future of the Navajo people.

As you might expect, it is not the majortiy of the Navajo people, or the people of Nenahnezad who are in favor of and promoting these new energy developments. Why? Because we know and have experienced overcrowding in our schools, the lack of proper housing, roads, and governmental services and the increase in traffic accidents and family problems that come as the result of rapid development. We have seen the loss of those special relationships between neighbors that come when too many people move in too fast. The Nenahnezad chapter has passed resolutions opposing further large scale developmants precisely because we know the full extent of the changes they bring about and don't want anymore.

I am personally opposed to the synthetic fuels loan guarantees that are being diseussed now in Congress and which, Senator Montoya, I understand you are sponsoring. First, although I don't know much about economics, I do understand that corporations usually raise capital for building their plants from the private market. If coal gasification is such a terrific idea, why is it that these companies - WESCO and El Paso - can't find enough people willing to risk their money for these developments? And why is it that certain congressmen are trying to loan them money - even though these companies receive a guaranteed profit as regulated public utilities. So with my tax money, these companies can build their plants, make gas that costs 8 or 10 times what natural gas does now, and then make a profit on it too. It is not the kind of thing I want the taxes that I pay spent on.

I am also concerned with the state's new leasehold tax legislation - it erodes Indian sovereignty and is an attempt by the state to encroach upon the special relationship between the Tribes and the federal government, It seems the only time we can get the state interested in what's happening on the Navajo is if there is some way for them to make some more money - I say now without equivocation that the Navajo People will never allow coal gasification on the Navajo Nation if this piece of legislation is in effect with respect to Indian lands.

I am happy to have had the opportunity to speak today. Thank you, Senator MONTOYA. We also have a letter from the Farmington Chamber of Commerce which will be made a part of the record at this point.

[The letter follows:]

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Farmington Chamber of Commerce

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Today is Friday, March 12
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The Honorable Joseph M. Montoya

Dear Senator Montoya:

The enclosed written presentation is being submitted for Ernest H. Bruss, Chairman of the Highways and Roads Committee for the Farmington Chamber of Commerce. Unfortunately, Mr. Bruss cannot be present for the hearing because of a death in the immediate family which required him to leave the city on March 11th. In the absence, I am submitting his formal statement which I hope will be incorporated as part of the record of the hearing conducted on March 12th.

Respectfully,

Van Miller

Van Miller
Executive Director

VM/jl

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Farmington Chamber of Commerce
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HEARINGS RELATING TO COAL GASIFICATION
CONDUCTED BY SENATOR JOSEPH MONTOYA
March 12, 1976 - San Juan College

TO THE HONORABLE SENATOR MONTOYA

As Chairman of the Highways and Roads Committee for the Farmington Chamber of Commerce, I wish to express the concern of the citizens of Farmington and the northwest portion of New Mexico regarding some of the highways serving this area. The coal gasification plants, as proposed, or the utilization of coal reserves in any manner will have a direct effect on our needs for the improvement and construction of three highways. Access to the coal leases and plants would be hampered, seriously, because of roads which have already been rated as critically deficient by the State Highway Department.

Two existing highways, State 44 and U.S. 666, which provide routes into San Juan County from the rest of the state, have long been neglected and there has been a continuing campaign for several years to bring them up to safe and adequate standards. A third highway, State 371, which travels south from Farmington to Crownpoint, is a poorly maintained, dirt road for all but a few miles and it is critical to the development of the coal leases as well as being the road which will bisect the vast 110,000 acre Navajo Indian Irrigation Project. It will serve as the prime access route into the heart of the project and will be used for the transportation of agricultural products and livestock out of the area.

The immediate need is to obtain funding to start work on these highways in order to keep pace with the development of energy resources. As there is no railroad into the area, shipments of materials and supplies will have to be brought in by truck. It should also be pointed out that, when coal gasification becomes a reality, there will be thousands of tons of by products which will have to be transported out from the plants.

Through your efforts and those of the rest of our Congressional delegation, funding was to be made available for partial construction and improvement of these three highways. The bill provided $25,000,000 in federal money with matching funds coming from the State of New Mexico and other sources. The latest information we have is that $10,000,000 has been allocated for this project but that funds have not been released and the State Highway Department is unable to start any kind of work until money is made available. We have been advised by a top representative of the State Highway Department that a figure of ninety million dollars

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would be a reasonable estimate to construct highways necessary to serve our future needs with highways that would meet accepted safety standards and provide for the volume of traffic which is anticipated.

Thank you for your past help and for any assistance you can provide us in the future that will help towards the development of all of our potential resources.

Respectfully,

Ernest H. Bruss

Ernest H. Bruss, Chairman
Highway and Roads Committee

Senator MONTOYA. We have Mr. Marlo Webb, mayor of Farmington, present. Mr. Webb, would you care to come up? And we have the mayor of Bloomfield, Mr. Ed Wagoner. Do you want to come up here and join the panel? Also, Mr. Jerry Parker, mayor of Aztec. Are they here? Mr. Jim Young and Mr. Danny Carpenter, are they here? If you would come up and join the panel here.

State Senator Jack Morgan? State Senator George Pennington? And Member of the House of Representatives, Leo Watchman?

Gentlemen, would you please identify yourselves for the record.

Mayor Webb, would you identify your associates for the record, and then we will call on you to make the original statement and then call on the others right after you in that order, in the order that you present them.

STATEMENT OF HON. MARLO WEBB, MAYOR, FARMINGTON, N. MEX., ACCOMPANIED BY JIM YOUNG, SAN JUAN COUNTY COMMISSION; AND DANNY CARPENTER, SAN JUAN COUNTY COMMISSION

Mr. WEBB. I am Marlo Webb, mayor of Farmington. To my immediate right is Mr. Jim Young, San Juan County Commission. To his right is Danny Carpenter, San Juan County Commission.

I have a status report that I will submit for the record of the city of Farmington. I do not have a prepared statement. I would like to make a few remarks, however, Senator.

Senator MONTOYA. The status report will be made a part of the record.

[See appendix B, p. 255.]

Senator MONTOYA. Do you wish your statement to be made a part of the record here, subject to your review and subject to your highlighting it?

Mr. WEBB. I just want to set the stage for the status report is all.

Senator MONTOYA. Fine.

Mr. WEBB. Senator, we would like to point out the impact in this area is not a future event but it is already upon us. It is not of our choice. We sometimes feel like the uninvited guest at the party.

We are not a party to the decisions that are being made on the impact that has been brought upon us and is proposed to be brought upon us, but we are expected to provide city services for those who do move in.

We are apparently in a position of having to react to events over which we have no control. We are very unsure of the time frame in order to prepare for this impact.

As you know, there is quite a lag from the time of construction until physical facilities are on the tax rolls and we can receive any benefits.

But we are in the unique position that most of the development is out of our taxing area. So we don't benefit from this tax base. We are the bedroom community of most of the development that is taking place. We are expected to provide city services and schools. We are the trade center.

I might mention for the record that the city of Farmington provides approximately 75 percent of the treated water that is used in

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San Juan County. We provide all of the areas west of us, including the Shiprock area and parts of the Navajo Reservation, as well as communities off the reservation.

Our scope of needs is great in all areas of the city services. Roads, being the one thing that isn't touched upon in the status report, but as was previously mentioned, internal roads within the city bounds are very vital.

There has been some very poor planning in the past. I might point out one example. We are approached in three directions by divided 4 lane highways, and they funnel into a two-lane bridge across the river, and about half a mile connecting link of two-lane highway.

We seem to be unable to get the State highway department to alleviate this condition, which is inside the city limits. We do not have the funds to face this need. We have very limited resources.

As has been pointed out by yourself, general obligation bonds are a vital factor in capital construction. At the present time we only have about $900,000 flexibility. The rest of it is used up.

In the past, these local citizens have been very cooperative in using this bonding source regarding sales tax revenue bonds. Sales tax, being one of the biggest revenue producers in our city, brings in approximately $2 million-plus a year to us and is used to a great degree, and it at the present time is limited because we can only use those funds in public buildings and adjoining parking lots.

Just this past 2 weeks we agreed to issue another $2 million worth of sales tax bonds to take care of some of our immediate needs.

Senator, in the past, the northwest part of New Mexico, and particularly the city of Farmington, has been very reluctant to use Federal funding. We have tried to do it on our own in the past. I know you know this is a very conservative area of the State. But now we find ourselves being penalized because we do not have a history of Federal funding in the past. We are not eligible for hold-harmless funds in the community development area.

This year alone our grant applications went to $250,000, where adjoining cities that have taken access to Federal funds in the past have funds given to them in the millions of dollars.

Senator MONTOYA. When did your policy change?

Mr. WEBB. As these needs have grown on us that we have not been able to face with our own funding.

Senator MONTOYA. When were your first applications made for these funds?

Mr. WEBB. We took advantage of these community development funds last year, the first year it was in activity.

Senator MONTOYA. You refused to file applications before that, is that it?

Mr. WEBB. I haven't refused to file it, no, because I have not been in office that long.

Senator MONTOYA. I mean your predecessor.

Mr. WEBB. I wouldn't say they refused. We tried to develop our needs. If we had adequate local sources, we preferred to do it that way. So far we kept up with the growth with local funding. It would appear to us we should have some awfully good credit built up in the Federal funding market because we have not taken advantage of it in the past. But, unfortunately, they do not keep books that way in Washington.

We are just recovering from the impact that we suffered because of oil and gas activity some 20 years ago, in the fifties. We are still paying for poor judgment at that time, where they attempted to get maximum benefits from limited dollars.

For instance, at that time many of our sewer lines were constructed with cement pipe that are now collapsing on us, and we are going to have to go back and replace them, at great additional cost today.

Senator MONTOYA. Whose fault was that?

Mr. WEBB. I don't believe it was anybody's fault. Senator. We were doing the best we could with the limited dollars we had in the fifties.

We grew from a town of approximately 3,500 people in 1950 to over 30,000 by 1958. Of course, when the oil and gas boom was over, about 10,000 trailer houses moved out, leaving us with a 20,000 base.

Today we have grown back up in the short 6 years. We estimate we have added another 12,000 people in a 6-year span, or a 5-year span I would say. We feel that the best approach to Federal funding as far as the city of Farmington is concerned is to have direct access to the Federal bureaus and bypass the State agencies, if we can possibly do it, such as EDA, because we find ourselves in a position of competing with the State on planning moneys.

In spite of what has been said earlier today, we question whether the State has the best interests of the local government at stake when they compete with us for planning moneys.

A case in point, and as a matter of record at this hearing: The title IX EDA funds are anticipating $100,000-plus in planning grants. We were told of this back in December, and the dealine was set for early January.

We came back, and through a consortium of local government officials, three incorporated communities and the county of San Juan applied for that fund—thinking that we would get it because we had been told those funds should be used by local sources to plan local needs.

The first thing we found was the State planning office competing with us. Then just this week we learned the Governor's office is competing with us for the funds. It looks like we are out in left field and someone again wants to do our planning for us.

Senator MONTOYA. Let me give you a little history on this subject. I have handled the EDA legislation for years. Originally the grants came to the local political subdivisions directly under the original concept as I developed it.

It was only under this administration and the previous administration where they insisted that the money go to the States to be administered by the States. I am still resisting this. I have hit a stone wall in Washington.

So if you have any recommendations to make, I hope you will make them to the President of the United States.

Mr. WEBB. Thank you, Senator. If that is the place to go, that is where we will go.

Senator MONTOYA. That is right. Because they are the ones who are insisting on making these grants directly to the State governments.

Mr. WEBB. I understand the title IX is available to local planning agencies and does not have to go to the State, and that is the reason I say they are competing with us.

Approximately 2 years ago we formed a task force with the Southwest Regional Council, and we feel like we have made great strides in local coordination and planning and affiliating ourselves with the Southwest Regional Council.

Every time we get ready to move, we are called up short and have to attend another hearing or go through another planning session.

We feel, as I indicated when I welcomed you this morning, that it is time to move forward. We are most grateful that you are here because we know your history of getting things done. Maybe now we can get on with the work at hand.

We are happy with our relationship with the State planning office, with the Southwest Regional Council, the Four Corners Regional Commission, and the EDA, and other direct agencies that we work with. We have had good results with them. We think we have developed good rapport with them.

But the eternal redtape we have to cut has got us pretty well frustrated, Senator.

Senator MONTOYA. I ride this redtape every day in Washington for many of my constituents here in New Mexico, including many mayors. It is frustrating. It is worse for me than it is for you people here because I have to really ride it every day.

Sometimes I start in the morning and I don't finish until the evening, and I have a staff of about 30 people in Washington doing about the same thing.

But I really want to have your views, Mayor, and the views of the county officials here and the other local people because I think the economic planning that you are engaged in right now is very important for the future of this region.

I have really learned a lot this morning just being here. I will perhaps learn more as we go along, because I intend to keep in touch with you.

Mr. WEBB. If I may summarize, Senator. Our budget for the present year is approximately $17 million: $6 million in utility funding, $4 million in general funding, and about $7 million in construction.

We work through revenue and GO bonds. We anticipate in the next I think 6-year span we will have capital requirements approaching $120 million, as we now forecast.

Senator MONTOYA. A year you mean?

Mr. WEBB. No; over the next 5-, 6-year span. It is all in the status report, and it is itemized and enumerated.

Senator MONTOYA. So that is in addition to the average that you have now, to the $17 million, of approximately $8 million, isn't it?

Mr. WEBB. We are funding at the present year $7 million worth of construction. We are going to be asked to fund over the next 5- to 6-year span $120 million.

Senator MONTOYA. In addition to the operating budget?

Mr. WEBB. Yes. There is no way we can reach it without outside funds. Again I would point out that we seem to be the innocent party because we have no input on when this impact takes place. We cannot program it to meet our needs.

Senator MONTOYA. Will this title IX application dealing with McKinley help you formulate some kind of a blueprint?

Mr. WEBB. We have our blueprint and have had it for some years. We are ready to go if we can get our hands on some construction money. It is all enumerated and the timeframe is in this status report.

Senator MONTOYA. Have you made any applications with any agencies?

Mr. WEBB. Yes; anyplace we can. We have had most of them turned down. We do have some ongoing projects working now.

Senator MONTOYA. Thank you very much, Mayor.

Mr. WEBB. Thank you, Senator.

Senator MONTOYA. Commissioner Young, do you have a statement?

STATEMENT OF JIM YOUNG, SAN JUAN COUNTY COMMISSION

Mr. YOUNG. Yes, sir. I have a prepared statement.

San Juan County and the municipalities within the county are presently experiencing above normal growth. A large portion of this growth can be attributed to the projected gasification projects.

Some must be credited to the Navajo Indian irrigation project.

While the proposed gasification projects and the irrigation project are located on Government or Indian lands, the county and cities adjoining are having to provide the commercial and residential facilities and the normal accompanying support services.

There is pending legislation in the Senate as well as in the House, however, Senator, and these bills, as you well know, may provide the necessary help for those areas that they were written to assist, but they are not dealing with those areas adjacent to Indian land and, therefore, are not any assistance to ourselves.

This would be in reference to Senate bill 3007, Senate bill 391, and Senate bill 7.

In regard to the Federal Energy Development Impact Assistance Act, this would provide loans. We in San Juan County are not in a position presently, I don't think, to levy taxation that would provide the opportunity of repayment of these loans with the small amount of deeded land we have for a tax base.

As you know, there is some question in reference to whether or not the taxation that we now have of non-Indian industry on Indian reservation land will be accessible in the future.

Senator MONTOYA. Can any of you tell me what proportion of the land in San Juan County is Indian land and what is not Indian land, and what is public?

Mr. YOUNG. Senator, the best of my ability, I can only give you what is public, and that is slightly over 9 percent. The remainder would be either Indian land, Government land, or land held in trust for the Navajo Tribe.

Senator MONTOYA. Nine percent then?

Mr. YOUNG. Yes, sir.

Senator MONTOYA. What is the total acreage of San Juan County?

Mr. YOUNG. Mr. Carpenter assures me it is 5,500 square miles. I have been using 6,000 as an approximation.

Senator MONTOYA. Page 5 of the status report has that information.

Mr. YOUNG. There is 59.8 percent referred to as Indian, Navajo Reservation; 29.2 percent Federal, BLM; 5.3 percent is State of New Mexico; while 0.2 percent would be inland water; and 5.4 percent private land.

Senator MONTOYA. It is 5,516 square miles.

Mr. YOUNG. Yes, sir.

May I continue, sir?

Senator MONTOYA. Yes.

Mr. YOUNG. Title IX does have some grant funds. However, these appear very limited; and I believe, as the mayor pointed out, we find ourselves somewhat in competition for those funds.

There are provisions in those funds primarily for planning, and at the present time we feel we have already formulated enough funds. What we would like is some way of implementing the plans we already have.

We produce energy in excess of our consumption, as you are most surely aware, and we export probably 60 percent or more of the energy developed and produced in San Juan County.

While we experience some positive results, we are also experiencing some negative features of the demand being made on our area to help eliminate the national dependence on foreign oil. I think perhaps we refer to this as Project Independence.

With the depletion of natural gas and the increased demand for natural gas, the synthetic natural gas, SNG, from the gasification of coal is more important right now than it has been at any time in the past.

To keep those who are now dependent on our natural gas supplied, it is our feeling they, the consumers of our exported product, should be subject to absorbing a part of the additional expense of our having provided this gas for them.

I do have a list of socioeconomic impacts of the coal gasification plant development. Unemployment, as you have already been made aware, is running in excess of 10 percent at the present time.

It is assured to us that 40 percent of these applications presently are from people out of our area, which I think emphasizes the fact that just the idea of the possibility that the gasification of coal will be implemented, we have people coming in for potential opportunities of employment.

We are having to absorb those people within our communities, within our county, and provide to them the services that we have to render to other citizens within the area.

Law enforcement is an area that is a very touchy subject to us at the present time. We have found from information provided by the grand jury for the past 10 years that the county's incarceration facility is not adequate; and yet, each time it has been submitted for a bond issue, the bond has been refused by the citizens. We are somewhat under a mandate to upgrade that facility. We have been seeking Federal funds for this through every possible grant available to us. We are meeting a stone wall in this on each occasion.

Senator MONTOYA. Maybe the local citizens don't want to go to jail.

Mr. YOUNG. Perhaps. I think all of us can recognize the need of a fine facility like a university, a college, but none of us expect to use a jail facility. So obviously it is a little difficult to have it funded.

Senator MONTOYA. There is a new provision in the Public Works Act which permits grants to be made to political subdivisions for buildings that are required for the administration of government. That is a provision that has been in the law for about 4 or 5 years. Have you tried to make an application under this?

Mr. YOUNG. I could refer you to our planner.

Miss SCHURKENS. We talked with Mr. Swearingen. He has told me jail facilities are not allowable under EDA.

Senator MONTOYA. We have had some applications in New Mexico for courthouse additions, and they will not permit any grants for jails?

Miss SCHURKENS. That is what Mr. Swearingen says.

Senator MONTOYA. The clerk on my committee informs me you can come under this law as I stated.

Miss SCHURKENS. Yes. I talked with Mr. Swearingen. I also talked with the Secretary who was here to testify this morning. They both indicated this would be under that particular heading. However, the funds are not available.

Senator MONTOYA. That is right. The administration has constrained the use of these funds.

Mr. YOUNG. So the amount of the funds that would be available would be so reduced they aren't about to provide those for one facility.

I think our facility would be demanding in the range of approximately $2 million. As you are very much aware, I am sure, we have, in addition to our district judges in this area, the third one who has been added. We are in need of providing for the judge facilities in which to hold court, and office space. Right at the present time our courthouse is so inadequate for space that we are seeking rental space to overflow.

Unfortunately, again, it appears that there are no funds available even for the courthouse annexes you were suggesting. Hopefully those funds could be implemented at some earlier than later date.

I would like to make this statement because I feel like it will have a certain amount of application here. One of the district judges, Mr. Musgrove, stated that lighter sentences and probation are being used in San Juan County for those who actually should be incarcerated for a period of time due to the inadequate facilities.

In fact, we are saying our citizens are being subjected to a criminal element on the street that should not be there because we do not have adequate facilities to house them.

I might say, and perhaps you won't take this to be facetious, but if we can find funds, shall we say, to experiment with a frisbee, hopefully we can find funds to build a jail.

Housing in San Juan County is at a premium despite the vast number of housing units currently under construction. Most of the housing units and apartments cost far in excess of what the average worker can afford.

According to Van Miller, Farmington Chamber of Commerce, rental units average $300 per month. According to the abstract companies, the average new home cost is $500 per month to purchase. This puts our housing among the highest in the Nation.

We have applied for the section 8, housing assistance program, under HUD which will allow relief for some low-income persons. The project, however, is still pending in Dallas.

Last year three mobile homes were sold for each housing unit, according to the Board of Realtors. Some of these mobile homes do not meet State regulations for construction.

Other areas of energy development, such as Rocksprings, Wyo., and Gillette, Wyo., have proven the demand placed on housing. Many of the initial work force will be living in mobile homes. We need proper planned mobile parks with adequate facilities. Front-end money is a must to build these facilities because they have to be in operation before construction begins.

Utilities must be developed to accommodate additional housing and commercial demands. At present it takes from 12 to 18 months to complete an application and receive the money for such projects.

What we need is up-front money, not money after the fact. What we need again, in emphasizing the mayor's remarks, is to cut the red tape and expedite the funds being received and implemented.

Senator MONTOYA. May I interrupt you here. This committee has drafted a bill, a Public Works Development Act, which has a title X provision—call it title X—in which the authorization is for $500 million for the whole country.

Under the provisions of this title, the administration is mandated to approve projects which can be finished within a 12-month period and must be considered from the pipeline of applications already in being and found to be feasible.

So I would suggest that if you people are interested in getting this approved, that you file an application under this title X of the Public Works Development Act as soon as possible, because the funding will probably not occur until approximately 3 months from now, if the bill is signed by the President.

Mr. YOUNG. That is quite an "if."

Energy development could, although it is not desirable on our part, be restricted or regulated because of our inability to provide housing and proper health factors that accompany the housing in the areas of heating, lighting, sewer, water, garbage collection, et cetera.

I think the major emphasis—and I would like to reiterate it once more—is the sewer factor. The cities of Aztec, Bloomfield, and Farmington are all in need of replacing ancient sewer lines and of new treatment plants for their sewage.

The unincorporated areas of the county have grown rapidly in the past 5 years, and they, too, are creating a need for sanitation districts and construction of sewer lines within the county, particularly in Lower Valley, Flora Vista, Lee Acres, and the Totah Vista areas. These areas are growing so rapidly that additional septic tanks are likely to create health hazards to the residents.

In regard to water, the municipalities of Aztec, Bloomfield, and Farmington are currently considering and are constructing additional water storage and treatment facilities for residences. However, we have six water users associations in San Juan County. Each of these associations is in need of expansion of facilities and distribution facilities.

This is creating a very dire problem, and there are a number of areas that have had a great deal of difficulty in accumulation of funds for the expanded needs.

In regard to some of the social related problems, drug, alcohol and related emotional problems, in our county we have the Sun Juan Mental Health Clinic, the Self-Help Center, and the Totah Council on Alcoholism which does operate a halfway house.

These projects need to be expanded with increased populations and will need better coordination than appears to exist at the present time.

We haven't met with as much success as we would like.

In regard to schools, I would like to bring to your attention the fact that I guess four school districts that exist in San Juan County have all recently passed bonds. This is the problem of the county in general, not so much so in their ability to pass bonds but in the ability to get the voters to vote for them.

The San Juan County situation is also a matter of providing for a $3 million bond issue in addition to passing the $6.8 million bond issue to provide health facilities in the San Juan County through the San Juan Hospital.

On March 19 the bond will be placed before the voters for election. Hopefully it will be passed. If so, we are not calling on the Federal Government to provide us with all of our needs.

Due to the population growth, we might wish at a future date to consider a clinic in the outlying areas in addition to the hospital facilities that we have. We would like to have this staffed with a physician or physician's assistant for emergency use.

In regard to emergency medical vehicles and staff, at the present time they are needed very badly with the increased growth of the county. We have two ambulances that have been applied for to be used in conjunction with the hospital, due to only one private ambulance being available. The private ambulance is no longer going to be available.

I think perhaps you might be aware we are working on a plan whereby the hospital would actually provide the ambulance service with subsidies from the county and three municipalities.

Fire equipment, at the present time there are five fire districts. We have a fire marshal who oversees these districts. These fire districts are in need of additional equipment.

This is particularly true, and I think emphasized even more so, in the western end of the county where we have those expensive plants in existence. We are at the present time providing the fire service for those areas.

Parks and recreational services: The need for parks and recreational facilities is due not only to the increase in the number of people in the county but a corresponding decrease in land area. Building for community facilities and outdoor recreational areas are very badly needed.

I think perhaps the idea of the road has been touched upon quite a bit. Let me emphasize the Santa Fe Railroad Systems is studying the feasibility of building a railroad spur into the southern section of San Juan County to service the uranium impact area.

Of course, we have been looking at the potential of developing a regional jet port for air service.

The pressure on the existing county roads is a great pressure.

In closing, Senator, if you would allow me—and shall I say I apologize perhaps for repetition—while we at the local government level invite the knowledge, interest, and assistance from those of higher government bodies and their bureaucratic arms, it is our feeling that the local authorities should have the lead role and final say on the various questions that are to be resolved.

We feel grants should be made to local governments, that studies and plans already developed should be used and implemented. We are reluctant to be studied further and see all funds tied up while these studies are being made.

We need help now to meet the demands of tomorrow, in order to avoid the chaos that appears to be imminent.

Thank you, sir.

Senator MONTOYA. Thank you very much, Commissioner Young Now we have Commissioner Carpenter. You have a statement here which I have read also which almost duplicates what William Parker has said.

If there is no objection, we will incorporate it in the record and you may proceed to give us your highlights and any further implementation you wish.

[The statement appears on p. 136.]

STATEMENT OF DANNY CARPENTER, SAN JUAN COUNTY COMMISSION

Mr. CARPENTER. Thank you, Senator. You took the words out of my mouth. I was going to sound like a broken record up here.

I think the highlight of my input would be to advise you that we have what we call a San Juan Regional Committee. This is an organization made up of various entities in this country. Voting representatives are a member from each: Aztec, Bloomfield, San Juan County, and Farmington. We have associate members at the present time. We have representatives from the Navajo Tribe, the San Juan Hospital, and other organizations if they so wish.

Our organization began in December to fill a need for closer coordination between the various groups in our county. Space is donated by the city of Aztec; planning time for the executive secretary is donated by San Juan County. Farmington and Bloomfield will donate services as needed.

Governor Jerry Apodaca has approved our organization for conducting A–95 reviews. We also plan to work closely with whatever organization is contracted to do the title IX development study.

My colleague, Mr. Young, went over the immediate needs, along with Mayor Webb, as to what this area is faced with. So I won't elaborate on that.

In closing, Senator, we certainly appreciate your interest in San Juan County. I hope that you will assist us in providing the services to our citizens. The San Juan Regional Committee in San Juan County wishes to work with the office and the Economic Development Administration in every way possible.

Senator MONTOYA. Thank you. I will assure you gentlemen that I will work very closely with you and try to be of whatever help I can render. I do hope that we maintain close liaison with each other's offices so we can be of service to the people of this particular area.

Thank you for appearing before this committee.

Mr. CARPENTER. Thank you, sir.

[Commissioner Carpenter's statement follows:]

I'M DANNY CARPENTER, I'M CHAIRMAN OF THE SAN JUAN REGIONAL COMMITTEE AND A MEMBER OF THE SAN JUAN COUNTY COMMISSIONERS.

FIRST, I'D LIKE TO TELL YOU A LITTLE ABOUT THE SAN JUAN REGIONAL COMMITTEE. THIS IS AN ORGANIZATION MADE UP OF THE VARIOUS ENTITIES IN THIS COUNTY. VOTING REPRESENTATIVES ARE A MEMBER FROM EACH: AZTEC, BLOOMFIELD, FARMINGTON AND SAN JUAN COUNTY. ASSOCIATE MEMBERS ARE A REPRESENTATIVE FROM THE NAVAJO TRIBE, THE SAN JUAN HOSPITAL, AND OTHER ORGANIZATIONS MAY JOIN IF THEY WISH.

OUR ORGANIZATION BEGAN IN DECEMBER TO FILL A NEED FOR CLOSER COORDINATION BETWEEN THE VARIOUS GROUPS IN OUR COUNTY. SPACE, IS DONATED BY THE CITY OF AZTEC, PLANNING TIME FOR THE EXECUTIVE SECRETARY IS DONATED BY SAN JUAN COUNTY. FARMINGTON AND BLOOMFIELD WILL DONATE SERVICES AS NEEDED.

GOVERNOR JERRY APODACO HAS APPROVED OUR ORGANIZATION FOR CONDUCTING A-95 REVIEWS. WE ALSO PLAN TO WORK CLOSELY WITH WHATEVER ORGANIZATION IS CONTRACTED TO DO THE TITLE 9, DEVELOPMENT STUDY.

OUR AREA HAS BEEN RELUCTANT IN THE PAST TO ASK FOR OR EVEN ACCEPT ASSISTANCE FROM THE FEDERAL GOVERNMENT. WE NOW REALIZE THAT THIS HAS BEEN A HINDERANCE IN RENDERING SERVICES TO OUR CITIZENS. THE OIL AND GAS BOOM OF THE 1950'S AND THE SUBSEQUENT "BUST" PERIOD OF THE 1960'S HAS LEFT OUR AREA WITH MANY NEEDS. TODAY'S ENERGY RESOURCE DEVELOPMENT ADDS TO THESE NEEDS.

SOME OF THE NEEDS WHICH WE SEE IN THIS AREA ARE:

(1) A COUNTY-WIDE "HALL OF JUSTICE"-A NEW DETENTION FACILITY IS NEEDED.

OUR CURRENT COUNTY JAIL WHICH HAS A MAXIMUM CAPACITY OF 40 PERSONS IS FAR EXCEEDING THIS IN NEED. THE COUNTY IS RESPONSIBLE FOR HOUSING PERSONS AWAITING TRIAL AND FOR HOUSING THOSE WHOSE SENTENCE IS LESS THAN 1 YEAR. WE ALSO HAVE AN AGREEMENT TO HOUSE THE PERSONS ARRESTED BY THE AZTEC AND BLOOMFIELD CITY POLICE. OUR NEED HAS GROWN RAPIDLY AS PERSONS COMING HERE TO SEEK WORK ON THE COAL GASIFICATION PLANTS HAVE BEEN FACED WITH A LACK OF EMPLOYMENT AND MANY HAVE TURNED TO CRIME FOR EMPLOYMENT.

OUR COURTROOMS ARE INADEQUATE ALSO, A THIRD JUDGE IS NEEDED AND HAS BEEN APPROVED BY THE STATE LEGISLATURE FOR THIS AREA IN ORDER TO KEEP UP WITH THE INCREASED WORK LOAD.

THIS FACILITY WILL COST APPROXIMATELY $2 MILLION AND WE WILL NEED FEDERAL ASSISTANCE FOR THE PROJECT. WE WOULD BE ABLE TO PROVIDE SOME LOCAL FUNDS, PERHAPS 10% TO 25% .

THUS, THE SAN JUAN REGIONAL COMMITTEE DOES SUPPORT THIS NEED FOR A NEW DETENTION AND COURTROOM FACILITY. A STUDY CONDUCTED LAST FALL BY THE SAN JUAN COUNTY PLANNING DEPARTMENT IS AVAILABLE GIVING FULL INFORMATION ON THIS NEED.

(2) ANOTHER VAST NEED FOR OUR AREA, IS THE NEED FOR AN EXPANSION OF OUR WATER AND SEWER SYSTEMS. THIS IS TRUE OF THE MUNICIPAL AREAS, MOST OF WHICH ARE NOW IN THE PROCESS OF ENGINEERING STUDIES TO UPGRADE CURRENT SYSTEMS AND, WHERE NECESSARY TO EXPAND EXISTING FACILITIES. IT IS ALSO TRUE, OF THE RURAL AREAS. MOST OF OUR

WATER USERS ASSOCIATIONS, ARE INADEQUATE TO HANDLE THE CURRENT NEEDS, FOR SUPPLYING WATER TO THE AREAS THEY SERVE. PARTICULARLY HARD HIT ARE THOSE AREAS TO BE GREATEST AFFECTED BY THE INFLUX OF PEOPLE FOR THE INDUSTRIAL DEVELOPMENT CAUSED BY THE COAL GASIFICATION AND THOSE AREAS LIKELY TO FURNISH THE RESIDENT FOR SUPPORT SERVICE PERSONS. THESE ARE THE LOWER VALLEY WATER USERS ASSOCIATIONS. THE LEE ACRES WATER USERS ASSOCIATIONS AND THE FLORA VISTA WATER USERS ASSOCIATIONS. THE WATER USERS ASSOCIATIONS DO NEED TO UPGRADE THEIR DELIVERY SYSTEMS FOR WATER AND TO INSTITUTE PLANS FOR SANITATION DISTRICTS.

SANITATION FACILITIES IN THE MUNICIPALITIES ARE IN NEED OF EXPANSION OF CURRENT FACILITIES AND REPLACEMENT OF MANY EXISTING LINES. THERE ARE AT PRESENT NO SANITATION DISTRICTS IN THE COUNTY. THE NEED FOR THESE WILL SHORTLY CREATE A HEALTH HAZARD IF THE SITUATION IS NOT CORRECTED, ESPECIALLY IN LOWER VALLEY, LEE ACRES AND FLORA VISTA BECAUSE OF THE IMPACT FROM INDUSTRIAL DEVELOPMENT.

WE WILL NEED FEDERAL GRANTS AND LOANS IN ORDER TO BRING WATER AND SEWER TO THE NEEDED LEVEL.

(3) THE NEED FOR ROADS IN THE LOCAL AREAS ARE CRUCIAL. THIS IS ESPECIALLY TRUE OF THE FACT THAT ONLY A ONE-LANE BRIDGE, SERVES THE PROPOSED DEVELOPMENT AREA. IT IS THE ONLY BRIDGE BETWEEN FARMINGTON AND SHIPROCK — A DISTANCE OF 26 MILES. WE HAVE REQUESTED ENGINEERING ASSISTANCE ON THIS PROJECT FROM THE STATE HIGHWAY DEPARTMENT. HOWEVER, WE WILL NEED FUNDS TO BUILD ANY RECOMMENDED BRIDGES AS EACH BRIDGE WILL COST APPROXIMATELY $1 MILLION. BASICALLY

THE BRIDGES WILL BE NEEDED AS THE INDUSTRIAL DEVELOPMENT IS LOCATED ON THE SOUTHSIDE OF THE SAN JUAN RIVER AND THE RESIDENCES ARE LOCATED ON THE NORTHSIDE OF THE RIVER.

OTHER LOCAL ROADS ARE ALSO IN NEED OF UPGRADING, BOTH FOR SAFETY AND TO CARRY THE INCREASED TRAFFIC.

(4) WE ARE IN NEED ALSO OF OTHER SERVICES SUCH AS HOUSING FOR THE INCREASE OF POPULATION.

PARKS AND COMMUNITY BUILDINGS ARE NEEDED AS YOUR POPULATION INCREASES AND LAND NEAR RESIDENTIAL AREAS BECOMES MORE SCARCE.

CLINICS AND OTHER MEDICAL FACILITIES WILL BE NEEDED. MANY OF OUR PEOPLE RESIDE AS MUCH AS 50 MILES FROM MEDICAL SERVICES.

TRAINING FOR OUR UNEMPLOYED PERSONS WILL BE NEEDED SO THAT THEY MAY OBTAIN EMPLOYMENT WITH OUR NEW INDUSTRY. A SAVINGS TO BOTH INDUSTRY AND THE COMMUNITY WILL BE RECOGNIZED AS LOCAL PEOPLE CAN BE EMPLOYED.

FIRE STATIONS AND FIRE EQUIPMENT WILL NEED TO BE UPGRADED TO COVER THE INCREASE IN POPULATION.

WE APPRECIATE YOUR INTEREST IN SAN JUAN COUNTY. I HOPE THAT YOU WILL ASSIST US IN PROVIDING THESE SERVICES TO OUR CITIZENS.

We realize that often times studies are needed to verify the need for some services. We would prefer that if possible studies will be conducted at the local level or the State level rather than contracting such work to firms from other areas which do not understand our rapid increase in population and the difficulties which it brings.

The San Juan Regional Committee and San Juan County wish to work with your office and the Economic Development Administration in every way possible.

Senator MONTOYA. We will be in a 5 minute recess. I have some people that came from out of town. I want to see them for about 5 minutes and then I will continue with the hearing.

[Brief recess.]

Senator MONTOYA. The committee will be in order.

Our next witness will be Mr. Sam Smith, vice president, El Paso Natural Gas, El Paso, Texas; and Mr. Robert Rudzik, general manager, Western Gasification Company of Los Angeles, Calif.

STATEMENTS OF SAM SMITH, VICE PRESIDENT, EL PASO NATURAL GAS CO., AND ROBERT RUDZIK, GENERAL MANAGER, WESTERN GASIFICATION CO.

Senator MONTOYA. Mr. Smith, how long is your statement?

Mr. SMITH. 12 pages, sir.

Senator MONTOYA. Would you mind submitting it for the record and then highlighting it, or would you rather read it all?

Mr. SMITH. I have had two of my staff working on a summary this morning, and due to the fact I tried to cover so many things, we haven't been able to do a job that we feel comfortable with.

I hate to take up the time, but perhaps it would be best if you could allow me the indulgence to read the entire statement.

Senator MONTOYA. Yes, sir. You may do so.

Mr. SMITH. Thank you, sir.

The social and economic effects of industrial development on communities are known to El Paso Natural Gas Co. Our company has not forgotten the problems that existed in the early 1950's when the city of Farmington was trying to accommodate the influx of people involved in the development of the gas fields and the construction of El Paso's natural gas processing facilities and pipelines.

In 1972, when El Paso initiated its design efforts for the coal gasification project, it also started work to address the problem of the availability of housing and related facilities, and of the socioeconomic impacts arising from project activities.

Our purpose was not merely to minimize the difficulties that might arise in San Juan County but also to maximize the educational, cultural, and economic benefits to the Navajo Nation and to the people residing in neighboring areas.

In the course of this effort, three separate studies covering many aspects of housing and "new town" planning were prepared by consultants at the joint expense of El Paso and WESCO.

With your permission, Senator, I would like to introduce into the record two of these studies which really contain the meat of the work that was done.

Senator MONTOYA. Without objection, the studies will be made available to the committee as part of the documents of this hearing.

Mr. SMITH. Thank you, sir.

[The studies referred to appear in appendix C, p. 285.]

Mr. SMITH. These three studies basically resulted in identifying the major problems that are faced in connection with energy expansion.

In addition to conducting these three studies, El Paso also engaged in a serious inquiry with HUD to explore the means by which new town planning on the Navajo Reservation could be implemented.

Several Navajo Nation representatives were involved in these studies pursuant to the interest expressed by the chairman of the Navajo Tribal Council.

These studies also addressed the impacts and considerations arising from implementation of the Navajo Indian irrigation project, which will involve the most extensive utilization of the land and create the largest potential demand for new housing facilities.

Among the more pertinent findings of these studies, relative to conditions on the Navajo Reservation, are the following:

One: Between 72 percent and 90 percent of the present housing on the reservation is considered substandard.

Two: About 90 percent of the income earned on the reservation is spent off the reservation to purchase goods and services. In the absence of significant town growth, there has been little opportunity to develop retail services and businesses which would, in turn, provide additional jobs and economic multipliers for businesses doing business on the reservation.

Three: It is likely that Navajos would represent about 70 percent of the households and more than 80 percent of the population of a new town.

Four: In terms of employment, a new town which would be economically self-sufficient, permanent in nature, and have the capability to offer continually expanding opportunities for the Navajo people, could have a beneficial impact greater than all previous industrial activities combined.

Direct Navajo influence on the planning, design, and governing phase of new town implementation would assure proper attention to Navajo cultural needs and preferences.

While new town objectives cannot be easily achieved, they are attainable with proper coordination and commitment. Facilities suitable for housing the initial influx of construction workers on the reservation could be utilized as the nucleus for the development of a permanent new community.

The desired amenities and required utility services, and municipal government design, could be planned in appropriate increments to accommodate growth of transient and permanent populations.

Adequate funding for planning purposes and the cooperation of the Navajo Tribe, the Navajo Agricultural Products Industry, the companies proposing these projects, as well as the assistance of local, State, and Federal agencies, will be needed.

The Navajo Tribe would require assistance for planning and implementation, as private companies are not empowered to unilaterally undertake such responsibilities on the reservation, thus placing emphasis on the requirements of tribal commitment and joint coordination.

The city of Farmington, while established and prospering, will experience rapid growth in numbers and be called upon to satisfy correspondingly increased demands for housing, utility services, and amenities.

The leadtime required to plan, finance, and construct schools, hospitals, utilities, and roads is longer than the period from receipt of approvals and the arrival of construction crews.

Furthermore, there is little or no income to be derived from new taxes during much of the preoperation phase of the project, which is also the time of greatest need for funds to provide such new facilities and services.

The means by which these impacts in and around the Farmington area can be most easily accommodated has been a matter of continuing study since inception of project planning. We have worked with all of the local people for the objective of identifying the problems and developing programs.

Representatives of El Paso have been interacting with appropriate governmental entities, such as city, county, and State officials, the state planning office, Farmington Industrial Development Service, Farmington Chamber of Commerce, Four Corners Regional Commission, and Southwest Federal Regional Council, among others.

The list is long and the amount of effort expended has been substantial; the objective being to identify the problems and to develop plans by which growth can be accomplished in an orderly fashion—without compromising existing living standards while extending the present quality of lifestyle to an expanded population.

The environmental impact of the proposed coal gasification project was addressed in the draft Environmental Impact Statement for the Burnham Complex, which was filed by the Department of Interior Bureau of Reclamation on July 16, 1974. Subsequently, public hearings were held in March 1975.

This draft statement (designated INT DES 74-76) is now being finalized and submittal to the Council of Environmental Quality is expected during the spring of this year. This document describes the socioeconomic as well as the physical effects of the proposed coal gasification project.

The economic impact of the project on the region would be significant and would result primarily from direct employment and secondary employment supported by local purchases of goods and services.

Hiring of construction workers for the gasification facilities would begin approximately 6 months after all necessary approvals have been obtained and the satisfactory financial arrangements have been made.

The plant construction work force will peak at approximately 3,500 persons. Hiring and training of 883 permanent plant operating personnel would begin approximately 2 years after receiving necessary approvals. The mining construction work force would total approximately 500 and the operating personnel about 340.

Goods and services purchased locally for the plant would reach a peak of about $3 million per year during construction and would average approximately $4 million per year during operation of the initial plant.

Based on 1975 information, El Paso has estimated that taxes, other than income tax, would be approximately $10 million per year during operation. Gross receipts and compensating tax on a $1 billion complex would amount to approximately $27 million during the 3-year construction period.

Total operating payroll for a 288 MMSCFD complex would be $13.6 million per year in January 1976 dollars.

The complex would occupy approximately 1,900 acres. The maximum number of people to be disturbed if the entire coal lease, containing 40,287 acres, were mined would be 24 families consisting of 47 adults and 52 children. Less than one-half of this area would be mined to supply a 288 MMSCFD complex for 25 years.

El Paso and Consolidation Coal Co., the joint owners of the Navajo coal lease, will reimburse the Navajo Tribe for relocation costs and for the value of improvements disturbed.

El Paso and Consol originally requested support by the New Mexico Interstate Stream Commission for a water contract with the United States providing for 28,250 acre-feet annually. Approval from that Commission was granted on September 8, 1972, followed by a letter of support from the Governor of New Mexico, addressed to the Secretary of the Interior, on September 12, 1972

A draft contract was negotiated and has been submitted by the Bureau of Reclamation to Interior. Approval of the contract must be granted by the Congress prior to execution by the Secretary of the Interior. The 288 MMSCFD plant being discussed here today will require approximately 10,000 acres-feet per year.

Coal gasification project costs run into the hundreds of million dollars. El Paso's proposed 288 MMSCFD plant was estimated in 1975 to cost $940 million. The cost of the gas over a 25-year period was estimated to be $2.75 per MCF.

Senator MONTOYA. May I ask this question now: Have you figured out what the additional cost would be on this $940 million plant for every year of delay?

Mr. SMITH. In a couple of paragraphs later, Senator, I give you some numbers on that.

Senator MONTOYA. All right.

Mr. SMITH. In view of the large capital investment requirements and the risk of technological, market, and legislative changes, the companies sponsoring these coal gas projects—including El Paso—have asked the Federal Power Commission to approve a tariff under which all costs are eventually borne by the consumer.

And even if a project is certificated which approves such a tariff, it may still be difficult, if not impossible, for the gas industry to finance these projects by conventional methods of issuing stocks and bonds without some form of Federal financial guarantees.

This could take the form of direct loans, grant assistance, or loan guarantees comparable to those provided for construction of ships in the U.S. under the Merchant Marine Act of 1936.

Some propose that loan guarantees be limited to small, independent producers. The fact that $1 billion of new investment exceeds the present total capitalization of all but the very largest gas transmission companies makes this concept unrealistic.

Others state that loan guarantees would push a technology that is not competitive with any alternative. This will be hard to believe by the homeowner who is forced to convert to electricity, at perhaps twice the cost, due to the lack of available synthetic fuel.

It has been stated that the market will determine the time when there is a need for coal gasification. This is true. However, due to the long lead time for projects such as these, it must be market forecasts that determine the need, and these forecasts show that construction should start today.

You have expressed concern regarding the continued spiraling cost of these projects. We too are extremely concerned over this problem. This is one of the major factors requiring us to adjust our thinking regarding the requirements for financing.

Our original FPC application, filed in November 1972, reflected an estimated capital cost of $353 million. Approximately 1 year later, that application was supplemented to show the cost at $491 million. Our latest estimate, completed in January 1975, placed the cost of the plant at $940 million.

We don't know what the actual completed cost will be but, assuming only a 7.5 percent inflation rate, the cost of the plant is increasing at a rate of over $200,000 per day. Administrative and regulatory delays must be reduced to a minimum.

Senator MONTOYA. Let's put in a proper figure on a yearly basis. Seven times 94 is $65 million.

Mr. RUDZIK. I will mention this a little later. Our 1976 estimate puts that a little closer to $75 million a year.

Senator MONTOYA. That is with a half of 1 percent which I didn't figure.

Mr. RUDZIK. Yes. We are higher than this on our estimated cost.

Mr. SMITH. Seven and one-half is a low figure. Eight to 10 is really a better number.

Senator MONTOYA. What is that?

Mr. SMITH. Eight to 10 percent.

Senator MONTOYA. I have been conducting hearings in the Joint Committee on Atomic Energy on reactors. The cost of reactors is going up faster than 7.5 percent.

Mr. SMITH. Yes, sir.

Senator MONTOYA. I think you are in the same ballpark.

Mr. RUDZIK. The same kinds of materials.

Mr. SMITH. Yes, sir.

Senator MONTOYA. I would say you are closer to 12 percent.

Mr. RUDZK. We are using 11.

Senator MONTOYA. You are closer to 12 percent. Your 7.5 is very conservative.

Mr. SMITH. We of course would like to see the administrative and regulatory delays related to such projects as this coal gasification project be reduced to a minimum.

The socioeconomic impacts upon northwestern New Mexico arising from our project are real, and they are major. However, the potential benefits flowing from this project are also real and major, and they will be of long duration.

A couple of the gentlemen this morning, without referring to names, talked about ghost towns, and the following paragraph particularly relates to that.

Lurgi coal gasification technology is in compliance with State and Federal environmental standards, and the pipeline quality gas produced is the most pollution-free fuel.

There will be an increasing demand for this fuel as far into the future as anyone can predict with any assurance. These plant facilities will similarly be utilized far into the future to consume coal produced from increasingly greater depths under the El Paso-Consolidation Coal Co. lease and possibly from other coal leases.

Thus, this plant and related byproduct facilities will be utilized for many years to come, so that the housing, utilities, primary and secondary employment potential, trade and commercial ventures can be planned with a sense of permanence.

This aspect of the project should be highly regarded, as relatively few enterprises can offer such assurance as to duration.

Assistance will undoubtedly be required to deal with the local impacts arising from such major energy projects. El Paso strongly endorses legislation designed to provide such aid, such as has been included in certain of the synthetic fuel project loan guarantee bills and in H.R. 11792.

I don't belive that by name at least H.R. 11792 has been perhaps explained clearly today. This is a bill which I am sure you are familiar with, Senator, that was introduced in the last 10 days or so calling for $1 billion to be provided to State and local communities in covering problems that might result or develop as a result of major energy projects.

Senator MONTOYA. Yes. That is the Javits-Humphrey bill, I believe.

Mr. SMITH. No; the Congressman from Florida.

Senator MONTOYA. But it was introduced in the Senate by Senators Humphrey and Javits.

Mr. SMITH. I have not seen the Senate version yet.

Senator MONTOYA. S. 3007.

Mr. SMITH. While I am speaking for our company, I certainly endorse the general thrust of such a bill, but the bill does cause me some concern as to the way it is worded. I think my concern is in line with some of the concerns you have expressed today, as this bill puts the assistance to be granted in the hands of the Secretary of the Interior.

This bill gives the Secretary of the Interior wide discretionary powers to authorize and determine the use of the moneys that might be appropriated, with little control left to local authority.

Two: Moneys are set aside for base employment impacts only, with nothing included for secondary employment impacts.

Three: No assistance would be provided for temporary peaks of employment, such as the construction work force.

Speaking in behalf of a company which has enjoyed a continuous business relationship with the Farmington community and with the Navajo Nation for over 25 years, during which time some 500 separate agreements with the Navajo Tribe have been entered into, I believe that we can point with some degree of satisfaction to past accomplishments and can look with great confidence to the future.

If the Navajo version of the American dream is to be realized—not assimilation, not the melting pot, but self-sufficiency as a reservation—I believe that what we at El Paso have proposed represents a unique opportunity for the Navajo people and industry, working together, to accomplish some very worthwhile objectives.

To be sure, in the development of a portion of the Navajo Nation's vast energy resources and, more important, in the development of its human resources—of which an estimated 62 percent are unemployed—the chairman gave a lower figure, 45 percent; and perhaps his number is more accurate than the 62-percent figure I have —there will be problems to overcome which will require the very best efforts of people from diverse cultural backgrounds.

The Navajo Tribe has taken two significant steps to assure the orderly development of its resource potential. A 10-year plan, at the direction of Chairman Peter MacDonald, has been designed to permit, and encourage, economic development in accordance with predetermined priorities.

In addition, he has established the office of program development, Office of Navajo Labor Relations, resources committee, and the Economic Development and Planning Committee of the Navajo Tribal Council which promote and protect its economic interests—that is, the Navajo Tribe—and, in addition to that, the Navajo Environmental Protection Commission was established in August 1972, to safeguard the quality of life on the reservation throughout the process of economic development.

The city of Farmington and surrounding area too should enjoy a healthy and sustained outlook for prosperity and diversified growth. An uncompromising quality of lifestyle is the potential reward for solving the difficult problems associated with the early years of rapid growth.

Without question, the close cooperation of the Federal Government, the Navajo Nation, the State of New Mexico, and private industry, is absolutely vital to the success of a project of the magnitude and duration of the El Paso coal gasification project.

I am confident that men and women of purpose and good will can, and will, work in harmony to bring about this goal.

Thank you, Senator.

Senator MONTOYA. Thank you very much, Mr. Smith, for a very lucid statement and a very explanatory one.

The project which you have in mind for which you have applied for a water allocation, how soon after congressional approval would you be ready to proceed with the project? Would that be contingent on funding, or are you ready with that funding?

Mr. SMITH. No, sir. We need to see a loan guarantee type bill passed by Congress and, in addition, would need to finalize our agreements with the Navajo Tribe before we would be able to have a project.

Senator MONTOYA. What would be that timetable before you start construction? What is your estimate?

Mr. SMITH. Assuming that Congress in this session passes a loan guarantee and we receive a Federal Power Commission certificate that is acceptable and one that will lend itself to financing, and we finalize our agreements with the Navajo Tribe, we hope to start construction by 1977.

Senator MONTOYA. Will your plants be built even if there are no loan guarantees? I don't think loan guarantees were talked about when you people were trying to negotiate these contracts, were they?

Mr. SMITH. No, sir. We didn't realize the costs were going to be so great. That is why we have now asked, and I would like to emphasize that we feel these loan guarantees are essential and probably absolutely mandatory if we are going to be able to go forward with the coal gasification project.

Senator MONTOYA. Have you thought of the idea of bank participation with Federal guarantees, or would you want to use these guarantees and just go and borrow the money?

Mr. SMITH. I don't want to reject out of hand any concept. I would prefer to review your question.

Senator MONTOYA. I don't want to trap you on this. What I am thinking about is small business concept where the banks participate on 10 percent of the loan, and then there is a guarantee by the Federal Government.

You would want perhaps a complete loan guarantee by the Federal Government on all the loan?

Mr. SMITH. Yes, sir.

Senator MONTOYA. What if the Congress does only part of it; say participate only by way of guarantor on the part of the Federal Government for 50 percent of the loan or 60 or 70, as the case may be? S. 2869 provides for 75 percent guarantee of the loan.

Mr. SMITH. Yes, sir. I am familiar with it, and I have a copy of it. I have analyzed that bill. I have also looked at its companion bill.

With the Senator's permission, I would like to provide some suggestions and comments on those two bills.

Senator MONTOYA. Sure, if you would.

Mr. SMITH. I would be pleased to.

Senator MONTOYA. I would like to know what the industry is looking at by way of acceptability.

Mr. SMITH. We just completed a preliminary analysis of the two bills yesterday. We do have some suggestions and comments. We will focus on that matter in a very expeditious manner and furnish you our comments in writing.

[The information requested follows:]

El Paso NATURAL GAS COMPANY

P.O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

SAM SMITH VICE PRESIDENT

March 30, 1976

The Honorable Joseph M. Montoya
United States Senate
5229 Dirksen Building
Washington, D. C. 20510

Dear Senator Montoya:

During the hearing of the Subcommittee on Economic Development, Senate Committee on Public Works, which you chaired in Farmington, New Mexico on March 12, 1976, you requested the comments of El Paso Natural Gas Company with respect to legislation sponsored by Senators Randolph, Jackson, Montoya and Domenici (S.2869) and Representative Teague (H.R. 12112), both of which would provide Federal loan guarantees for coal gasification and other types of energy projects. In response to your request we offer the following comments.

El Paso Natural Gas Company supports the principle of Federal loan guarantees for coal gasification projects and other capital-intensive energy projects as embodied in both S.2869 and H.R. 12112.

The coal gasification project proposed by El Paso Natural Gas company on the Navajo Indian Reservation in northwest New Mexico would produce approximately 288 million cubic feet per day of synthetic natural gas beginning in 1980, assuming the timely receipt of all authorizations and further assuming satisfactory financing for the project. We presently estimate the capital cost of our proposed Burnham Plant to be approximately $1 billion in 1975 dollars or about twice the estimated cost of such a plant three years ago. The sponsors of other, subsequent coal gasification proposals fully confirm such escalations in their own cost projections.

The magnitude of the required investment, together with the fact that the first commercial pipeline quality coal gasification plant has yet to be built, has inevitably caused considerable concern among potential private investors as to the ultimate feasibility of coal gasification on a commercial scale. Until operation over a reasonable period of time has demonstrated the technological and economic feasibility of such undertaking, we are now convinced that some degree of Federal financial assistance is absolutely necessary. After satisfactory resolution of the present uncertainties, however, we believe that it may be possible for the sponsors of subsequent plants to rely on more traditional means of financing through the private sector.

More specifically, the definition of "commercial demonstration facilities" should be expanded specifically to include commercially scaled coal gasification projects such as that being proposed by El Paso Natural Gas Company. Section 17(a) declares the purpose of the legislation "to assure adequate Federal support to foster a commercial demonstration program to produce synthetic fuels from coal . . . on a commercial scale . . ." This declaration of purpose should be carried forward into the authorization section of Section 17(b)(1)(A).

Section 17(b)(1)(A) would provide guarantees for financing the "construction and startup costs" of coal gasification and certain other kinds of commercial demonstration facilities. This language may leave some room for doubt as to whether permanent, as opposed to interim, financing is contemplated. Section 17(c) limits the amount of the guarantee to 75% of the total cost of the facility but permits the guarantee of amounts up to 90% of the total costs "during the period of construction and startup," thus indicating that amounts may be guaranteed for periods beyond "construction and startup." Accordingly, Section 17(b)(1)(A) should be modified specifically to authorize permanent as well as interim financing guarantees in conformity with Section 17(c).

Consideration should be given to suggesting that the 90% limitation on guarantees during the period of construction and startup, specified by Section 17(c), should be expanded to a 100% guarantee during this period. During the construction and startup phases, short-term construction loans probably will represent a project's entire capital structure. Since the risk inherent in short-term construction financing during the construction and startup phases are considered by potential lenders to be substantially greater that the risk associated with permanent financing after the plant has reached full production, the need for Federal loan guarantees is substantially greater during these phases. Assuming a $940 million plant, it is doubtful that $94 million in short-term construction loans could be secured in the absence of Federal guarantees.

We very much appreciate the opportunity to provide these comments. Please feel free to call upon us for any further information that may be needed in connection with this matter.

Very truly yours,

Sam Smith

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Senator MONTOYA. If you will remain here, Mr. Smith, then I will ask both you and Mr. Rudzik some questions.

Mr. SMITH. Fine, sir.

Senator MONTOYA. Mr. Rudzik, you have a statement. Do you wish to read your statement or do you wish to submit it for the record and then summarize it?

Mr. RUDZIK. Mr. Chairman, let me submit it for the record and let me summarize our statement since it is similar. I can do it very rapidly.

Senator MONTOYA. Sure. So it will be made a part of the record.

[The statement appears at p. 158.]

Senator MONTOYA. You may proceed to summarize it, Mr. Rudzik.

STATEMENT OF R. L. RUDZIK, GENERAL MANAGER, PACIFIC COAL GASIFICATION CO.

Mr. RUDZIK. Thank you, Mr. Chairman. I will point out primarily the differences in our two projects since they are quite similar.

Primarily the differences in our two projects, since they are so similar are these: The WESCO project, which is the Western Coal Gasification Co., is a joint venture of subsidiaries of the Pacific Lighting Corp. in Los Angeles and Texas Eastern Transmission Corp. in Houston, Tex.

The coal supply for our project will be furnished by Utah International who currently operates the Navajo mine from their lease and they would also supply us with the water for the plant.

This water is available under an existing contract with the Department of Interior and was approved by Congress in about 1968.

We have allocated to us approximately 36,000 acre-feet of water per year.

Senator MONTOYA. Would that be adequate?

Mr. RUDZIK. That would be adequate water in terms of Utah's coal supply to build four facilities.

Senator MONTOYA. Would the supply that is within the Utah contract with the Navajo tribe be large enough to feasibly permit you to amortize the cost of construction of the plant?

Mr. RUDZIK. I am not sure I understand the question, sir.

Senator MONTOYA. Have you considered the amortization of the plant in light of today's costs against the utilization of the plant for the contracted coal that Utah has agreed to supply you?

Mr. RUDZIK. Our current contract with Utah is a 25-year contract. Yes, the plant would be amortized over that time span.

I might point out, as Chairman MacDonald said, the Utah lease is less than 5 percent of the total Navajo coal reserves. So this plant could run for 50, 60 years, or for the duration of the fossil fuel energy period if, well, assuming the coal is available from the Navajo Nation.

We are in quite good agreement with the Nation to purchase coal down the road sometime when Utah runs out. We do see a very long life for that facility.

Senator MONTOYA. Are you satisfied that the coal gasification process is economically feasible?

Mr. RUDZIK. At this time, yes. As Mr. Smith has said, and others, our current January 1, 1976 cost projection is just over a billion dollars. This puts the price of gas at about $2.80 per mcf.

By 1977 or 1980, when this plant—let's say 1982—when this plant could be onstream, we might be looking at over $1.5 billion for this facility, and probably looking at $3, $4 mcf from these facilities.

Senator MONTOYA. How would that compare with the natural gas?

Mr. RUDZIK. Natural gas being regulated at the moment, I don't think it is comparable at this time.

Senator MONTOYA. It is not comparable?

Mr. RUDZIK. No. Right now natural gas at the border in California is just under $1. That is interstate gas, and I don't think you can compare it even if gas were unregulated.

It compares, I think, favorably with, let's say, number six fuel oil if it were sulfur-free.

Right now in California I think number six fuel oil is about $18 or $19 a barrel, which on a 6-to-1 conversion is about $3 per mcf for gas.

So really the price we are looking at 2 years out will probably be very comparable to oil, if the market continues to escalate.

Senator MONTOYA. Will it be environmentally feasible as you see it today?

Mr. RUDZIK. Yes. We feel that our coal gas plant, which will comply with the State of New Mexico standards, which are generally speaking about twice as strict as the Federal standards—we have been working with the Navajo environmental group. Their standards are very similar in strictness with the State of New Mexico. We can meet those standards.

Senator MONTOYA. Let me read this statement which has been prepared by our research staff:

> Although air pollution will be reduced compared to direct coal-fired electric plants, it still must be considered. The carcinogenic nature of coal conversion byproducts, while known for over 100 years, is poorly understood.
>
> In addition, control and safety procedures have been far from foolproof.

Do you know anything about this?

Mr. RUDZIK. Yes. I am surprised to see—unless I misunderstood you—carcinogens had been misunderstood. I think we have studied them for 100 years, and we still don't know what their effect is. That is one of the reasons we are unable to set standards for them.

Senator MONTOYA. That is what he says; they are poorly understood.

Mr. RUDZIK. I am sorry; I misunderstood you. That is correct. We do agree with you.

We have run some tests on our own. One thing in favor of coal gasification: it is a pressurized system, unlike combustion of coal for electric generation.

So we have a substantial reduction in the amount of pollutants that are emitted in the atmosphere. We have the ability to control 90 to 95 percent of the stack emissions, for example, with current technology that is available, right here in this country, as a matter of fact; not on the size of boilers that the power companies are using—let me make this perfectly clear. We are not arguing with the power companies. We are using a size boiler considerably smaller.

Consequently, the technology that we are using is considerably less risky.

A system we are proposing to use just went into operation this last month in Illinois at the Caterpillar plant. The technology is here and is commercially available.

Senator MONTOYA. What about the recycling of the water?

Mr. RUDZIK. We are recycling our water, there is no return in any form. The water is reused within the facility and finally is evaported in ponds, which are minimal.

We also will supply recycle water to Utah International for washing of coal, for dust control, and revegetation of the mined area.

Senator MONTOYA. Tell me more about the recycling process of water. How many cycles do you go through before the water evaporates?

Mr. RUDZIK. I will have to generalize that because the cycles are not totally complete. But I would say as many as eight on the average.

I might also add that our final environmental statement was submitted to CEQ by the Secretary of the Interior on the 7th of this month. So it is final and it is out. We have received our Federal Power Commission ruling. It is subject to final approval of our plan of financing. We feel the ruling is one we can live with, if we can raise the money.

Our main effort remains on an agreement for an onsite lease with the Navajo Nation. We have been working on this lease for some 2 years. We think we are very close to agreement and we have answered the concerns of the Nation. The final test will be, of course, when the tribal council reviews the agreement. We hope this can be done when the spring session begins.

The socioeconomic impact is spoken to in our environmental statement. I might very quickly summarize some of it.

As Mr. Smith has said, we have jointly funded studies for a proposed new town on the reservation which we felt would be of benefit to the Nation. That study has been under consideration by tribal authorities, and some decision will be made down the road, as I am sure the chairman said earlier this afternoon.

Senator MONTOYA. What do you anticipate your tax to be on the improvements and the tax payable to the State of New Mexico?

Mr. RUDZIK. The current tax we are looking at is about $9 million a year, very similar to what Mr. Smith spoke of.

Senator MONTOYA. What do you anticipate to be the capital outlay requirements for the new town complex that might become necessary as a result of your development there?

Mr. RUDZIK. Subject to updating of escalation on that study, I recall that our initial studies said a new town could be started for about $120 million.

Then the key problem we face, and the Nation has to look at this themselves, we feel that the moneys or funds are available to start the new town. But the Nation has to look at some technique of sustaining the new town.

As you know, there are no taxes on the Indian people. Unless there is some way to support that town once it is built, it is indeed I think the major problem that we have to face.

Senator MONTOYA. Is it your feeling that the $7 million in taxes that you project will not be adequate enough to take care of the operation and maintenance of the town and the principal overhead?

Mr. RUDZIK. I am not sure that I can speak to that one.

Senator MONTOYA. Has your plan envisioned that contingency?

Mr. RUDZIK. Of having a company town?

Senator MONTOYA. No. I don't mean a company town. If your development is going to require that a town be built there to furnish housing, to furnish schools, and other public facilities for the residents, and there is no tax base such as there is in almost any other town, except the tax base that emanates from the improvement on the land—not the land itself—and you say that that would approximate $9 million; of course, perhaps the development would also generate other improvements on your surrounding lands, such as shopping centers, stores, and other improvements which could be subject to State tax. But your plan has not developed this picture.

Mr. RUDZIK. I think in the situation of taxes, these go to the State of New Mexico.

Senator MONTOYA. Yes. I understand that.

Mr. RUDZIK. I don't understand how you generate taxes with the Nation.

Senator MONTOYA. The point I am trying to make is this: If these taxes go to the State of New Mexico, I was trying to say that then the State of New Mexico has this revenue to reapply back for operation and maintenance.

The further point I was going to make was this: If the State of New Mexico receives this revenue, it might have to change its distribution of revenue structure to take care specially of these towns which fall into a very distinct category.

Mr. RUDZIK. I am not that familiar with State taxing authority. I should leave that area to the tax people.

The kind of town we envisioned here initially was one that would be on the reservation. I am not sure of the cash flow between the two entities, to be honest with you. That is beyond my knowledge.

Senator MONTOYA. I don't think anybody is sure yet, because I think there is a little controversy as to whether the State of New Mexico can tax improvements. There is still that controversy.

There is also resistance from the Navajo Indians, and all the Indians, to the State of New Mexico levying any taxes even on improvements. So there might be an impasse there.

Mr. RUDZIK. I think there is. The Supreme Court will be involved, I am sure.

Senator MONTOYA. Yes. But I thought I would develop this dialog.

Mr. RUDZIK. In agreements for major projects, you are now talking about substantial tax dollars being generated. I know in our discussions with the Nation they have reserved their right to tax; but, on the other hand, how do they apply the tax? Duplicate taxes are involved. It is a very complicated area of discussion.

Senator MONTOYA. Mr. Smith, you were going to say something a while ago. I am sorry that I interrupted you.

Mr. SMITH. Perhaps I interrupted, sir, at the wrong time. But what I had in mind, when you were raising questions about the feasibility of operating coal gasification complexes, we have had in the

Union of South Africa, since the early 1950's, a very large coal gasification complex that has presented no health problems to either, you might say, livestock or the workers. Livestock graze right up beside the plant.

In addition, the Lurgi type technology has been used in Czechoslovakia and North Korea and other places, and we have no evidence of any health problem that is connected with the operation of these plants.

Senator MONTOYA. What about environmental problems?

Mr. RUDZIK. Again the environmental problems, I think an electric generation facility of the same energy output has twice the pollutant problems we are going to have, if not higher, because we utilize a pressurized system.

When the off gases are removed before making methane, as it were, we then bring these gases to atmospheric pressure through controlled equipment for cleanup. This equipment is redundant to insure continuous clean operation.

So we feel that we have taken every precaution that can be taken to assure clean emission and a high standard for the plant.

If I may continue I will quickly finish up.

In planning for construction, WESCO has come to the conclusion that we must build a construction camp. The initial camp will be of sufficient size to house approximately 2,800 single people, very similar to dormitory cubicles; with two people to a cubicle. We would also install a trailer park in the near vicinity that would handle approximately 500 families initially. Both facilities could be expanded as required.

We would have water, sanitation, medical facilities, and other necessities. This will not alleviate the problem with surrounding communities. There will still be some people who won't live in a construction camp. Farmington and all the other communities surrounding will have an impact.

As was mentioned earlier by the Governor, roads are going to become a very difficult situation when and if we start construction. I think the bill you mentioned earlier is indeed very timely in that respect.

Mr. Teague's new House bill HR 12112 for loan guarantees we feel is a step in the right direction. We have a lot of confidence that Congress will indeed pass it.

I can say for the WESCO project without this bill there will be no gasification as far as we are concerned. Our financial advisers tell our companies, even with a joint venture, we are not large enough to absorb these kinds of costs.

During the construction period—you asked Mr. Smith a question earlier—we feel that the guarantee should be no less than 90 percent of the total construction cost; primarily because during construction, while we are willing to take a risk for those things we have control over, there is a very large number of items over which the sponers have no control, and we feel that risk properly belongs with the Congress.

Senator MONTOYA. Would this gas be commingled with natural gas?

Mr. RUDZIK. Our current plans pipeline the gas south on the reservation to near Gallup where it would be commingled with natural gas in the existing Transwestern pipeline system.

Senator MONTOYA. Then you would come under the power of the Federal Power Commission?

Mr. RUDZIK. Yes. The two subsidiaries sell directly to the buyers. Transwestern merely transports the gas.

Senator MONTOYA. Would that increase the viability of the project, the fact that you would commingle this synthetic gas with natural gas on the interstate pipeline?

Mr. RUDZIK. Yes. But the companies building the facility would not come under the Federal Power Commission's jurisdiction until the first foot of the gas sold. Our problem exists until that time.

It does improve the viability. Once the first foot of gas is sold, the risks drops considerably.

Senator MONTOYA. Do you have anything else to add?

Mr. RUDZIK. No, Senator. I think that summarizes what I have to say at this time.

Senator MONTOYA. If you have any supplementary statement to make or any amplification that you desire to place in the record with respect to any of my questions, or any of your answers, or any part of your statement, you may do so.

Mr. RUDZIK. Thank you.

Senator MONTOYA. You may submit them to us.

Thank you, gentlemen.

Mr. RUDZIK. Thank you.

Mr. SMITH. Thank you.

[Mr. Rudzik's prepared statement follows:]

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STATEMENT

BY

WESTERN COAL GASIFICATION COMPANY

FOR

ECONOMIC DEVELOPMENT SUBCOMMITTEE

U.S. SENATE COMMITTEE ON PUBLIC WORKS

FARMINGTON, NEW MEXICO

MARCH 12, 1976

By R. L. Rudzik

General Manager

Pacific Coal Gasification Company

I am here to provide testimony concerning a proposed coal gasification plant to be built in northwest New Mexico on the Navajo Reservation. The plant will be the first of four planned for the area to be built, owned and operated by Western Gasification Company or WESCO.

Before getting into the proposed project itself, I should identify WESCO as a joint venture of subsidiaries of the Pacific Lighting Corporation in Los Angeles and Texas Eastern Transmission Corporation in Houston, Texas.

The purpose for the project is to provide what we believe to be a most promising alternative for supplying future energy needs in this country. Coal gasification offers the combined advantages of large untapped domestic potential energy reserves, in the form of coal, with currently available technology and environmental acceptability. Key basis for such a commitment is the fact that coal is the nation's most abundant energy resource comprising more than 85 percent of the remaining US fossil fuel supply potential.

The chemical conversion of coal into substitute natural gas offers several significant benefits. The gasification process provides a high efficiency of energy conversion. The overall thermal efficiency of a coal gasification plant will be approximately 70 percent. Movement of the SNG to market would utilize existing pipeline systems which already provide one of the most efficient means of transporting energy now known. Recent decreases in supply and consequent curtailments have resulted in existing pipeline systems not being utilized at maximum capacity. Existing gas transmission, distribution and utilization systems would be used because the WESCO plant output would replace declining gas supplies. Reduced pollution is another advantage. In production of a given amount of energy, emissions of pollutants are significantly lower from coal gasification which occurs in a closed and pressurized system than from the combustion of coal. And gas, natural or substitute, is the cleanest burning of all hydrocarbon fuels. Finally, coal gasification promises a major new source of energy for domestic consumption without dependence on foreign suppliers and without a negative impact on the US balance of payments.

Summing up, the purpose of this project is to build a commercial sized coal gasification facility using current technology and yet allowing for research and development activity while utilizing our existing vast coal reserves.

And, of course, WESCO fully recognizes its responsibility to cooperate and work with the Tribal, state and local agencies responsible for planning to minimize impacts resulting from impending growth in the Four Corners region which may include coal gasification.

The plant is designed to convert approximately 9½ million tons of coal each year into SNG. Its cost as of January 1, 1975 is 853 million dollars. The joint venturers of WESCO have contracted with Utah International Incorporated for the necessary coal for the first plant. At the same time, Utah International will assign its existing water rights to WESCO as water is also necessary in the gasification process. Fluor Corporation has been retained as engineering constructor for the first plant which will take some 32 months to build after obtaining the necessary approvals which I will discuss further on. The process used in the chemical conversion is German technology -- A Lurgi process design. In addition to the approximate 9½ million tons of coal processed each year, the plant will use approximately 8 thousand acre feet of water each year and fifty eight hundred tons of oxygen each day. Hourly steam requirements from in-plant boilers will be slightly over two million pounds. Seventy magawatts of electrical power will be required to operate the plant which includes a river pumping station. At the peak of construction four thousand three hundred people will be employed. The total construction payroll will be approximately $122 million in '75 dollars. The Company has established a goal of Navajo employment averaging 53 percent with some classifications expected to reach 95 percent Navajo.

Plant operation will involve approximately 600 employees. The Company has agreed to affirmative action at all job levels including those in management to reach an initial goal of more than 50 percent and approximately 90 percent Navajo employment after ten years of operation. Another 400 employees will be required for Utah International's coal mine. The plant and mine operating payroll annually will be approximately $16 million.

Local taxes over the first five years should total about $30 million and coal revenues for the Navajo Nation should be approximately $5 million each year. Of the more than $850 million I mentioned as the capital required for the plant, more than $150 million has been earmarked solely for environmental protection. Cost of the gas at the California border will be $2.50, again in January 1, 1975 dollars. The plant, in addition to producing synthetic natural gas, will also produce byproducts which have an estimated annual value of approximately $30 million. The plant is designed to produce on a calendar year basis 250 million cubic feet of SNG each day with an approximate heating value of 980 Btu. This annual output of the WESCO plant is equivalent to an average annual energy output of seven Hoover Dams or equivalent to 25 percent of the U.S. nuclear energy production in 1974.

At this point it might be well to give you a brief backgrounding as to the chronology and status of the most important project steps to date.

In September 1971, Pacific Lighting and Texas Eastern agreed to undertake a joint study as to economic, technical and environmental feasibility. That study was successfully concluded in

July 1972.

As you might expect, a project of this magnitude requires numerous approvals from a variety of federal and state agencies. WESCO's first plant will require something like one hundred separate approvals from more than 40 different federal and state agencies. Let me describe for you what we view as the major approvals necessary for the project and their status.

With the completion of various preparatory activities such as negotiations and signing of a coal contract with Utah International and preparation of an environmental impact report by Battelle Columbus Laboratories, an application for project authorization was filed with the Federal Power Commission in February 1973. Following a decision by the FPC in September 1973 that it had no jurisdiction over the plant itself but rather FPC jurisdiction would be limited to the tap where the synthetic natural gas would be introduced into Transwestern Pipeline's existing interstate transmission system just north of Gallup, an amended application was filed in November 1973. The Federal Power Commission's public hearings for the project were held in December of that year and early February 1974. On April 21, 1975, some 27 months after filing of the initial application, the FPC issued Opinion No. 728 approving the transportation and sale of the gas to California and midwestern customers. In that opinion the Commission stated "...we are acutely aware of the need for this country to develop its own sources of energy. The coal gasification process is a means by which the United States may attain a greater measure of energy self sufficiency and reduce its vulnerability through dependence on foreign markets. Coal gasification is one of the few potentially commercial means of developing a supplemental supply of gas from domestic resources." In issuing that decision, however, the Commission did not provide conditions which would allow the financing of the WESCO project. Specifically, the rate mechanism included in the FPC's order did not provide the assurance of adequate revenue to cover all costs. Following petitions for a rehearing by the California Public Utilities Commission and ourselves, the FPC in November 1975 amended its order to provide a rate making theory as proposed by the California Public Utilities Commission and supported by us that would permit financing of the project. Some form of a federal loan guarantee program, however, will still be necessary in order to finance the project, a fact recognized by the California Commission in its petition for rehearing with the FPC. At one time during the very early stages of project planning we felt we could move forward using normal project financing given favorable conditions by the FPC. However, as a result of regulatory and other delays, inflation has escalated costs to more than double that projected originally. They now approach the one billion dollar range. The extent of the large capital investment required, coupled with the fact that this will be the first commercial size <u>high</u> Btu coal gasification plant in the world has made it clear government support in the form of a federal loan guarantee program would be needed. Lacking loan guarantees, ours and Texas Eastern's net worth and income together simply do not provide sufficient credit base to convince lenders the loan would be paid off if we were unable to complete or operate the project for reasons beyond our control such as legislation prohibiting strip mining.

To emphasize and underline my above comments I would like to quote for you a passage titled Results, Conclusions and Recommendations as found in the summary of a study of Recommendations for Synthetic Fuels Commercialization Program submitted in November of last year by the Syn Fuels Interagency Task Force to the President's Energy Resources Council. I quote -- "Based on present information including industry plans it is concluded that, in the absence of federal incentives and changes in regulatory policy with regard to synthetic gas or other policies creating a stable and favorable synthetic fuels investment environment, significant amounts of synthetic fuels are not likely to be produced in the United States by 1985. This conclusion stems primarily from the anticipated cost of synthetics and from the risk associated with large synthetic fuel plant investments in light of the uncertainty of future world oil prices" -- end of quote.

The Department of Interior's Bureau of Reclamation office in Salt Lake City began preparation of an Environmental Impact Statement shortly before September 1973 when it was determined that Interior rather than the FPC would be the lead agency. It wasn't until March 1975, however, before public hearings were held on the draft statement. The Final Environmental Statement was filed by the Secretary of Interior with the Council on Environmental Quality in early January of this year.

The New Mexico Surfacemining Commission, following public hearings, issued a permit for operation of the mine to Utah International in July 1974. This, after Utah made a basic commitment to reclaim and revegetate the land to at least equal to the existing grazing capacity as established by the Bureau of Indian Affairs.

Permit Authority to Construct the plant was received from the New Mexico Environmental Improvement Agency in September 1974 after satisfying that agency that the plant would meet the state's regulations for point source emissions and would not result in the EPA's ambient air standards being exceeded. Because the permit had a one year life, we were subsequently required to refile for the permit which was issued again in January of this year.

Negotiations for a business site lease agreement with the Navajo Nation were initiated with the Tribal Administration in March 1973. After nearly three years, we now expect that agreement will be considered by the next Navajo Tribal Council session which will convene in the Spring.

Summing up the status of the essential approvals, those still requiring resolution before the project can move ahead are the ratification of the business site lease agreement by the Navajo Tribal Council and congressional action on some form of a federal loan guarantee program to insure financing of the project.

In the time remaining I would be pleased to attempt to respond to any questions you might have concerning the WESCO coal gasification project, and I thank you very much for the opportunity to be here today to present this statement.

3/10/76

Senator MONTOYA. Do you want to testify?

Mr. YAZZIE. Yes, sir.

Senator MONTOYA. Let's listen to Mr. Fowler and then I will give you a chance. He is on the program.

Mr. YAZZIE. I would like to say something with these two gentlemen still on the stand.

Senator MONTOYA. Go ahead and say it.

STATEMENT OF DUAYNE YAZZIE, CHAPTER SECRETARY, SHIPROCK CHAPTER, NAVAJO NATION

Mr. YAZZIE. Senator Montoya, my name is Duayne Yazzie. I am the chapter secretary of the Shiprock Chapter.

I am very bothered with the nature of your proceedings here. It appears that everything is going backwards. It seems these two characters over here are——

Senator MONTOYA. Wait a minute. I wouldn't call them characters.

Mr. YAZZIE. Gentlemen.

Senator MONTOYA. All right.

Mr. YAZZIE. First of all, I would like to express my appreciation and thanks for these hearings here today, with everybody on the stand, Senator, and the people that are still here and all the other unimportant—let me rephrase it—and all the other all-important unnecessary people in between.

Senator MONTOYA. That is a matter of opinion, the other unimportant, unnecessary people in between.

Now, we came here to do a job. We came here to listen to all the people.

Mr. YAZZIE. I wasn't referring to you, Senator.

Senator MONTOYA. Well, please don't call anybody unnecessary people because they are all citizens, including you, and they have a right to be heard. Nobody is unnecessary.

Mr. YAZZIE. OK. Can I have my say?

Senator MONTOYA. Go ahead.

Mr. YAZZIE. As an elected official of the Navajo people, I feel that what I have to say is the opinion of the people. And as I say, I am bothered with the nature of your proceedings here today.

Senator MONTOYA. What bothers you?

Mr. YAZZIE. These guys should have been on first because that is what the whole issue is about.

Senator MONTOYA. How long have you been here today? Were you here this morning?

Mr. YAZZIE. I came in in the middle of Chairman MacDonald's statement. I was of the impression that these proceedings would not start until 1:00. I was wrong. But I don't know if these gentlemen had the first say-so.

Senator MONTOYA. We have had a mixture of presentations here. Go ahead.

Mr. YAZZIE. If I may, sir. We are of the feeling that what you are dealing with here is the land and the people on the land. You are talking about our land and our lives. We should have been consulted first.

If you want to do this on an all-democratic way, you should hold your proceedings out in Burnham's Chapter, first of all, with all of these other people who are instigating or advocating these developments.

Now I don't know what your standards are pro and con on this.

Senator MONTOYA. Let me give you my stand right now, since you brought it up.

Mr. YAZZIE. I would like to hear it.

Senator MONTOYA. I didn't come here to tell the Navajo people to enter into a contract. I did not come here to tell these people who represent these other companies to enter into a contract. That is beyond the jurisdiction of this committee. I am not here to encourage this contract.

I am here to try to develop a picture which will reflect that if and when the development does occur, what is the responsibility of the Federal Government to try to implement the development so that the Navajo people and all other people that might be located here or on the periphery or surroundings of the project may attain equal opportunity insofar as a facility of living, or other living conditions and educational facilities, hospital facilities, police protection, and so forth. That is our only interest.

I am not advocating that you lease your land, that you give your land, or anything like that. That is outside of the jurisdiction of this committee. Is that understood?

Mr. YAZZIE. Yes, sir. I hope you will remain to have that unbiased opinion until, if and when, these developments do come in; because as Indian people, we have always looked up to you, Senator, and have respected you.

Senator MONTOYA. I have worked hard for your people, as you know. I would venture to say here that I have worked harder for your people and I have accomplished more for your people than perhaps any other living American. And I mean that sincerely.

Mr. YAZZIE. We are aware of that, sir.

Senator MONTOYA. You can ask any Navajo on the reservation who knows about me and he will agree with that statement.

Mr. YAZZIE. We are aware of that, sir.

Senator MONTOYA. Do you agree with that statement?

Mr. YAZZIE. Yes, sir. Like I said, if you want to really help the people, you should hold these proceedings in Burnham.

Senator MONTOYA. I was going to come last night to Shiprock.

Mr. YAZZIE. We were waiting for you.

Senator MONTOYA. I don't know whether you heard my statement this morning. I left Albuquerque by plane to be there at the appointed hour. When I was on the plane, 25 or 30 miles out of Albuquerque, I received a radio communication.

> Turn back, because the weather is bad. You cannot land in Farmington. And the weather around the Farmington area is so bad that we will not permit you to fly. Turn back to the airport.

This was at 4:00. I would have arrived here at 5:00. I would have gone to Shiprock and had dinner with you, at your expense.

Mr. YAZZIE. Right.

Senator MONTOYA. I would have enjoyed the evening with you people. I wanted to do that.

Mr. YAZZIE. We were waiting, sir.

Senator MONTOYA. They wouldn't let me risk my life to come here.

Mr. YAZZIE. You might consider the weather.

Senator MONTOYA. But I will come back and see you.

Mr. YAZZIE. We do appreciate it, sir.

Senator MONTOYA. You have some Indian bread when I come back.

Mr. YAZZIE. We will.

But the situation is different, the feelings are different down there on the little people level. You might consider the weather as of last night as a divine intervention—you might.

I would like to ask these guys where they are from.

Senator MONTOYA. Let me explain; or you go ahead and identify yourselves, gentlemen.

Mr. SMITH. I am Sam Smith. I am from El Paso, Texas.

Mr. RUDZIK. I am Robert Rudzik from Los Angeles.

Senator MONTOYA. I think we had better proceed with the hearing. I have given you enough time.

Mr. YAZZIE. I don't think you have heard the feeling of the people yet today. That is what I would like to express here. We have heard enough figures and statistics on paper. We have seen enough statements, written statements, but you have not heard anything from the people, from the real people.

Now, who are these guys coming from Texas and Los Angeles to make judgment as to what is good for the people down here? This I consider the mentality of the U.S. Government. They have been trying to tell us, "This is good for you; that is what is good for you," for 400, 500 years—who is counting?

And these guys talk about agreements. What about our 374 broken treaties? The almighty U.S. Government. If they are so concerned with our feelings, why aren't our feelings considered?

Senator MONTOYA. I have just listened to you now, and you have had the opportunity to be heard. I will give an opportunity to your people at Shiprock.

Mr. YAZZIE. Can I finish what I have to say, sir? It won't take but 5 or 10 minutes.

Senator MONTOYA. Let's make it five, because I have to listen to these people. They are on the schedule and you were not.

Mr. YAZZIE. It is always the Indian people when you are talking about them, they are not on schedule.

Senator MONTOYA. I beg to differ with you. If you had requested permission to come here, I would have listened to you.

Mr. YAZZIE. In 1492 this dude came sailing over across the waters. We were doing all right until that time. Ever since then we have been living in this hell that you are trying to save us from.

Senator, who are you people? Who the hell is the U.S. Government to tell us what to do with our land? This is our land. It is our life and blood.

Senator MONTOYA. I am not trying to tell you what to do with your land.

Mr. YAZZIE. No. I am talking about the U.S. Government and El Paso and WESCO.

Senator, if I may just say what I have to say, I would appreciate it, because it is the true opinion of the people.

Senator MONTOYA. Let me reach an understanding with you. Will you listen to me for just one second?

Mr. YAZZIE. Yes, sir. And then you listen to me.

Senator MONTOYA. I am trying to be understanding here. Now these meetings were scheduled. We scheduled witnesses. I have permitted you to say whatever you wanted to say.

Mr. YAZZIE. No: you haven't.

Senator MONTOYA. Now I am asking you please, tell us what you have in mind so that we can continue with the hearing. We will listen to you. Now tell us.

Mr. YAZZIE. Basically what we want is to have our opinions and our input considered, because it is with our land and our life that you are dealing, first of all; because you don't know what we are going through, what we are going to go through. We are the principal ones who are going to have to suffer, the people out here.

You living in Santa Fe, it won't affect you at all. I may be considered a no-class savage. If I am considered as such, I think of people who think of me that way. Regardless, I am an elected official and elected representative of the people.

What I have to say is the opinion of the people, because we would only like our input, what we have to say, our feelings considered without all of these scheduled meetings and et cetera.

Senator MONTOYA. How do you want to provide your input?

Mr. YAZZIE. Come to Shiprock Chapter, come to Burnham Chapter, and talk with the people there.

Senator MONTOYA. I will do that; I promise you.

Mr. YAZZIE. You will come to Burnham Chapter.

Senator MONTOYA. You can get the people from both areas into the Shiprock area.

Mr. YAZZIE. Why not Burnham? Too uncivilized?

Senator MONTOYA. Now wait a minute. I didn't say that.

Mr. YAZZIE. No, you didn't.

Senator MONTOYA. No; and I will not say that. So let's leave that out.

Mr. YAZZIE. Why don't you go out there? That is where the gasification plants are going to happen, if they are.

Senator MONTOYA. I will go to either place. Which place do you want me to go?

Mr. YAZZIE. Burnham.

Senator MONTOYA. I will consult with the other leaders of the Navajo people there and ask them where do they want me, in what place, and I will go to that place. I won't leave it up to you. I will leave it up to the cross-section of the leadership of the Navajo people.

Mr. YAZZIE. Including Mr. MacDonald?

Senator MONTOYA. Including everybody.

Mr. YAZZIE. First of all, sir, one thing: I don't have any respect for Mr. MacDonald, but I will say this, that he does not represent the majority of the Navajo people. What he had to say here was good. I liked it. But his words and actions may not jive that much.

That is why I say talk to the people out here, the people who are living off of potatoes and beans day after day. Talk to those people.

We don't have these big, fine clothes, travel around in these big fast cars. We are the little people. You are talking about our blood.

That is what is the matter with you most, Senator. With all of your humanity, you are just a man. You have got goodness in you. You have got a heart. You have a soul. You have got people. You have love in you.

We are the same. We feel hate. We cry. We just want our voice in the matter in these things when you are talking about our land.

Now, I can call any land in the U.S. Indian land: Sante Fe, Washington, D.C., regardless of what unrealistic treaties and agreements have been made in the past. You all are just immigrants, foreigners, and here you are telling us what to do with this, our land.

Now, we have a great respect for this Earth, Mother Earth. We call upon the Earth. We have respect for her. We love her. The reason we call her Mother Earth is because it is from Mother Earth that our lives come. That is the only reason that we live from day to day.

Everything that you wear, everything that you touch from day to day comes from Mother Earth. It is not just a rock. If it were just a rock, you wouldn't be sitting here today.

Senator MONTOYA. Do you agree with me that I have listened to you very patiently? Do you agree with me?

Mr. YAZZIE. Yes, sir.

Senator MONTOYA. Would you let us proceed forward with this hearing? I have already told you that I will come back to listen to your people.

Mr. YAZZIE. OK. That is all I wanted to do was ask you personally to come down.

Senator MONTOYA. I thank you for the invitation.

Mr. YAZZIE. I believe you got our resolution from last night.

Senator MONTOYA. I certainly did. I read it in the paper this morning.

Mr. YAZZIE. One thing I want to say about your colleague, Mr. Domenici, who was here and now he is embarking all over the country advocating gasification and et cetera.

Like I say, who the hell is he to say that? He should come to the people where it matters most. He is nobody to deal with Mr. Webb and all of these other big fine people up there.

We are the ones that should matter first, and that is all we are asking. We want to be considered, and we demand it; because as a brother of mine, you knew Mr. Fred Johnson. You are aware of his feelings. Those still hold true, sir. His words still live. What he said still holds true. I believe you knew the man.

Senator MONTOYA. Thank you very much.

Mr. YAZZIE. Thank you, Senator.

Senator MONTOYA. We will proceed with the rest of the testimony. The next statement will be presented by Mr. Delbert M. Fowler, regional administrator of the Federal Energy Administration, region VI, accompanied by Mr. Herbert F. Lindsay, Liaison Officer of the Federal Energy Administration.

Mr. Fowler, do you wish to read your statement or to present it and then highlight it?

STATEMENT OF DELBERT M. FOWLER, REGIONAL ADMINISTRATOR, FEDERAL ENERGY ADMINISTRATION, REGION VI, ACCOMPANIED BY HERBERT F. LINDSAY, LIAISON OFFICER, FEA

Mr. FOWLER. I think it is very brief, sir. I would prefer to read it.

Senator Montoya, ladies and gentlemen: My name is Delbert Fowler, and I am the regional administrator of the Federal Energy Administration's region VI, with headquarters in Dallas, Tex.

In another capacity, I am also the chairman of a multiagency task force created by the Southwest Federal Regional Council to give special attention to the socioeconomic impacts of resource development in northwest New Mexico.

It is in this second role, as chairman of the task force and as a representative of the Southwest Federal Regional Council, that I appear here today.

The resource development plans for this part of the State are already well known to you, and additional details are being provided at this hearing. Consequently, it would be redundant for me to describe at length the many activities, some planned and some already underway, which are expected to impact both San Juan County and the New Mexico portion of the Navajo Reservation.

Let me simply indicate the magnitude of these developments by a few statistics.

Major construction underway or planned for San Juan County totals almost $9 billion. This includes 34 projects in addition to the proposed gasification plants and the Navajo Indian irrigation project. It does not include oil and gas development, mobile home parks, or service related business expansion.

In addition to the above, the Navajo Tribe's 10-year plan identified development needs estimated to cost $600 million. While most of the dollars will be spent on sections of the reservation outside New Mexico, a program of this size could affect the tribe's ability to respond to needs of the New Mexico section of the reservation.

If all major developments should take place at once, the population of San Juan County could increase by as much as 30,000 persons over a 2 to 3 year period.

If, as appears more likely, some of the development projects are stretched out or even curtailed, the population could still increase by 50 percent over 5 or 6 years, and then decline as construction is completed.

The city of Farmington estimates that its maintenance and capital improvement costs will double over a 3 year period, from $17 million in 1975 to $34.1 million in 1978.

It should be noted that figures of this kind are always "guesstimates" at any one point in time. Investment and employment projections for any development project can change from quarter to quarter or even from 1 month to another.

In looking at potential impacts, we have considered that the most significant characteristics of the data are, (1) the order of magnitude of planned developments: (2) the probable rate of change—for example, in total employment or population from year to year—and (3) the local government's capability to respond to the needs likely to be generated.

By these criteria, it is obvious to us that, even with substantial variations in individual timetables or employment projections, the total impacts of resource development in northwest New Mexico will be so great as to be beyond local government's capability to respond without outside assistance.

In early 1974, the Southwest Federal Regional Council recognized the Federal Government's responsibility to assist in this area by creating a special task force of Federal, State, and local government representatives charged with specific objectives.

In the 1974–75 SWFRC work plan, the effort was called the Northwest New Mexico socioeconomic impacts project and was identified as program objective No. 10. The assigned objectives were as follows: to identify the socioeconomic impacts which will result from development of natural resources in northwest New Mexico; to determine the role of the SWFRC in assisting local, COG and State officials in preparing a comprehensive plan for the orderly growth and development of facilities and services; to serve as a focal point for coordinated delivery of Federal assistance and services; to promote cooperation among the municipalities of Farmington, Bloomfield, and Aztec, the Navajo Indian Tribe, San Juan County, the State of New Mexico, and the Federal agencies concerned with the impacts.

In August 1975, the SWFRC further expanded the membership and scope of the task force in several important respects, identifying it in the 1975–76 work plan as program objective No. 6 and calling it the Northwest New Mexico energy/economic development socioeconomic impact project.

Membership was expanded to include representatives from the Navajo Tribe and from private industry. Additional emphasis was placed on energy resource development.

A new objective required the task force to "expand its current functions of obtaining baseline data by relating this data to the strategies and the corresponding government action."

At no time did the SWFRC give the task force authority to undertake planning as such, nor to participate in the processing of specific grant applications. The group was conceived as a coordinating and problem-solving body.

Among other things, the SWFRC task force charter provides that "all plans will be developed and implemented locally," "greater reliance will be placed on State and local governments," and "Federal and State capacity building will be broadened by responding to a coordinated, comprehensive and locally initiated problem-solving effort."

In September 1975, existing task force memberships were reconfirmed and new members were invited from the Navajo Tribe and from private industry.

At the local government level, members were designated from Farmington, Aztec, Bloomfield, and San Juan County. Governor Apodaca reappointed the Director of the State Planning Office as the State's representative. Chairman MacDonald appointed two members from the Navajo Tribal Council Staff, and a third member was later designated to represent the Navajo Indian irrigation project.

Private industry is represented by officials from WESCO, El Paso Energy Resources Co., and Utah International's Navajo mine.

Federal members, in addition to myself and Herb Lindsay from the Federal Energy Administration, include representatives from Agriculture, Community Services Administration, Economic Development Administration, Environmental Protection Agency, Four Corners Regional Commission, HEW, HUD, Interior, Labor, LEAA, and Transportation.

Other officials, while not on the list of regular members, have agreed to work with the task force on an ad hoc basis. Willard Lewis, Special Assistant to the Secretary of the Interior and chairman of the task force during its first year, continues to provide valuable assistance.

D. K. Nowlin, Director of the Special Programs Division of the Energy Research and Development Administration in Albuquerque, and Dr. Edward Hammel, Assistant Director of Energy for the Los Alamos Scientific Laboratory, furnish information and guidance on research and technical matters of interest to the task force.

Technical support is also provided by Jim Ray of the State Planning Office and Doyle Caton of the UNM Technology Application Center. Chuck Pfeiffer in Dallas serves as the SWFRC Secretariat Representative from the Federal Energy Administration.

Altogether, the task force has 30 working members. To facilitate coordination, a steering committee was set up in October 1975. The members are: municipal interests, Mayor Marlo Webb, city of Farmington; county, Bob Bacon, County Manager, San Juan County; State, Jim Ray, State Planning Office; Navajo, Steve Godoff, Navajo Tribe; private industry, Terry McCollister, El Paso Energy Resources Co.; Federal, Herb Lindsay, Federal Energy Administration.

During its first year, the task force concentrated on improving lines of communication and collecting, documenting and analyzing data concerning resource development and its impacts in the San Juan County area. Some of the results were presented at a meeting in Farmington on October 16 and 17, 1974.

At that time, the major development projects were identified, employment and population projections were made, and impacts were analyzed in terms of water and sewer facilities, solid waste disposal, educational facilities, health care services, parks and recreation, and transportation needs.

It is highly significant that while the type and level of potential socioeconomic impacts remain about the same in current forecasts, estimated investment costs have increased from $5.5 billion in October 1974 to $8.7 billion in March 1976, due primarily to increases in the estimated costs of the WESCO and EPNG gasification plants.

Numerous meetings were held in 1974 and 1975, to promote an exchange of information among local, State and Federal agencies. Development and impact data were updated from time to time and published in reports distributed to task force members and others.

The last of such reports we have not made available to you, sir, but we will provide a copy of that.

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Senator MONTOYA. If you submit them, we will incorporate them as part of the record of this hearing for use by the committee but not in the transcript.

Mr. FOWLER. These efforts were interrupted to some extent by the dissolution of the San Juan Council of Governments in mid-1975.

The expanded task force held its first meeting in Farmington on October 23, 1975. Largely as a result of new membership from the Navajo Tribe and private industry, discussions were broadened in principle and narrowed in terms of specific problems and needs.

Navajo representatives reported that the tribe is conducting a number of projects and planning others that should be considered in assessing potential impacts both on and off the reservation.

Industry representatives reported that the complexities and time requirement for obtaining Navajo and Federal decisions is making their planning very difficult and continuously increasing project investment costs.

Local government representatives pointed out that uncertainty and red tape made it virtually impossible for them to develop firm assumptions for planning and financing needed facilities and improvements.

State and Federal representatives observed that similar and sometimes competing grant applications from different local governments made evaluation difficult and time-consuming, especially in the absence of a comprehensive area-wide plan and a COG or other area-wide planning and review body.

Two specific problems were identified at the October meeting for possible action by the task force. These were further researched and then brought up for consideration by the full task force at a meeting in Albuquerque on December 9, 1975.

Road construction and improvement: Legislation to authorize $25 million in road improvement funds was enacted in January 1975, and the legislative history indicates that the intent was to construct and upgrade portions of US 666 and State Routes 44 and 371.

As of December 1975, however, no provisions had been made to appropriate any part of the authorized funds. At its December 9 meeting, the task force approved a memorandum to the SWFRC expressing its concern and recommending that prompt action be initiated to fund the needed road improvements.

The SWFRC concurred with the recommendation at its December meeting and sent a letter to the Office of Management and Budget on December 19 urging that prompt action be taken to determine funding alternatives.

Senator MONTOYA. I take it at this point the Office of Management and Budget did not recommend any budget estimate for this purpose.

Mr. FOWLER. No. In addition to what small measures we had taken of writing a letter, lots of other people were working on the problem, including elected officials from the State.

We have been advised OMB has indicated it will approve a $10 million addition to the Interior Department fiscal year 1976 budget.

Senator MONTOYA. That is what I was speaking about this morning.

Mr. FOWLER. Yes, sir. This modification request should be transmitted to the Congress in the next 2 weeks for inclusion in the next supplementary appropriations bill for the Department of the Interior.

The second thing the council undertook was the local planning body. When the San Juan Council of Governments was dissolved on July 1, 1975, several effects were felt immediately. Most of these involved the A-95 review procedure and the processing of grant applications.

From the task force's standpoint, the action meant that there was no longer an area-wide planning body and no technical staff with area-wide coordination responsibility.

Since the whole concept of the task force was based on local initiative reflecting data collection, projection and analysis of area-wide impacts, task force members generally agreed that some form of local planning body should be reinstituted which would include representation from all impacted government entities.

This was discussed at some length at the October and December meetings and in special meetings between the State Planning Office and local government officials.

In January 1976, the San Juan Regional Committee was formed with members from San Juan County and the cities of Farmington, Aztec, and Bloomfield. All school districts, the local hospital, and the Navajo Tribe have been invited as nonvoting members. Governor Apodaca and OMB have recently approved the San Juan Regional Committee as an A-95 review agency.

At the present time, the task force is continuing to collect information which may be of use to the group as a whole or to individual members in monitoring resource development projects and assessing potential impacts.

I would like to emphasize, however, that the task force is an action-oriented body whose main function is to seek solutions to multiagency or intergovernmental problems brought to its attention by State and local government representatives.

In this respect, it serves as a unified extension of the executive branch of Federal Government at the regional level, ready to assist State and local governments in coordinating and expediting the delivery of essential Federal services into the impacted area.

The time required to obtain decisions from the Navajo Tribe and from several Federal agencies creates uncertainties which make rational planning more difficult than in the usual situation.

Planning for minimum impacts would likely be inadequate and could lead to continuous revisions and physical add-ons in what the mayor of Farmington called "a catch-up game." On the other hand, planning for maximum impacts could lead to overbuilding and either a waste of Federal funds or an exorbitant local tax rate, or both.

Two types of early funding are required. Funds are needed to support a technical staff which can devote its full attention to the preparation and coordination of an areawide program based on accepted planning assumptions and reflecting specific needs and relative priorities.

The State has applied to the Economic Development Administration for a title IX grant for this purpose. The geographical scope of the proposed project covers the impacted areas of San Juan, McKinley, Valencia, and Sandoval Counties.

Project objectives include "strengthening the management and implementation capabilities of local units of government" and "assisting the SWFRC task force."

Funds are also needed to finance community facilities and services when impacts strike before local tax revenues rise enough to pay for them.

EDA title IX implementation funds may meet a portion of this need. Development of an areawide program mentioned above may also facilitate the processing of grant applications under other Federal programs.

As the committee is aware, the administration has just submitted a proposal for legislation to provide grants and loan guarantees for community facilities in energy-impacted areas. That is the House bill you already discussed earlier.

Local and State government officials have expressed their concern on many occasions regarding the improvement of U.S. 666 and State Roads 44 and 371. The Navajo Indian irrigation project is now ready to irrigate and plant the first 10,000-acre block, and it has been estimated that 400 trucks will be needed to haul supplies and produce this year.

Block 2 will be ready for farming in 1978, with one additional block scheduled for completion each year thereafter until the entire 110,000 acres is placed in production.

Heavy traffic is also being created by expansion of electric generating plants and other projects already underway. If the proposed coal gasification plants begin construction, the existing roads will be totally inadequate.

The State Highway Department estimates that at least one year of planning will be required before major improvements can be started. Appropriation of a portion of the authorized $25 million Federal funds will permit the planning to begin.

Impact planning in northwest New Mexico involves approximately 12 Federal agencies, 3 Federal regional councils—the other 2 being in Denver and San Francisco—10 major companies, 6 State agencies, 4 counties, 8 municipalities, 4 areawide planning bodies, and the Navajo Nation.

Creation of the SWFRC task force, we believe, has resulted in better coordination among the Federal agencies and the Federal regional councils.

On February 17, Governor Apodaca announced the formation of a Governor's Energy Impact Task Force to assist in coordinating energy-related economic development in the State, especially in the northwestern portion of the State.

We understand that the State planning office has assigned coordinators for direct and frequent communication with local governments and areawide planning bodies.

The additional staff to be funded under the EDA title IX grant may be located in San Juan and/or McKinley Counties to further improve day-to-day working relationships with local government agencies and the Navajo Tribe.

We further understand that the Navajo Tribe is considering the establishment of a small regional office in Farmington to coordinate planning for the New Mexico portion of the reservation as well as to participate in off-reservation planning affecting the Navajo people.

Recent formation of the San Juan Regional Committee, and ongoing operation of councils of governments in other areas, will provide coordination at the local level. Efforts are now underway to establish formal and informal linkages among the various coordinating bodies such as the SWFRC task force, the Governor's task force, the State planning office special project staff, the several areawide planning bodies, and the Navajo Tribe special staff.

Perhaps the best way to summarize my testimony is to say that the SWFRC task force has been and continues to be part of an evolving process which is taking place at all levels of government in an effort to improve communication and expedite relief in one form or another for those areas of northwest New Mexico that are suffering abnormal growing pains as a result of accelerated resource development.

The task force provides a useful forum for discussion, but it also provides a mechanism for bringing important problems to the attention of Federal agencies at the regional level or at the Washington level if necessary.

To this end, it must rely largely on the initiative of local and State government officials in identifying problems which might be attacked in this manner.

We recognize the difficulty, and I believe I speak for all Federal members of the task force in offering to State and local government representatives whatever technical assistance we can provide as individual Federal agencies, in addition to our participation in the task force itself.

I appreciate the opportunity to submit this testimony to the subcommittee. If additional information is requested on any of the matters discussed herein, or on other matters involving the task force, we shall be glad to provide it at your request.

Senator MONTOYA. Thank you very much. This is a new aspect introduced in the hearings. I appreciate it very much.

What Federal agencies are most active in your task force?

Mr. FOWLER. The Department of Interior, of course; and the Economic Development Administration we have worked very closely with. Mr. Pfeiffer, who is on my staff in Dallas, has for the last several years worked in the EDA in Austin. So we are fortunate in having him working with us because he is familiar with their procedures and the manner in which funds might be obtained.

They are the two. And HUD is working with us closely, too. But I think EDA and Interior are two most active ones.

Senator MONTOYA. Thank you very much, gentlemen.

Mr. FOWLER. Thank you.

Senator MONTOYA. I appreciate your coming here.

[The following information was supplied for inclusion in the record:]

DALLAS REGION

FEDERAL ENERGY ADMINISTRATION

STATUS REPORT ON NATURAL RESOURCES DEVELOPMENT PROJECTS WITH MAJOR POTENTIAL IMPACTS UPON SAN JUAN COUNTY, NM

Revised October 1975

INTRODUCTION

Previous compilations of this report, distributed in December 1974, and May 1975, were limited in scope to energy and other natural resource development projects which could result in major impacts upon San Juan County, New Mexico. This report extends that scope by reporting more comprehensively upon the proposed rail extension from the Prewitt-Thoreau area to the Star Lake area. Should rail service ultimately be extended beyond Star Lake to the north and west, it will impact substantially on San Juan County. However, the present rail and mine proposal would impact most significantly upon eastern McKinley and western Valencia Counties, and to a lesser extent, upon western Sandoval County.

It appears to the authors of this report that the time is near when the Southwest Federal Regional Council should consider extending the scope of the SWFRC project to McKinley, Valencia, and perhaps Sandoval Counties.

This report is prepared to assist in fulfilling one element of the Southwest Federal Regional Council Northwest New Mexico Energy/Economics Development Socio/Economic Impact project. This element is to identify and analyze energy and other natural resource development projects which may result in major impacts upon the San Juan County, New Mexico, area. This status report is a brief compilation of those development projects which:

(1) will require federal approvals, authorizations, and/or permits; and

(2) will directly or indirectly result in major employment and other socio-economic impacts upon the local area.

GENERAL DISCUSSION OF IMPACTS

Each of the development projects will have environmental, social, and economic impacts. The environmental impacts of each project are discussed in depth in environmental impact statements (EIS) required for compliance with Section 102 of the National Environmental Policy Act. This report will note the status of EIS for projects.

The primary social and economic impacts will result from direct employment during construction and operation of the projects, and secondary and indirect or "spin-off" employment resulting from the projects and project employment. The SWFRC Project has encountered uncertainties regarding the residential location of project employees, particularly for projects which will occur on the Navajo Reservation. The uncertainties center around two significant factors:

1. No definitive decisions regarding the establishment of an on-reservation "new town" for construction and operating employees have been made by the Navajo Tribe nor have other alternatives been reported as under consideration.

2. Road access to the development sites from existing communities is inadequate at present. Steps to overcome this problem are still in discussion stages.

Until these uncertainties are at least partially resolved, it will be very difficult to make reliable projections of where the employment impacts will occur.

Another employment impact uncertainty relates to the time frame. It is very difficult to estimate starting dates on a number of the developments due to pending federal actions, actions by the Navajo Tribe, and certain decisions on the part of developers themselves. This report identifies major governmental actions required and attempts, where feasible, to put estimated time frames on the actions.

Revised October 1975

EL PASO COAL GASIFICATION COMPLEX

Brief Project Description

El Paso Natural Gas Company (EPNG) through a subsidiary, Fuel Conversion Company, proposes development of a pilot and two operating coal gasification plants in the Burnham Chapter area of the Navajo Reservation in San Juan County, approximately 35 miles southwest of Farmington, New Mexico.

The pilot plant would refine the process and train operators. The first operating plant would produce 288 million cubic feet per day (MMCFD) of substitute pipeline gas. Upgrading of the first plant and construction of a second plant would bring ultimate production to 785 MMCFD. The Lurgi process, coupled with a methanation unit, would be used to produce a high-BTU pipeline quality gas.

In addition to mining operations (discussed as a separate development in a following section), necessary supporting facilities for the complex include roads, diversion and pipelining of 28,250 acre-feet per year of water from San Juan River, ash disposal, byproduct removal and disposition, feeder gas pipelines to connect with existing EPNG system, and housing, and other community facilities for the work force.

Cost of the 288 MMCFD facility will probably be nearly $1 billion with total complex costs well above $2 billion.

While the developer continues to describe the project in these terms, it should be noted that a substantial diversion of coal reserves in the lease (see Consolidation-El Paso Coal Mine Development section for a more complete discussion) may require a scaling down of the size of this project, which could reduce employment and other impacts.

Projected Employment Impacts

During the more than six-year development period needed to build the entire complex -- 3 gasification plants plus the coal-source strip mine -- total employment (including construction, operations, and mining personnel) would range from approximately 50 persons during the first month to a peak of almost 6,000 during the fifth year.

Because of the overlapping sequence of development, construction employment will rise to 3,800 at the middle of year three, decline to just over 1,600 shortly thereafter, rise again to 3,500 early in year five before gradually declining to ultimate construction phase-out. Increases in permanent operating and mining employment will partially soften the fluctuations, but substantial total employment fluctuations will recur during construction phases.

After construction is completed, the total employment would stabilize at approximately 2,800 operations and mining personnel. A table showing quarterly employment estimates during the development phase is attached. Should reassignment of some coal to other purposes result in a reduction of the gasification complex size, the employment would be different from that presently projected.

Substantial indirect and secondary employment can be anticipated from a development of this magnitude. A work force of this size and related family members require supporting service occupations. The employment multiplier differs for various types of jobs, but using a very conservative multiplier of 1.2 would result in an additional 7,200 secondary jobs at peak employment.

The production of byproducts generated by the gasification process should create jobs in satellite businesses and industries. These byproducts include sulphur, tar, tar oil, naptha, ammonia, and crude phenols. No definitive work relating to the satellite employment potential is available, but it should be recognized as an additional employment impact.

The direct construction, plant operation, and mining work force will be essentially employed in the Burnham area. However, there are no housing and other community facilities available for personnel in the immediate area. In fact, there are only twenty-four Navajo families throughout the area proposed for mining over the twenty-five year life of the project. There appear to be several alternatives for work force residential facilities, any one or all of which could occur:

1. Establishment of a "new town" or construction camps within the Navajo Reservation.

2. Establishment of a "new town" or construction camps near the site, but outside the Navajo Reservation.

3. Settlement within existing communities and developed areas in or near Bloomfield, Aztec, Farmington, and the small unincorporated river valley communities.

4. Drift of workers and job-seekers setting up trailers or tents, singly and in clusters near the working area in "squatter" settlements both on and off the reservation.

To date, little action beyond a company consultants' study on potentials for a new town has been undertaken toward the first alternative, and the attitude of the Tribe is not clear. The second alternative has been explored by the company: the absence of any significant parcels of close-by, non-public or non-Indian, land makes this alternative difficult to implement. Alternative three would impose great impacts on local governments in San Juan County. Some manifestation of alternative four is probably inevitable.

It is most likely that a combination of all four alternatives will occur. Concerted cooperative effort on the part of local and state government, the Navajo Tribe, federal agencies, and industry is needed to effect the most satisfactory "mix" of these alternatives.

Required Major Governmental Actions

1. An environmental impact statement (EIS) must be filed with the Council on Environmental Quality; the Bureau of Reclamation filed a draft EIS in July 1974. Public hearings were held March 25-27, 1975, in Window Rock, Arizona, and Farmington, New Mexico. An additional report on cumulative socio-cultural impacts was contracted by the Bureau, so that additional data could be included in the final EIS. Completion of a final EIS is being held up while Department of the Interior (DOI) discusses broadening the EIS scope to include other alternative actions under consideration by the company. (See Consolidation-El Paso Coal Mine Development section for a more complete discussion.)

2. A water service contract must be approved by the Bureau of Reclamation, the Secretary of the Interior, and the Congress. While negotiations are occurring, it is not certain when the contract can go forward.

3. The Federal Power Commission must approve the pipeline connections between the gasification plants and the existing EPNG transmission lines, including approval of the proposed cost of gas to the consumer. An FPC examiner approved the application contingent on several conditions which EPNG requested the full FPC to review and delete or modify significantly. Subsequently, EPNG requested a deferral of decision from the FPC until it can file an amended application reflecting changed circumstances with regard to coal supply, increased costs, etc. No time has been set for a new or amended filing, but indications are that EPNG will delay for an extended period of time.

4. The Navajo Tribe must grant leases for the plants and related facilities. (Coal is under existing lease, see El Paso coal mine section following.) The Bureau of Indian Affairs and the Secretary of the Interior must approve those leases. Negotiations between the company and the Tribe are underway, but no estimated date of tribal action is available yet.

5. Various other federal, state, and tribal approvals are needed for the mining and reclamation plan, for compliance dates to meet air and water quality standards, and for construction permits. Some of these have already cleared, and it is assumed that all needed approvals can follow in a reasonable time frame.

Status and Timetable

This project must now be viewed as indefinitely postponed. As noted above, EPNG has asked FPC to defer action until a new or revised EPNG filing at an unknown future date. Other uncertainties, including redesignation of Consolidation Coal as coal lease operator, the need for extending the life of the coal lease, difficulties associated with obtaining a water service contract, and continuing reports of economic and financing difficulties, make the project uncertain.

EL PASO COAL GASIFICATION COMPLEX
PROJECTED EMPLOYMENT

Time Period (x=starting date)	Total Employment*	Construction Personnel*	Plant Operation Personnel*	Mining Personnel*
x	50	50		
x + 3 months	300	300		
x + 6	650	650		
x + 9	1,125	1,125		
End of year one	1,650	1,650		
x + 15	2,055	2,055		
x + 18	2,636	2,580	56	
x + 21	2,805	2,726	79	
End of year two	3,774	3,200	374	200
x + 27	5,041	3,800	991	250
x + 30	5,221	3,800	1,081	340
x + 33	2,869	1,600	929	340
End of year three	2,944	1,610	984	350
x + 39	3,382	2,098	934	350
x + 42	3,814	2,550	914	350
x + 45	4,007	2,600	1,057	350
End of year four	4,882	3,100	1,352	430
x + 51	5,981	3,500	1,951	530
x + 54	5,749	3,500	1,619	630
x + 57	4,332	1,800	1,802	730
End of year five	4,537	2,100	1,637	800
x + 63	4,849	1,630	2,369	850
x + 66	4,823	2,000	1,923	900
x + 69	3,371	540	1,901	930
End of year six	3,191	360	1,876	955
x + 75	3,626	195	2,476	955
x + 78	2,901	70	1,876	955
x + 81	2,831		1,876	955

Full operating level: Total 2,831 employees *

Prepared 12/74

* Based on plans for mining for EPNG coal gasification. Should some mine production be shifted to other purposes, this schedule of employment would probably be altered.

Revised October 1975

CONSOLIDATION-EL PASO COAL MINE DEVELOPMENT

Brief Project Description

Consolidation Coal Company (Consol) and The El Paso Company (EPNG) through its subsidiary, El Paso Energy Resources Company, are equal share owners of a 40,287 acre coal lease in the Burnham area of the Navajo Reservation in San Juan County, New Mexico. Consol is now the lease operator.

Total coal reserves within the lease total 824.5 million tons, most of which lie at strippable depths. Original plans called for dedication of this lease to the gasification complex producing 785 MMCFD (see discussion in previous section). This would require the mining of 750 million tons of coal during a 25-year life of the lease. The total mined area would be approximately 30,000 acres. In full production 77,000 tons of coal would be used each day, or 25.522 million tons per year, and 29.45 million tons per year would be mined.

Since the gasification project is now uncertain, the lessees are now considering several alternatives for ulitization of at least a portion of the leased coal. In addition to mine-mouth use in the immediate area, these alternatives could include off-lease sale for export out of the immediate area. Off-lease sales would be contingent upon development of transportation systems such as railroad or slurry pipeline. Rail service could conceivably be extended from the Star Lake area if extension to that area occurs as proposed. (See Santa Fe Industries Railroad Extension section for more complete discussion.)

As previously noted, use of coal from the lease for other than the EPNG gasification project will decrease the amount of gasification possible, and, therefore, possibly reduce the size of the facility needed.

Ash resulting from the gasification process would be disposed in mined areas. The surface would be restored and reclaimed to meet mined-land reclamation requirements of federal, state, and tribal governments.

Projected Employment Impacts

Mining employment related to gasification would begin about two years after construction of the gasification complex is initiated. Initial employment is estimated at 200, and employment would peak and stabilize at 955 about four years later. These figures on mining employment are included in the preceding discussion of the EPNG coal gasification complex and its accompanying employment table, and of course are predicated on development of the full gasification complex.

No employment projections are available for development of a portion of the mine for other coal sales since no firm plans have been developed.

Required Major Governmental Actions

Since the EPNG coal gasification project has been delayed for so long, the most immediate need of the lessees is to negotiate an extension of the lease beyond the 1978 expiration date. Negotiations have recently occurred between the companies and the Navajo Tribe for an extension. It is possible that a new lease extension could be approved during the Fall Tribal Council session which meets in late October.

U.S. Geological Survey must approve a mining and reclamation plan. Such a plan was submitted in February 1975, subject to adjustments and additional specifications at the time new federal mined land reclamation regulations become effective. State Coal Surfacemining Commission approval has already been secured. However, the possibility of other development for off-lease sale may require submission of a new or extensively revised plan for approval by federal, state, and tribal authorities.

Off-lease sales presume a transportation system which does not now exist. Such a system would require federal rights-of-way permits and compliance with NEPA, possibly to the extent of a regional EIS.

Alternatives not covered in the existing EPNG gasification draft EIS will require either a new EIS or modification of the present draft EIS which has been prepared by Bureau of Reclamation.

Status and Timetable

Since the gasification project is now indefinitely postponed and alternative coal sales have only recently been considered, no timetable is feasible at present. Development of a new, or modification of the existing, EIS will require some time.

Any feasible development is now contingent upon Navajo Tribe action which may or may not occur very soon.

Revised October 1975

WESCO COAL GASIFICATION COMPLEX

Brief Project Description

Western Gasification Company (WESCO) proposes sequential development of up to four gasification plants in the Burnham Chapter area of the Navajo Reservation, San Juan County, New Mexico. The site is about 30 miles southwest of Farmington, New Mexico.

WESCO is a joint venture of Pacific Coal Gasification Company, a subsidiary of Pacific Lighting Corporation; and Transwestern Coal Gasification Company, a subsidiary of Transwestern Pipeline Company, which is in turn a subsidiary of Texas Eastern Transmission Corporation.

Coal supply would be mined by Utah International, Inc., from its existing coal leases adjacent to proposed gasification plant sites on the Navajo Reservation -- to be further discussed in a later section. Water for gasification would also be supplied by Utah International under its existing contracts for San Juan River water.

Each plant would produce 250 million cubic feet per day (MMCFD) of substitute natural gas, or a total daily output of one billion cubic feet per day if all four plants are developed. The Lurgi process, coupled with a methanation unit, would be used to produce a high-BTU pipeline quality gas.

Necessary supporting facilities include roads, diversion and pipelining of 33,040 acre feet per year of water, ash disposal, byproduct removal and disposition, feeder gas pipelines to connect with existing Transwestern Pipeline Company line near Gallup, and related housing and other community facilities for the work force.

Cost <u>per plant</u> is now estimated to be nearly $1 billion.

Projected Employment Impacts

During the approximate nine-year development period needed to build the four plant complex, total employment (including not only construction and operation, but mining personnel) would range from about 1,000 in early construction to a peak of about 7,450 near the end of the eighth year. The sequential development schedule will cause substantial fluctuation in construction employment. This class of employment will rise from 1,000 to a peak of 4,300 near the end of the third year, then decline to 3,450 near the end of year four, rise again to 4,300 near the end of year five, then fall again to 3,450 near the end of year six, rise again to 4,300 near the end of the seventh year, and again fall to zero when project is completed. Permanent operating and mining employment increases will somewhat soften the fluctuations, but total employment declines and rises will recur three times during the construction phase.

After construction is completed, total employment for four plants will stabilize at approximately 4,000 plant operating and mining personnel. Each plant would require approximately 600 operating personnel and 400 mining personnel. A table projecting quarterly employment estimates during the development phase is attached.

Substantial indirect and secondary employment can be anticipated from a development of this magnitude. A work force of this size, and related family members require supporting service occupations. The employment multiplier differs for various types of jobs, but using a very conservative multiplier of 1.2 would result in an additional 8,900 secondary jobs at peak employment.

The production of byproducts generated by the gasification process should create jobs in satellite businesses and industries. These byproducts include sulphur, tar, tar oil, naphtha, ammonia, and crude phenols. No definitive work relating to the satellite employment potential is available, but it should be recognized as an additional employment impact.

The direct construction, plant operation and mining work force will be essentially employed in the Burnham area. However, there are no housing and other community facilities available for personnel in the immediate area. In fact, there are only eight Navajo families throughout the area proposed for mining over the twenty-five year life of the project. There appear to be several alternatives for residential facilities for the work force, any one or all of which could occur:

1. Establishment of a "new town" or construction camps within the Navajo Reservation.

2. Establishment of a "new town" or construction camps near the site, but outside the Navajo Reservation.

3. Settlement within existing communities and developed areas in or near Bloomfield, Aztec, Farmington, and the small unincorporated river valley communities.

4. Drift of workers and job-seekers setting up trailers or tents, singly and in clusters near the working area in "squatter" settlements both on and off the reservation.

To date, little action beyond a company consultants' study on potentials for a new town has been undertaken toward the first alternative, and the attitude of the Tribe is not clear. The second alternative has been explored by one company: the absence of any significant parcels of close-by, non-public or non-Indian, land makes this alternative difficult to implement. Alternative three would impose great impacts on local governments in San Juan County. Some manifestation of alternative four is probably inevitable.

It is most likely that a combination of all four alternatives will occur. Concerted cooperative effort on the part of local and state government, the Navajo Tribe, federal agencies, and industry are needed to effect the most satisfactory "mix" of these alternatives.

Required Major Governmental Actions

1. An environmental impact statement (EIS) prepared by Bureau of Reclamation must be filed with Council on Environmental Quality. A draft EIS was filed in December 1974. Public hearings were held in March 1975. The final EIS is expected to be filed in November 1975.

2. The existing Utah International water service contract has been modified and approved by the Bureau of Reclamation and the Secretary of the Interior.

3. The Federal Power Commission must approve the pipeline connection of the gasification plant to the Transwestern Pipeline Company line, in the neighborhood of Gallup, and the cost to the consumer of the product gas. The FPC issued a certification on April 21, 1975, granting the approvals. However, WESCO is requesting a rehearing because it considers the rate allowed, and the method allowed for amortizing the investment to be inadequate to finance the project.

4. The Navajo Tribe must grant, and the Bureau of Indian Affairs and Secretary of the Interior must approve, leases for the site of the plant complex and related facilities other than the mine. Negotiations have been underway for some months, but no estimate of a date for final action by the Tribe is possible at this time.

5. A variety of other approvals from federal, state, and tribal agencies are needed for the mining and reclamation plan, on compliance dates for meeting air and water quality standards, and for construction permits. Several of these approvals, especially at state level have been granted. It is assumed that the other required approvals can follow within the same time frame as required by the federal actions listed above.

71-333 O - 76 - 13

Status and Timetable

WESCO had originally hoped to begin construction as early as 1974. This proved impossible. It is now unlikely that the project can be begun before Spring 1976 at the earliest.

WESTERN GASIFICATION COMPANY
PROJECTED EMPLOYMENT

Time Period (x=starting date)	Total Employment	Construction Personnel	Plant Operation Personnel	Mining Personnel*
x	1,000	1,000		
x + 3 months	1,500	1,500		
x + 6	1,750	1,750		
x + 9	2,050	2,050		
End of year one	2,500	2,500		
x + 15	3,000	3,000		
x + 18	3,200	3,200		
x + 21	3,450	3,450		
End of year two	3,900	3,600	200	100
x + 27	4,300	3,800	300	200
x + 30	4,700	4,000	400	300
x + 33	5,300	4,300	600	400
End of year three	5,000	4,000	600	400
x + 39	4,800	3,800	600	400
x + 42	4,600	3,600	600	400
x + 45	4,750	3,450	800	500
End of year four	5,100	3,600	900	600
x + 51	5,500	3,800	1,000	700
x + 54	5,900	4,000	1,100	800
x + 57	6,400	4,300	1,200	900
End of year five	6,200	4,000	1,200	1,000
x + 63	6,200	3,800	1,300	1,100
x + 66	6,200	3,600	1,400	1,200
x + 69	6,050	3,450	1,400	1,200
End of year six	6,300	3,600	1,500	1,200
x + 75	6,600	3,800	1,600	1,200
x + 78	6,900	4,000	1,700	1,200
x + 81	7,400	4,300	1,800	1,300
End of year seven	7,300	4,000	1,900	1,400
x + 87	7,300	3,800	2,000	1,500
x + 90	7,400	3,600	2,200	1,600
x + 93	7,450	3,450	2,400	1,600
End of year eight	7,000	3,000	2,400	1,600
x + 99	6,000	2,000	2,400	1,600
x + 102	5,000	1,000	2,400	1,600
x + 105	4,000		2,400	1,600

Full operating level: Total 4,000 employees

* Includes figures for Utah International mine expansion

Prepared 12/74

Revised October 1975

UTAH INTERNATIONAL COAL MINING EXPANSION

Brief Project Description

Utah International, Inc., (UII) holds coal leases of approximately 31,000 acres on the Navajo Reservation, San Juan County, NM, running north to south from a point about 20 miles west of Farmington to a point just above Burnham. This lease was estimated to contain in excess of 1.1 billion tons of strippable coal. UII currently operates the Navajo Mine, near the north end of the lease, which supplies about 25,000 tons per day, or 8 million tons annually, to the Four Corners Power Plant, operated by Arizona Public Service Company. This mine is the largest in the US in terms of production.

UII also operates for Public Service Company of New Mexico the San Juan Project coal mine, located eight miles north of the Navajo Mine (see discussion of San Juan Generating Plant in another section). In future, the proposed expansion of the San Juan Generating Plant will use UII coal from about 5,500 acres of the Navajo Reservation lease to augment existing supplies at the San Juan Project mine.

As noted in the previous discussion of the WESCO coal gasification complex, UII is under contract to provide coal for WESCO. This coal would be mined from approximately 6,500 acres in the southern portion of the lease near Burnham. About 25,000 tons of coal per day would be required per plant, or 100,000 tons per day if all four plants are constructed. At this rate, the coal reserves dedicated to the WESCO project would be sufficient to operate each plant for at least 25 years.

UII currently transports coal by both truck haulage, and its own rail system. It is contemplated that the WESCO coal would be moved first by truck, and later by company rail system.

The company is exploring opportunities to serve additional potential customers out of the immediate area. Long haul potential is probably contingent on development of either rail service or slurry pipeline.

Projected Employment Impacts

Currently UII's Navajo Mine work force is about 480, and the San Juan Project work force numbers about 70.

The mine work force to supply the WESCO project is estimated at 400 persons for each gasification plant, or a total mine work force of 1,600 if all four plants are developed. The mining employment figures are incorporated in the previous section discussions and accompanying employment table dealing with the WESCO project. The additional mine employment would begin about two years after gasification construction is initiated and reach a stable peak early in year eight.

This mine work force would be located in the Burnham area and would be subject to the same residential location constraints discussed in the WESCO section.

The mine work force increase needed for the San Juan Project expansion is estimated to be an additional 75 persons. This employment is incorporated in the discussions and accompanying employment table in the report section discussing the San Juan Generating Plant. The proximity of the San Juan mine and the Navajo Mine to existing residential and community facilities and the relatively small number of additional employees involved minimize locational impact problems directly attributable to these developments.

Required Major Governmental Actions

Utah International's operations are being dealt with in three environmental impact statements (EIS) currently in preparation by Bureau of Reclamation:

1. The WESCO coal gasification complex EIS, discussed in the WESCO report section;

2. The San Juan Generating Plant EIS, discussed in the section relating to that project; and

3. The Four Corners Powerplant and Navajo Mine EIS, not elsewhere discussed in this report. Since the powerplant and mine were developed prior to the implementation of the National Environmental Policy Act (NEPA), it was deemed necessary to prepare an extensive EIS relating to certain modifications of the plant and related operations. A draft of this statement was filed in July 1975, and hearings were held in August 1975. The final statement is scheduled for filing December 1975 or January 1976.

UII is also subject to US Geological Survey, State Coal Surfacemining Commission, and Navajo Tribe approvals of subsequent mining and reclamation plans as it moves into mine expansion areas not already approved.

Status and Timetable

The major element of the coal mining expansion outlined above is, of course, contingent upon the development of the WESCO coal gasification complex. The expansion of the San Juan Generating Plant seems virtually assured, barring unforeseen difficulties. However, the WESCO project is still subject to a number of uncertainties as discussed in the WESCO section.

As noted earlier, the mine development timetable for WESCO lags about two years behind the gasification complex schedule, since the mine can be prepared for production much faster than gasification complex construction. Thus, if WESCO is able to proceed in 1975, the mine expansion impacts would begin in 1978.

Revised October 1975

SAN JUAN GENERATING PLANT EXPANSION

Brief Project Description

Public Service Company of New Mexico and Tucson Gas and Electric Company co-own the San Juan Generating Plant, located 14 miles northwest of Farmington, New Mexico, near Fruitland in San Juan County. This project is not on Navajo Reservation land. Presently, the first of four planned units is in operation. Its rated capacity is 330 megawatts (MW). The second unit is planned for 340 MW and units three and four would be 500 MW each. The total capacity would be 1,670 MW.

The present and planned units are coal-fired steam generating facilities. Present coal supply is provided from an adjacent lease, on national resource lands and state lands, leased by Western Coal Company (WCC), a subsidiary of the two companies. The coal mine is operated by Utah International, Inc., (UII) under a contract with WCC. The lease encompasses about 6,950 acres, of which approximately 2,000 acres will be surface mined, while reserves in the eastern area could be mined utilizing underground mining methods. Coal reserves are estimated at 50 million tons. The first unit consumes about 3,500 tons per day, or 1.1 million tons annually. Ultimate peak consumption for all four units would be 5.8 million tons annually. Coal supply would be augmented by coal from UII's Navajo Mine, as discussed in the UII Mine Expansion section.

Water supply is pumped from San Juan River under a water contract which allows the use of 20,200 acre-feet (AF) annually. The facility also has some additional present water rights, and may ultimately require additional rights or a change to some dry cooling in the future. It is estimated that 9,600 AF may be needed, above the 20,200 AF available under the Navajo Reservoir Storage water contract.

This project also requires the construction of substantial new high voltage transmission lines to Arizona and into the Rio Grande Valley of New Mexico.

Total project cost of the four units is now estimated at $660 million.

Projected Employment Impacts

Current employment of construction, operating, and mining personnel for the project is around 560. Total employment would peak at about 1,540 around January 1977, decline gradually until construction is completed, about mid-year 1980. Permanent operating and mining work force is estimated to be 311 persons, at full operating levels. A table showing quarterly projected employment is attached.

The proximity of existing residential and community facilities to the project area relatively lessens housing and service impact problems in comparison with others discussed for this region. However, the impact of another 1,000 personnel upon the area will be substantial.

Required Major Governmental Actions

The first unit and mine predated the National Environmental Policy Act, but the Bureau of Reclamation environmental impact statement (EIS) which is being prepared for the three additional units and related transmission lines will include a discussion and analysis of the existing developments. A draft EIS is expected to be filed in February 1976, public hearings are tentatively set for March 1976, and a final EIS could be filed by June 1976.

The companies have received approvals from the state Environmental Improvement Agency for construction of units 2 through 4.

Most transmission line right-of-way permits required from federal, state, and Indian tribal agencies have been obtained.

Mining and mined-land reclamation plans have received federal and state approvals.

Status and Timetable

Barring unforeseen problems, the timetable for this expansion project can be determined with considerable precision. The companies desire to have facilities in operation as follows:

Second Unit--------------------December 1976
Third Unit---------------------June 1978
Fourth Unit--------------------May 1980

At present the project appears to be meeting this schedule.

SAN JUAN GENERATING PLANT
PROJECTED EMPLOYMENT

Time Period (x=starting date)	Total Employment	Construction Personnel	Plant Operation Personnel	Mining Personnel*
x[a]	562	400	87	75
x + 3 months	675	500	100	75
x + 6	780	600	105	75
x + 9	985	800	110	75
End of year one	1,231	1,040	116	75
x + 15	1,305	1,100	120	85
x + 18	1,365	1,150	125	90
x + 21	1,423	1,200	128	95
End of year two	1,540	1,310	130	100
x + 27	1,532	1,300	132	100
x + 30	1,524	1,290	134	100
x + 33	1,516	1,280	136	100
End of year three	1,509	1,270	139	100
x + 39	1,455	1,200	145	110
x + 42	1,365	1,100	150	115
x + 45	1,275	1,000	155	120
End of year four	1,196	910	161	125
x + 51	1,091	800	161	130
x + 54	901	600	161	140
x + 57	706	400	161	145
End of year five	531	220	161	150
x + 63	411	100	161	150
x + 66	311		161	150

Full operating level: Total 311 employees

* Includes figures for Utah International mine expansion

[a] Since this project is already underway and proceeding on schedule, "x" is taken to be January 1975.

Prepared 12/74

Revised 5/75

NAVAJO INDIAN IRRIGATION PROJECT

Brief Project Description

The Navajo Indian Irrigation Project (NIIP) is a federally-funded project to provide irrigation for the Navajo Tribe on over 110,000 acres of land south of Farmington, New Mexico, in San Juan County. The project includes lands both within and outside the Navajo Reservation boundaries. National resource lands outside the reservation have been withdrawn from the public domain and will be placed under the jurisdiction of the Tribe.

Water for the project derives from an allocation of up to 508,000 acre-feet from the Colorado River Storage Project and is impounded behind Navajo Dam, some thirty miles northeast of the eastern edge of the project lands. Water will be withdrawn directly from Navajo Reservoir and conveyed to the project through a complex system of gravity feed canals, tunnels, and siphons, then lifted, where necessary, to the irrigable lands by pumping. A portion of the pumping and related power requirements will be generated by a small hydroelectric plant to be constructed at Navajo Dam.

The irrigable lands are divided into eleven blocks of approximately 10,000 acres each which will be sprinkler irrigated.

The Navajo Tribe has established Navajo Agricultural Products, Inc., (NAPI), a tribally-owned agribusiness to operate the farming enterprise. The Tribe and Bureau of Indian Affairs (BIA) are responsible for the infrastructure facilities for farming, including roads, sprinklers, equipment, transportation, storage and processing facilities, and housing and community facilities.

No rail service is currently available to transport products, but the potential for service is being studied. (See Santa Fe Industries Railroad Extension section.)

Current estimates of the project cost are now well in excess of $302 million.

Projected Employment Impacts

Construction-related employment for NIIP will rise from a current level of about 400 to 800, a level which will be sustained until about the end of 1985 and then should decline to zero by the end of 1986. Farm project operating employment will begin early in 1976 and climb gradually to a permanent level of about 1,500 at the end of 1985. Peak total employment, estimated at over 2,000 persons, should occur near the end of 1985. A table reflecting project employment during the construction cycle is attached.

Secondary and indirect employment related to this project will, in time, probably be very significant. While the amount of spin-off processing generated by project crops and project-fed livestock is not yet determined, it could be considerable. Some conservative estimates project secondary employment at least equalling direct farm employment, or another 1,500 persons at full operation. Thus, primary and secondary employment could reach 3,000. Indirect employment generated from these 3,000 jobs could reach 3,600 based on a 1.2 multiplier.

A large percentage of the direct farm employment will be Navajo. No final decisions have been made regarding housing and other community facilities for these workers.

Consultants for El Paso and WESCO have produced proposals for a "new town," with three possible scales of development described. The third, or largest scale of development, would base its economy on the NIIP as well as the two gasification complexes.

With or without such development, secondary and indirect employment would probably tend to locate in or near existing river valley communities in San Juan County. Should rail service be extended sufficiently near the project to be an economical means of transportation, some of the secondary and indirect employment would probably be concentrated in that area, which is likely to be outside the river valley.

Required Major Governmental Actions

1. Construction funds for NIIP are dependent upon the normal Congressional appropriations process, as are funds for ancillary facilities needed to prepare the land for farming. Thus, the contemplated construction schedule is contingent on annual Congressional action.

2. The BIA is preparing an environmental impact statement (EIS) which will address production activities and construction completion, expanded to cover activities predating the National Environmental Policy Act. The draft EIS is nearing completion, but no firm date for a final EIS is available.

Status and Timetable

The first of eleven blocks of approximately 10,000 each will receive water prior to the 1976 growing season. It is planned that sufficient on-farm facilities will be available so that block 1 can be cultivated in 1976. Previously the plan was to complete the irrigation system for one additional block each year so that all land would be under cultivation in 1986. However, the decision to use sprinkler irrigation on the entire project has caused a slippage in that schedule. Under the revised timetable, block 2 will be ready for farming in 1978, and one block per year will be completed, with the final block brought under cultivation in 1987.

Some question the ability of the BIA and Tribe to fund on-farm facilities on this schedule and the ability of NAPI to assimilate these massive amounts of land over the eleven- to twelve-year schedule. The year of slippage should help resolve these potential problems.

Time Period (x=starting date)	Total Employment	Construction Personnel	Project Operation Personnel
x[a]	400	400	
x + 3 months			
x + 6			
x + 9			
End of year one	487	487	
x + 15	633		146
x + 18			200
x + 21			300
End of year two	999	599	400
x + 27			400
x + 30			400
x + 33			400
End of year three	1,135	735	400
x + 39			440
x + 42			500
x + 45			550
End of year four	1,180	580	600
x + 51			694
x + 54			750
x + 57			850
End of year five	1,510	560	950
x + 63			987
x + 66			1,000
x + 69			1,100
End of year six	1,735	535	1,200
x + 75			1,310
x + 78			1,320
x + 81			1,340
End of year seven	1,845	485	1,360
x + 87			1,374
x + 90			1,380
x + 93			1,390
End of year eight	1,935	535	1,400
x + 99			1,419
x + 102			1,425
x + 105			1,435
End of year nine	1,975	535	1,440
x + 111			1,445
x + 114			1,450
x + 117			1,460
End of year ten	2,000	535	1,465
x + 123			1,471
x + 126			1,480
x + 129			1,490
End of year eleven	2,035	535	1,500
x + 135			1,500
x + 138			1,500
x + 141			1,500
End of year twelve	1,500		1,500

Full operating level: Total 1,500 employees

[a] This is an ongoing project, "x" is considered December 1974.

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Revised October 1975

INTENSIFIED NATURAL GAS DRILLING AND PRODUCTION

Brief Project Description

The Blanco Mesa Verde Pool, located in San Juan and Rio Arriba Counties, New Mexico, is one of the most prolific natural gas production fields in the world. Until recently, the New Mexico Oil Conservation Commission (OCC) limited spacing to one gas well on each 320 acre unit. There are 2,100 gas wells in the field, which have produced 3.9 trillion cubic feet (CF) since production began in 1928. Another 5 trillion CF is thought to be produceable from these wells.

Under a recent OCC rule, a second well on each 320 acre unit will be permitted at the operator's option. An additional 6.7 trillion CF of gas, which would otherwise be lost, will be made available if the permissible new wells are drilled.

The major operator in the field, El Paso Natural Gas Company (EPNG), contemplated the drilling of 200 new wells annually, at least until prime areas are drilled. However, its 1975 program was cut back to about 100 wells.

Projected Employment Impacts

No definitive direct employment impacts from the intensified drilling program have been ascertained. It is reported that EPNG is seeking to put ten rigs into the field as soon as possible, which would result in direct employment of approximately 200 persons. If the 200 wells per year figure is to be attained, more than ten drilling rigs would presumably be required.

The labor intensity of production of gas fields after drilling is completed is very low. No figures are currently available.

Secondary, related employment generated by drilling supply, drilling mud, servicing units, etc., would be important but is unquantified.

Not all the impacts would occur in San Juan County since the field extends into Rio Arriba County areas.

Required Major Governmental Actions

Drilling activities on national resource and state public lands would necessitate various approvals for the additional sites, rights-of-way, etc.

Status and Timetable

The little information regarding operators' plans is reflected above.

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WESTERN COAL COMPANY COAL DEVELOPMENT

Brief Project Description

Western Coal Company (WCC), which is a subsidiary of both the Public Service Company of New Mexico and the Tucson Gas and Electric Company, holds a lease on national resource lands in the Bisti area, about 30 miles southeast of Farmington, in San Juan County, New Mexico. The lease encompasses approximately 5,000 acres of potentially strippable coal.

WCC is exploring the possibility of mining the lease for coal to be sold to customers off-site and/or to the parent companies for use in an electric generating plant in the immediate area. No firm plans have been made for either alternative. Development constraints include (1) the lack of transportation, although potential rail service in the area is being studied (see section on Santa Fe Industries Rail Service); (2) the apparent lack of water for steam generating facilities in the area, or for slurry lines.

Projected Employment Impacts

Due to the preliminary nature of planning, no estimates of employment impacts have been undertaken.

Required Major Governmental Actions

A large number of governmental actions for development would be required once plans were developed. Coal mining would presumably require preparation of an environmental impact statement (EIS), approval of mining plans by federal and state agencies, etc. An electric generating plant would require the same coal mining actions, plus utility regulatory authority approvals, air and water quality approvals, approval of water supply sources, transmission line rights-of-way, etc.

Due to the unique and fragile nature of certain "badland" areas within the lease, WCC and Bureau of Land Management have conducted conferences to study the feasibility of land exchanges, with view toward possible preservation of the environmentally sensitive areas before commitment is made to specific development plans.

Status and Timetable

No timetable is available. It is not expected that the parent companies will need generating facilities at this site before the mid-1980's. However, due to "diligence" requirements, WCC is under some pressure to develop off-lease saleable coal by the late 1970's.

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NAVAJO URANIUM EXPLORATION AND DEVELOPMENT

Brief Project Description

The Exxon Corporation has negotiated an exploration agreement and lease with the Navajo Tribe. Under terms of the agreement, Exxon has the right to explore 400,000 acres of the reservation, south and west of Shiprock, San Juan County, New Mexico. The company could ultimately select up to 51,200 acres for lease and mining. It is assumed that the mining would be conducted underground.

Exxon proposes to pay a $6 million bonus for exploration and allow the Tribe the option for joint venture participation or straight royalty payments.

Projected Employment Impacts

Exploration is not expected to involve large numbers of people. Subsequent development will be dependent on the results of exploration and no employment estimates are presently possible.

Required Major Governmental Actions

The agreement is not effective until approved by the Bureau of Indian Affairs (BIA) and the Secretary of the Interior. The BIA, with assistance from US Geological Survey, has initiated work on an environmental impact statement, which would be a prerequisite for the Secretary's approval.

Mining would require approval of the US Geological Survey and would be subject to various health and environmental approvals of state and federal agencies as well as the Tribe.

Status and Timetable

As above, the EIS period could take 12-18 months unless data already available from company consultants and other EIS in the region are found suitable for use. This matter is currently under review.

Although some geologists believe that the probability of finding economically recoverable uranium is good, it is difficult to make any reasonable projections regarding the potential scope of development activity at this time.

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ANIMAS-LA PLATA DIVERSION PROJECT

Brief Project Description

The proposed Bureau of Reclamation (BR) project would divert water from the Animas River to La Plata River near Durango, Colorado. It would provide irrigation water for lands in La Plata River drainage of Colorado and New Mexico and provide municipal and industrial water supply for Aztec, Bloomfield, and Farmington, New Mexico. The Animas River flows through Aztec, and both it and La Plata River flow into the San Juan River at Farmington. Compact agreement would apparently allow approximately 34,000 acre-feet of additional average annual stream depletion in New Mexico via this project.

Projected Employment Impacts

Construction employment impacts would probably fall essentially in the Durango area. The most significant employment impacts upon San Juan County would occur as a result of intensified agricultural activity in La Plata River drainage. A large part of the benefit is expected to be additional water to acreage already under cultivation. Therefore, although potential increased employment has not been quantified, it is likely to be considerably less significant than the previously described projects.

Required Major Governmental Actions

This project is still in preliminary planning stages with the Bureau of Reclamation. Currently the planners are considering plan formulation alternatives. A definitive plan is expected in May 1977. A draft environmental statement (EIS) is tentatively scheduled for filing in May 1977 with public hearings to follow in June of that year and a final EIS to be filed in November 1977.

The normal federal funding process through the Department of the Interior, the Office of Management and Budget, and the Congress would be required for construction funding, and would condition subsequent schedules.

Final contracts with water-using public entities would have to be negotiated--municipalities, water districts, etc.

Status and Timetable

Covered above. Additional delay possible pending adjudication of New Mexico and Indian water rights.

Other Comments

This project probably will not result in major direct employment impacts in San Juan County. It is included in this group of projects because the municipal and industrial water to be made available to San Juan County communities could become very significant if other impacts outlined ultimately occur. Lack of water could well become a constraint on population growth in the county.

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SANTA FE INDUSTRIES RAILROAD EXTENSION

Brief Project Description

Salt River Project has recently reached agreement with Cherokee Pittsburg (which is Santa Fe's mining company) and Peabody-Thermal to purchase 86 million tons of coal from Star Lake for their Coronado Electric Generating Station at St. Johns, Arizona. Unit train transportation arrangements are being negotiated with Salt River Project and will require the Santa Fe Railroad (SFRR) to construct a new track to the mine at Star Lake. This line will depart from the main line at Prewitt, NM, which is approximately 40 miles east of Gallup. This new line will be about 70 miles in length running in a northeasterly direction and cost more than $50 million. SFRR contracted with VTN Consolidated, Inc., to perform an environmental corridor analysis to determine the most favorable routes for rail line construction to Star Lake. This study was just recently completed and a second phase study of more detail was started which should be completed by the end of 1975. This analysis will cover not only environmental but socio-economic aspects of the project. This proposed rail line will have common carrier certification.

The final engineering is expected to be completed and contracts for grading let during the early part of 1977. Initial coal shipments over the line are projected to begin in mid-1978. It has been indicated that additional trackage may be required in the future if economically justified.

Projected Employment Impacts

About 170 workers will be required for about 18 months for rail line construction. About 36 workers will be required to operate and maintain the line after construction. Most construction and maintenance workers are expected to be hired locally from the McKinley and Valencia County area.

Required Major Governmental Actions

The right-of-way for the rail line is expected to utilize the following land ownerships--51% private, 26% Indian allotments, 12% Navajo Tribe, 6% State, 3% BLM, and 2% Government Trust. Rights-of-way permits from the federal and state agencies and the Tribe will be required. This rail line extension will be included in the environmental impact statement for the Coronado Generating Plant which is now under preparation.

Status and Timetable

In order to meet the deadline for coal deliveries outlined above, the EIS would have to be completed by mid-1976, and rights-of-way acquired by the end of 1976. There are substantial doubts that this timetable can be met.

Other Comments

This project is significant to the area under discussion in this report, not because of the direct impacts, but because the potential for further extension from Star Lake could:

(1) open up a major undeveloped coal area to potentially feasible development;

(2) enhance changes for satellite industry at the coal gasification complexes; and

(3) enhance prospects for marketability of agricultural products from the NIIP.

Senator MONTOYA. We have a witness who wishes to be heard, Miss Eva Benally, Director of the Navajo College.

I certainly welcome you before the committee, Miss Benally. Do you have a statement to make?

STATEMENT OF EVA BENALLY, DIRECTOR, NAVAJO COLLEGE

Miss BENALLY. Thank you, Senator. I do not have a written statement as it is. I would like to thank Hon. Senator Montoya for helping the Navajo College come into existence and receiving the funds for the Navajo Community College.

I am director of the Shiprock Navajo Community College. We have our own specific needs, needs that more or less relate to energy development in this area.

As the chairman of the Navajo Nation said in the statement earlier today, the Navajo Nation leaders recognize that in order for proper energy development to be assured, there must be a means of assisting Navajo people in the struggle for economic freedom, and this development must be accomplished under Navajo goals, objectives, priorities and policies.

They must be done in Navajo perspective, and to insure that protection of Navajo resources be carried out.

The Navajos themselves must maintain control; and, as such, if Navajos are to maintain control, it means that the education under the Navajo Tribe must play a major role in the energy development, and that the Navajo Community College, as a tribal entity, has a very great responsibility to play in energy development.

However, as it is presently, Navajo Community College lacks the necessary funding to carry out its responsibility to the Navajo people within the Four Corners area. It lacks funds to develop proper facilities to insure programs and educational opportunities for young Navajos who aspire to management positions or positions other than of the labor level; that both the Federal Government and the State and the Navajo Tribe must make some type of a funding available for the Shiprock branch of the Navajo Community College to develop plans, educational plans, for effective training programs that will insure the Navajos' management positions and technicians and levels of various industries within the Four Corners area.

Senator MONTOYA. How many students do you have in college now?

Miss BENALLY. At present we have 252 students.

Senator MONTOYA. When did you start the college?

Miss BENALLY. We have been in operation 3 years now. We conduct all of our classes in rooms made available to us by the Bureau of Indian Affairs, the elementary school, and the local public high school.

The Shiprock branch rents a space 25 by 50 feet, and this, I would say, is the only space that we could say we own. But otherwise we run all of our programs under facilities owned by other agencies.

Senator MONTOYA. Do you have any vocational training there?

Miss BENALLY. We have had an agriculture training program funded by the Concentrated Employment Training Act. Our purpose there is to provide manpower for the Navajo Indian irrigation project. In essence, we are training Indians for the Navajo agriculture industry.

Senator MONTOYA. What other training do you provide there?

Miss BENALLY. We provide transfer courses. We provide the basic education for Navajos who wish to transfer to 4-year colleges, Navajos who are interested in pursuing a 4-year program in engineering, and also in social, educational, and whatever fields that are available.

Senator MONTOYA. Do you have adult training courses?

Miss BENALLY. Yes. We offer both basic education and pre-GED and GED tvpe courses for Navajos who wish to work toward acquiring a GED equivalency diploma.

Senator MONTOYA. Do you have any bilingual courses?

Miss BENALLY. Yes. The Navajo Community College is dedicated toward integrating all of the Navajo culture into all of the courses that it offers.

As part of the institutional requirements for an AA degree, a graduate must have 9 hours in Navajo studies, which would include the language, and two semester courses in Navajo culture.

Senator MONTOYA. Do you have anything else to say?

Miss BENALLY. I feel that since much of the industry is located on the reservation, that it is only just the branch college should receive part of this revenue to enlarge its facilities to provide the manpower that is necessary and required to man the proposed gasification plant and the presently existing industries in the Four Corners area.

Senator MONTOYA. Did you hear my discussion this morning that different schools would be eligible to receive funding or grants for the construction of vocational schools?

Miss BENALLY. Yes.

Senator MONTOYA. Will you look into this? If I can help you, I would be very happy to do so.

Miss BENALLY. I sure will. Thank you.

Senator MONTOYA. Thank you very much.

[The following was subsequently supplied:]

PRIORITY NEEDS FOR NAVAJO COMMUNITY COLLEGE, SHIPROCK BRANCH, SHIPROCK, N. MEX.

A. Funds for:

1. Construction of facilities: *a.* Classrooms; *b.* Laboratories; (*c*) Dolmitories; *d.* Library; *e.* Student union; *f.* Field house; *g.* Administration building; and *h.* Housing for staff and faculty.

2. Instructional activities: *a.* Office equipment for vocational-technical programs—typewriters, calculators, adding machines, and any other equipment necessary for the implementation of a business and management curricula; *b.* Laboratory equipment for biological and physical science programs, agriculture, engineering technology, nursing, water resources technician program, and chemistry; *c.* Language laboratory equipment; and *d.* Math laboratory equipment.

Statistics indicate that the average Navajo high school graduate is deficient in English and math. The University of New Mexico claims the high attrition rate of native American students is due to the high deficiencies in these two areas. It appears that high schools in the Navajo Reservation fail to equip high school graduates with the necessary capabilites in these two areas, therefore it becomes the responsibility of Navajo Community College, Shiprock

Branch to provide opportunities for Navajo high school graduates sufficient in these areas to cope with a four year program in any college or university.

3. Equipment for a learning center which will enable the branch college to provide adequate services as an area wide research and information center for the Navajo in the Four Corners area.

4. Transportation: *a.* Career education mobile complete with media dispensing equipment and materials; *b.* Busses for enrichment trips for students; *c.* A car and van for execution of administrative duties.

B. Establishing a mechanism with appropriate governmental agencies enabling the Shiprock Branch eligibility to participate and receive government excess property and supplies and equipment from GSA stores.

C. Immediate receipt of excess mobile homes—To take care of immediate needs, Navajo Community College, Shiprock Branch, is in dire need of excess mobile homes to serve as temporary classrooms, office space, for staff and faculty, student centered offices and recreation center, and housing for staff and faculty.

To date, more than half of our present staff and faculty commute a distance of 84 miles a day to work due to lack of housing in Shiprock.

Presently, Shiprock Branch is conducting classes in the Bureau of Indian Affairs classrooms and the local public high school classrooms.

Senator MONTOYA. I want to say that today's hearings have been very informing to me, and I want to thank all of the witnesses who have appeared here—those who traveled from afar and those who were here locally—because their contribution has been tremendous.

I wanted to develop a mosaic here of comprehension with respect to the local problems, and I think the input that has been provided at this hearing has accomplished just that.

Of course, we will continue further hearings with respect to other parts of New Mexico and the country, and these will fit into the hearing record so that when we forge legislation or develop programs through other agencies, other than those that come under the jurisdiction of this committee, we will have the benefit of the testimony received here today.

I want to thank this college and its director and its staff for the courtesy extended to this committee. I want to thank these young men for coming up here and appearing with me at this forum. I want to urge them to continue their studies, and very soon I will be retiring from the Senate and my seat will be vacant. But in the meantime, just don't interfere with me.

I do want to thank my staff for working so hard in arranging for the testimony. I want to thank Mr. Tom Hynes, the District Attorney, for being with us all day and accommodating us as the prime host here in Farmington. Mr. Tom Hynes worked in my office when he was going through law school, and he was a good worker. I hope he is making a good district attorney. I understand that he is. So I wish him well.

Before we close, did you have something to say, sir?

Mr. BERMAN. Yes, sir.

Senator MONTOYA. How long?

Mr. BERMAN. Very brief.

Senator MONTOYA. Proceed.

STATEMENT OF GORDON BERMAN, LAWYER, FARMINGTON, N. MEX.

Mr. BERMAN. My name is Gordon Berman. I am a practicing attorney here in Farmington, N. Mex.

Senator MONTOYA. You may proceed, sir.

Mr. BERMAN. Senator Montoya, I have worked as a welfare worker in one of the richest per capita counties in the Nation: Montgomery County, Md.

Senator MONTOYA. I lived there. I couldn't afford to pay the taxes there.

Mr. BERMAN. I am no longer there. I have worked as a legal aid attorney for one of the poorest counties in the Nation, Rio Arriba, here in New Mexico. I am currently working as a legal aid attorney in Farmington.

Yet in all of that time I have never seen a larger palm extended for welfare benefits than I have here today. The representatives of private industry are requesting that the Federal Government guarantee several billions worth of dollars in private industry loans so that energy can be developed in this region.

I would have liked to have seen more dialog between yourself and those representatives to discuss why, if the projects they propose are as beneficial and as environmentally feasible and, hopefully, as profitable as they imagined, why private industry, private capital itself, cannot support those projects.

Senator MONTOYA. Let me explain this. This committee has no jurisdiction over that legislation. I am sure that there will be plenty of dialogue when the appropriate committees in the Congress consider the legislation, and there will be very thorough hearings on that. We didn't have time to go into the bills thoroughly.

Mr. BERMAN. I understand that. I know it is before the House now, I believe, after having been twice rejected by that body. But I think if the Senator had directed questions to particularly Mr. Smith and the representative from WESCO, rather than accepting at face value their assertions that those projects cannot be implemented and will not be furthered without government assurances.

Senator MONTOYA. I thought I asked those questions. If you will read the record of the hearings on the Joint Committee on Atomic Energy where similar guarantees are proposed, you will find out that I was asking questions in depth in that committee, and the reason I was is because I had jurisdiction over the legislation.

So there is a line of demarkation on the kind of questioning we do in these hearings. Within the time allocation that was available to us today, I am afraid I couldn't have gone into it as you suggest, although I might have wanted to.

Mr. BERMAN. In conclusion, then, I might point out to the Senator how very disturbing the current trend with Government involvement, support, and guarantee of private industry has become, and what consequences could befall this area and the Government itself with this program should it become initiated and should it fail.

Senator MONTOYA. I am glad to have your views. Thank you for your views.

Mr. BERMAN. Thank you.

Senator MONTOYA. Thank you.

Mr. Frost, who came up here, would like to say a few words.

STATEMENT OF RAY FROST, PRESIDENT, INDIAN CLUB, SAN JUAN BRANCH COLLEGE

Mr. FROST. I would like to extend my appreciation to Senator Montoya on behalf of the student body, as well as on behalf of the club, for him to come here to San Juan College and listen to these various statements.

As a student here at San Juan College, I would like to say one thing, that most of the statements have brought forth one thing to my mind, that we who live in this State of New Mexico and those who live on the reservation should get together and formulate a plan where New Mexico and the tribe will gain quite a bit of responsibilities from whatever they do jointly on an agreement, to where both parties will achieve funding from whatever the Government can do.

Here in San Juan College I know the economic impact will be great here in this country and that San Juan College has various opportunities provided. It is a 2-year college and it gives you an AA degree in whatever courses you pursue.

It also has vocational training in welding and auto mechanics and secretarial work. I am sure because of the economic impact those who are going to be leaders or are going into management on the irrigation project or on the WESCO project or these projects or going to the reservation, I am sure they will be very delighted to come to San Juan College and take in the various courses they have.

One thing that this college does have is a management program for those who would like to be midmanagement instead of receiving a 2-year type of education and getting a degree. They can take this course in midmanagement and still receive a degree in management.

Again I would like to thank Senator Montoya for coming, and I appreciated sitting up here with him. Thank you very much.

Senator MONTOYA. We enjoyed having you both, Mr. Ray Frost—you are the president of the Indian club here at the college—and Gary Benally, who is here with me also at the table.

I do hope that you will continue to concentrate on the needs of the Navajo people. They need leaders such as you two for the future. I wish you well.

Mr. FROST. I forgot to say that I am not a member of the Navajo Tribe. I am originally from Colorado and I am a member of the Southern Ute Tribe. I am sorry; I should have brought this up before.

Senator MONTOYA. Can I say I hope you go back to the Ute Tribe and become a leader there.

Mr. BENALLY. The impact from this gasification will be tremendous. The way things are going with the tribe right now, the population increasing and the amount of money coming in on revenues, the problems will get greater as the years go on.

No matter what happens to the gasification, if it is approved, it is going to have to be very sensitive, flexible, and responsive to the needs of everybody.

The Government, the tribe, the State, and the local people are going to have to bend over on their backs in order to make this thing work.

The Navajo people—I can't speak for them—but from an observation that I have presently, the young people are going through a culture breakdown. It is hard for Mr. MacDonald to represent all of the people. It is really hard. He did his best, and he expressed some good points.

What the people decided in Burnham and Shiprock in no way represents all other chapters and the councilmen. The majority of the land resources are there, yes. But those two chapters can only speak for these people.

Thank you, Senator Montoya.

Senator MONTOYA. Thank you very much, Gary, for a very splendid statement.

Now we will be in adjournment. Thank you all.

[Whereupon, at 5:35 p.m., the subcommittee recessed subject to the call of the Chair.]

APPENDIX A

THE NAVAJO 10-YEAR PLAN

THE NAVAJO 10 YEAR PLAN

PART I

A 100-Year Deficit and the Needed Investment to Bring About Equal Navajo Opportunity

. . . . what is rightfully ours, we must protect; what is rightfully due us, we must claim.

What we depend on from others, we must replace with the labor of our own hands and the skills of our own people.

What we do not have, we must bring into being. We must create for ourselves.

Peter MacDonald

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June, 1972

FOREWORD

THE 100-YEAR DEFICIT

By Peter MacDonald, Chairman
Navajo Tribal Council

For over a century the Navajos have been waiting for the fulfillment of promises made. On June 1, 1868, the Navajo Tribe and the United States Government entered into a treaty wherein the United States agreed to give aid to the Navajo people. Article VI of the Treaty included a pledge that "for every thirty children – a house shall be provided, and a competent teacher furnished –." Farms and implements and by inference irrigation water were to be provided Navajos who wished to farm. Schools, roads, and health care were promised.

Shelter and employment opportunity have been promised by subsequent white leaders and by acts of Congress. Expansions of these promises have been made continuously since that time; pledging to improve the education, the health, and the economy of the Navajo people. Although the Navajos have long since fulfilled their part of the treaty, the United States Government has repeatedly reneged on its promises or only partially fulfilled them.

It is not necessary to turn to the remote past for evidence of duplicity. Indians were assured in the early 1950's that no termination action would be taken without careful consultation. BIA Commissioner Glen L. Emmons, the father of termination, said repeatedly, " . . . I can and do pledge that each tribal group will be fully consulted by the Bureau of Indian Affairs before we take any final action recommending a termination program to the Congress."

The promises were broken. The Indians were consulted infrequently, and when they were sought out they were coerced with threats to freeze claims awards, with promises of extra concessions and with a variety of high-pressure tactics which effectively precluded any meaningful Indian participation or opposition. Hearings on termination became a pro forma orchestration of decisions already made in Washington by non-Indians.

More recent cause for the lack of Indian trust in Washington government occurred in 1966. The Indians were promised that they would be centrally involved in the creation of a master plan for Indians – the Johnson Administration Indian Resources Development Bill – which was introduced in Congress a year later. The Interior Department wrote the Bill, and Indian support was viewed as crucial for its passage. Regional hearings were held in nine areas, with Indians participating and offering a total of 1,950 recommendations. Press coverage was excellent. Only later did the Indians learn that the legislation had been drafted – *before the hearings.* The bill as drafted was called the Indian Omnibus Bill by its sponsors but, for cause, came to be known in Indian country as the Indian Ominous Bill. Few regretted the bill's failure.

Another example, one of direct concern to the Navajos, was Public Law 87-483. This law, recognized in Congressional hearings to be a fulfillment of treaty obligation, was designed to furnish water to 110,000 irrigable Navajo acres. Water was to reach the first 10,000 acres by 1970. Less than one third of the funds authorized by Congress were actually appropriated, and as time wore on Public Law 91-416 amended the time of delivery to 1975 at the earliest. Another example of a promise made and a promise broken.

For too long the interests of the Navajo have been expendable or amendable in favor of other interests. This was stated clearly by President Nixon in 1970 when he spoke to Congress of the white man's *"frequent aggression, broken agreements, intermittent remorse* and *prolonged failure."*

But the Navajo now has new hope. The President went on to state: "It is long past the time that the Indian policies of the Federal Government recognize and build upon the capacities and insights of the Indian people. Both as a matter of justice and as a matter of enlightened social policy, we must begin to act on the basis of what the Indian themselves have long been telling us. The time has come to break decisively with the past and to create the conditions for a new era in which the Indian future is determined by Indian Acts and Indian Decisions."

In the following pages we compare the present level of development of the Navajo Nation with the rest of the United States. We have made preliminary estimates of the deficit and projections of both the amount of money and the time that will be required to eliminate it. The amount of money which will be required is large but this sum must overcome a deficit which has been accumulating for over 100 years. It must also be remembered that this sum will not only relieve the suffering, deprivation and neglect so long born by a proud people. It will also save the tax payers many times this amount as the Navajo economy develops and wages and production replace public aid. Self-determination is the road to self-sufficiency, and we are on our way.

In presenting this report I wish to acknowledge the help of those dedicated people who made it possible – my colleagues in the Navajo Tribal Council and Advisory Committee who provided wise advice and patient counsel, the members of my staff who worked unselfishly and tirelessly in research and analysis, and most of all the Navajo people at the hogan level, who have in thousands of meetings and individual discussions made it clear to me that they are determined to move ahead – so that our children can have a better life.

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SUMMARY

For over a hundred years the Federal Government has been underfunding its treaty obligations and other commitments to the Navajos. As a result of this underfunding, much of the Reservation economy now operates at the level of bare subsistence.

Roads are few and these few are substandard, housing is many years behind the times, education and health programs are minimal . . . on every hand, Navajo country lacks the facilities and organization which sustain economic development. These deficiencies in social overhead capital have brought on even more marked deficiencies in industrial and commercial capital.

Deficiencies in social and productive capital are in turn reflected in undeveloped human resources – in lagging educational levels, a high incidence of disease and malnutrition, and an emerging complex of human problems. Figure 1 sets out statistical indicators of the various deficiencies in Navajo circumstances.

The Navajo people and their Tribal government have determined to reverse this long trend, and to seek government assistance for a Ten Year Plan to bring the Navajo up to an equal footing with the rest of the nation. Implementation of this plan will, indeed, require a substantial increase in public expenditures. The essential difference between this plan and previous "plans" and administered efforts does not lie in any proposed funding additions, however, but in this Ten Year Plan's thrust toward development of Navajo self-sufficiency – toward substitution of Navajo production for public subsidy. The history of federal assistance for the Navajo makes it clear that if present programming concepts persist the Navajo may never escape dependency. Only an adequately financed program, designed and implemented by Navajos, can break with the sorry record of our administered past and begin to forge ahead.

The Ten Year Plan will be developed in two parts. Part I, which is presented in this report, sets out the main features of the gap – the deficit – that separates the Navajo's economic and social circumstances from the circumstances of their fellow Americans. This part also indicates the magnitudes of the public investment that will be required to close the gap. Part II will elaborate a design for development – will specify goals and the steps we must take to achieve them.

Table I summarizes the Part I report. Public funds of $4 billion over the next ten years will be required in order to make a substantial impact on the 100-year deficit. Funding requirements are set out in two categories:

1. Social overhead investment – the public funds required to cut back significantly the deficits in health, education and economic infrastructure which handicap Navajo development. Social overhead investment of $3.8 billion will be needed over the next ten years. These funds include – are not in addition to – present federal expenditures in Navajo country. Present

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expenditures projected at their existing level would total nearly $1.9 billion after 10 years. Proposed public expenditures would thus be about double present funding levels.

2. Investment in productive business enterprise. The planned public investment in social overhead capital is expected to generate complementary private investment in industrial and agricultural production and in commercial and service enterprise. If national ratios of capital investment to continue jobs ~~obtained~~ during the Ten Year Plan, public loan funds of $232 million will generate about twice as much investment by private capital – about $400 million. For purposes of Part I of the Plan, however, the investments set out in Table I include only public funds, i.e., the public funds required to generate an effective amount of private investment in productive business enterprise. More precise determination of private investment requirements will be a primary component of Part II of the Ten Year Plan.

In summary, ten year requirements for public funds for social overhead facilities and services and for productive enterprise are projected as follows:

	Social Overhead Capital	Directly Productive Enterprise
	(Millions of dollars)	
Present funding level	$1,900	$ 50
Additional public funds	1,900	180
Total	$3,800	$230

Jobs and productive work were a primary gauge for determining the amount of the Ten Year Plan's investment requirements. About 25,000 men and women in the present labor force – more than 60% – are now effectively unemployed. They want work but are unable to find steady work. The proposed public and private investments will provide jobs or remunerative self employment for 46,000 Navajos – 26,000 in the public sector and 20,000 in the private sector. Development of a now lacking multiplier will raise this total by several thousand. By the conclusion of the Ten Year Plan, 90 to 95% of the anticipated Navajo labor force will be employed. Navajo unemployment will be down to national levels.

The other primary gauge ~~guage~~ for determining Ten Year Plan investment requirements was the deficit between the social overhead capital provided the Navajo and that afforded his fellow Americans. That is, the Plan will not only provide jobs; it will also create the economic infrastructure upon which development of productive enterprise depends.

The $3.8 billion in social overhead investment which we propose over the next ten years will provide the following capital assets, and result in an infrastructure capable of supporting a highly productive economy:

$170 million worth of facilities and equipment for education and vocational training,

$50 million worth of inpatient and outpatient clinics and hospitals,

$160 million worth of water, sanitary and electric utilities,

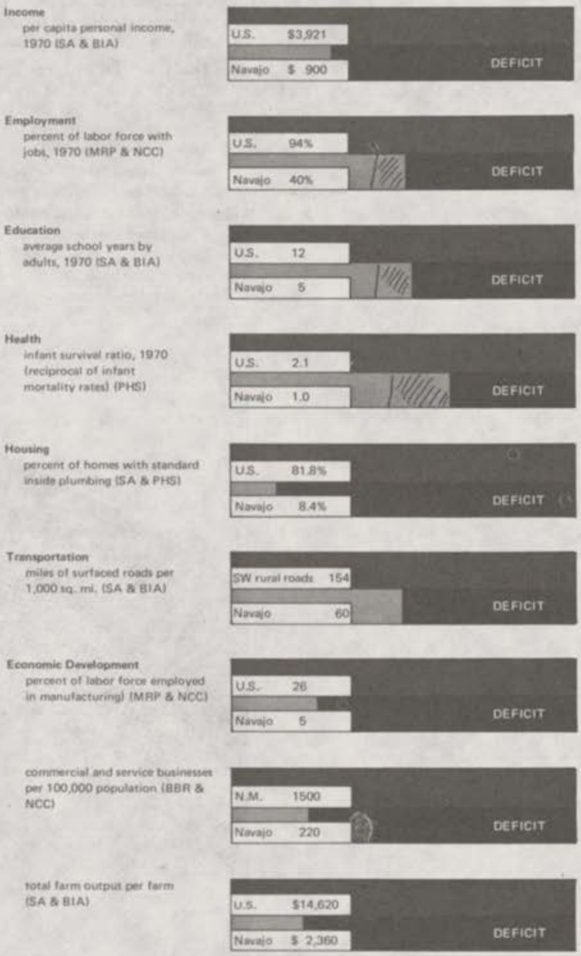
20,000 new housing units,

2500 miles of paved roads and streets and a somewhat greater mileage of graded, graveled roads,

$6 million worth of industrial and commercial and service businesses.

Figure 1
NAVAJO CATCH-UP REQUIREMENTS: SOCIAL INDICATORS

The following indicators show how much must be done to give the Navajo people an even break in education, health and necessities of life, and in the opportunity to make their own way in the economic world. Better indicators could be devised if facts were available, but the indicators set out here are adequate for the task at hand – to show the gap which must be closed and to point to requirements for closing it.[1]



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[1]Sources for Figure 1: SA – Statistical Abstract of the United States, 1970, BIA – Navajo Area Office, Bureau of Indian Affairs, MRP – Manpower Report of the President, 1971, NCC – Navajo Community College, PHS – Navajo Area Office, Public Health Service, BBR – Bureau of Business Research, University of New Mexico

Cost estimates set out in the Ten Year Plan are based on 1972 price levels, and as time goes on these estimates will have to be increased as costs escalate with inflationary trends in the national economy. Another factor understating results in the Plan's estimated costs ~~understanding~~ the amounts which will be needed to give the Navajo people an even break. The Ten Year Plan goals for 1982 in Navajo education, health, etc., are based on United States averages in 1972. Navajo circumstances will therefore continue to lag behind in 1982, but we will be rapidly closing the gap that still exists.

As the Ten Year Plan becomes operational, we expect an increasing proportion of public expenditures for welfare services to be replaced by private Navajo earnings. Navajo savings and investment will increasingly supplement public investment. Increasing tax revenues from Navajo country will offset other public expenditures as economic development gains momentum. We calculate that the economic value of these benefits to American society will be three times greater than the costs which American society will have to incur in implementing the Ten Year Plan (a benefit/cost ratio of 6 to 1.9). The existing social deficits are very heavy, however, and a commitment to a full ten years of both substantial national investment and unremitting Navajo effort will be needed if we are to insure a significant "take off" in the Navajo economy.

Figure 2
ECONOMIC DEVELOPMENT PLAN: CHANGING COMPOSITION OF THE NAVAJO ECONOMY

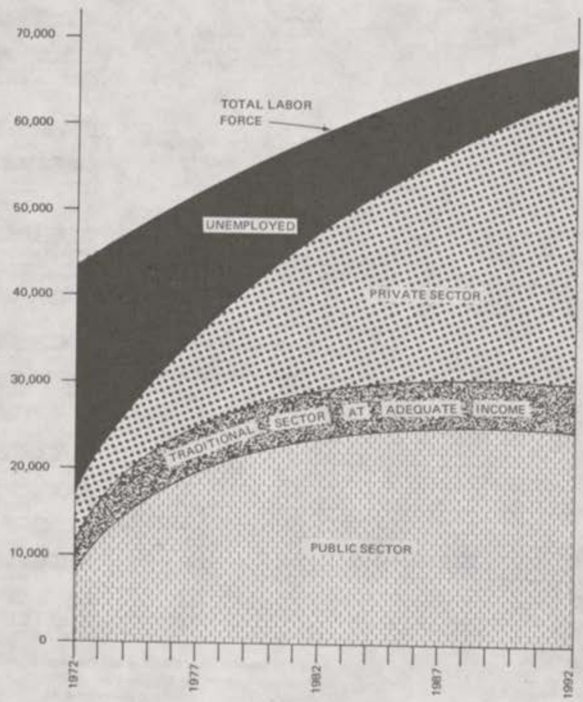


Table 1

PUBLIC INVESTMENT (TEN YEAR TOTALS) AND RESULTING EMPLOYMENT (ANNUAL AVERAGES)

Social Overhead (Public) Sector* (Investment in Human Resources Development)			Production (Private) Sector (Investment in Directly Productive Activities)		
Program	Investment 10 Years	Employment (Per Year)	Industry	Public Share** of Investment	Employment (Per Year)
Education and Manpower Development	$1,210,000,000	10,200	Small Business		
			Manufacturing, transportation and construction	$ 24,000,000	2,200
Health	422,000,000	3,300	Retail trade and services	30,000,000	4,700
			Large Scale Industry		
Housing (public sector)	372,000,000	1,500	Footloose Industry	13,000,000	3,000
			Resource utilization	1,000,000	1,700
			NFPI	8,000,000	800
Roads and other transportation	740,000,000	1,400	Tourism & Recreation		
			Motels, etc.	26,000,000	1,200
Public Utilities	164,000,000	1,100	Arts & Crafts	10,000,000	(increased incomes)
Public Services	173,000,000	1,900	Agriculture		
			Navajo Indian Irrigation Project		
Parks and Recreation	137,000,000	5,500	Farms	30,000,000	1,000
			Processing	30,000,000	1,000
Land and Water	520,000,000	1,000	Crop production	10,000,000	–
Research & Development	40,000,000	100	Transforming traditional agriculture: credit, marketing, etc.	50,000,000	5,000
TOTAL	$3,778,000,000	26,000		$232,000,000	20,600

*Includes present, on-going program expenditures as well as needed additional expenditures. About half of the expenditure totals are for present programs and about half are additional expenditures.

**Public funds will generate private investment in considerable larger amounts. The amount of private funds will be estimated in Part II of the Ten Year Plan's determination of specific business potentials.

SECTION I

CONTEXT FOR DEVELOPMENT DESIGN

HISTORICAL PERSPECTIVE

After their return from Ft. Sumner, the Navajo quickly adapted to the economic potentials of the land restored to them. Sheep were the primary means of livelihood in this land, and Navajo flocks grew steadily to support the increasing Navajo population. Much of Navajoland is semiarid, and Navajo families were soon making use of all the land where pasture and water could be found.

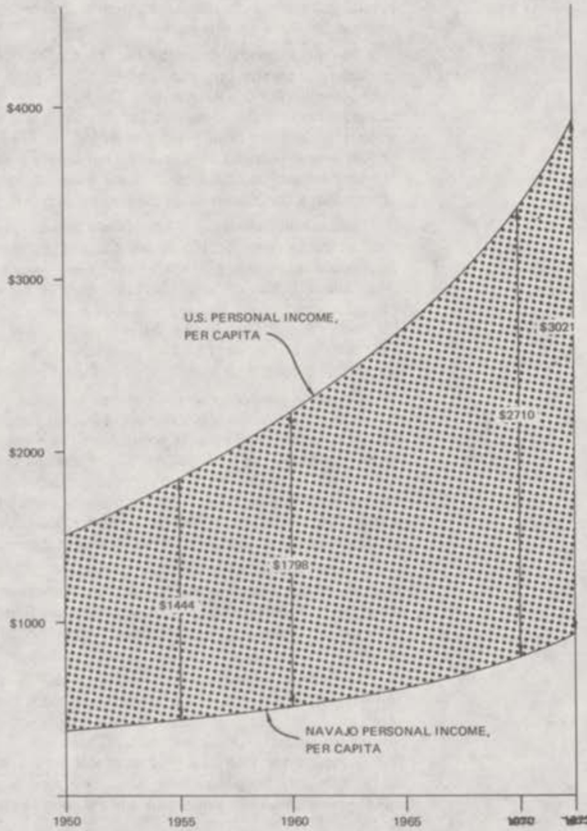
For a time the needs of the increasing population were met by enlarging the Navajo land area. Land acquisition was practically closed off by the early 1900's, however, and the increasing population and increasing herds of livestock brought heavier and heavier pressure on the fixed land base. The grazing crisis of the 1930's and the livestock reduction trauma finally left no way out except through creating a more diversified economic base.

Navajo country had been isolated from the main economic currents of America. Traders had come as time went on, the railroads brought work for maintenance crews, and the federal work programs of the 1930's had a substantial impact on the Navajo economy. Then came World War II, and from that time on far-reaching changes have come thick and fast.

The veterans returned, their war record renowned and their code talkers internationally famous; all of them with new technological knowledge and skills. The Tribal Government steadily assumed a much wider range of authority. In 1950 the U.S. Government recognized the shameful lack of schools for Navajo children and embarked on the Navajo-Hopi Rehabilitation program. Oil was discovered and the Tribe invested oil revenues in scholarships, in economic development, and in welfare services neglected by state and federal governments. In the 1960's the Tribe began to utilize their economic base somewhat more fully and to seek protection for their resource rights.

The Widening Gap – Although substantial gains have been made during recent times in Navajo health, education and welfare, the actual gap between Navajo incomes and general U.S. incomes is actually widening (Figure 3). Year by year the Navajo economy has fallen farther behind. The new Tribal government of 1971 thus found itself faced with a developing crisis. The Ten Year Plan is the basic step forward to meet this crisis.

Figure 3
THE WIDENING GAP BETWEEN UNITED STATES AND NAVAJO PERSONAL INCOME (PER CAPITA)



1970 - 1972

Source: Statistical Abstract of the U.S., B.I.A., and N.C.C.

Notes: U.S. and Navajo income data are not strictly comparable, but the discrepancy understates the gap that actually exists; i.e., results from showing higher Navajo incomes than actually exist. Income data are in current dollars.

RESOURCES AND ECONOMIC BASE

Land and Water – The Navajo land area encompasses some 25,000 square miles. More than half of the land (55%) is classed as desert, but supports scattered herds of livestock. Nearly two-fifths (37%) of the land is classed as steppe, a semiarid land also used for grazing. About 8% of the land is forest and mountain country, used for lumber production and with attractive potentials for outdoor recreation.

Because of the lagging development of other means of livelihood, Navajo rangeland for many years had to carry more livestock than it could actually support. As a result the land is badly eroded and has lost much of its natural grasses and shrubs. Restoration and conservation of the land is an essential for Navajo development.

Navajo water rights must also be restored. The Navajo are legally entitled to the water they can use beneficially from the streams which flow through or border the Reservation. The Navajo use very little of this water, however, because the dams and irrigation projects which are necessary for water use have not been provided. At last, in 1962, the Navajo Irrigation Project was authorized by Congress, but only a trickle of funds have been provided to carry out the Congressional authorization. As a result of this and other failures, the Navajo are in danger of losing their rights to water.

Recreation Resources – The Navajo Country, even the arid and rocky area, is spectacularly beautiful, and tourism and outdoor recreation have a considerable economic potential. Lake Powell, which fronts on a stretch of the northern border of Navajo country, may be the major tourist potential. There is, however, no highway whatever and very few roads of any kind on the Navajo side of Lake Powell. All roads which have been built thus far (and built with public money) lead to non-Indian retail markets, lodges, marinas and camping sites. The tourist dollar is forced to go where these roads lead.

Energy Resources – Navajo energy resources – oil, natural gas, coal, and uranium – are the major sources of Navajo Tribal income. Oil leases and royalty revenues have made it possible for the Navajo Tribe to pay the costs of its government and administration, of law and order in Navajo country, and of a good many work project and welfare costs, such as the cost of clothes for school children. Oil and gas reserves are, however, being depleted; and coal, the other major Navajo energy resource, cannot replace the oil and gas revenues. Coal reserves are nevertheless extensive, and are being utilized.

Human Resources – The Navajo peoples' skills and capabilities are the essential resource upon which Navajo development depends. Navajo workers have proved their capability whenever they have found work, but many lack skills and a considerable number have little or no knowledge of the English language.

The Navajo labor force is estimated at slightly more than 40,000 men and women. Of these men and women, only 15,000 are employed with any regularity, and 5,000 of these are self-employed – are raising stock or making handicrafts, or usually both. There are, therefore, about 25,000 Navajo men and women who need work and want to work, but who can find no work or only temporary jobs, often away from home. In addition, about 2,000 young men and women grow up and enter the Navajo labor force each year.

The Navajo are a young population – nearly half are 17 years of age or younger (Figure 4). This is 12 years younger than the median age of the United States population. One consequence is that a proportionately higher in estment in schooling is required for Navajo people. Another consequence is that proportionately fewer Navajos are in the labor force – are available for productive work. The average Navajo family size is 5.6, compared with 3.6 for the United States as a whole. The larger family size has important implications for planning medical facilities, schools, nutritional programs and for family income generally.

Table 2 compares certain Navajo labor force and population characteristics with those of the rest of the United States.

Figure 4
NAVAJO AND U.S. POPULATION, BY AGE GROUPS

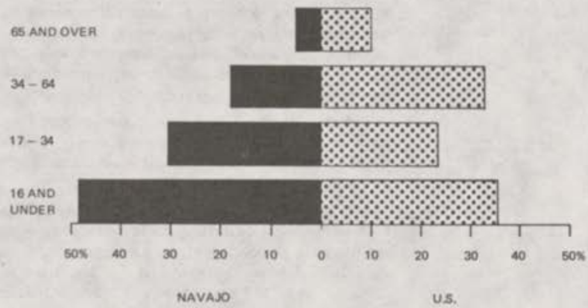


Table 2
POPULATION & LABOR FORCE CHARACTERISTICS: NAVAJO AND U.S.

	Navajo	All U.S.
Median age	17	29.5
Average family size	5.6	3.6
Annual population growth rate	2.5	1.1
Labor force as % of population	31	40
Rate of unemployment (%)*	60	6

Sources: Navajo demographic data, BIA & PHS; Labor force and unemployment data, NCC; U.S. data, Statistical Abstract, 1970, and Manpower Report of the President, 1971.

* The percentages are not strictly comparable. The U.S. rate includes only those actively seeking work. The Navajo rate includes all those wanting work and without regular work, even though they may not be actively seeking work because they know that there is no work to seek.

Capital Reserves – Accumulated capital reserves derived from oil revenues now total about $50 million. Some of these funds are available for investment in economic development. The funds must be guarded carefully, however, against the time when oil depletion reduces Tribal income below the amount necessary to maintain essential services.

COSTS AND BENEFITS OF THE TEN YEAR PLAN

Direct Costs and Benefits – Costs of the Ten Year Plan are, in the first place, the additional public expenditures on social facilities and programs – on Social Overhead Capital. These costs – which amount to $1.9 billion – are set out in Section II. Not included in these costs is "private sector" investment – investment in productive enterprise. Both public and private components of this productive investment will be evaluated, as is other productive investment, on the basis of its profitability.

The overall objective of the Ten Year Plan is substantial Navajo self-sufficiency, and social benefits should be measured in achievement of this goal. In this report employment is generally used as a proxy for self sufficiency. As the plan is implemented, therefore, the economic value of its benefits to society will be measured in increases in employment and earnings. Its public sector benefits will be measured primarily in decreases in welfare payments on the one hand, and increases in tax payments on the other. Other useful measurements will also be carefully recorded and analyzed – educational achievement, improved health, and various indices of quality of life as well as of economic performance.

Rather than attempt to estimate in Part I of the Ten Year Plan the economic (dollar) value of these potential benefits, however, this report simply notes a useful benefit-to-cost ratio which can be derived from presently obtainable facts and figures.

Economic Loss through Underutilization of Manpower – Methods have been designed for estimating the loss to society – the goods and services that are foregone – because of poor utilization of manpower resources.(2) The output of Navajo manpower is far less than it should be because of unemployment and also because manpower that is employed is so poorly equipped – works with so little capital equipment and technological know-how – that its productivity is low.

One estimate(3) placed the output of Indian manpower which was foregone in 1960 at $1 billion. At the rate at which the loss in potential product has increased, the total loss would have amounted to $2 billion by 1970. The Navajo proportion of total Indian manpower underutilization in 1970 would thus amount to about $600 million a year, or $6 billion or more over the next ten years.

The direct gains from economic development would, by the conclusion of the Ten Year Plan, have risen to a ratio of $6 billion in benefits to $1.9 billion in costs (incremental costs, or additional costs above existing expenditures). The major share of benefits will not be realized in the first ten years, but through accelerating Navajo production as time goes on. Not only direct gains but induced gains (the multiplier effect) should increase substantially as time goes on.

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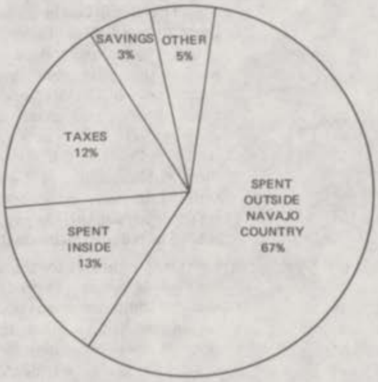
(2)For an exposition of such a method, see "Developing Estimates of Economic Underemployment for the Rural Labor Force of Seven Southern States," by Thomas T. Williams and Robert Glagow, *American Journal of Agricultural Economics,* Vol. 50, No. 4-5 (Nov. – Dec., 1968)

(3)"American Indian Manpower: Costs of Underutilization" by Dennis J. O'Connor and Benjamin J. Taylor (paper presented at the 43rd, 1969, Annual Conference of the Western Economic Association).

Adding a Multiplier Effect to the Navajo Economy – The effects of increased investment normally include a multiplier reflecting additional income resulting from additional rounds of local expenditure of wages and other payments. In Navajo country, however, there is almost no multiplier. As illustrated in Figure 5, only 10% to 15% of the money made in the Reservation is spent within the borders of the Reservation. Very little Reservation production is sold, moreover, (for processing or for consumption) to people who live on the Reservation.

The aim of the Ten Year Plan is to give the Navajo economy a multiplier approaching 1.5, which is only slightly less than the multiplier of the New Mexico economy.

Figure 5
WHERE THE NAVAJO DOLLAR GOES



Source: Navajo Community College

SECTION II

SOCIAL OVERHEAD INVESTMENT

This section summarizes the investments required in roads, education, health, utilities, and the other socially provided facilities and organizations that serve the community. Housing which is presently needed by Navajo families is included in this section. Housing which will be needed by middle and higher income families is included in Section III – the private or production section. Because of general Navajo poverty incomes, most housing will be in the public (social overhead) sector for some time to come.

The social overhead categories which follow include only the most urgently needed public programs. Social services are a rapidly emerging sector of the national economy and a good many public facilities and services that have been thought of as amenities are increasingly seen as necessities. In Navajo country, moreover, economic development and resulting urbanizing trends will make it necessary to provide many public services that are not now found in Navajo country, or are performed by family and extended family members. As time goes on the costs of many of these public services will of necessity be borne by community resources. Until community resources are more nearly adequate, however, federal government support for essential services and for various amenities will be needed in order to facilitate development.

Costs estimates for the various following categories are the aggregate of the existing program expenditures, projected at a 2.5% per year growth rate, plus the additional program expenditures which are required to bring Navajo circumstances up within the range of present national circumstances. "Present national circumstances" is not an adequate criterion to use in 1972 to establish goals for 1982. More exact and useful criteria than those used in Part I will be developed in Part II of the Ten Year Plan.

Projections of existing program expenditures in this report have been based on average annual expenditures over the past five years, where data are available. To the extent that facts are available, existing program expenditures include all federal and state programs.

Although cost estimates in this report provide for a constant rate of population growth, no provision is made for inflation. *Costs are figured in 1970 dollars*, and the long term escalation of price levels will of course mean that the costs set out here will have to be revised upwards steadily as the Ten Year Plan goes on.

EDUCATION AND MANPOWER DEVELOPMENT

Deficit – In the treaty of 1868, the U.S. Government agreed to provide the Navajo Indians with schools and a teacher for each thirty Navajo children. In 1950 the Government undertook its first substantial program to fulfill the treaty obligation. This program's expenditures were concerned with primary and secondary schools. As shown in Figure 6, these expenditures brought about considerably better educational opportunities for Navajo children. Much remains to be done, however, for improved elementary and secondary education, and whole new efforts must be mounted in other educational fields. In recent years beginnings have been made in some of these other fields. Major deficits which are outstanding are as follows:

1. Secondary Education. Boarding schools were acceptable as an interim solution to the education problem in the 19th century but with the modern means of transportation now available they are not acceptable. There are still far too many Navajo children taken away from their homes and parents for long periods and sent to off-reservation schools. Such actions are not welcome in any society and are totally alien to the close family traditions of the Navajo. With the construction of the roads and schools recommended by this Ten Year Plan it should no longer be necessary to separate families.

2. Higher Education. Deficiencies in higher education are illustrated by the fact that only 1% of the teachers of Navajo children are Navajos. This is the actual accomplishment of 35 years of a grandly announced and constantly reiterated program of the Federal government to educate Navajos so that Navajo teachers would teach Navajo children. It should be obvious that a wholly new education and degree-granting program is needed in Navajo country, together with considerably expanded programs for scholarships and career opportunities. The Ten Year Plan estimates which follow are designed to increase the 1% of teachers who are Navajo to at least 50% of the teachers of Navajo children.

3. Adult Education. About one-half of Navajo adults over 25 years of age are illiterate in English – neither read nor write – and one-third of Navajo adults do not even speak English.

4. Pre-school Education. This is recognized to be essential for Indian children. Present Headstart programs are funded uncertainly and reach only a portion of pre-school Navajo children.

5. Technical and skill-training. There is no skill center and only minimally equipped technical, paraprofessional and skilled trades training programs for Navajo Indians.

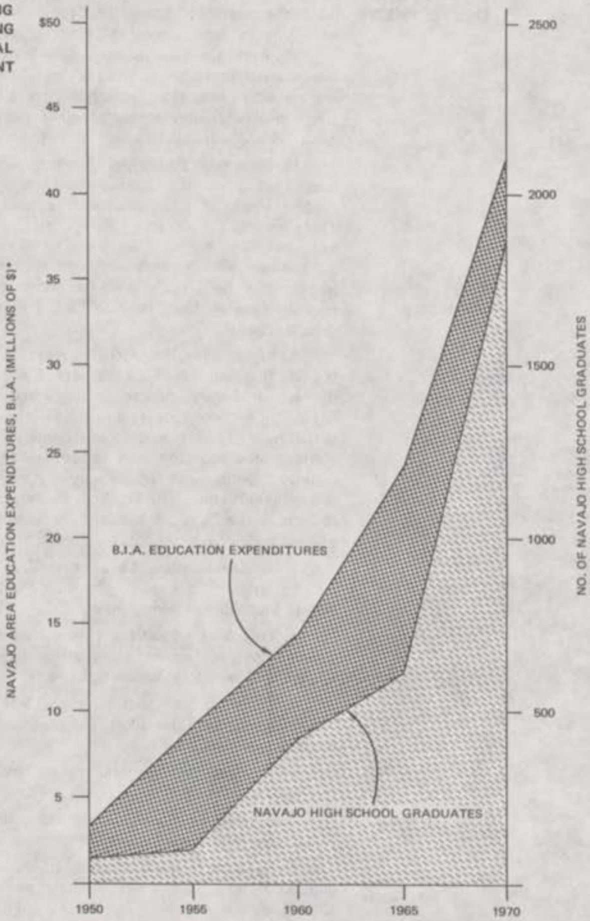
6. Business training. Training in business management and aid to businessmen is essential if the Navajo are to develop their economy.

7. Agricultural training. Here again almost no provision for Navajo Indians has been made by any Government agency or land grant university.

8. Special education. Because of isolation, health and language and cultural factors, Navajo children have especially urgent needs for special education programs.

Investment Needed to Close the Gap – The Ten Year Plan funding requirements for more equitable Navajo educational opportunity are shown in Table 3. All federal, state and tribal programs are included.

Figure 6
INCREASING EXPENDITURES ON EDUCATION BRING INCREASING EDUCATIONAL ACHIEVEMENT



* In current dollars

Source: BIA & Navajo Community College

Table 3
EDUCATION AND MANPOWER PROGRAMS: TEN YEAR COSTS & ANNUAL EMPLOYMENT

Educational Program	Cost (10 Yrs.) Construction & Equipment	Cost (10 Yrs.) Operation	Employment (Average Per Year) Construction	Employment (Average Per Year) Operation
Pre-school				
Class and group	$ 10,000,000			
Field & playground	2,000,000	$ 50,000,000	400	400
Life Enrichment	1,000,000			
Elementary & Secondary				
(2.5% growth per year)	120,000,000	630,000,000	600	5,000
Higher Education				
Regular Programs*	15,000,000	50,000,000		
Career Programs	1,000,000	20,000,000	200	500
Business Aids & Education		5,000,000		
Technical & Skill				
Skill Centers (institutional training)	10,000,000	100,000,000	200	300
Work experience and job training		120,000,000	200	200
Agricultural				
NIIP	5,000,000	11,000,000	350	200
Traditional	1,000,000	(included under resources)		
Adult Education				
Community programs	1,000,000			
(including health)		50,000,000	500	800
Educational TV & radio	1,000,000			
Special Education				
Institutions	1,000,000	3,000,000	50	200
Home programs	–	2,000,000	–	100
TOTALS	$168,000,000	$1,041,000,000	2,500	7,700

*Including scholarships
Source: Navajo Tribal Education Office, BIA, and Navajo Community College

HEALTH

Deficit – The health status of the Navajo is comparable to that of the general population of the U.S. 20 to 25 years ago, according to Public Health Service estimates. The consequences are not only felt in human suffering, but are serious handicaps to social and economic development. Table 4 contains some of the available facts indicating the extent of the deficit in Navajo health and in Navajo health services and circumstances.

Table 4
HEALTH AND MEDICAL CARE INDICATORS:
NAVAJO AND U.S. – 1970

	Navajo	U.S.
Infant death rate, per 1000 live births	42.3	20.7
Incidence of certain infectious diseases, per 100,000 population		
Tuberculosis	270	19
Rheumatic fever	90	1.6
Hepatitis	1,120	223
Life expectancy at birth (years)	63.2	70.5
Hospital beds per 1,000 population	4.4	7.8
Physicians per 100,000 population	92	163

Source: Navajo Area Office, U.S. Public Health Service

Directly related to the high Navajo mortality and morbidty rates are lack of basic sanitary facilities, poor nutrition, the effects of poverty, cultural clash, geographic isolation, unemployment, and lack of education. These related factors are the subjects of other parts of this report.

Investment Needed to Close the Gap – Health services to meet the needs of the Navajo people can be provided in three major categories: (1) Inpatient Services; (2) Outpatient Care Services (outpatient clinics, field health and homes services); and (3) "a vast expansion of preventive medicine, health education," including nutritional programs for young children and for mothers.[4] Needed Environmental Health Services (water, sewer, and waste disposal) are noted briefly in this section, but the costs of providing these services are included in the later "Utilities" section.

Table 5 summarizes the costs involved in providing needed facilities, equipment, staff and other directly related requirements to bring Navajo inpatient and outpatient health services up to more nearly the U.S. level. Figure 7 illustrates the effect that increasing federal programs for medical care have had in increasing Navajo infants' chances for survival.

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(4) "A Plan for Navajo Economic Development," by David F. Aberle. *Toward Economic Development for Native American Communities*, Joint Economic Committee, Congress of the United States, Vol. 1, p. 269.

Table 5
MEDICAL CARE PROGRAMS:
TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Cost (10 Years)		Employment (Average Per Year)
	Construction	Operation	
Inpatient Services	$46,000,000	$305,000,000	2,700
Outpatient Services	4,700,000	66,000,000	589
Totals	$50,700,000	$371,000,000	3,289

Source: Navajo Area Office, U.S. Public Health Service

Health Education and Nutrition – Malnutrition among Navajo children has received national attention. Pilot projects have demonstrated that educational programs can effectively reduce malnutrition through use of local Navajo teachers under expert guidance and through adequate food supplements. These programs can be combined with community educational programs which will accompany, and undergird, the whole development program. The costs of these educational programs are included under Education and Manpower Development, above.

Environmental Health Services – Provision of elemental sanitation facilities for Navajo communities and homes is essential in the prevention of environmentally related diseases and is basic to the improvement of health. The lack of safe water supplies and waste disposal facilities is in large measure responsible for the high incidence of such preventable diseases as gastroenteritis and amoebic and bacillary dysentery (more than 27 times higher than the rate in the general population). For Navajo infants who return to their home environment after hospital birth, and particularly for infants one month through eleven months of age, the death rate is about three times that of comparable age groups in the general population.

These conditions are in large part associated with the lack of sanitation facilities in the Navajo home and extremely crowded living conditions. Costs of correcting these conditions are included in following subdivisions headed Utilities and Housing.

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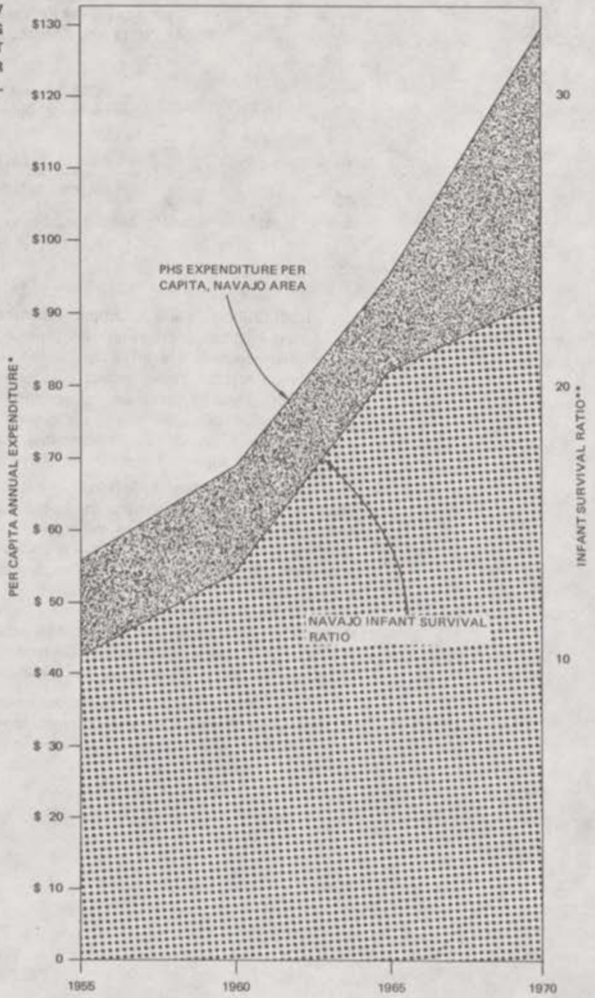
Figure 7
INCREASING NAVAJO INFANT CHANCES FOR SURVIVAL



* In current dollars

** Reciprocal of infant mortality rate per 1000 live births

Source: Public Health Service, Navajo Area Office and N.C.C.

HOUSING

Deficit – Most Navajo people live in one-room log dwellings called hogans. Often these dwellings lack electricity, running water and sewage connections, and are heated by a fire built on the earthen floor or in a small wood burning stove. The U.S. population has one modern dwelling (with standard plumbing facilities) for each 3 people. The Navajo have only 1 modern dwelling for each 20 people.

Other housing deficiencies are of the same order of magnitude. Large families live in a house with but a single room, so that over-crowding by modern standards is the common lot. There are few glazed windows, if any at all, in order to keep out winter cold and summer heat.

In order to provide Navajo people with modern housing, 19,281 new housing units are presently needed. Of the 6585 existing houses which have standard inside plumbing, 4,894 units now need repair and renovation.

Investment Needed to Close the Gap – The estimated costs to provide Navajos who now lack modern housing with housing comparable to U.S. averages are shown in Table 6. The assumption is that a new, 2-bedroom house will cost $18,250 (the present average cost on the Navajo Reservation) and that renovation and repair of presently existing housing will average $3,000 per unit.

During the course of the next ten years, houses will be needed to accommodate the increased population and repairs and renovating will be needed for all standard housing. The costs of such additional housing and of repairs to new housing are *not included* in this report, on the basis that these costs will be assumed in the private sector.

Table 6
HOUSING PROGRAMS: TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Number	Total Cost	Average Employment (Per Year)
New housing presently needed	19,281	$350,966,000	1250
New housing: streets & curbs	19,281	6,250,000	230
Present housing: renovation & repair	4,894	14,682,000	30
TOTALS		$371,898,000	1510

Source: Navajo Housing Authority

ROADS AND OTHER TRANSPORT FACILITIES

Deficit – Roads which have been built on the Navajo Reservation have been built primarily to link the various government facilities – schools, hospitals, and government offices. Two east-west and two north-south highways cross the Reservation. Only 1,370 miles of roads are paved. This is little more than one-third of the ratio of paved roads to square miles in rural areas of the states surrounding the Navajo Reservation. The BIA also maintains what are called "all weather roads" on the Reservation. These roads are indeed all weather, as long as it does not rain or snow. Projections in this program are for roads that are actually "all weather" and for all-weather maintenance (also now generally lacking).

There are no railroads crossing the Navajo Reservation and this makes an adequate highway system doubly necessary. Landing strips have been built here and there on the Reservation but must be vastly improved to serve modern air traffic needs. The failure of adequate transportation facilities is reflected in many deficiencies – boarding school rather than day school education for children, lack of medical care, high prices, and particularly the lack of industrial and commercial development. Some of the needed roads will be expensive to construct – those to the Navajo side of Lake Powell for example.

Investment Needed to Close the Gap – Road construction and maintenance needed to provide a transportation infrastructure for the Navajo equivalent to that in surrounding rural areas(5) would amount to over 2,140 miles of paved roads plus twice that amount of graded, graveled roads. Total costs of needed paved roads at an average cost of $200,000 per mile comes to $430 million. Additional needed mileage of graveled, graded roads would bring total costs of rural roads up to $600 million. Urbanizing communities will need another 400 miles of paved roads, costing another $80 million.

An adequate system of road maintenance would add another $50 million. As time goes on, an arrangement should be feasible to offset a good bit of road maintenance costs from Navajo payment of State gasoline taxes. However this may be arranged, total road costs for the ten-year period would come to $730 million.

Needed airport facilities will add an additional $10 million, bringing the needed road and transportation total to $740 million, employing an average of 1,400 workmen a year in construction, maintenance and administration.

PUBLIC UTILITIES

Deficit – Approximately 61% of Navajo homes are without electricity, and 80% are without water and sewer service.

In off-reservation areas of the United States, 99% of the homes have electric service available and more than 90% have running water and sewer facilities. Due to the fact that more than half of Navajo Indian families have annual incomes of less than $3,000, they will have to use kerosene lamps and to haul water for many miles unless utility expansion can be financed.

With home improvement programs and planned housing expansion, the need for utility expansion and home installation will become even greater. If

(5)The mileage of rural roads per 1000 square miles of land area in New Mexico, Arizona, and Utah was used as a basis for comparison. Statistical Abstract of the U.S., 1971. Navajo area were provided by B.I.A.

data

the economy of the Navajo Reservation is to increase, industrial, commercial and tourism facilities must be expanded. As part of this expansion, support services and additional housing will be required to meet the needs of workmen and management personnel. Every expansion and improvement requires additional utility expansion of all types.

Investment Needed to Close the Gap – Table 7 sets out the estimated costs and resulting employment for providing utility service to presently unserved homes.

Table 7
PUBLIC UTILITIES: TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Cost (10 Years)	Employment (Average Per Year)
Labor, Construction	$ 65,000,000	850
Material	84,825,000	
Machinery	9,425,000	
Operations	4,430,000	270
TOTALS	$163,680,000	1,120

Source: Navajo Tribal Utility Authority

PUBLIC SERVICES

Deficit – Public services provided by local governments in the rest of the United States include such functions as public safety, fire protection, law and order, environmental protection and various others. In Navajo country some of these services are provided by volunteer effort by Navajos. Other services are performed by various federal and Tribal offices. A good many of these public services are not found at all in Navajo country. These missing services must be provided and all services must be upgraded in order for economic development to proceed.

Investment Needed to Close the Gap – As economic development brings about changes in urban/rural living a multitude of new public services will be needed, including many of the amenities which are common in American communities but have never been provided in Navajo country. In addition, particular facilities and services (industrial parks, etc.) will be needed for economically productive endeavors. These major needed public services are set out in Table 8.

Table 8
PUBLIC SERVICES:
TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Cost (10 year)	Employment (average per year) Construction	Operation
Public Services (Police and fire protection, public welfare, general control and other)	$146,900,000	100	1,500
Social Amenities (100 parks & play-grounds, etc.)	20,000,000	100	100
Industrial & Commercial Parks (20 such parks)	6,000,000	50	50
TOTALS	$172,900,000	250	1,650

Source: Costs-based on per capita state and local expenditures for all services except education, highways and health. *Financing State and Local Governments*, by James Maxwell, The Brookings Institution, 1965. Employment ratios, *Manpower Report of the President, 1971.* Dollar quantities in the Brookings' study have been converted to 1970 dollar equivalents, but no increase has been estimated for additional services during the ensuing years.

PARKS AND RECREATION

Deficit – Navajoland has a wealth of recreational potential and the human resources are readily available, but development of this potential is lacking, as is the specialized training of Navajos necessary for operation and maintenance. Accommodations, too, are totally inadequate to meet the needs of Navajos and of the touring public.

Investment Needed to Close the Gap – Development plans include areas and sites as follows:

14 major recreation projects either in the planning stage or underway.

18 Navajo Tribal Parks heretofore established or proposed. Development of these has been minimal.

15 Navajo Parks and Monuments presently established in and around the Navajo Reservation.

196 site locations within or near the five Navajo Agencies.

Development of these areas and sites will vary considerably – from the setting of guide signs only to the construction of adequate access roads, motel and restaurant accommodations, trailer courts, campgrounds, rest stops and picnic areas, vistor and culture centers, racetrack and possibly additional airport facilities.

In order to develop these recreational complexes, the Navajo Tribe expects to contract with the National Park Service for the most effective use of funds allocated for development of these facilities and the training of Navajo personnel. Income derived from these projects will be deposited to the Navajo Tribe's account for further expansion and development. When sufficient Navajo personnel have been trained to operate the facilities, the National Park Service will turn over operation and maintenance to the Navajo Tribe. Table 9 summarizes the estimated Parks and Recreation expenditures and employment during the Ten Year Plan.

Table 9
PARKS AND RECREATION:
TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Cost (10 years)		Employment (average per year)	
	Construction	Operation	Construction	Operation
Present program continuance	–	$ 5,000,000	–	100
New Programs				
Major projects	$ 56,900,000	8,534,000	350	2,500
Navajo Tribal Parks	51,400,000	7,710,000	300	1,900
National Parks & Monuments	(NPS)	(NPS)	–	–
Historical & Scenic places	5,000,000	750,000	50	300
Interpretive material	1,500,000	225,000		
TOTALS	$114,800,000	$22,219,000	700	4,800

Source: Navajo Tribal Parks and Recreation Division

LAND AND WATER RESTORATION AND CONSERVATION

Deficit – Because of lack of dams, canals and irrigations systems, the Navajo have never been able to make use of their rights to the water which flows through their land. The Navajo Indian Irrigation Project is lagging far behind its scheduled construction, and other reclamation projects for Navajos are pitifully few and inadequate. These deficiencies and others brought about pressures on the land which resulted in the erosion crisis of the 1930's. The land was never restored after this crisis. Government programs have touched only a few small areas in the most favorable locations.

Investment Needed to Close the Gap – In order to make optimum use of Navajo land and water resources, much more must be found out about their quantity and quality, and a massive campaign must be set in motion to conserve those that are being lost and to utilize all of them in ways that bring most benefit to Navajo people.

Navajo Indian Irrigation Project. Completion of the Navajo Indian Irrigation Project has top Navajo Tribal priority. Funds were promised for this Project when the Navajo permitted diversion of San Juan River basin water to the Rio Grande. The water is now going to the Rio Grande, but the Navajo Project has lagged intolerably. Estimates are that $170 million (at present prices) will be needed simply to complete the basic canals and related facilities. If the Project is to be completed by 1986, about $150 million will be needed during the Ten Year Plan; i.e., through 1982.

Transforming Traditional Agriculture. The second need is for a program to upgrade the productivity and incomes of those several thousand Navajo families engaged primarily in traditional livestock and farming operations. The low productivity of traditional agriculture is primarily the result of minimal investment in capital goods and in human resource development.

Transforming traditional agriculture requires patient, persistent effort, involving demonstration to many stockmen and farmers of the means of increasing their incomes through better technology and better livestock and farming practices. The essential means seems to include withdrawal in accordance with community planning of a sequence of grazing on selected pasture areas while new grass and cover crops are grown. This would imply not only investment in pasture improvement and stock upgrading, but also feed for stock kept off the accustomed (and only) range.

Costs of conservation and restoration of Navajo soil and water resources other than the Navajo Indian Irrigation Project are set forth in Table 10. These costs were calculated on the basis of the present cost of pilot reseeding projects which are being carried on by Tribal and federal agencies. Because of stock care, water and other problems, it is likely that only one-third of the total land acreage which needs restoration can be usefully attended in the course of the next ten years. Minimum attention can be given the other areas, and needed reservoirs, tanks, etc., can be built.

In addition to administrative and technical staff, approximately 5,000 Navajo families would be involved in the work of transforming Navajo agriculture to modern productivity. Their work would be combined with training and work experience and the total costs are included in the Public Sector (i.e., in this Section) regardless of whether these costs take the form of investment in human or in natural resource development. Total employment is included in the private sector since these families will be making their own way as time goes on.

Table 10
TRANSFORMING TRADITIONAL AGRICULTURE:
TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Cost (10 Years)	Employment (average per year)
Navajo Indian Irrigation Project:		
Project construction through 1982	$150,000,000	500
Traditional agriculture area		500 (staff)
Reseeding, fencing, etc.	150,000,000	
Wells, stock tanks, etc.	20,000,000	
Reservoirs, runoff controls, irrigation systems	100,000,000	(5,000 families included in Private Sector tables and totals)
Income maintenance, stock feed, etc., during soil restoration	100,000,000	
TOTALS	$520,000,000	1,000

Source: Navajo Tribal Water Resources Office and BIA

RESEARCH AND DEVELOPMENT

Deficit – In spite of thousands of studies about Navajos, many essential facts needed for economic development are not known. Information that must be found out about Navajo resources – water, soils, minerals, etc. – is noted in foregoing sections. We do not know, moreover, many things that we need to know about adapting animals and plants to meet the semiarid Navajo conditions. Economic and social data are even scarcer and less reliable. In writing this brief summary, for example, many obviously needed facts simply could not be found – the extent of Navajo capital investment in agriculture, for example, or the supply of skilled Navajo construction workers. Moreover, the scattered data which have been compiled are not available in any one place, and essential facts are not kept up to date in useful trend series.

What certainly is not needed is more studies *about Navajos.* What certainly is needed is research *by Navajos, for Navajo use.*

Investment Needed to Close the Gap – Investment in Research and Development (R & D) runs at about 5% to 6% of GNP in a number of major industrial countries. This sum gives a guideline for estimating needed Navajo R & D investment. Navajo R & D need not concern major national problems (defense), but will have to involve more than the usual amount of demonstration projects and more community development research, i.e., research geared to social programs. The following major areas are noted here, although further expenditure breakdown would be premature.

Health, including a substantial mental health component.

Economic development incentives and community organization, including business structure adaptation to Navajo social forms.

Resource inventories and utilization methods – including conservation and restoration of land, plant and animal life and water resources.

For purposes of this report, an R & D component of public funds is provided for at the rate of 1% of total public expenditure. This percentage is roughly one half of the non-military and non-space percentage of R & D expenditure to U.S. Gross National Product. The resulting expenditure would amount to $40 million, with ~~employement~~ estimated at an annual average of 100.

employment

SECTION III

DIRECTLY PRODUCTIVE ACTIVITIES

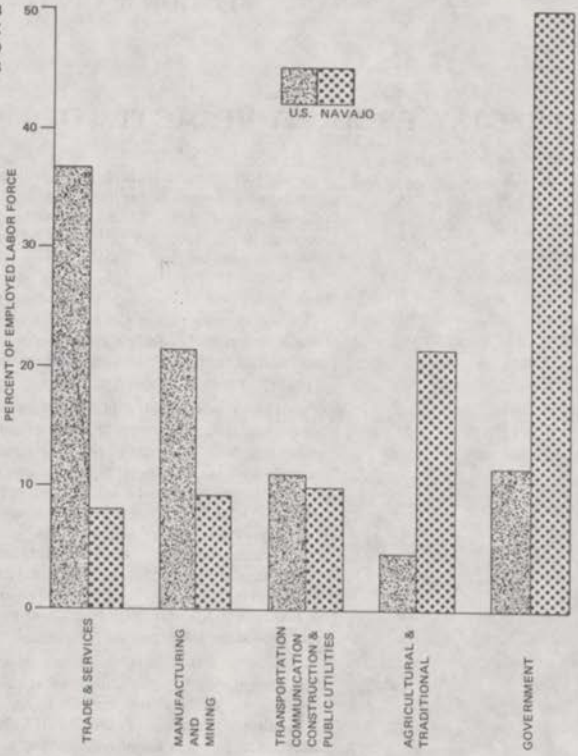
The investments in natural and human resource development which are summarized above in Section II will, if properly designed, generate an accelerating output by directly productive activities – manufacturing, mining, more productive agriculture, service businesses, commercial establishments and the rest of the generally private sector operations that keep the American Economy going. The greater part of investment in these enterprises will be private, but substantial public support will be needed. This section summarizes the public investment which will be required. The whole experience of Indian areas, and in fact of all lagging economic areas, makes it clear that Indian businesses will have to be encouraged and aided if they are to have a chance to survive.

The proportion of public funds to total required capital (public plus private capital) varies with the type of enterprise. Capital requirements for industries such as electric power production are very high, but private sources can be expected to provide practically all of the needed capital. Service businesses, on the other hand, require much less capital but in the early stages of Indian community development most of this capital will have to come from public sources. This section therefore presents capital requirements in broad categories according to the proportion of needed public funds. Mobilization of private capital will increasingly be the key to development, however, and first attention in this section is devoted to providing a credit structure which will mobilize savings and channel them into productive investment.

A basic and perhaps heroic assumption in the estimates that follow is that Navajo society can absorb (put to efficient use) the amounts of capital needed to provide the specified employment. The social overhead expenditures detailed in Section II, above, should warrant the basic assumption in every major employment area but two – in commercial and service businesses and in traditional agriculture. Because of the slowness of change in these sectors, no change is projected for employment in traditional agriculture, and only two thirds of the ideally potential expansion is projected for commercial and service businesses.

Figure 8 illustrates the disproportionate reliance of the Navajo economy on government services and traditional agriculture, in contrast with the dominance of productive activities in the U.S. economy. The Ten Year Plan will significantly increase the share of productive activities in the Navajo economy.

Figure 8
INDUSTRIAL MIX
OF U.S. AND
NAVAJO ECONOMIES



Source: U.S. data – Manpower Report of the President, 1971;
Navajo data – "Manpower planning for Navajo Employment," by Philip Reno, *New Mexico Business*, Nov-Dec., 1970.

A SAVINGS AND CREDIT STRUCTURE

Adequate credit, properly supervised and coordinated with training and education, has often been judged to be the essential element in successful economic development programs in emerging countries. Various special circumstances confront development of a Navajo credit structure. Most Navajo incomes are barely enough to meet subsistence needs. Navajo savings are consequently low. Incomes of employed Navajos are rising, however, and economic development will provide more savings. There are only five commercial banks on the Navajo Reservation, and none of these is focused on support of local business development.

The difficulty which Indians have in obtaining credit for businesses has been noted in practically every study of constraints on Indian economic development. In consequence of these constraints, special credit institutions are needed in Indian country. Special institutions do exist – SBA, EDA, and the Tribal Revolving Loan fund – but these institutions have only a fraction of the loan capital needed to meet current requests and are not structured to render the required services. These institutions must be adequately capitalized, and new and different credit forms and institutions must be created if Navajo business is to have a chance to develop.

Recommendations for new credit forms for Indians generally have included the following suggestions:[6]

1. An appropriation of additional funds for Tribal Revolving Loan Funds.
2. Establishment of a loan guaranty fund.
3. Authorization of interest subsidies on guaranteed loans.
4. Authorization for sale of existing revolving fund loans to financial institutions, thereby increasing the amount of funds available for loan.
5. Authorization for the Tribes to issue bonds exempt from federal income tax for purposes related to the governmental affairs or operations of the Tribe.
6. Establishment of Tribal banks and development corporations to administer the above and other credit.

Estimates of public loan funds needed for Navajo development of particular sectors are included in the following pages. Estimates of revolving fund and credit guaranty needs are therefore not included (to avoid double counting) in total capital needs set out in Table 13 at the conclusion of this section.

Additional forms of public support for business operations in developing areas include tax advantages and allowances, perference in government contracts and purchases, and various other forms. Each of these forms needs to be explored in providing adequate support for Navajo Indian business development.

SMALL BUSINESS DEVELOPMENT

Manufacturing, Processing and Transportation – Certain productive enterprises can be planned to provide inputs for the various social overhead investment programs summarized in Section II. Construction is the major industrial sector involved in the projected social expenditures, and needed inputs can be estimated precisely enough to plan production of these inputs. A considerable amount of cabinets and furniture will be needed, for example, and a certain amount of concrete and concrete products. Production of these items will require publicly-funded capital investment in buildings and equipment and operating capital.

Capital will be required for other production for local consumption, and for transportation and trucking businesses to serve the local market. The amount of needed capital can be estimated on the basis of regional or

(6) "Indians' Problems in Acquiring Development Capital" Report to the Four Corners Regional Commission by New Mexico State University Agricultural Experiment Station.

"Toward a Fundamental Program for the Training, Employment and Economic Equality of the American Indian," by Herbert E. Striner, Upjohn Institute.

national product-to-population ratios. Ratios of local production that are higher than national ratios can be obtained by "import substitution" policies in Navajo country, but the estimates in this report simply reflect regional or national ratios. The total public investment needed to support 2,400 employees in manufacturing, processing and transport is estimated at $24 million. Private funds of almost $30 million will be generated by the public commitment.

Commercial and Service Businesses – Retail business activity depends on disposable incomes as well as numbers of people, and also on factors such as transportation and peoples' wants and needs. National income levels are far higher and consumption patterns far different from those of the Navajo. More comparable estimates can be derived by use of New Mexico rather than U.S. ratios, and this is the basis for the following estimates of Navajo retail and service business potential and capital requirements.

Because of the lag in Navajo incomes and because of social and cultural factors constraining small business development, the goal set for the Ten Year Plan is achievement of two-thirds of the New Mexico level of commercial and service businesses. It is hoped that through the impetus given the Navajo economy by the Ten Year Plan the gap can be wholly closed within one generation.

Table 11
RETAIL SALES AND SERVICES: NAVAJO AREA AND NEW MEXICO

	New Mexico	Navajo	
		Present	To Be Developed
Number of establishments per 100,000 people	936	200	424
Number of employees per 100,000 people	7,000	1,200	3,500
Average annual sales per establishment			
Retail trade	$145,000)	$70,000	
Selected Services	$ 61,000)		

Source: Bureau of Business Research, University of New Mexico, and Navajo Community College

On the basis of national averages of capital to sales ($1 of capital to $3 1/2 of sales), initial capital investment of $30 million is needed in order to bring Navajo retail and service business activity up to two thirds of 1967 New Mexico averages. A continuing stream of savings and investment will be required. A decreasing proportion of this stream of funds will be required from public funds. For purposes of estimating a total ten-year public fund requirements for retail sales and service businesses, it is simply assumed that continuing capital requirements will be met from private sources, but that the total of initial capital ($30 million) will have to be provided by public loan funds.

LARGER SCALE INDUSTRY

The major manufacturing plant in Navajo country is the Fairchild Semiconductor facility at Shiprock, New Mexico. Two additional facilities of this size, or a number of smaller ones, would bring the ratio of Navajo employment in manufacturing up to the New Mexico proportion of manufacturing employment to total labor force. Tribal and Federal funds amounting to $6.7 million have gone into programs to aid the Fairchild plant's establishment and operation. Funds of double this sum are projected in Table 13 for development of additional plants of about twice the total employment capacity of the Fairchild plant.

Present and planned processing of Navajo resources includes large scale coal gasification and production of electric power. Funds should be obtainable from private sources. Funding for development of Navajo timber resources is projected in Table 13 at the rate of development which obtained over the last ten years.

The Navajo Tribe, itself, is not unfamiliar with large scale industry. It owns and operates one of the largest saw mills in the United States, employing over 500 Navajos. The Navajo Tribal Utility Authority serves the entire reservation with electricity, gas, water and sewage disposal. It is Tribally owned and employs over 600 Navajos. The newly established Navajo Agriculture Products Industries will, when the Navajo Irrigation Project is completed, be one of the major agri-business enterprises in the Southwest.

More complete and profitable utilization of the Navajo mineral and fuel resources is currently being planned. Several private firms are well along in planning large scale coal gasification plants and electric power generating plants. The present and future plans for development of these resources will involve the Tribe and the Navajo people in a much more profitable way than has been the practice of the past.

It is anticipated that most of the funding for the planning and construction of plants using the mineral and fuel resources of the Navajo Reservation will come from private sources. Some initial financing might be required for investigations, pilot plants, feasibility studies, etc. Such public funds as can now be foreseen are included in Table 13. More complete forecasts will result from the research for Part II of The Navajo Ten Year Plan.

TOURISM AND OUTDOOR RECREATION

As noted above under "Social Overhead Investment, Parks and Recreation," Navajo country contains the greatest abundance of historical, cultural and natural resources under the collective ownership of an Indian Tribe in the United States. Lodges and motels, campgrounds, etc., will be needed in order to develop the economic opportunities presented by these resources. Capital requirements for these facilities are set forth in Table II. These initial investments would require 20% of Tribal and 80% of public funding, if past funding ratios for this type of Tribal enterprises continue in the future.

Navajo arts and crafts – rugs, silverwork and the rest – are world famous. If properly developed, sales of these items could provide much better incomes for Navajo people. Underdevelopment of this resource at present is a consequence of lack of capital for effective outlet development, for inventory build up and for adequate promotion.

Estimated capital needed for this and other tourism and related development is included in Table 12. Many of the 5,000 or more Navajos who are presently engaged in arts and crafts production make much less than adequate incomes. The goal of this Plan's investment is not to increase the number employed but rather to increase the incomes of those engaged in this work.

Table 12
TOURISM & OUTDOOR RECREATION:
TEN YEAR COSTS AND ANNUAL EMPLOYMENT

	Public funds Cost (10 Years)		Employment (average per year)	
	Construction	Operation	Construction	Operation
Tourism facilities	$22,960,000	$3,443,000	280	952
Arts and crafts	2,000,000	8,000,000	(5,000 presently employed, mostly part time)	

Source: Navajo Program Development Office

AGRICULTURE

Agriculture – stock raising and small farms – has traditionally been the source of Navajo livelihood. Today these agricultural activities engage some working time and effort by nearly one-third of all Navajo families, and contribute a major source of livelihood for a good many of these families. With only a few exceptions, these agricultural incomes provide only bare subsistence. A primary effort must clearly be devoted to developing Navajo agricultural productivity and income. This will be done in two major ways and will involve investment programs as follows:

1. **Navajo Indian Irrigation Project** – The major hope for agricultural development rests with the Navajo Indian Irrigation Project, which will bring 110,000 acres into irrigated agricultural production. In addition to the basic water diversion system, funds will be needed to build farm roads, water systems, and community services. These costs are included in the foregoing Social Overhead section (Section II).

To provide direct, productive means for realizing the Project's agricultural potential, capital investment will be needed in farm structures (living quarters, barns, corrals, etc.) in equipment, livestock, other capital goods, and in working capital in reasonably equivalent amounts to general requirements in America. Since the Navajo have little or no savings to invest in agricultural enterprise, new credit forms and a substantial amount of "seed money" public investment will be needed in equipment, facilities and agricultural technology.

The amount of such capital investment needed for Irrigation Project Operations has been estimated at over $50 million,(7) or about $30 million during the years from 1976 – 1981 (years included in the Ten Year Plan). This sum accords with the investment required for a productive farm and stock business of family size in the United States (which varies from $120,000 to $200,000). This rate of capital needs would aggregate approximately $33 million by 1981. In addition, crop production credit will be necessary. An initial public commitment of $10 million may be adequate.

---

(7) "Projected cropping patterns, livestock enterprises, processing activities, capital requirements, employment, income, and training needs for alternative farm organizational structures for the Navajo Indian Irrigation Project," Department of Agricultural Economics and Agricultural Business, New Mexico State University, June 1971.

Processing and service businesses (including feed lot and livestock operations) will require initial capital outlays of another $30 million, more or less, by 1981. As time goes on, an increasing proportion of capital for these enterprises will come from private sources, but at the outset the regional ratio of public loan funds (40% public/60% private) can be anticipated in order to develop the Navajo share of enterprise.

2. **Transforming Traditional Agriculture** – More than 5,000 Navajos who are now engaged in traditional agriculture and stock raising will not be reached through the developments set out above. These Navajos will, however, share in projects for restoring the Navajo land and water resources and in transforming traditional agriculture to more productive operations. The major capital costs in achieving this transformation are included in the Social Overhead Section II, above. Private sector investment (individual and family investment) should be supported by public investment in the early stages of development. A public share of $50 million should initiate a production credit system capable of maintaining its operations.

Table 13
REQUIRED PUBLIC FUNDS AND ADDITIONAL EMPLOYMENT: DIRECTLY PRODUCTIVE ACTIVITIES

Sector	Required Public Funds*	Employment per year Additional	Present	Total
Small Business				
Manufacturing, Processing, Transportation and Construction	$ 24,000,000	2,000	200	2,200
Retail Trade and Selected Services	30,000,000	3,500	1,200	4,700
Larger-scale Industry				
Footloose industry	13,000,000	2,000	1,000	3,000
Resource utilization	1,000,000	1,000	700	1,700
Navajo Forest Products Industries	8,000,000	300	500	800
Tourism and Outdoor Recreation				
Motels, Resorts and Directly related enterprises	26,000,000	1,000	200	1,200
Arts and Crafts	10,000,000	(additional income for those now employed)		
Agriculture				
Navajo Indian Irrigation Project (to 1981)				
Completion of Project canals, etc.	(Under Social Overhead, Section II)			
Farm development	30,000,000	1,000	–	1,000
Processing and Service development	30,000,000	1,000	–	1,000
Crop Production	10,000,000	(above)		
Transforming Traditional Agriculture	(Under social overhead)			
Production Credit	50,000,000	–	5,000	5,000
TOTALS	$232,000,000	11,800	8,800	20,600

*Public funds needed to generate and support private investments. As noted in the text, private funds in varying proportions are expected to carry most of the investment in productive activities. In some cases practically the total investment will come from private sources; in every case a major share will be private investment. At this stage of planning, it is not possible to estimate with any reliability the private capital which will be forthcoming.

71-333 O - 76 - 17

APPENDIX B

CITY OF FARMINGTON—STATUS REPORT

CITY OF FARMINGTON

STATUS REPORT

March 11, 1976

Source: City of Farmington
New Mexico

City Council:
ROBERT S. CULPEPPER
J. A. DRAKE
ERICK A. JOHNSON
WILLIAM A. HALL

MARLO L. WEBB
Mayor

City of Farmington
Energy Capital of the Southwest
P.O. BOX 900
FARMINGTON, NEW MEXICO 87401

March 11, 1976

Honorable Joseph M. Montoya
United States Senate
Subcommittee on Economic Development
Washington, D. C. 20510

Dear Senator Montoya:

Enclosed is the City of Farmington Status Report for your inspection and review. This document briefly analyzes the City's present and projected needs which have been accelerated because of the major economic development throughout Northwest New Mexico.

The City of Farmington appreciates the opportunity to present this document summarizing the problems the City faces today and will face in the future. The City solicits your aid and assistance in overcoming the present and projected strenuous demands for city services which we will be hard-pressed to meet.

Sincerely,

Marlo L Webb

Marlo L. Webb
Mayor

MLW:jh

INTRODUCTION

Since the early 1970's the northwest part of New Mexico has been identified to receive anticipated major Energy Resource Development Impact. The City of Farmington is the trade center of this area. The City is already suffering from its inability to adequately meet the advance impact of these ongoing developments. This report briefly documents the City's dilemma and immediate need for assistance.

Enclosed is a summary of the City's needs and resources. The document identifies the location of the City of Farmington, Present and Anticipated Economic Developments, Constraints, Projected Municipal Needs for the short run and long run periods. Also included is a list of actual projects that the City must undertake in order to cope with the present population growth, not to mention any future anticipated growth.

A brief synopsis of the City's bond issues and resources is reviewed. Also enclosed is the status of the City's present attempts to acquire State and Federal funds.

CITY OF FARMINGTON

STATUS REPORT

City of Farmington

The City of Farmington is situated in the northwest portion of the State of New Mexico. The City is the center of population of San Juan County. The municipality is located in the northcentral part of the county, intersected by three major highways: U. S. 550 southwest of Aztec, U. S. 64 west of Bloomfield, and New Mexico 17 south from LaPlata, and the northern terminus of Highway #371 which will filter gasification plants and irrigation project impacts into Farmington.

Table No. 1 estimates the City of Farmington's population for 1976 as 33,450 which identifies an increase of 52.9% from the 1970 total of 21,979. Also, Table No. 2 reflects a comparison of the City's population and San Juan County for periods from 1970 to 1985. The population increases realized by the City have been primarily due to the increased economic activities throughout San Juan County. Farmington serves as the bedroom community for the surrounding area and is the four-state trade center.

Economic Development

San Juan County is endowed with an abundance of natural resources which are, at present, in the early stages of economic development, and ultimately will result in a rapid growth of jobs and population. The evidence points out that the projected population growth will be a long-lasting versus a temporary surge.

The economy of San Juan County is well diversified and depends mainly on trade, Government construction, oil and gas production, electric power generation and agriculture.

MAP NO. 1

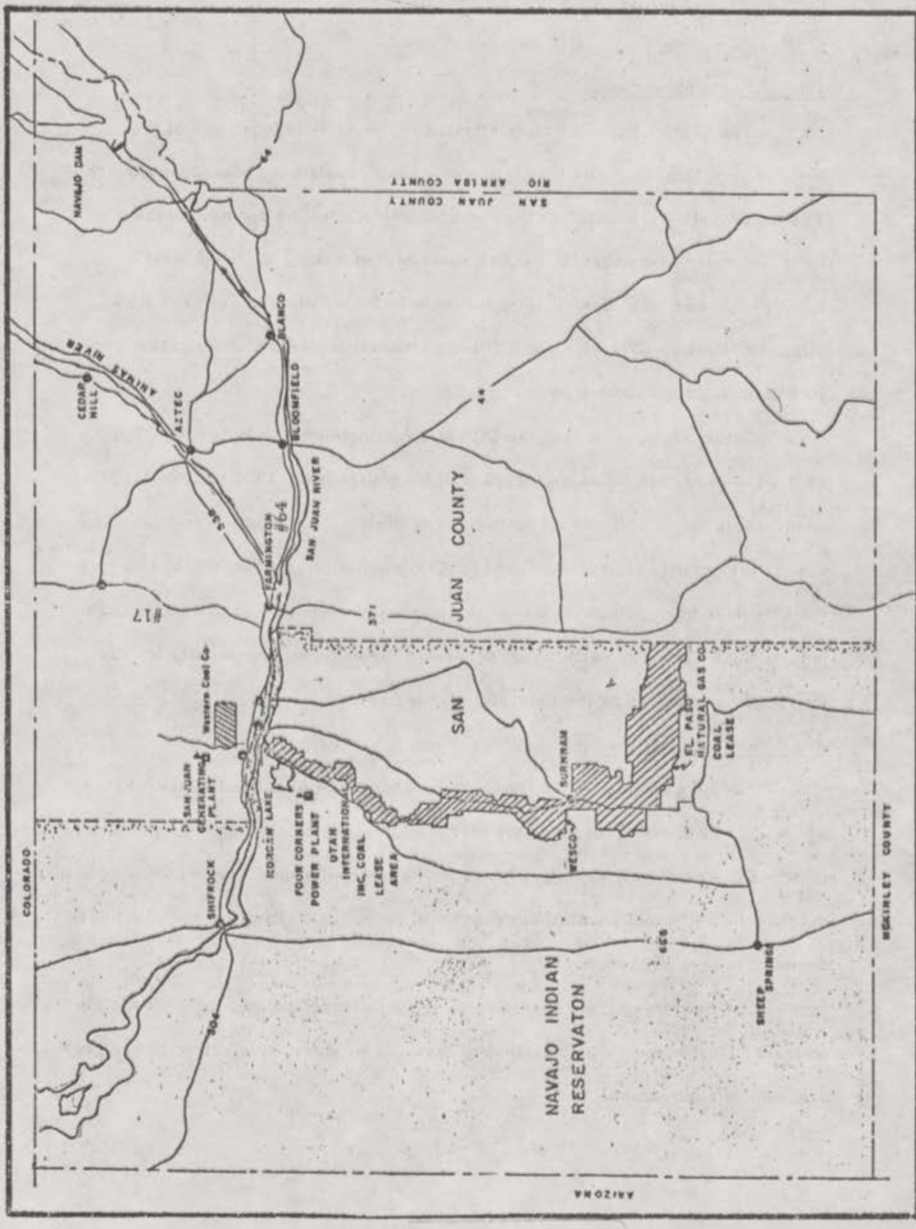

NAVAJO DAM
SAN JUAN COUNTY
RIO ARRIBA COUNTY
BLANCO
CEDAR HILL
ANIMAS RIVER
AZTEC
BLOOMFIELD
44
FARMINGTON
#64
SAN JUAN RIVER
SAN JUAN COUNTY
#17
371
Western Coal Co.
SAN JUAN GENERATING PLANT
SHIPROCK
FOUR CORNERS POWER PLANT
UTAH INTERNATIONAL INC. COAL LEASE AREA
BURNHAM
EL PASO NATURAL GAS CO. COAL LEASE
WESCO
COLORADO
NAVAJO INDIAN RESERVATON
666
SHEEP SPRINGS
McKINLEY COUNTY
ARIZONA

TABLE 1
SUMMARY OF FARMINGTON POPULATION FORECASTS

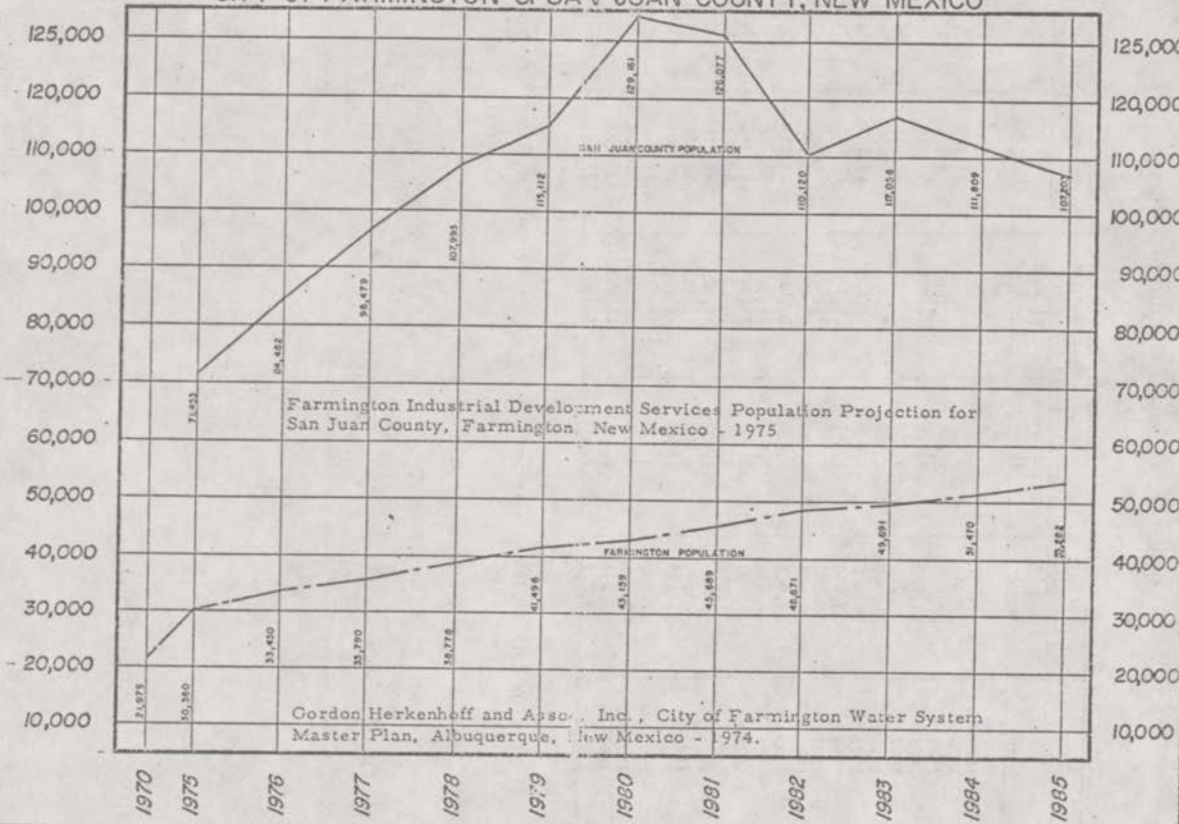
Year	Basic Forecast (Low)	Effects of Coal Gasification Plants: With New Town	Effects of Coal Gasification Plants: Without New Town	Total Potential Population (Medium)	Total Potential Population (High)
1973	26,000			26,000	26,000
1974	27,340			27,340	27,340
1975	28,680	1,680	1,680	30,360	30,360
1976	29,720	3,730	3,730	33,450	33,450
1977	30,760	4,759	5,030	35,519	35,790
1978	31,800	6,104	6,978	37,904	38,778
1979	32,840	7,328	8,656	40,168	41,496
1980	33,880	7,167	9,279	41,047	43,159
1981	34,557	8,106	11,132	42,663	45,689
1982	35,249	9,918	13,422	45,167	48,671
1983	35,953	9,804	14,016	45,757	49,696
1984	36,672	9,677	14,798	46,349	51,470
1985	37,403	10,042	15,879	47,445	53,282
1986	38,152	10,409	16,606	48,561	54,758
1987	38,914	9,528	16,548	48,442	55,462
1988	39,694	9,132	16,522	48,826	56,216
1989	40,487	8,913	16,628	49,400	57,115
[illegible]	41,296	8,717	16,615	50,013	57,911
1991	42,123	8,493	16,543	50,616	58,666
1992	42,967	8,235	16,406	51,202	59,373
1993	43,827	8,235	16,406	52,062	60,233

Gordon Herkenhoff and Associates, Inc., City of Farmington Water System Master Plan - 1974

Albuquerque, New Mexico - January, 1974

TABLE NO 2

POPULATION PROJECTIONS FOR CITY of FARMINGTON & SAN JUAN COUNTY, NEW MEXICO



4.

The tremendous growth is expected during the next five (5) years due to the new economic developments proposed as follows:

1. Construction of two coal gasification plants
2. Development of the $250 million Navajo Indian Irrigation Project funded by Congress and administrated by the Navajo Tribe and the Bureau of Indian Affairs.
3. Expansion of electric generation plants
4. New drilling and exploration for oil and natural gas

In summary, the projected investment level over the next ten (10) years is forecased over eight billion dollars (Refer to Table No. 3).

Constraints

1. One of several constraints is the land ownership pattern of the County, which is outlined as 59.8% Indian (Navajo Reservation), 29.2% Federal (BLM), 5.3% State (New Mexico), 0.2% Inland Water, and 5.4% private land. The County is composed of approximately 5,516 square miles.

2.* The "people" impact on the San Juan Area is resulting, and will continue to result, in an accelerated demand for services. These services are costly and long-range ones that must be provided primarily by local governments, school districts, health & social service agencies and other special districts. The burden facing these agencies is awesome indeed, even with federal funding assistance and virtually insurmountable without it.

3. The City of Farmington is utilizing the property tax for capital improvements through the use of general obligation bond issues. In a

*Source: Southwest Federal Regional Council Meeting at Farmington, New Mexico October 16 and 17, 1974 (Prepared by the San Juan Council of Governments)

TABLE NO. 3

MAJOR CONSTRUCTION SCHEDULED FOR SAN JUAN COUNTY

*	Wesco Gasification Plants (4 Plants Proposed)	$ 3,400,000,000.00
*	El Paso Gasification Plants (3 Plants Proposed)	2,550,000,000.00
*	APS, TG&E, SCEC, El Paso Electric, El Paso Gasification Wesco Gasification (Pollution Equipment Bonds)	1,500,000,000.00
*	Public Service Company of New Mexico (Construction 3 Power Plants)	624,700,000.00
	Navajo Indian Irrigation Project (11 Blocks Const.)	322,367,000.00
	NAPI - 1 Block $5M - 10 Blocks $70M (Operational)	75,000,000.00
	Peabody Coal Company (Coal Mining)	65,000,000.00
	Santa Fe Rail Spur (Construction)	50,000,000.00
*	Palmer Realtors (Housing - Harper Hill) 800 Lots	28,000,000.00
	San Juan Jetport (Proposed)	25,000,000.00
*	Palmer Realtors (Housing - Glade) 374 Lots	13,000,000.00
*	Western Development Company (250 Homes - Proposed)	10,000,000.00
	San Juan Hospital (Under Construction)	9,800,000.00
*	San Juan Plaza (½ Complete)	8,000,000.00
*	Inn Motel (Under Construction)	8,000,000.00
	Hood Corporation (Irrigation Construction)	6,500,000.00
*	Nataani Nez Development Corporation (Housing)	4,800,000.00
	Farmington Public Schools (Expansion Approved)	4,500,000.00
	Farmington Utility Bonds (To Be Issued)	3,000,000.00
*	Mountain Bell Telephone Company (Expansion - Approved)	2,800,000.00
	San Juan College Expansion (Approved)	2,615,000.00
	San Juan County Detention Center and Judicial Facilities (Proposed)	2,000,000.00
*	Orchard Shopping Center (Construction)	2,000,000.00
*	La Quinta Inn and Rest (Proposed)	1,800,000.00
*	[illegible]	[illegible]
*	Warren Schaeffer Apartments	1,200,000.00
*	Hutton Shopping Center (Construction)	1,000,000.00
*	Kysar Office Building Complex (Construction)	750,000.00
*	Sunset Villa (22 Units)	650,000.00
*	Village Apartments (72 Units)	600,000.00
*	Lively Equipment Company (Construction)	400,000.00
*	Road Equipment Company (Construction)	400,000.00
*	Rust Tractor Company (Construction)	400,000.00
*	Wade Construction (Apartments - 23 Units)	250,000.00
*	Alfred M. Lewis Company , Inc.	250,000.00
*	Allen Theatres (Proposed)	228,783.00
*	Sirloin Stockade	200,000.00
*	N. C. Ribble (Construction)	170,000.00
*	Sizzler Steakhouse	165,000.00
*	Consolidated Equipment Company (Construction)	150,000.00
*	Downtown Shops (Under Construction)	147,000.00
*	Farmington Daily Times (Construction)	142,686.00
*	Utah International (Company Policy not to release figures)	----------
*	Western Coal Company (Company Policy not to release figures)	----------
TOTAL		$ 8,727,585,469.00

Note: These are only major construction and expansion programs. No general business expansion is included. There is no way to determine the service-related business that will result in the future gorwth of this area. These figures are based on today's dollar and do not reflect any inflation in the future. No oil and gas development or mobile home parks are included.

* Companies subject to taxes.

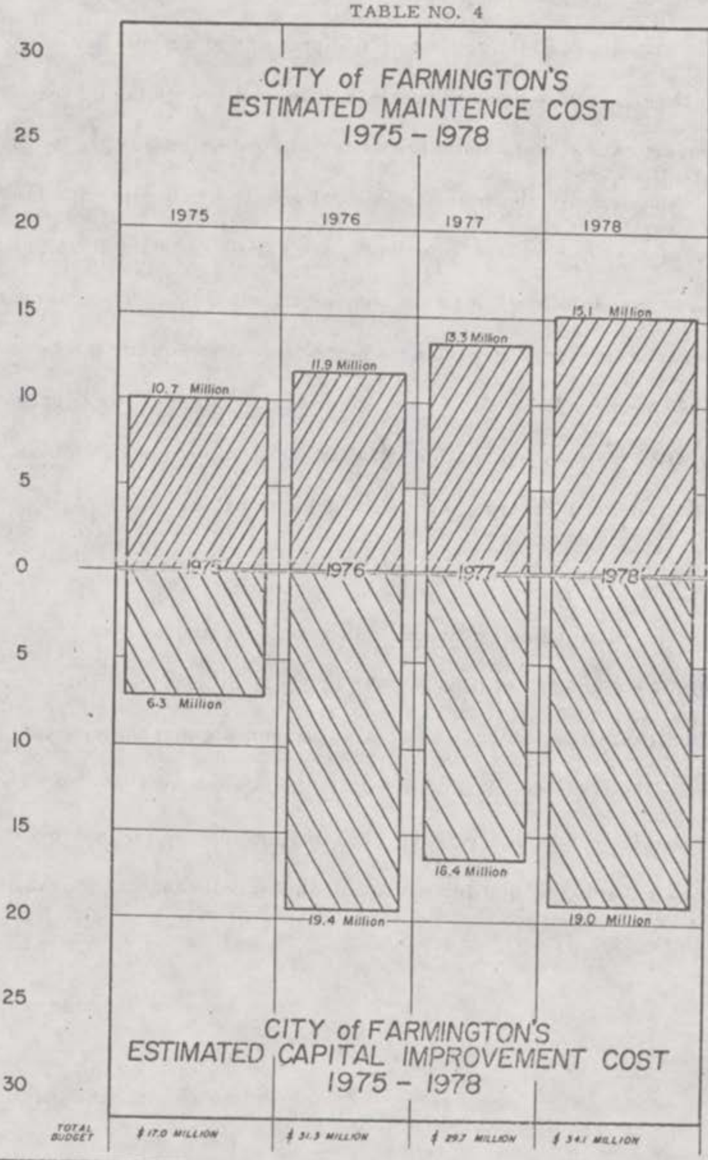
FARMINGTON INDUSTRIAL DEVELOPMENT SERVICE, INC.
Post Office Box 900
Farmington, New Mexico 87401

period of "boom" or high growth, property values skyrocket, increasing the tax base. This may appear then to be a self-supporting situation, however, this is not the case. This is because there is at least a year's lag or lead time in the property tax system and a limitation of bonding capacity. By the time the boom is underway, the inflation in local construction costs and land prices tends to offset the increase in property tax values and hold down local financing capability even more. It is not only slow, but politically difficult to get the old property taxpayers to assume a new bond obligation for the benefit of a wave of newcomers and builders from the outside. Most of the energy related industry will be developed outside the City of Farmington and this tax base will not contribute to meeting the needs of Farmington.

Projected City Budgets

The City of Farmington is forecasted to increase annual municipal budget expenditures from $17 million in 1975 to $34.1 million in 1978, an increase of 101% (Refer to Table No. 4). Also, assuming that the city increases from 33,450 (1976 population) to 60,000 population by 1980-1985 the City is anticipated to invest an estimated $120 million for capital improvements as well as on-going budget for operation and maintenance of $36 million (Refer to Table No. 5).

TABLE NO. 4



SOURCE:

1) Federation of Rocky Mountain States Inc., Resource City Rocky Mountain Denver, Colo. 1974.
(Note: Capital improvements costs are arrived at $4000. per capita for new incoming residents locating within the municipal boundaries, & maintenance costs for related City services are arrived by $600 per capita on annual basis).

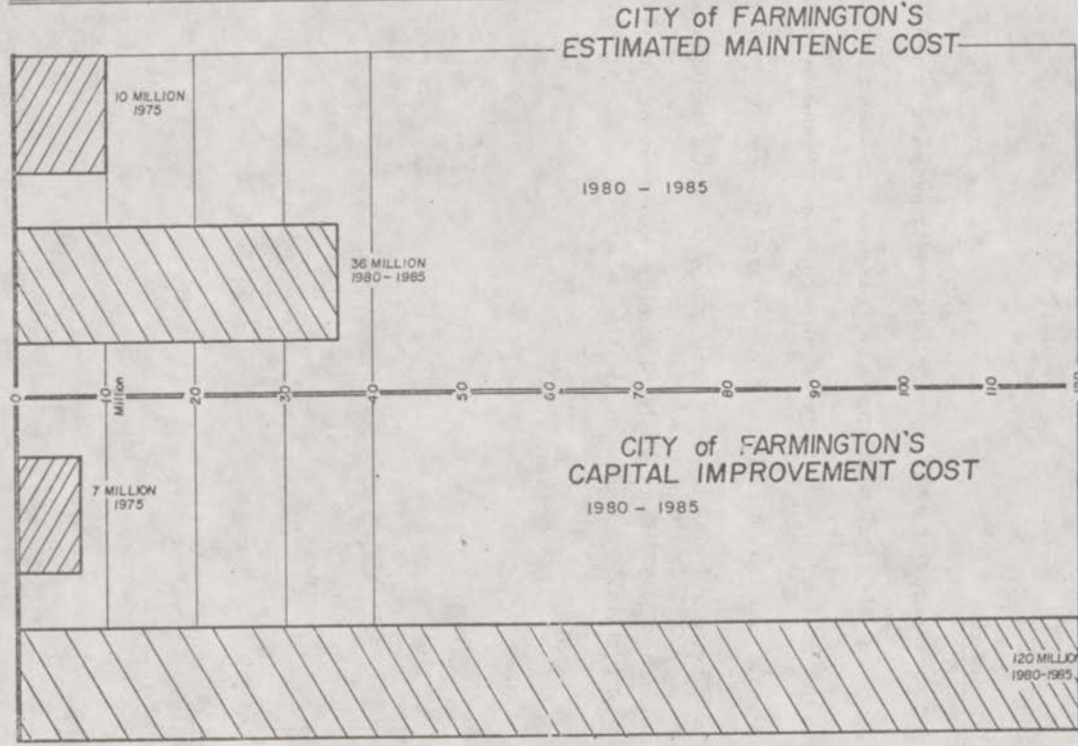
2) Gordon Herkenhoff & Assoc., City of Farmington Water Master Plan, Albuquerque, N. M. - 1974

Date
March 1/1976

CITY OF
FARMINGTON, N.M.

TABLE No. 5

PROBABLE CITY EXPENDITURES



NOTE: The possibility exists that the City of Farmington may double in population (From 30,000 to 60,000) between 1980 and 1985 if the City receives the major portion of the energy development population.

DATE MARCH 1, 1976 CITY OF FARMINGTON, NEW MEXICO

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM 1976-1980

Actual Projects

At present the City has over twenty major projects in areas of water, sewer, fire, etc. which must be undertaken as soon as possible to bring the City in line with the present population. (Refer to population projections, Table No. 1). These projects are estimated at over $25 million. The time frame in which these projects should be undertaken is commencing in 1976 and completed within a four-year period (1980).

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location (refer Map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
1	Raw Water Storage Capacity Goal: To increase the raw water storage capacity for the City. (The City provides 75% of the treated water to San Juan County - Regional System)	Farmington Lake	$6,000,000	EDA - 75% HUD - 5% 4-CRC- 3% City - 17%	1976-77
2	Water System Improvements Goal: To transfer treated water supply from one storage tank to another tank, thereby offering greater supply to the Navajo Reservation, and Lower Valley Water Users	ED 15A, ED 11, ED 27B, ED 16B	854,190	EDA - 75% City - 25%	1976-77
3	Upgrading Sewer Plant and Laying Sewer Lines. Goal: Installation of obsolete sewer lines as well as establishment of new lines	City wide and outside the city limits	4,000,000	EDA - 75% EIA - 12½% City - 12½%	1976-78
4	Installation of Interceptor Sewer Line Goal: The replacement of obsolete sanitary sewer lines in the peninsula vicinity	ED 29 and ED 30A	281,045	HUD-CDA-90% City - 10%	1976-77

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location(refer map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
5	Waterline from San Juan River to Animas River Pump Station Goal: The water supply for the City of Farmington presently comes from the Animas River, but there is no storage facility on the Animas River. In order to avoid water shortage emergencies such as was experienced in the summer of 1972, the City plans to construct a water line from the San Juan River to the pumping station at the power plant so that water from the San Juan River can be pumped into the treatment plant during periods of water shortage in the Animas River. This project is estimated to require approximately 10, 500 linear feet of piping, pump, pumphouse and intake facilities	ED 29A , .ED 23B and Outside the city limits	$ 500, 000	EDA - 50% HUD - 25% City - 25%	1976-77

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location (refer map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
6	Water Construction Equipment Goal: Improvement and expansion of adequate operating and maintanence equipment for the existing water system	City wide	$ 100,000 ($100,000 per year for a three-year period)	City - 100%	1977-1980
7	Sanitation Department Equipment Goal: Expansion and improvement of sewer system to cope with existing population	City wide	$ 75,000 ($75,000 per year for a three-year period)	City - 75% EIA - 12½% HUD/CDA - 12½%	1977-1980
8	Urban System Highway Program Goal: The City is currently engaged in an urban system highway program in order to alleviate serious traffic congestion and safety programs on its existing thoroughfares (Refer to Attachment No. 1)	City wide	$5,230,000	Federal Highway Funds - 78% City - 22%	(Refer to Attachment No. 1)
9	Parks & Recreation Facilities Improvements Goal: Expansion and improvement of parks and recreation facilities to cope with existing population	City wide	$ 584,000	BOR - 25% City - 75%	1976-77

ATTACHMENT NO. 1

GROUP I (Need right-of-way acquisition)

Priority	Project Description	Est. Cost	Fiscal Year Matching Available	District
1	30th - Cherry Hills to Sullivan: grade, drain, surface & pave	$875,000	1977-78	ED 15A
2	Sullivan Ave. - Main to 30th: grade, deain, surface and pave	$300,000	(½) 1976-77 (½) 1977-78	ED 15B, 15A & 21A
3	30th - Sullivan to Butler: grade, drain, surface & pave	$300,000	1978-79	ED 15B
4	Scott Rd. - San Juan Blvd. to Main: grade, drain, surface, pave & signals at Scott & San Juan & Main	$130,000	1977-78	ED 23A
5	Airport Drive Bridge: replace with culvert or culvert pipe	$200,000	1978-79	ED 26A
6	Build Bridge over Animas River near power plant & 4-lane from Scott to Gibson's	$1,250,000	1977-78	ED 23B
7	Replacement of bridge on Miller Ave.	$800,000	1978-79	ED 29B
8	Widen 20th St. between Santiago and Butler	$250,000	1978-79	ED 15B

GROUP II (No right-of-way needed)

Priority	Project Description	Est. Cost	Fiscal Year Matching Available	District
1	30th St. - from Butler to Sunset Ave. (under Construction)	$200,000	1975-76	ED 15B (Completed)
2	30th St. - on Arroyo west of Main St.	$ 50,000	1976-77	ED 12A
3	20th St. at Sullivan	$30,000	1976-77	ED 20A
4	Butler and San Juan Intersection: redesign	$25,000	1975-76	ED 23A

ATTACHMENT NO. 1

GROUP II (Continued)

Priority	Project Description	Est. Cost	Fiscal Year Matching Available	Census District
5	San Juan Blvd.	$600,000	1978-79	ED 23A, 22A
6	20th St. & Monterey Ave.: grade change	$ 10,000	1977-1978	ED 16A
7	Miller & Pinon St: signals	$ 20,000	1975-76	ED 29A
8	Main St. & Airport Dr.: intersection changes & signalization	$ 20,000	1976-77	ED 27A
9	Main St. & Lake Ave.: intersection changes & signalization	$ 30,000	1976-1977-	ED 28A
10	Main St. & Vine Ave.: signal revision & inter-section changes	$ 20,000	1977-78	ED 24A
11	Signalization & revision:	$140,000	1976-1977	
	a) Butler & 20th			ED 16A
	b) Butler & Ute			ED 19A
	c) Butler & Apache			ED 24A
	d) 20th & Dustin			ED 16A
	e) Broadway & Vine			ED 23B
	f) Airport & Apache			ED 26A
	g) 20th St. & Hutton			ED 16A
	TOTAL BUDGET	$5,230,000		

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location (refer map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
10	Exhibition Hall Goal: This facility needed to complete Civic Center complex and is the profit generating part of the complex.	ED 26A	$ 900,000	Revenue Bonds	1976-77
11	Storm Sewers Goal: A long-range program is planned to provide storm sewers throughout the City	ED 26A, 25A, 29A, ED 29B, 28A, 21A, ED 22A, 14A, and ED 15A	$ 850,000	General Obligation Bonds - 100%	1977-78
12	Municipal Operation Center Goal: The present Municipal Operation Center is spaciously and functionally inadequate. Therefore, the City is considering the relocation of this facility and construction of adequate shops and vehicle storage space	ED 21A	$1,250,000	General Obligation Bonds - 50% Revenue Sharing - 50%	1977-78
13	Fringe Area Study Goal: This study will undertake a complete analysis of fringe areas surrounding the City which might be considered acceptable for annexation	City wide	$ 10,000	HUD - 75% City - 25%	1976-77

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location(refer to map2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
14	Land Acquisition Goal: The City has resolved to allocate $75,000 per year for the purpose of acquiring land for public use, such as parks, public facilities, open space etc.	City wide	$ 75,000/yr	Fed. - 60% City - 40% (Undertake on several programs for project developments)	1976-1980
15	Peninsula Area Redevelopment Study Goal: Due to the age and high instance of substandard housing within the peninsula area, it is recommended that a redevelopment study be undertaken in order to upgrade structures in this area.	ED 28, ED 29B, ED 23B, ED 29A, ED 30A, and ED 30B	$ 8,000	CDA - 90% HUD/ 701 - 10%	1977-78
16	Fire Department Improvements Goal: Expansions and improvements of the Fire Department such as construction of sub-stations, trucks, etc.	City wide	$ 550,000	City - 90% State - 10%	1976-77
17	Criminal Justice Facility Goal: The establishment of a comprehensive criminal justice facility to include jail, juvenile detention, court room facilities, etc.	ED 26A	$1,500,000	LEAA - 50% EDA - 25% City - 25%	1977-78

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location (refer Map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
18	Transit Study Goal: This study would examine the needs and feasibility of supplying express bus services between City's employment and business centers and outlying areas	City wide	$ 7,500	Federal Highway Program - 60% City - 40%	1978-79
19	Neighborhood Facility Goal: This facility should be constructed in the southern portion of the City and should be primarily for Indians use. This facility should include such items as multiple usage of interior space, day-care center, social services, library, swimming pool, etc.	ED 28	$1,000,000	EDA - 75% CDA - 25%	1976-77
20	Library Goal: Both design and size of the present library are inadequate. Therefore, a new building should be constructed in the downtown area to serve the City's library needs.	ED 25	$ 750,000	City - 50% State - 50%	1978-79

CITY OF FARMINGTON

CAPITAL IMPROVEMENT PROGRAM

Priority	Project & Goals	Location (refer map 2) Census Tract or Enumerated District	Estimated Cost	Source of Funds	Time Frame (fiscal year)
21	Special Federal Census Study Goal: Because of accelerated growth in the city since the last federal census in 1970, Farmington is in need of a special census in order to have a reliable measure of its present population for future planning purposes. The City would also receive increased federal and state funds under programs which allocate funds on a per capita basis. This special census would be under federal supervision, but local personnel could do most of the work involved in enumeration.	City wide	$ 20,000	HUD/701 - 75% City - 25%	1976-77
		TOTAL COST for periods 1976-1980	$25,044,735		

CITY OF FARMINGTON RESOURCES

1. Bonds:

A. General Obligation Bonds:

According to New Mexico law, a community can issue General Obligation Bonds to a maximum of 4% of the City's assessed evaluation excluding water and sewer improvements. At present, the City of Farmington has a maximum of $1,981,000 General Obligation Bonds excluding water and sewer. Therefore, the remaining amount that the City can issue under the General Obligation Bond category is $911,000 excluding water and sewer.

B. Revenue Bonds:

The City has two main Revenue Bond Issues which are characterized by Utilitv Bonds and Sales Tax Bonds. Utility Bonds are employed for Electric, Water and Sewer Programs. The remaining Sales Tax Bonds are for Public Building and Parking Lots. Currently, the City of Farmington has outstanding $14,655,000 of Utility Bonds and $538,000 of Sales Tax Bonds. The total Revenue Bond Issues outstanding for the City is at $15,193,000. The City approved issuing an additional $2,000,000 Sales Tax Revenue Bonds February 24, 1976.

2. City of Farmington Resources - 1975-76

Incoming Revenue from all City resources	$14,183,008
Bond Issues - General Obligation and Revenue Bonds	2,855,034
Total Budget for the City of Farmington	$17,038,042

SUMMARY OF APPLICATIONS SUBMITTED TO VARIOUS STATE AND FEDERAL AGENCIES

Grant Applications

As of March 1, 1976 the City of Farmington has submitted several applications to various state and federal agencies. To date the City has requested $1,839,654.99 from federal agencies, $100,000 from state agencies and $435,766.23 local (City of Farmington match contribution) for a total of $2,375,421.22.

STATUS REPORT

City of Farmington's Applications Submitted to Various State and Federal Agencies

	APPLICATION	MATCH	TOTAL	STATUS
1.	Project - Community Develpment Act/ Replacement of Obsolete Sanitary Sewer Lines in the Peninsula Vicinity Grantor - U. S. Department of Housing and Urban Development	Fed. - $250,000 Local - $31,045	$281,045	Submitted 2/09/76
2.	Project - City of Farmington Water Line Replacement and Extension (12-inch line replacement along N. M. Highway 64)	* EIA - $100,000 U. S. EDA - $200,000 City of Farmington - $50,000 ** Four Corners Regional Comm. - $100,000	$450,000	Submitted 2/02/76

Grantor -
* Environmental Improvement Agency (Requested amount is $100,000).
** Assuming the City receives Federal match.
NOTE: No. 2 and 3 are the same project.

	APPLICATION	MATCH	TOTAL	STATUS
3.	Project - City of Farmington Water Line Replacement and Extension (12-inch line replacement along N. M. Highway 64)	EIA - $100,000 * U. S. EDA - $200,000 City of Farmington - $50,000 ** Four Corners Regional Comm. - $100,000	$450,000	Submitted 2-02-75
	Grantor - * U. S. Department of Commerce, Economic Development Admin. ** Assuming the City receives Federal match. NOTE: No. 2 and 3 are the same project.			
4.	Project - Farmington Police Department Canine Task Force Grantor - New Mexico Governor's Council on Criminal Justice Planning (LEAA)	LEAA - $2,743.59 City of Farmington - $304.84	$3,048.43	Submitted 2-02-76 Governor's Council will review proposal in 3/76 meetin
5.	Project - Farmington Police Department Communication Console Grantor - New Mexico Governor's Council on Criminal Justice Planning (LEAA)	LEAA - $30,000 City of Farmington - $35,915	$65,915	Submitted 2-02-76 Governor's Council will review proposal in 3/76 meeting

	APPLICATION	MATCH	TOTAL	STATUS
6.	Project - Installation of Water Lines Grantor - U. S. Dept. of Commerce Economic Development Admin.	EDA - $372,930.40 City of Farmington - $131,029.60	$503,960.00	City receive[d] notification o[f] disapproval 11/10/75

NOTE: A possibility exists that the proposal can be submitted under EDA's new program, Title IX.

	APPLICATION	MATCH	TOTAL	STATUS
7.	Project - Comprehensive City Planning Monies Grantor - New Mexico State Planning Office/701B - HUD	HUD - $45,000 City of Farmington - $15,000	$60,000	Submitted 8-27-75 No comment[s] have been received
8.	Project - Comprehensive City Planning Monies Grantor - New Mexico State Planning Office - 701 funds	Budget not allocated for fiscal year 1976-77		Letter of intent
9.	Project - City of Farmington Recreation Monies Grantor - State Planning Office Division of Bureau of Outdoor Recreation	SPO - $16,835 City of Farmington - $16,835	$33,670	City is unde[r] process of resubmitting documentati[on] on a new recreation project due 2/27/76

	APPLICATION	MATCH	TOTAL	STATUS
10.	Project - Purchase of Fire Truck Grantor- Department of Transportation, Federal Avaiation Administration	FAA - $28,700 City of Farmington - $6,300	$35,000	Submitted pre-applicat 10/14/75
11.	Project - Overlay of the Farmington Airport Runway 5-23 Grantor - Department of Transportation Federal Avaiation Administration	FAA - $793,446.00 City of Farmington - $149,336.79	$942,782.79	Submitted pre-applicat 12/01/75
12.	Project - Surplus and Excess Property Grantor - The State of New Mexico and the Federal Government			On-going project

TOTALS:	Federal	$1,839,654.99
	State	100,000.00
	Local	435,766.23
		$2,375,421.22

APPENDIX C

NAVAJO NEW TOWN FEASIBILITY OVERVIEW
AND
HOUSING AND COMMUNITY SERVICES FOR COAL GASIFICATION COMPLEXES

71-333 O - 76 - 19

NAVAJO NEW TOWN
FEASIBILITY OVERVIEW

August, 1975

MORRISON-KNUDSEN COMPANY, INC.
CONTRACTORS - ENGINEERS - DEVELOPERS

Morrison-Knudsen Company, Inc.
CONTRACTORS - ENGINEERS - DEVELOPERS

E. M. ARMSTRONG
EXECUTIVE VICE PRESIDENT

EXECUTIVE OFFICE
400 BROADWAY
P. O. BOX 7808, BOISE, IDAHO 83729
U. S. A.

(208) 345-5000

October 20, 1975

Mr. George H. Ewing
Western Coal Gasification Company
3535 East 30th Street
Petroleum Plaza Building
Farmington, New Mexico 87401

Mr. W. L. McConn
El Paso Energy Resources Company
P. O. Box 990
Farmington, New Mexico 87401

SUBJECT: Navajo New Town Feasibility Overview

Gentlemen:

Morrison-Knudsen Company, Inc. has studied and reviewed available information concerning the feasibility of a new town to serve employee requirements for the Navajo Indian Irrigation Project and the proposed coal gasification plant south of Farmington, New Mexico. These findings are presented in accordance with our agreement of June 10, 1975.

1. A new town development on the Reservation would provide a substantial economic benefit to the Navajo Nation.

2. There would be sufficient primary and secondary permanent employment as a result of the Navajo Indian Irrigation Project and development of a coal gasification plant(s) to warrant a new town. Additional housing and community facilities would be needed in Shiprock, Farmington and other neighboring communities if a new town is not developed.

3. Morrison-Knudsen believes that a new town is economically feasible, provided the Navajo Tribe and the other proposed participants make commitments, take action and provide full support as described in the report.

4. As NAPI is a major factor in the need for a new town, it is essential that it provide its share of the financial and other support. The Tribe must assume this responsibility if NAPI cannot provide the required financial support.

5. In order to develop a viable new town on the Navajo Reservation, Morrison-Knudsen believes that the Navajo Tribe must first

declare its intent to provide an economically justifiable business lease to the gasification companies and to participate with the companies and NAPI in developing a new town to serve their interests.

6. The Navajo Tribe must also provide land for the new town.

7. In our opinion, the most desirable (but not the most practical) means of insuring the economic feasibility of a new town, following a decision by all participants to make the necessary commitments to the project, is to obtain special new town legislation with guarantees, grants and appropriations from Congress. This action is described under Scenario I in Part IV.

8. Special legislation would probably be difficult to obtain and could take considerable time to accomplish. Recent conversations with Morrison-Knudsen's Washington representative and the Navajo Tribe's Washington Counsel indicate that it would be possible to accomplish the goals outlined in Scenario I by first utilizing all of the existing grant-in-aid programs as described in Scenario II and obtaining supplemental legislation, appropriations and authorities under Titles I, IX and X of the Economic Development Administration Act. However, the Tribe's Washington Counsel states that this action must be instituted immediately, and the applications must be well documented if there is to be any chance of success.

9. The Tribe's Washington Counsel indicates that such a supplemental appropriations bill will probably be brought before Congress in January or February of 1976, and any special requests for the new town should be submitted as a line item to be attached to this bill.

10. The special legislation is not a necessity for Scenario II, which is based on utilizing only existing grants-in-aid programs. In our judgement, the probability of developing a viable new town under Scenario 2 is less than 50%.

11. Further studies will be required to prove or disprove the conclusions reached in this overview study. These are outlined on pages C-9 and C-10 of the commitments section.

Mr. George H. Ewing
Mr. W. L. McConn
October 20, 1975
Page Three

We appreciate the opportunity of being of service to you and look forward to continuing to serve you on this most interesting project.

Sincerely,

E. M. Armstrong

DLB:EMA/dgr

NAVAJO NEW TOWN - FEASIBILITY OVERVIEW

August, 1975

Prepared For
THE NAVAJO NATION
Office of Program Development

Funded By
EL PASO NATURAL GAS COMPANY
and
WESTERN GASIFICATION COMPANY

THE STUDY TEAM:

Morrison-Knudsen Company, Inc.
Contractors, Engineers, Developers

Guirey, Srnka, Arnold & Sprinkle
Architects & Planners

Earle V. Miller Engineers
Division of International Engineering Co., Inc.

This study was funded by El Paso Natural Gas Company and Western Gasification Company to evaluate the feasibility and potential of new town development concepts, but in no way implies that these companies either endorse such development concepts or agree to assume the responsibility for any related costs.

TABLE OF CONTENTS

LIST OF EXHIBITS

PURPOSE OF THE STUDY

The following is excerpted from the Letter Agreement, dated June 10, 1975, commissioning Morrison-Knudsen Co., Inc. to prepare this study.

"The Navajo Nation has a deep and abiding interest in the development of suitable housing facilities and community services and in the preservation of its cultural values on the Navajo Reservation. Large-scale projects in various stages of planning and implementation in the northeastern portion of the Reservation will have significant impact on such matters; among such projects are two coal gasification projects and associated mining operations and the Navajo Indian Irrigation Project.

"Western Gasification Company (WESCO) and El Paso Natural Gas Company (El Paso) recognized the need to analyze the housing opportunities offered by increased employment in this area arising from such projects, and commissioned the study, *Housing and Community Services*, by Development Research Associates, a division of Booz, Allen & Hamilton, Inc. and Gruen Associates, dated April, 1974.

"By Letters dated February 26, 1975, to WESCO and El Paso, the Chairman of the Navajo Tribal Council, Peter MacDonald, stated that, '. . . a planned community in the eastern portion of the Reservation, should the answers we seek prove such an idea to be feasible, could be of enormous potential and economic value to the Navajo People.' That letter requested financial support from WESCO and El Paso to further examine certain basic questions relating to the feasibility of a new community and both companies responded affirmatively . . . .

" . . . It is agreed that the primary objectives of the studies to be undertaken by M-K are the following:

1) To identify those factors that will affect the financial aspects and the economic feasibility of a community development, including, but not limited to, availability of land, availability of capital, legal constraints, governmental participation, Tribal participation, operating conditions, potential subsidies required, and the degree of probable acceptance by Navajos and non-Navajos.

2) For each factor so identified, to provide a realistic assessment of the impact of that factor on financing prospects and the economic feasibility of the project.

3) To identify the parties whose cooperation is necessary to develop the project and determine the initial responsibilities of all such parties. This shall include, but not be limited to, the possible formation of an entity to promote, on a timely basis, a community development or such other housing facilities, either on the Navajo Reservation or on lands adjacent to the Reservation which M-K would recommend and which the parties deem desirable for such development. . . ."

PRECONDITIONS

Since the purpose of this report, as outlined on the previous page, is to examine the financial feasibility of developing a new town on or adjacent to the Navajo Indian Reservation, it was necessary for the Study Team to establish a set of assumptions to form a context for our investigations. These assumptions are, in effect, necessary preconditions for this study to proceed. These assumptions are:

1. That the Navajo Tribe make a commitment to coal gasification and to the New Town. A commitment in concept is possible initially, to be followed by a total commitment to the New Town upon the satisfactory conclusion of the negotiations for business site leases for the coal gasification plants. Further, the Navajo Tribe will participate in the development and utilization of the New Town.

2. That the Navajo Tribe and the gasification companies sign business site leases for construction of the plants.

3. That the coal gasification companies obtain Federal Power Commission and other required approvals and a rate structure sufficient to justify their investments.

4. That the Navajo Indian Irrigation Project proceed as planned and participate in the development and utilization of the New Town.

5. That the coal gasification companies give their full support to the New Town and participate in its development and utilization.

6. That, as a minimum, existing federal grant-in-aid programs will be available for financial support of the New Town.

7. That the State of New Mexico and its subdivisions provide financial support through the construction of state system access roads, schools, and other public facilities and services.

8. That the New Town not be a company town, neither built, owned, nor operated by El Paso or WESCO. This is a previously stated position of the gasification companies.

9. That the New Town and others develop the public services and facilities needed to make it a desirable place to live.

10. That the New Town aggressively seek the retail business and personal service establishments needed to make it a desirable place in which to live and shop.

GENERAL SUMMARY

- Unemployment on the Navajo Reservation is extremely high. The U.S. Public Health Service reported in 1972 that of 39,359 Navajo men and women who need and want work, only a few more than 12,000 (or 3.5%) are regularly employed. These figures indicate an immediate need to create more job opportunities on the Reservation. Several recent studies have shown that employment is much easier to find in the Reservation's existing population centers. (1)

- In recent years, the Navajo Nation has moved to reduce unemployment through the creation of productive enterprise such as the Navajo Forest Products Industry and most recently the Navajo Agricultural Products Industry (NAPI) located in the northeast corner of the Reservation south of Farmington, New Mexico. At ultimate development, NAPI will employ almost 3,500 persons in agricultural production, processing, and packaging facilities.

- Two coal gasification complexes with attendant mine facilities have been proposed for construction just south and west of the NAPI area. These complexes are proposed by El Paso and WESCO. Each plant and related mine will employ over 3,500 persons during the peak of the construction phase and over 1,000 persons during the operational phase.

- A single gasification plant and attendant mine operations will produce a payroll in excess of $15,000,000 annually, while NAPI and its related processing facilities will produce a payroll in excess of $20,000,000 annually at ultimate development.

- A 1974 survey indicated that almost 90% of the Navajo Reservation's income dollar leaves the Reservation during the first round of income-spending to economically benefit other communities. This "leakage" of income represents a loss of thousands of potential secondary employment jobs to the Navajo Nation. Secondary employment is comprised of those jobs (retail store clerks, teachers, doctors, government employees, etc.) required to supply goods and services to the residents of a town or community.

- It has been estimated that between 72% and 90% of the present housing on the Reservation is "substandard," most of which are hogans. Two-thirds of the households interviewed indicated that they haul water to their place of residence. (3)

- The employment opportunities offered by NAPI, the coal gasification plants, and attendant mining operations in an undeveloped area of the Navajo Reservation will create a permanent need to accommodate the influx of a substantial number of workers and their families. Interviews with numerous individuals considered to be knowledgeable indicate that the Navajo will live in an urban environment if employment and reasonably priced housing are available. It is projected, assuming a New Town as described herein is constructed, that within ten years of the start of operation of NAPI and the gasification plants/mines, approximately 85% of the total employees will be Navajo.

- It would be physically possible to construct and operate the coal gasification plants and NAPA without the employers making provisions for housing and community facilities for their employees in a New Town on or adjacent to the Reservation. However, this would not meet the Navajo Nation's stated goal of creating economic strengths within the Reservation and providing adequate housing for its people.

- All these items suggest the desirability of creating a New Town designed to be economically self-sufficient, socially balanced, permanent in nature, and having the capability of offering continually expanding opportunities for the Navajo people. In terms of persons employed, the beneficial impact to the Navajo Nation could be greater than all previous industrialization activities combined.

- The major concern of most new communities lies in attracting an employment base sufficient to support the anticipated residents. Special efforts are often required to attract basic industry. A New Town on the Reservation would be uniquely opposite: employment potential is known, and other potentials are probable through the upgrading and marketing of by-products.

- Projections of **in-town** basic and secondary employment and population under two sets of assumptions have been prepared. Each of these assumptions (or sets) is based on a "stable-state" town after construction has been completed and the plants/mines and NAPI have entered the operating stages. These are summarized in the following exhibit:

	Set 1 - One coal gasification plant/mine and five blocks of NAPI and limited processing facilities.	Set 2 - Four coal gasification plants/mines and eight blocks of NAPI and all processing facilities.
Basic Employees (Residing In Town)	1,405	4,099
Secondary Employees (Residing In Town)	1,391	8,095
Population	11,143	47,691
Size	1,000 acres	5,000 acres

- There are numerous constraints on the feasibility of locating a New Town on the Navajo Reservation because of the federal trust status of the land. Investigations of off-Reservation sites were made; however, any off-Reservation location within a reasonable proximity of the prime employment sources was located on the land held by the Navajo Tribe in the Navajo Indian Irrigation Project area. Even though this land is off the Navajo Reservation, it will be held in federal trust status for the benefit of the Navajo Nation and cannot be sold or subordinated to a mortgage. Therefore it does not offer any significant advantage over an on-Reservation location as far as financing is concerned. In fact, a New Town located on off-Reservation trust lands raises numerous jurisdictional problems -- such as whether Indians residing there are subject to state income tax, who is responsible for police protection, etc. For these reasons and since a substantial majority of the residents of a New Town would be Navajo and their expressed desire to live on the Reservation, it is recommended that the New Town be located on the Reservation.

- Part IV of this study shows that a New Town would be feasible under certain conditions. The ideal situation, as shown in Scenario I in Part IV, calls for strong support and participation by the federal government to meet the dual needs of advancing the economic development of the Navajo Indian Reservation and its people while at the same time contributing to the supply of energy required for the United States to maintain and advance its standard of living.

- Capital costs of constructing the New Town have been estimated at $110,730,000 for the Set 1 town and $441,180,000 for the Set 2 town. The numerous fiscal resources available to meet these capital costs are outlined in Part IV of the study.

- The development of these major employment sources and a New Town will have the following effects:

  Advantages to the Navajo Nation are:

  - That Set 1 would generate 1,391 secondary employment jobs; 1,117 of these would be held by Navajos, representing a total annual Navajo payroll of $6,540,000.
  - That Set 2 would generate 8,095 secondary employment jobs; 6,136 of these would be held by Navajos, representing a total annual Navajo payroll of $36,646,000.
  - That NAPI would find less difficulty recruiting and retaining qualified employees.
  - That a substantial number of new housing units would be created for Navajo families.
  - That substantial outside financial support would be attracted to the Reservation.
  - That a New Town would be an ideal location for some additional unrelated industries that could be attracted to the Reservation, thus creating more primary and secondary employment.
  - That direct Navajo influence in the planning, design and governance phases of the New Town will assure proper attention to Navajo cultural needs and preferences.

- Failure to create a New Town or a suitable alternative would result in:

  Shanty villages with attendant unsanitary conditions strewn around the primary employment sources.

  Long commuting distances for Navajo and non-Navajo employees.

  Difficulty in recruiting employees.

  Employee dissatisfaction and high turnover rate.

  Loss of opportunity to create new housing for Navajo families.

  Loss of secondary employment and income for the Navajo Nation.

  Loss of various amenities such as recreation, shopping, educational, etc.

- o Creation of a New Town or a suitable alternative would offer these advantages to the coal gasification companies:

  Less difficulty in recruiting and retaining qualified employees.

  Probability for substantial Navajo employment.

  Reduction of employee dissatisfaction and high turnover rate.

  Reduction of long commuting distances for Navajo and non-Navajo employees.

- o Advantages of a New Town to the United States Government include:

  More efficient provision of services such as health, welfare, and education (required of the government for the Navajo Nation) in the urban setting created by the New Town.

  Reduction in the need for some existing governmental services (such as welfare) for the Navajo people through creation of substantial employment opportunities.

- o An alternative to creating the New Town would be development of a scattering of smaller housing complexes around the area. Most of these would probably be an expansion of existing communities. Many of these existing Reservation communities would find it difficult, if not impossible, to provide the infrastructure and community facilities required to serve these new residents since they could not acquire all of the fiscal resources, particularly grants-in-aid, that could be available to the New Town.

- o Such dispersed development would also be less efficient and not supply the conveniences that can be supported by a larger community. A certain "critical mass" (size), in terms of population, must be reached to support a variety of amenities and services such as shopping, recreation, education, and social and cultural opportunities.

- o The timing of the development of the New Town is of primary importance in achieving this "critical mass". If the New Town is not available when the first gasification plant opens, the employees of the plant will settle elsewhere and the attraction rate of the New Town will be significantly reduced because they probably would not relocate again without a change of employment.

- o In absolute terms, there is no minimum level or size of town below which it would not be viable. This is strictly a function of (1) what one is willing to pay, and (2) what benefits one wishes to derive from the town.

- o Therefore, the decision as to minimum viable size of a New Town must be made by those involved in its creation and who will derive benefits from its existence on a cost-benefit basis.

Some factors to consider in making this decision are:

(1) Economy of scale--the per capita costs for a New Town of 40,000 population will be approximately 12% less than one of 3,500 population.

(2) Available amenities--a community must reach a population of approximately 4,500 before a reasonable component of amenities and services such as schools, parks, shopping, etc. can be supported. At a population of approximately 12,000, a fairly completed range of amenities can be justified.

(3) Economic employment multiplier--even with a concerted effort on the part of the developer to attract secondary employment establishments, a New Town of approximately 3,500 population would generate an economic multiplier of only about 1.6, while a New Town of approximately 40,000 population would provide an economic multiplier of 3 (See Part III).

o The steps required in the formation, development and operation of a New Town are outlined in Part V of this study. The initial step must be a commitment to the concept of a New Town by the Navajo Tribal Council. The next step would require formation of a Development Entity composed of the Navajo Tribe, NAPI, the gasification and mining companies and others to initiate action necessary to bring the New Town to reality. Also vital to the feasibility of the New Town is a commitment by the United States Government to its creation. The commitments required of the various parties involved are outlined throughout this report and summarized in the next section.

SUMMARY OF COMMITMENTS

Numerous commitments from the various parties involved in the proposed New Town, as envisioned in this report, will be required. The following summarizes these commitments which are discussed in detail throughout this report. In a few cases, alternatives to these commitments exist and are listed herein.

These commitments are listed in two classes: necessary and desirable. "Necessary Commitments" are those which **must** be made by the parties involved for the New Town to be viable. (In some cases, there are acceptable alternatives.) "Desirable Commitments" are those that would enhance the viability of the New Town, but the New Town would probably not fail if these were not made.

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NAVAJO NATION COMMITMENTS

NECESSARY COMMITMENTS - ALL CASES

1. Be committed to coal gasification industry and formation of a New Town.

2. Create a Development Entity representing all parties benefiting from the New Town.
   ALT: Tribe and/or NAPI alone participate in Development Entity. However, base of support for that entity would be small and its success questionable because of inability to obtain financing.

3. Grant the Development Entity quasi-governmental authority (see Sections 2.2 and 8.1 of Part V).
   ALT: Tribe retains all authority. Base of support for that entity would be so small its success would be questionable and attraction rate reduced.

4. Provide Tribe's share of "seed money" necessary to initiate the New Town.
   ALT: Some outside sources of funds are available but not likely. Gasification and mining companies cannot be expected to provide more than their share of seed money.

5. Make adequate water rights available to the New Town.

6. Select a Town site and grant a long term, no cost land lease to the Development Entity for Town site and required right-of-way. Land lease must also include transfer of authority to the Development Entity as listed in Sections 2.2 and 8.1 of Part V.

7. Form "Special Assessment District" for collection of leasehold ad valorem taxes, as outlined in Appendix A, to finance operation and maintenance of the Town.
   ALT: Reach an agreement with New Mexico regarding state shared revenues (see Part III) or incorporate the town under the laws of the State of New Mexico.

8. Remove Town site and right-of-way from political influence of the Chapters involved.

9. Prohibit unauthorized occupancy of lands adjacent to irrigation district, coal leases, business site leases and Town site.

10. Create a Management Entity to operate the New Town, with authority as outlined in Step 8, Part V.
    ALT: Development Entity could continue as Management Entity, but this is not desirable.

11. Grant a degree of "home rule" to a municipal type government for the New Town (see Sections 8.2 and 8.3, Part V).
    ALT: Continued Tribal control of the New Town; however, this would probably be detrimental to the long term stability of the New Town.
    ALT: Incorporate the New Town under the laws of the State of New Mexico.

NECESSARY COMMITMENTS - FINANCING SCENARIO I (SEE PART IV)

This Scenario I is based on the following premises: (1) That the Development Entity would be a non-profit corporation with authority to issue tax exempt bonds to finance all capital costs not financed by the state and others; (2) These bonds would be guaranteed by the federal government; and (3) The federal government would provide a 100% grant-in-aid for construction of all infrastructure and public facilities not financed by others.

1. Tribe sponsors and/or actively participates in obtaining required special federal legislation and financial support (see Financing Scenario I, Part IV).
   ALT: Conditions as outlined under Financing Scenario II, requiring subsidies by Development Entity participants.

2. Tribe guarantees to make up its share of deficits (if any) in the debt service. (None are projected under this Scenario.)

NECESSARY COMMITMENTS - FINANCING SCENARIO II (SEE PART IV)

This Scenario II is based on the following premises: (1) Federal grants-in-aid would amount only to existing programs; (2) Development Entity would issue tax exempt bonds to finance infrastructure and public facilities not financed by others; and (3) All other capital costs would be financed through mortgages.

1. The Development Entity be chartered by the federal government.
   ALT: Tribe agrees to incorporate the Development Entity under laws of a mutually agreed state.

2. Tribe agrees to litigate any conflicts or contractual disagreements with creditors in the U.S. Federal Court system.

3. Tribe acts as co-guarantor on bonds issued by the Development Entity by pledging coal royalty and gasification plant lease income.
   ALT: The other Development Entity participants act as guarantors.

4. The Development Entity be granted the right to pledge, without limitation, tax revenues for retirement of general obligations of the entity.

5. Tribe guarantees to make up its share of any deficits in the debt service. (Some deficits are projected under this Scenario.)

DESIRABLE COMMITMENTS - ALL CASES

1. Tribe agrees to lift liquor ban for New Town site at some specific time in the future.
   ALT: Agree to let New Town residents make this decision.

2. Grant the Development and/or Management Entity authority to adopt and enforce maintenance standards for all improvements within the New Town.

NAPI COMMITMENTS

NECESSARY COMMITMENTS - ALL CASES

1. Be committed to formation of a New Town and encourage NAPI employees to live there.

2. Agree to become and remain a participant in the Development Entity.
   ALT: If NAPI does not participate and their employees live in the New Town, the Navajo Tribe must assume NAPI's share of the Development Entity.

3. Provide NAPI's share of "seed money" necessary to initiate the New Town.
   ALT: If NAPI does not participate and their employees live in the New Town, the Navajo Tribe must assume NAPI's share of the "seed money".

4. Participate in site selection.

5. Agree to inclusion in the "Special Assessment District" outlined in Appendix A.

6. Prohibit unauthorized occupancy of NAPI lands.

NECESSARY COMMITMENTS - FINANCING SCENARIO I (SEE PART IV)

1. NAPI actively participates in obtaining required special federal legislation and financial support (see Financing Scenario I, Part IV).
   ALT: Conditions as outlined under Financing Scenario II requiring subsidies by Development Entity Participants.

2. NAPI guarantees to make up its share of any deficits in the debt service. (None are projected under this Scenario.)
   ALT: Navajo Tribe assumes NAPI's commitment.

NECESSARY COMMITMENTS - FINANCING SCENARIO II (SEE PART IV)

1. The Development Entity be chartered by the federal government.
   ALT: NAPI agrees to incorporate the Development Entity under laws of a mutually agreed state.

2. NAPI agrees to litigate any conflicts or contractual disagreements with creditors in the U.S. Federal Court system.

3. NAPI acts as co-guarantor on bonds issued by the Development Entity.
   ALT: The other Development Entity participants assume NAPI's commitment.

4. The Development Entity be granted the right to pledge, without limitation, tax revenues for retirement of general obligations of the entity.

5. NAPI guarantees to make up its share of any deficits in the debt service. (Some deficits are projected under this Scenario.)

DESIRABLE COMMITMENTS - ALL CASES

1. Agree to participate in a voluntary payroll withholding program for lease for mortgage payments by NAPI employees.

GASIFICATION AND MINING COMPANY COMMITMENTS

Commitments listed here would apply to any other industries (such as by-products processing plants, railroad, etc.) locating in or adjacent to the New Town.

NECESSARY COMMITMENTS - ALL CASES

1. Be committed to formation of a New Town and encourages their employees to live there.
2. Agree to become and remain participants in the Development Entity.
3. Advance their share of "seed money" necessary to initiate the New Town.
4. Participate in site selection.
5. Agree to be included in the "Special Assessment District" outlined in Appendix A.
6. Prohibit unauthorized occupancy of their leased lands.

NECESSARY COMMITMENTS - FINANCING SCENARIO I (SEE PART IV)

1. The companies actively participate in obtaining required special federal legislation and financial support (see Financing Scenario I, Part IV).
   ALT: Conditions as outlined under Financing Scenario II requiring subsidies by the Development Entity participants.
2. The companies guarantee to make up their share of any deficits in the debt service. (None are projected under this Scenario.)

NECESSARY COMMITMENTS - FINANCING SCENARIO II (SEE PART IV)

1. The Development Entity be chartered by the federal government.
   ALT: The companies agree to incorporate the Development Entity under laws of a mutually agreed state.
2. The companies agree to litigate any conflicts or contractual disagreements with creditors in the U.S. Federal Court system.
3. The companies act as co-guarantor on bonds issued by the Development Entity.
   ALT: The other Development Entity participants could act as guarantor, but this would not have the same strength in the financial markets.
4. The Development Entity be granted the right to pledge, without limitation, tax revenues for retirement of general obligations of the entity.
5. The companies guarantee to make up their share of any deficits in the debt service. (Some deficits are projected under this Scenario.)

DESIRABLE COMMITMENTS - ALL CASES

1. Agree to participate in a voluntary payroll withholding program for lease or mortgage payments by their employees.

DEVELOPMENT AND/OR MANAGEMENT ENTITY COMMITMENTS

NECESSARY COMMITMENTS - ALL CASES

1. Secure land lease and necessary authorities (see Sections 2.2 and 8.1 of Part V).
2. Contract for preparation of complete physical and fiscal development plans.
3. Prepare and enforce land use and construction codes.
4. Actively seek federal, state and local grants-in-aid, participation, and special legislation.
5. Employ professional management.
6. Form "Special Assessment District" (see Appendix A).
7. See authority to levy and collect sales and ad valorem taxes.
   ALT: Navajo Tribe could levy and collect such taxes and return the money to the New Town.
8. Contract for Construction Management services.
   ALT: Development Entity could act as Construction Manager. (Not recommended, however.)
9. Operate and manage the Town.

NECESSARY COMMITMENTS - FINANCING SCENARIO I (SEE PART IV)

1. Sell tax exempt bonds to finance all construction not financed by others.
2. Collect lease payments for bond debt service.

DESIRABLE COMMITMENTS - ALL CASES

1. Employ Master Plan Team to coordinate and control planning, design and development.
2. Develop and enforce maintenance standards for the entire Town.

NECESSARY COMMITMENTS - FINANCING SCENARIO II (SEE PART IV)

1. Sell tax exempt bonds for construction of infrastructure and public facilities not financed by others.
2. Sell or lease improvements for bond debt service.
3. Obtain interim construction financing and permanent mortgage financing.
4. Collect and disburse subsidy payments.

FEDERAL GOVERNMENT COMMITMENTS

NECESSARY COMMITMENTS - ALL CASES

1. Be committed to formation of a New Town.
2. Approve formation of the Development Entity and give it authority to issue tax exempt bonds.
3. Provide needed approvals, legislation and appropriations on a timely basis.

NECESSARY COMMITMENTS - FINANCING SCENARIO I (SEE PART IV)

1. Act as guarantor of bonds.
2. Appropriate money for 100% grant-in-aid for all infrastructure and public facilities not funded by others.

NECESSARY COMMITMENTS - FINANCING SCENARIO II (SEE PART IV)

1. Appropriate money to provide grants-in-aid to full authorization under existing programs.
2. Provide mortgage guarantee insurance under existing programs.
3. Provide subsidy payments for low income families under existing programs.

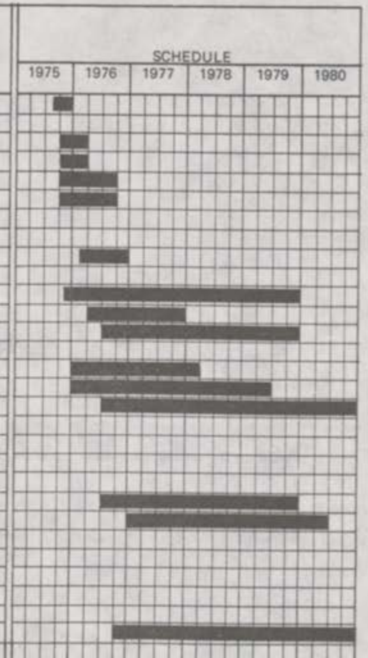
NEW TOWN RESIDENT COMMITMENTS

NECESSARY COMMITMENTS - ALL CASES

1. Actively support the New Town and participate in its functioning.
2. Be committed to pay at least the projected amount for housing costs.
   ALT: Federal government and Development Entity participants provide additional subsidy.

EXHIBIT C-1
NAVAJO NEW TOWN
ESTIMATED BUDGET AND PROJECTED SCHEDULE
(SET 1)

ITEM			TOTAL ESTIMATED BUDGET AMOUNT $1000
NAVAJO TRIBE COMMITMENT			
FORMATION OF DEVELOPMENT ENTITY			
SELECT SITE AND NEGOTIATE LAND LEASE			
ENVIRONMENTAL IMPACT STATEMENT			
PREPARE MASTER PLAN: PHYSICAL AND FISCAL			
SUBTOTAL FRONT END COSTS			2,990
DESIGN AND BUILD CONSTRUCTION CAMP			
SECURE FINANCING:	GRANTS-IN-AID	34,280	
	BONDS – COMMERCIAL	13,300	
	BONDS – HOUSING	44,130	
DESIGN – OFF SITE			
– ON SITE			
CONSTRUCTION MANAGEMENT AND CONSTRUCTION			
SUBTOTAL CAPITAL CONSTRUCTION			
COST BY DEVELOPMENT ENTITY			91,710
STATE AND LOCAL CONSTRUCTION			
(ROADS – SCHOOLS – ETC.)		13,370	
PRIVATE CONSTRUCTION–(SOCIAL)		2,660	
SUBTOTAL COSTS BY OTHERS			16,030
ESTIMATED TOTAL CAPITAL COSTS			
FOR PRELIMINARY BUDGET PURPOSES			110,730
OPERATION AND MANAGEMENT			



Further studies will be required to prove or disprove the conclusions reached in this overview study. The following lists these studies, identifies the expertise required to carry them out, estimates the elapsed time and amount that should be budgeted for each study.

The estimated budgets shown here only reflect the cost for outside consulting services and do not include the costs that the study sponsors would incur for the time spent by their personnel. These budget figures assume that the study sponsors would provide a considerable amount of support from their staffs, particularly their legal counsels. These studies should be funded by all of the parties who would participate in the New Town and derive benefits from its existence.

In order to insure a unified effort and consistency in the results, it is suggested that all of these studies be prepared under the direction of the same team that will be employed to prepare the Master Plan. In many cases, the Master Plan Team will employ special consultants for portions of the work.

LEGAL STUDIES

1. **STUDY:** Research and draft recommendations for the proposed special Congressional legislation.
   RESPONSIBILITY: Master Plan Team (special legal counsel)
   ELAPSED TIME: 4 to 6 months
   ESTIMATED BUDGET: $100,000

2. **STUDY:** Participate in discussions with federal officials and testify at Congressional hearings.
   RESPONSIBILITY: Master Plan Team (special legal counsel)
   ELAPSED TIME: 6 months
   ESTIMATED BUDGET: $15,000

3. **STUDY:** Research into the legal constraints affecting the terms of the lease and formation of the Development Entity. This will include constraints on the Tribe's granting of authorities to the Development Entity.
   RESPONSIBILITY: Master Plan Team (special legal counsel)
   ELAPSED TIME: 4 months
   ESTIMATED BUDGET: $50,000

4. **STUDY:** Prepare an overview Master Plan and research factors affecting site selection. These factors will condition the terms of the land lease.
   RESPONSIBILITY: Master Plan Team
   ELAPSED TIME: 2 to 3 months
   ESTIMATED BUDGET: $45,000

FINANCIAL STUDIES

1. **STUDY:** Research government grant-in-aid programs, prepare preliminary applications and aid in filing final applications.
   RESPONSIBILITY: Master Plan Team
   ELAPSED TIME: 3 to 4 months
   ESTIMATED BUDGET: $100,000

2. **STUDY:** Market study to verify the percent of income the New Town residents would devote to housing costs.
   RESPONSIBILITY: Master Plan Team (Economist)
   ELAPSED TIME: 3 months
   ESTIMATED BUDGET: $10,000

PART I

INTRODUCTION

Unemployment on the Navajo Reservation is extremely high. The U.S. Public Health Service reported in 1972 that of 39,359 Navajo men and women who need and want work, only a few more than 12,000 (or 30.5%) are regularly employed. A recent survey of employment and income on the Navajo Reservation reveals that the mean monthly family income reported by heads of households for June, 1974, was $379.00. Both female and male heads of households who are working are generally employed near major population centers on the Reservation, e.g., Window Rock, Shiprock, and Crownpoint. (1) These employment figures indicate an immediate need to create more job opportunities on the Reservation, and the study also shows that employment is much easier to find in existing population centers on the Reservation.

The Navajo Nation, with the cooperation of the United States Government, is in the process of creating a major source of jobs for the Navajo people while at the same time contributing to the U.S. food supply. This is being accomplished through the Navajo Agricultural Products Industry (NAPI), which is an organization formed by the Navajo Tribe for the purpose of operating an integrated agri-business on the 110,000 acres to be irrigated by the Navajo Indian Irrigation Project. NAPI is totally owned by the Navajo Tribe and governed by a board of directors made up of both Navajos and non-Navajos.

The Navajo Indian Irrigation Project came about as a result of the U.S. Government's earlier commitment to the Navajo Nation entitling every adult Indian to 160 acres of land and the seed and the fertilizer necessary to cultivate it. Since it would be impossible to cultivate a number of 160-acre tracts scattered all over the Reservation, the provisions of this commitment are being met through the construction of the Navajo Indian Irrigation Project. The Bureau of Indian Affairs is contracting with the Bureau of Reclamation to construct the water delivery system which will bring San Juan River water to the project site.

The program is to bring under irrigation eleven blocks of approximately 10,000 acres each. The first block of land is scheduled to be irrigated in early 1976 and another 10,000-acre block added each year thereafter until the full 110,000 acres is reached.

At ultimate development NAPI will employ approximately 2,530 workers in the agricultural production area and approximately 963 workers in related processing facilities such as feed lots, canning plants, etc. It is projected that approximately 95% of these employees will be Navajos and will come from all over the Reservation to work for NAPI. As they migrate to Shiprock–Farmington area, there will be an increasing demand for housing and community facilities to serve them.

In addition to the ever increasing need for expanded food supplies, the United States is at present faced with a natural gas shortage of increasingly critical dimensions. This growing shortage of natural gas is only one facet of an overall shortage of energy--and the supply of energy is an important factor in determining our overall living standard and economy.

Today natural gas supplies one-third of the nation's energy; demand for it is soaring largely because natural gas is the cleanest known fuel and contributes to maintaining the environment. Natural gas companies, however, are finding it increasingly difficult to fulfill the requirements for their present customers--much less adding new customers.

Over the past five years, natural gas has been consumed more rapidly than replacement supplies have been found. The production from many existing natural gas fields is declining rapidly. Throughout the country, industrial customers who use natural gas are now being faced with curtailed supplies and many will be forced to use alternate fuels.

In a message to Congress on June 4, 1971, the President of the United States noted the seriousness of the developing national energy shortage and called for "an expanded program to convert coal into a clean, gaseous fuel."

The response to this call was actually underway even as the President spoke. El Paso Natural Gas Company and Western Gasification Company independently announced proposals to construct large plants on the Navajo Reservation to convert coal into substitute natural gas.

COMPANIES PROPOSING COAL GASIFICATION PLANTS

The construction of separate, yet similar, coal gasification projects has been proposed by El Paso Natural Gas Company (El Paso) and Western Gasification Company (WESCO). The plants' concepts and locations will be discussed jointly, but the developing and operating entities are separate and independent organizations.

EL PASO NATURAL GAS COMPANY

El Paso Natural Gas Company was originally founded to transmit natural gas from the Permian Basin of west Texas and southeastern New Mexico to customers in El Paso, Texas, and later westerly to California. More recently, El Paso has produced and transmitted gas from the San Juan Basin of northwestern New Mexico. Gas delivered to Arizona and California is sold to large industrial users and to public utilities for distribution.

WESTERN GASIFICATION COMPANY

Western Gasification Company is a joint venture of Pacific Lighting Corporation and Texas Eastern Transmission Corporation through their respective subsidiaries, Pacific Coal Gasification Company and Transwestern Coal Gasification Company. Pacific Lighting, through its subsidiary, Southern California Gas Company, serves retail customers in California; and Texas Eastern delivers natural gas to public utilities at various locations.

The coal gasification plant will be owned and operated by WESCO. Pipeline quality gas will be transported to customers by Transwestern Pipeline Company, a subsidiary of Texas Eastern.

COAL RESERVES

The landmass of the United States contains some three trillion tons of coal, perhaps 88% of the reserve of fossil fuel energy on the continent and one of the largest anywhere in the world. Even at a vastly accelerated rate of consumption, the U.S. has enough coal to last 200 to 300 years or more.

A significant portion of these coal reserves is found in remote areas of the western United States. The major coal resources of New Mexico are located in the San Juan Basin in the northwest portion of the state.

On the Navajo Reservation, a prime source of coal is the Fruitland Formation, which lies in an area located west and south of Farmington, New Mexico. In 1953, Utah International began exploring this area, finding sub-bituminous coal, located in four main seams ranging in depth from less than 20 feet to over 200 feet. In 1957, the Navajo Nation granted Utah a mining lease containing some 24,000 acres of coal-bearing lands. This lease, since expanded to 31,000 acres, contains 1.1 billion tons of coal.

Utah International provides coal to the Four Corners Power Plant and proposes to mine coal for the WESCO gasification plant. Southeast of the Utah lease, the Navajo Nation has leased coal lands to El Paso and Consolidation Coal Company.

COAL GASIFICATION PLANTS

Only one commercially proven high pressure process exists today for converting coal to substitute natural gas (SNG). This is a process developed by a West German firm, Lurgi Mineraloeltechnik GmbH and referred to as the "Lurgi Process". It has been utilized in some sixteen plants around the world and is the process both El Paso and WESCO contemplate using. Theirs will be the first such commerical gasification facilities in the United States.

All of the several processes under study in this country involve essentially the same chemical principle. Basic coal gasification involves adding oxygen and steam to coal under conditions of heat and pressure to form a substitute gas composed of hydrogen, carbon oxides, methane, and various sulfur compounds. The carbon dioxide and sulfur compounds are then removed, leaving a usable gaseous fuel having a low Btu content. This gas is sometimes referred to as "town gas". To this process will be added a further step, methanation, which will increase the heating value of the gas from about 415 Btu to about 960 Btu per standard cubic foot. Three pilot plants have proved the methanation step.

PLANT COMPLEXES

Each gasification plant proposed is currently designed to produce at least 250 million standard cubic feet per day (mmcf/d) of substitute natural gas. Each complex will cover about 1,000 acres. Included in the main complex will be coal and ash handling facilities, multiple gasifiers, crude gas shift converters, purification plants, methanators, compressors, and dehydrators. Support installations and facilities will include a boiler plant, cryogenic air separation plants, gas liquor treatment, sulfur plant water reservoir, plant roads, parking lots, administration office buildings, shops, storage buildings, laboratory and other miscellaneous structures. Construction would take about three years and require up to 3,500 construction employees for each plant and mine complex at the peak period.

The initial WESCO plant is designed to utilize approximately 25,000 tons of coal a day to produce about 250 million cubic feet per day (mmcf/d) of substitute natural gas, while El Paso will use 28,000 tons of coal to produce 288 mmcf/d in their initial plant. Ultimate development on the Navajo Reservation is currently contemplated to be:

El Paso		750	mmcf/d
WESCO		1,000	mmcf/d
	Total	1,750	mmcf/d

At the size of the first plants proposed (250 mmcf/d), WESCO would build a total of four plants and El Paso three. It is possible that larger--and fewer--plants may be constructed than the seven now seen as the ultimate development and El Paso may, for example, build two plants rather than three.

SCHEDULE OF CONSTRUCTION

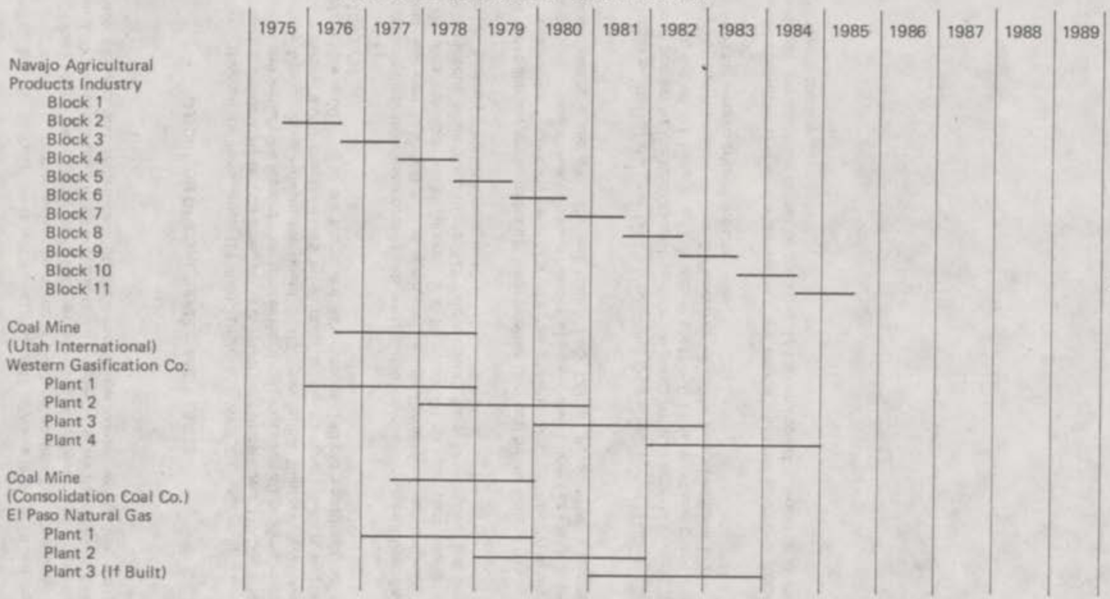
The latest, best estimate of construction scheduling is that under optimal conditions the construction of the initial plant for WESCO will start in early 1976 with El Paso following within about one year. Each plant will require about three years to build. A projects schedule of construction is shown in Exhibit 1.

COAL MINING OPERATIONS

WESCO will obtain its coal from Utah International, which first leased coal rights from the Navajo Nation in 1957. Utah's total lease is now 31,000 acres, with over 1.1 billion tons of coal that can be extracted by strip mining methods. Since 1963, coal has been provided by Utah to Arizona Public Service Company for the Four Corners Power Plant on the Navajo Reservation near Fruitland, New Mexico, which burns coal to create electricity.

EXHIBIT I-1

PROJECTED SCHEDULE OF CONSTRUCTION



Source: Morrison-Knudsen Company, Inc.

Coal to supply the El Paso plants will come from a 40,287-acre lease purchased from the Navajo Nation in 1968. The coal mine will be operated by Consolidation Coal Company, a joint owner with El Paso of the lease. On this lease there are in excess of 700 million tons of recoverable coal less than 150 feet below the surface and additional reserves at lower depths. Surface mining techniques will be used and reclamation of the removed overburden will follow the mining operation.

LOCATION OF COAL LEASES AND PLANTS

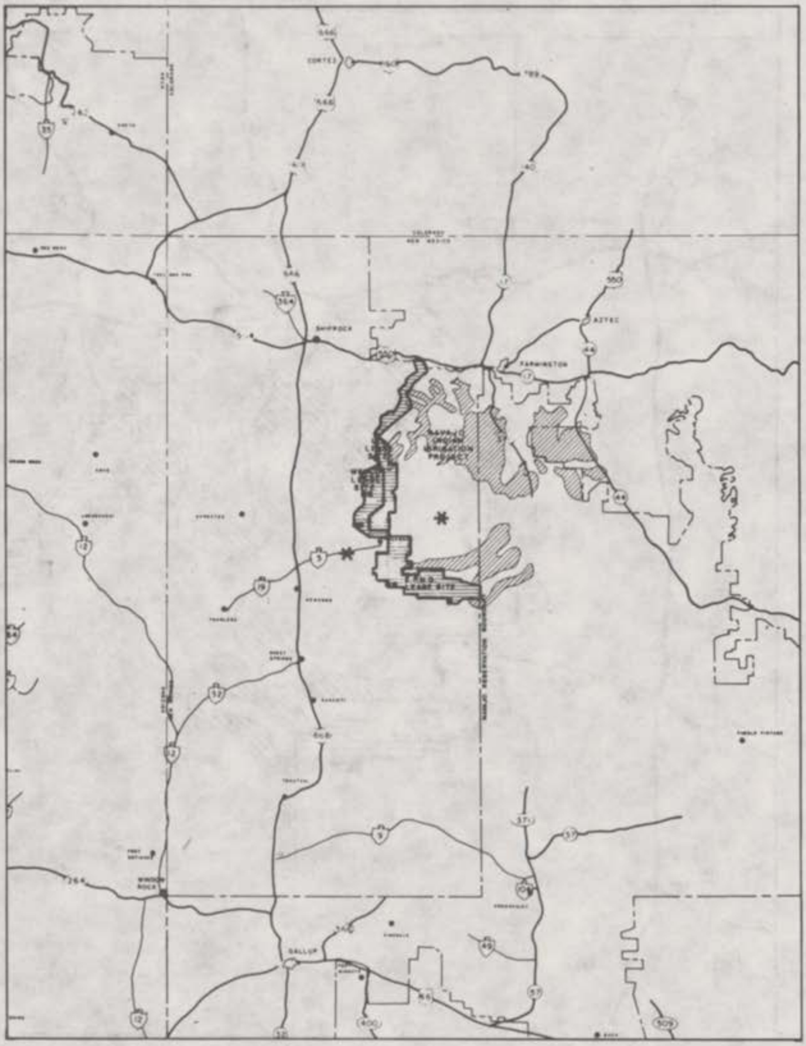
The three Reservation lease areas (El Paso, Utah, and WESCO), shown in Exhibit I-2 following, contain approximately 86,000 acres, while the NAPI will irrigate over 110,000 acres. The center of activity will initially be located near the center of this area some 30 to 35 miles south of Farmington, New Mexico, now estimated at about 35,000 population. Shiprock, New Mexico, a town of approximately 9,000 people lies 35 to 40 miles to the northwest. Gallup, with a 1970 population of 14,596, is 60 miles to the south; and Albuquerque, 140 miles southeast, has a 1970 population of 243,751.

At the present time, the closest paved roads are U.S. 666 running north-south from Shiprock to Gallup, and east-west U.S. 550 to the north, connecting Farmington and Shiprock. State Highway 44 connects Farmington and Albuquerque. Interstate 40 runs east-west through Gallup and on to Albuquerque while State Route 371 extends south from Farmington. The Sante Fe Railroad main line generally parallels Interstate 40.

Most of the region is made up of Navajo lands or other land held by the Federal Government. Activity in this region has historically been of a very low intensity of use, consisting primarily of grazing or agriculture. In more recent years, a number of power plants have been built in order to utilize rich coal deposits in the area. The well-known Four Corners Power Plant is located near Fruitland.

The northern portion of the Utah lease has been allocated to the Four Corners Power Plant and the southern portion to the WESCO coal gasification plant. WESCO intends to build its first plant on the west side of the lease area. The second plant will be built adjacent, utilizing joint administrative and support facilities of Plant 1. Plants 3 and 4 will be located adjacent to each other further south along the western edge of the Utah lease.

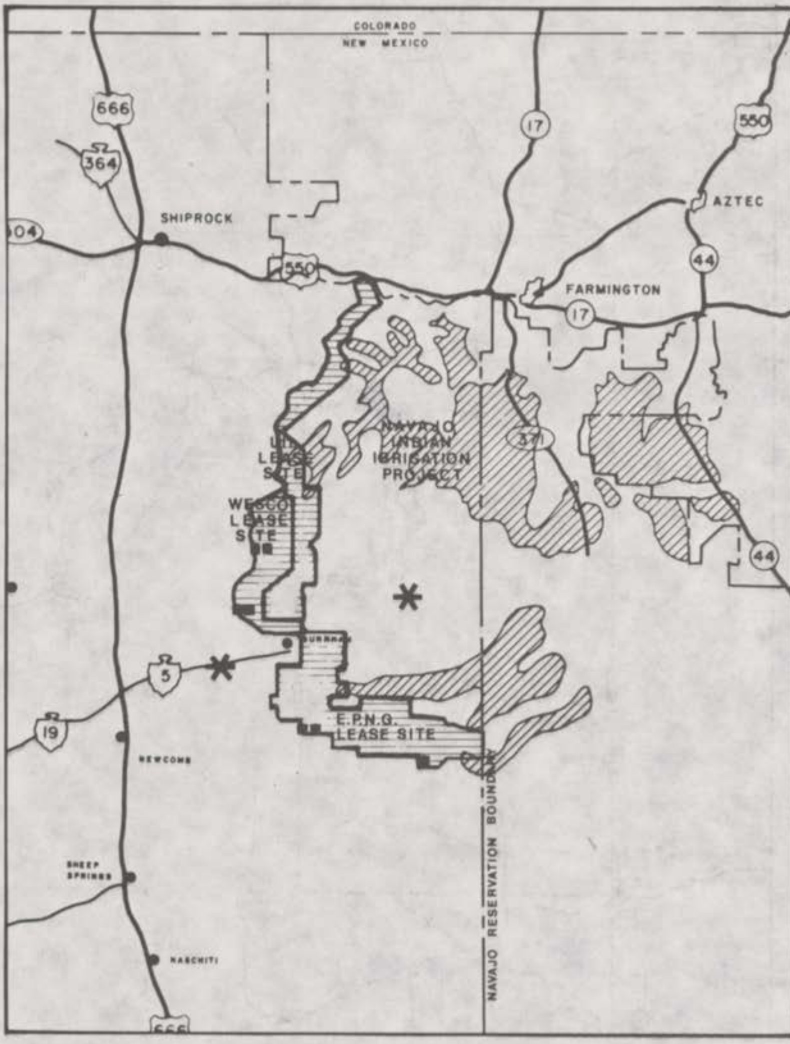
El Paso selected its first plant site on the southern edge of the lease so its coal supply will likely be mined from the southeast corner of the lease. The second complex would be located at a separate site further to the west.



REGIONAL LOCATION

EXHIBIT I-2

MORRISON-KNUDSEN COMPANY, INC.



VICINITY MAP

EXHIBIT I-3

LEGEND:
■ PLANT SITE
✱ TOWN SITE RECOMMENDED BY DRA

N

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SCALE IN MILES

PART II

THE STUDY

The construction and operation of the Navajo Indian Irrigation Project, coal gasification plants, and attendant mining operations in an undeveloped area of the Navajo Reservation will create a permanent need to accommodate a substantial number of workers and their families, a majority of them being Navajos. The location of these operations, in terms of existing communities and the often-stated Navajo desire to create economic strengths on the Reservation, suggests the desirability of a New Town designed to be economically self-sufficient, socially balanced, permanent in nature, and having the capability of offering continually expanding opportunities for the Navajo people.

OBJECTIVES OF THE NAVAJO AGRICULTURAL PRODUCTS INDUSTRY (NAPI)

NAPI was formed by the Navajo Tribe to operate an integrated agri-business on the 110,000-acre Navajo Indian Irrigation Project and thus provide employment for a significant number of their people. The creation of this major employment base will result in the migration of many people from all over the Reservation to the NAPI site in search of jobs. NAPI has recognized that in order to maintain a stable work force these new employees and their families will require a place to live and as a result has endorsed the concept of the formation of a New Town near the Irrigation Project.

OBJECTIVES OF EL PASO AND WESCO

The ultimate objective of both El Paso and WESCO is to construct and operate coal gasification plants to utilize the large coal resources on the Navajo Reservation. To operate these plants requires, beyond the obvious technological factors, an effective work force for plants located near the coal resources. The proposed plants are located in an undeveloped area of the Navajo Reservation, and to recruit and retain the employees desired may require housing in the vicinity of the plants. This closeness would cut down commuting time. Both companies have to consider not only the goals of attracting Navajo employees, but also the benefits which must be available to attract the necessary non-Navajo employees at the beginning of the operation.

OBJECTIVES OF THE NAVAJO NATION

The indicated objectives of the Navajo Nation are to utilize their natural resources for the highest possible benefit for the Navajo Nation itself and for individual Navajos. The Navajo Ten-Year Plan is designed "to bring the Navajo up to an equal footing with the rest of the nation" by investment in productive business enterprise. Two major objectives will be achieved by establishment of the coal gasification plants, whether provision is made for a New Town or not. The first of these is the creation of jobs for Navajos. The proportion of Navajo employment is expected to rise over the course of operation as Navajos are trained in gasification skills until eventually the plant employment will be substantially Navajo. A second objective is to obtain revenues which will accrue to the Nation for use in providing social and local government services, and in encouraging additional industrial development of the Reservation.

The number of housing units on the Reservation has never been totally documented. However, current Bureau of Indian Affairs estimates of total actual Navajo housing units show a range of 18,000 to 19,750. "Approximately three out of four households reported that they live in hogans and do not pay rent. . . . The households who live in hogans have heads who are older and have completed less formal education. In most instances, these heads of households have not received vocational training, are currently unemployed, have lived the majority of their lives on the Reservation, and do not speak or read English 'well'." (1) Only 3,000 new units or improvements to existing structures have been provided by all types of federal and tribal programs. (2) Provision of a large number of new homes for employees of the irrigation project and the coal gasification plants would go a long way toward bridging the massive gap between needed and available housing on the Reservation.

The industrial development which has occurred to date on the Reservation has not provided all the benefits which it might to the Navajo Nation. New jobs have been created, and Navajos are in many cases earning salaries enabling them to support themselves and their families quite well. These salaries have not, however, provided the boost to the Navajo economy which is typical of new industry off the Reservation. Navajo wage-earner families are forced to go off the Reservation for purchases of many goods and services which they desire. Vehicle purchases and related expenditures are the largest single expenditure of the Navajo families, yet there are no franchised automobile or truck dealers on the Reservation. The second largest expenditure is for food, yet there are only a few supermarkets in the entire Navajo Nation. The Navajo Ten-Year Plan states: "In Navajo country, however, there is almost no multiplier . . . only 10 percent to 15 percent of the money made in the Reservation is spent within the borders of the Reservation." Because of this, opportunities for creating Navajo-owned and operated stores and service establishments and for creating employment for many Navajos who do not have the training or desire to work in the coal gasification plants or NAPI may be lost. The establishment of a community on the Reservation could provide a substantial increase in secondary employment.

Recognizing that the needs of their employees and those of NAPI would better be served by making available needed housing and community facilities in a convenient location, El Paso and WESCO commissioned the DRA study. Following a review of that study, the Navajo Nation felt that certain additional questions should receive further examination. El Paso and WESCO recognized that their interests, as well as those of the Navajo Nation, would be served by this further study and thus agreed to fund the preparation of this report.

STUDY APPROACH

Since the primary objective of this study was to identify and evaluate those factors which will affect the financial feasibility of the proposed New Town, it was determined that the analysis would be confined to a "stable-state" town, i.e., after construction of the gasification plants and NIIP is complete and the gasification plants and the Navajo Agricultural Products Industry have entered their operational state. The DRA study had identified the estimated costs of constructing and operating the New Town, the employment mix that would probably be attracted to the New Town, and the income available to amortize the construction costs and pay the cost of operation and maintenance. With these parameters already established the activities of the Study Team were directed toward:

1. Reviewing and evaluating all existing data, updating and revising it where necessary.

2. Conducting additional interviews with appropriate officials to further ascertain the factors affecting the financial feasibility of the New Town.

3. Initiating contacts with the financial marketplace to determine what constraints it would place on development of the New Town.

Under this approach primary emphasis was placed on utilizing existing data sources.

ACKNOWLEDGEMENTS

The basic parameters for major portions of the data included in this report were taken from the earlier study prepared by Development Research Associates. Employment projections, construction schedules, and other information have been supplied by officials of the Navajo Nation, particularly the Office of Program Development; El Paso and WESCO. Information on the financing for the project has been supplied by the A.G. Becker & Company Municipal Securities, Inc. of Chicago, the Boston National Corporation of Boston, and White-Weld & Company of New York. The Study Team wishes to acknowledge gratefully the assistance of all these individuals and organizations for their assistance in preparing this study. We also wish to acknowledge the many people who supplied input for this study during our numerous interviews and discussions (see Appendix F).

PART III
CHARACTERISTICS OF THE TOWN

ECONOMIC BASE

For the purpose of this study, two levels of New Town Development, labeled "Set 1" and "Set 2" have been assumed. As stated previously, both represent the town's characteristics in a "stable-state" situation. No attempt has been made here to deal in detail with the temporary effects of the transient construction force. The population surge created by the construction forces is recognized as a significant problem, but we feel it is one that must be dealt with by the companies involved at the time. Exhibits III-1 and III-2 depict the total numbers of employees, both construction and permanent, expected with each set, and illustrate the relative magnitude of the "construction hump."

Both gasification companies have indicated that there must be some provision for housing construction workers. This will likely take the form of "construction camps". It is assumed that the capital costs of such construction camps have already been budgeted by the gasification companies. Inclusion of these construction camps in the New Town, as its first village, would provide several advantages. First, the infrastructure installed could be integrated into that of the New Town, thus reducing the total costs of the New Town. Second, the existence of these residents will make possible the construction of commercial and public facilities before the permanent (operating) population of the New Town begins moving in. This will help increase the attraction rate of the New Town for the permanent residents, thus moving toward the "critical mass" described in the Summary. These factors again call for immediate action in order to achieve this desirable condition.

Set 1 contemplates the existence of only gone gasification plant/mine complex and five blocks of NAPI by about mid-1979. It has also been assumed that a portion of the projected basic processing facilities associated with NAPI would be in existence at that time, these being the beef slaughtering and beef and sheep feedlot operations. Set 1 was chosen as representing a level of basic employment most likely to exist in the foreseeable future and provide a test to see if this minimum condition would support a viable New Town. Based on information provided by WESCO,* El Paso,* and the Office of Program Development of the Navajo Nation (OPD),* Set 1 could exist by about mid-1980 (see Exhibit I-1).

A potential for additional basic employment exists in the New Town from the processing or other use of by-products of the coal gasification process. A plant of 250 mmcf/d will produce approximately the following by-products:

Sulfur	63,690 Tons/Year
Crude Phenols	38,300 Tons/Year
Naphtha	80,513 Tons/Year
Tar Oils	177,754 Tons/Year
Tar	237,634 Tons/Year
Ammonia	67,000 Tons/Year (1)

In addition, El Paso has determined that it will market the coal fines which are too small to gasify (less than 2 milli-meters). These fines will amount to 1.4 million tons annually. WESCO is projected to use their fines. The gasification companies have indicated that for one plant (Set 1) the by-products would probably be trucked out in their raw state since the volume would not be sufficient to justify on-site processing facilities.

Set 2 assumes a town based on four plant/mine complexes, assuming both projects, eight blocks of the irrigation project, and the full range of NAPI processing facilities. This set will provide substantial contrast in size to Set 1, with enough employment to dramatize the "multiplier" effect which magnifies the economic benefits the Navajo Nation could derive from a New Town. Set 2 is assumed to exist about mid-1982 (see Exhibit I-1).

The volume of by-products produced by more than one plant may result in the construction of plants near the gasification complexes for processing them into finished products. If more than one plant is built, a railroad will probably be constructed to the area to handle this large volume of raw or finished by-products. Both of these activities will create additional primary employment jobs. However, it is impossible to quantify them at this time.

The total basic employment expected for each set is as follows:

Employer	Number of Basic Employees Set 1	Set 2
Gasification Plant(s)*	612(2)	2,448(2)
Mine(s)*	400	1,600
Basic NAPI Functions*	1,208	1,900
NAPI Processing Facilities	499	963
TOTALS	2,719	6,911

These basic employees will require retail sales, personal services, public services, etc. Providing these services generates secondary employment, and these secondary employees in turn require services. This creates a chain reaction resulting in the "economic multiplier" effect. Generally speaking, the larger the town the larger this multiplier, as certain population plateaus create successively greater demands for services. As an example, a town of 10,000 people may provide the base for relatively modest retail facilities so that families must go to a larger town for major purchases. A town of 40,000, however, may provide the base for a major department store as well as auto dealers, theaters, etc., enabling residents to shop in their own town.

Using the DRA report for a base and adding further research, we have set the ratio of secondary employees to basic employees (the "economic multiplier") at one to two (1:2) for Set 1 and one to three (1:3) for Set 2. These multipliers assume that the Development Entity will aggressively seek the retail businesses and personal service establishments required to serve the residents of the Town. The multipliers for the New Town are conservative because higher economic multipliers are common in other off-Reservation urban areas. For example, information from the Arizona Office of Economic Planning and Development shows that the resource related community (copper mining) of Clifton, Arizona, with a 1975 population of approximately 5,100 has an economic mutliplier of 1:3.06 while the cities of Bisbee and Douglas, also copper mining communities with a 1975 combined population of slightly over 20,000, have a multiplier of 5.96. As will be developed below, the net New Town secondary (non-basic) employment computes to 1,391 for Set 1 and 8,095 for Set 2.

NAVAJO/NON-NAVAJO EMPLOYMENT MIX

The proportion of employees which are Navajo and non-Navajo are affected by three factors:

- o The type of industry and positions available.
- o The objective requirements of the Navajo Nation.
- o The availability of Navajos with skills matching the positions available.

The Navajo Nation has the objective of ultimately filling all, or as many as possible, job opportunities on the Reservation with Navajos. One primary method of obtaining this objective is to make a wider range of jobs available, i.e., secondary employment.

Information received from the gasification companies for this analysis indicates that their goal is to employ Navajos for more than 50% of their operating personnel at startup of the plants. They plan to increase this Navajo employment through training to 80-90% by about ten years after start of operation of the plants. For purposes of this study, we assumed that 60% of the plant/mine operating employees will be Navajos.

Information provided by the NAPI indicates they expect 95% of their employees to be Navajo. This percentage has been used for basic NAPI employees for both sets. It was assumed for both sets, however, that the NAPI processing facility employees would be 60% Navajo due to the more technical nature of the work. This latter percentage would naturally increase over a period of time, but to simplify calculations it has been held constant for this report.

Again, for simplicity of calculations, the economic multiplier was applied equally to both Navajo and non-Navajo basic employees. These simplications have only minor impact on the population figures.

Exhibits III-1 and III-2 illustrate the total of all types of employment, including construction for both Sets for ten years after completion of the plants.

ATTRACTION OF THE NEW TOWN

Attraction rates (i.e., the percent of employees choosing to live in the New Town) used for this study are based on the DRA report augmented by further research. They are as follows:

	Navajo		Non-Navajo	
	Set 1	Set 2	Set 1	Set 2
Basic Employment	70%	75%	45%	50%
Secondary Employment	100%	100%	95%	95%

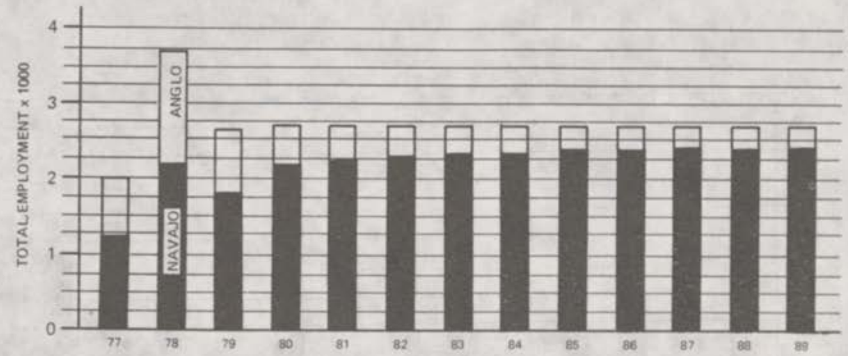

EXHIBIT III-1

TOTAL EMPLOYMENT vs. NAVAJO EMPLOYMENT

(GASIFICATION & IRRIGATION PROJECT)

SET 1

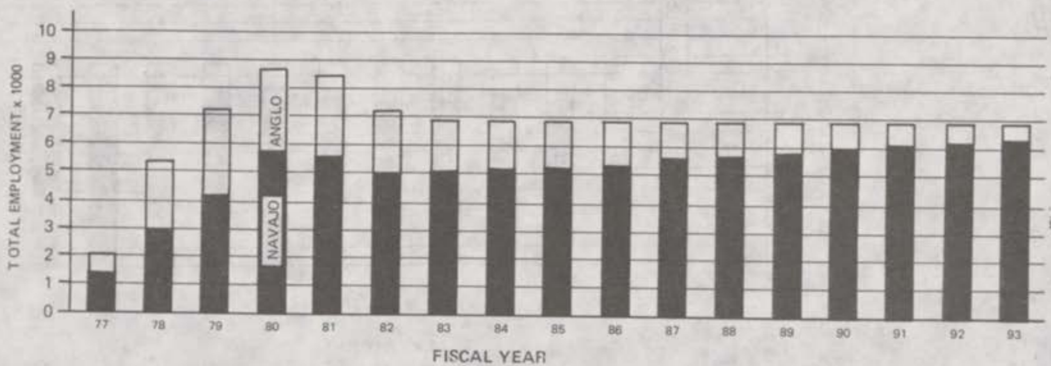

EXHIBIT III-2

TOTAL EMPLOYMENT vs. NAVAJO EMPLOYMENT

(GASIFICATION & IRRIGATION PROJECT)

SET 2

Information from NAPI indicated 10% of their basic employees will find it necessary to live on NAPI land. To account for the temporary nature of some of the employment, an additional 30% was deducted. These reductions were based on the best estimates of the Study Team since NAPI's employment projections are not firmly fixed at this time. These employees have therefore been excluded from the New Town and above attraction rates then applied to the remaining 60% of NAPI basic employees, plus all of the NAPI processing facility employees.

The factors used here are 5% higher than those used in the DRA study for basic employment and the same for secondary employment. We believe these attraction rates are reasonable given the parameters used in this study (see the discussion of "critical mass" in the Summary and on Page III-1. Offering a higher than average quality of amenities such as careful, efficient planning and operation; ample parks and recreation facilities; well-designed and affordable housing; convenient location; and generally attractive surroundings could be expected to increase these attraction rates.

Interviews with numerous individuals (see Appendix F and the BYU Study) indicated that the Navajo will live in an urban environment if employment and reasonably priced housing are available. These interviews also indicated that the Navajo desires the same basic life style and amenities normally found in a suburban community in the Western U.S.; however, the Navajos interviewed expressed a preference for a community with a "distinctive Navajo style".

OTHER PARAMETERS AFFECTING POPULATION ESTIMATES

Household size and average number of employees per household were taken directly from the DRA report. These are as follows:

	Navajo	Non-Navajo
Employees per family	1.28	1.24
Persons per household	5.76	3.27
Persons choosing group quarters (% of total in-town employment)	5%	0%

The following outlines DRA's procedure for determining these family sizes:

"The average non-Navajo family size in Farmington in 1970 was 3.37 persons. The decline in the birthrate and increasing number of single households is reducing average household size for non-Navajo populations nationwide. We project this trend will have limited applicability to Northwest New Mexico, and therefore assume an average non-Navajo household size of 3.27 for the economic system model.

"Navajo family sizes are much higher than for non-Navajos; in fact, they are among the largest in the nation. No precise figures are available, so our research program involved data from five sources:

1970 Census
BIA estimates
Navajo Housing Authority tenants
Town of Navajo population count
Interviews

"The findings of that research show family size calculated within a range of 5.0 to 7.0 persons per family. This analysis by the economic system model assumes a Navajo family of 5.76 persons by household. These calculations do not take into account the 'extended family', where brothers, sisters and other persons live in the same housing unit. Industries on the Reservation estimate one-half their employees live in extended families ranging in size up to 18 persons. The actual number is not possible to estimate, however, and has little effect on number of housing units or total retail sales. These large family sizes for Navajos can cause interesting impacts. As portions of the work force change from non-Navajo to Navajo, the same number of employees and households can result in a much larger town population. This has little impact on retail sales, number of housing units or construction costs, but does not affect the size of units required and especially school population." (3)

In recent interviews, several people have stated that the residents of the New Town would probably be younger and therefore have smaller families. Since employment mix and family size in the New Town may vary from the factors used in this study, it must be recognized that the population projections given here could vary from those actually reached.

NUMERICAL CHARACERTISTICS OF THE NEW TOWN

New Town employment, number of households and population are summarized in Exhibit III-3, all derived from the foregoing parameters and assumptions and using DRA's formulas. Set 1 would result in a total population of 11,140 persons and a townsite of approximately 1,000 acres, and Set 2 in a population of 47,700 persons and a townsite of approximately 5,000 acres.

The "economic multiplier" effect can be seen from the totals. While the smaller town provides as many secondary jobs as basic jobs, Set 2's higher population magnifies the effect, providing six times as many secondary job opportunities as the smaller town one-fourth its size.

EMPLOYMENT/INCOME PATTERNS

Employee wages as listed in DRA were used for this study, escalated* from mid-1973 levels to expected early 1976 levels.

DRA information* indicates NAPI expects 50% of its families to contain two wage earners. Because secondary employees will be in the same general wage class as most NAPI employees, we have also assumed that 50% of all families in which the breadwinner is engaged in secondary employment will contain two wage earners. Two wage earners have been assumed in only 30% of the higher paid plant/mine worker's families in accordance with the DRA study.

EXHIBIT III-3
TOWN CHARACTERISTICS

EMPLOYMENT	Set 1	Set 2
Total Base Employment	2,719	6,911
Base Employment in Town	1,405	4,009
Navajo	1,117	3,068
Non-Navajo	288	1,031
Non-Base Employment in Town	1,391	8,095
Navajo	1,117	6,136
Non-Navajo	274	1,959
Total Employment in Town	2,796	12,194
Navajo	2,234	9,204
Non-Navajo	562	2,990
HOUSEHOLDS		
Navajo Households	1,658	6,831
Navajo Group Quarters	112	460
Subtotal	1,770	7,291
Non-Navajo Households	453	2,411
Total	2,223	9,702
POPULATION		
Navajo Households	9,550	39,347
Navajo Group Quarters	112	460
Subtotal	9,662	39,807
Non-Navajo Households	1,481	7,884
Total	11,143	47,691

The results of calculations from these assumptions are summarized in Exhibit III-4.

The economic benefits to the Navajo Nation from the creation of a New Town are apparent in this summary. Set 1 would generate 1,117 secondary jobs for the Navajos, representing a total annual payroll of $6,540,000 (see Exhibits III-3 and III-4). Set 2 would generate 6,136 secondary jobs for Navajos, representing a total annual payroll of $36,646,000. Without the New Town, almost all of the primary employment payroll would leave the Reservation and almost no additional secondary employment would be created on the Reservation.

CAPITAL COSTS

Capital costs for the New Town generally were developed directly from DRA data, using their housing mix, square feet per capita of Public and Commercial Facilities, and land use requirement formulas. DRA unit costs were escalated* from mid-1973 levels to anticipated starting dates of early 1976. In analyzing infrastructure requirements and costs, some additional data and cost estimates were developed regarding access roads; water, natural gas, and electrical power sources; sewage and solid waste disposal. Design and engineering costs have been included in each of the construction cost categories.

The results of these capital cost calculations are summarized in Exhibit III-5.

EXHIBIT III-4
EMPLOYMENT/HOUSEHOLD/INCOME PATTERNS

	Number of Employees		Mean Income Per Employee	Total Income (000)	
	Set 1	Set 2		Set 1	Set 2
NAVAJO					
One Wage Earner					
Plant/Mine	232	1,011	$14,540	$ 3,373	$ 14,700
Agriculture	270	492	6,720	1,814	3,306
Secondary	436	2,431	6,620	2,904	16,190
Two Wage Earner					
Plant/Mine + Secondary	386	1,622	9,720	3,752	15,766
Agriculture + Agriculture	280	502	6,720	1,882	3,373
Agriculture + Secondary	283	504	5,810	1,650	2,928
Secondary + Secondary	346	2,642	5,780	2,000	15,271
Total	2,234	9,204		17,375	71,534
Average				$ 7,778	$ 7,772
NON-NAVAJO					
One Wage Earner					
Plant/Mine	96	457	$14,690	$ 1,410	$ 6,713
Agriculture	48	89	8,130	390	724
Secondary	110	790	9,590	1,055	7,756
Two Wage Earner					
Plant/Mine + Secondary	148	706	9,840	1,456	6,947
Agriculture + Secondary	148	264	8,130	1,138	2,146
Secondary + Secondary	20	684	7,240	145	4,952
Total	562	2,990		5,594	29,238
Average				$ 9,954	$ 9,779
GRAND TOTAL	2,796	12,194		$22,969	$100,772

EXHIBIT III-5

TOTAL CAPITAL COSTS*
(In Thousands of Dollars)

	Set 1	Set 2
Front End	$ 2,990	$ 9,030
Infrastructure**	32,520	109,350
Housing**	44,130	193,460
Public Facilities**	17,790	76,570
Commercial**	13,300	52,770
	$110,730	$441,180

* Projected to January, 1976.
** Includes design and field engineering fees.

PUBLIC SERVICES

The provision of some of the required public services (operation and maintenance of the town) will be the responsibility of several existing agencies (see Exhibit III-8). However, there will remain a number of public services required for the ongoing operation and management of the New Town; an entity must be created to provide them and a means developed to finance this entity. As discussed in Part V of this report, it is recommended that this entity take the form of a municipal government with authority to raise the necessary operating revenue through several forms of taxation that should be authorized in the charter for the New Town.

Exhibits III-6 and III-7 present preliminary municipal operating budgets based on costs of operation for four Arizona cities (Bisbee, Douglas, Flagstaff, and Prescott) and one New Mexico city (Farmington) of comparable sizes. Police protection would be provided by the Navajo Tribal Police with the New Town funding the operation under a contract with the Tribe. Public utilities such as water, sewer, gas, telephone, etc., would be operated by the agencies now established for these purposes; users' fees would cover the entire costs of utility operation and are therefore not reflected in the municipal budget.

The revenues shown in Exhibits III-6 and III-7 were estimated based on parameters established in the DRA report and were updated as required. It was assumed, for the purpose of these projections, that the New Town would not be incorporated under the laws of the State of New Mexico due to the stated policy of the Navajo Tribe. Officials of the State of New Mexico have indicated that the New Town would not be eligible for state shared revenues (gas tax, cigarette tax, auto license, etc.) unless it is incorporated. By not incorporating, the New Town would not receive an estimated $518,000 in state shared taxes for Set 1 nor an estimated $2,217,000 for Set 2. This represents 42.5% of the projected expenditures for Set 1 and 40.6% of the projected expenditures for Set 2.

As shown in Exhibit III-6, there would not be sufficient tax base within the town to cover all operating expenses. However, if the gasification plants and mines were included in the tax base (as shown in Exhibit III-7), there would be a small surplus under Set 1 and a small deficit under Set 2.

It is obvious from these tables that either the town would have to be incorporated in order to receive state shared revenues, or some agreement reached with the State of New Mexico in order for the town to receive these state shared revenues. A third alternative is to broaden the tax base by forming a "special assessment district" (see Appendix A) that would include the plants, mines, NIIP and any other industry which would benefit by creation of the New Town. Very few communities can operate without an industrial tax base. Numerous precedents for such a special assessment district exist, the most pertinent of which is the community of Gillette, Wyoming, which has followed this procedure to accommodate recent growth caused by energy development. Since it was impossible to determine a value for these other industries, they are not reflected in the values shown in Exhibit III-7. But by including all the related industry in the tax base, the tax load can be spread and the tax rate lowered for all.

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As shown in Exhibit III-7, property taxes would supply a major portion of the New Town's operating revenue. It is desirable that such taxes, rather than land lease payments, be the source of this revenue because the operating costs of the town will fluctuate over the years and tax rates can be adjusted to compensate for this. Lease income would be a fixed sum and could not be adjusted to meet these changing revenue needs.

Another possible revenue source for the New Town would be funds or services provided by the Navajo Tribe. Since the Tribe is now providing many of these services to some of the persons who would move to the New Town, it would appear equitable for them to continue to provide these services or make a contribution to the New Town to finance these services. Since this would be subject to a decision of the Tribal Council, this revenue source is not shown on Exhibits III-6 or III-7.

It is assumed that the gross receipts tax revenue shown in Exhibits III-6 and III-7 would be levied by the Tribe or the New Town and that the state would not collect gross receipts taxes within the Town. Such a procedure will probably raise legal complications, and therefore it might be better to devise another type of tax to replace this projected revenue source. Additional investigations into the legal questions associated with this form, or alternate forms, of tax should be undertaken.

EXHIBIT III-6

PRELIMINARY MUNICIPAL OPERATING BUDGET
(In-town Tax Base Only)

Expenditures	Set 1	Set 2
Administration	$ 222,000	$ 992,000
Police	333,000	1,488,000
Fire	110,000	496,000
Streets	144,300	664,800
Sanitation (refuse)	166,500	744,000
Parks and Recreation	110,000	496,000
Miscellaneous	133,200	595,200
TOTAL	$1,219,000	$5,456,000

Revenues (Assuming Town is NOT incorporated)		
Property Tax* (in-town only)	$ 68,050	$ 284,700
Gross Receipts Tax**	234,000	1,050,000
Revenue Sharing	172,700	739,200
TOTAL	$474,750	$2,073,900
Annual Difference (loss)	($744,250)	($3,382,100)

*Assuming a tax rate of $2.50/$1,000.00 of assessed value for municipal operating budget which is normal for New Mexico cities. Assessed value equals 33% of in-town capital costs and land improvement costs. (See Appendix A.)

**Assuming a 2% gross receipts tax (sales tax) within the town on retail sales projections based on DRA parameters. The 2% tax rate was chosen to give the New Town merchants a competitive advantage over off-Reservation merchants.

EXHIBIT III-7

PRELIMINARY MUNICIPAL OPERATING BUDGET
(Including Plant(s) & Mine(s) in Tax Base)

Expenditures	Set 1	Set 2
Administration	$ 219,000	$ 992,000
Police	333,000	1,488,000
Fire	110,000	496,000
Streets	144,300	664,800
Sanitation (refuse)	166,500	744,000
Parks and Recreation	110,000	496,000
Miscellaneous	133,200	595,200
TOTAL	$1,219,000	$5,456,000

Revenues (Assuming Town is NOT incorporated)		
Property Tax* (total district)	$ 901,333	$3,618,033
Gross Receipts Tax**	234,000	1,050,000
Revenue Sharing	172,700	739,200
TOTAL	$1,308,033	$5,407,233
Annual Difference (loss)	$ 89,033	($48,767)

*Assuming a tax rate of $2.50/$1,000.00 of assessed value for municipal operating budget which is normal for New Mexico cities. Assessed value equals 33% of in-town and plant and mine capital costs and land improvement costs.

**Assuming a 2% gross receipts tax (sales tax) within the town on retail sales projections based on DRA parameters. The 2% tax rate was chosen to give the New Town merchants a competitive advantage over off-Reservation merchants.

EXHIBIT III-8

PROVISION OF PUBLIC SERVICES

Service	Agency
General Policy	Navajo Tribal Council
Specific Policy	Local Legislative Body
Land Use Controls	Navajo Tribal Council Local Legislative Body
Building Inspection	Local Government Body
Police	Navajo Police BIA Law and Order FBI State Police San Juan County Sheriff
Fire Protection	Local Government Body
Animal Control	Local Government Body
Water	Indian Health Service (construction) Navajo Tribal Utility Authority (operation)
Sewage Disposal	Indian Health Service (construction) NTUA (operation)
Sanitation (Refuse Collection)	Local Government Body
Power & Gas Construction and Maintenance	Local Government Body NTUA
Road Construction and Maintenance	State of New Mexico County of San Juan Bureau of Indian Affairs Local Government Body
Storm Drainage	Local Government Body
Parks and Recreation	Local Government Body
Library	Local Government Body
Hospital & Clinics	Indian Health Service San Juan County Hospital
Schools	HEW County School District BIA (contract)
Welfare	State of New Mexico Bureau of Indian Affairs Navajo Tribe

(Source: Development Research Associates, p. VII-20)

PART IV

FINANCING

As stated at the beginning of this report, the primary objective of this study is "to identify those factors that will affect the financial aspects and economic feasibility of a community development . . . ." The unique nature of the proposed New Town in terms of its purpose, physical location, and its relationship to existing governmental entities places numerous constraints on its feasibility. At the same time these conditions offer some unique opportunities for financing the New Town. Financing for the project will be extremely complex and will require a great deal of additional effort before it can be implemented. This part of the study will outline two potential financing scenarios and the constraints related to each. To aid in understanding the scenarios, the terms used are described here.

DEFINITIONS

PROJECT COSTS

Project Costs are broken down into three major categories: (1) Capital Costs--the costs of constructing the New Town, (2) Public Services Costs--the costs of operating and maintaining the New Town once it is built, and (3) Housing Costs.

Capital Costs can be further broken down into five types:

- o Front End--the money required to cover further planning, organization, legal, financial, and governmental analyses, evaluations and negotiations.
- o Infrastructure--the money required to design and construct roads, storm drains and utilities.
- o Public Facilities--the money required to design and construct schools, medical facilities, local governmental offices, parks and recreation facilities, and social activities such as churches, private clubs, etc.
- o Housing--the money required to design and construct housing facilities for the town.
- o Commercial--the money required to design and construct the commercial facilities, including offices, that will be needed to serve the town.

Public Services include such activities as local government administration, fire protection, animal control, refuse collection, road maintenance, storm drain maintenance, park and recreation operation and maintenance, and police protection, which will be supported by fees raised within the Town. Additional public services such as water and sewer operation and maintenance, electric and gas utilities, hospitals, courts and welfare will be supported by other governmental agencies or financed through user fees in the case of the utilities.

Housing Costs are the portion of a family's gross income devoted to providing its shelter. These include debt service, taxes, utilities, insurance and maintenance.

POTENTIAL FISCAL RESOURCES

Numerous potential sources of funds to finance the capital costs and public services were identified and investigated in the DRA report. This study further investigated additional funding sources as well as those previously identified. Each of these potential funding sources can be linked to one or several of the costs listed above.

Advances from the participants in the Development Entity will be required to provide the Front End money. Under certain conditions, upon sale of the leasehold interests in the land and/or the improvements (other than residential) for example, some or all of these initial Front End advances may be recoverable. Funds from private sources were assumed to cover the costs of constructing and operating the social activities.

Grants-In-Aid from federal, state, and county governments are available to pay for the construction of certain of the Infrastructure and Public Facility elements. Some grants-in-aid may also be available to pay a portion of the operation and maintenance costs, primarily through the funding of training programs, but it is impossible to quantify these until the operating entity of the town is established and specific programs can be outlined.

Bonds, either revenue or general obligation, may be used to finance the portion of the Infrastructure or Public Facilities costs that would not be covered by grants-in-aid. Under certain conditions (as described in Scenario I) bonds may also be used to finance all of the required improvements including housing and commercial structures.

Downpayments, in the case of the sale of a leasehold interest and/or improvements, would of course result in a reduction of the mortgage and thus the required monthly payments.

Mortgages (Deeds of Trust) would be required to finance all of the Capital Costs not assumed by one of the resources listed above. The Development Entity, an individual, a corporation, or other business entity may mortgage the leasehold interest or improvements that they own or purchase.

Sale of Leasehold Interest and/or Building will transfer the responsibility of repayment from the original developer (the Development Entity) to the purchaser.

DEBT SERVICE

Debt service is the money required to make the regular payments to repay the debt incurred and the interest on that debt. In the case of the Development Entity, several sources of income are available to service the debt. These include lease or rental of the building and/or lands owned by it, and subsidies received from outside sources.

In the case of an individual or other entity, the morgage payments would be the responsibility of the mortgagor and will not be reflected in the Financial Scenarios.

Lease Payments, in the case of land leases, will be income to the Development Entity that it can utilize to repay the advances of Front End costs or for its other debt service. The leasing of land only, with structures, will most likely be confined to commercial or industrial properties under Scenario II. As shown in both Scenarios, the available housing money (see Exhibit IV-2) is not adequate to cover the additional cost of a land lease payment and therefore none is projected. This is consistent with the current policy on the Navajo Reservation.

In the case of lease payments for buildings, the funds received will be utilized to service the debt (either Bonds or Mortgages) that financed the construction of the buildings.

Rentals are basically the same method of deriving revenue to cover debt service costs except that these do not carry the same long term obligation on the part of the occupant as a lease.

Subsidies will be necessary to cover any gap between the amount required for debt service and the income received. Some subsidies may be available from various federal agencies such as BIA, HUD, Farmers Home Administration, etc. The amount of subsidies available from these sources cannot be quantified here because the number of households meeting the criteria for such subsidies is unknown and, more importantly, these programs have been changing rapidly in recent years. It is impossible to predict what, if any, programs would be available at the time the Town is constructed.

Therefore, the primary responsibility for providing any subsidies required will fall to the Development Entity participants unless adequate outside sources are available. The responsibility for any such subsidies should be distributed to the Development Entity participants in proportion to the number of households employed by each. Exhibit IV-1 indicates a projected number of households per employer.

FINANCING SCENARIOS

Two Financing Scenarios are given here to link the Project Costs, Fiscal Resources and method of servicing the Debt and to outline the constraints related to each.

ASSUMPTIONS

The following assumptions apply to both Financing Scenarios:

- That capital costs for the social facilities (within the Public Facilities category) would be privately financed and fully service their own debt.

- That commercial facilities would be developed as justified by the demand and therefore would fully service their own debt.

- That even though each individual household will make its own choice as to the size and type of housing desired and thus the payments to be made; however, it is possible to derive overall town averages for use in this analysis.

- That this overall town average be applied to all households (both Navajo and non-Navajo) in computing the monies available for debt service. To do otherwise would be discriminatory and would have an adverse effect on the non-Navajo attraction rate and on the Navajo/non-Navajo social relationships within the Town.

EXHIBIT IV-1

HOUSEHOLDS PER EMPLOYER

Employer	SET 1 Households	SET 1 % of Total	SET 2 Households	SET 2 % of Total
Coal Gasification (Plant/Mines)	522	23%	2,143	22%
Secondary Employment*	1,106	50%	6,374	66%
NAPI	595	27%	1,185	12%
TOTAL	2,223	100%	9,702	100%

*If the secondary employers will not or cannot assume the subsidies for their employees, these will have to be redistributed among the primary employers.

AVAILABLE HOUSING MONEY

The DRA study and others have reported on the relatively low priority for housing within the average Navajo family budget. A recent study comments further on this.

"One of the significant findings of this study is the difference in the pattern of expenditures between an average Navajo household and an average United States family of four living in a non-metropolitan area. Major differences for the Navajo include a relatively high level of expenditures for transportation. Higher food expenditures may be due in part to a larger household size, while the higher transportation expenditures may be biased upward if a seasonal pattern exists for transportation expenditures. Nevertheless, the data shows that (1) the means of transportation are given high priority in a consumer's budget and (2) the Navajo household tends to spend relatively more for transportation causing the Navajo household's real standard of living to be overstated as measured by income.

"District differences in expenditures patterns are due to remoteness or proximity to urban areas, differences in income, and the extent of farming undertaken in the district . . . .

"Expenditures for housing, car or pickup payments, recreation, and meals eaten out **increase** with increases in income. Expenditures for food and personal care items **decrease** relative to income increases, while expenditures for transportation and clothing remain **constant** relative to income increases.

"The most significant aspect of housing expenditures is the fact that 82% of the households make no direct payments for housing. This high percent can be compared with the high percent (74%) of the households who live in hogans or similar dwellings and pay a small percent (11%) of the total household expenditures." **(1)**

"Approximately three out of four households reported that they live in hogans and do not pay rent. Three percent of the households live in cash rentals, 2.8% own or are buying, 7.9% live in government housing, 8.1% live in a trailer, and 4.5% live in a house owned by a relative. The households who live in hogans have heads who are older and have completed less formal education. In most instances, these heads of households have not received vocational training, are currently unemployed, have lived the majority of their lives on the Reservation, and do not speak and read English 'well.'

"In contrast, the household who lives in a cash rental, government housing, or has purchased a house have heads who are younger, have completed relatively more formal education including vocational training, and speak and read English 'well.' In addition, these heads of households have lived a smaller proportion of their lives on the Reservation and may have a smaller household." **(2)**

These comments, particularly the last paragraph above, along with the interviews conducted by the Study Team, lead us to believe that this pattern would change in the New Town. In our opinion, it is reasonable and we believe that on an overall average, the New Town household should devote 20% of its gross income to housing costs. This is still below the 22.1% for "non-urban Western households" as reported by the Bureau of Labor Statistics and the 25% that is normal for urban households. The reasons for this are:

- That persons living in the New Town would be younger, better educated, and have stronger desires for modern housing than the Reservation population as a whole.
- That many potential New Town residents have lived and worked off the Reservation at one time or another and have become accustomed to paying more for housing.
- That living in the New Town will allow them to reduce their transportation expenditures due to more easily available services and shopping and close proximity to employment.
- That New Town residents will tend to have smaller families and therefore may reduce their food expenditures.
- That the federal government in most of its subsidized low income housing projects requires the family to pay 25% of their adjusted gross income for housing costs.

The percent of income available for debt service will decrease from Scenario I to Scenario II due to need for property taxes to pay for the Infrastructure and Public Facilities capital costs that would not be covered by grants-in-aid. The need for these property taxes to retire the bonds sold to install the Infrastructure (see Appendix A) in Scenario II will leave 15% of the income available for debt service while 15.28% will be available under Scenario I because no bonds would be required due to the 100% grant-in-aid.

EXHIBIT IV-2

ANNUAL MONIES AVAILABLE FOR HOUSING DEBT SERVICE

	Set 1	Set 2
Housing costs (20%)	4,593,800	20,154,400
Property Tax-Operating (.20%)	45,938	201,544
*Property Tax - Capital improvements (.28%)	64,313	282,162
Insurance (.46%)	105,657	463,551
Maintenance (.46%)	105,657	463,551
Utilities (3.6%)	826,885	3,627,792
Debt Service (15.28%) Scenario I	3,509,664	15,397,962
Debt Service (15.00%) Scenario II	3,445,350	15,115,800

*Scenario II only

SCENARIO I

This Scenario is based on the premise that the Development Entity would be formulated as a non-profit corporation with the ability to issue tax-exempt bonds to finance the total capital costs of all improvements and structures that it will construct. Special legislation from Congress will probably be required to charter the Development Entity and give it tax exempt status. A precedent for such legislation can be found in the Indian Financing Act of 1974.

Another element of this special Congressional legislation would be the provision of a 100% grant-in-aid for the capital costs of the infrastructure and public facilities that would not be constructed by others. A precedent for such special legislation exists in the Navajo Indian Irrigation Project. Such legislation should receive favorable support since it would meet the dual needs of advancing the economic development of the Navajo Indian Reservation and its people while at the same time contributing to the supply of energy required for the United States to maintain and advance its standard of living by aiding gasification.

A third premise is that this special Congressional legislation would include federal government guarantees of the tax exempt bonds issued by the Development Entity. Again, several precedents for such guarantees exist, including the Indian Financing Act of 1974.

Capital costs as outlined in Part III are summarized again in Exhibit IV-3.

Fiscal Resources under this Scenario are:

- o Advances from the Development Entity participants for the Front End costs.
- o Construction of certain Infrastructure and Public Facilities by the State of New Mexico and its subdivisions and private groups for social facilities. (See Exhibit III-8.)
- o Grants-in-aid from the federal government for all Infrastructure and Public Facilities not constructed by others.
- o Tax exempt bonds issued by the Development Entity would finance the construction of all remaining structures (residential and commercial buildings).

Debt Service under this Scenario would be limited to repayment of the bonds issued to finance the residential and commercial structures. As previously stated, it is assumed that commercial leases would fully service their own debt. Therefore, only the residential element remains on which debt service must be computed. Since state and federal grants-in-aid and private groups (social) are assumed to cover all Infrastructure and Public Facilities costs, no taxes are required for this purpose. Taxes would still be required for the provision of Public Services (operation and maintenance of the Town) as outlined in Part III.

This Scenario is summarized in Exhibit IV-3, and the debt service for the residential sector is summarized in Exhibit IV-4.

EXHIBIT IV-3

SUMMARY OF FINANCING SCENARIO I

	Set 1	Set 2
	(In Thousands of Dollars)	
Total Capital Costs	$110,730	$441,180
Fiscal Resources		
Advances from Development Entity Participants (Front End Costs)	$ 2,990	$ 9,030
State and Local Construction (Roads, Schools, etc.)	13,370	48,717
Private Construction (Social)	2,660	11,408
Federal Grant-In-Aid	34,280	125,795
To Be Financed by Development Entity Bonds	$ 57,430	$246,230
Bonds Required		
Commercial	$ 13,300	$ 52,770
Housing	$ 44,130	$193,460

EXHIBIT IV-4

SUMMARY OF HOUSING DEBT SERVICE–SCENARIO I

	Set 1	Set 2
Housing Capital Costs	$44,130,000	$193,460,000
Annual Debt Service Required*	$ 3,523,260	$ 15,445,440
Annual Monies Available for Housing Debt Service (see Exhibit IV-2)	3,509,664	15,397,962
Annual Difference	$ (13,596)	$ (47,478)

As shown here, a small deficit exists in both Sets. A breakeven point would require 15.34% of the annual income for debt service for both Sets 1 and 2. This reflects the "stable-state" New Town and could not be expected to occur for a period of five to seven years after beginning construction.

*Assume 30-year tax exempt federal government guarantee bonds at 7% interest.

Conditions that will probably be imposed by the bond holders under Scenario I are:

- o That bonds not be retired for a number of years (probably a minimum of 10 years) without paying substantial penalties. This requires that all units be owned by the Development Entity and not sold for ar least 10 years. This may bring some resistance on the part of the New Town occupants who want to own their homes. It may be possible to institute a "lease with option to buy" and thereby allow some equity buildup for the purchaser.
- o That the Development Entity employ professional management.
- o That the Management Entity employ professional management. (See Step 8, Part V.)
- o That all construction be in accordance with nationally recognized codes and regulations.
- o That the original participants remain a part of the Development Entity for a number of years.
- o That adequate land use controls (zoning) be established and enforced to assure conformance to the Master Plan.

SCENARIO II

This Scenario is based on the premise that the Development Entity would be formulated as a corporation with the ability to issue tax exempt bonds to finance only the capital costs of the Infrastructure and Public Facilities not financed by the state, school district, private parties, or existing federal grants-in-aid. Special legislation from Congress will probably be required to charter the Development Entity and give it tax exempt status.

It is assumed under this Scenario that federal guarantees of the bonds would **not** be received. In this case, it will be necessary for the Development Entity participants to guarantee these bonds (see Appendix A), which will result in a much higher interest rate. This will also require formation of a "Special Assessment District" (see Appendix A) in order to include the gasification plants, mines, and others in the tax base.

Under this Scenario, housing and commercial structures would be financed through mortgages (deeds of trust) with mortgage insurance provided under one of the existing programs established for this purpose including:

Federal Housing Administration
Indian Financing Act of 1974
Veterans Administration
Farmers Home Administration

Capital Costs, as outlined in Part III, are summarized again in Exhibit IV-5.

Fiscal Resources under this Scenario are:

- o Advances from the Development Entity participants for the Front End costs.

- Construction of certain Infrastructure and Public Facilities by the State of New Mexico and its subdivisions and private groups for social facilities.

- Grants-in-aid from the federal government under existing programs for a portion of the Infrastructure and Public Facilities. Projected grants-in-aid as shown on Exhibit IV-5 were calculated on the basis of current programs available, including those under BIA, DOT, PHS, HUD, EPA, EDA, and BOR. As the programs are all subject to authorization and allocation of funds by fiscal years, a factor of seventy-five percent was applied as a reasonable amount that could be expected to be available for the project. Tax exempt bonds issued by the Development Entity to finance that portion of the Infrastructure and Public Facilities not funded by others.

- Downpayments will be required to obtain financing under the mortgage guarantee programs named above. These downpayments will range from very minimal under VA financing to 20% or more for conventional financing without guarantees. Since it is impossible to estimate the mix of these different types of mortgages and the financial institutions will require a 10% minimum downpayment from the Development Entity, that figure (10%) is used for this Scenario. The Development Entity will recover all or part of these downpayments upon sale of the units.

- Mortgages (deeds of trust) to finance the capital costs of commercial and housing facilities.

Debt Service under this Scenario would fall into two categories:

- Taxes for the repayment of bonds used to finance the Infrastructure and Public Facilities (see Appendix A). Imposition of this tax will reduce the amount of monies available for housing debt services as shown in Exhibit IV-2.

- Lease or mortgage payments for repayment of the loans used to finance commercial and housing facilities. As stated previously, it is assumed that the commercial sector will fully service its own debt. Therefore, only the housing debt service is summarized in Exhibit IV-6; and the entire Scenario is summarized in Exhibit IV-5.

EXHIBIT IV-5

SUMMARY OF FINANCING SCENARIO II

	Set 1	Set 2
	(In Thousands of Dollars)	
Total Capital Costs	$110,730	$441,180
Fiscal Resources		
Advances from Development Entity Participants (Front End Costs)	$ 2,990	$ 9,030
State and Local Construction (Roads, Schools, etc.)	13,370	48,717
Private Construction (Social)	2,660	11,408
Federal Grants-In-Aid	21,974	73,582
To Be Financed by the Development Entity	$ 69,736	$298,443
Financing Required		
Bond for Infrastructure and Public Facilities*	$ 12,306	$ 52,213
Commercial	$ 13,300	$ 52,770
Housing	$ 44,130	$193,460

*See Appendix A for discussion of retirement of these bonds.

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EXHIBIT IV-6

SUMMARY OF HOUSING DEBT SERVICE–SCENARIO II

	Set 1	Set 2
Housing Capital Costs	$44,130,000	$193,460,000
Less 10% Downpayments	4,413,000	19,346,000
Net Amount to be Mortgaged	$39,717,000	$174,114,000
Annual Debt Service Required*	$ 3,664,713	$ 16,064,792
Annual Monies Available for Housing Debt Service (see Exhibit IV-2)	3,445,350	15,115,800
Annual Difference (loss)	($219,363)	($948,992)

As shown here, a deficit exists in both sets. A breakeven point would require 15.95% of the annual income for debt service for both Sets 1 and 2. There are several possible sources of funds to make up this deficit:

- Federal low income housing subsidies from:

  HUD
  BIA
  Farmers Home Administration

- Subsidies from Development Entity participants.
- A reduction in costs of construction.
- A reduction in the interest rates to reduce the amount required for debt service. Some reduction in the interest rate may be possible under the Indian Financing Act of 1974.

This reflects a "stable-state" New Town and could not be expected to occur for a period of five to seven years after beginning of construction.

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*Assume 30-year FHA, VA, or Indian Financing Act financing at 8-1/2%.

Conditions that will probably be imposed by the bond holders under Scenario II are:

- o That bonds not be retired for a number of years (probably a minimum of 10 years) without paying substantial penalties.
- o That the Development Entity employ professional management.
- o That the Management Entity employ professional management.
- o That all construction be in accordance with nationally recognized codes and regulations.
- o That the original participants remain a part of the Development Entity for a number of years.
- o That adequate land use controls (zoning) be established and enforced to assure conformance to the Master Plan.
- o That a Development Corporation be created and chartered under the laws of a mutually agreeable state.
- o That there be an agreement to litigate any conflicts or contractual disagreements with creditors in the State of New Mexico or U.S. Federal Court system.
- o That the Development Corporation be permitted to build, operate, and maintain Public Facilities and Infrastructure on leased Navajo soil.
- o That the Development Corporation be permitted to impose ad valorem leasehold taxes upon all subleases within the New Town.
- o That the Development Corporation be permitted to issue tax exempt general obligation and revenue bonds.
- o That the Development Entity be granted the right to pledge, without limitation, tax revenues for the retirement of the general obligations of the entity.
- o That the entity be granted the right to sublease property within the New Town.
- o That the need for special enabling legislation from the State of New Mexico be investigated in more detail.
- o That the need for special enabling legislation from the Congress of the United States, because of the trust status of the Reservation, be investigated in more detail.

Conditions on Mortgages which will probably be required by the lenders under Scenario II are:

- That the Development Entity participants guarantee to make up any deficits in the debt service.
- That the Development Entity employ professional management.
- That the Management Entity employ professional management.
- That all construction be in accordance with nationally recognized codes and regulations.
- That the original participants remain a part of the Development Entity for a number of years.
- That adequate land use controls (zoning) be established and enforced to assure conformance to the Master Plan.
- That further documentation be prepared to substantiate the percent of income that the New Town residents will be willing to devote the housing costs.

PART V

STEPS IN NEW TOWN FORMATION, DEVELOPMENT, AND OPERATION

The following step-by-step procedure should be executed in order to make the New Town a reality based on the assumptions listed at the beginning of this report. The steps are listed here in their order of occurrence. In many cases the activities associated with some of these steps can be carried on simultaneously--in fact, it will be mandatory to do so in order to accomplish the tasks in the short period of time available.

The Navajo Indian Irrigation Project is proceeding, with the initial block being irrigated in 1976; the opening of each subsequent block of land will create an ever-increasing demand for housing and community facilities for its employees. The coal gasification companies have indicated that they will pursue a rapid schedule of development upon receiving their required approvals from the Navajo Tribe and the federal agencies (see Exhibit I-1). These factors place severe time restraints on the formation and development of the New Town, particularly in light of the monumentally complex task that lies ahead. Ideally, two to three years should be spent in advance planning, design, preparation of legal documents, securing needed legislation, etc. From the projected schedule given in the Summary of Commitments, it can be seen that this will not be possible.

Even though it will be necessary to carry on many of these activities concurrently, the sequence in which they are listed here is still an overriding constraint. Each subsequent step will be building upon the previous step and in many cases will be determined by the outcome of the previous step. It is therefore imperative that action commence immediately if there is to be any possibility of reaching the goal of a New Town in the time allotted.

STEP 1 - NAVAJO TRIBAL COMMITMENT

Existing Conditions: The Navajo Tribe has not made any commitments either for or against the development of coal gasification or a New Town on the Reservation.

Necessary Conditions: It will be necessary for the Navajo Tribe to make a commitment to the formation of a New Town before any of the subsequent steps can be taken. This commitment may be made in two stages--an initial commitment to the concept of a New Town, to be followed by a total commitment to the New Town upon satisfactory conclusion of the negotiations for business site leases for the coal gasification plants. In order for the New Town to be successful, as it is currently envisioned, it must have the full support and participation of the Navajo Tribe, and must be constructed simultaneously with the gasification plants. If construction of the New Town is delayed and the employees of the plants and NAPI establish residence somewhere else, the number that can be attracted to the New Town will be greatly reduced. The steps listed here will outline a number of the commitments that will be required of the Navajo Tribe and the other participants.

Desirable Conditions: The availability of water to serve the New Town has been analyzed by a number of authorities. Since the ground water rights at the site of the New Town and immediately adjacent thereto are held by the Navajo Tribe, the Tribe should immediately initiate the necessary actions to make these water rights available to the New Town Development Entity. At the same time, the Navajo Tribe should initiate the necessary actions to make a portion of their surface water rights available to the New Town Development Entity.

Alternatives: Assuming that coal gasification proceeds as planned, among the alternatives to the formation of the New Town would be (1) the development of an off-Reservation New Town or (2) development of individual construction camps during construction of the plants, with the plant operating personnel housed in adjacent communities, primarily Farmington and Shiprock. While neither of these alternatives would make it impossible for the coal gasification companies to construct or operate their plants, these alternatives would not serve the best interest of the Navajo Tribe, NAPI, the coal gasification companies, or others.

STEP 2 - FORMATION OF THE DEVELOPMENT ENTITY

2.1 NEED FOR AGREEMENTS

Existing Conditions: The formation, development and operation of a New Town will require the creation of a Development Entity in which the interested parties will participate. No such Development Entity has been formed.

Necessary Conditions: The Development Entity should be formed through an agreement among the Navajo Tribe, WESCO, El Paso, Utah International, Inc., Consolidation Coal Company, the Navajo Agricultural Products Industry, and any other parties who might contribute to the New Town or whose interest would be served by its creation. The Development Entity should be established in the form of a corporation, whether it is incorporated or not, with each of the participants contributing to it in proportion to the benefits to be derived by each. It is possible that the formation of this Development Entity may require some special legislation, as discussed below, in order to carry out its intended function.

Alternatives: The Development Entity could be formed by the Navajo Tribe and/or the Navajo Agricultural Products Industry alone. However, under these conditions, the base of support for the entity would likely be so small that its success would be questionable.

2.2 AUTHORITY

Existing Conditions: In order for the Development Entity to carry out its assigned function, it must have a broad range of powers. Most, if not all, of the required powers are now held by the Navajo Tribe and a means of transferring them or making them available to the Development Entity must be found.

Necessary Conditions: It will be necessary for the Development Entity's charter to give it the authority to:

- Obtain a master lease for the town site from the Navajo Nation under which no lease payments from the Development Entity to the Navajo Nation are required. The Development Entity participants could agree that the value of this lease would constitute a portion of the Tribe's advances toward the capital costs of the Town.
- Contract for professional services (legal, planning, design, and other consulting services).
- Contract for construction management services.
- Obtain financing for the New Town.
- Issue bonds to finance construction.
- Mortgage improvements and leasehold interests.
- Impose taxes within the town site or have the Tribe impose taxes and return the money to the Development Entity.
- Impose and collect charges or users' fees for subleases of land and services.
- Sublease land and improvement.
- Obtain grants-in-aid (Congressional authority may be required in order for the Development Entity to be designated a grantee agency).
- Implement land-use controls and construction codes.

Desirable Conditions: While not mandatory, it would be desirable for the Tribal Council to remove the ban on sale and possession of liquor within the New Town site.

Alternatives: If a Development Entity is to be formed and carry out its assigned function, it would require, at a minimum, all of the authorities listed here. During the process of creating the Development Entity, additional requirements may arise and the charter must provide for their inclusion as necessary.

2.3 SEED MONEY

Existing Conditions: In order to finance the initial formation and organization of the Project, seed money will be required to cover further planning, organizational, legal, financial, and governmental analyses, evaluations and negotiations. Seed money to carry on these activities has not been allocated at this time.

Necessary Conditions: One potential source of seed money is government grants, such as 701 Planning Funds from the Department of Housing and Urban Development. However, Congressional appropriations for this and similar programs have been reduced in recent years. The time required to process applications for grants such as these is often extended with ultimate approval in question. The critical time period required to implement a project of this type and magnitude and the absolute necessity to allow sufficient time for preliminary planning and organization cannot be over-emphasized if the project is to have a reasonable chance for successful implementation. The result is that the project participants will probably have to become the primary source of the required Front-end money.

Alternatives: The only alternative to adequate planning in advance of the development would be a haphazard and chaotic growth of the New Town with the negative results far outweighing any benefits that the participants might expect to receive.

2.4 SURFACE WATER RIGHTS

Existing Conditions: No surface water rights are currently assigned for use in the New Town.

Necessary Conditions: There appear to be some surface water rights available to the Navajo Tribe. It will be necessary for these rights to be transferred to the Development Entity or for the Tribe to make sufficient surface water available, probably from the San Juan River, through a contract to the Development Entity.

Alternatives: Limited quantities of ground water appear to be available in the area. However, it is unlikely that the quantities will be sufficient to support the New Town at its ultimate size; therefore, adequate surface water rights must be assured before the development of the New Town goes beyond the construction camp phase. Some of the local ground water or surface water allocated to the coal gasification plants could serve as interim sources during the early phases of the New Town, since that water will not be fully used until the plants are fully developed.

STEP 3 - SECURE LAND LEASE

3.1 SITE SELECTION

Existing Conditions: No site for the New Town has been selected. Some research into town site locations was done by DRA and Gruen Associates and two potential sites identified.

Necessary Conditions: A town site will have to be selected at the earliest possible date. This selection will be made by the New Town participants with the Navajo Tribe playing a major role in this decision.

Exhibit 17 on Page VI-5 of the DRA report lists a number of factors considered in selecting the two potential sites recommended in that study. All of these factors should be reviewed again in making the final site selection, and two additional factors should be included: (1) The site should be as free as possible from any mineral resources that have significant potential value, and (2) it must be within reasonable commuting distance of all the prime employment sources--but as far removed from the competing communities (Farmington, Shiprock, etc.) as possible.

3.2 LAND LEASE

Existing Conditions: Most, if not all, of the land within the Navajo Reservation is leased or assigned for some form of use. The Tribal code provides for several types of leases (i.e., homesite leases, business site leases, etc.). Previous discussions with the Tribal General Counsel indicated that it would be possible, and probably desirable, to create a new mechanism within the Tribal Code to accommodate the unique situation presented by the New Town.

Necessary Conditions: The Navajo Tribe must grant a land lease to the Development Entity for construction of the New Town. This lease should authorize the Development Entity to carry out those activities listed in Items 2.2 above and 8.1 below. The initial lease should cover the maximum area that will ultimately be required for the development of the New Town, including an adequate open space buffer around its periphery. The lease must also provide for compensation of those people who will be displaced from the New Town site. Funds for such payments are included in the Front End costs and would be made from the Development Entity to the Tribe. Provisions for land necessary for an airport should be made in the initial land lease.

Alternatives: The only alternative to the Navajo Tribe's issuing a satisfactory land lease to the Development Entity would be the development of an off-Reservation town or expansion of existing communities in the area.

3.3 RIGHTS-OF-WAY

Existing Conditions: Some roadways exist in the vicinity of the two potential sites identified in the DRA report.

Necessary Conditions: Additional access roads will be required no matter what site is selected for the New Town. Utilities must also be brought from outside the site. Both of these will require that the Navajo Tribe grant the required rights-of-way to the appropriate agencies.

Land for a sanitary land fill, on or off-site, for refuse disposal and right-of-way for roads to it will be required.

3.4 RELATIONSHIP TO CHAPTERS

Existing Conditions: Of the two potential town sites identified in the DRA report, one is located within the Burnham Chapter and the other in the Two Gray Hills Chapter.

Necessary Conditions: The needs and desires of the members of these Chapters and the residents of the New Town will not coincide in most cases. Ultimately the residents of the New Town will require some voice in determining their own destiny. Some form of local governmental structure will have to be implemented, and it is therefore necessary that the town site and right-of-way be removed from the political influence of the Chapters at the time the land lease is granted.

3.5 UNAUTHORIZED HOMESITES

Existing Conditions: On several previous occasions when major employment sources developed on or adjacent to the Reservation (for example, Shiprock and Page), persons moved to those areas from all over the Reservation seeking employment. Many of these people settled on undeveloped, vacant Tribal land surrounding these communities. This created unsightly, unsanitary and unsafe living conditions for numbers of people.

Necessary Conditions: In order to prevent a re-occurrence of these events, the Tribal government must commit itself to preventing unauthorized persons from settling just outside the community and taking advantage of its amenities and services without being fully responsible for their financial support.

STEP 4 - PREPARE MASTER PLAN

4.1 NECESSITY FOR FULL MASTER PLAN

Existing Conditions: This study, the DRA study, and numerous other previous studies constitute a preliminary program for preparation of the Master Plan. Additional detailed research will be required for preparation of a master plan of development for the New Town. The Navajo Tribal Council has adopted some construction codes but has not fully enforced them.

Necessary Conditions: The Development Entity must contract with professional consultants for the preparation of: (1) an environmental impact statement for the New Town, (2) a master plan of development for the New Town, and (3) land use controls (zoning) and construction standards (building and construction codes). It will also be necessary for some governmental authority (probably the Navajo Tribe) to establish an agency and procedures for the enforcement of these codes within the New Town in order to satisfy the lender that his investment will be protected. The question of whether these codes would apply only for the New Town alone or the Reservation as a whole will have to be resolved.

The construction camps and off-site facilities should be included in the Master Plan for the New Town. It is recommended that the construction camps for the gasification plants be included within the New Town and form its first village.

The client for the preparation of the Master Plan would be the Development Entity. Each of the participants in the Development Entity will supply input to the Master Plan through the Development Entity. In order to accomplish such a complex task, especially in the limited time that will be available, it is imperative that the Master Plan Team have a single "client" to which it is responsible and which has the authority to make binding decisions.

Desirable Conditions: Detailed design and construction documents of the numerous elements within the New Town may be prepared by a number of different firms. In order to insure a comprehensive approach and adherence to the intent of the Master Plan, the Master Plan Team should be employed by the Development Entity to coordinate and control the detailed planning, design and development of the New Town. The Master Plan Team, along with the staff of the Development Entity, would serve as a "Design Review Board" for plans submitted for the individual elements of the New Town.

Alternatives: Without a Comprehensive Master Plan to guide the development of the New Town, the result would be a chaotic, uncoordinated scattering of developments which would fail to achieve the goals of the Navajo Tribe or the other participants in the Development Entity.

4.2 NECESSITY FOR COMPLETE FISCAL PLAN

Existing Conditions: This study, the DRA study, and other studies have made recommendations concerning the fiscal requirements to implement the New Town concept.

Necessary Conditions: A complete Fiscal Plan should be included as part of the Master Plan Program to serve as a guide for securing financing. The Fiscal Plan and Physical Plan for the New Town are inseparable and should be prepared simultaneously under the guidance of the Master Plan Team.

STEP 5 - SECURE FINANCING

As stated numerous times, the securing of financing for the proposed New Town is one of the most critical items in determining its feasibility. Several potential sources of funds for construction of the New Town were discussed in Part IV. This section of the report will address three types of financing for the New Town and identify the potentials and constraints on each. These three types of financing are: (1) grants-in-aid, primarily from the federal government; (2) bonds; and (3) mortgage financing.

5.1 GRANTS-IN-AID

Existing Conditions: Numerous categorical grants are now available from the federal government, while the state and its subdivisions are responsible for funding certain types of improvements, primarily major access roads and schools. This section will focus exclusively on the federal grant-in-aid programs. Although a number of federal programs which would be applicable to the proposed New Town have been enacted into law, necessary funds for implementing some of them have either not been appropriated by Congress or have been frozen by the administration. In many other cases, funding for active programs is not sufficient to meet the demands of such a massive program as the proposed New Town. During interviews with officials of the various grantor agencies, many of them expressed concern that meeting their obligations on such a massive project as the New Town would require diverting funds from other areas of the Navajo Reservation, which may not be acceptable to the Tribe. The necessary applications must be instituted immediately to have any chance of obtaining these funds.

Necessary Conditions: It is recommended that Congress provide total project legislation, authority, and funding for the New Town. This legislation would be similar to that enacted for the Navajo Indian Irrigation Project. Since this legislation would be in the national interest, it should provide funding for 100% of the infrastructure and public facilities capital costs that would not be met by the state or its local subdivisions.

Desirable Conditions: If the total project legislation is not possible, it is suggested that an Integrated Grant Program be formulated under the new Joint Funding Simplification Act. Such a program would utilize existing categorical grants but would be administered by a single agency such as:

- o Federal Energy Administration.
- o Department of the Interior (Bureau of Indian Affairs).
- o Department of Housing and Urban Development.
- o Energy Research and Development Administration.
- o Economic Development Administration.

In order to receive maximum support from the existing categorical grants, additional funds would have to be appropriated by Congress. Even under such integrated programs, the Development Entity would still be required to negotiate with the numerous grantor agencies in order to obtain funds.

Alternatives: It would, of course, be possible to obtain grants-in-aid from existing categorical grant programs through the numerous grantor agencies. However, it is virtually certain that the maximum amount of grant-in-aid assistance could not be obtained utilizing this approach because a number of existing categorical grant programs are not adequately funded to meet the needs of a project such as the New Town. In addition, each of the categorical grant programs has separate application requirements, review procedures and time limitations. The complexities of this procedure would greatly limit the amount of funds that could be expected from such an approach, and the time required to prepare and process the numerous applications could place the feasibility of the entire New Town Project in jeopardy.

5.2 BONDS

Existing Conditions: The Navajo Tribe now has the authority to issue bonds (either revenue or general obligation). However, any such bond issues would not be tax exempt under the current laws.

Necessary Conditions: Legislation giving the Tribe and/or the Development Entity authority to issue tax exempt bonds is required. This provision could be incorporated as a part of the total project legislation previously discussed. The ideal means of accomplishing this would be to have the Development Entity chartered by Congress as a corporation with authority to issue tax exempt bonds for the construction of the entire New Town. These bonds would be repaid through taxes and/or lease payments for the land and/or improvements. Under these conditions, the bonds could be guaranteed by the United States Government or the participants in the Development Entity or both as shown in Part IV. U.S. Government guarantees are required to obtain a satisfactory interest rate.

5.2.1 TAXES

Existing Conditions: The Tribe has the authority to levy and collect taxes within the Reservation. The Tribal Council, by resolution, has established a tax commission, but no further steps have been taken in implementing a taxing program.

Necessary Conditions: The Tribe must adopt and implement a form of property taxes in order to retire the bonds that finance the construction of the infrastructure in public facilities. Since the Navajo Tribe has not previously issued such tax exempt bonds and the bonds cannot be secured with the land due to its federal trust status, the bond holders will require that the bonds be guaranteed. If the total project legislation as previously discussed can be obtained, the ideal guarantor would be the United States Government. In lieu of this, it will be necessary for the Development Entity, and its participants, to guarantee these bonds. The Navajo Tribe could pledge the new income that it will derive from the coal mine royalties and the income from the business site leases issued for the construction of the gasification plants (see Appendix B). The coal gasification companies, as participants in the Development Entity, will also be required to act as guarantor of the bonds. Tax exempt bonds of the type described here usually carry a clause requiring a substantial premium for early redemption (for a period of ten years).

5.3 MORTGAGE FINANCING

Existing Conditions: While it is not possible to mortgage the land on an Indian Reservation, because of its federal trust status, it is possible to mortgage the leasehold interest in the land. It is also possible to mortgage the improvements placed on leased land on an Indian Reservation.

Security for the loan is always the first criterion a mortgage lender requires when evaluating a mortgage application. The inability to subordinate the land to a mortgage loan has always been a major constraint to development on an Indian Reservation. Another major constraint has been the mortgage lender's reluctance to accept the Tribal court as the court of competent jurisdiction for foreclosure proceedings. An alternate means of securing a debt has recently become available on the Navajo Reservation. This is a "deed of trust" accompanied by a title insurance policy guaranteeing the title to the leasehold interest. Under a deed of trust arrangement, it is not necessary to institute court proceedings to foreclose due to default on the payments. All that is required under the law is to post the property in question and give ninety days' legal notice, and then the trustee is free to sell the leasehold interest and improvements. Under this arrangement, the Federal National Mortgage Corporation and the Government National Mortgage Corporation have agreed to buy the mortgages (deeds of trust) issued by a savings and loan or other lender. This procedure will greatly increase the availability of money to finance construction on the Navajo Indian Reservation.

Necessary Conditions: In order to obtain mortgage financing for the construction of housing and other improvements, it will probably be necessary to utilize the deed of trust procedure. The exact form that such a deed of trust would take if the Development Entity remains the owner of a leasehold interest and its improvements must be determined. Without this form of security, it would be extremely difficult, if not impossible, to obtain the necessary financing for the construction of housing and other improvements within the New Town.

In order to provide more security for the lender, it is recommended that a voluntary program of payroll withholding for mortgage (deed of trust) payments or rental payments be instituted within the New Town. The Tribal Council has recently passed a resolution authorizing such a program, and it is recommended that it be utilized to the widest extent possible within the New Town.

Desirable Conditions: The lenders would prefer, and may insist that the Development Entity, through its participants, guarantee the mortgage (deed of trust) payments. It will be possible, in many cases, to obtain mortgage guarantee insurance through several federal agencies such as the Federal Housing Administration, the Veterans Administration, Indian Financing Act of 1974, and the Farmers Home Administration. In some cases it may also be possible to obtain subsidy payments through the same agencies for low income families.

STEP 6 - DESIGN

Existing Conditions: The information presented in this study, the DRA study and others constitutes a preliminary program for the design of the New Town and its improvements. The New Town should incorporate all of the latest advances in urban design and construction, but at the same time must reflect its unique nature and be sensitive to the needs and desires of the Navajo people.

Necessary Conditions: The Development Entity must contract for professional services for the design of the infrastructure and buildings, both on-site and off-site. These design services may be provided by a number of different firms, but their work must be consistent with the design intent of the Master Plan. As suggested previously, the Master Plan Team and the staff of the Development Entity should act as a Design Review Board, thus insuring conformation to design intent for all of the improvements within the New Town.

An added level of protection for the residents of the New Town and the lender would be deed restrictions to be included in the sublease agreements. It is recommended that such deed restrictions be prepared by the Master Plan Team and be complimentary to, not in conflict with, the land use controls and construction codes adopted to govern the development of the New Town.

STEP 7 - CONSTRUCTION MANAGEMENT

Existing Conditions: Since the Development Entity has not been formed, no construction management services have been employed.

Necessary Conditions: In order to accomplish the tremendous amount of work that will be required in such a short period of time, it is recommended that the Development Entity immediately employ a qualified construction manager to administer the construction work, both on-site and off-site, for the entire project. The actual construction work will undoubtedly be accomplished by a number of separate contractors and subcontractors. The construction manager would participate in the design of the New Town and would be responsible for scheduling and coordinating the work of these numerous other contractors in order to insure a timely completion of the project in accordance with the design and intent established by the Master Plan.

Alternatives: The Development Entity could act as its own construction manager for the project. This would require the Development Entity to employ a large staff of experienced people, and it may be impossible to assemble and train such a staff in the time required. The Development Entity would be "owner" of the New Town and should commit its resources and energy to developing the overall policy and direction for the New Town rather than diluting its attention by becoming involved in the construction management process.

STEP 8 - OPERATION AND MANAGEMENT OF THE NEW TOWN

8.1 AUTHORITY

Existing Conditions: Several agencies of the Navajo Tribe now have the authority to carry out certain functions required for operation and management of the New Town, i.e., the NTUA for utilities, Tribal police for police protection, etc. However, there will be numerous other activities required for the ongoing operation and management of the New Town. One of the most important of these is the authority to levy and collect taxes to support the operation and management of the New Town.

Necessary Conditions: A town Management Entity capable of providing normal municipal services will be required. This entity must have the authority to:

- o Employ professional management.
- o Contract for services such as police protection from the Navajo Tribal Police, etc.
- o Provide all remaining municipal services as required.
- o Impose and collect taxes within the town site or have the Tribe impose and collect taxes and return the money to the Management Entity.

In the early stages of the New Town, these management and operation services will probably be provided by the Development Entity. However, ultimately the primary role of the Development Entity (construction of the New Town) will be completed and an entity must be created to provide the ongoing operation and management services. Provisions for this entity must be included in the New Town and Development Entity's charters.

During the initial phases of the development of the New Town, the mortgage lenders will probably require the continued participation of the Development Entity and its participating organizations in the operation and management of the New Town.

Desirable Conditions: In order to insure the quality of the environment of the New Town, over the long term, it is desirable that the Development and/or Operation and Management Entity have authority to establish and enforce maintenance standards for all improvements within the New Town. This could be accomplished by giving the Management Entity the authority to maintain all public and common areas within the New Town similar to the authority of a Homeowners Improvement Association in a condominium development.

8.2 LOCAL GOVERNMENT

Existing Conditions: The Development Entity, by virtue of its master lease from the Navajo Tribe, will have control of the entire town site.

Necessary Conditions: As the New Town reaches a stable state and is populated by permanent residents, a local unit of home rule government (municipal type) must be formed and controlled by the residents of the town. Unless the residents of the town (including the non-Navajos) are given a voice in controlling their own destiny, they will become dissatisfied and move to other locations whenever possible. The long term viability of the town will dictate that its residents eventually have some form of self-government. It will be possible to establish limits on the degree of self-government to be obtained by the New Town residents in the original master lease and charter issued by the Navajo Tribal Council. However, great care must be taken to not make these conditions too restrictive.

Alternatives: An alternative to some form of self-government by the New Town would be permanent Tribal control. This would likely be detrimental to the long term stability of the town and thus undermine the primary goal of the Navajo Tribe of economic betterment for its people.

8.3 LEGAL STATUS OF NEW TOWN GOVERNMENT

Existing Conditions: No town or local unit of government has been incorporated or chartered on the Navajo Indian Reservation.

Necessary Conditions: In order to achieve some degree of self-government, the New Town should be chartered by the Tribe and/or the federal government. The terms of such a charter should be thoroughly researched at the earliest possible date so that its provisions can be incorporated in the master lease from the Tribe to the Development Entity.

Alternatives: The New Town could be incorporated under the laws of the State of New Mexico. However, to this date the Tribal Council has been reluctant to approve incorporation of towns on the Reservation. Therefore, this is probably not a viable alternative.

The alternative would apply if no charter for the New Town government were given by the Navajo Tribal Council. In this case, the operation and management activities described above would be carried out by the Development Entity. Under these circumstances, the New Town would be a "Company Town." Such a "Company Town" would not have the same connotations as a town built, owned, and operated by a single company because of the broader base of the Development Entity; but some of the problems associated with a "Company Town" would still exist.

CONCLUSION

Given the premises and conditions shown in this report, the Study Team's opinion is that a New Town is feasible as well as desirable. It is now up to the potential Development Entity participants to study these conditions and determine whether they can accept them. If all parties agree to proceed, the actions listed in this Part V must be initiated immediately. To delay could result in missing this unique opportunity to expand the economic base of the Navajo Nation.

FOOTNOTES

GENERAL SUMMARY

(1) Martin J. Wistisen, Robert J. Parsons, and Annette Larsen, *A Study to Identify Potentially Feasible Small Businesses for the Navajo Nation* (Brigham Young University, Provo, Utah, 1975) – hereafter cited as *Study*.

(2) *Ibid.*, p. 143.

(3) Ibid., p. 94.

PART I

(1) Martin J. Wistisen et al., *Study*, pp. 29, 134, 138.

GENERAL NOTE: Major portions of this Part I were excerpted from the report titled *Housing and Community Services* prepared by Development Research Associates and Gruen Associates, April 1974.

PART II

(1) Martin J. Wistisen et al., *Study*, p. 94.

(2) *Housing and Community Services*, p. II-2.

GENERAL NOTE: Major portions of this Part II were excerpted from the report titled *Housing and Community Services* prepared by Development Research Associates and Gruen Associates, April 1974.

PART III

(1) Data supplied by WESCO.

(2) WESCO numbers only are used here for simplicity. Corresponding numbers for El Paso are: one plant = 935, and attendant mine = 299.

(3) Development Research Associates and Gruen Associates, *Housing and Community Services* (no place of publication, April 1974), p. III-23.

PART IV

(1) Martin J. Wistisen et al., *Study*, pp. 48, 49.

(2) *Ibid.*, p. 94.

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Appendix A

MEMORANDUM

TO: Study Team

FROM: Edward T. Maloney
A. G. Becker & Company Municipal Securities, Inc.

RE: **City Tax Base**

Revenue generated by an ad valorem tax placed upon the leasehold interest of the New Town will prove to be a valuable source of funds. These funds can be applied to the amortization of the debt incurred by the Development Entity for the construction of the Infrastructure and Public Facilities. It is questionable whether an outside entity, the state or county government, can impose taxes upon leaseholds found on the Navajo Reservation. However, we shall assume that the Tribe has the authority to create a "special assessment district" which can impose taxes in order that the improvement debt can be retired. This special assessment district may be the New Town or may be structured along the line of a utility district or improvement district.

It appears that whatever form the Development Entity takes, it must have the power to impose an ad valorem leasehold tax. This position has been taken for several reasons. First, the investment community, when it evaluates a particular bond issue, prefers that the agency which issues the bonds also has the power to raise sufficient funds to retire the outstanding debt. In other words, it is very desirable for the Development Entity as issuer, since it is ultimately responsible for repayment of all principle and interest, to have the authority to generate sufficient funds to meet its obligations. Dependence upon coal royalties as a source of funds provides an intriguing alternative. Nevertheless, this alternative, because the gasification companies set the levels for coal production, takes away the Development Entity's power to assure the necessary flow of funds. Second, a steady, predictable flow of funds provides for a more attractive credit than a volatile flow of funds. Coal royalties may fluctuate from year to year because the amount of coal extracted in any given year will depend upon such factors as general economic conditions, the demand for synthetic gas, and internal business decisions of the gasification companies. This fluctuation increases the probability the revenues may not be sufficient in a given year to meet debt service requirements and fund required capital reserves. I should like to point out that the Development Entity I refer to will be limited to the development of the Public Facilities and Infrastructure. Other construction projects may be managed by an entity other than the entity to which I referred.

It appears, upon initial review, that the Tribe is not restricted in the nature of its leasehold tax. Nevertheless, we shall assume that the Tribe shall structure its leasehold tax according to the format used by the City of Farmington, New Mexico. Farmington's property tax rate in 1973 was \$7.40 per \$1,000.00 of the assessed valuation. The City of Farmington currently assesses property at \$5.00 per 1,000.00 of the assessed valuation for the amortization of debt. The remainder of the \$7.40 of property tax is applied toward current operations. Again, it is important to know that the Tribe could establish a higher leasehold tax rate. Nevertheless, tax rates which are substantially higher may place the New Town vis-a-vis Farmington in an uncompetitive position. A fledgling town, if it is to attract new residents and business, must not provide such tax disincentives.

The credit of the bonds issued to finance the construction of the Infrastructure and Public Facilities ultimately rests upon the credit of the coal gasification companies when the plants are included in the tax base. The coal gasification plants account for a major proportion of the taxable wealth within the assessment district. The Study Team's data indicates that of a total district assessed valuation in Set 1 of $353,013,000, the coal gasification plants account for $333,000,000 (or 94%) or that sum. The data further suggests that in Set 2 the total district assessed valuation equals $1,418,486,000 and that the gasification plants account for $1,320,000,000 (or 93%) of that sum. The gasification plants also will account for a primary share of the income generated within the community. For these reasons, plus the fact that the Navajo Tribe is an unknown entity for credit rating purposes, this suggests that we can assign a credit rating of BB for industrial bonds and BBB for tax exempt bonds.

Given these conditions, you will find in the following summary that the Development Entity could hope to issue under Set 1, $17,492,000 of tax exempt bonds and $14,299,000 of industrial bonds, and under Set 2, $70,290,000 of tax exempt bonds or $57,430,000 of industrial bonds.

The Tribe must establish certain conditions before the projected financing can take place. These conditions can be listed as follows:

- That a Development Corporation be created and chartered under the State of New Mexico.
- That there be agreement to litigate any conflicts or contractual disagreements with creditors in the State of New Mexico or U. S. Federal Court System.
- That the Development Corporation be permitted to build, operate, and maintain Public Facilities and Infrastructure on leased Navajo soil.
- That the Development Corporation be permitted to impose ad valorem leasehold taxes upon all subleases within the New Town.
- That the Development Corporation be permitted to issue tax exempt general obligation and revenue bonds.
- That the Development Entity be granted the right to pledge without limitation tax revenues for the retirement of the general obligations of the entity.
- That the entity be granted the right to sublease property within the New Town.
- That the need for special enabling legislation from the State of New Mexico be investigated in more detail.
- That the need for special enabling legislation from the Congress of the United States, because of the trust status of the Reservation, be investigated in more detail.

Table A-1

TAX BASE

	Set 1 ($1,000)	Set 2 ($1,000)
Market Value		
Housing	$ 44,130	$ 193,460
Commercial	13,300	52,770
Land Value (1)	12,306	52,213
Subtotal - Town	$ 69,736	$ 298,443
Plants/Mines	1,000,000	4,000,000
Total District	$1,069,736	$4,298,443
Assessed Valuation (@ 33%)		
Town	$ 23,013	$ 98,486
Total District	$ 353,013	$1,418,486
Annual Bond Tax Potential (@ $5.00)		
Town	$ 115	$ 492
Total District	$ 1,765	$ 7,092
Total Bonds Supportable		
Tax exempt bonds:		
Town (2)	$ 1,140	$ 4,876
Total District (2)	$ 17,492	$ 70,290
Taxable bonds:		
Town (3)	$ 932	$ 3,986
Total District (3)	$ 14,299	$ 57,450

(1) A leasehold value was assigned equal to that portion of the Infrastructure and Public Facilities capital cots that were not covered by grants-in-aid.

(2) Assume 30-year tax free bonds @ 9-1/2%.

(3) Assume 30-year industrial bonds @ 12%.

Appendix B

MEMORANDUM

TO: Study Team

FROM: Jerry Ross and Bill Fletcher
White, Weld & Company

RE: **Bond Financing for Navajo New Town**

In analyzing any form of financing, the lender looks for two things: (1) security for the debt, and (2) an assured method of repayment. In order to utilize tax exempt bond financing for construction of the Navajo New Town, potential bond purchasers will have to be satisfied on both of these counts. Federal government guarantees of the bonds would, of course, be the ideal situation. If it is not possible to secure federal guarantees for the bonds, the Development Entity, through its participants must guarantee them. This can be done in the following manner:

1. Identify an income stream that the bond holder is confident will be continuous. The most likely income stream to satisfy these requirements would be the coal royalties and business site lease payments that will be paid to the Navajo Tribe by the coal gasification companies.

2. This income stream must then be "trapped" through an off-Reservation trust, possibly through the Bureau of Indian Affairs. The bond holders will not rely on payment of leases from occupants of the New Town for repayment of the bonds. It will be necessary for the income stream to be placed in this off-Reservation trust fund with the bonds having first lien on the trust fund. Debt service for the bonds would be made from the trust fund by the trustee directly to the bond holder. Any lease income received by the Development Entity from the occupants of the New Town would then be transferred to the Tribe to replace the income stream that has been placed in the trust fund. This is similar to the procedure used for mass transit bond issues. The trust fund would be required to hold a reserve fund equal to one year's debt service.

The formation of the Development Entity raises the problem of identifying the responsible party. Since the Navajo Tribe is an unknown quantity in the financial market, the coal gasification companies would have to hold a majority of interest in the Development Entity.

Non-profit corporations are not well defined under current law and therefore, the bond holders will be reluctant to accept such bonds without the backup guarantee of the Development Entity participants. The law is much better defined to provide security to lenders in a "for profit corporation" or a municipal corporation. It would be much easier to market the bonds if the New Town were incorporated under the laws of the State of New Mexico.

There is a limited market for bonds in the New Mexico/Arizona region. If the bond issue is so large that it would absorb the entire capital in the regional market in a single year, the issue would have to be marketed nationally. This would result in a slight increase in the interest rate if the bond issue has to be marketed nationally rather than regionally.

If the bond issue could be guaranteed as outlined above, it would be reasonable to give it an A or BBB rating. This would result in an interest rate of 7-1/2% to 8% for A rated tax exempt bonds and 9% to 9-1/2% for BBB rated tax exempt bonds. Corporate bonds (not tax exempt) would bring a rate of 9-1/4% to 9-1/2% for A rated bonds and 10-1/4% to 10-1/2% for BBB rated bonds.

Current IRS policy is to discourage issuance of tax exempt bonds. IRS prefers to make all bonds taxable and then subsidize the difference in interest rates. To date, this policy has not received strong support in Congress.

Summarized by G. Robert Eubanks from notes of telephone conversations with Jerry Ross and Bill Fletcher.

BNC
BOSTON NATIONAL CORPORATION
250 BOYLSTON STREET
BOSTON, MASSACHUSETTS 02116
617 262-9550

July 11, 1975

Mr. Robert Eubanks
Guirey, Srnka, Arnold & Sprinkle, Architects
3122 North 3rd Avenue
Phoenix, Arizona 85013

Dear Mr. Eubanks:

After studying the information you sent me pertinent to the proposed Navajo New Town, and at such time a full commitment for a New Town exists and a Development Entity is formulated, I recommend that a simple approach should be directed towards conventional construction financing.

In order to assure that housing will be available in the New Town for the employees of the various companies, the Development Entity will enter into purchase agreements and rental agreements with Morrison-Knutsen Company (borrower) for housing. The purchase agreements will provide for specific dwelling units to be built on specific building sites to be delivered within a specified period of time at pre-determined prices and will include the following conditions:

- Development Entity or its assignee will have an option to purchase the dwelling units specified in the purchase agreement for a period of 30 days after the date of completion of each dwelling unit that is constructed for sale.

- If Development Entity or its assignee does not exercise its option to purchase the dwelling unit within the specified 30 day period, (builder-borrower) will place the dwelling unit on the open market for sale and (builder-borrower) will aggressively market the dwelling unit.

- If the dwelling unit does not sell within 60 days from the date it is placed on the open market, (builder-borrower) may, at his option, request the Development Entity or assignee purchase the dwelling unit at the original option price specified in the purchase agreement and the Development Entity or assignee will be obligated to purchase the dwelling unit.

Mr. Robert Eubanks
July 10, 1975
Page 2

The Development Entity will also enter into lease agreements for rental apartment units or guarantee the rental on the apartment units.

It is understandable that in order for the guarantee to be strong and credible to the eyes of the short term loan construction lender, the credit and financial clout of the Development Entity will have to be within a very large aggregate sum, as the strength of Exxon Corporation and some of its subsidiaries.

If the Development Entity does not have the initial financial strength, then I say that the credit of the U.S. Government through some existing act or grant or a form of new legislation will probably be necessary to guarantee the construction lender an "absolute take-out" of the loan upon completion of construction.

The following list of documents is typical of what should be demanded from a national lender to close a loan commitment:

1. Bank Commitment acceptance
2. Fire insurance - flood insurance, if required
3. Signed mortgage note
4. Mortgage trust deed
5. Title Insurance policy
6. Construction loan agreement and cost breakdown
7. Assignment of leases and rents
8. Acknowledgment and agreement from Development Entity
9. Purchase agreements (Development Entity/builder-borrower)
10. Rental guaranty agreements
11. Survey
12. Plans & Specifications
13. Building permits
14. Evidence of availability of utilities and municipal service
15. Evidence of proper zoning and compliance with laws
16. Insurance certificate (liability)
17. Schedule relating to single-family units, apartments and other improvements
18. Certified resolutions of borrower's Board of Directors
19. Opinion of borrower's counsel
20. Opinion of General Counsel to the Navajo Tribe
21. Opinion of State Counsel
22. Evidence that the purchase agreements and rental guaranty agreements are in full force and effect
23. Direction for disbursement of proceeds of initial advance.

BOSTON NATIONAL CORPORATION

Mr. Robert Eubanks
July 10, 1975
Page 3

Enclosed you will find a hypothetical example of how I believe a typical mortgage loan commitment would look like in today's market.

I sincerely hope that the contents of this letter serves as some help in your endeavor to reach final success of the Navajo New Town development.

Sincerely,

Raymond Thibault

Raymond Thibault

RT:jw

BOSTON NATIONAL CORPORATION

Gentlemen:

We ("Bank") are pleased to advise you("Borrower") that Bank will, subject to the terms and conditions set forth in this letter of commitment, make to Borrower a construction mortgage loan (the "Loan") in the maximum aggregate principal amount of $, of which amount (a) $ (the "Single Family Portion") will be applied by Borrower to defray the cost of construction of 160 single family dwelling units (the "Single Family Units") on certain property (the "Mortgaged Premises") to be acquired by Borrower, located in the City of and containing approximately acres and (b) $ (the "Apartment Portion") will be applied by Borrower to defray the cost of construction on the Mortgaged Premises of garden apartment buildings (the "Apartments") containing units. The Single Family Units and the Apartments, together with all improvements on the Mortgaged Premises incidental thereto, are hereinafter sometimes collectively called the "Improvements."

This commitment is issued subject to (i) statutory and other requirements by which we as a national banking association are governed; (ii) inspection and approval by us of the Mortgaged Premises and the Improvements and approval by us of the feasibility of the project; (iii) an acceptable appraisal of the Apartments by an MAI appraiser acceptable to Bank; (iv) compliance with all of the provisions, hereof; and (v) the following terms and conditions:

(1) Amount of the Loan: Not to exceed $.

(2) Rate of Interest: The greater from time to time of (a) during the first 18 months of the term of the Loan, 2%, and thereafter, 3%, above the prime rate of interest on new 90-day loans to commercial borrowers of substantial size and highest credit standing in effect at Bank from time to time, or (b) during the first 18 months of the term of the Loan, 2%, and thereafter, 3%, above the latest three-week moving average interest rate payable on 90-to-119 day dealer placed commercial paper as published by the Federal Reserve Bank of New York or, if said publication shall be suspended or terminated, such three-week moving average interest rate determined by Bank on the basis of quotations received by Bank from three New York commercial paper dealers of recognized standing. A determination of the interest rate from time to time in effect shall be made on the Closing Date (as hereinafter defined) and on the last business day of each month thereafter until payment in full of the Loan. The interest rate so determined on the last business day of each month shall become effective on the first day of the month following the date of such determination and shall remain in effect until the effective date of the next determination.

(3) Terms of Payment: Interest at the rate specified at (2) above on outstanding balances of principal payable on the first day of each month after the date of closing of the Loan (which closing is herein called the "Closing" and which date is herein called the "Closing Date") and at the time of payment in full of the loan.

(4) Maturity:

(a) As to the Single Family Portion, the first day of the 19th month following the Closing Date; and

(b) as to the Apartment Portion, the day preceding the fifth anniversary of the Closing Date.

(4) (A) Prepayment:

(a) Borrower shall have the privilege to prepay the Loan in whole or in part on any interest payment date without payment of premium or penalty; and

(b) Borrower shall pay to Bank annually on the first day of the 14th, 26th, 38th and 50th month following the Closing Date an amount equal to all net income of Borrower for each year from the Closing Date from the Apartments for the preceding period commencing on the Closing Date and on each anniversary thereof, which amount shall be applied to principal reduction and which net income shall be computed in accordance with generally accepted accounting principles consistently applied. In addition Borrower will on or prior to the first day of the 14th month following the Closing Date and semi-annually thereafter during the term of the Lease furnish to Bank operating statements (income and expenses) relating to the operation of the Apartments.

(5) Security:

(a) A first lien mortgage (the "Mortgage") in the amount of the Loan covering the Mortgaged Premises and the Improvements;

(b) a prior perfected security interest in all goods and chattels now or hereafter owned by Borrower and now or hereafter located on the Mortgaged Premises and used or intended for use in connection with the operation of the Improvements, together with all additions thereto, replacements thereof and substitutions therefor;

(c) assignments to Bank of all existing and future leases of space in the Mortgaged Premises and the Improvements and all rentals and other monies due and to become due under said leases;

(d) paramount assignments by Borrower to Bank of Purchase Agreements in form and content satisfactory to Bank and a prior perfected security interest in and to all of Borrower's contract rights, accounts and proceeds arising under said Purchase Agreements, which Purchase Agreements will in the aggregate provide that all Single Family Units will be sold by Borrower to and be purchased by (Development Entity Participants) the obligations of which will be unconditionally and irrevocably guaranteed by the parent company named above) (all of the foregoing companies and subsidiaries are hereinafter called the "Companies") for net prices to Borrower at least equal to the Single Family Portion; and

(e) paramount assignments by Borrower to Bank of Rental Guarantee Agreements in form and content satisfactory to Bank and a prior perfected security interest in and to all of Borrower's contract rights, accounts and proceeds arising under said Rental Guarantee Agreements, which Rental Guarantee Agreements will in the aggregate provide that the Companies, or any one or more of them, will rent and/or guarantee rental payments on all of the Apartments, which rentals shall be subject to approval by Bank.

(6) Construction Loan Service Charge and Commitment Fee: Borrower shall pay to Bank the sum of $ as a construction loan service charge and commitment fee, of which $ shall be paid concurrently with acceptance hereof and the remainder shall be paid at the Closing. Said fee shall not be subject to reduction and shall not be refundable, except as set forth in paragraph (14) hereof.

(7) Loan Documents, etc.: The Loan will be evidenced by Borrower's Note in the amount of $ secured as aforesaid and made pursuant to the provisions of a Construction Loan Agreement between Bank and Borrower. All instruments, documents and other items required in connection herewith and in connection with the Loan shall be designated by and shall be prepared or approved by Bank or by counsel selected by Bank. All Loan documents shall be executed and delivered in the and the Note and Construction Loan Agreement shall specifically provide that the laws of the shall apply thereto.

(8) Title to the Premises: On the Closing Date marketable fee simple title to the Mortgaged Premises and the Improvements shall be held by Borrower and shall be free and clear of all liens and encumbrances (except the lien of the Mortgage and the subordinate lien of a second mortgage in the amount of $ to easements, restrictions, conditions, reservations, exceptions and other matters, except such as are approved by Bank.

(9) Items to be Supplied: Borrower will at least ten days prior to the Closing Date (unless otherwise set forth below) furnish the following to Bank at Borrower's own cost and expense:

(a) a survey of the Mortgaged Premises with the signature and seal of a registered engineer or surveyor affixed showing all easements affecting the Mortgaged Premises and other matters apparent thereon, the relation of the Mortgaged Premises to public thoroughfares for access purposes and the proposed location of the Improvements. (Similar surveys shall be furnished after the actual location of the Improvements is established and after completion of the Improvements);

(b) A legal description of the Mortgaged Premises compatible with the above-mentioned survey and sufficient for the purpose of the Mortgage;

(c) complete plans and specifications for the Improvements (including all working drawings) approved and signed for identification purposes on behalf of Bank, Borrower and to the extent required by Bank, the Companies (which plans and specifications as so approved and signed are hereinafter called the "Plans");

(d) evidence of (i) satisfactory zoning of the Mortgaged Premises for the Improvements, (ii) the availability of all necessary permits, licenses and approvals to construct, occupy and operate the Improvements, and (iii) proof of the availability of all utility and municipal services required for construction and operation of the Improvements;

(e) evidence in such form as Bank may reasonably require that all types of hazard insurance available with respect to the Improvements and public liability and property damage insurance with respect to the Mortgaged Premises and Improvements are in force and will continue in force so long as borrowings on account of the Loan are outstanding;

(f) a preliminary report of title or title binder issued by a title insurance company acceptable to Bank, pursuant to which said title insurance company will issue to Bank, a policy of title insurance insuring the Mortgage in the principal sum thereof, and such portion thereof as has been advanced from time to time, as a first lien upon the Mortgaged Premises and the Improvements, containing no exceptions for unfiled mechanics liens or similar claims, subject only to such exceptions as may be approved in writing by Bank;

(g) a breakdown certified to the true and correct by Borrower setting forth in such detail as Bank may reasonably require, the cost for each class of work included in the cost of construction of the Improvements;

(h) a complete breakdown in form, scope and content acceptable to Bank (the "Cost Certificate") of Borrower's estimate of all costs of acquisition of the Mortgaged Premises, financing costs, construction costs and other items of cost incidental to the construction of the Improvements, the acquisition of the Mortgaged Premises and the financing thereof, which breakdown shall be certified by Borrower and shall be incorporated into the Construction Loan Agreement as the basis upon which advances thereunder shall be made;

(i) a schedule in form, scope and content acceptable to Bank and certified by Borrower to be true and correct, setting forth the precise type of each of the Single Family Units, with an appropriate designation thereof, and the lot within the Mortgaged Premises upon which such Single Family Unit will be constructed; said schedule will also set forth inter alia with respect to each such Single Family Unit (i) the minimum sales price ("Base Price") at which each such Single Family Unit will be sold pursuant to the aforesaid Purchase Agreements, and (ii) the amount for which Bank will release each such Unit from the lien of the Mortgage, which amount is herein called the "Release Price" and shall be computed by multiplying the Base Price by 95%. Bank recognizes that pursuant to the Purchase Agreements the Base Price and therefore the "Release Price" may be adjusted with respect to the "Phase II" portion of the Single Family Units;

(j) [i] a certified copy of the Articles of Incorporation, as amended, of Borrower; [ii] certificates of the Secretary of State of the state of Borrower's incorporation evidencing that Borrower is in good standing and validly subsisting under the laws of the state of Borrower's incorporation; [iii] a certificate of the Secretary of the State of evidencing that Borrower is duly registered and authorized to do business in and is in good standing under the laws of the State of [iv] a certificate of incumbency as to each of the officers of Borrower who will sign the Loan documents, together with specimen signatures of each such officer; [v] a certified copy of resolutions of the Board of Directors of Borrower authorizing the acceptance hereof and borrowings hereunder and the execution and delivery of all documents called for herein or necessary or appropriate for the purpose hereof; and [iv] an opinion of counsel for Borrower to Bank, satisfactory in form and scope to Bank, to the effect that Borrower is duly incorporated, validly subsisting and in good standing under the laws of the state of its incorporation, is in good standing, validly subsisting and duly authorized to do business in and under the laws of the State and that all documents executed in connection with the Loan by Borrower have been duly executed and are valid, binding and enforceable in accordance with the respective terms of each;

(k) evidence satisfactory to Bank that the Purchase Agreements and the Rental Guarantee Agreements referred to in paragraph (5) of this commitment have been modified in a manner acceptable to Bank and as so modified are in full force and effect and have been duly executed by and are valid and binding upon, and legally enforceable against the Companies and Borrower; and

(l) assurance, in form and scope satisfactory to Bank, that the Companies will grant extensions of time acceptable to Bank with respect to commencement and completion of construction of the Improvements by Borrower for purposes of the aforesaid Purchase Agreements and Rental Guarantee Agreements.

(10) Construction of the Improvements: The Improvements shall be constructed on the Mortgaged Premises by Borrower in accordance with the Plans. No changes in the Improvements or in the Plans shall be effective unless approved in writing by Bank and the appropriate Companies.

(11) Borrowing Procedure: Borrower may borrow on account of the Loan not more frequently than once each month. All applications for borrowings on account of the Loan shall be submitted in such form and shall set forth such information as Bank may reasonable require. The proceeds of such borrowings will be credited to Borrower's account with Bank. Each borrowing application shall contain, inter alia, a certification by Borrower and an architect or a consulting engineer approved by Bank and the Companies to the effect that the progress of construction is in accordance with the Plans and is such that the Improvements will be completed within 18 months following the Closing Date. Prior to the Closing, the Companies shall agree in writing that the certificate of completion issued by such architect or engineer with respect to the Improvements or any part thereof shall be conclusive evidence of completion of the Improvements or such part thereof under the Purchase Agreements and the Rental Guarantee Agreements.

(12) Borrowing Limitations: (a) Borrowings on account of the Apartment Portion shall be limited to the aggregate amount of the Apartment Portion and shall be further limited to (x) the lesser of either, (i) prior to completion of the Apartments 90% of, and after completion 100% of, the actual cost of work and labor done on the Apartments and materials incorporated in the Apartments or suitably stored on the Mortgaged Premises or (ii) prior to completion of the Apartments 90% of, and after completion 100% of, the actual value as determined by Bank of work and labor done on the Apartments and materials incorporated in the Apartments or suitably stored on the Mortgaged Premises plus (y) the costs of acquisition of that portion of the Mortgaged Premises to be occupied by the Apartments; provided, however, that at all times the unborrowed balance of the Apartment Portion shall be sufficient to fully pay the costs of completing construction of the Apartments in accordance with the Plans within 18 months following the Closing Date;

(b) Borrowings on account of the Single Family Portion shall be limited to the aggregate amount of the Single Family Portion and shall be further limited with respect to each of the Single Family Units to the following percentages of the Release Price based on the stage of completion of construction of such Single Family Unit:

(i) 10% when foundation is completed;

(ii) 20% when dwelling is raised, sheathed and under rough roof;

(iii) 15% when plumbing, heating and wiring are roughed in;

(iv) 15% when exterior walls and roof are completed;

(v) 15% when drywalls or plastering is completed;

(vi) 15% when cellar floor, furnace, water heater, and all bathroom and kitchen fixtures are installed; and

(vii) 10% upon full completion.

(13) Fees and Expenses: Borrower will pay the fees of Bank's counsel for services in connection herewith and borrowings hereunder and all expenses of Bank relating to matters contemplated herein, including without limitation expenses incurred by Bank in inspecting progress of construction of the Improvements. All items required to be furnished hereunder shall be furnished without cost to Bank.

(14) Special Conditions: As an additional condition precedent to Bank's obligation to disburse the proceeds of the Loan, Borrower shall furnish to Bank at or prior to the Closing Date a favorable opinion satisfactory in form, scope and content to Bank, of counsel satisfactory to Bank, to the effect that (i) the making of the Loan as contemplated herein shall not be deemed to constitute the doing of business by Bank in the State of so as to require Bank to register or otherwise qualify to do business in the State of (ii) that the making of the Loan shall not subject Bank to the payment of any tax or taxes to the State of or any municipal subdivision thereof, and (iii) the transactions contemplated hereby do not violate the usury or other laws of the State of relating to the maximum rate of interest and setting forth such other matters with respect to the laws of the State of as Bank may require in connection with the Loan. If such opinion is not favorable and for that reason the transaction contemplated by this commitment cannot be and is not consummated, Bank's obligations hereunder shall forthwith terminate and Bank will refund to Borrower the paid portion of the construction loan service charge and commitment fee referred to in paragraph (6) hereof, less the fees and expenses referred to in paragraph (13) hereof.

(15)	Sale of Single Family Units:	As each Single Family Unit in the Improvements is sold, Bank will release from the lien of the Mortgage the unit so sold at the time said sale is closed and consummated; provided that, as a condition precedent to the obligation to so release any such unit Borrower will pay to Bank to be applied to reduction of the principal amount of the Loan an amount equal to the Release Price for such unit.
(16)	Brokerage Fees:	Bank shall not be liable in any way for the payment of any brokerage fees or commissions to any broker or other person entitled or claiming to be entitled to same in connection herewith and the transactions contemplated hereby, and Borrower by acceptance hereof agrees to hold Bank harmless on account of all claims for brokerage fees or commissions which may be made in connection with the transaction contemplated hereby.
(17)	Assignment:	Borrower may not assign this commitment or transfer any rights hereunder without the prior written consent of Bank.
(18)	Acceptance of Commitment:	This commitment may be accepted by Borrower by signing the Acceptance of the enclosed duplicate copy hereof in the manner indicated below and by returning said copy hereof to Bank within 14 days of the date hereof, together with the sum of $3,000 on account of the construction loan service charge and commitment fee referred to in paragraph (6) hereof. Unless this commitment is so accepted, the same shall be invalid.
(19)	Breach or Repudiation of Commitment:	Any breach or default by Borrower in the performance of any undertaking hereunder shall constitute an event of default, whereupon Bank may terminate Bank's undertaking to make the Loan. In the event of a breach of this commitment by Borrower, Borrower will pay such fees and expenses of Bank and Bank's counsel as shall be billed to Borrower for fees and expenses actually incurred in connection herewith.
(20)	Termination:	If the Closing does not occur within 60 days from the date hereof, this commitment shall terminate without further liability by Bank to Borrower.
(21)	Place of Closing:	The Closing shall be held and all loan documents shall be executed and delivered at the principal office of Bank in the City of .

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(22) Survival of Provisions: The terms and conditions herein set forth and the covenants and agreements of Borrower hereunder shall survive the Closing.

Very truly yours,

By______________________________
Assistant Mortgage Officer

ACCEPTANCE

Intending to be legally bound, the undersigned hereby accepts the foregoing loan commitment and agrees to perform the undertakings of the undersigned thereunder.

Date:________________ By______________________________
President

Appendix D

EXCERPTS FROM INDIAN FINANCING ACT OF 1974 PUBLIC LAW 93-262

Section 2 - Declaration of Policy. "It is hereby declared to be the policy of Congress to provide capital on a reimbursable basis to help develop and utilize Indian resources, both physical and human, to a point where the Indians will fully exercise responsibility for the utilization and management of their own resources and where they will enjoy a standard of living from their own productive efforts comparable to that enjoyed by non-Indians in neighboring communities."

Section 3 - Definitions. "(e) 'Economic enterprise' means any Indian-owned (as defined by the Secretary of Interior) commercial, industrial or business activity established or organized for the purpose of profit: **Provided,** That such Indian ownership shall constitute not less than 51 per centum of the enterprise."

TITLE I - INDIAN REVOLVING LOAN FUND

This portion of the Act consolidates several existing acts "in order to provide credit that is not now available from private money markets . . . ."

Section 102. "Loans may be made for any purpose which will promote the economic development of (a) the individual Indian borrower, including loans for educational purposes, and (b) the Indian organization and its members including loans by such organizations to other organizations and investments in other organizations regardless of whether they are organizations of Indians: **Provided,** That not more than 50 per centum of loan made to organizations shall be used by such organization for the purpose of making loans to or investments in non-Indian organizations."

Section 104. "Loans shall be for terms that do not exceed thirty years and shall bear interest at (a) a rate determined by the Secretary of Treasury taking into consideration the market yield on municipal bonds: **Provided,** That in no event shall the rate be greater than the rate determined by the Secretary of Treasury taking into consideration the current average yield on outstanding marketable obligations of the United States of comparable maturity, plus (b) such additional charge, if any, toward covering other costs of the program as the Secretary may determine be consistent with its purpose . . . ."

Section 108. "There is authorized to be appropriated, to provide capital and to restore any impairment of capital for the revolving loan fund $50,000,000 exclusive of prior authorizations and appropriations."

TITLE II - LOAN GUARANTEE AND INSURANCE

Section 201. "In order to provide access to private money sources which otherwise would not be available, the Secretary is authorized (a) to guarantee not to exceed 90 per centum of the unpaid principle and interest due on any loan made to any organization of Indians having a form or organization satisfactory to the Secretary, and to individual Indians who are not members of or eligible for membership in an organization which is making loans to its members; and (b) in lieu of such guarantee, to insure loans under an agreement approved by the Secretary whereby the lender will be reimbursed for losses in an amount not to exceed 15 per centum of the aggregate of such loans made by it, but to to exceed 90 per centum of the loss on any one loan."

Section 203. "Loans guaranteed or insured pursuant to this title shall bear interest (exclusive of premium charges for insurance, and service charges, if any) at rates not to exceed such per centum per annum on the principle obligation outstanding as the Secretary determines to be reasonable taking into consideration the range of interest rates prevailing in the private market for similar loans and the risks assumed by the United States."

Section 204. ". . . No loan to an individual Indian may be guaranteed or insured which would cause the total unpaid principle indebtedness to exceed $100,000. No loan to an economic enterprise (as defined in Section 3) in excess of $100,000, or such lower amount as the Secretary may determine to be appropriate, shall be insured unless prior approval of the loan is obtained from the Secretary."

Section 206. "Loans made by any agency or instrumentality of the federal government, or any organization of Indians from funds borrowed from the United States, and loans the interest in which is not included in gross income for the purpose of Chapter 1 of the Internal Revenue Code of 1954, as amended, shall not be eligible for guaranty for insurance hereunder."

Section 210. "The maturity of any loan guaranteed or insured hereunder shall not exceed thirty years."

Section 217. "(a) There is hereby created an Indian Loan Guarantee and Insurance Fund (hereinafter referred to as the 'fund') which shall be available to the Secretary as a revolving fund without fiscal year limitation for carrying out the provisions of this Title.

"(b) The Secretary may use the fund for the purpose of fulfilling the obligations with respect to loans guaranteed or insured under this title, but the aggregate of such loans which are insured or guaranteed by the Secretary shall be limited to $200,000,000."

TITLE III - INTEREST SUBSIDIES AND ADMINISTRATIVE EXPENSES

Section 301. "The Secretary is authorized under such rules and regulations as he may prescribe to pay as an interest subsidy on loans which are guaranteed or insured under the provisions of title II of this Act amounts which are necessary to reduce the rate payable by the borrower to the rate determined under section 104 of the Act."

Section 302. "There are authorized to be appropriated to the Secretary (a) to carry out the provisions of sections 217 and 301 of this Act, such sums to remain available until expended, and (b) for administrative expenses under this Act not to exceed $20,000,000 in each of the fiscal years 1975, 1976, and 1977."

TITLE IV - INDIAN BUSINESS GRANTS

Section 401. "There is established within the Department of Interior the Indian Business Development Program whose purpose is to stimulate and increase Indian entrepreneurship and employment by providing equity capital through nonreimbursable grants made by the Secretary of the Interior to Indians and Indian tribes to establish and expand profit-making Indian-owned economic enterprises on or near Reservations."

Section 402. "(a) No grant in excess of $50,000, or such lower amount as the Secretary may determine to be appropriate, may be made to an Indian or Indian tribe.

"(b) A grant may be made only to an applicant who, in the opinion of the Secretary, is unable to obtain adequate financing for its economic enterprise from other sources: **Provided**, That prior to making any grant under this title, the Secretary shall assure that, where practical, the applicant has reasonably made available for the economic enterprise funds from the applicant's own financial resources.

"(c) No grant may be made to an applicant who is unable to obtain at least 60 per centum of the necessary funds for the economic enterprise from other sources."

Section 403. "There are authorized to be appropriated not to exceed the sum of $10,000,000 for each of the fiscal years 1975, 1976, and 1977 for the purposes of this title."

Appendix E

DETAILED CHARACTERISTICS OF THE TOWN

Escalation Factors

Unit costs used in the DRA report to derive capital costs were escalated from mid-1973 prices (approximate time of preparation of the DRA data) to January 1976 (assumed start date of the first plant). Escalation factors were derived from the Engineering News Record (ENR) Construction Index and the Turner Construction Index, using the one most appropriate for each category of construction. The ENR factor (16%) was applied to the DRA wage rates to derive the income figures used here for industrial workers. Two thirds of this, or 11%, was applied to NAPI and non-base workers, on the premise that wages in these sectors normally lag industrial wages.

INFRASTRUCTURE COSTS
(in Thousands of Dollars)

	Set 1			Set 2	
	Unit Cost	Quantity	Total Cost	Quantity	Total Cost
Roads					
Access		LS	10,000	LS	16,000
Major	$2,900	1,000 AC	2,900	5,000 AC	14,500
Internal	2,100	1,000 AC	2,100	5,000 AC	10,500
Storm Drains	600	1,000 AC	600	5,000 AC	3,000
Water					
Source		LS	1,200	LS	5,000
Distribution	2,100	1,000 AC	2,100	5,000 AC	10,500
Sewage Disposal					
Treatment		LS	1,500	LS	7,500
Collection	1,300	1,000 AC	1,300	5,000 AC	6,500
Electric					
Power Source		LS	2,000	LS	3,000
Distribution	2,000	1,000 AC	2,000	5,000 AC	10,000
Natural Gas					
Source		LS	500	LS	750
Distribution	700	1,000 AC	700	5,000 AC	3,500
Solid Waste Disposal		LS	200		400
Subtotal			27,100		91,150
Design, Field Engineering and Construction Supervision @ 20%			5,420		18,200
TOTAL			32,520		109,350

HOUSING COSTS SUMMARY
(in Thousands of Dollars)

	Set 1	Set 2
Single Family	$33,986	$150,204
Multi-Family	1,947	8,488
Mobile Homes	6,048	25,473
Group Quarters	451	1,852
Subtotal	42,432	186,017
Design @ 4%	1,697	7,441
TOTAL	$44,129	$193,458
Navajo	34,423	141,800
Non-Navajo	9,706	51,658

NAVAJO HOUSING NEEDS & COSTS BREAKDOWN

	Unit Cost $/SF	Unit Area SF	Number of Units Set 1	Number of Units Set 2	Total Cost (1) (in Thousands of Dollars) Set 1	Total Cost (1) (in Thousands of Dollars) Set 2
Single Family						
2 bedrooms	17.50	1,130	290	1,228	5,893	24,284
3 bedrooms	17.50	1,140	401	1,652	9,824	40,474
4 bedrooms	17.50	1,700	329	1,355	9,788	40,312
Subtotal			1,028	4,235	25,505	105,070
Multi-Family						
1 bedroom	22.00	750	32	133	528	2,194
2 bedrooms	22.00	900	51	209	1,010	4,139
Subtotal			83	342	1,538	6,333
Mobile Homes						
Single	11.50	720	213	879	1,764	7,278
Double	11.50	1,000	334	1,375	3,841	15,813
Subtotal			547	2,254	5,605	23,091
Total Households			1,658	6,831	32,648	134,494
Group Quarters	17.50	230	112	460	451	1,852
TOTAL			1,770	7,291	33,099	136,346

(1) Design Fees are not included

NON-NAVAJO HOUSING NEEDS & COSTS BREAKDOWN

	Unit Cost	Unit Area	Number of Units		Total Cost (1) (in Thousands of Dollars)	
	$/SF	SF	Set 1	Set 2	Set 1	Set 2
Single Family						
2 bedrooms	17.50	1,130	227	1,209	4,489	23,908
3 bedrooms	17.50	1,140	135	717	3,308	17,567
4 bedrooms	17.50	1,700	23	123	684	3,659
Subtotal			385	2,049	8,481	45,134
Multi-Family						
1 bedroom	22.00	750	14	73	231	1,205
2 bedrooms	22.00	900	9	48	178	950
Subtotal			23	121	409	2,155
Mobile Homes						
Single	11.50	720	23	121	190	1,002
Double	11.50	1,000	22	120	253	1,380
Subtotal			45	241	443	2,382
Total Households			453	2,411	9,333	49,671

(1) Design fees are not included

PUBLIC FACILITIES COSTS
(in Thousands of Dollars)

	Set 1			Set 2	
	Unit Cost	Quantity	Total Cost	Quantity	Total Cost
Schools	$46.50/SF	222,900 SF	$10,365	953,800 SF	$44,352
Medical (Clinic)	46.50/SF	11,100 SF	516	47,700 SF	2,218
Local Government					
Offices	27.50/SF	3,300 SF	91	14,300 SF	393
Other Structures	26.00/SF	13,400 SF	348	71,500 SF	1,859
Recreation/Parks	290/Capita	11,143 EA.	3,231	47,691 EA.	13,830
Social	230/Capita	11,143 EA.	2,563	47,691 EA.	10,969
Subtotal			17,114		73,621
Design @ 4%			685		2,945
TOTAL			17,799		76,566

COMMERCIAL COSTS
(in Thousands of Dollars)

	Set 1			Set 2	
	Unit Cost	Quantity	Total Cost	Quantity	Total Cost
Retail	$21.00/SF	170,500 SF	$ 3,581	562,800 SF	$11 819
Office	27.50/SF	14,500 SF	399	81,000 SF	2,230
Hotel/Motel	23.50/SF	62,400 SF	1,466	267,100 SF	6,277
Commercial Recreation	21.00/SF	36,800 SF	773	104,900 SF	2,203
Wholesale	14.00/SF	5,600 SF	78	47,700 SF	668
Mobile Home Parks	6260/Pad	592 EA.	3,706	2,495 EA.	15,619
Transportation, Communications and Utilities	250/Capita	11,143 EA.	2,786	47,691	11,923
Subtotal			12,789		50,739
Design @ 4%			512		2,030
TOTAL			13,301		52,769

Appendix F

PERSONS INTERVIEWED

Name	Title/Office	Organization	City
Fred Alexander	Tribal Utility Authority	Navajo Tribe	Window Rock, AZ
Ralph Armstrong	Assistant Area Director	Bureau of Indian Affairs	Window Rock, AZ
Janet Atwood	Budget Division, DFA	State of New Mexico	Santa Fe, NM
Jefferson Begay	OPD/Urban Planner	Navajo Tribe	Window Rock, AZ
John Benally	Area Roads Engineer	Bureau of Indian Affairs	Gallup, NM
Bahe Billy, Ph.D.	Planning & Training Administrator	Navajo Agricultural Products Industries	Farmington, NM
A. F. Borchert	Regional Vice President	Minnesota Title Company	Phoenix, AZ
Henry Borgrink	Department of Education	State of New Mexico	Santa Fe, NM
Gerald Boyle, Ph.D.	Chairman, Department of Economics	University of New Mexico	Albuquerque, NM
Tom Brose	Labor Relations	Navajo Tribe	Window Rock, AZ
Stephen Charnos	Counsel	New Mexico Municipal League	Santa Fe, NM
Bob Columbo	Office of Manpower	Bureau of Indian Affairs	Washington, D.C.
Dan Cook	Manager, Industrial Relations	WESCO	Farmington, NM
Roland Dart	Division of Law Enforcement	Navajo Tribe	Window Rock, AZ
Luke Deswood	OPD/Transportation Planner	Navajo Tribe	Window Rock, AZ
Harold Fish	General Manager	Navajo Agricultural Products Industries	Farmington, NM
Wilford Frazier	Area Roads Office	Bureau of Indian Affairs	Gallup, NM
Harry Geveitz	Director, Synfuels Services	El Paso Natural Gas	El Paso, TX
Ken Glessner	Project Engineering Coordinator	WESCO	Los Angeles, CA
Stephen Godoff	Program Development	Navajo Tribe	Window Rock, AZ
Eileen Grevey	Governor's Energy Office	State of New Mexico	Santa Fe, NM
Wayne Gyulai	State Planning Office	State of New Mexico	Santa Fe, NM
George Hilty	Attorney	Brown, Vlassis & Bain, General Counsel to the Navajo Tribe	Phoenix, AZ
Ben Hogue	Councilman	Navajo Tribal Council	Burnham Chapter
Graham Holmes	Land Administrator	Navajo Tribe	Window Rock, AZ
John J. Karmelich	Counsel	Minnesota Title Company	Phoenix, AZ
Albert Keisker	Urban Economist	Albert D. Keisker & Assoc.	Los Angeles, CA

Robert Landmann	Deputy State Planning Officer	State of New Mexico	Santa Fe, NM
Gerald Levy, Ph.D.	Chairman, Department of Anthropology	University of Arizona	Tucson, AZ
Willard Lewis	Special Assistant to the Secretary	Department of the Interior	Albuquerque, NM
Stephen Linzer	Attorney	Brown, Vlassis & Bain, General Counsel to the Navajo Tribe	Phoenix, AZ
Terry McCollister	Manager, Field Community Services	El Paso Natural Gas	Farmington, NM
William Malone	Planning Assistant	WESCO	Farmington, NM
Pat Chee Miller	Executive Director	Navajo Housing Authority	Window Rock, AZ
Robert P. Murphy, Jr.	OPD/Chief of Physical Planning	Navajo Tribe	Window Rock, AZ
Bill Musick	Manager, Community Services	El Paso Natural Gas	El Paso, TX
Donald Myer	Chief, Environmental Health	Indian Health Service	Window Rock, AZ
Jay Natelson	Urban Economist	The Natelson Company	Los Angeles, CA
Free O'Chesky	Finance Department	State of New Mexico	Santa Fe, NM
Gordon Page	State Planning Office	State of New Mexico	Santa Fe, NM
Ralph Prather	State Planning Office	State of New Mexico	Santa Fe, NM
Eric Natwig	OPD/Economist/Planner	Navajo Tribe	Window Rock, AZ
Douglas R. Nelson	National Accounts Executive	Minnesota Title Company	Phoenix, AZ
Wes Nunn	Land Officer	Navajo Agricultural Products Industries	Farmington, NM
David Redhorse	OPD/Director of Planning	Navajo Tribe	Window Rock, AZ
John Romero	Bureau of Revenue	State of New Mexico	Santa Fe, NM
Bob Rudzik	General Manager	WESCO	Los Angeles, CA
Robert Schryber	Director/Minerals Development	Navajo Tribe	Window Rock, AZ
Eve Taggart	State Planning Office	State of New Mexico	Santa Fe, NM
Ken Townsend	General Manager	Navajo Housing and Development Enterprise	Window Rock, AZ
Jim Trant	Program Development	Salt River Indian Community	Scottsdale, AZ
Richard Virtue	Counsel	New Mexico Municipal League	Santa Fe, NM
Hansen Wanetka	Housing Authority	Navajo Tribe	Window Rock, AZ
Buddy Whipple	Housing Officer	Bureau of Indian Affairs	Window Rock, AZ
David Williams	Urban Economist	Homm-Williams & Assoc.	Washington, D.C.

HOUSING AND COMMUNITY SERVICES

FOR COAL GASIFICATION COMPLEXES
PROPOSED ON THE NAVAJO RESERVATION

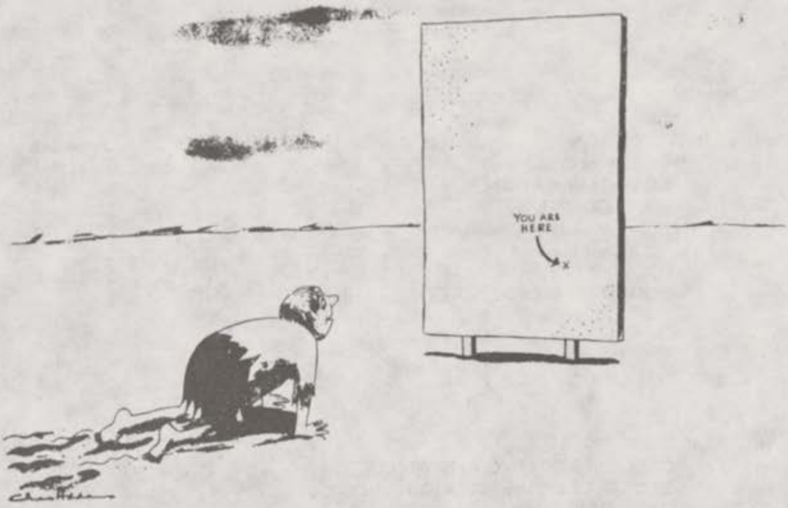
PREPARED FOR

EL PASO NATURAL GAS COMPANY
AND
WESTERN GASIFICATION COMPANY

APRIL, 1974

DEVELOPMENT RESEARCH ASSOCIATES
A division of Booz, Allen & Hamilton Inc.
GRUEN ASSOCIATES

This study was prepared by Development Research Associates and Gruen Associates for El Paso Natural Gas Company and Western Gasification Company to evaluate the feasibility and potential of new town development concepts, but in no way implies that these companies either endorse such development concepts or agree to assume the responsibility for any related costs.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SUMMARY OF FINDINGS AND CONCLUSIONS

- Two coal gasification complexes and attendant coal mines are proposed for construction concurrently on the Navajo Reservation, south of Farmington, New Mexico by El Paso Natural Gas Company and Western Gasification Company.

- Each of the complexes is designed to produce, from large coal reserves on the Reservation, from 250 to 288 million cubic feet per day of substitute natural gas, which will be important in meeting national energy needs.

- The two initial complexes and related mining operations should employ an estimated 2,370 persons, creating a need for housing and community services which can be met only with great difficulty with existing resources.

  - 72 to 90 percent of the present housing on the Reservation is inadequate, most of it hogans.

  - Much of the benefit of the current industrial employment on the Reservation is lost because families must purchase goods and services off the Reservation. There has been little opportunity to create a secondary economy in retail and service businesses, which would provide many additional jobs and multiply the monies coming onto the Reservation through industrialization.

- Housing for complex and mine employees and others in a new town could provide modern quality housing, which has not been achievable on any significant scale on the Reservation.

- Payrolls will be in excess of $30 million annually and average more than $12,500 annually per employee. The remoteness of the operation in terms of existing communities and the often stated Navajo desire to create economic strengths on the Reservation, suggest the desirability for a new town designed to be economically self-sufficient, socially balanced, permanent in nature, and having the capability of offering continually expanding opportunities for the Navajo people generally and for that proximate area. The beneficial impact on the Navajo Nation could be greater than all previous industrialization activities combined.

- o The major concern of most new communities lies in attracting an employment base sufficient to support the anticipated residents. Special efforts are often required to attract basic industry. A new town on the Reservation would be uniquely opposite. Employment potential is known, and other potentials are probable through upgrading and marketing of by-products.

- o An economic system model has been developed to assess the impacts of basic employment and to project local service employment potentials. Under three sets of assumptions, population at a "steady state" following the initial complex openings and attendant coal mines ranges from 3,300 to 15,500, as follows:

Set	Employers	Base Employment	Population
1	One Complex	1,210	3,300
2	Two Complexes	2,420	9,800
3	Two Complexes plus Navajo Indian Irrigation Project	2,903	15,500

- o The need for rapid housing development to have facilities ready when the new complexes open, the potential for additional complexes but the uncertainty over schedules, and the unprecedented nature of the task, have all led to the creation of a unique new town concept based on neighborhoods, communities, and villages with the potential for regenerating themselves over the life of the town. Such a concept allows the town to be a viable entity at any level of population and economic activity.

- o Location possibilities have been identified which meet site selection objectives of access to employment and population centers as well as sound physical conditions for construction and expansion.

- o Capital costs of the Set 2 (two complex size) town total $78,925,000. An evaluation of revenues indicates that from $48,437,000 to $71,566,000 would be available from conventional financing sources. The remaining amounts to be financed might be raised in part through the rescheduling of capital costs as monies become available or through other sources such as the Bureau of Indian Affairs, Indian Health Service and private foundations.

- Most of the employee housing objectives of the coal gasification and mining companies could be met either by the construction of a company camp or by the creation of a new town. There are, however, significant advantages to the Navajo Nation by creation of a new town. The largest version of the town could have these advantages:

    - A broader economic base to support retail and service businesses, educational and medical facilities and a wide spectrum of social and recreational activities not found in smaller towns.

    - The diversity of Navajo and non-Navajo families, plant workers and policemen, agricultural workers and shopkeepers, school teachers and construction workers.

    - The housing and amenities to attract and retain both Navajo and non-Navajo employees and families.

    - Greater justification for substantial outside financial support for capital costs and subsidies for long-term operations.

    - Direct Navajo influence on the planning, design, and governance phases of new town implementation which will assure proper attention to Navajo cultural needs and preferences.

- Failure to create a new town could result in:

    - Shanty villages with attendant unsanitary conditions strewn around the complexes and mines.

    - Long commuting distances for Navajo and non-Navajo employees.

    - Difficulty in recruiting employees.

    - Employee dissatisfaction and high turnover rate.

    - Loss of opportunity to create new housing for Navajo families.

    - Loss of secondary employment and income for the Navajo Nation.

- A town serving only one complex and mine would be virtually a company camp. On the other hand, inclusion of the Navajo Indian Irrigation Project is economically feasible and equitable only if it contributes its share of housing and community services costs.

- The strategy required to successfully implement a new Set 3 town (serving two complexes and the Irrigation Project) involves:

  - Joint commitment and cooperative efforts by the Navajo Nation, appropriate governmental agencies and private groups, and the coal gasification and mining companies to establish the framework for new town development, and to create a planning group of involved agencies.

  - Decisions by the Navajo Nation and coal gasification and mining companies to set up internal project teams and to work jointly for the creation of a new town.

  - Creation of a development entity jointly governed and financed through the efforts of the Navajo Nation, El Paso Natural Gas Company, Western Gasification Company, Utah International and the Navajo Indian Irrigation Project.

  - Obtaining seed money to set up the organization, provide planning and engineering, seek financing and start construction.

  - Establishment of a local government body able to collect revenues, issue construction bonds and provide municipal services to the residents of the new town.

- Immediate and sustained action is required by all involved parties -- the Navajo Nation, the coal gasification companies, the Navajo Indian Irrigation Project and federal and local service agencies -- in order to have the new town ready to serve employees as the initial coal gasification complexes and mines are completed.

  - Initiation of cooperative planning efforts, without delay, could expedite development and generate substantial economic benefits for the new town economy by accommodating at least some portion of the construction workers. During peak activity periods at each complex, the construction force will number approximately 3,500 and have an annual payroll of $70 million.

Exhibit 1
NATIONAL POPULATION DISTRIBUTION

NATIONAL POPULATION DISTRIBUTION GRUEN ASSOCIATES

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I
INTRODUCTION

The United States is at present faced with a natural gas shortage of increasingly critical dimensions. This growing shortage of natural gas is only one facet of an overall shortage of energy .. and basically it is the supply of energy which determines our overall living standard and economy.

Today, natural gas supplies one-third of the nation's energy and the demand for natural gas is soaring. One reason is that natural gas is the cleanest known fuel and contributes to cleaning up the environment. The natural gas companies, however, are finding it increasingly difficult to fulfill the requirements for their present customers -- much less adding new customers.

Over the past few years, natural gas has been consumed more rapidly than replacement supplies have been found. The production from many existing natural gas fields is declining rapidly. Throughout the country, industrial customers who use natural gas are now being faced with curtailed supplies and will be forced to use alternate fuels.

In a message to Congress on June 4, 1971, the President of the United States noted the seriousness of the developing national energy shortage and called for "... an expanded program to convert coal into a clean gaseous fuel."

The response to this call was actually underway even as the President spoke. El Paso Natural Gas Company and Western Gasification Company independently announced plans to each construct a large plant on the Navajo Reservation to convert coal into substitute natural gas.

As an introduction to this study, this chapter will describe:

- Coal Reserves -- of the Navajo Reservation and northwest New Mexico
- Coal Gasification Plants -- proposed to utilize these coal reserves, including size and schedule of construction (employment is described in Chapter III - Nature of the Town).
- Location of Coal Leases and Plants
- Companies Proposing Coal Gasification Plants -- El Paso Natural Gas Company (EPNG) and Western Gasification Company (WESCO).

COAL RESERVES

The landmass of the United States contains some three trillion tons of coal, perhaps 88 percent of the reserve of fossil fuel energy on the continent and one of the largest anywhere in the world. Even at a vastly accelerated rate of consumption, the U.S. has enough coal to last 200 to 300 years or more.

A significant portion of these coal reserves are found in remote areas of the western United States. The major coal resources of New Mexico are located in the San Juan Basin in the northwest portion of the state, with the majority of that basin located on the Navajo Reservation. The existence of coal in the San Juan Basin has been known for many years, and it is believed that the Anasazi period Indians burned it in their kivas along the San Juan River some 1,000 years ago.

On the Navajo Reservation, the best source of coal is the Fruitland Formation, which lies in an area running west and south of Farmington, New Mexico. In 1953, Utah International began exploring this area, finding sub-bituminous coal, located in four main seams ranging in depth from less than 20 feet to over 200 feet. In 1957, the Navajo Nation granted Utah a mining lease containing some 24,000 acres of coal-bearing lands. This lease, since expanded to 31,000 acres, contains 1.1 billion tons of coal.

Utah International provides coal to the Four Corners Power Plant and proposes to mine coal for the WESCO gasification plant. Southeast of the Utah lease, the Navajo Nation has leased coal lands to EPNG for use in the gasification process. To the west, in Arizona, leases have been granted on Black Mesa to Peabody Coal Company for mining coal for burning in the Navajo and Mohave Generating Stations.

COAL GASIFICATION PLANTS

Only one commercially proven process exists today for converting coal to substitute natural gas (SNG). This is a process developed by a West German firm, Lurgi Mineraloeltechnik GmbH and referred to as the "Lurgi Process." It has been utilized in some 12 plants around the world and is the process both EPNG and WESCO contemplate using. Theirs will be the first such commercial gasification facilities in the United States.

All of the several processes under study in this country involve essentially the same chemical principle. Basic coal gasification involves adding oxygen and steam to coal under conditions of heat and pressure to form a substitute gas composed of hydrogen, carbon oxides, methane, and various sulfur compounds. The carbon dioxide and sulfur compounds are then removed, leaving a usable gaseous fuel having a low Btu content. This gas is sometimes referred to as "town gas." To this process will be added a further step, methanation, which will increase the heating value of the gas from about 415 Btu to about 972 Btu per standard cubic foot. Three pilot plants have proved the methanation step. A small size demonstration plant program will have been completed on the Reservation before either complex begins full-scale production.

Coal will enter the complex, where it will be blended, screened and conveyed into the gasifiers. There, in a pressurized, sealed system it will be reacted with oxygen and steam to produce the substitute gas. The carbon monoxide-to-hydrogen ratio required for methane synthesis is adjusted in a shift conversion step. Compounds such as sulfur and carbon dioxide will be removed, and then the Btu content of SNG will be upgraded through the methane sythethesis process. The gas will then be compressed, dehydrated, and delivered into nearby pipelines. The sulfur compounds will be converted to elemental sulfur for sale.

PLANT COMPLEXES

Each gasification plant proposed is currently designed to produce at least 250 million standard cubic feet per day (mmcf/d) of substitute natural gas. This total of 500 mmcf/d is the equivalent of approximately 16 percent of the current basic usage of Southern California. Each complex will cover about 1,000 acres. Included in the main complex will be coal and ash handling facilities, multiple gasifiers, crude gas shift converters, purification plants, methanators, compressors, and dehydrators. Support installations and facilities will include a boiler plant, cryogenic air separation plants, gas liquor treatment, sulfur plant, water reservoir, plant roads, parking lots, administration office building, shops, storage buildings, laboratory and other miscellaneous structures.

Estimates provided by EPNG and WESCO with their applications indicate a construction cost ranging from $380 million to $420 million in 1972 dollars for each plant, not including mining. Construction would take about three years and require up to 3,500 construction employees for each plant at the peak period.

The WESCO plant is designed to utilize approximately 25,000 tons of coal a day to produce about 250 million cubic feet per day (mmcf/d) of substitute natural gas, while EPNG will use 28,000 tons of coal to produce 288 mmcf/d. Ultimate development on the Navajo Reservation is currently contemplated to be:

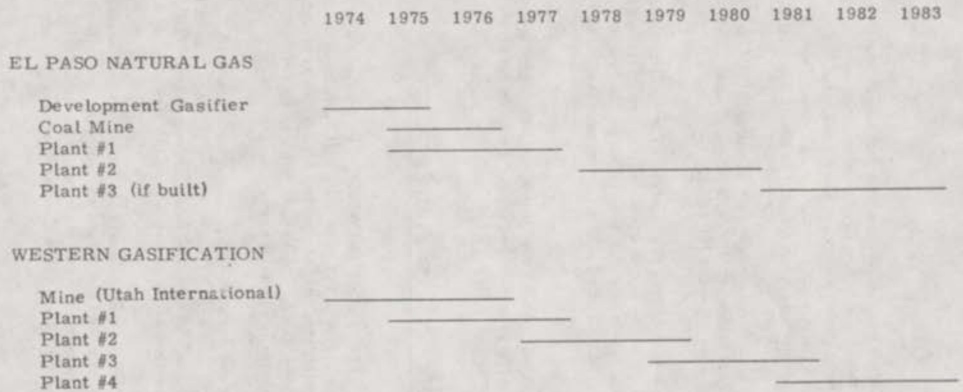
EPNG	785	mmcf/d
WESCO	1,000	mmcf/d
Total	1,750	mmcf/d

At the size of the first plants proposed (250 mmcf/d), WESCO would build a total of four plants and EPNG three. Coal gasification technology, however, is changing rapidly, so that it is possible that larger -- and fewer -- plants may be constructed than the seven now seen as the ultimate development. EPNG, therefore, may build two plants rather than three.

SCHEDULE OF CONSTRUCTION

The latest, best estimate of construction scheduling is that under optimal conditions the construction of the initial plants for both EPNG and WESCO will start by the end of 1974, and final plant opening will be in 1983. Each plant will require about three years to build. A potential schedule of construction is shown in Exhibit 2.

Exhibit 2
PROJECTED SCHEDULE OF PLANT CONSTRUCTION



Source: Development Research Associates

COAL MINING OPERATIONS

WESCO will obtain its coal from Utah International, which first leased coal rights from the Navajo Nation in 1957. Utah's total lease is now 31,000 acres, with over 1.1 billion tons of coal that can be extracted by strip mining methods. Since 1963, coal has been provided by Utah to Arizona Public Service Company for the Four Corners Power Plant on the Navajo Reservation near Fruitland, New Mexico, which burns coal to create electricity.

With large uncommitted reserves, Utah is able to contract to supply WESCO with the coal it needs. The coal reserves presently dedicated to this project by Utah can supply a plant of 250 million cubic feet per day capacity for about 100 years.

El Paso Natural Gas will mine its own coal on a 40,287-acre lease purchased from the Navajo Nation in 1968. On this lease there are in excess of 700 million tons of recoverable coal, less than 150 feet below the surface. This lease has been under exploration by El Paso Natural Gas for at least 15 years, resulting in a detailed plan of mining over the life of the coal gasification plants.

Surface mining techniques will be used. As the coal is removed, the mined areas will be reconstructed to resemble the topography of undisturbed areas. Reclamation of the removed overburden will follow the mining operation.

LOCATION OF COAL LEASES AND PLANTS

The three Reservation lease areas (EPNG, Utah, and WESCO), shown on Exhibit 3 following, contain approximately 86,000 acres. The center of activity will initially be located near the center of this area some 30 to 35 miles south of Farmington, New Mexico, a city of nearly 30,000 population. Shiprock, New Mexico, lies 35 to 40 miles to the northwest. Gallup is 60 miles to the south, and Albuquerque is 140 miles southeast.

At the present time, the closest paved roads are U.S. 666 running north-south from Shiprock to Gallup, and U.S. 550 to the north, connecting Farmington and Shiprock. State Highway 44 connects Farmington and Albuquerque. Interstate 40 runs east-west through Gallup and on to Albuquerque. The Santa Fe Railroad main line generally parallels Interstate 40.

Most of the region is made up of Navajo lands or land held by the Federal Government. Activity in this region has historically been of a very low intensity, consisting primarily of grazing or agriculture. In more recent years, a number of power plants have been built in order to utilize rich coal deposits in the area. The well-known Four Corners Power Plant is located just south of Fruitland.

Exhibit 3
THE REGION

Another major development is the Navajo Indian Irrigation Project (NIIP) now under construction. Ultimately to contain 110,000 acres, this agricultural program will generate an eventual population of 7,000 to 10,000 people, according to the Bureau of Indian Affairs, and require a variety of support facilities.

The northern portion of the Utah lease has been allocated to the Four Corners Power Plant and the southern portion to the WESCO coal gasification plant. WESCO intends to build its first plant on the west side of the lease area. The second plant will be built adjacent, utilizing joint administrative and support facilities of Plant 1. In similar fashion, Plants 3 and 4 will be located adjacent to each other further south along the western edge of the Utah lease.

El Paso Natural Gas plans to begin coal mining operations in the southeast corner of its lease, and therefore picked the first plant site on the southern edge of the lease, close to earlier mining. The second complex would be located separately further west. Plant locations are shown in Exhibit 16 in Chapter VI - Setting of the New Town (see page VI-3).

COMPANIES PROPOSING COAL GASIFICATION PLANTS

The construction of separate, yet similar, coal gasification projects has been proposed by El Paso Natural Gas Company (EPNG) and Western Gasification Company (WESCO). The plant concepts and locations will be discussed jointly, but the developing and operating entities are separate and independent organizations.

EL PASO NATURAL GAS COMPANY

El Paso Natural Gas Company started by supplying natural gas from the Permian Basin of west Texas and southeastern New Mexico to customers in El Paso, Texas, and later westerly to California. More recently, EPNG has produced gas from the San Juan Basin of northwestern New Mexico. Gas delivered to California is sold to public utilities for distribution.

EPNG has assigned responsibility for the coal gasification plants to its Synthetic Fuels Division. Mesa Resource Company, a wholly-owned subsidiary, will mine the coal, Fuel Conversion Company, another wholly-owned subsidiary, will produce the gas and deliver it to the EPNG Southern Division for distribution. Stearns-Roger Corporation of Denver, Colorado, is the design engineering consultant for EPNG.

WESTERN GASIFICATION COMPANY

Western Gasification Company is a joint venture of Pacific Lighting Corporation and Texas Eastern Transmission Corporation, through their respective subsidiaries, Pacific Coal Gasification Company and Transwestern Coal Gasification Company. Pacific Lighting, through its subsidiary, Southern California Gas Company, serves retail customers in California and Texas Eastern delivers natural gas to public utilities at various locations.

Coal for the WESCO project will be mined by Utah International. The coal gasification plant will be owned and operated by WESCO. Pipeline quality gas will be transported to customers by Transwestern Pipeline Company, a subsidiary of Texas Eastern. Fluor Engineers and Constructors, Inc., of Los Angeles, is the design engineering consultant to WESCO.

UTAH INTERNATIONAL

Mining for the coal to supply the WESCO coal gasification plant will be done by Utah International, Inc. (UII). This multi-national firm, formerly known as Utah Construction and Mining Company, pursues the exploration and mining of coal, iron ore, uranium, copper and other mineral deposits throughout the world. The Navajo Mine, currently serving the Four Corners Power Plant at Fruitland, New Mexico, is the largest coal mine in terms of production in the United States. Utah also operates, under contract, the coal mining operation for the Public Service Company of New Mexico coal-burning electric power generation plant, northwest of Farmington, New Mexico.

Throughout the report, references to "coal gasification companies" include Utah International. It is recognized that Utah does not gasify coal, it only mines coal, but it is an integral part of the entire process. Utah was not, however, one of the client companies for this consultant report.

TRANSITION

The impact of large coal gasification plants could not be determined by reference to the limited, and not necessarily applicable, experience of industrialization and community development on the Navajo Reservation. El Paso Natural Gas Company and Western Gasification Company recognized the need for a comprehensive study of these impacts and of how housing and community services could be provided. Chapter II - The Study - describes the objectives and scope of this required study.

II
THE STUDY

The construction and operation of coal gasification plants, and attendant mining operations, in a remote area of the Navajo Reservation creates a need to accommodate a substantial number of workers and families over a prolonged period. The remoteness of the operation in terms of existing communities and the often stated Navajo desire to create economic strengths on the Reservation, suggest the need for a new town designed to be economically self-sufficient, socially balanced, permanent in nature, and having the capability of offering continually expanding opportunities for the Navajo people.

As a result of these needs, together with a desire to avoid a "company town" or a temporary construction camp, El Paso Natural Gas Company and the Western Gasification Company have embarked on an evaluation of the feasibility and desirability of assisting in establishing housing and community services on the Navajo Reservation near the coal gasification activities.

This chapter discusses the important elements in the initiation and preparation of this study:

- Objectives of EPNG and WESCO -- the overall reasons for the companies' concern with housing and community services.
- Objectives of the Navajo Nation -- as set forth in the Navajo Ten-Year Plan.
- Study Objectives -- as set down in the consulting contract.
- Study Team -- personnel assigned to the study by the consultants, Development Research Associates and Gruen Associates.
- Assignment -- tasks to be carried out by the study team.
- Initial Premises -- presented to the study team by the client.
- Study Approach -- philosophy and methodology adopted by the study team.
- Acknowledgements -- appreciation to the officials and staff of the study clients, El Paso Natural Gas Company and Western Gasification Company.

OBJECTIVES OF EPNG AND WESCO

Why should El Paso Natural Gas and Western Gasification Companies be involved at all in the consideration of housing and community services for their employees? More specifically, why should they be doing this study? The ultimate objective of both EPNG and WESCO is to construct and operate coal gasification plants to utilize the large coal resources on the Navajo Reservation. To operate these plants at a profit requires, beyond the obvious technological factors, an effective work force for plant locations near the coal resources. The proposed plants are located in a remote area of the Navajo Reservation. To recruit and retain the employees desired may require housing close to the plants. This closeness would cut down commuting time and build an identification with the major employers. Both companies have to consider not only the problems of attracting Navajo employees, but also the benefits which must be available to attract the necessary non-Navajo employees at the beginning of the operation.

OBJECTIVES OF THE NAVAJO NATION

The indicated objectives of the Navajo Nation are to utilize their natural resources for the highest possible benefit for the Navajo Nation itself and for individual Navajos. The Navajo Ten-Year Plan is designed "... to bring the Navajo up to an equal footing with the rest of the nation," by investment in productive business enterprise. Two major objectives will be achieved just by establishment of the coal gasification plant whether any provision is made for housing or not. The first of these is the creation of jobs for Navajos. The proportion of Navajo employment is expected to rise over the course of operation as Navajos are trained in gasification skills until eventually virtually all of the plant employment will be Navajo. A second objective is to obtain business site lease payments and coal royalty payments which will accrue to the Nation for use in providing social and local government services, and in encouraging additional industrial development of the Reservation.

The number of housing units on the Reservation has never been documented, however current Bureau of Indian Affairs estimates of total actual Navajo housing units show a range of 18,000 to 19,750. A rough sampling suggests that some 72 percent to 90 percent of these housing units are inadequate by Federal Government standards and need replacement or improvement to bring them up to a minimum safe and sanitary condition. In fact, it has been estimated that the majority of Navajo housing units are still mud and log hogans with earth floors. Only 3,000 new units or improvements to existing structures have been provided by all types of Federal and tribal programs. The extent of this problem is shown in Chapter IV on housing. Provision of a large number of new homes for employees at the coal gasification plant would go a long way toward bridging the massive gap between needed and available housing on the Reservation.

The industrial development which has occurred to date on the Reservation has not provided all the benefits which it might to the Navajo Nation. New jobs have been created and Navajos are in many cases earning salaries enabling them to support themselves and their families quite well. These salaries have not, however, provided the boost of the Navajo economy which is typical of new industry off the Reservation. Navajo wage-earner families are forced to go off the Reservation for purchases of many goods and services which they desire. Vehicle purchases are the largest single expenditure of the Navajo families, yet there are no automobile or truck dealers on the Reservation. The second largest expenditure is for food, yet there is only one supermarket in the entire Navajo Nation. The Navajo Ten-Year Plan states: "In Navajo country, however, there is almost no multiplier ... only 10 percent to 15 percent of the money made in the Reservation is spent within the borders of the Reservation." Because of this, opportunities for creating Navajo-owned and operated stores and service establishments and for creating employment for many Navajos who do not have the training or desire to work in the coal gasification plants are lost. The establishment of a community on the Reservation could provide a substantial increase in secondary employment.

STUDY OBJECTIVES

El Paso Natural Gas Company determined that the question of housing and community services could be an important factor in recruiting and retaining a stable work force. The potential ramifications of providing housing or creating a new town were not clear, however. The experience nationwide in creating new towns indicates the extreme difficulty of planning and implementation. Adding to the complications for this new town are its location on the Navajo Reservation - with an entirely different cultural and legal heritage - and its requirement for rapid construction to keep pace with coal gasification plant construction.

Western Gasification Company, planning a similar plant in the community, realized it faced the same questions of whether - and how - to provide for their employees. EPNG and WESCO agreed, therefore, that they would jointly sponsor this study of housing and community services. Cooperation in this study implied no commitment either for further joint action or construction of housing and a new town. Rather, these decisions were to be made in concert with the Navajo Nation only after completion of this study and careful review of its findings and recommendations.

To set the framework for these conclusions, the following objectives for this study were established:

- Explore potential size and characteristics of possible communities resulting from the construction of coal gasification plants and mines.
- Examine potential participation of EPNG and WESCO in new community and estimate potential financial implications for EPNG and WESCO. Of special concern were construction costs and the potential for outside financing.

- o Prepare information about the new town for EPNG and WESCO to present to the Navajo Nation.

- o Outline costs and benefits to Navajo Nation and possible participation in development process.

- o Prepare a preliminary action strategy for development of a new town.

STUDY TEAM

To prepare this study of housing and community services, Development Research Associates (DRA), the economic consulting division of Booz, Allen & Hamilton, Inc., management consultants, was selected. To assist DRA in the town concept and potential location aspects, Gruen Associates, an international firm of planners, architects and engineers, was selected. The study team assigned to this project by DRA/Gruen included:

Development Research Associates

Jay W. Natelson, Vice President
David C. Williams, Project Manager
Walter Hahn, Chief Economist
John C. Corrough, Senior Associate
D. Wylie Greig, Associate

Gruen Associates

Ben W. Southland, Principal in Charge
Judy Frank, Project Manager
Freydoon Rassouli, Planner

ASSIGNMENT

The assignment given this study team was to perform the following tasks:

Task No. 1: Assemble Consultant Team

Task No. 2: Prepare Detailed Phase I Study Plan

Task No. 3: Define Detailed Construction, Start-up, and Operation Phasing of the EPNG and WESCO Coal Gasification Complexes

Task No. 4: Select a Primary Townsite and One Alternative Townsite for the Study

Task No. 5: Define the Basic Data Needed for the Study, and Collect this Data

Task No. 6: Define Probable Mixes of Navajo and non-Navajo Employees

Task No. 7: Develop the Economic System Model for the New Town and Use it to Make Preliminary Projections

Task No. 8: Develop Housing Design and Site Planning Concepts

Task No. 9: Prepare Conceptual Sketch Plans and the Development Program for the New Town

Task No. 10: Estimate the Costs of Developing the New Town

Task No. 11: Prepare a Plan for Financing Development of the New Town

Task No. 12: Develop Approaches to Local Government Organizations and Structure for the New Town

Task No. 13: Prepare an Implementation Strategy for Actual Development of the New Town

Task No. 14: Prepare for and Participate in Presentations

INITIAL PREMISES

At the onset of the study, five major premises were developed under which the study team would begin its research. These premises were considered to be those most logical for the new town based on previous study and stated corporate objectives. Although they provided a focus for the study team, the team was directed to question these premises and report on whether they were feasible and, if not, to suggest new premises for creation of housing and community services. Initial premises of the study were:

- A new town should be considered because of the remote location and lack of existing housing.
- Potential new housing and community services would be in one town serving all basic employers, rather than in separate towns.
- The new town would not be a company town, neither built, owned, nor operated by EPNG or WESCO.
- The new town would serve both Navajo and non-Navajo employees, and not be a segregated community.
- The new town would be on the Navajo Reservation, rather than east of the boundary.

STUDY APPROACH

The study team, recognizing the need for a compressed time-frame, established the following approach to the study:

- o Prepare a comprehensive study covering all relevant subjects, but at a preliminary, general rough-cut level.
- o Obtain quickly a large amount of data from EPNG and WESCO on plant employment and operations, area, physical characteristics,
- o Rely heavily on available sources:
  - . printed reports, studies and surveys
  - . extensive interview program on and near the Navajo Reservation

INTERVIEW PROGRAM

To determine housing needs and desires, the consultant usually looks at previous experience and surveys the potential users of housing. On the Navajo Reservation there is no directly pertinent experience of rapid creation of a large urban settlement designed for wage-earner families. The study team therefore had to review recent experience and pick from each example that element which might be applicable to a new town.

We interviewed both Navajos and non-Navajos who had close association with the Navajo Nation to obtain the benefits of their experience. The over 70 persons interviewed included:

- o Operating level officials of the Navajo Nation, Bureau of Indian Affairs, and Indian Health Service.
- o Managers and personnel officials of industries which have recently located on the Reservation.
- o Housing officials of the Navajo Nation, Navajo Housing Authority and non-profit corporations.
- o Operators of private businesses on the Reservation.
- o City, county, state and federal officials.

The persons interviewed are listed in Appendix A in alphabetical order. We assured each person of the confidentiality of the interview, and therefore there are no direct quotes in this report. While we learned much from these interviews and incorporated many ideas into our findings, this listing in no way implies that those interviewed either know of or support our conclusions. Development Research Associates assumes all responsibility for findings, conclusions and recommendations of this study.

DATA FILE

During the research effort, the study team collected a large number of reports, studies, surveys, books, articles and other printed documents which form an extensive data file. Each of these documents has been catalogued and is listed in Appendix B.

ACKNOWLEDGEMENTS

In the preparation of this study and report, the study team relied heavily on the staffs of El Paso Natural Gas and Western Gasification Companies, which had commissioned this effort. Many persons were involved in setting the study approach, providing information and reviewing study progress in several meetings between client and study team. We appreciate the assistance given, and especially the opportunity presented to the study team to participate in this challenging assignment.

III
NATURE OF THE TOWN

The purpose of this chapter is to determine the size and characteristics of a new town which might be created with the economic base of the coal gasification plants and mines. To accomplish that, an economic system model has been created which describes the flows of dollars into, out of and within the new town. In using this model, a number of critical assumptions must be made, anticipating the decisions which employees of the coal gasification plants and attendant coal mines and the potential agricultural project will make about where they live and how they spend their money. A major portion of the research of this study has been devoted to determining the likely range of these decisions.

This chapter consists then of the following elements:

- Economic system model - used to translate employment and income of basic industries into secondary employment and total population projections.
- Economic base - including coal gasification plants and mines, and possibly the Navajo Indian Irrigation Project.
- Major assumptions required for the economic system model- which include:
  - Navajo/non-Navajo employment mix
  - Attraction of the new town to Navajo and non-Navajo employees
  - Consumer spending patterns of Navajo and non-Navajo families
  - Sales and employment characteristics of the retail industry
  - Requirements of population-based employment
  - Employment patterns of families
  - Family size of Navajo and non-Navajo families
- Projections of the new town characteristics - basic and secondary (non-basic) employment, number of households and total population are projected for three sets of assumptions:

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- a new town serving one coal gasification plant and mine
- a new town serving both of the initial coal gasification plants and mines
- a new town serving both coal gasification plants and mines, and the Navajo Indian Irrigation Project.

ECONOMIC SYSTEM MODEL

An economic system model is used to project the population, composition , and development costs which would result from alternative new town concepts. The principal inputs to this model are the number and average pay of employees at mines and gasification plants (base employment), plus a series of assumptions about the characteristics of non-base employment. Outputs from the model are detailed breakdowns of total employment (base and non-base) in the new town, population size and characteristics, the physical facilities necessary to house and support the population, and the costs of developing these physical facilities.

These outputs become the basis for subsequent physical planning in Chapter V-Town Concept and a financial analysis of each alternative in Chapter VIII-Financing.

CHARACTERISTICS OF THE MODEL

The economic system model is basically a dollar flow model which describes the flows of dollars into, out of, and internally within the new town. Selected dollar flows are traced from the economic units generating them (employed individuals, households, businesses, etc.) through the various channels in which they are spent, saved and invested. The nature and magnitude of the money flow through any one of these channels -- such as a retail outlet -- provides a basis for measuring the demand for that activity in the new town. In the case of retailing, retail employment and physical plant requirements are easily developed from the retail sales money flow.

New town concepts not generated directly from money flows, such as housing needs and local government service requirements, are developed on the basis of the town's population and demographic characteristics (e.g., total number of people, number of households, household size and Navajo/non-Navajo mix).

The total population in each new town alternative is determined by calculating the number of local service (non-base) employees necessary to provide an adequate supply of goods and services to the mines and gasification plant (base) employees and their families living in the town. The non-base employees and their families living in town, in turn, also require goods and services for their support which generates further non-base employment and population. The cycle repeats itself until an equilibrium balance between non-base and base employment is reached within the town, and a total population figure for given assumptions is derived. A conceptual example of the model's operation is provided in Appendix D for a simple two sector economy.

NEW TOWN ECONOMIC MODEL STRUCTURE

The complete new town economic system model used to project the three new town sizes is structured as shown in Exhibit 4. The principal interrelationships between the various components of the model (dollar flows, population and employment, and physical size) are indicated by the different arrows drawn between them. As described earlier, the model operates by translating base industry employment and payroll into population and households resident in the new town. This initial population generates demands for a range of goods and services which creates local service jobs (non-base employment). A proportion of this non-base employment becomes resident in the new town, increasing the town's population and generating additional demand for goods and services, and local service employment.

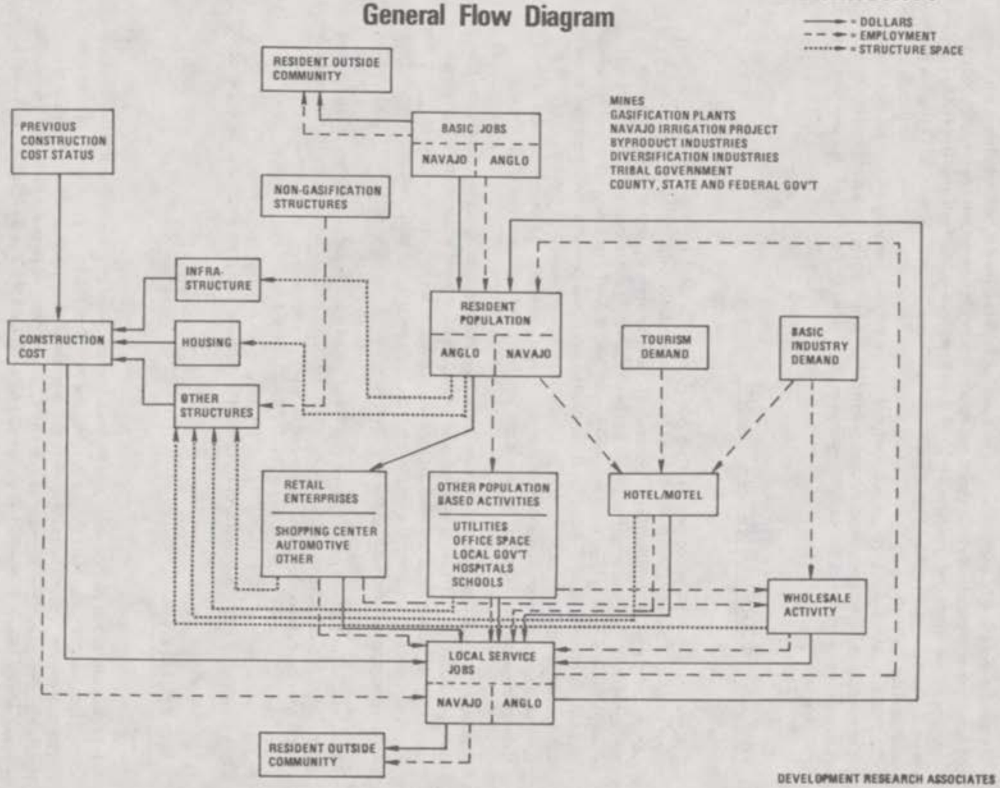
Demands for goods and services are also translated into physical requirements for dwelling units, commercial, office, and warehouse space, and the town infrastructure including roads, water, sewer, gas and electricity lines needed to service them. Construction of the new town generates further employment which, temporarily at least, further increases population and demands for local goods and services.

Ultimately, for a given point in time and fixed set of input assumptions, the feedback loop from local service jobs to resident population stabilizes and allows solution of the model for total non-base (secondary) employment. At this point total demand for local goods and services have been solved for and defined in terms of dollar volume (as applicable), employment generated, physical (building and infrastructure) requirements, and cost of providing the physical plant. The results of this model's operation are presented later in this chapter.

SETS FOR STUDY

It is possible to run an economic system model at any point in time during the life of the plants or potential community. By running the model at the same point in time for several alternatives, it is possible to determine the impacts of changes in basic employment and other assumptions. For purposes of this study, it was decided to use a period of time several years after opening of the first two plants, one each for EPNG and WESCO. This would

ECONOMIC SYSTEM MODEL FOR GASIFICATION COMPLEX COMMUNITY
General Flow Diagram



allow for many of the anticipated secondary activities to begin operation and for most of the impact of the temporary construction workers to be gone. The community would thus be in a "steady-state" condition.

The point of time was chosen to be after the first two plants only, because those are covered by formal applications already made public. The companies are committed to pursuing those applications, but decisions about further plants are not detailed enough now to be of value in running an economic system model.

The primary thrust of this study is looking toward the feasibility of a town jointly serving both coal gasification complexes. One run of the economic system model should, therefore, be run for the condition of two plants as the basic employment. For comparison purposes, the assumptions and results of creating a town serving only one plant must also be determined. Finally, it is of concern to determine what the impact of providing housing for the Navajo Indian Irrigation Project would be.

The economic system model for this study is run, therefore, for three sets of assumptions:

- Set 1 - Town serving either EPNG or WESCO, with no involvement of the NIIP. Obviously there could be two similar communities, one for each coal gasification facility.

- Set 2 - Town serving two plants of both EPNG and WESCO, but still not involving NIIP.

- Set 3 - Town serving both plants and the Navajo Indian Irrigation Project.

Serving the Navajo Indian Irrigation Project is possible only because its location is close to the proposed coal gasification facilities. In the right location then, a new town could serve both the plants and the NIIP.

Set 3 can provide substantial benefits to the Navajo Nation, but Sets 1 or 2 would serve the needs of the companies. Consideration of the third set therefore does not imply any responsibility by the companies for the larger town. A full discussion of potential roles of the companies will be presented in Chapter VIII - Financing.

ECONOMIC BASE

Many new towns have been proposed in the United States in the past few years. Some of them have developed rather successfully, such as Columbia, Maryland and Reston, Virginia. Most proposals, however, have either floundered or never gotten off the drawing boards. The chief problem has been lack of economic base, i.e. the difficulty of obtaining industrial employment.

A potential new town on the Navajo Reservation is fortunate in that it does not have this problem. The economic base will be there, and the problem now is to create the housing and community services which that economic base requires. The coal gasification plants and mines proposed will provide permanent employment for thousands of Navajo men and women. The Navajo Indian Irrigation Project now under construction in the area could provide quite different job opportunities and provide a balance to the coal gasification plants. This diversity of employment could have significant impact on the nature of the new town, its organization and potentials for financial support. As the new town develops there are potentials for other industry, either the by-products of the coal gasification or agricultural processes, or other basic industries made possible by the large population center to be created. In this section we will discuss the elements of the economic base for the new town:

- Coal Gasification Plants - employment and wages for the first two plants proposed.
- Navajo Indian Irrigation Project - employment and wages are described at the time of the steady state condition.
- By-Products - the potentials for by-products industries are discussed, though no projections are made of employment or income.
- Other export industries - general potential for other basic industry in the new town is discussed, giving emphasis to the favorable conditions to be created by a new population center on the Navajo Reservation. No projections are made of employment or income.

The economic base to be created in the new town, in terms of employment and income, forms the major input to the economic system model.

COAL GASIFICATION COMPLEXES

Large work forces will be required to operate the coal gasification complexes and the mines which will provide the coal. Operating personnel figures were obtained from both EPNG and WESCO for a point in time approximately two years after opening of the first two plants. Because of changes in technology, and thus plant design, the actual employment may change by the time operations begin.

El Paso Natural Gas projects that it will require 893 persons to operate its first coal gasification plant. Another 370 persons will run the mines resulting in a total employment of 1,263 persons at EPNG. Western Gasification Company will employ 612 for its first plant. In addition, 450 persons will be employed by Utah International in the Navajo Mine to provide coal to WESCO. Total employment for the WESCO complex will be 1,062. Part of the difference in employment ratios between the two companies is attributed to different ways of counting those who work the coal stockpiles at the plant, part is attributed to slightly different operating methods. The total employment for EPNG is higher partially because the projected output is 288 mmcf/d compared to 250 mmcf/d for WESCO.

A development gasifier is proposed by EPNG to be constructed starting in 1974 and operational in 1975. With a three year period of operation, the development gasifier could still be functioning at the point in time for the run of economic system model. The development gasifier will employ 55 persons. The mine personnel to supply it are already counted above. At the end of the three year demonstration period, the 55 employees will be transfered to the main coal gasification complex.

In Table III-1 we present those employment figures for the "steady-state" after opening at two plants. Set 3 - the largest size town - is presented first as it is most detailed, and the other sets are derived from it. It should be noted that this table has applied the Navajo/non-Navajo mix of employment assumptions which are discussed later in this chapter. In Set 3, we see that 820 persons are employed in the mines and 1,500 persons are employed at the coal gasification plants. The same 2,370 basic employees of the coal gasification complexes are tabulated in Set 2 - the two-company town. For Set 1, a one-company town, we have averaged the plant and mine construction to obtain the town's basic total employment, rather than make separate runs for EPNG and WESCO. This set, therefore, assumes 775 plant and 410 mine employees, for a total of 1,185 in coal gasification plus 25 in permanent construction.

CONSTRUCTION

To build one coal gasification complex and develop its mines will require the largest construction work force ever assembled in the Four Corners region. The force required for two plants of similar size to be constructed on essentially the same schedule will have an extraordinary impact on the area.

Table III-1
BASIC EMPLOYMENT ASSUMPTIONS

Employer	Number Employed Set 3	Set 2	Set 1	Annual Wage Assumptions
TOTAL				
Mines	820	820	410	
Complexes	1,550	1,550	775	
Navajo Indian Irrigation Project	483	0	0	
Permanent Construction in Town	50	50	25	
	2,903	2,420	1,210	
NAVAJOS				
EPNG Mines	226			
WESCO Mines (Utah)	274			
Subtotal Mines		500	250	$12,404
EPNG Development Gasifier	11			
EPNG Complex	538			
WESCO Complex	373			
Subtotal Complex		922	461	12,589
Navajo Indian Irrigation Project	459	0	0	6,055
Permanent Construction in Town	40	40	20	6,550
Total Navajo Employment	1,921	1,462	731	$10,860
NON-NAVAJOS				
EPNG Mines	144			
WESCO Mines (Utah)	176			
Subtotal Mines		320	160	$12,561
EPNG Development Gasifier	44			
EPNG Complex	345			
WESCO Complex	239			
Subtotal Complex		628	314	12,730
Navajo Indian Irrigation Project	24	0		7,340
Permanent Construction in Town	10	10	5	8,440
Total Non-Navajo Employment	982	958	479	$12,490

Note: These estimates are those of the consultant for use in the economic model only, and do not reflect any decisions by the companies or the Navajo Nation concerning share of Navajo/non-Navajo employees.

Source: Development Research Associates

The total construction work force for each plant is projected to peak at a level of 3,500 persons in the period 24 to 30 months after start of construction. By the time of the "steady-start" of the new town being considered in this analysis, the permanent construction force in the area is assumed to be approximately 50 persons, working on the complexes and on the new town.

NAVAJO INDIAN IRRIGATION PROJECT

Delivery of water to Block 1 of the Navajo Indian Irrigation Project is projected in the spring of 1976. One additional block will be added annually, each at approximately 10,000 acres. Block 11 will be served by 1986 if the schedule can be maintained. For purposes of this analysis, we assumed the fourth year of operation of NIIP to determine employment. In that year, there will be 483 permanent and semi-permanent employees. The latter are those employed eight or more months each year, and therefore projected to be residents of whichever community serves the NIIP.

Seasonal employees are projected to be about one-third the work force at the mid-point of development and one-half the work force at maximum development. These employees are projected by NIIP to follow the migrant worker pattern described as the semi-traditional life-style in Appendix C. Under that assumption, their families would remain on the Reservation and they would return to them when not working. They are not counted as basic employees for this analysis of the new town.

The Navajo Indian Irrigation Project is funded by the Bureau of Indian Affairs. The actual construction of the canals and fields is being done by the Bureau of Reclamation, Department of the Interior. The operation of NIIP will be the responsibility of Navajo Agricultural Products industries (NAPI), a Navajo Tribal enterprise.

BY-PRODUCTS

A potential for additional basic employment exists in the new town from the processing or other use of by-products of the coal gasification process. A plant of 250 mmcf/d will produce approximately the following:

Tar	239,250 gallons per day
Tar Oil	157,370 gallons per day
Naphtha	74,900 gallons per day
Crude Phenol	32,470 gallons per day
Sulphur	167 long tons per day
Ammonia Solution (20%)	260 short tons per day

In addition, EPNG has recently determined that it will market the coal fines which are too small to gasify (less than 2 millimeters). These fines will amount to 1.4 million tons annually. WESCO is projected to use their fines.

This study has assumed no basic employment generated in the new town from the by-products of coal gasification. The NIIP has discussed the possibility of using the ammonia solution in the production of fertilizer for its agricultural production. To date however, there are no definite plans or even employment analyses upon which to base a run of the economic system model. By-product processing could be as important a factor in basic employment as the plants. On the other hand, all the by-products could be shipped out by truck or rail, resulting in a small increase in transportation employment.

OTHER EXPORT INDUSTRIES

A new town on the Reservation could be the location of non-resource export industries. New resource industries as described in Appendix C are bound to locate where the resources are, but other new industry, such as electronics, can locate anywhere it finds the attributes it needs - qualified employees. The new town will have those employees, as a "by-product" of assembling a large number of households. There will likely be many adult Navajo and non-Navajo women, whose husbands work at the plant or mine, who would be available and interested in employment in an electronics plant, similar to Fairchild or General Dynamics already on the Reservation. In addition, the new town will already have developed transportation capabilities, infrastructure for plants, and housing and community services for potential employees.

No projections have been made for non-resource basis employment in the new town, for the following reasons:

- Location of electronics plants on the Reservation is highly dependent on the state of the industry, which we cannot project.
- There is no way to project the precise employment or wages of any electronics plant(s).
- The Navajo Nation may desire to spread basic employment throughout the Reservation, rather than allow its further concentration in the New Mexico portion. Fairchild, Arizona Public Service, Utah International and Navajo Forest Products are already there, and coal gasification projects are proposed.

INCOMES

In preparing the economic system model, the consultant team made a detailed analysis of all classes of positions to be found in the coal gasification plants and mines. To be useful in later analyses of consumer spending patterns, projections of the Navajo/non-Navajo mix in each class were made by the consultant. By calculating the average income for each class, it is possible to determine the average Navajo and non-Navajo incomes for each basic employee.

The results of these calculations, presented in Table III-1, show that non-Navajo employees are likely to have slightly higher average incomes inititally than Navajo employees. Navajos and non-Navajos will be paid exactly the same wage for the same position, but it is projected that non-Navajo employees will, at least initially, be slightly more concentrated in higher skill-level positions than Navajo employees.

The average annual wage for Navajo employees is projected to be $10,860 under Set 3. This is lower than the general range of Navajo plant and mine salaries, $12,000-13,000, because of the inclusion of a large number of agricultural workers, who even at full-time salaries will earn only $6,000 annually.

Average wages for non-Navajos are projected to be $12,490 annually. The small number of non-Navajo agricultural workers has little inpact on these incomes. In contrast to these wages, the non-base wages of both Navajos and non-Navajos are projected to be much lower than base wages: $7,140 for non-Navajos and $5,440 for Navajos.

ECONOMIC SYSTEM ASSUMPTIONS

Basic employment only provides the opportunity for a new town. Employees of the coal gasification plants and mines will have to make decisions about where they want to live and how they will spend their money. Based on the research portion of this analysis, we have concluded that these decisions will be different for Navajo and non-Navajo families. Each are, therefore, considered separately in this section, which describes the factors which are the major inputs to the economic system model.

NAVAJO/NON-NAVAJO EMPLOYMENT MIX

The proportion of employees which are Navajo and non-Navajo is affected by three factors:

- The type of industry and positions available
- The objectives and requirements of the Navajo Nation

- The availability of Navajos with skills matching the positions available

The Navajo Nation has the objective of having all - or as many as possible - job opportunities on the Reservation filled by Navajos. The method of obtaining this objective is to set guidelines for employment practices by all who obtain leases from the Nation.

Construction employment has been averaging 20 percent Navajo, but this is likely to be increased under Tribal guidelines. At the onset, approximately half of the operating employees will be Navajo, assuming that level of availability, with the expectation that this proportion would increase with the combined growth of positions to be filled and qualified Navajos to fill these positions. Apprentices will be entirely Navajo. Employment at entering level positions will be largely Navajo. The most difficult positions to fill by Navajos will be heavy mechanics, electricians, engineers and top management, because of the current lack of these positions on the Reservation.

For this analysis, we made the assumption that at a time several years after opening the plants, Navajos may have 60 percent of the positions in the coal gasification complexes. Based on experience on the Reservation, the ratio of Navajos might be slightly higher for the mine portion than the plant portion. Employment at the Navajo Indian Irrigation Project is projected to be 95 percent Navajo. Permanent construction forces are projected to be 80 percent Navajo.

Combining all these elements in Set 3 gives a Navajo share of 66.2 percent of basic employment. For Sets 1 and 2, without the irrigation project, the Navajo share of employment is 60.4 percent.

The Navajo share of non-base employment at 70 percent is projected to be higher than for base employment because of the higher proportion of two wage-earner families in the Navajo population.

ATTRACTION OF THE NEW TOWN

Creation of a new town with available quality housing will provide opportunities for all employees and their families to live close to their employment. How many will take advantage of such opportunity is dependent on many factors, which may be summarized as the general feeling towards living in the new town.

The choice available to Navajos is primarily between living in the new town and remaining in available housing and communities in the Reservation. The latter course could involve commuting from the worker's present home or moving closer, perhaps to live with members of the clan. In this section the thirteen factors affecting Navajo residency are evaluated for their new town or Reservation advantages. The manner in which these factors are considered is, to a large extent, subjective and therefore the weighting assigned to each factor can only be established for the individual employee and family.

In the factors affecting Navajo residency presented graphically in Exhibit 5, certain factors are necessary for the new town to be considered by potential residents, but are not incentives to move, e.g. political voice and acceptance, cultural and social amenities, activities for wives, and access to the Reservation. The most positive inducement to live in the new town will be the availability of housing in close proximity to employment. The exhibit shows that proximity will have a new town advantage from the beginning with no change over the life of the town. Housing availability will have even more of a new town advantage, which will increase as even more housing of a greater variety is built.

The overall image in the minds of Navajos is likely, however, to favor the Reservation until they can see the new town actually underway and can be assured that it will be concerned with Navajo culture, life-style and political control. For the economic system model, we project that by the "steady-state", 75 percent of Navajo base employees would decide to live in the largest new town, Set 3. We assume the attraction to Navajos at 65 percent for Set 2 and 50 percent for Set 1.

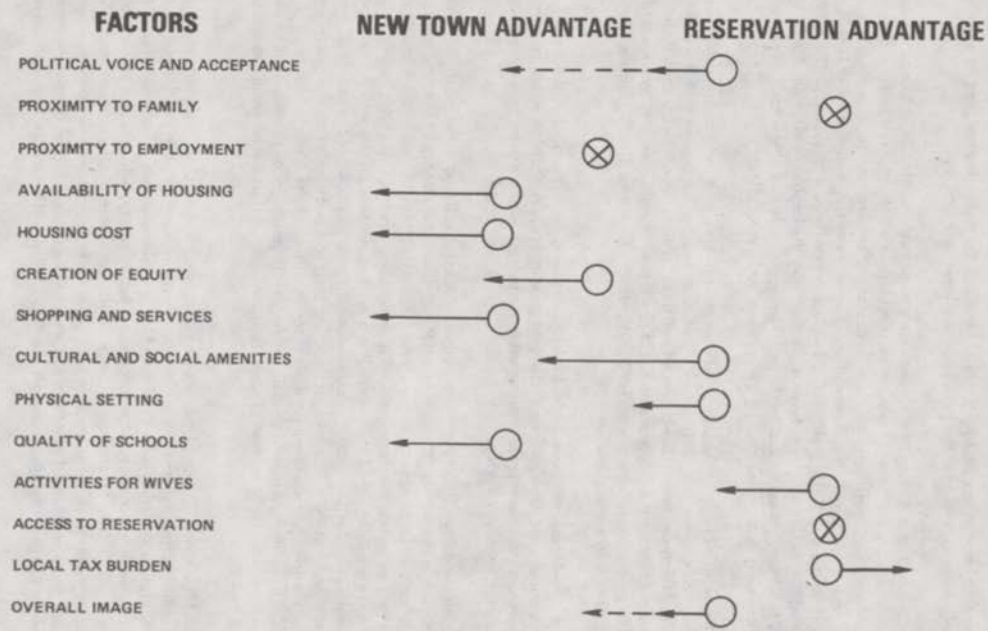
For non-Navajo employees and families, the same factors apply but the weightings and evaluations are applied from a different perspective. A decision would have to be made to move onto the Reservation, as opposed to moving into the existing community of Farmington and the San Juan Valley.

There are compelling reasons for both the Navajo Nation and the gasification companies to encourage the highest possible level of non-Navajo residency in the new town. The Navajo Nation's ultimate objective is to have 100 percent Navajo employment for all plants and mines located on the Reservation. It recognizes, however, that this is going to take a long time to achieve, and in the meantime a number of non-Navajos will be required to fill construction, skilled trade, and management positions. A major concern of the Nation has been that non-Navajo employees earning their pay on the Reservation are living off the Reservation and thus spending their incomes outside of the Navajo economy. A major objective, therefore, of increasing non-Navajo residency on the Reservation would be to retain a significant portion of non-Navajo income dollars for secondary expenditures within the Navajo economy.

For EPNG, WESCO and Utah, having employees live in close proximity to the plants will reduce commuting time for employees, reduce absenteeism and provide quick response for emergency situations. A further benefit of non-Navajo residency on the Reservation would be to match public service needs, such as schools and public safety, with the tax base provided by the plant. To locate all the non-Navajo employees within the Farmington School District off the Reservation would increase school expenses there. The plants however would not pay taxes there, but would pay them to Central Consolidated School District Number 22 (which covers Kirtland, Fruitland and all the Navajo Reservation within San Juan County).

Exhibit 5

FACTORS AFFECTING NAVAJO RESIDENCY



Neither EPNG nor WESCO contemplate any requirement that employees live in the new town. The town, therefore, must provide positive inducements to attract new residents. For employees a mixed town would provide an option for them to live closer to work than in Farmington. It is our opinion that the objective considerations of commuting distance which are commonly used in locational studies have little significance in the case of this new town.

It is assumed that the new town will be located on the Navajo Reservation and the established community of Farmington is located off the Reservation. This creates new factors to be considered, such as creation of equity and political voice. These factors are discussed below and graphically displayed in Exhibit 6.

The availability of housing at a reasonable price will be a major consideration for non-Navajos. In these factors the new town has an advantage which will be improving. The projected lower housing costs than in Farmington can be important.

The following groups of factors can discourage non-Navajo residency if they are not provided in a quality perceived to be as good as Farmington: shopping and services, cultural and social amenities, quality of schools and activities for wives. A second major concern will be with the political and social position of the non-Navajo in a predominately Navajo town. A sufficient number of non-Navajo families to create a non-Navajo presence and a local political system which allows a voice in decisions by non-Navajo residents will influence the decision to live in the new community.

Whatever the amenities provided, whatever the attraction of the new town and whatever the disadvantage of living in Farmington, there will be a large number - likely a majority - of non-Navajo base employees who will choose not to live in the new town. We assume that the percentage of non-Navajos choosing the new town will be 35 percent in Set 1, 45 percent in Set 2 and 40 percent in Set 3.

CONSUMER SPENDING PATTERNS

Sufficient information is available from a variety of sources to project consumer spending patterns of non-Navajo families. For this analysis, Bureau of Labor Statistics estimates of non-urban Western households are used, as shown in Table III-2. The information currently available on Navajo consumer spending patterns, however, is sparse. There is lots of information available on income, ranging from the 1970 Census to entrance standards of the Navajo Housing Authority. The distressing low family and per-capita income levels have been documented in BIA and Navajo Tribal studies and plans and analyzed in numerous academic studies of the Navajo Nation.

The recent life style of the Navajo has been a pattern of sporadic employment, low wages, poverty, large families and a lack of adequate housing, utilities, access to shopping and even paved roads. This low income, poor access to goods and services and a cultural tradition quite different from that off the Reservation could lead us to assume that the Navajo family

EXHIBIT 6

FACTORS AFFECTING NON-NAVAJO RESIDENCY

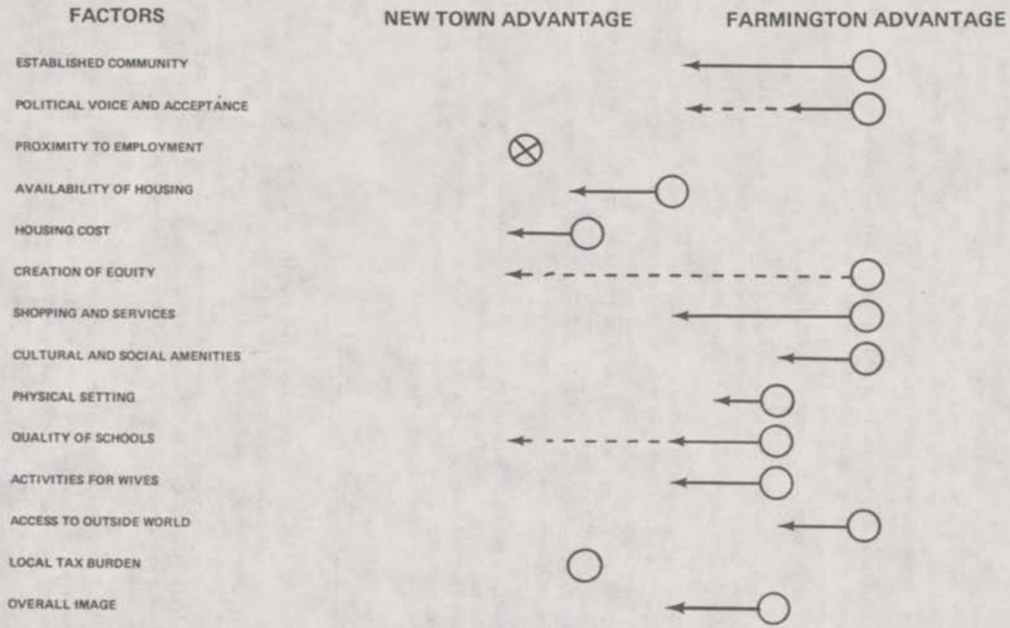


Table III-2
ESTIMATED CONSUMER SPENDING PATTERN
AVERAGE NON-NAVAJO BASE WAGE EARNER

Assume: Annual income of $12,540; Monthly income of $1,045;
Family size of 3 + persons.

		Percent[1]		Amount
GROSS INCOME		100.0%		$1,045
Deductions				
Federal Income Tax	11.8%		$123	
Social Security	5.1		53	
State Income Tax	1.9		20	
Subtotal		18.8%		$ 196
NET INCOME		81.2%		$ 849
Transportation		9.0%		$ 94
Food				
At Home	19.4%			
Away From Home	2.7			
Subtotal		22.1		231
Clothing		9.3		97
Housing and Utilities		21.2		221
Furniture and Appliances		3.3		34
Medical Care		5.2		54
Savings		4.1		43
Other		7.0		73
Total Spending		81.2%		$ 849

[1]For "non-urban Western households".

Sources: Bureau of Labor Statistics
Development Research Associates

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would spend its money differently than the non-Navajo family. In the past -- and for traditional Navajo families -- this has been true. There is substantial evidence, however, that Navajo life-styles are changing. This is not a new phenomenon, for Navajo culture and life-styles have always been changing.

We, therefore, determined to create a typical Navajo family spending pattern -- a monthly budget -- for the family of an average wage earner in basic employment and use this pattern to make generalizations about Navajo wage earners at other levels in income. The information for this typical pattern would come, in bits and pieces, from two sources:

- o A thorough review of available studies, reports and documents.
- o Interviews with persons knowledgeable about Navajo spending through experience on the Reservation.

From information provided by EPNG, WESCO and Navajo Agricultural Products Industries (which will operate the NIIP), we have estimated the average annual wages for Navajos at the new employment centers to be (in 1974 dollars):

Coal Gasification Plants	
(Combining mines and complexes)	$12,530
Navajo Indian Irrigation Project	6,055
Average Base Employment	$10,860

This average would apply under Set 3 only. Sets 1 and 2 without NIIP would obviously have a higher average base wage.

For purposes of this budget analysis, shown in Table III-3, we have assumed a typical annual salary of $10,860 or $905 monthly gross income. This typical family is assumed to have only one wage earner and no other source of income is included. The typical Navajo family size ranges between five and six persons. No extended family is presumed to be living in the new community with the wage earner, but a family or clan elsewhere on the Reservation looks to the town wage earner for support. Characteristics of the Navajo population as a whole are presented in subsequent sections of this chapter.

The results of this analysis show that the Navajo family spends its entire income. Spending patterns change as income rises but the tendency to spend the entire income remains. The estimated monthly consumer spending pattern for Navajo families is shown in Table III-3. Deductions are estimated at 14 percent of gross income, leaving $778 in take-home pay.

Without exception, there is agreement that transportation is the number one priority spending item for Navajo families. The purchase of a pick-up truck is considered an absolute necessity. Transportation has priority because of the distance from home to services and to relatives throughout the Reservation. We estimate that the typical Navajo base wage earner family will spend $213 monthly or 23.5 percent of gross income on transportation.

Table III-3
ESTIMATED CONSUMER SPENDING PATTERN
TYPICAL NAVAJO BASE WAGE EARNER

Assume: Annual income of $10,860; Monthly income of $905;
Family size of 6 persons; One wage earner.

		Percent		Amount
GROSS INCOME		100.0%		$905
Deductions				
Federal Income Tax	8.2%		$ 74	
Social Security	5.8		53	
Subtotal		14.0%		$127
NET INCOME		86.0%		$778
Transportation				
Vehicle	11.0%		$100	
Gas and Tires	9.7		88	
Insurance	2.8		25	
Subtotal		23.5%		$213
Food		23.0		208
Clothing		8.0		72
Housing		8.8		80
Utilities		3.8		34
Furniture and Appliances		3.3		30
Medical Care		1.6		15
Family Support		8.0		72
Savings		1.0		9
Other		5.0		45
Total Spending		86.0%		$778

Note: This table applies only to the "typical" Navajo family described above. The average annual wage is that of all base workers in Set 3. Under Set 2, with no agricultural workers, the average wage would be $12,530. The proportions and amounts available for housing would be higher at that wage.

Source: Development Research Associates

Again, there is general agreement that food is the second major item in the Navajo family spending pattern. The heavy expenditure for food is required because of the large average family size, because food is purchased for the extended family and relatives on the Reservation and because even with large areas of land, the average Navajo family cannot raise their own food. We estimate that our typical Navajo family will spend 23.0 percent of gross income or $208 per month on food.

There is general agreement that until this time, housing has had a low priority for Navajo families. The Navajo family has constructed its own hogan or other home with very little cash outlay. The Navajo family therefore has not been used to making monthly house payments or rental payments. There is an indication that the amount spent for shelter will increase in the future. One interviewee states that "priorities will change with the younger generation, and they will spend more for housing". Another states that "resistance will decline as incomes rise". Others not so optimistic citing higher social and family demands. Insistance on paying 25 percent of gross income for shelter in public housing will only lead to moving into house trailers, according to several persons interviewed. That action has taken place at public housing projects in Shiprock with recent strict enforcement of the income rules. We estimate that the typical Navajo family spends $80 monthly on housing payments, exclusive of utilities, or 8.8 percent of gross income. It is unlikely that this expenditure will increase at this income level, because of competing demands for transportation and family support. Higher incomes, however, will allow a greater percentage to be spent on housing.

Membership in a clan imposes upon the Navajo wage earner an obligation to provide support to other members of that clan. The high unemployment rate, estimated at 60-70 percent of the labor force, may mean that the typical wage earner is supporting as many as two other families out of his income. Navajo families generally do not save any money out of their monthly paycheck. The major reason for this is that the clan will take care of its members in any emergency, meaning there is little need to save. Another reason stated is the low income, pressing demands for transportation and food and the resulting lack of extra funds.

Based on the findings of these studies of consumer spending patterns, we conclude that the percentage of gross income allocated to retail sales is as follows:

	Navajo	Non-Navajo
Shopping Center	34.0%	38.8%
Service Stations	9.7	3.2
Lumber Yards	1.0	2.0
Auto Dealers	11.0	8.3
Total	55.7%	52.3%

RETAIL CHARACTERISTICS

The economic system model makes a number of assumptions about the characteristics of the retail businesses in the new town. For the most part, these are derived from the experience of similar sized western communities, modified as necessary by actual experience on the Navajo Reservation. The retail assumptions shown in Table III-4 include capture rates, average annual volume per employee, cost of goods as a percent of sales and dollar sales per square foot.

Capture rates are projected to be higher under Set 3 which has the largest population and thus greatest potential market for retail sales. With smaller populations, there is less support for shopping facilities, cutting down on variety and size of facilities and leading to more shopping in Farmington in contrast to the new town. Tribal warehouses are a major retail center in many urban settlements on the Reservation. Their sales would be included on Table III-4 under shopping centers.

POPULATION-BASED EMPLOYMENT

Outside of employment in basic industry and retail sales, determination of required secondary employment is based on a ratio of employment to population. For this analysis, comparisons were made with resource-based towns in the Southwest United States, municipalities in New Mexico and services currently being provided on the Navajo Reservation. For the economic system model we assumed the following employment per 1,000 population:

Education	44.0
Transportation, Communications & Utilities	19.05
Commercial Office	5.0
Local Government Office	1.0
Other Local Government	4.7
Hotel/Motel	3.6
Medical Clinic	1.5
Commercial Recreation	1.35

AVERAGE NUMBER OF EMPLOYEES PER FAMILY

Another major input to the economic system model is the average number of employees per family. The impact of this factor is two-fold:

- o A higher ratio reduces the number of households in the new town for the same sized work force

Table III-4
RETAIL CHARACTERISTICS

	Capture Rates			Average Annual Volume Per Employee	Cost of Goods as a Percent of Sales	Dollar Sales Per Square Feet
	Set 1	Set 2	Set 3			
Shopping Centers	50.0%	70.0%	77.4%	$ 28,700	61.3%	$70
Service Stations	100.0	100.0	100.0	45,455	65.0	95
Lumber Yards	0.0	0.0	0.0	51,070	70.0	45
Auto Dealers	20.0	35.0	40.0	145,770	80.0	55
Wholesale[1]	0.0	12.0	15.0	80,520	NC	NC
Construction	NC	NC	NC	30,700	NC	NC

NC - Not calculated.
[1] Sales locally to shopping center and auto dealers.

Source: Development Research Associates

- o A higher ratio increases average household income as more families have two wage-earners; this can boost retail sales and allow larger payments for housing

This run of the model assumes 1.24 employees per non-Navajo family and 1.28 employees per Navajo family in the new town.

HOUSEHOLD SIZE

The average non-Navajo family size in Farmington in 1970 was 3.37 persons. The decline in the birthrate and increasing number of single households is reducing average household size for non-Navajo populations nationwide. We project this trend will have limited applicability to Northwest New Mexico, and therefore assume an average non-Navajo household size of 3.27 for the economic system model.

Navajo family sizes are much higher than for non-Navajos, in fact, they are among the largest in the nation. No precise figures are available, so our research program involved data from five sources:

- o 1970 Census
- o BIA estimates
- o Navajo Housing Authority tenants
- o Town of Navajo population count
- o Interviews

The findings of that research show family size calculated within a range of 5.0 to 7.0 persons per family. This analysis by the economic system model assumes a Navajo family of 5.76 persons by household. These calculations do not take into account the "extended family", where brothers, sisters and other clan members live in the same housing unit. Industries on the Reservation estimate one-half their employees live in extended families ranging in size up to 18 persons. The actual number is not possible to estimate, however, and has little effect on number of housing units or total retail sales. These large family sizes for Navajos can cause interesting impacts. As portions of the work force change from non-Navajo to Navajo, the same number of employees and households can result in a much larger town population. This has little impact on retail sales, number of housing units or construction costs, but does affect the size of units required and especially school population.

CHARACTERISTICS OF THE NEW TOWN

The economic system model as described earlier uses the input assumptions and calculates the characteristics of the new town in employment, retail sales, population and households. Results of the model for each set of assumptions are presented in Table III-5. Set 1 would result in a population of 3,320 persons, Set 2 in a population of 9,798 persons and Set 3 in a population of 15,504 persons.

Under Set 1, the economic multiplier factor (ratio of base employment to total employment) would be 1:1.6. This means that for every 10 basic jobs, 6 secondary jobs are added. Under Set 3, the multiplier effect would be twice as high at 1:2.2, with 12 secondary jobs added for every 10 basic jobs. This larger town would provide seven times as many opportunities for secondary employment as the smallest town one-fifth its size.

The share of Navajos and non-Navajos in the community would not vary too much under the three sets of assumptions. Under both Sets 1 and 2, Navajos would comprise 72 percent of households and 81 percent of total population. Under Set 3, these shares would be 74 percent of households and 83 percent of total population.

EMPLOYMENT/INCOME PATTERNS

It is important for later analysis, especially of housing, to not only know numbers of employees/households and average wages, but also to know how they relate to each other. Families with two wage earners have the opportunity to create a better economic life. The average Navajo family with one employee in the plant and one in secondary employment will have earnings of $16,930. On the other hand, a second wage earner for an agricultural family may be an absolute necessity, for one employee will earn only $6,055 annually. NIIP estimates one-half its families will have two wage-earners, allowing an income of $12,110 annually (nearly as high as one coal gasification complex employee).

In Table III-6, the pattern of employment and household income is projected for Navajo and non-Navajo families. Under Set 1, average household income will be $12,352 and $12,661 respectively. This demonstrates a remarkable increase over the averages that would prevail with only one wage-earner per family. By Set 3, average household income has declined to $10,402 for Navajos and $11,513 for non-Navajos. The opportunities for secondary employment have, to a large extent, offset the lowering effects of the agricultural wages.

Table III-5
TOWN CHARACTERISTICS

EMPLOYMENT	Set 1	Set 2	Set 3
Total Base Employment	1,210	2,420	2,903
Base Employment in Town	544	1,409	1,834
Navajo	401	1,041	1,441
Non-Navajo	143	368	393
Non-Base Employment in Town	315	1,132	2,146
Navajo	224	792	1,525
Non-Navajo	91	340	621
Total Employment in Town	859	2,541	3,980
Navajo	625	1,833	2,966
Non-Navajo	234	708	1,014
HOUSEHOLDS			
Navajo Households	464	1,361	2,202
Navajo Group Quarters	31	92	148
Subtotal	495	1,453	2,350
Non-Navajo Households	189	571	818
Total	684	2,024	3,168
POPULATION			
Navajo Households	2,672	7,839	12,682
Navajo Group Quarters	31	92	148
Subtotal	2,703	7,931	12,830
Non-Navajo Households	617	1,867	2,674
Total	3,320	9,798	15,504

Source: Development Research Associates

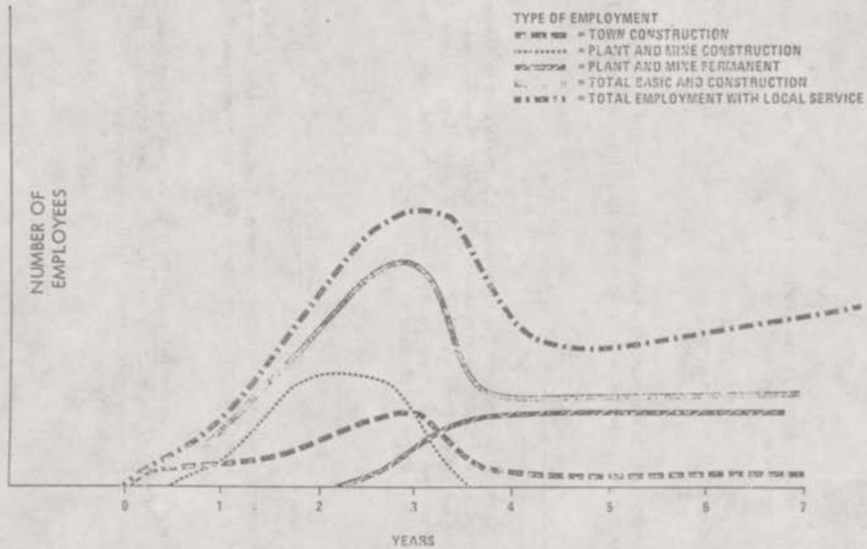
Table III-6
EMPLOYMENT/HOUSEHOLD/INCOME PATTERNS

	Number of Households			Mean	Total Income (000)		
	1	2	3	Income	1	2	3
NAVAJO							
One Wage Earner							
Plant/Mine	290	753	746	$12,530	$ 3,634	$ 9,435	$ 9,347
Construction	6	16	18	6,650	40	106	120
Agriculture	-	-	115	6,055	-	-	696
Secondary	69	304	755	6,000	414	1,824	4,530
Two Wage Earner							
Plant/Mine + Secondary	103	266	326	16,930	1,744	4,503	5,519
Construction + Secondary	2	6	7	11,050	22	66	77
Agriculture + Agriculture	-	-	100	12,110	-	-	1,211
Agriculture + Secondary	-	-	29	10,455	-	-	303
Secondary + Secondary	25	108	254	10,400	260	1,123	2,642
Total	495	1,453	2,350		6,114	17,057	24,445
Average					$12,352	$11,739	$10,402
NON-NAVAJO							
One Wage Earner							
Plant/Mine	107	274	286	$12,665	1,355	3,470	3,622
Construction	2	6	5	8,400	17	50	42
Agriculture	-	-	8	7,340	-	-	59
Secondary	35	154	323	8,615	302	1,327	2,783
Two Wage Earner							
Plant/Mine + Secondary	33	86	90	17,065	563	1,468	1,536
Construction + Secondary	1	2	2	12,800	13	25	25
Agriculture + Secondary	-	-	2	11,740	-	-	23
Secondary + Secondary	11	49	102	13,015	143	638	1,328
Total	189	571	818		2,393	6,978	9,418
Average					$12,661	$12,221	$11,513

Source: Development Research Associates

Exhibit 7

WORK FORCE DYNAMICS
2 Plant Complex



DEVELOPMENT RESEARCH ASSOCIATES

RETAIL SALES

The retail sales projected for the new town in shopping center, service station, and auto dealer categories are projected to be:

Set 1	$ 2.4 million
Set 2	8.8 million
Set 3	13.1 million

Average sales per capita within the new community are slightly higher under Set 3 because the capture rate will be higher with added shopping facilities fewer sales will be made off the reservation.

WORK FORCE DYNAMICS

Combining the basic employment as given and the secondary (or local service) employment as determined by the economic system model, it is possible to demonstrate the changes in work force size and composition. Exhibit 7 shows the build-up from the start of construction to the construction peak at Year 3 and the rapid decline in the next year. A steady state condition is arrived at in approximately Year 5.

TRANSITION

The creation of new households in the new town will create a need for new housing. In Chapter IV the potentials for the development of this new housing and the problems which must be overcome are discussed.

The variety of assumptions which may be made about town size and characteristics make it extremely difficult to prepare a physical plan for the new coomunity. In Chapter V, a new town concept is presented which provides for the development of a viable community under a broad range of actual conditions.

IV
HOUSING

There have been no significant housing projects built on the Reservation for Navajo employees of the new basic industries. The few housing projects completed have been federally subsidized and oriented almost entirely to low income families. Housing has not been available for employees whose earnings are similar to those employees who will be working at the new coal gasification plants.

There is sufficient national and regional experience available to determine the housing needs and the ability to pay of non-Navajo families who might live in the new town. Navajo families, on the other hand, have not had market rate housing available and are used to paying a smaller proportion of their income on housing. What then will their reaction be to the availability of housing in the new community?

This study has to give careful attention to a number of questions:

- What are the housing needs and desires of Navajo families?
- How do these needs and desires change as Navajo families have substantially higher incomes?
- Will Navajo families be willing to pay the market rate to obtain the new housing which will be created in the new community?
- If not, what actions must be taken by the planners of the new community -- the reduction in cost, a subsidy, or a combination of these two?

In this chapter we will discuss:

- Housing needs -- the lack of adequate and available housing.
- Housing concepts -- the style and characteristics of housing which will meet the needs and desires of Navajo and non-Navajo families.
- Housing projections -- the number, type of housing and costs required to serve the families projected by the economic system model to be living in the new town.

- Marketing potentials -- the extent to which Navajo families are projected to either pay for market rate housing or require subsidy.

HOUSING NEEDS

It must be stated, emphatically from the beginning, that new housing is needed for the employees of the coal gasification plants. There is no settlement of Navajos anywhere near the plant sites.

The Bureau of Indian Affairs estimates total Navajo housing units at approximately 18,000 to 19,500. A rough sampling suggests that some 72 percent to 90 percent of these housing units are inadequate by Federal Government standards. It is estimated that the majority of Navajo housing units are still mud and log hogans.

The 1970 Census showed that on the Navajo Reservation:

- The median number of rooms was 2.0.
- The median number of persons was 5.1.
- Fewer than 30 percent had bathroom or sewer.
- Median value was $3,100.

These units are certainly not adequate for families of Navajo employees, nor are they available to families of non-Navajo employees.

Our analysis of Farmington indicates that it will have difficulty in providing housing for either Navajo or non-Navajo families. Navajo employees of the new plant are unlikely to want to live in Farmington, as we discussed earlier in Chapter III - Nature of the Town. Non-Navajo families will find it difficult to secure housing in Farmington. A large influx of construction and operating employees will quickly deplete the supply of vacant housing. Purchase prices will rise to a level substantially above that currently asked. Based on the average salary of non-Navajo employees at the new plants, families will be able to afford houses of values up to $30,000, which is below the current asking price for new housing.

To project the potential requirements for housing in the new town, we went through the following steps, separately for Navajo and non-Navajo families:

- Determine the number of households and individuals in group quarters, from the economic system model.

- Establish different housing types and sizes to be provided.

- Estimate the percentages of households and individuals who will desire each housing type and size. This step is based on the space and number of bedrooms needed for various family sizes, and does not consider income or payment potentials.

The results of these steps are presented in the following tables. In Table IV-1, the number of households and individuals for each set of the new town sizes at the two plant state is shown.

HOUSING CONCEPTS

The traditional Navajo house was the hogan, a circular, single-room dirt floored dwelling made of wood or stone and used both for living and for ceremonial purposes. To the people, their hogans are not just places to eat and sleep; mere parts of the workday world; as homes have tended to become in the minds of non-Navajos. The hogan occupies a central place in the sacred world also. The hogan reflects the people's way of life; the harmony between the Navajo, and his family, his community and his land:

May my house be blessed
From my head to my feet
Where I lie and all above me
All around me, may it be holy

(From the dedication ceremony for a new hogan)

Cabins made out of any combination of wood, stone and mud, are becoming more prevalent throughout the Reservation. Shortages of timbers, desire for large structures, and the need for floors for furniture and stoves, have led to more dwellings being built out of machine-processed frame materials. The cabin is constructed with a typical off-Reservation floor plan; separate bedrooms, kitchen, living and dining areas. The cabin is almost always built in conjunction with a conical or domed hogan which is used for ceremonial purposes.

Life in the hogan or cabin is typical of the traditional way of life. There is no way to accurately estimate the number of Navajos who are traditional, although 34 percent subsist on livestock. While raising livestock does not insure a traditional approach to life, this occupation seems to best represent this life-style. The semi-traditional life-style is typified by the seasonally employed migrant farm workers. This broad category probably contains the majority of Navajos on the Reservation today. The family may move to a transitional community, but still strongly identifies with the local community from which it migrates.

The non-traditional life-style consists of urban Navajos or Navajos with salaried jobs. These urban Navajos do not want to live in hogans. A recent survey of tenants of the Navajo Housing Authority concluded, ... "that a sizable majority of the people residing on the Navajo Reservation have a desire to live in modern houses. While there is a strong cultural

Table IV-1
HOUSEHOLDS AND INDIVIDUALS IN GROUP QUARTERS

	Set 1	Set 2	Set 3
NAVAJO			
Households	464	1,361	2,202
Individuals in Group Quarters	31	92	148
Total	495	1,453	2,350
NON-NAVAJO			
Households	189	571	818
TOTAL			
Households	553	1,932	3,020
Individuals in Group Quarters	31	92	148
Total	684	2,024	3,168

Source: Development Research Associates

attraction to the traditional hogan because of its warmth, and because of its cozy atmosphere, the people interviewed indicated that the modern conveniences to be found in conventional houses far outweigh the attractions of a hogan."[1]

There is general agreement - from our interviews and our research - that non-traditional Navajo families:

- Want modern houses rather than hogans.
- Consider housing for shelter pruposes primarily, and not for status.
- Place low priority on housing in their budget expenditures.

To create a housing concept to meet these desires and practices is difficult indeed. The Albuquerque Collaborative (TAC) developed a concept in their housing study which we believe to be valid for our planning of a new town. The transition from a traditional hogan to a modern house is shown in Exhibit 8.

Based on this analysis, TAC developed a prototype, two-bedroom Navajo house, shown in Exhibit 9. This structure encloses 1,130 square feet, and contains a living/dining room, kitchen, master bedroom, dormitory (possibly two bedrooms) and one bathroom. An enclosed storage area opens into the attached carport. The structure is designed on a 12 foot module to allow for prefabrication. Provision is made for expansion by adding a bedroom or a family/dining/loom room.

This concept can be supplemented by information gathered in our interviews:

- A number of houses should have three or four bedrooms to accommodate larger families.

- Should have one and one-half baths for these larger units.

- Living and dining room should be together, with separate kitchen.

- Fireplace is desirable.

- Space should be provided for washers and dryers.

- Outside storage is required.

- Parking should be in garage, but carport is acceptable if adjacent to house.

- No carpeting

- House must be built of solid, high-quality materials for long life, easy maintenance and resistance to vandalism.

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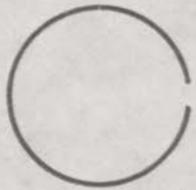
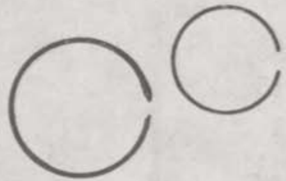
Exhibit 8

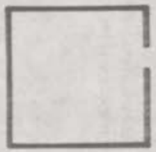


TRADITIONAL —NAVAJO HOGAN IS A CIRCULAR FORM WITH ALL LIVING IN ONE LARGE SPACE

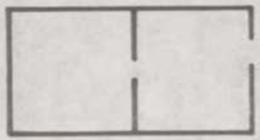


EXPANSION WAS SIMPLE BUILD ANOTHER HOGAN ADJACENT

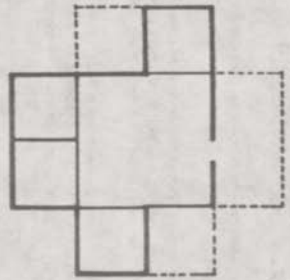
WHEN THE NAVAJO ADAPTED TO ANGLO ARTIFACTS AND BUILDING MATERIALS THE WALLS BECAME STRAIGHT



FURTHER ADAPTATION TO ANGLO CULTURE RESULTED IN RECTANGULAR FORM



EXPANSION MEANT THE ADDITION OF ANOTHER RECTANGLE WHICH WAS ATTACHED TO THE FIRST RECTANGLE

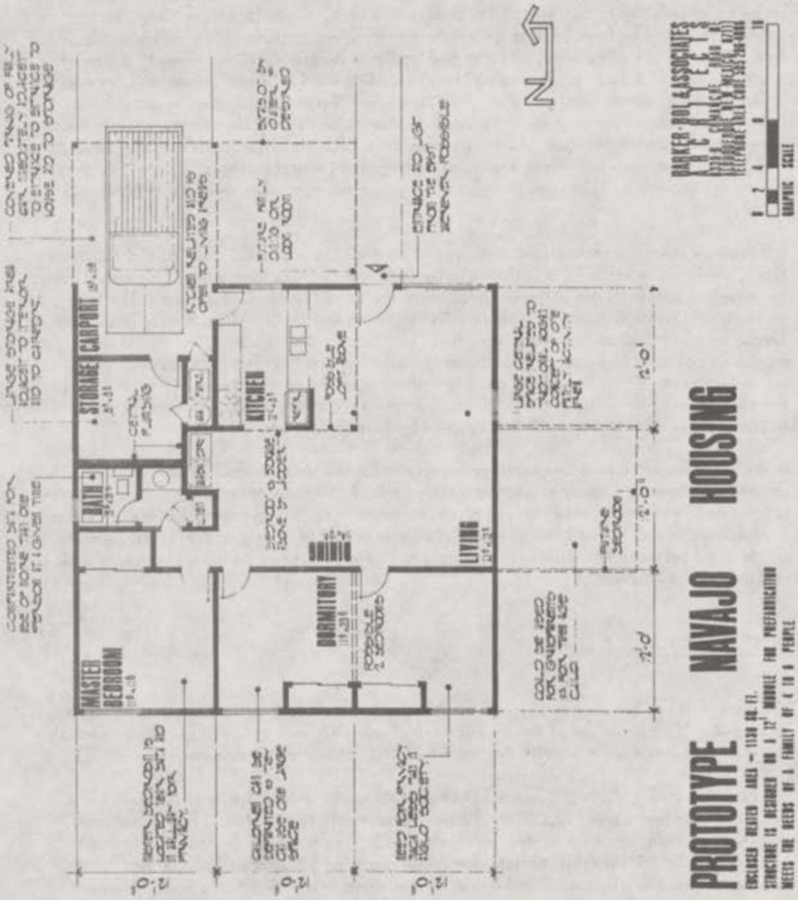


SOLUTION: USING MODULAR-PREFABRICATED CONSTRUCTION, PROVIDE ONE LARGE LIVING AREA IN CENTER OF HOUSE WITH SMALLER SPACES AS REQUIRED ON THE PERIMETER OF LIVING AREA

NAVAJO HOUSING STUDY

A RESEARCH PROJECT OF THE COMMUNITY DESIGN CENTER AT UNM
PRODUCED BY: JOHN BORREGO, H. BARKER & RON ROMERO

Exhibit 9


PROTOTYPE NAVAJO HOUSING
MASTER BEDROOM
DORMITORY
LIVING
DINING
KITCHEN
BATH
STORAGE
CARPORT
BARKER-BOL & ASSOCIATES
GRAPHIC SCALE

- o Windows, doors and insulation must be good because of cold weather and strong winds.

Units have not been constructed to meet this concept because of the lack of financing. First, there has been only a limited number of wage-earner Navajo families who have the income and stability to consider purchase of such a unit. Second, private financing has been discouraged by fears of land ownership status and non-enforceability of contracts. And, finally, federal assistance for low and moderate income families, never high enough to make much of a dent in the massive Navajo housing need, has been stopped under the federal housing moratorium. As a result, Navajo families wanting modern housing have been forced into self-made cabins or, more common recently, mobile homes. Mobile homes have been attractive because financing is available - the unit itself is its own collateral. In addition, the units come fully equipped with appliances and furnishings. Finally, they can be moved, which is perhaps more common on the Reservation than in the non-Navajo world.

For the new town under study, housing unit characteristics are established for eight different types, as shown in Table IV-2. The majority of housing will be single family detached units. No one-bedroom units are projected because of the large Navajo family sizes. The two-bedroom unit is the concept presented earlier as developed by the Albuquerque Collaborative. Three- and four-bedroom houses range up to 1,700 square feet in size. The added space represents not only bedrooms, but bathrooms, halls and storage. While it has been the practice that non-Navajo families usually desire larger houses than Navajos, we have utilized the same sizes in this study. As the town changes to predominately Navajo, many units initially occupied by non-Navajo will be occupied by Navajo families.

A small number of multi-family units are proposed for individuals, couples and families with one child. These are likely to become more popular in this new town as they have throughout the nation recently. Mobile homes are projected in both single and double-wide sizes. A double-wide unit would have at least 1,000 square feet of floor space. Finally, group quarters are proposed for individual Navajo employees who return on the weekends to their families on the Reservation.

COST OF UNITS

The experience of building housing on the Reservation and close-by is that construction is expensive. The remoteness of the location - and resulting need to import building materials and skilled trades - combine with the small building volume to increase costs.

The Navajo Housing Authority has not been able to meet the HUD limits of $18,000 for a three-bedroom house and $22,000 for a four-bedroom unit (about $17.00 per square foot). Housing in Farmington is now being built in the $22-$24 per square foot range. In Page, Arizona, the Salt River Project found new housing costing $30,000 to $38,000 was too expensive for plant employees. The Central Consolidated School District is building houses for teachers on the Reservation at a cost of $25.00 per square foot.

Table IV-2
HOUSING UNITS CHARACTERISTICS

	Area in Square Feet	Cost	Payments [1]		Family Size		Share of Household	
			Annual	Monthly	Navajo	Non-Navajo	Navajo	Non-Navajo
SINGLE FAMILY								
2 Bedroom	1,130	$17,100	$1,506	$126	4 - 5	2 - 4	18%	50%
3 Bedroom	1,400	21,000	1,850	154	6 - 7	5	24	30
4 Bedroom	1,700	25,500	2,246	187	8 +	6	20	5
MULTI-FAMILY								
1 Bedroom	750	14,250	1,255	105	1 - 2	1 - 2	2	3
2 Bedroom	900	17,100	1,506	126	2 - 3	3	3	2
MOBILE HOME								
Single-wide	720	7,200	982	82	2 - 3	2	13	5
Double-wide	1,000	10,000	1,364	114	4 - 5	3 - 4	20	5
GROUP QUARTERS	230	3,450	304	25	1	-	NA	NA

[1] 30 years @ 8%; mobile homes 15 years @ 11%

Source: Development Research Associates

The size of the new town proposed, the need for rapid development and the need to keep costs down, all lead to the intention to provide modular housing for the single family units. For purposes of this study, we estimate that modular housing can be provided for $15.00 per square foot. The cost of single family homes is projected to range from $17,100 for a two-bedroom unit to $25,500 for a four-bedroom house.

Multi-family units, which will not benefit from the modular housing concept to the extent that single family units will, are estimated at $19.00 per square foot. These apartment structures are assumed to include more in amenities, such as recreation facilities and laundry rooms, than single family houses. Mobile homes are estimated to cost $10.00 per square foot complete for the mobile home itself, not including the pad required in a mobile home park, which is calculated later in this analysis as a commercial venture. Group quarters are estimated to cost $15.00 per square foot of living space.

Annual Costs

The annual cost of housing units is calculated, based on our best estimates of what terms and interest rates will be available for this new town. Permanent structures are projected to be financed for 30 years at eight percent interest. A four-bedroom unit would, therefore, require a monthly payment of $187 for principle and interest.

Mobile homes are projected to be financed for 15 years at eleven percent interest, resulting in a $114 per month payment for a double-wide unit. This does not include the approximately $40 per month required for lease of a space in a mobile home park.

HOUSING DESIRES

The share of households which would desire each type of housing are displayed in the final columns of Table IV-2. We project 62 percent of Navajo families will desire single family houses, with a high proportion of these in three- and four-bedroom sizes. Non-Navajo families are apt to desire a higher proportion of single family houses than Navajos. Because of much smaller non-Navajo family sizes, though, the mix of units will be much more oriented to the smaller houses. Fifty percent of all non-Navajo families are projected to desire two-bedroom houses, compared to only 18 percent of Navajo families.

Only five percent of families, both Navajo and non-Navajo, are projected to desire apartments. These are oriented primarily to single individuals and working, childless couples.

Mobile homes will have an appeal, because of their lower costs and mobility, for Navajo families desiring to own a housing unit and for non-Navajos who have lived in mobile homes elsewhere. We project 33 percent of Navajo and 10 percent of non-Navajo families will desire mobile homes.

HOUSING PROJECTIONS

Total housing costs for Navajo families and individuals can be calculated by applying the cost factors for each type of housing unit to the number of units required for each set of the new town. Table IV-3 demonstrates that under Set 1, 495 units will be required at a total cost of $7,975,000. The annual payment required for principle and interest will be $768,000. By Set 3, the total housing cost for Navajos has increased to $37,844,000, or $3,645,000 annually.

The size and costs of housing units and annual payments required are calculated on the same basis for non-Navajo families as for Navajo families. In Table IV-4, the total non-Navajo housing needs and costs are shown for the three sets of new town development. In Set 1, 189 units are required at a total cost of $4,460,000 and an annual cost of $303,000. In Set 3, total cost has increased to $14,654,000, requiring an annual payment of $1,224,000.

Housing needs and total costs have been presented separately for Navajos and non-Navajos of different cultural experience, family sizes and housing desires. Later in this study, the separate costs will be important in assigning the responsibility of the Navajo Tribe and Federal agencies with programs directed toward Indians for providing or assisting with housing programs.

To determine the total housing needs and costs of the new community, the Navajo and non-Navajo totals are summed in Table IV-5. Under Set 1, total annual housing costs will be $1,071,000, increasing to $4,869,000 in Set 3.

MARKETING POTENTIALS

One of the most critical questions of this study is how much Navajo families will be willing to pay for the housing they need and desire. The comprehensive analysis of Navajo consumer spending patterns described in Chapter III - Nature of the Town, was designed in large part to answer that question.

There is general agreement that until this time, housing has had a low priority for Navajo families. The purpose of housing has been to provide shelter but not much else. The Navajo family has constructed its own hogan or other home with very little cash outlay. The Navajo family therefore has not been used to making monthly house payments or rental payments.

The Bureau of Indian Affairs has a program to provide $3,500 grants for the construction of "dry" dwelling units (no water or sewer) in remote locations. Most of the new housing on the Reservation, however, has been in more urbanized settings, with construction by the Navajo Housing Authority or a non-profit corporation using federal subsidies. In these housing units, rentals can be as low as $55-$60 per month for low income families. Wage earners, however, can be required to pay 25 percent of gross income or from $150 to $220 per month for these same housing units. There has been significant resistance to the requirement of paying this

Table IV-3
NAVAJO HOUSING NEEDS

	Number of Units			Total Cost (in thousands of dollars)			Annual Cost [1] (in thousands of dollars)		
	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
SINGLE FAMILY									
2 bedrooms	84	245	397	1,436	4,190	6,789	127	369	598
3 bedrooms	111	327	529	2,331	6,867	11,109	205	605	979
4 bedrooms	93	272	440	2,372	6,936	11,220	209	611	988
Subtotal	288	844	1,366	6,139	17,993	29,118	541	1,585	2,565
MULTI-FAMILY									
1 bedroom	9	27	44	128	385	627	11	34	55
2 bedrooms	14	41	66	239	701	1,129	21	62	99
Subtotal	23	68	110	367	1,086	1,756	32	96	154
MOBILE HOME									
Single	60	177	286	432	1,274	2,059	59	174	281
Double	93	272	440	930	2,720	4,400	127	371	600
Subtotal	153	449	726	1,362	3,994	6,459	186	545	881
Total Households	464	1,361	2,202	7,868	23,073	37,333	759	2,226	3,600
GROUP QUARTERS	31	92	148	107	317	511	9	28	45
TOTAL	495	1,453	2,350	7,975	23,390	37,844	768	2,254	3,645

[1] 30 years @ 8%; mobile homes 15 years @ 11%

Source: Development Research Associates

Table IV-4
NON-NAVAJO HOUSING NEEDS

	Number of Units			Total Cost (In Thousands of Dollars)			Annual Cost[1] (In Thousands of Dollars)		
	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3	Set 1	Set 2	Set 3
SINGLE FAMILY									
2 bedrooms	95	285	409	1,624	4,874	6,994	143	429	616
3 bedrooms	57	171	245	1,197	3,591	5,145	105	316	453
4 bedrooms	9	29	41	230	740	1,046	20	65	92
Subtotal	161	485	695	3,051	9,205	13,185	268	810	1,161
MULTI-FAMILY									
1 bedroom	6	17	25	86	242	356	8	21	31
2 bedrooms	4	11	16	68	188	408	6	17	36
Subtotal	10	28	41	154	430	764	14	38	67
MOBILE HOME									
Single	9	29	41	65	209	295	9	28	40
Double	9	29	41	90	290	410	12	40	56
Subtotal	18	58	82	155	499	705	21	68	96
Total Households	189	571	818	3,360	10,134	14,654	303	916	1,324

[1] 30 years at 8 percent; mobile homes 15 years at 11 percent.

Source: Development Research Associates

Table IV-5
TOTAL HOUSING NEEDS AND COSTS

	Set 1	Set 2	Set 3
UNITS REQUIRED			
Navajo	495	1,453	2,350
Non-Navajo	189	571	818
Total	684	2,024	3,168
TOTAL COST (In Thousands of Dollars)			
Navajo	$7,975	$23,390	$37,844
Non-Navajo	3,360	10,134	14,654
Total	$11,335	$33,524	$52,498
ANNUAL COST (In Thousand of Dollars)			
Navajo	$ 768	$2,254	$3,645
Non-Navajo	303	916	1,224
Total	$1,071	$3,170	$4,869

Source: Development Research Associates

25 percent of gross income for housing. A number of families have moved out of public housing because of the recent imposition of this 25 percent requirement. Wage earning Navajos have objected to paying a substantially higher rent for the same unit for which a low income family pays much less even though this lesser amount constitutes 25 percent of their gross income.

There is an indication that the amount spent for shelter will increase in the future. One interviewee states that priorities will change with the younger generation, and they will spend more for housing. Another states that "resistance will decline as incomes rise." Others are not so optimistic citing higher social and family demands. Insistance on paying 25 percent of gross income for shelter in public housing will only lead to moving into house trailers, according to several persons interviewed. That action has taken place at public housing projects in Shiprock with recent strict enforcement of the income rules.

We estimate that the typical Navajo family with an income of $10,860 spends $80 monthly on housing payments, exclusive of utilities, or 8.8 percent of gross income. It is unlikely that this expenditure will increase at this income level, because of competing demands for transportation, food, and family support. It will increase, however, as income rises.

With no experience on the Navajo Reservation of a large number of wage-earner Navajo families being offered a large supply of quality homes, it is not appropriate to choose one number -- such as $80 per month -- and base our marketing assumptions on it. In anticipation of the format of our financing program in Chapter VIII, we have established three scenarios of Navajo willingness to pay:

- Scenario A -- the most optimistic possibility, that Navajo families will come fairly close to the non-urban Western pattern of housing expenditures as a share of total family spending.

- Scenario B -- the more reasonable projection, that Navajo families will pay a larger share than they now pay, but that this will not approach the non-urban Western share.

- Scenario C -- the worst case, that Navajo families will not pay more than the accepted monthly payment of $80 monthly for middle-income families.

In reviewing the employment/income relationships of Navajo families described in Chapter III - Nature of the Town, it is apparent that Navajo families fall into three major categories of income, which are likely to have different patterns of housing spending:

- $6,000-$7,000 Income

  Single wage-earner family in year-round agriculture, construction or primary non-base.

Housing payment for principle and interest would range from 10 percent under Scenario C to 12 percent under Scenario A. This is a higher percentage than for higher incomes under Scenario C because many of these families would be in subsidized housing requiring 25 percent of gross income to housing, including utilities, maintenance and insurance.

- $10,000-$13,000 Income

  Single wage-earner families in plants, and two wage-earners in agriculture, construction or primary non-base plus agriculture or secondary employment.

  Under Scenario C, these families would pay only $80 monthly for housing, the amount developed in Chapter III as the current monthly housing expenditure for the typical Navajo family. The monthly payment could increase to $120 monthly under the most optimistic scenario.

- $16,000+ Income

  Double wage-earner families in plant and secondary non-base positions.

  These families will have more discretionary income than Navajos have had in the past, and -- with transportation and food needs met -- they may spend more for housing than the middle-income families.

In Tables IV-6 through IV-8, the annual amount of money which Navajos would have available for the payment of housing principle and interest is calculated for all three sets under each scenario. As an example of our calculations, in Table IV-6, the Navajo family in the $6,000-$7,000 income category is assumed to have a gross income of $6,000. Twelve percent would be allocated to housing principle and interest under Scenario A. The monthly payments of $60 would result in an annual payment of $720. The 75 households in this category would generate total annual payments of $54,000 for housing. For Set 1, therefore, we project from $497,000 to $724,000 would be available annually from Navajo families. By Set 3, under the most optimistic scenario, the amount of housing monies available from Navajo families has risen to $2,953,000 annually.

NON-NAVAJO HOUSING MONIES

In the same manner, the housing monies available from non-Navajo families have been projected for each of the three sets. The income categories are slightly higher than for Navajo

Table IV-6

HOUSEHOLD MONIES AVAILABLE[1] FOR NAVAJO HOUSING - SET 1

Scenarios	Percent to Housing	Average Annual Payments	Number of Households[2]	Total Annual Payments
SCENARIO A				
$6-7,000 Income	12%	$ 720	75	$ 54,000
$10-13,000 Income	12	1,440	317	456,000
$16,000+ Income	13	2,080	103	214,000
Total			495	$724,000
SCENARIO B				
$6-7,000 Income	11%	660	75	50,000
$10-13,000 Income	10	1,200	317	380,000
$16,000+ Income	11	1,765	103	182,000
Total			495	$612,000
SCENARIO C				
$6-7,000 Income	10%	$ 600	75	$ 45,000
$10-13,000 Income	8	960	317	304,000
$16,000+ Income	9	1,440	103	148,000
Total			495	$497,000

Note: For $6-7,000 income, use $6,000
For $10-13,000 income, use $12,000
For $16,000+ income, use $16,000

1 Available for payment of principle and interest annually
2 From Table III-6, constant under all scenarios

Source: Development Research Associates

Table IV-7

HOUSEHOLD MONIES AVAILABLE[1] FOR NAVAJO HOUSING - SET 2

Scenarios	Percent to Housing	Average Annual Payments	Number of Households[2]	Total Annual Payments
SCENARIOA A				
$6-7,000 Income	12%	$ 720	320	$230,000
$10-13,000 Income	12	1,440	867	1,148,000
$16,000+ Income	13	2,080	266	553,000
Total			1,453	$2,031,000
SCENARIO B				
$6-7,000 Income	11%	$ 660	320	$ 211,000
$10-13,000 Income	10	1,200	867	1,040,000
$16,000+ Income	11	1,765	266	469,000
Total			1,453	1,720,000
SCENARIO C				
$6-7,000 Income	10%	$ 600	320	$ 192,000
$10-13,000 Income	8	960	867	832,000
$16,000+ Income	9	1,440	266	383,000
Total			1,453	$1,407,000

Note: For $6-7,000 income, use $6,000
For $10-13,000 income, use $12,000
For $16,000+income, use $16,000

1 Available for payment of principle and interest annually
2 From Table III-6, constant under all scenarios

Source: Development Research Associates

Table IV-8

HOUSEHOLD MONIES AVAILABLE[1] FOR NAVAJO HOUSING - SET 3

Scenarios	Percent to Housing	Average Annual Payments	Number of Households [2]	Total Annual Payments
SCENARIO A				
$6-7,000 Income	12%	$ 720	888	$639,000
$10-13,000 Income	12	1,440	1,136	1,636,000
$16,000+ Income	13	2,080	326	678,000
Total			2,350	$2,953,000
SCENARIO B				
$6-7,000 Income	11%	$ 660	888	$ 586,000
$10-13,000 Income	10	1,200	1,136	1,363,000
$16,000+ Income	11	1,765	326	575,000
Total			2,350	$2,524,000
SCENARIO C				
$6-7,000 Income	10%	$ 600	888	$ 533,000
$10-13,000 Income	8	960	1,136	1,091,000
$16,000+ Income	9	1,440	326	469,000
Total			2,350	$2,093,000

Note: For $6-7,000 income, use $6,000
For $10-13,000 income, use $12,000
For $16,000+ income, use $16,000

[1] Available for payment of principle and interest annually
[2] From Table III-6, constant under all scenarios

Source: Development Research Associates

families, because of the different mix of employment. Scenarios continue to range from A -- the most optimistic to C -- the worst case.

Average annual payments available for housing principal and interest are projected to be higher than for Navajo families, especially in the lower- and middle-income brackets. Under Scenario C, the worst case, non-Navajo families are likely to pay less as they compare their monthly housing costs to what Navajos pay for the same units. In Tables IV-9 through IV-11, available housing monies for non-Navajo families are shown by set. For Set 1, we project $260,000 to $353,000 will be available annually. By Set 3, under the most optimistic scenario, $1,389,000 will be available from non-Navajo families.

HOUSING MONEY GAP

The amounts of money available annually from projected resident households in the new town are not sufficient to meet the annual cost of housing needed. In this section, the annual costs of housing, for both Navajo and non-Navajo families (derived from Tables IV-3 through IV-5) are matched with the annual monies available from households (derived from Tables IV-6 through IV-11). The results of this match-up are presented in Tables IV-12 through IV-14.

The comparisons are made on an aggregate basis for Navajo and non-Navajo families. No match-up is made from individual families to specific housing units.

Under Set 1 in Table IV-12 -- the individual company towns -- the annual gap ranges from $44,000 under Scenario A to $314,000 under Scenario C. Only under Scenario C is there a gap for non-Navajo families. The excess non-Navajo funds available under the other scenarios are not added to the combined totals to compensate for Navajo gaps.

The "annual difference capitalized" calculates the amount of money which would be required to be paid in capital cost at the time of construction to eliminate the need for annual subsidy. In Set 1, this ranges from a low of $441,000 under Scenario A, to $3,194,000 under Scenario C.

Under Set 2, the annual difference ranges from $222,000 under the most optimistic scenario to $1,000,000 under the worst case. The construction subsidy required would be $2,237,000 to over $10,000,000.

Finally, for the largest new town -- Set 3 -- the annual difference would range from $692,000 under Scenario A, to $1,843,000 under Scenario C. Under the worst case, the capital subsidy would exceed $18.6 million. This housing gap is approximately twice that of Set 2, with only slight improvements for gasification employees. Unless substantial funding can be obtained from NIIP or outside sources to meet this extra deficiency, the entire town viability will be threatened.

Table IV-9

HOUSEHOLD MONIES AVAILABLE[1] FOR NON-NAVAJO HOUSING
SET 1

Scenarios	Percent to Housing	Average Annual Payments	Number of Households[2]	Total Annual Payments
SCENARIO A				
$7-9,000 Income	15%	$1,275	37	$ 47,000
$11-13,000 Income	15	1,905	119	227,000
$17,000+ Income	14	2,380	33	79,000
Total			189	353,000
SCENARIO B				
$7-9,000 Income	15%	$1,275	37	$ 47,000
$11-13,000 Income	14	1,800	119	214,000
$17,000+ Income	13	2,210	33	73,000
Total			189	334,000
SCENARIO C				
$7-9,000 Income	12%	$1,020	37	$ 38,000
$11-13,000 Income	11	1,397	119	166,000
$17,000+ Income	10	1,700	33	56,000
			189	$260,000

Note: For $7-9,000 income, use $8,500
For $11-13,000 income, use $12,700
For $17,000+ income, use $17,000

1 Available for payment of principle and interest annually
2 From Table III-6, constant under all scenarios

Source: Development Research Associates

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Table IV-10

HOUSEHOLD MONIES AVAILABLE[1] FOR NON-NAVAJO HOUSING
SET 2

Scenarios	Percent to Housing	Average Annual Payments	Number of Households[2]	Total Annual Payments
SCENARIO A				
$7-9,000 Income	15%	$1,275	160	$204,000
$11-13,000 Income	15	1,901	325	619,000
$17,000+ Income	14	2,380	86	205,000
Total			471	$1,028,000
SCENARIO B				
$7-9,000 Income	15%	$1,275	160	$204,000
$11-13,000 Income	14	1,800	325	585,000
$17,000+ Income	13	2,210	86	190,000
Total			471	$979,000
SCENARIO C				
$7-9,000 Income	12%	$1,020	160	$163,000
$11-13,000 Income	11	1,397	325	454,000
$17,000+ Income	10	1,700	86	146,000
			471	$763,000

Note: For $7-9,000 income, use $8,500
For $11013,000 income, use $12,700
For $17,000+ income, use $17,000

1 Available for payment of principle and interest annually
2 From Table III-6, constant under all scenarios

Source: Development Research Associates

Table IV-11

HOUSEHOLD MONIES AVAILABLE[1] FOR NON-NAVAJO HOUSING
SET 3

Scenarios	Percent to Housing	Average Annual Payments	Number of Households[2]	Total Annual Payments
SCENARIO A				
$7-9,000 Income	15%	$1,275	336	$428,000
$11-13,000 Income	15	1,905	392	740,000
$17,000+ Income	14	2,380	90	214,000
Total			718	$1,389,000
SCENARIO B				
$7-9,000 Income	15%	$1,275	336	$428,000
$11-13,000 Income	14	1,800	392	706,000
$17,000+ Income	13	2,210	90	199,000
Total			718	$1,333,000
SCENARIO C				
$7-9,000 Income	12%	$1,020	336	343,000
$11-13,000 Income	11	1,397	392	548,000
$17,000+ Income	10	1,700	90	153,000
Total			718	$1,043,000

Note: For $7-9,000 income, use $8,500
For $11-13,000 income, use $12,700
For $17,000+ income, use $17,000

1 Available for payment of principle and interest annually
2 From Table III-6, constant under all scenarios

Source: Development Research Associates

Table IV-12
HOUSING NEEDS AND AVAILABLE
HOUSEHOLD MONIES - SET 1
(In Thousands of Dollars)

	Scenario A	Scenario B	Scenario C
NAVAJO			
Annual Costs	768	768	768
Annual Available from Households	724	612	497
Annual Difference	44	156	271
Annual Difference Capitalized[1]	441	1,564	2,718
NON-NAVAJO			
Annual Costs	303	303	303
Annual Available from Households	353	334	260
Annual Difference	(50)	(31)	43
Annual Difference Capitalized[2]			476
COMBINED			
Annual Costs	1,071	1,071	1,071
Annual Available from Households[3]	1,027	915	757
Annual Difference	44	156	314
Annual Difference Capitalized	441	1,564	3,194

[1] 76% standard housing - 30 years @ 8% and 24% mobile home - 15 years @ 11%
[2] 93% standard housing - 7% mobile home
[3] Amount available from non-Navajos is limited to actual annual cost.

Source: Development Research Associates

Table IV-13
HOUSING NEEDS AND AVAILABLE
HOUSEHOLD MONIES - SET 2
(In Thousands of Dollars)

	Scenario A	Scenario B	Scenario C
NAVAJO			
Annual Costs	2,254	2,254	2,254
Annual Available from Households	2,031	1,720	1,407
Annual Difference	223	534	847
Annual Difference Capitalized [1]	2,237	5,345	8,495
NON-NAVAJO			
Annual Costs	916	916	916
Annual Available from Households	1,028	979	763
Annual Difference	(111)	(63)	153
Annual Difference Capitalized [2]			1,694
COMBINED			
Annual Costs	3,170	3,170	3,170
Annual Available from Households [3]	2,947	2,636	2,170
Annual Difference	223	534	1,000
Annual Difference Capitalized	2,237	5,345	10,189

[1] 76% standard housing - 30 years @ 8% and 24% mobile home - 15 years @ 11%
[2] 93% standard housing - 7% mobile home
[3] Amount available from non-Navajos is limited to actual annual cost.

Source: Development Research Associates

Table IV-14
HOUSING NEEDS AND AVAILABLE
HOUSEHOLD MONIES - SET 3
(In Thousands of Dollars)

	Scenario A	Scenario B	Scenario C
NAVAJO			
Annual Costs	3,645	3,645	3,645
Annual Available from Households	2,953	2,524	2,093
Annual Difference	692	1,121	1,552
Annual Difference Capitalized [1]	6,941	11,244	15,567
NON-NAVAJO			
Annual Costs	1,324	1,324	1,324
Annual Available from Households	1,389	1,333	1,043
Annual Difference	(65)	(9)	281
Annual Difference Capitalized [2]			3,111
COMBINED			
Annual Costs	4,969	4,969	4,969
Annual Available from Households	4,277	3,848	3,136
Annual Difference	692	1,121	1,833
Annual Difference Capitalized	6,941	11,244	18,348

[1] 76% standard housing - 30 years @ 8% and 24% mobile home - 15 years @ 11%
[2] 93% standard housing - 7% mobile home
[3] Amount available from non-Navajos is limited to actual annual cost.

Source: Development Research Associates

OPERATING COSTS

It is not enough to build the housing for families in the potential new town. Each house, apartment or mobile home must be operated and maintained. Utilities must be paid for, insurance provided, and the structure kept in sound condition.

While this analysis has not calculated the annual or cumulative cost of operating and maintaining all housing, it is possible to project the amounts of money families will have available. A test of reasonableness can then be applied to these projections to indicate the likelihood of potential problems.

The consumer spending patterns developed in Chapter III indicate that for the typical family the following amounts of money are spent on housing:

	Navajo	Non-Navajo
Gross Monthly Income	$905	$1,045
Percentage to:		
Principle and Interest	8.8%	14.0%
Utilities and Maintenance	3.8	7.2
Monthly Amount to:		
Principle and Interest	$ 80	$ 146
Utilities and Maintenance	34	75

The relationships of utility and maintenance spending to housing spending and gross income shown here are applied to the three scenarios and three income categories developed earlier in this chapter. The results of this analysis are shown in Table IV-15.

Under reasonable expectations, the households with one wage-earner at a coal gasification complex will have $43 monthly available for utilities and maintenance. This will be sufficient if the cost of utilities can be reduced from their present level through creation of the large, economical system we project for the new town.

The amounts projected to be available should be sufficient for non-Navajos under virtually all combinations. Navajo families in the $6,000-$7,000 range, however, will not have sufficient funds out of their monthly income to maintain their homes and purchase utilities.

TRANSITION

This chapter has defined housing needs, and the gap between what is available from households and what is required. No attempt has been made to assign responsibility for making up the difference or for outside sources of money to assist housing in the new town. These matters will be discussed -- and potential solutions defined -- in Chapter VIII - Financing.

Table IV-15
HOUSEHOLD MONIES AVAILABLE MONTHLY FOR UTILITIES AND MAINTENANCE

	Scenario A	Scenario B	Scenario C
NAVAJO			
$6,000-$7,000 Income[1]	$26	$24	$22
$10,000-$13,000 Income[2]	52	43	34
$16,000+ Income[3]	75	64	52
NON-NAVAJO			
$7,000-$9,000 Income[4]	$55	$55	$44
$10,000-$13,000 Income[5]	82	77	60
$17,000+ Income[6]	102	95	73

1 Use $6,000
2 Use $12,000
3 Use $16,000
4 Use $8,500
5 Use $12,700
6 Use $17,000

Source: Development Research Associates

V
TOWN CONCEPT

A new town located on the Navajo Reservation in northwest New Mexico would represent a substantial impact on the settlement patterns and community inter-relationships throughout the Southwest United States. The general location of such a town in relationship to the major centers of the region has been shown in Exhibit 1 in the Summary. One of the important things to note is the absence of any major urban center nearby. As a result, this new town could not only become the second largest city in New Mexico, if all the proposed plants are built, but could also be one of the few examples of a truly balanced free-standing new city in the United States.

The magnitude of the challenge is substantial. The potential for making an innovative contribution to the internal economics of the Navajo, while at the same time establishing a new town as a major urban force in the Southwest, is great indeed.

Presently, the area, while showing little urbanization, provides resources to the nation and the indications are that resource development could increase in the future. Should the urban development status remain as it is, the escape of capital from the Reservation will continue. Should the Navajo elect to retain capital within the Reservation boundaries, a major urban addition, with its accompanying economic activities, could become necessary.

At present, no one knows what a new town on the Navajo Reservation will be like, either during its development or at its "ultimate" state. There are an extremely varied number of new town sizes and characteristics at any point in time due to:

- Plant design and improvement of technology
- The unknown scheduling of all the necessary approvals for a plant construction
- Level of acceptance of the new town by employees
- Ever-changing social and economic characteristics of both Navajo and non-Navajo families
- The effect of alternative locations
- The availability of financing

The creation of a town concept, therefore, could not result in a physical plan based on an exact town size at a specific location for a given point in time. Rather, the town concept has to be flexible enough that it would accommodate all the reasonable variations which could be expected, and still provide, at any point in time, a viable community. The nature of the new town, as described by the economic system model, indicates three major changes which will take place over the life of a new town:

- A change from a construction camp to an ongoing community

- An ever increasing share of Navajos within the community.

- A significant increase in population, even though employment and housing units remain the same, because of the much larger size of Navajo families.

In addition, extremely rapid growth is possible if all the coal gasification capacity contemplated is created on the schedule outlined in Chapter 1. The challenges of rapid growth and unknown town size were presented to Gruen Associates, the land planning and urban design consultant on the study team. The planning consultant has responded with the creation of a unique, flexible town concept. In this section the following elements of the town concept are described:

- Initial Premises -- the size and characteristic variations which might be expected based on the economic system model, and the resulting new town land requirement.

- Urban Patterns -- the experience of existing urban areas in responding to growth and change which are for the most part not appropriate for this new town.

- New Town Criteria -- the objectives of new town planning which must be met by the town concept.

- New Town Components -- the elements of a new town which include neighborhood, community and village.

- Development Sequences -- the ways in which new town components might be assembled and renewed over the life of the new community.

INITIAL PREMISES

The major concern of most new communities and new towns currently proposed and developed in the U.S. lies in attracting an employment base sufficient to support the anticipated residents. The Navajo new town is uniquely opposite. Immediate employment is known, and growth and extensions of employment can be reasonably projected using resource development as a base. This might solve the major conventional problem but it raises others in its place. From a planning standpoint, pace and change are the most critical.

Because of the tight time constraints placed on this study, both the socio-economic and land planning groups operated simultaneously, rather than sequentially as they might have done under a more normal schedule. Early in the study, before creation, or running, of the economic system model, preliminary estimates were given to the planning consultants of the likely range of employment and population at projected levels of development: through the ultimate construction of approximately seven plants. The details of these estimates are provided in text and exhibit in Appendix E.

The findings of this initial study indicate that:

- o The new town could grow to nearly 60,000 people by the year 2000, with all seven coal gasification plants in operation.
- o After a short life span of only four to five years, the new town must be capable of almost instant economic and operational maturity.
- o Population could grow to 32,000 in ten years.
- o As the total population ratio shifts between Navajo and non-Navajo, the number of households does not shift dramatically. The large Navajo family size means that, although the total population may be increasing at a very high rate, the actual number of dwelling units may increase only nominally.

Not only must the new town be capable of accommodating growth rates greatly exceeding those experienced in the conventional U.S. urbanization process, but it must also be capable of accommodating major changes in life-style, family size, and economic status, long before physical obsolescence of the housing inventory.

Further, as Navajos move to this new location, add skills, change their economic status, and become involved in education, health, social, fiscal and recreational matters, the mode of family life might change. Since one of the primary purposes for this new town is the addition of choice and the enhancement of life on the Reservation, planning accommodations for any such changes must be anticipated and provided for.

Before getting into any detail about physical forms and strategies, a review of available information, and how this information might help in establishing some guidelines, is useful.

The proposed new town should be judged on the following:

- o Its ability to grow rapidly.
- o Its administrative power to retain its balance at all stages of its development (even when growth accelerates or diminishes). Be prepared to accept a population of 12,000 or one of 100,000.
- o Its flexibility in the accommodation of racial mixes, family sizes, economic shifts, social modifications, and

- o Its ability to respond to all other manner of stable or changing human conditions that might occur in the near and long-term future.

Normally, these conditions of uncertainty would be unacceptable as a basis for new town development, but the conditions in this case are radically different from the norm:

- o There is a known immediate employment base.

- o The Navajo desire something far beyond the "escape economics" they presently endure.

- o Financing is promising from two points of view:

  - . This ia a "special" town, and because of its very nature, it warrants special governmental consideration.

  - . It has a diversified employment base immediately available.

With these unique conditions present, the planning consultant started with an initial premise that:

> Potential new housing and community services would be in one town serving all basic employers, rather than separate towns.

The reasons for this premise include:

- o Provide critical mass for economic activity
- o Create additional secondary employment
- o More competitive with Farmington because of added services and amenities
- o Potential capital cost savings for infrastructure
- o Variety of residents
- o Reduced dependence on one employer
- o Potential for federal and Navajo support, not likely for company camp
- o Avoid company paternal image

Drawbacks or potential disadvantage of the premise include:

- o Reduced corporate control over location, plan and costs
- o Reduced access to plants

Both the socio-economic and land planning elements of the study team were instructed to start with this premise, but to review it critically and make adjustments in it if the findings of the study effort made it necessary or desirable. Provision was made, both in the economic system model and the town concept/location aspects of the study, for new towns which would serve:

- All coal gasification plants and the Navajo Indian Irrigation Project;
- All coal gasification plants; or
- Plants of individual coal gasification companies

URBAN PATTERNS

The question of arranging land use requirements, growth and change into a pattern which is appropriate for the rapidly changing town and the basic characteristics of the Navajo life-style is quite complex, and a brief discussion about Navajo life-style in relation to urban development patterns is appropriate in this context.

The Navajos have no history of urbanization. They have historically been agrarian and nomadic, and towns have principally been developed in response to Navajo needs vis-a-vis economic and government relationships.

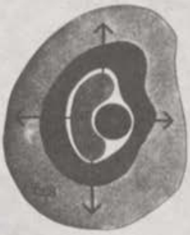
Therefore, this analysis attempts to accommodate a cultural settlement pattern which may not lend itself to urban development. At the same time, it must be recognized that preservation of a culture as a "museum piece" is no better than obliterating the original culture by overwhelming it with new and different customs.

The question can now be raised: "What kind of town development concept best matches Navajo life-style and heritage and at the same time provides for their culture in transition to a socio-economic system based on conventional urban relationships?" Many theoretical constructs or systems have been advanced and/or implemented by writers and practitioners. The series of diagrams shown on Exhibit 10 represent a number of alternates. The last two illustrate an approach which seeks to accommodate change through physical regeneration and recycling.

CONVENTIONAL

The conventional pattern of development is probably most familiar, since it represents the dominant character of our cities today. It is the outgrowth of an historic process which began at the center and moved outward as the population grew. Its major failing has become all too

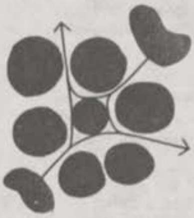
Exhibit 10
URBAN PATTERNS



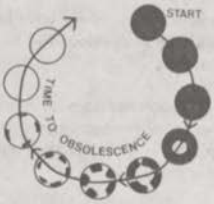
CONVENTIONAL

GARDEN CITY

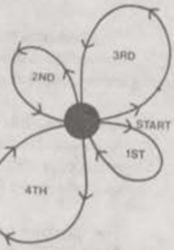
RADIAL CITY



VILLAGES



REGENERATIVE THEORY



REGENERATIVE CITY

Notes:

CBD:	Central Business District
Green:	Greenbelt
Ind:	Industrial
Open:	Open Space
Res:	Residential

URBAN PATTERNS GRUEN ASSOCIATES

familiar as we watched our cities decay. Spatial constraints, functional obsolescence and inaccessibility have all combined to prevent flexibility and response to change in this pattern. There is no possible application of this pattern to any town that might be built on the Navajo Reservation.

GARDEN CITY

The garden city concept is a classic form developed in the 19th Century in order to overcome the undesirable early manifestations of the industrial revolution in high density city forms focusing on industrial and worker districts which were poorly planned and built. Its basic features included a series of residential areas separated from industry by greenbelts. Surrounding the entire community was a permanent greenbelt. The idea was to control growth, allow each family to reach open countryside, and create an optimum-size city. Many of England's new towns today are based on this concept. As a form, it cannot respond to changes in growth rate, social or life-style shifts, or economic modifications. As a static concept, it could never be sensitive to the Navajo situation of constant mobility.

RADIAL CITY

The radial city is composed of a central business district with close-in suburbs which extend out al ng the arterials. In such a plan, housing is located close to major radial roads, and the land in between has low-intensity uses like low-density housing, farming and open space.

The open nature of the radials provides a way of accommodating new growth and leaving the existing communities behind. Since the existing facilities cannot absorb the additional pressure, their changes and the municipal services and facilities get strained. Many of the regional developmentson the East Coast represent this city pattern.

VILLAGES CONCEPT

The main features of this concept are the development of many community clusters and a network of regional facilities shared by these villages. In this concept, small new communities with populations of approximately 2,000 people would be built on vacant land, combining various types of housing and neighborhood shopping facilities, and other services.

Village clusters are made up of adjacent units, and regional commercial services are created to provide a basic framework for new growth.

The major disadvantage of the villages concept is the high cost of infrastructure. New growth in the region would involve development of new community clusters in presently undeveloped areas. Extension of highways, water and sewer systems, and other public facilities to those areas, would be relatively more expensive than a more closely knit form.

Many of the new towns developed within the last 20 years in the United States, such as Reston and Columbia, represent application of the villages concept. However, since this form does not embody a time or phasing feature, it has limitations in the present situation.

REGENERATIVE FORM

All of the above described forms fail to deal with the fact that urban life is in constant flux and change dominates rather than the static urban form. Therefore, we can no longer afford to start from a core and build outward, because, in time, the centers strangle and the suburbs starve. The necessity for extraordinary rapid growth and change in the Navajo situation requires an innovative approach. The regenerative city is proposed as an appropriate new city form for the Navajo new town. This regenerative city would be built to recycle itself by assuming a circular configuration designed to intercept its initial area of development at about the time that the initial area either reaches obsolescence or is in need of new urban infusion because of its growing role in regional affairs. The circular or looped pattern is explicit, but "helical" is a better term to describe the process, when actual growth is related to real time.

NEW TOWN CRITERIA

Exhibit II summarizes our understanding of the planning criteria directly applicable to this new town. The foregoing drawings have indicated the general physical situation, the anticipated growth, change, and the space requirements for the total operation at key stages of its development.

The criteria drawing is divided into three parts:

- Socio-cultural flexibility
- Population accommodation
- Physical form

It will be noted that each of these parts has a common theme: the necessity for accommodating high growth rates, together with the ability to respond to social and economic change.

A second theme is the ability to slow the growth rate and provide a desirable urban environment even if the resource development would not provide employment for a population beyond 12,000 to 15,000.

Exhibit 11
NEW TOWN CRITERIA

SOCIO-CULTURAL FLEXIBILITY

1. High initial growth, radical changes in the resident mix and social patterns, and an elevated economic level, are factors that combine to place flexibility, the ability to gracefully respond to change, as the most important single criterion for the new town.

2. Must be capable of accommodating a rapidly changing mix of residents, from a Navajo/non-Navajo ratio of 1:1 in 1977 to 2:1 in 1979, and 5:1 by 1985.

3. Must anticipate major life-style modifications as both Navajo and non-Navajo engage in developing the first new major town in the Southwest.

4. Should have a great concern for the Navajo culture.

POPULATION ACCOMMODATION

1. Must be capable of accommodating extremely high population growths in its earliest years, 100 percent within two years after initial phase is complete.

2. Must be capable of accommodating residents above 60,000 if needs should warrant.

3. Must provide the mechanisms which allow construction of 5,700 dwelling units within a four-to five-year period.

4. At a two-plant level (15,000 population), the town must be a viable entity.

PHYSICAL FORM

1. Rapid initial growth and major socioeconomic changes require special attention to stability. This suggests a series of small-scale residential enclaves designed to enhance community life and remain free from the forces of growth and change.

2. The grouping of enclaves into larger components capable of supporting full urban services and amenities will be necessary. These components must reach an adequate community facility support level quickly. This suggests a pattern of growth that would not allow scatteration.

3. Rapid rates of change indicate the desirability of a system that allows for periodic reassessment, renewal and socioeconomic regeneration.

4. Near-term regeneration will allow the town to accommodate early rapid growth, respect Navajo and non-Navajo traditions, and mature without dangerous economic dislocation.

5. The criteria of optimum choice in housing type, location and cost must prevail throughout each component of the new town.

6. The new town, with an assured basic employment, must be capable of developing to its full economic and social potential within the Reservation boundaries. This means a full range of support facilities, added industry, sales and service, and cultural and social amenities.

7. Should cause little ecological disruption and minimize pollution.

71-333 O - 76 - 32

A third, and very significant, theme is that family stability and cultural heritage must be preserved despite the stresses of growth and change.

Underlying all of the criteria is the goal of providing the Navajo with the opportunity of establishing an urban system capable of retaining within the Reservation the economic gains that the Navajo and the Navajo lands might produce. If this is to be accomplished, the Navajo urban system must attract to itself most of the earned income that now flows off the Reservation.

All of the work in this study points toward the criteria of:

- Economic growth
- Population accommodation
- Response to growth and change
- Enrichment of the Navajo heritage

NEW TOWN COMPONENTS (1)

We suggest that the regenerative pattern appears to be the most functionally known planning mechanism for consideration because it is capable of responding to the personal, social and economic needs of this new town.

If the principle of regeneration is accepted as being the most appropriate to the unique requirements of this new town, then it is next necessary to formulate the size, character and inter-relationships for each of the new town components.

We start with the smallest possible urban grouping, the neighborhood, and move to groups of neighborhoods forming a community, on to groups of communities forming a village, and then to groups of villages forming a town. Exhibits 12 and 13 offer diagrams explaining the components of a settlement that might commence with the immediate accommodation of construction people and then move on to respond to increasing family activity, changing racial mixtures, varying life-styles, cultural cross-fertilization, and economic change. The implicit "product" of these diagrams is a direct path from hastily erected camps to an established and viable town accomplished without waste.

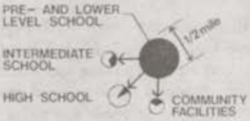
THE NEIGHBORHOOD

With between 300 and 350 families, the neighborhood is the basic component of the community, the village, and the town. Its population of approximately 1,500 will need a full range of activities either within it or immediately adjacent.

The size proposed will support a fully staffed and equipped elementary school within a quarter mile of the most remote homes. Pre-school facilities can be provided at the elementary school

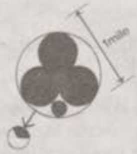
Exhibit 12
NEW TOWN COMPONENTS - I

NEIGHBORHOOD



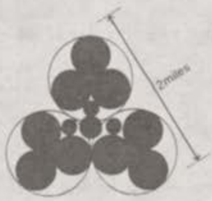
POPULATION: ± 1,500
AREA: ± 140 ACRES
TOTAL HOUSING: ± 330 D.U.s
1 PRE AND LOWER LEVEL SCHOOL
1/3 INTERMEDIATE SCHOOL
1/9 HIGH SCHOOL
1/3 COMMUNITY FACILITIES

COMMUNITY



POPULATION: ± 4,500
AREA: ± 420 ACRES
TOTAL HOUSING: ± 1,000 D.U.s
FULL INTERMEDIATE SCHOOL
1/3 HIGH SCHOOL
FULL COMMUNITY FACILITIES

VILLAGE = 2 PLANTS



POPULATION: ± 13,500
AREA: ± 1,360 ACRES
TOTAL HOUSING: ± 3,000 D.U.s
FULL HIGH SCHOOL
FULL VILLAGE FACILITIES
1/3 REGIONAL FACILITIES

NEW TOWN COMPONENTS I GRUEN ASSOCIATES

Note: D.U. = Dwelling Unit.

location, and so offer the same geographic convenience.

With elementary and pre-school activities as the nucleus of the neighborhood, the opportunities for family stability and social enhancement should not be eroded by the growth and transition of the world immediately outside. The neighborhood is designed to be the quiet enclave. It will certainly have its doors and windows, but it cannot be a hallway for the extensive activities around it.

Because of its intimate scale, the neighborhood cannot, by itself, support needs much beyond the education of its younger children. It must share its higher-level educational needs with other neighborhoods. If it expects reasonable costs for goods and services, these too will have to be joined with larger groupings of people. Health, utilities, fire and security, and government itself, will need the joining of neighborhoods if any desired level of service is to be provided.

A neighborhood would require about 140 acres to accommodate all uses including roads.

THE COMMUNITY

We propose that three neighborhoods be clustered to form a community. This community would contain about 1,000 families and have a population of approximately 4,500.

A settlement of this size would allow close-to-home education up to the high school level, could provide most daily needs for goods and services, and could begin some important advances in health and social care. Utility and emergency services would not be substantially improved over the neighborhood, but response time could be substantially reduced. Local government would not yet be very effective because, at this scale, too many decisions would necessarily be made in other locations.

A community would require about 415 acres, approximately three times the size of the neighborhood.

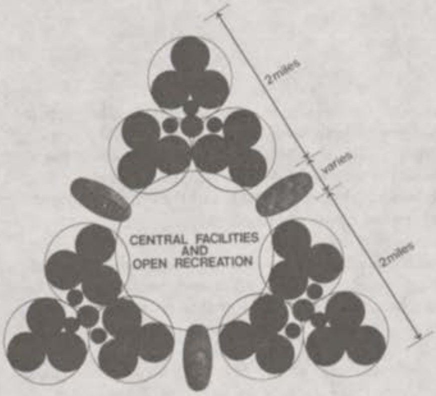
THE VILLAGE

Once populations grow beyond the community level (4,500 population), the next level of urbanization is the village.

The village would consist of nine neighborhoods clustered into three communities, with three communities grouped into a village. The village would have a population of 12,000 to 15,000. If the Navajo new town development should slow at this point, it will still be balanced.

Exhibit 13
NEW TOWN COMPONENTS - II

THE NEW TOWN



POPULATION: ± 40,000
AREA: 4,400 ACRES
TOTAL HOUSING: ± 9,000 D.U.s
FULL EDUCATIONAL SYSTEM, 1 COLLEGE
FULL REGIONAL FACILITIES
AND OPEN SPACE

NEW TOWN COMPONENTS II GRUEN ASSOCIATES

Note: D.U. = Dwelling Unit.

It will have educational facilities through high school and perhaps beyond; its institutions will have at least some representation; its government will have a resident rather than a remote emphasis; many of its goods and services can be provided locally; the utilitarian and protective systems should be complete.

At the level of 12,000 to 15,000, some obvious weaknesses will still exist: some younger people might leave in search of higher education or expanded economic opportunities, some major purchases may still flee the Reservation with a consequent economic out-flow, the expansive entrepreneur might feel hampered by the relatively small size, and so on.

Nevertheless, a village of this size can be a haven for its residents because the basic necessities can be developed, social maturity has a chance, economic demands can be met, cultural advances are fostered, and the "city" pressures are minimized.

NEW TOWN COMPONENTS (II)

THE TOWN

As its extensive agricultural and mineral resources are developed, it is entirely possible that the initial Navajo settlement will grow far beyond the village level of 12,000 to 15,000 people. In anticipation, we believe the next level of urbanization should be the town. The town is the essential element of three communities - population 36,000 to 45,000 people. A town of this magnitude would be a major force in the Southwest, playing a social, political and economic role far beyond that captured by the village level of development.

Its educational system can be complete, its economic base diversified from mineral extraction and agriculture through processing, distribution, marketing, and, of course, secondary and tertiary employment. Individual choice would be amplified, social choice broadened, and opportunities expanded.

What has been proposed here is a pattern of settlement and growth able to accommodate immediate needs, adjust to either high or low growth rates, consolidate at any point in time, not leave behind any urban debris, and be prepared to move on from community to village to town without either waste or disruption.

The diagrammatic form suggested here provides the maximum of exposure to the land, eliminates scatteration, allows for growth, minimizes transportation, and, above all else, it recognizes that, no matter how the settlement might begin, it will be forced through some remarkable changes in the earliest years of its life.

Under other circumstances, this concept and the strategy for its development could not be considered. Vested private ownerships would dissipate any attempts at structuring a growth pattern based on actual need. However, since ownership of all the land rests with the Tribe, we believe the concept of directional growth to be altogether feasible.

DEVELOPMENT SEQUENCE I

The location and arrangement of various land uses, as shown in Exhibits 12 and 13, are only one part of the new town concept. Equally important is the notion of growth, change, flexibility and regeneration.

As we have said, the regenerative city would be built to recycle itself by assuming a circular configuration, designed to intercept its initial area of development at about the time the initial area either reached obsolescence in a physical sense or was in need of change by virtue of demographic changes. The problems presented by population changes described earlier can best be solved by this kind of system. For example, we think it can accommodate the adjustment between temporary, highly-skilled construction workers, and long-term, semi-skilled workers. Furthermore, it can take care of the needs of an increasing Navajo composition.

The process of regeneration is graphically presented in Exhibit 14. City building would commence with the first <u>neighborhood</u> or two, and as these first neighborhoods near completion, the first <u>community</u> is planned and begins to develop. As this community nears completion, the <u>second community</u> is planned and begins to develop, and the planning community number three takes place as the second is being built. Construction operations are thus uninterrupted while growth continues. This sequential process is directed along a curved path designed to return to the first community at the time when this initial area is becoming functionally and physically obsolete. Upon re-entry by the growth process, the first community is either "regenerated" and/or a new community is added adjacent to it.

Regeneration of the initial community is socially, economically and politically viable because it occupies the most valued geographic position at that time and because it is the oldest of the communities, and consequently the one most subject to economic re-evaluation. When regeneration occurs, the land is cleared, skeletonized or reconstructed along lines that are then relevant.

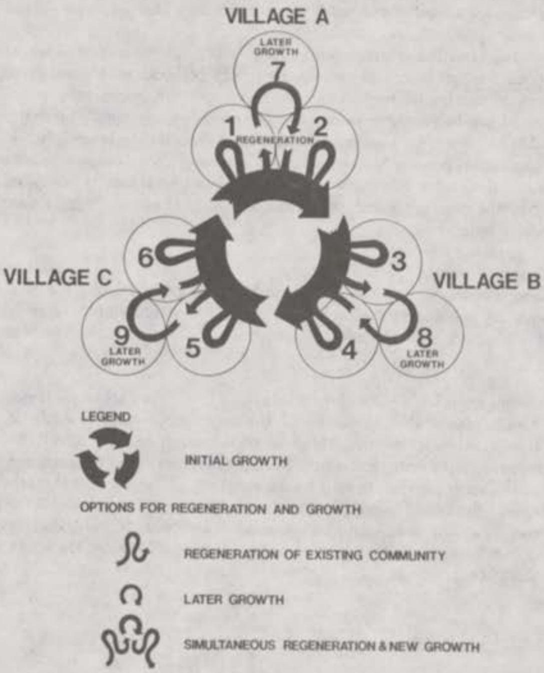
As the spiral continues toward completion of its first cycle, the initial and subsequent communities settle in, secure in the knowledge that, even though the city's active growth might at present be several miles away, it certainly will return. This kind of recycling activity runs through the entire continuing growth cycle, with each community in turn accommodating to change as it is then applicable. Obviously, each community will be substantially different from the others, but one phenomenon is constant. The oldest is adjacent to the newest, and the pressure is for regeneration of the older community. Any area could be bypassed if such was its wish, and no area would ever be abandoned, with the result that permanent obsolescence as currently found in urban areas, would be nonexistent.

DEVELOPMENT SEQUENCE II

The preceeding diagrams illustrated the basic settlement pattern from neighborhood to community to village to town. More significantly, a development strategy designed to meet the special

Exhibit 14
DEVELOPMENT SEQUENCE - I

GROWTH AND REGENERATION



DEVELOPMENT SEQUENCE I GRUEN ASSOCIATES

needs of the unique new town has been outlined.

The conclusions drawn were the following:

- A village of 12,000 to 15,000 population could be viable and operative, even though heavily dependent on outside social, economic and political support.

- A town of 36,000 to 45,000 people would occupy a dominant position in the Southwest and would achieve the status of an export city capable of advancing almost all of the personal goals of its citizens, attaining political voice, and fortifying its economic base by providing a full range of facilities to the entire region.

If the Navajo town should reach this point, it is entirely possible that even further development might occur. The diagrams on Exhibit 15 indicate growth beyond the town level into a city category without any diminution of the regenerative system that guided its development from the beginning.

Growth to 90,000 population, or even more, is outlined. Certainly, it is not important that the town achieve this size. The point is that, if unforeseen forces should cause it to happen, the town must have a response designed to turn the forces of growth into a positive urban addition, rather than, as is so common, a further exacerbation of urban problems.

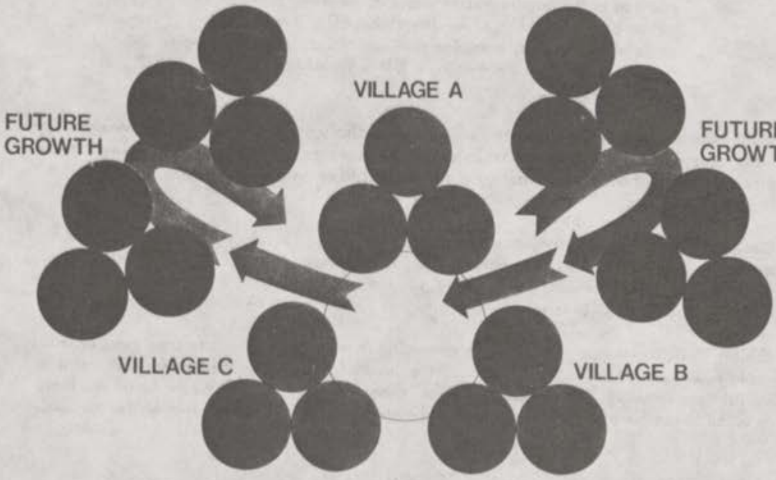
Exhibit 15 indicates additional growth emanating from the initial area in one, two, or it could even be more, directions. Each of the growth loops follows the regenerative loops of initial development. The principle remains in that all growth returns to the heart and that, as urban activities accumulate over time, they return to reinforce the areas settled earlier.

TRANSITION

Creation of this town concept gives assurance that it will be possible to plan and implement a viable new town to serve the coal gasification plants and Navajo Indian Irrigation project. In Chapter VI - Setting of the New Town - alternative locations for this new town will be identified and evaluated. Two examples will be given of how the town concept presented in this chapter could be applied to specific locations.

Exhibit 15
DEVELOPMENT SEQUENCE - II

GROWTH BEYOND 40,000



GROWTH BEYOND VILLAGES A,B,AND C (APPROXIMATELY 40,000 POPULATION) CAN BE ACCOMODATED, IF NECESSARY, IN A SEQUENCE AND LOCATION THAT RELATES WELL TO THE ORIGINAL DEVELOPMENT CORE. THE DIAGRAM ILLUS-TRATES HOW A CITY OF SOME 95,000 PEOPLE COULD OCCUR.

DEVELOPMENT SEQUENCE II GRUEN ASSOCIATES

VI
SETTING FOR THE TOWN

To determine the feasibility of a town, we need to know whether a town can physically be created near the coal gasification plants. The purpose of this chapter, then, is to determine whether sites are available which would be appropriate locations for the new town. This study does not intend, however, to select a town site. Potential areas have been identified which would serve either one of the coal gasification plants, both of the plants, or the plants and the Navajo Indian Irrigation Project. These sites are evaluated by two major groupings of criteria: first, distances and access to major employers and other locations both on and off the Reservation, and second, the physical suitability of individual sites to be developed for a new town.

The chapter concludes that there are two sites which are well-qualified to be the location for a major new town. The advantages and constraints of each site are presented. It is expected that a decision on the site of a new town would be made jointly by the Navajo Nation and the partners involved in the development entity.

In this section we will discuss the following items:

- The Area -- and pertinent employment centers.
- Factors in Town Site Selection -- the thirteen criteria which are either mandatory or desirable for a new town location.
- Potential Development Areas -- presentation of those factors which outline where a new town might be located, including existing infrastructure, employment locations and topographic and geological characteristics.
- Alternative New Town Locations -- identification of the seven most likely sites for a new town.
- New Town Location Considerations -- evaluation of seven sites and constraints imposed on five sites which should not be considered.
- New Town Concepts for Two Locations -- demonstration of the way in which a town concept developed in the previous chapter could be applied to the two most likely locations for a new town.

THE AREA

The areas under direct consideration for new town development were chosen for proximity to the gasification activities as well as the Navajo irrigation project. The land available is vast, but the choices for an appropriate new development are not as open as one might imagine. Attention has been centered on areas within the Reservation.

Exhibit 16 shows the existing lease boundaries and the tentative plant sites. The locations of these plant sites are critical to new town location because they will be the major employment centers on both a short- and long-term basis. Coal mining and irrigation activities will be more dispersed in terms of location and lower in employment density.

Plant sites numbered "1" for both mining and operations are now fixed and represent the first increment of development. Subsequent plant sites are still tentative and will be located as engineering continues.

The land is generally barren, with limited sheep-grazing as the only major agricultural activity. The Navajo Indian Irrigation Project, however, will change this focus and bring many changes to the Reservation, including population growth, which will require facilities for community activities for mining and resource processing.

Surface soils are mainly sand and sandstone with exposed coal beds. Vegetation is sparse to nonexistent. Several major washes traverse this area. These gather numerous minor washes and transfer waters from the east and south to the north. Drainage through erosive soils has left the surface highly disturbed.

Elevations range from a low of approximately 5,000 feet above sea level (Chaco River North) to 6,500 feet (the Eastern Plateau). The average elevation within the mining leases is 5,500 feet. The base of Shiprock is 5,500 feet, and the Central Area of Farmington is 5,400 feet.

FACTORS IN TOWN SITE SELECTION

The approach taken in this project has been to move along two parallel paths at the initial stages. The first was to take a very quick look at the physical and locational setting. The team then turned its attention to the social and demographic issues at work, and from there evolved a town concept based on the people needs rather than the physical or land opportunities. This was done with two thoughts in mind. The first was the knowledge that a conventional new town was simply not going to work, given the time and demographic problems. Secondly, the land was so vast, and the potential areas so numerous, that it seemed unnecessary to locate a site before having some notion of the town concept. Presumably, it could have gone in a number of different places and still have met the demographic needs.

Exhibit 16
THE AREA

However, these two parallel paths can now be put together, and site selection factors may be analyzed. The listing presented in Exhibit 17 applies to virtually any town concept. All of them are very important. But, for purposes of evaluation and analysis, we have categorized them at three levels of relative importance: mandatory, high desirability and desirable.

POTENTIAL DEVELOPMENT AREAS

The process of matching site selection factors with the study area has resulted in identification of six generalized areas for consideration. The circles on Exhibit 18 delineate approximately 25,000 acres -- not all of which, of course, would be used. The idea is to show that an adequate amount of land is available in these general locations.

All of the sites possess the following characteristics which are in primary focus at the moment:

- Located on the Reservation
- Reasonable proximity to gasification and irrigation projects
- Workable topography
- Acceptable soil and subsurface conditions. (Sites B and F have not yet been geologically surveyed and mapped in detail, but all indications are that these areas will also prove to be acceptable from a geologic point of view.)

As shall be seen ahead, on closer examination and analysis, several areas offer more advantages than others. With some there are definite problems.

ALTERNATE NEW TOWN LOCATIONS

Exhibit 19 represents a synthesis or a match between criteria related to town concepts and geographic realities. We have now focused in on all of the previously mentioned development areas except for Area A (eliminated because of distance from the plants) and have tried to apply basic town concepts to each location. As can be seen from the drawing, all of the sites lend themselves to the regenerative concept.

A brief description of the advantages and disadvantages of each one is discussed below.

Exhibit 17
SITE SELECTION FACTORS

MANDATORY

1. Potable water availability including legal allocation (reservoir via pipeline wells). Approximate requirement (excluding mining and processing): .11 acre feet/person/year.

2. Located outside mining leases.

3. Clear of flood plains, washes, arroyos and other hydrologic hazards.

4. Located on land free of prior development rights.

5. Site must have adequate size for growth and flexibility – approximately 10,000 acres net of hydrologic, geologic or topographic problem areas.

HIGHLY DESIRABLE

1. Minimize geologic problems such as rock, shifting sand, erosion and exposed coal (fire).

2. Improved road connection to Highway 666 (Shiprock, Window Rock, Fort Defiance), Highway 550 (Farmington, Irrigation Project), and Highway 371.

3. Direct relationship to the plant processing sites (road access and minimum distances).

4. Free of any disturbance from mining operations.

5. Minimize adverse environmental impact.

6. Close to or have ready access to other employment and activity centers (Farmington, Irrigation District).

DESIRABLE

1. Be as near as possible to all necessary utilities (water, electricity, gas, telephone, television, etc.).

2. Should take advantage of natural characteristics (interesting terrain, micro-climate, views, soil fertility and wind protection).

3. Nearby air access.

4. Allow for rail connection.

5. Provide regional recreation.

6. Capable of attracting a high level of Navajo cultural activities and tourist support.

Source: Gruen Associates

Exhibit 18
POTENTIAL DEVELOPMENT AREAS

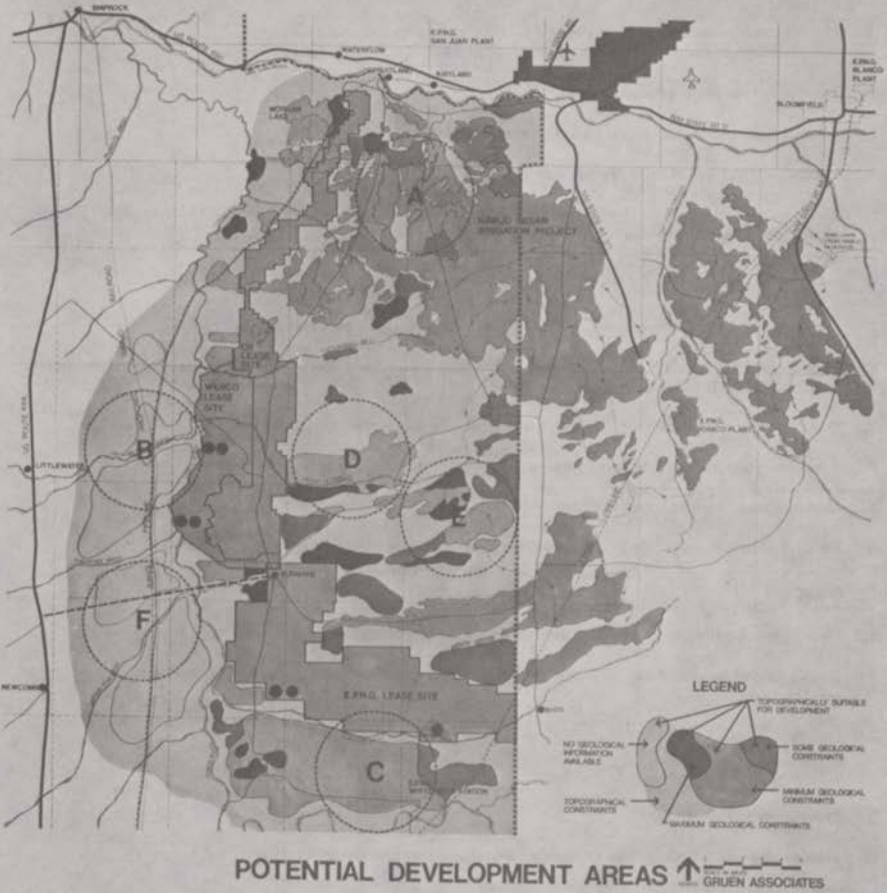
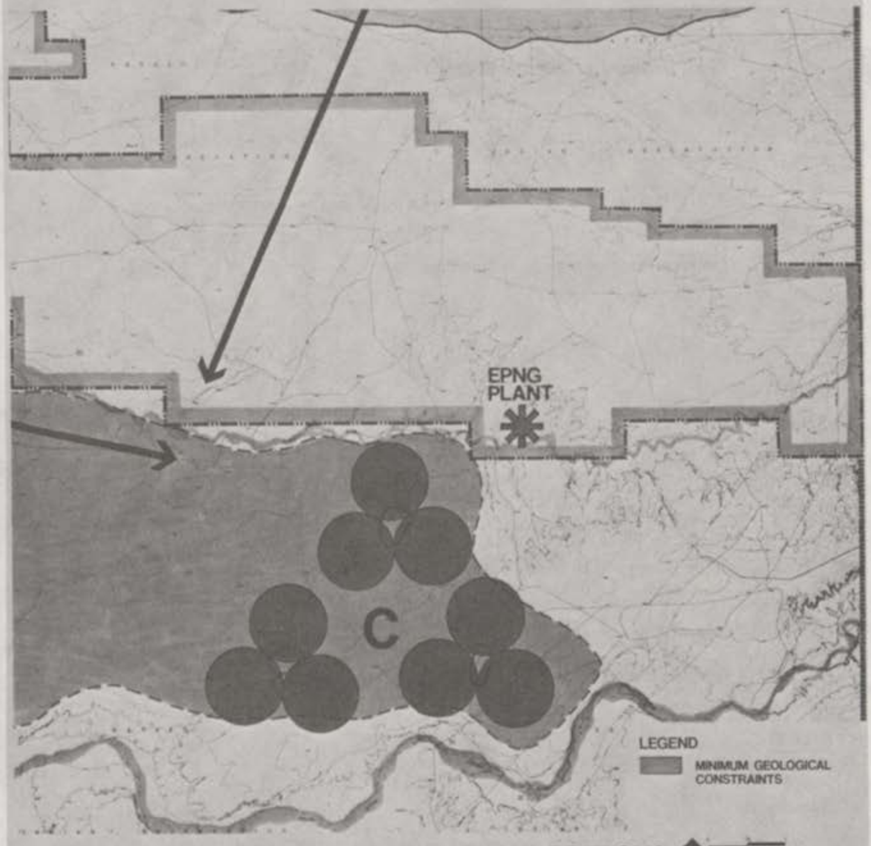


Exhibit 19
ALTERNATIVE NEW TOWN LOCATIONS



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AREA B

Advantages:

- Excellent proximity to WESCO plants
- Good proximity to U.S. Route 666

Disadvantages:

- Too far from EPNG plant sites
- A site dominated by WESCO's presence could take on a company town image
- No knowledge of geology at this time

AREA C

Advantages:

- Excellent proximity to EPNG plants

Disadvantages:

- Too far from WESCO's plants
- A site dominated by EPNG's presence could take on a company town image
- Most distant from any existing or proposed highways
- Too distant from Navajo Indian Irrigation Project

AREA D

Advantages:

- Reasonably central location for EPNG, WESCO and the NIIP

Disadvantages:

- o Area is too flat, may cause drainage problems and provide difficulty in creating interesting environment

AREA E

Advantages:

- o Centrally located in terms of EPNG, WESCO and NIIP
- o Most interesting topography at buildable areas among six alternates
- o Close to Farmington for access, but not too close for creation of retail economy

Disadvantages:

- o Would require highway crossings through WESCO and EPNG lease sites in order to get to plants
- o Closest to Reservation boundary; may cause shanty-town spillover in areas outside the Reservation
- o Poor access to existing highways

AREA F

Advantages:

- o Generally equidistant from WESCO and EPNG plants sites
- o Close to established north-south Route 666
- o Interesting topographic features
- o Does not require highway crossing of either EPNG or WESCO lease sites to get to plants
- o Far enough from Farmington to allow better, competitive position for new town

Disadvantages:

- Would not be convenient to Navajo Indian Irrigation Project
- No firm geology information at this time

NEW TOWN LOCATION CONSIDERATIONS

In taking a close look at each of the areas, several sites present problems that would be difficult to overcome.

Areas B and C have the same disadvantages -- namely, corporate association. A town located in either place would take on the character of a company town. Employees from other companies would not likely be attracted to such a community. This could lead to ad hoc villages near employment centers and drag down the company town, imposing difficult administrative chores on the part of the Navajo Nation.

Area D, although somewhat closer to WESCO operations, suffers from lack of amenity. This site is so flat as to preclude good drainage patterns and the creation of an aesthetically interesting environment.

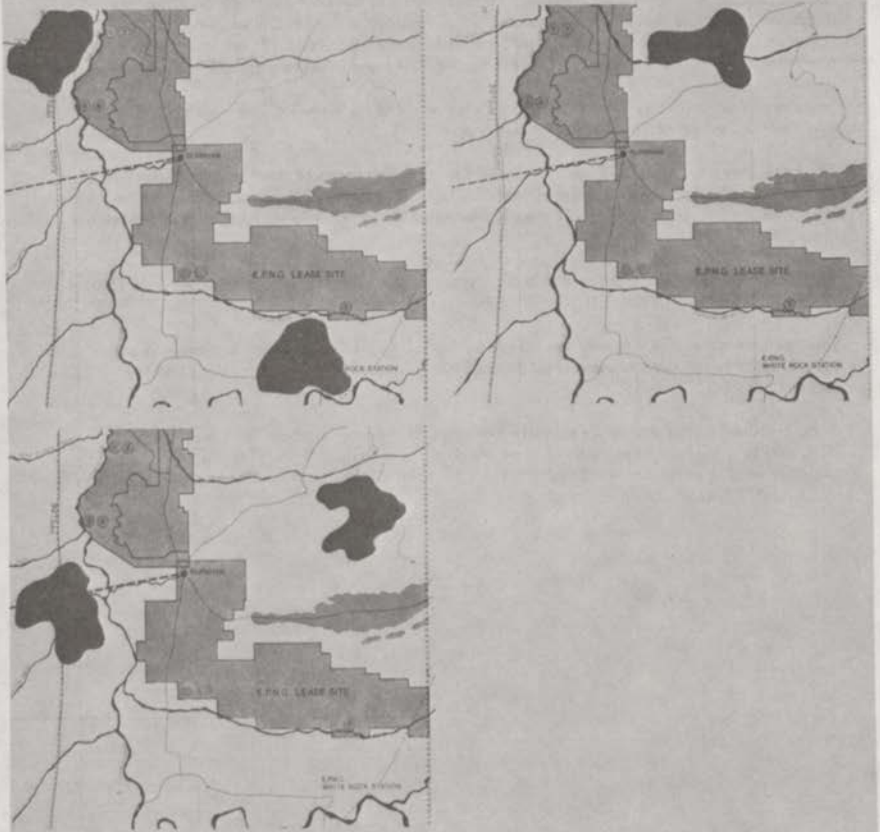
Sites E and F, on the other hand, have none of these difficulties and appear to merit more serious consideration. Schematic designs are shown ahead, and the discussion focuses on the merits of both these locations.

NEW TOWN CONCEPTS FOR TWO LOCATIONS

Exhibits 20 and 21 summarize the results of this preliminary study. Two probable locations for the new town are shown. The choice between them will require careful and detailed consideration. So far as the scope of this study is concerned, each of the two is acceptable.

Either of the two alternatives will satisfy the basic requirements of population accommodation, size, and geological and hydrological acceptance. Either location can allow for adoption of the regenerative strategy required for growth and change. Urban costs in either location would be about equal. The differences lie in the town's relationship to the reservation as a whole, the mining and processing areas, the irrigation project, and the Reservation boundary.

Exhibit 20
NEW TOWN LOCATION CONSIDERATIONS



NEW TOWN LOCATION CONSIDERATIONS

GRUEN ASSOCIATES

LOCATION E

Town Site E is located about nine miles east of Burnham and slightly north. It occupies a portion of the Eastern Plateau and slopes gently from an eastern high elevation of about 6,300 feet to a low of approximately 5,800 feet. The land is topographically and geologically appropriate for new town development. Further, this site does not encroach on either the irrigation project or the mineral resources. Highways across the coal leases would be required, however. The terrain is interesting, with majestic panoramic views. It is not eroded. Natural plant life is minimal. Floodable areas are well defined and relatively insignificant in magnitude.

Because of its attributes, this is one of two sites selected for a preliminary application of the new town criteria described earlier in this report.

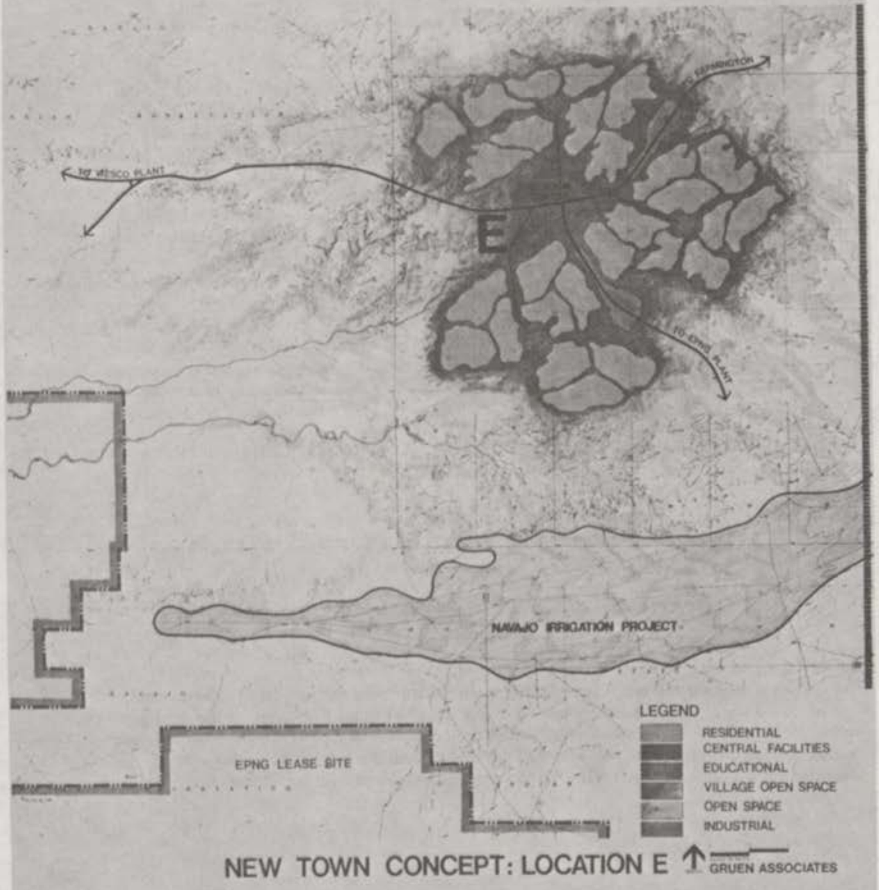
The town shown on Exhibit 21 would provide the maximum range of urban opportunities. The concept of neighborhoods to communities to villages to a town here is applied directly to the land. Each of these components is clearly identifiable, as is the great central area that serves them all.

Care has been taken to insure that this city form can meet the challenges of growth and change. The principle of regeneration is built into the plan.

This town measures about twenty square miles, including all central areas and open spaces that thread through the town and provide maximum contact between the resident and the undisturbed land.

Access would be provided by an easterly extension of the new Burnham Road from existing U.S. 666 to a southerly extension of New Mexico State Route 371 from Farmington. Local access to mining activities would extend from the town site to the irrigation project would be by Route 371 heading north to Farmington.

Exhibit 21
NEW TOWN CONCEPT: LOCATION E



LOCATION F

Town Site F shown in Exhibit 22 is an alternate to E. It is located about seven miles west of Burnham and adjacent to the Chaco River. The new road under construction from U.S. 666 to Burnham would serve it directly. Access to the mining operations would be by new roads going north to WESCO and east to EPNG. Contact with the irrigation project will require an easterly extension of the new Burnham Road and a southerly extension of State Route 371 from Farmington.

This land rises from the west bank of the Chaco at elevation 5,300 to highs of about 5,500. These minor elevation changes are adequately offset by the range of differences in ground surface characteristics. Site F is located at the confluence of the Chaco River and the Captain Tom Wash. Its central area would straddle the wash with developed facilities located on the higher surrounding lands.

The neighborhoods, communities and villages forming the town are situated on the higher lands overlooking the Chaco and with panoramic views of the surrounding mountains and flat lands.

Vegetation is sparse, and there is no conflict with irrigation, mining or sheepherding. Geologic and topographic conditions are satisfactory.

The dimensions and characteristics of Town Site F are almost identical with E. It will occupy about twenty square miles, accommodate about 40,000 people, and offer expansive opportunities for the town's inhabitants to join with the open land. The maximum periphery idea of each component from neighborhood to village and town will, on both sites, insure this relationship.

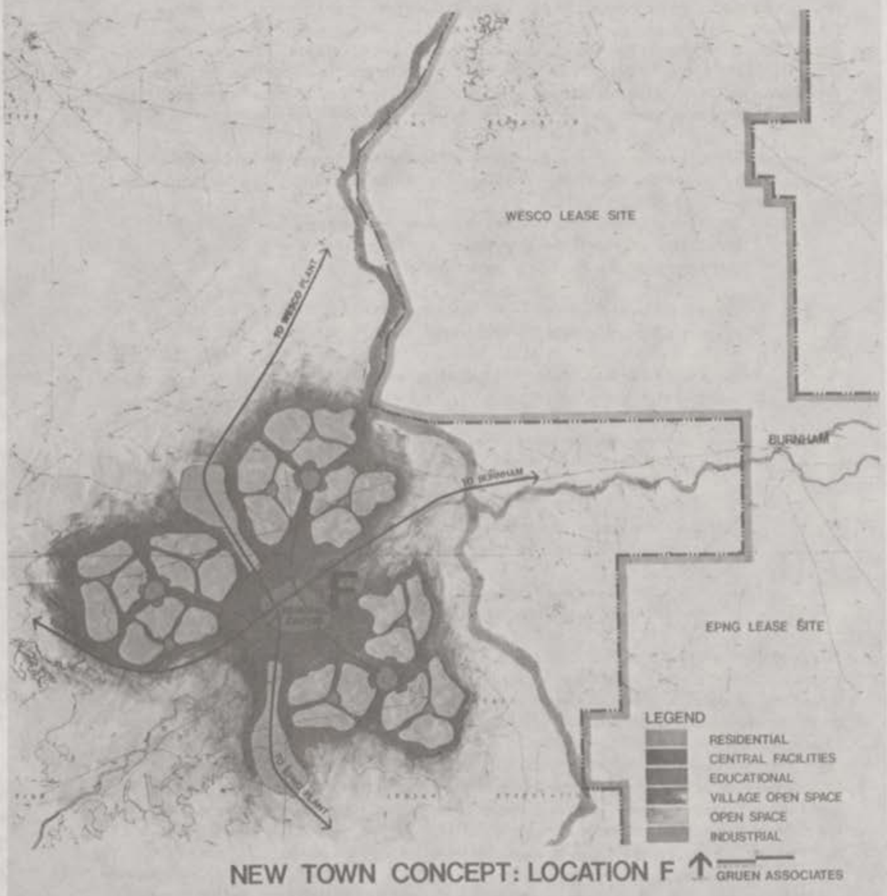
The development of Navajo resources, agricultural, mineral, or both, will require heavy infusion of people in this northeast area of the reservation.

This study rejects the concept of "company" camps because these would, by their nature, be divided, temporary, economically wasteful, and socially disastrous. Certainly, no positive, long-lasting benefits could be expected.

TRANSITION

The chosen setting for the new town will not have much impact on the cost of development, but it can have a significant impact on service to the involved major employers -- the coal gasification plants and the Navajo Indian Irrigation project. This in turn will have critical impacts on how the town is organized and who will provide financial support. These impacts will be discussed more fully in Chapter VII - Organization, and Chapter VIII - Financing.

Exhibit 22
NEW TOWN CONCEPT: LOCATION F



VII
ORGANIZATION

An organization must be created to plan, construct, operate and govern the new town. Present experience is not of much value in determining this appropriate organization. Recent new towns throughout the United States have been developed under economic and legal systems which are not applicable on the Navajo Reservation. Settlement patterns on the Reservation have either developed with no planning at all or on a scale too small to be emulated by the new town.

We are confident, however, that the required organizational framework can be developed to successfully create the new town. The elements of this chapter on organization include:

- Experience in new towns -- the organizational patterns for recent new towns off the Reservation and for existing settlements on the Navajo Reservation.

- Organization assumptions -- the assumptions used in this chapter concerning property and organization potentials.

- Approach to organization -- a suggested organizational format which includes:

  - A planning task force to set the objectives and town concept, and oversee plan development

  - A development entity which can finance and construct the new town

  - A local government body which can provide public facilities and services

The organizational entities that create this new town will have a significant impact on the financing potentials to be discussed in the following chapter. These entities will either be the source of money or the applicants for support from outside the new town. We have therefore given careful consideration to these financing needs in developing our approach to organization.

Of even greater significance in developing the organizational concept is the recognition that the creation of this new town is a cooperative effort. Each of the entities involved has general goals and specific objectives which it desires to see accomplished. Those we outlined earlier in Chapter II can be mutually beneficial to all concerned. Each of the entities has differing legal powers, financial resources and responsibilities. Our evaluation of these concludes that the new town cannot be planned and built by one entity alone.

Certainly the coal gasification companies - El Paso Natural Gas Company, Western Gasification Company and Utah International - cannot create a town by themselves. Such a "go-it-alone" position would run directly counter to the companies' stated objective to avoid a company town. Moreover, the Navajo Nation owns the land and establishes the legal framework for creation of a town. State and federal agencies have roles in providing services and financing of facilities. Our approach to organization is designed to facilitate the needed cooperation among entities.

The role of the companies in the organization is limited too, by their specific responsibilities. To build and operate the coal gasification complexes will require a number of employees, for whom the companies desire to see that housing and community services are provided. This concern could be met by the construction of a company camp, similar to those EPNG has built near its compressor stations. There are significant advantages to the Navajo Nation and the Navajo Indian Irrigation Project by creating a larger town which can serve NIIP employees and expand the Navajo secondary economy. The responsibility for this larger town, above what the coal gasification complexes require, belongs to the Navajo Nation and NIIP, and not to the coal gasification companies.

Finally, it must be fully recognized that the Navajo Nation, the companies and the NIIP are all acting not only for themselves, but also for the residents of the new town who cannot be involved in its planning and construction, but will be vitally affected by the manner in which it is created.

EXPERIENCE IN NEW TOWNS

Not many planned projects in the United States are really "new towns", i.e., brand-new, free-standing, economically self sufficient, balanced communities, such as the new town under study has the potential to be. Rather, there are under way and planned a number of "major new communities." Some of their experience may be applicable to portions of the planning and organizational aspects of the Navajo New Town. This section will look at the experience of:

- Columbia, Maryland
- Flower Mounds, Texas
- Jonathan, Minnesota
- Lysander, New York
- Reston, Virginia
- Riverton, New York

- Soul City, North Carolina
- Woodlands, Texas

General characteristics of these major new communities relating to planning, organization, financing and city services are shown in Table VII-1.

SITE SELECTION

In virtually every case the site selection and initial planning of the major new community has been done in secret, because a private developer who announces his intentions can expect land prices to skyrocket or property owners to hold out.

Upon completion of site acquisition, the local authority is then petitioned for approval of the location. This is, however, not a problem or concern on the Navajo Reservation. The Navajo Nation will be fully involved in all stages of site selection.

DEVELOPER/FINANCING

The actual developer of the major new community can range from an individual to a governmental agency, though both of these are rare. The New York State Urban Development Corporation is the only governmental agency developing new communities, with those now under way financed by state general obligation bonds, which are designed to be repaid out of development revenues. In Riverton, New York, Robert Simon -- the original developer of Reston -- is involved, supported by private financing. James Rouse started Columbia with his own mortgage company, but had to obtain large commitments ($50 million each) from Connecticut General Insurance and Chase Manhattan Bank/Teacher's Amenity Association. In Reston and Woodlands, the corporate developer is generating financing internally for the project. A limited partnership in Flower Mound, a non-profit black-owned development corporation in Soul City, and a for-profit development corporation in Jonathan are all underway with outside private financing. In all these projects, except Columbia and Reston a HUD Title VII guarantee is involved. Because of the New York State Urban Development Corporation's special character as a state land development agency, it received grant assistance rather than a Federal guarantee for land acquisition and development.

PLANNING

Generally, after site selection and announcement of the major new community by the private developer, detailed planning is undertaken as a joint responsibility of developer and local government. The developer takes the lead, hires the planners -- and presents concepts

Table VII-1
MAJOR NEW COMMUNITIES

Name/Location	Projected Population	Developer	Financing	HUD Title VII Guarantee	City Services
COLUMBIA Maryland	110,000	James Rouse	Private-insurance and pension funds	-	Columbia Association, Howard County
FLOWER MOUND Texas	65,000	Limited Partnership	Private	$18 million	City of Flower Mound
JONATHAN Minnesota	50,000	Jonathan Development Corporation	Private	$26 million	Town of Chaska
LYSANDER	18,000	State Urban Development Corporation	State U.D.C.	Grants, not guaranteed	Onandaga County
RESTON Virginia	75,000	Gulf-Reston, Inc	Developer	-	Fairfax County
RIVERTON New York	25,000	Robert Simon	Private	$12 million	County
SOUL CITY North Carolina	44,000	Non-profit corporation	Private	$14 million	Special districts
WOODLANDS Texas	150,000	Mitchell Energy and Development	Developer	$50 million	City of Houston

Source: Architectural Record

and proposals. The local government with land use controls, either city or county, responds to those proposals. A recent feature is involvement of planning and governmental bodies more concerned with social and service aspects (for example, the Genessee-Finger Lakes Regional Planning Board in Riverton).

PUBLIC SERVICES

Typically, major new communities have not been innovative in providing public services. Little has been done to coordinate or centralize services in one locally governed agency. New towns have used a variety of approaches to governmental and public services.[1]

Corporate Government: The Developer

The established pattern of American new-town development has been for a development corporation to assemble the land with no help from and probably without the knowledge of local or state governments and to arrange financing entirely through the private money market. The local authority is then petitioned for approval of the master plan and for appropriate zoning, which are subject to the usual political influences, which are either in support of or in opposition to the developer's plans and which are largely those the developer and citizens already living in the jurisdiction of the proposed new town can bring to bear.

When the first houses are ready for occupancy and people move in, they find themselves, as do most suburbanites, dealing with their developer as well as the local government. Unless the developer or these early residents incorporate or make some other provision for the new town's government, there is no official mechanism for citizen participation. New town citizens as such have no direct control over the remaining development and therefore have no official power in dealing with the developer. Homeowners' associations or other types of community organizations that may be formed must compete with the developer and with any other organizations in the jurisdiction for influence with the parent local government. Until development is largely completed, however, the developer is the key figure in the political system: as owner of the undeveloped land, he has the initiative in dealing with the local government, which has a financial interest in continued development. As a consequence the developer is in a strong position to bargain for public services for his development and to act as intermediary between the new town residents and the government. His political position is enhanced by the fact that home values depend in part on his ability to complete his plan, so he often has the active cooperation of residents in dealing with the local government.

Private Government: The Homeowners' or Community Association

A private government through a homeowners' or community association is often established by the developer to assure that the amenities he provides will be maintained by the residents and to shift the financial burden of maintaining these amenities from himself to the residents. Membership in a homeowners' association is usually covenanted with the land. Every home buyer automatically becomes a member of the association and liable for its dues or assessments. The homeowner's association normally bears responsibility for the maintenance of common areas and facilities deeded to it by the developer. It is funded through assessments of property owners.

In Reston, Virginia, the Reston Homeowners' Association is composed of all property owners including the developer with one vote for each housing unit. The association operates and maintains swimming pools, tennis courts, playgrounds, ball fields, walkways and open spaces that have been conveyed to it by the developer. In addition, the association operates an architectural review board, consisting of six architects and two laymen, which must approve all new structures and exterior alterations to existing property. The developer chooses all the members except one architect and one layman. Since 1969 the association has employed a full time executive director.

To broaden participation in the affairs of the association, a town council was established as an advisory body to the homeowners' association in the 1970 merger. Renters may vote in the council, as may all adult members of a household. The developer has no votes in the council, but the directors still exercise all legal power over association affairs and the majority of directorships is retained by the developer.

Townhouse owners in Reston automatically belong to "cluster associations" (so called because the townhouses are built in clusters) in addition to the homeowners' association. Membership in each cluster association is on the basis of property ownership, with the developer voting the unsold lots plus one vote. The cluster association maintain the common property of the cluster and are responsible for services such as upkeep of landscaped areas, sidewalks, outdoor lighting and parking areas, removal of snow and maintenance of playgrounds. A Restonian who lives in a townhouse pays dues to both the cluster and the homeowners' associations in addition to his local taxes, which pay for the county's usual services.

The basic pattern of private government in Columbia, in Howard County, Maryland, is quite different from that of Reston. The Columbia Park and Recreation Association (The Columbia Association) is organized as a private corporation with a very broad charter. It may undertake almost any function not prohibited by law that its board of directors desires. The association was formed before the new town was opened to residents, and a professional manager was appointed to administer its affairs.

The Columbia Association has a wide range of functions including construction and maintenance of community facilities such as community centers and swimming pools, conduct of recreation programs, an early childhood education program and an information and complaint service; and administration of a community transportation program in the new town.

One of the unique features of the Columbia Association is that it assesses businesses as well as residential property to support activities, thus easing the burden on homeowners. The association's assessment of property owners is based on the property values established by the Howard County Assessor. Additional fees are charged for use of facilities such as swimming pools.

A homeowners' or community association offers some obvious advantages to the developer and to the home buyer. If votes in the governing body are based on site ownership or occupancy, the developer will have majority control until the development is more than half sold, and thus he can be assured of substantial completion of the development on the basis of plans in which he has a very large financial investment. In the meantime the developer is able, through the association's assessment system, to relieve himself of costly maintenance programs by deeding many common facilities to the homeowners. Unless the developer suffers financial collapse or alters course while he still holds the majority of votes in the association, the home buyer has reasonable assurance that the association will protect his investment in a planned community by maintaining common areas and amenities and even in some cases, by assessing derelict owners for improvements if individual acts of neglect affect the appearance of the community. In return, the homeowner pays assessments or "dues" to the cluster or village association and to the community association in addition to his mortgage payments and local property taxes.

The local government may also benefit from the development and maintenance by the association of parks and community programs without use of local revenue. This may mean, however, that so-called public areas are, in fact, private property unless, as in Columbia, the parent government in its zoning ordinances requires public retention of some open space in the plan.

Along with the advantages, the use of the private association as the principal, or sole, vehicle of new town governance gives rise to a number of problems, relating primarily to representation - who gets to vote? Control may rest with home owners only, or the developer may be able to control long after a majority of the community is developed. Another problem is public access to association controlled parks and open spaces and recreation facilities.

Associations are essentially private in form and character, even if they have voting provisions based on the principal of one man, one vote. They are bodies corporate but not politic. They may, in some form, be very desirable as one of several instruments of government, but it is questionable whether they should be the principal or permanent means of public participating in new town affairs.

Public Governments: Unincorporated New Towns

Most new towns are unincorporated and depend on their county governments and their developers for local services. The kinds of governmental relationships that new towns in this situation have developed in order to secure the levels of amenities and services promised in their development plans are illustrated by the experience of Reston and Columbia, located in quite different kinds of counties.

Reston is in Fairfax County, Virginia, one of the nation's most rapidly growing areas. In Virginia, cities and counties are completely separated, so urban counties provide all municipal services.

The incorporation of Reston and its consequent organization as a separate political subdivision has never been seriously considered, and it is not likely to be, especially since recent state legislation prohibits new incorporations in urban counties.

Reston, then, must compete with all other communities in Farifax County for county services. As a "showcase" community it has fared quite well in this competition. The county has been cooperative in building elementary schools and in providing other services, and the level of public services in the county at large is sufficiently high that there are no marked differences between Reston and other communities. Because of its tax base, the county has been able to absorb the cost of the public investments in the new town without material change in the overall tax rate.

Columbia, also unincorporated, depends on Howard County, Maryland, for many services. Howard County, in contrast to Fairfax, is an exurban-rural county. Until Columbia was built it had a population of less than 50,000. Howard County has had an enlightened public leadership that has responded favorably to the new town, and the formerly rural county government has been converted into a much more urban-oriented one. A new charter providing for broad home rule powers and an elected chief executive has been adopted. The Columbia Association, however, had to provide many of the initial services and amenities planned for the new town, since the county could not have provided them without a politically disastrous impact on its tax rate. In a manner similar to that of Columbia and Reston, the new towns of Lysander and Riverton, New York will be utilizing the existing counties to plan development and provide urban-type services.

Public Governments: Incorporation

New towns, of course, can incorporate in most states as an alternative to depending on county governments for public services and as focal points for local political organization. Incorporation as an independent municipality certainly provides a sense of identity and helps to stimulate new town community spirit. A municipality can issue bonds and receive federal grants-in-aid and state equalization grants and shared revenues. It can provide police and other services and can carry out regulatory functions that cannot be performed by homeowners' or community associations.

Some of these advantages may be offset by the limitations certain states place on municipal debt and tax rates, which virtually prevent operation above subsistence level. Furthermore, homeowners' or community associations based on restrictive covenants may be more effective

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than public agencies in enforcing esthetic standards and environmental restrictions. Also some community services and amenities of new towns such as preschools, swimming pools and arts programs are not considered appropriate municipal functions in some states.

Flower Mound, Jonathan and Woodlands are located or will annex to existing municipalities which will be able to provide all needed public services.

Public Government: Special Districts

Single-purpose districts, which permit the use of public credit for such purposes as providing water and reclaiming land, are commonly employed in many parts of the country. However, special districts, whether single or multipurpose, tend to remove some governmental functions from surveillance by the electorate. Redwood City, California, seems to have overcome this problem through the use of the dependent district. There, the improvement district area, Redwood Shores, was annexed to Redwood City. The city council serves as the board of the improvement district, and thus the district is legally and administratively an arm of an existing city government.

The Navajo Tribal Utility Authority operates in a manner similar to a special district on the Reservation. Because of its ownership by the Navajo Nation, it acts as an integral element of the Navajo Tribal government.

NAVAJO RESERVATION

The only example of a planned new community on the Reservation is the Town of Navajo, New Mexico, described in Appendix C. Planning for the community was led by Navajo Forest Products, Inc., with response by the Navajo Tribal Council. While services are provided by several agencies, the overall coordinating function remains with NFPI. A resident elected advisory council is assuming more responsibility and eventual incorporation of the town is contemplated, but no proposal has been made to accomplish this.

The community of Shiprock, New Mexico is the largest urban settlement on the Navajo Reservation. The Navajo Tribal Council has overall policy responsibility for Shiprock and makes all major planning and service decisions. The Shiprock Chapter is involved in ascertaining community attitudes and therefore has some influence in these decisions.

Public services are provided in Shiprock, as in all the Navajo Reservation,by a variety of agencies - tribal, state, federal and county. Water, sewer and electricity are provided by the Navajo Tribal Utility Authority. Police protection is provided by the Navajo Police, BIA Law and Order, FBI, State Police and County Sheriff. Road construction and maintenance is done by the Bureau of Indian Affairs and State of New Mexico. Medical service is provided by the Indian Health Service. There is no local agency with comprehensive responsibility for public services within Shiprock.

ORGANIZATIONAL ASSUMPTIONS

The creation of appropriate organizations is completely influenced by the location of the new town on the Navajo Indian Reservation, which means that:

- Reservation lands are owned in common by the Navajo Nation and held in trust by the United States.
- State and local laws are not necessarily applicable to the Reservation, which is governed under Federal law and treaties between the United States and the Navajo Nation.

In order to develop an organizational framework for the new town, a number of assumptions are made in this study concerning the relationships of the Navajo Nation to Federal and state laws, property rights on the Reservation, and permitted uses and activities. This is not a legal study, however, and each of these will have to be considered tentative subject to legal research or judicial determination. The organizational assumptions used in this study include the following:

PROPERTY RIGHTS

- The Navajo Nation is the beneficial owner of the entire Reservation.
- Reservation lands are held in trust for the Nation by the United States, which has designated the Bureau of Indian Affairs as its trustee.
- Fee ownership of portions of the Reservation may not be given or allocated to individual Navajos.
- The Secretary of the Interior is authorized to transfer, upon request of the Navajo Tribal Council, legal title to or a leasehold interest in any unallocated lands held for the Navajo Nation. Such transfer can be made only to a corporation owned by the Nation or to a municipal corporation organized under state law.
- The Navajo Nation may, with approval of the Secretary of the Interior, lease lands for "public, religious, educational, recreational, or business purposes, including the development of natural resources in connection with operations under such leases." Such leases may be for a term not to exceed 99 years, and no provision is made for extension of such lease.

- A development entity may lease property and sublease portions of it for business and residential purposes:
  - Business site leases are available to Navajos and non-Navajos.
  - Residential leases are available to non-Navajos.
  - Land leases and contracts with the Nation are regarded legally as enforceable, but concern exists as to the determination of the forum having or acknowledging jurisdiction by non-Navajo entities, lenders and residents.

TAXATION

- Property taxes may not be imposed by the state, county, or school district on land or facilities owned by the Nation or on personal property owned by Navajos.
- The coal gasification plants are subject to ad valorem taxes.
- Navajos living and working on the Reservation are not subject to state income tax, but they are subject to Federal income tax and social security.
- Retail purchases made by Navajos on the Reservation are not subject to state or county sales tax.
- The Navajo Nation is attempting to establish a new taxation system which will include a "sales tax" on retail purchases by Navajos and non-Navajos.

POLITICAL

- The State of New Mexico retains responsibility for state highways and traffic enforcement on them.
- The County of San Juan is responsible for provision of police (sheriff's) services to non-Navajos on the Reservation, and is likely responsible for other services paid for out of property taxes collected on the Reservation.

- A townsite can be withdrawn from the chapter by a development entity owned or chartered by the Navajo Nation.
- A municipality could be incorporated on the Reservation with all the rights, powers and responsibilities of New Mexico cities except those prohibited by federal law or the treaty with the Navajo Nation.
- Incorporation of a new municipality would require the approval of the Navajo Tribal Council.

APPROACH TO ORGANIZATION

The key need in the approach to creating the organizational framework is to assure a logical sequence and vehicle for the transfer of property rights, i.e., the right to use property, not ownership of it, from the Navajo Nation to the residential or business user within the town. The recommended approach to development and governance, conceived to meet this requirement within the unusual legal environment of the Navajo Reservation, is delineated in Exhibit 23. The elements of this approach include trusteeship, development entity, property management and city government.

TRUSTEESHIP

The Navajo Reservation is held in trust for the Navajo Nation by the United States. The current Federal trustee for the Navajo lands is the Bureau of Indian Affairs, which in effect is charged with the beneficial preservation of the rights of the Navajos in matters concerning the Reservation. This trusteeship is considered a given, with any parameters it implies to be binding upon any subsequent development regarding the new town.

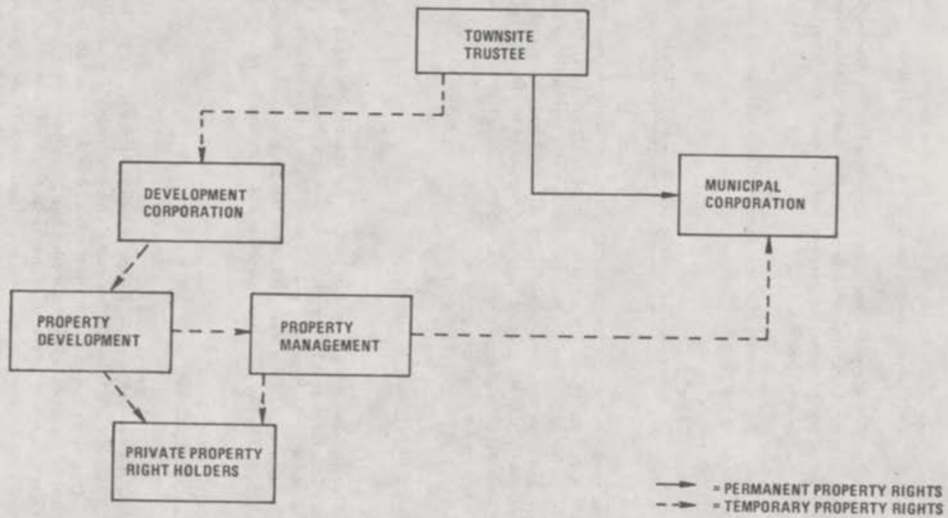
Town Site Trustee

Because the very scope of the Bureau of Indian Affairs trusteeship involves the entire Reservation, we believe it imperative that a "sub-trusteeship" be established with said trustee being specially charged with matters concerning the entire new town within the guidelines and limitations approved by the master trust. In this way, a trustee directly concerned with and responsible for the town and its development, and consequently more likely to be responsive to the needs of the town and of assistance in the implementation of necessary items concerning its development, would be established. This trustee could be made up from a variety of sources, including the Navajo Tribal Council itself, Navajo and/or non-Navajo financial institutions, state government, federal government (perhaps as an additional agency

Exhibit 23

APPROACH TO DEVELOPMENT AND GOVERNANCE

Organizational Arrangements



within the Department of the Interior) and private business interests. Obviously, the ultimate make-up of the trusteeship would have to satisfy the Navajo Nation, the Bureau of Indian Affairs, and all other interested parties. Assuming this criteria could be met, the ultimate composition would be subject to negotiation dependent in large measure upon the attitudes of the various parties at the time of the negotiation, and agreement on an effective workable size, to assure that the body is capable of action within a reasonable time period.

Planning Group

Planning for a new town will require the involvement of all those legal entities and organizations which will make decisions, approve proposals, implement plans or provide service. An initial step in the implementation process should be the creation of a mechanism to provide for setting town objectives, selecting a site, establishing the town concept and preparing detailed plans.

This planning group would be a planning and coordinating body working with the development entity. The development entity cannot serve as the only planning group, for many of the involved agencies cannot become owners of, or invest in, a non-profit corporation. The planning group membership would obviously include the development entity, partners and a variety of public agencies, including the following possibilities:

Development Entity

Navajo Nation
El Paso Natural Gas Company
Western Gasification Company
Utah International
Navajo Agricultural Products Industries (if largest town is chosen)

General Governmental Agencies

Bureau of Indian Affairs
State of New Mexico
County of San Juan
Navajo Office of Program Development
Burnham Chapter

Service Agencies

Navajo Tribal Utility Authority
Navajo Housing Authority
Navajo Housing and Development Enterprise
Navajo Police

Bureau of Indian Affairs
Education
Roads
Indian Health Service
Central Consolidated School District #22
Navajo Community College

The planning group will not come together on its own, nor can the companies create it. The most logical method of formation would be by invitation of the Navajo Tribal Council.

DEVELOPMENT CORPORATION

Several options are open for consideration as the development entity for a new town on the Navajo Reservation:

- Government agency - such as the New York State Urban Development Corporation (UDC) which has extensive redevelopment and new town powers. No other state, however, has created such an agency, and we assume the State of New Mexico would not be involved in this new town.

- Navajo Nation enterprise - similar to the Navajo Forest Products, Navajo Tribal Utility Authority and Navajo Agricultural Products Industries. A new enterprise for the town could be created, but all previous enterprises have been designed for profit, and the new town sponsor will not likely make a profit. We assume that an enterprise will not be created for the entire town, but might be established to construct or operate selected profitable segments of the town.

- For-Profit corporation - the sponsors of new towns underway described in Table VII-1 are all designed to make a profit, with the one exception of Soul City. None of these towns has yet made that profit. With our new town projected to cost money, we assume no for-profit corporation will be interested in developing the town.

- Limited-Profit corporation - such as those developing large urban renewal projects under enabling laws conferring certain rights to develop land upon limited-profit but not for-profit corporations. The new town will not even make limited profits and therefore will not likely be attractive.

- Non-Profit corporation - incorporated under state or federal laws to carry out the specific objective of creating and operating a new town. A major reason for choosing this alternative is that none of the others are legally or financially feasible. The responsibilities for such a non-profit corporation are outlined below.

- Public development corporations - legislation will likely be introduced in the next Congress to provide for the creation of public development corporations, with many responsibilities similar to UDC, which could build new towns and redevelop old ones. These corporations could buy and sell land, build structures and operate, sell or lease them. Federal assistance in the form of grants, loans and guarantees, would be available. Such an entity, however, will not be created in time to assist our new town.

A non-profit corporation subject to the limitations of the trusteeship, as noted above, would be organized initially with representation from the Navajo Nation, El Paso Natural Gas Company, Western Gasification Company, Utah International and the Navajo Indian Irrigation Project, which could each invest in and become owners of the development corporation. This entity could:

- Obtain the master business site lease from the Navajo Nation;

- Prepare the physical and social plan for the new town;

- Obtain long-term financing from public and private sources for all construction;

- Obtain construction loans until long-term financing is available;

- Retain architects and engineers for town and structure design;

- Select and pay contractors for all construction projects not covered by existing agencies; and

- Promote retail and service uses in the new town.

In a format similar to port authorities and other development entities utilized throughout the country, this corporation would in fact serve as a defacto "local government body" until an actual physical plan is established, and in its initial capacity have the power under a master granting of property rights entrusted by the trustee, to plan for, contract for, and manage the implementation of the projected community.

Development of the entire town concept will be undertaken by the development corporation as its principal charge. As property is developed, beneficial rights to its use could be turned over to private property right holders as the uses are absorbed. In this manner, property right conditions equivalent in concept to those normally enjoyed off the Reservation, can be developed and maintained, with the limitations implied by the trusteeship relatively passive in nature.

PROPERTY MANAGEMENT

Individual family or business ownership of houses and stores may be difficult for a number of reasons which have been discussed in this analysis, and may be summarized as follows:

- Land can only be leased or assigned to individual users, never owned by anyone other than the Navajo Nation.
- Transfers of leases of land and ownership of structures may be exceedingly complex.
- Creation of equity in a structure may be difficult because of the ultimate limitations on the length of a land lease.
- There is a strong tradition of public ownership of housing on the Reservation.
- There is concern over the quality and consistency of maintenance and operating standards for housing and commercial structures.
- Imposing taxes on privately owned structures may be subject to legal and technical difficulties.
- There will be a strong need to carefully control and encourage the secondary economy.
- The residence period in the town may be shorter than in other communities because of the transition from construction to operations, and the transition of a number of units from non-Navajo to Navajo.
- Financing for individual units on leased land may be extremely difficult to obtain because of a lack of understanding by off-Reservation institutions.

All of these conditions combined may lead the planning group and development entity to the concept that the entire new town would be owned by the development entity and individual units - residential or commerical - would be leased or rented to individuals.

This community ownership concept, if accepted, would require an on-going organization to operate and maintain the town. The methods employed would be similar to those used by the Navajo Housing Authority in owning and maintaining its units, but would apply to all the housing, not just a particular income bracket.

The property management organization could be either a for-profit or non-profit corporation. If the latter, it could be the development entity, operating in a new role, or a spin-off of that entity with perhaps a different set of partners and a new charter.

Financing for the operations of the property management organization would come from regular monthly lease or rental payments from the users of housing and commercial structures. To this might be added contributions from governmental agencies and fees for services, as described in the following chapter. Funds would be collected for payment of principle and interest on the capital costs, operation and maintenance, and administration. The organization could serve as the collection agency, or even perform the functions of, the utility and local governmental bodies.

LOCAL GOVERNMENT BODY

Ultimately, when the function of the development entity has been completed, i.e., scheduled property has been developed, and managed to the point of transfer to private parties or the property management organization, then the development corporation itself could phase out of existence in favor of a local government body established under the same guideline as the corporation itself, but in a legal position to take over the defacto role of the corporation as a recognized governing entity. It is at this point that the property right holders would, in effect, enjoy the same rights and privileges under the proposed organization as would be the case in other municipalities outside the Reservation.

There are several municiaplities established on Indian Reservations, primarily in North and South Dakota. These cities are, however, formed on alloted lands, owned by individual Indians, rather than lands owned by a tribe and held in trust by the Federal government. The major reason for incorporation has been to receive federal grants and state subventions. Most services, such as police, fire and roads, continue to be provided by the Bureau of Indian Affairs.

For the new town under consideration, a local government body would perform three major functions:

- Under the general guidelines of the Navajo Tribal Council, set local policy for the new town.

- o Provide local services not provided by other agencies, including:
  - Building inspection
  - Fire protection
  - Animal control
  - Sanitation (refuse collection)
  - Local street maintenance and cleaning
  - Storm drains
  - Street lighting
  - Local parks and recreational facilities
- o Coordinate the operating programs of the many governmental agencies to provide service to the new town.

For the new town, it is suggested that agencies - existing and proposed - assume the responsibilities shown in Table VII-2.

TRANSITION

The organizations outlined and described in this chapter will have responsibility for obtaining the financing required for construction and operation of the new town. The financing program is discussed in Chapter VIII. The necessary steps to set up the organizational framework are presented in Chapter IX - Preliminary Implementation Strategy.

Table VII-2
PROVISION OF PUBLIC SERVICES

Service	Agency
General Policy	Navajo Tribal Council
Specific Policy	Local Legislative Body
Land Use Controls	Local Legislative Body
Building Inspection	Local Government Body
Police	Navajo Police BIA Law and Order FBI State Police San Juan County Sheriff
Fire Protection	Local Government Body
Animal Control	Local Government Body
Water	Indian Health Service (construction) Navajo Tribal Utility Authority (operation)
Sewage Disposal	Indian Health Service (construction) NTUA (operation)
Sanitation (Refuse Collection)	Local Government Body
Road Construction and Maintenance	State of New Mexico County of San Juan Bureau of Indian Affairs Local Government Body
Storm Drains	Local Government Body
Parks and Recreation	Local Government Body
Hospital	Indian Health Service San Juan County Hospital
Welfare	State of New Mexico Bureau of Indian Affairs

Source: Development Research Associates

VIII
FINANCING

The single most important portion of this Phase I study relates to the financing of the new town:

- o How much will it cost?

- o What resources are available from those who will use the town, or from outside sources to finance the town?

In dealing with the question of financing of the project new town complex, it is imperative that certain limiting parameters fundamentally affecting the projected development be taken into account. The totally unique nature of the project in terms of its purpose, physical location, and use cycle makes it basically unrealistic to define in any exact manner the financial aspects of the ultimate project involved. It is, rather, necessary from a practical implementation standpoint to define likely alternative situations and ranges of options, and to estimate the financial magnitudes and risks resulting from those sets of assumptions.

The purpose of this chapter is, then, to define those ranges and the ways in which the cost of developing the new town can be financed by both public and private means. To answer the questions listed above we discuss in this chapter the following steps:

- o Concept of financing -- identifying and describing the various elements of a financing program.

- o Project cost -- determining the total construction cost for the three levels of new town potential which are projected by the economic system model.

- o Financing resources -- determining the ability of residents and users of the new town to pay for what they need and to identify potentials for outside sources of money.

- o Financing methods -- identifying and discussing the ways in which immediate construction cost can be paid over the life of the community.

- o Potential financing programs -- presenting for each level of new town a range of alternative financing programs including strong, reasonable and weak support from outside the new town.

CONCEPT OF FINANCING

The purpose of this section is to identify and define the elements of a financing program for the new town. Such a program involves a complex variety of components and options for consideration by the companies and the Navajo Nation. The general relationship among these elements is shown in Exhibit 24, Capital Financing Program.

BENEFICIARY

Those who will benefit from the construction of the new town are those who should ultimately pay for it. We can identify three major groups of beneficiaries:

- User, (or direct) - residents who live, employees who work and businesses which operate in the new town.
- Indirect - the projects whose employees and their families could be housed in the new town, and the Navajo Nation which will obtain new housing and a secondary economy.
- General - those larger governmental bodies which benefit by the creation of a new town providing for the well-being of their citizens, e.g., the Federal, State and County Governments.

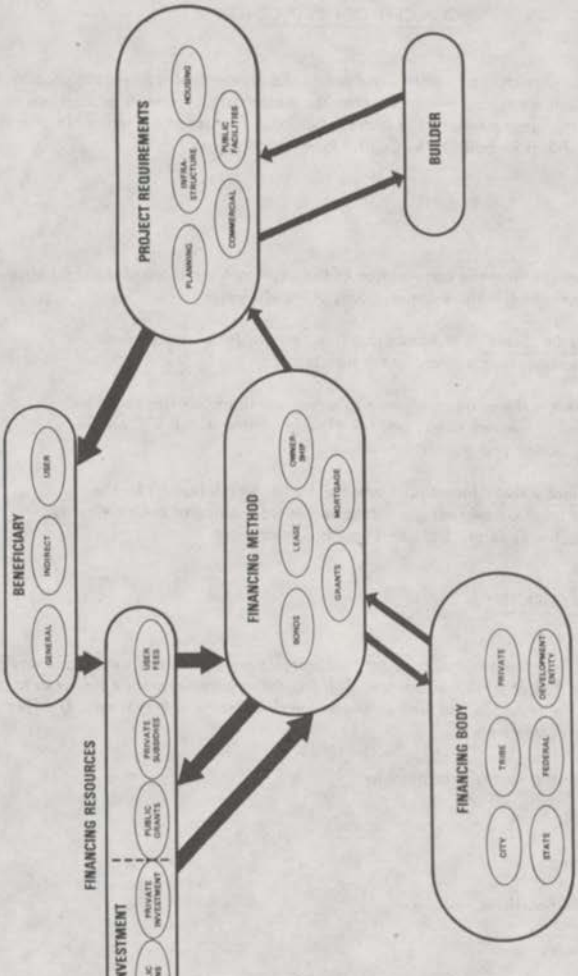
PROJECT REQUIREMENTS

Under a capital financing program, project requirements are construction costs and services required to assure that construction occurs. The project requirements are calculated to meet the full needs of the residents and businesses projected to locate in new town. The five categories of requirements are:

- Front-end money - or planning
- Infrastructure
- Housing
- Public Facilities
- Commercial

Exhibit 24

CAPITAL FINANCING PROGRAM



FINANCING RESOURCES

To pay for these project requirements, the beneficiaries should ultimately provide all the monies needed. The three major categories of financial resources match the three types of beneficiaries:

- o User fees - direct payments by users (or direct beneficiaries) of the new town, e.g., house payments by residents, lease payments by businesses and utility charges by customers.

- o Private resources - funds advanced by indirect beneficiaries in the form of capital grants or operating subsidies which are considered necessary to achieve or support their project objectives.

- o Public grants - donations of public monies from federal, state or county governments, or grants from private foundations for a public purpose.

Advances may be required to provide the monies necessary at the time of construction. The primary sources are private investment and public loans. Both sources expect a return of their investment, which will ultimately be repaid by user fees over the life of the project.

FINANCING METHOD

The financing method is that procedure by which revenues -- current and future -- are converted into current capital expenditures. For grants and capital subsidies, this procedure is simple for the money is available at the time needed. The more difficult task is to convert future revenues into current value for capital construction. Three methods of conversion include the following:

- o Bonds - general obligation or revenue bonds create a present value by assuming that future revenues will be available from user fees to repay the investment and compensate for the risk involved; used primarily for infrastructure and public facilities.

- o Lease - the investor retains ownership of the structure or improvement while allowing use in return for user fees; can be used for all project requirements except planning.

- o Mortgage - the primary method used to convert private investment into funds to pay for housing and commercial requirements.

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The financing method is not a revenue source. General obligation bonds may provide immediate capital funds, but ultimately the costs are paid for by the financing resources described above.

FINANCING BODY

The financing body is that legal entity, whether Navajo Nation,government, special authority or development entity, which will make the financing decision, choose and implement the method, obtain the resources and pay for the project requirements. In the creation of this new town, there will be a combination of financing bodies working in concert, as described in Chapter VII - Organization. Those which are possible in this case include the following:

- Navajo Nation - acting as the Tribe itself, or through one of its enterprises, such as the Navajo Indian Irrigation Project, Navajo Tribal Utility Authority, or Navajo Housing Authority.
- Development entity - that organization suggested as a partnership of the Nation and project companies to plan and develop the new town.
- Private - organizations financing and constructing facilities for profit, e.g., retail stores and telephone utilities.
- Local government body - a municipality or other local government for the new town which would be eligible to receive public grants, impose taxes, issue bonds and construct and operate infrastructure and public facilities.
- State and Federal - larger, already established governments, which could provide infrastructure and public facilities directly. This includes San Juan County, which is an agent of the State of New Mexico.

The "builder" is that group of contractors or organization which receives the proceeds of the financing methods and in return constructs the project requirements, turning them over to the financing body for sale, lease or use. No further consideration need be given the builder in this study.

PROJECT COSTS

The capital cost of the new town is directly related to the town's population and land area. In Chapter III - Nature of the Town, we established three sets for town size. The population and number of households are repeated below for reference purposes, along with the land usage projections developed in this section:

	Set 1	Set 2	Set 3
Population	3,320	9,798	15,504
Households (including group quarters)	684	2,024	3,168
Land Use (in acres)	294	864.5	1,358

Land usage projections are based on the number and type of dwelling units, and the required public facilities and commercial uses to serve the projected population. Land coverage factors for each of these uses are detailed in Appendix F - Cost Schedule. The largest use, occupying just over one half of directly used land, is single family housing, at a density of three units per acre. The results of these projections are shown in Table VIII-1. To the direct coverage of housing, public facilities and commercial, an additional 20 percent has been added for design factors necessary to compensate for anticipated topography and soil conditions. The new total defines the acreage for which infrastructure-streets and utilities will have to be provided. The additional space for streets will increase the town size to approximately the ten persons per acre estimate of Gruen Associates, detailed in Appendix E.

Set 1	330 acres
Set 2	980 acres
Set 3	1,550 acres

Open space surrounding the town and buffers between villages will be determined at the time of more precise planning. Under the town concepts developed in Chapter V, the new town, at this point in time, would be composed of approximately the following elements:

Set 1 - Two neighborhoods
Set 2 - Two complete communities (six neighborhoods)
Set 3 - One village (three communities)

TOTAL COSTS

The total capital costs for each set of the new town at the two-plant stage are projected to be $26,440,000 for Set 1, $78,925,000 for Set 2, and $113,343,000 for Set 3. These costs are shown by the five major categories of project requirements in Table VIII-2.

All costs reflect 1973 conditions. Front-end costs include planning, economic consulting, engineering, some design and architecture studies, legal fees, financial counsel, promotion and administrative costs. Front-end costs are estimated for each set on the basis of $1 million plus two percent of construction costs.

Costs detailed below are based on recent relevant experience, not detailed engineering and must be considered as guidelines rather than actual estimates. Any meaningful step beyond

Table VIII-1
DIRECT LAND USE PROJECTIONS
(In Acres)

	Set 1	Set 2	Set 3
Housing			
Single Family	149.5	443.0	687.0
Multi Family	4.0	12.0	19.0
Mobile Homes	14.0	40.0	64.0
Group Quarters	0.5	1.0	1.5
Subtotal	168.0	496.0	771.5
Public Facilities			
Schools	15.0	45.0	69.5
Medical	0.5	1.0	69.5
Local Government	0.5	2.0	4.0
Recreation/Parks	33.0	98.0	155.0
Social	16.5	49.0	77.5
Subtotal	65.5	195.0	308.0
Commercial			
Retail	4.0	14.0	17.0
Office	0.5	1.0	2.5
Hotel/Motel	1.0	2.0	5.0
Commercial Recreation	1.0	2.0	2.0
Wholesale	0.0	0.5	1.0
Mobile Home Parks	Above	Above	Above
Transportation, Communications & Utilities	5.0	10.0	15.0
Subtotal	11.5	29.5	42.5
Total Coverage	245.0	720.5	1,121.0
Plus 20% for Design Factors	49.0	144.0	237.0
Total Acres	294.0	864.5	1,358.0

Note: Does not include streets.

Source: Development Research Associates

Table VIII-2
TOTAL CAPITAL COSTS
(In Thousands of Dollars)

	Set 1	Set 2	Set 3
Front End	1,500	2,525	3,203
Infrastructure	6,861	21,952	26,009
Housing	11,335	33,524	52,498
Public Facilities	4,352	12,846	20,164
Commercial	2,392	8,078	11,469
Total	26,440	78,925	113,343

Source: Development Research Associates

these general guidelines will require site selection, a town plan, infrastructure design, and a year-by-year development program.

Lacking these necessary inputs, the costs presented here are straight-line projections based on size. Economies of scale are often overcome by pre-construction demands. Community facilities are often brought on line early, more because of desire than necessity. Needed activities may be called upon considerably in advance of operational efficiency, while others may be delayed. These and many other uncertainties make detailed estimates of unknowns extremely dangerous. We believe the experience technique is the most suitable at this stage.

INFRASTRUCTURE

Infrastructure costs, shown in Table VIII-3, include roads and utilities. The basis for estimating these costs is to apply the infrastructure cost factors shown in Appendix E to the acreages in Table VIII-1. Access roads, however, are estimated based on the locations of the towns and required linkages to the plants and other destinations. Set 1 assumes a short link from the single-plant town to the plant it serves, plus a link to the nearest paved road (Bisti for the EPNG town - location C - and Burnham for WESCO - location B). Location F, in Set 2, would include links to both plants and a new road extending from the town northeasterly to Farmington. Set 3 at location E would have access roads to each plant built across the coal leases, plus a road northeasterly to Farmington, which would serve the NIIP and one southwesterly to Burnham.

Major and internal roads are estimated at a total of $4,300 per acre. They are separated in this analysis because major roads are often eligible for state and county financial assistance while internal roads may not be. Storm drains are estimated at a cost of $500 per acre, with the construction often done as a part of the road projects.

Water and sewage disposal costs are divided into two categories: internal distribution and collection systems, and external costs. The water system would likely have to include a pipeline from the San Juan River near Farmington. Distribution costs are estimated at $1,800 per acre. Sewage collection may be provided for $1,100 per acre, while the cost of a treatment plant is equivalent to $500 per acre.

Electric and gas utilities are projected to cost $1,700 and $600 per acre, respectively. Responsibility for these rests with the Navajo Tribal Utility Authority.

HOUSING

The construction costs of housing represents by far the largest element of total capital costs, ranging from 42 to 46 percent in Sets 2 and 3. Under Set 1, with fewer public and commercial facilities, housing costs are 69 percent of the total outlay.

Table VIII-3
INFRASTRUCTURE COSTS
(In Thousands of Dollars)

	Set 1	Set 2	Set 3
Roads			
Access	3,375	12,375	11,250
Major	735	2,161	3,395
Internal	529	1,556	2,444
Storm Drains	147	432	679
Water			
Source	400	500	500
Distribution	529	1,556	2,444
Sewage Disposal			
Treatment	147	432	679
Collection	323	951	1,494
Electric	500	1,470	2,309
Natural Gas	176	519	815
Total	6,861	21,952	26,009

Source: Development Research Associates

Housing costs shown in Table VIII-4 are derived directly from the analysis of Chapter IV - Housing. Again, the factors used on a square footage basis are shown in Appendix E.

PUBLIC FACILITIES

Public facility costs shown in Table VIII-5 include schools, at the elementary and high school level, to be provided by the Central Consolidated School District. While we project an eventual campus of the Navajo Community College, it will not be included as part of this stage of development. Medical facilities include a clinic to be provided by the Indian Health Service and several private doctors' offices, but no hospital. For this stage, at least, hospital service for Navajos will be provided by the Indian Health Service hospital at Shiprock, while non-Navajos and Navajos using insurance will be served by the San Juan County Hospital in Farmington.

Local government facilities include, besides general offices, such facilities as police and fire stations and maintenance yards. Recreation and park development is projected on the basis of $250 per capita with actual costs highly dependent here - as in all communities - on the financing available. The social category includes community centers, clubs, churches and other private associations for which the actual cost can only be set by the citizens of the new town.

COMMERCIAL

Retail and service establishments are covered in Table VIII-6, on commercial costs. Retail covers all the stores which would go into a shopping center, plus auto dealers and service stations, at an average cost of $18 per square foot. The office category would include space for attorneys, insurance, sales and other service activities.

Commercial recreation includes theaters, bowling alleys and similar establishments. No wholesale activity is projected for Set 1, but in larger sets the cost is projected at $10 per square foot.

Mobile home parks are covered under the commercial category, rather than under housing, because they will be constructed and run as a private business. Construction costs are estimated at $2,700 per pad, including all internal utilities, roads and recreation facilities.

Transportation, communications and utilities consist largely of one private utility-telephone service projected to be provided by Navajo Communications. Costs are estimated at $210 per capita based on the experience of comparable towns.

The cost tabulations do not indicate the source of funds, nor do they differentiate between private and public investment. These will be covered in following sections of this chapter.

Table VIII-4
HOUSING COSTS
(In Thousands of Dollars)

	Set 1	Set 2	Set 3
Single Family	9,190	27,198	42,303
Multi-Family	521	1,516	2,502
Mobile Homes	1,517	4,493	7,164
Group Quarters	107	317	511
Total	11,335	33,524	52,498
Navajo	7,975	23,390	37,844
Non-Navajo	3,360	10,134	14,654

Source: Development Research Associates

Table VIII-5
PUBLIC FACILITIES
(In Thousands of Dollars)

	Set 1	Set 2	Set 3
Schools	2,628	7,759	12,035
Medical	133	392	620
Local Government			
Offices	17	49	80
Other Structures	80	236	452
Recreation/Parks	830	2,450	3,876
Social	664	1,960	3,101
Total	4,352	12,846	20,164

Source: Development Research Associates

Table VIII-6
COMMERCIAL COSTS
(In Thousands of Dollars)

	Set 1	Set 2	Set 3
Retail	584	2,701	3,285
Office	83	245	526
Hotel/Motel	324	943	1,480
Commercial Recreation	200	590	622
Wholesale	-0-	52	157
Mobile Home Parks	462	1,369	2,182
Transportation, Communications and Utilities	729	2,178	3,217
Total	2,392	8,078	11,469

Source: Development Research Associates

FINANCING RESOURCES

A bewildering variety of financial resources - coupled with appropriate financing methods - is available to be considered for the construction of a new town on the Navajo Reservation. In this section, known sources of financing which are applicable to the project are identified and described in general terms, by the type of project requirement to be financed.

Sources and methods described fall into the following general categories:

- Federal grants available to any local government entity
- Federal grants available only to, or with a specific amount reserved for, Indian Tribes
- Federal loans
- Federal guarantees
- State grants available to local governments (no state grants reserved for Indian Tribes)
- County and state road funds
- City general obligation or revenue bonds
- Private equity investment
- Private loans and mortgages
- Tribal enterprises

FRONT-END MONEY

To sustain the initial and ongoing momentum of the project during its formation and organization stages, "seed" monies would be necessary to cover further planning, organization, legal, financial, and governmental analyses, evaluations, and negotiations. It is imperative that this seed money be made available at this time if there is to remain any chance of meeting reasonable timetables to correlate development of the proposed project with actual plant development in the coming years. We cannot over-emphasize the critical time period required to implement a project of this type and magnitude and the absolute necessity to allow sufficient preliminary planning and organization to provide reasonable chances for successful implementation.

Some small amounts of money, but primarily staff time, may be available from the Navajo Tribe Office of Program Development and the Navajo Indian Irrigation Project. One potential source of planning funds for the Navajo Nation is a 701 Planning Grant from the Department of Housing and Urban Development. Such monies would only provide for additional planning, however, and would not reduce the need for a corporate investment at this time. The result is that the project companies may be a primary source of front-end money.

INFRASTRUCTURE

Sources of financing for infrastructure costs are identified in Table VIII-7. The major source for the water, sewage disposal, electric and gas utilities will be the Navajo Tribal Utility Authority. In the area of water and sewage disposal, many federal programs and a few state ones are available to cut financing costs. Private financing is not a normal source of infrastructure financing.

It is an irrefutable fact that new town development which does not employ some form of long-term relatively low cost financing to cover basic infrastructure costs becomes burdened with such an intolerable front-end "load" that no future level of activity is likely to enable the overall project to be economically viable. The need then for a funding form in the nature of municipal bonds, or their equivalent as might be developed in the Navajo context, must be recognized. To issue such bonds, it is necessary to establish a "city" as the legal base from which the bonding power and authority amanates. Thus it becomes imperative to concentrate legal and corporate efforts on a means of establishing a legal "city", be it an extension of the Navajo Tribal Counsel, or a more traditional form of city government composed of elected officials. In any event, the legal entity must be of primary concern rather than the composition of the ultimate body or its method of representation, since the primary purpose of the entity is to provide the framework within which municipal bonds or their equivalent could be issued.

It is also clear in this context, that any municipal bond emanating from such an entity would not have the normal base for bonding power as might be the case in other incorporated areas. This suggests the need for guarantees from governmental or quasi-governmental bodies, including the Navajo Nation itself, the Bureau of Indian Affairs, and varied agencies of federal and state governments. The priority, however, remains the establishment of a city as the framework within which to qualify for a series of governmental programs as well as bonding authority.

HOUSING

Housing programs are traditionally financed through:

- private sources
- private sources guaranteed through federal programs (FHA)
- public housing programs

Table VIII-7
SOURCES OF INFRASTRUCTURE FINANCING

	Roads			Storm	Water		Sewage Disposal			Natural
Federal	Access	Major	Local	Drains	Source	Distribution	Collection	Treatment	Electric	Gas
BIA - Roads and Bridges	G									
Indian Health Service					G	G	G	G		
HUD-New Communities	X	X	X	X	X	X	X	X	X	X
Better Communities Act				G	G	G	G	G		
Environmental Protection Agency							G			
Farmers Home Administration	L	L	L		G/L	G/L	G/L	G/L		L
Economic Development Administration	G	G			G	G	G	G		
Revenue Sharing	G	G	G	G	G	G	G	G		
State										
Severance Tax Bonds								G		
Water Supply Grants					G					
Road Fund	G									
Local										
County Road Fund	G	G								
City General Bonds				B	B	B	B	B		
Revenue Bonds	B	B	B		B	B	B	B	B	B
Tribe										
Navajo Tribal Utility Authority					B	B	B	B	B	B
Navajo Indian Irrigation Project	G				G			G		

B = Bonds, G = Grants, L = Loans, X = Guarantees

Source: Development Research Associates

The amount of money available from housing residents is projected in Chapter V - Housing. The primary methods of converting this money into capital funds is the private mortgage, backed up by FHA and VA conventional guarantees. The Farmers Home Administration has funds which might be used for agricultural workers, and the Tribe and BIA have limited revolving funds available for Navajo families. The Central Consolidated School District is expected to provide housing for its employees. Sources of housing financing are presented in Table VIII-8.

PUBLIC FACILITIES

To a large extent, public facilities are provided by the capital improvement programs of the agencies which will operate the facilities. The primary source of funds for the public schools, therefore, is the Central Consolidated School System. Medical facilities would be primarily provided by the Indian Health Service. Local government offices would be provided by the local government, e.g., the city. Parks and recreation programs typically require major grants from outside sources such as HUD or Department of Interior. Sources of public facility financing are shown in Table VIII-9.

COMMERCIAL

Commercial financing requirements fall into two objectives:

- o Providing commercial uses which meet an assured need.
- o Providing the opportunity for Navajo entrepreneurs to own and operate their own businesses.

The economic system model projects only those uses required to meet the needs of the new town residents. Planning of the town should provide for that limited activity so that the market required for profitable operation will be there. Under this assumption, private financing should be available if financial institutions and commercial enterprises can be convinced there are no extraordinary risks due to land tenure or legal standing on the Reservation. Enough private operations have succeeded, such as FedMart in Window Rock and the bank in Shiprock, to provide such convincing.

In creating the new town, a sound program of identifying opportunities for Navajo ownership and potential Navajo owner/operators should be instituted. The Federal and Tribal programs listed in Table VIII-10 are those designed to provide initial capital and operating assistance to enable Navajos to succeed in business.

Table VIII-8
SOURCES OF HOUSING FINANCING

	Navajo	Anglo	Type of Unit: Single	Multi	Mobile	Group	Employer: Plant	Agriculture	Non Base
Federal									
FHA Conventional	X	X	X	X	X	X	X	X	X
VA Conventional	X	X	X	X	X	X	X	X	X
HUD - Ownership Subsidy	G	G	G					G	G
Rental Subsidy	G	G	G	G				G	G
Farmers Home Administration			L	L				L	
BIA - Revolving Fund	L		L		L		L	L	L
Tribe									
Tribal Revolving Fund	L		L				L	L	L
Navajo Housing Authority	G		G	G				G	G
Navajo Agricultural Products	G							G	
Employer									
Central Consolidated School	G	G	G						G
Private	L	L	L	L	L	L	L	L	L

G = Grant, L = Loan, X = Guarantee for Private Financing (Mortgage)

Source: Development Research Associates

Table VIII-9
SOURCES OF PUBLIC FACILITY FINANCING

	Schools	Medical	Local Government Office	Local Government Other	Parks/Recreation	Social
Federal						
BIA - New Town	G	G	G	G	G	G
Johnson-O'Malley	G					
HUD - New Communities	X	X				
1 Better Communities Act				G	G	G
Interior-Land and Water Conservation					G/L	
Indian Health Service		G				
Revenue Sharing			G	G	G	G
Farmers Home Administration			L	L		
Local						
Central Consolidated School	B/G					
City - General Bond			B	B	B	
Revenue Bond						
Private		G				G
Tribe						
Navajo Police				G		
Navajo Community College	G					

B = Bonds, G = Grants; X = Guarantees for private financing

Source: Development Research Associates

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Table VIII-10
SOURCES OF COMMERCIAL FINANCING

	Retail	Office	Hotel/ Motel	Commercial Recreation	Wholesale	Mobile Home Parks	TCU	Navajo	Anglo
Federal									
BIA - Indian Revolving Fund	L	L	L	L				L	
Indian Business Development Fund	G	G	G	G		G		L	
EDA - Business Development	L	L	L	L	L			L	L
SBA - Business Loans	L	L	L	L				L	L
MESBIC	I/L	I/L	I/L	I/L		I/L		I/L	
Development Company	L	L		L				L	L
Economic Opportunity	L	L						L	
Tribe									
Tribal Credit Program	L	L	L	L	L	L		L	
Private									
Financial Institutions	I	I	I	I	I	I	I	I	I
Utilities							I	I	I

I = Investment, L = Loans, G = Grants

Source: Development Research Associates

PRIVATE FINANCING

This analysis has operated on the assumption that, if the market is demonstrated and the risk reasonable, private financing will be available. The endless sources of private financing called "financial institutions" in these tables could include banks, savings and loans, mortgage companies, mortgage bankers, insurance companies, pension funds or Japanese investors. Attention has been concentrated rather on the potentials for repayment and the risks involved. As shown above, the town would be planned to carefully balance residential and commercial activity to assure market demand. Risks would be minimized under the legal assumptions outlined in Chapter VII - Organization.

POTENTIAL FINANCING PROGRAMS

The objective of the financing program is to obtain the greatest possible internal support and outside assistance possible.

It is not possible to establish or project an assured financing program for the new town. The question has been asked, "Exactly how much money can we get from federal grants and other sources?" The response has to be that no one knows for certain. There are too many variables built into the creation of any new town to project precisely. Even established cities cannot project the receipt of federal grants or other discretionary income when few of these variables exist. Among the major unknowns in this project are the following:

- What will be the size of the new town?
- How many Navajos will live in it?
- Who will be the development entity?
- To what extent will the Navajo Nation be involved?
- Will a new city be formed?
- Will municipal financing be available?
- Will the Navajo Indian Irrigation Project be involved?

Add to these unknowns the great uncertainties existing in the outside world, including:

- What changes will take place in federal housing programs over the next five years?

- Will there be a federal housing program in five years?

- Will the Administration maintain a moratorium on housing and community development programs?

- Will Congress pass the Better Communities Act? In what form?

- Will special financing programs for Indians be maintained or increased?

- o Will individual administrators be intrigued by the new town concept or turned off by its apparent problems?
- o Will the Indian Health Service be adequately funded?
- o Will the energy shortage encourage federal support for the new town?

This analysis is designed to provide a financing program which is viable no matter what the answers to those questions.

For each of the three potential town sizes, we have established three potential scenarios of how the new town financing might go.

- o Scenario A - the best case. Everything goes well, with internal support and outside assistance at a high level.
- o Scenario B - the reasonable expectation. The financing program that can be projected now based on existing programs and current practice.
- o Scenario C - the worst case. Internal support, especially for housing, is low. Outside assistance is based on those amounts virtually required by law.

The assumptions for these scenarios are spelled out in Tables VIII-11 through VIII-13. With these assumptions, it is possible to match the available revenue sources to the project requirements, in great detail. For example, a projection can be made of the support of the Indian Health Service for water system construction for Set 1 under Scenario A. Other sources would be available for the same purpose, so that alternatives are available for the companies, development entity or city to pursue. The results of this analysis are displayed in Tables VIII-14 through VIII-16 for each town size for each financing scenario by major categories of project requirements.

For Set 1 - a town oriented to one coal-gasification plant -- we projected a total capital cost of $26,440,000. Under Scenario A - the best case -- we project $23,085,000 available from other sources, leaving $3,355,000 as the amount to be financed. A more reasonable expectation might be for $18,817,000 available from other sources, leaving $7,678,000 to be financed. Under Scenario C, $14,469,000 would be available and $11,971,000 would need to be financed.

For Set 2 - a joint two plant town -- the construction cost would be $78,925,000. Under best case conditions, we project $71,566,000 available from other sources, leaving $7,359,000 to be financed. Scenario B - the reasonable expectation -- projects $60,381,000 available, with $18,544,000 to be financed. Under the worst case, the amount needed would be $30,488,000 as $48,437,000 would be available from other sources.

Table VIII-11
ASSUMPTIONS FOR ALTERNATIVE
FINANCING PROGRAMS - SET 1

Scenario A	Scenario B	Scenario C
Each individual company plans, constructs and operates its own town.		
Tribe assists companies in housing Navajo families	Tribe involvement limited to NTUA and Police	Tribal approval, but all responsibility to companies
Bureau of Indian Affairs offers housing and grants already available	Bureau of Indian Affairs builds access roads	No involvement of Bureau of Indian Affairs
State and federal grants restricted to those for non-profit corporations	Limited grants given to Tribe for use in new town	No grants available from state or federal sources
Private investment in no-risk housing and business	Limited loans and mortgages only for prime investment	Private investment limited to companies or company guaranteed loans
Non-profit corporation to build and run town - no cityhood	Non-profit corporation, but not eligible for outside assistance	No local government entity created for new town -- owned directly by company

Source: Development Research Associates

Table VIII-12
ASSUMPTIONS FOR ALTERNATIVE
FINANCING PROGRAMS - SET 2

Scenario A	Scenario B	Scenario C
Companies jointly work to plan, construct and operate new town.		
Tribe takes secondary role in development entity	Tribe involvement limited to NTUA, police and public housing	Tribal approval, but all responsibility to companies
Bureau of Indian Affairs leads efforts to obtain funding from other federal programs	BIA offers housing and road grants already available	No involvement of BIA, but partial grants by Indian Health Service
State and federal grants given consistent with recent performance	Grants restricted to those available to non-profit corporation	No grants available from state or federal sources - access roads from county
Private investment in no-risk housing and businesses	Limited loans and mortgages for prime investment	Investment limited to companies or company-guaranteed loans
New city established to finance infrastructure, at high interest rates	Non-profit corporation established to build and run town	Companies jointly own and operate town - no city or non-profit corporation

Source: Development Research Associates

Table VIII-13
ASSUMPTIONS FOR ALTERNATIVE
FINANCING PROGRAMS - SET 3

Scenario A	Scenario B	Scenario C
Companies take strong lead in planning and organizing development		
Companies and tribe join together in development entity	Joint effort with companies taking lead position	Tribal approval, but all responsibility to companies
Bureau of Indian Affairs contributes substantially to creation of first Indian new town	BIA leads efforts to obtain funding from other federal programs	BIA accepts responsibility only for Navajo Indian Irrigation Project
Strong support given by other federal agencies	Support given consistent with recent performance	Limited grants by state and federal agencies
Heavy investment in town by private institutions	Reasonable investment in no-risk housing and business	Investment quite limited to company guaranteed loans
New city established to finance and run infrastructure	Public financing available only at higher rates to new city	No city established and public financing unavailable

Source: Development Research Associates

For Set 3 - the larger town including the Navajo Indian Irrigation Project -- total capital costs are projected at $113,343,000. Under Scenario A, $105,489,000 would be available from other sources, with $7,854,000 to be financed. Scenario B projects that $95,242,000 would be available leaving $18,101,000 to be financed. The worst case shows $79,415,000 available, with $33,928,000 to be financed.

The amounts to be financed are not, however, the sole responsibility of the coal gasification companies. In Set 3, a portion of the base employment and resulting secondary employment -- estimated at 15 percent of the town -- is generated by the Navajo Indian Irrigation Project. This project might, therefore, be responsible for that share of the amount to be financed. Even more important, there are several potentials for additional funding not now in existence which we will explore in this section.

Support by Bureau of Indian Affairs

The new town proposed for the Burnham Chapter area of the Navajo Nation would be the first substantial new town ever created on an Indian Reservation in the United States. It is a town which would provide housing for Navajos and support Navajos obtaining well-paying jobs and employment. It would be a Navajo planned and Navajo governed town which could maintain the Navajo culture. For these reasons, we believe the Bureau of Indian Affairs should support with capital grants the construction of this new town. The U.S. Department of Housing and Urban Development has a New Communities Program of guarantees, but a new town for Navajos has serious legal problems because the land cannot be mortgaged for security.

A proposal should therefore be made to the BIA seeking general funds to be used in a variety of projects, directed entirely at Navajo families and business. Areas of concern are:

- Housing grants and guarantees
- High risk Navajo owned businesses
- Grants to NTUA and Navajo Police
- Park and recreation grants
- Social facility grants

Such a BIA New Town program would be an addition to the existing roads and bridges and Indian business and development funds. We consider this proposal applicable primarily under Set 3 -- the new town serving more than just coal-gasification plant employees -- and likely only under Scenario A.

Table VIII-14
SUMMARY OF FINANCING SCENARIOS - SET 1
(In Thousands of Dollars)

	Total Cost	Available From Other Sources			To Be Financed		
		A	B	C	A	B	C
Front End	1,500	600	300	-0-	900	1,200	1,500
Infrastructure	6,861	5,313	2,971	676	1,548	3,890	6,185
Housing	11,335	11,279	10,196	9,006	56	1,139	2,329
Public Facilities	4,352	3,860	3,491	3,113	492	861	1,239
Commercial	2,392	2,033	1,854	1,674	359	538	718
Total	26,440	23,085	18,812	14,469	3,355	7,628	11,971

Source: Development Research Associates

Table VIII-15
SUMMARY OF FINANCING SCENARIOS - SET 2
(In Thousands of Dollars)

	Total Cost	Available From Other Sources			To Be Financed		
		A	B	C	A	B	C
Front End	2,525	2,020	1,010	-0-	505	1,515	2,525
Infrastructure	21,952	16,360	10,896	5,580	5,592	11,056	16,372
Housing	33,524	33,307	30,398	27,385	217	3,126	6,139
Public Facilities	12,846	12,609	11,291	9,171	237	1,555	3,675
Commercial	8,078	7,270	6,786	6,301	808	1,292	1,777
Total	78,925	71,566	60,381	48,437	7,359	18,544	30,488

Source: Development Research Associates

Table VIII-16
SUMMARY OF FINANCING SCENARIOS - SET 3
(In Thousands of Dollars)

	Total Cost	Available From Other Sources			To Be Financed		
		A	B	C	A	B	C
Front End	3,203	2,600	1,300	-0-	603	1,903	3,203
Infrastructure	26,009	20,191	17,636	10,274	5,818	8,373	15,735
Housing	52,498	52,138	48,391	44,627	360	4,107	7,871
Public Facilities	20,164	19,664	17,593	14,765	500	2,571	5,399
Commercial	11,469	10,896	10,322	9,749	573	1,147	1,720
Total	113,343	105,489	95,242	79,415	7,854	18,101	33,928

Source: Development Research Associates

Navajo Royalty Fund

The Navajo Nation has had a large fund generated from oil and gas royalties which has been used for a variety of tribal improvements and industrial development. While large at one time, it has been used enough so that the Tribe is carefully watching even their established operating programs.

In the process of mining coal, the companies will be paying a per-ton royalty to the Navajo Nation. At a rate of 20¢ per ton, each mine would be contributing $1,800,000 annually to the Nation. With the benefits to be received by the Nation in mind, it may be possible to request that portion of that royalty, say 50 percent or 10¢ per ton, be earmarked for new town development. The money would be controlled by the Navajo Nation and disbursed through the development entity of which they are a partner.

The annual amount available of $900,000 per mine would support a bond issue of nearly $12.5 million. Since these funds would have to be used for Navajos, it may be better to have the money used for the high-risk areas where it is hard to obtain outside support, e.g., Navajo-owned businesses.

Cost Reduction

One obvious method often used to bridge the gap between needed expenditures and available revenues is to reduce the expenditure figure. No reduction is projected for those areas of capital which are essential or pay for themselves. Several potential reductions appear to be worthy of consideration:

- Parks and recreation facilities could be built on a schedule matching receipt of federal funding, over a period of a decade or so rather than being in place only a few years into the town's life cycle.
- Social facilities are projected to be largely privately financed and therefore will be scheduled as groups and individuals raise the necessary funds.
- Commercial ventures will be established as their feasibility is thoroughly demonstrated to the potential owners and operators. In addition, the actual space constructed may be limited to assure the success of those enterprises which are established.

CORPORATE ROLE

The companies involved in the creation of employment should assist the Navajo Nation in development of housing and community services for their employees. This support would vary by set as the ratio of company employees to the total employment varied. These ratios are presented in Table VIII-17. In Set 3, the larger town, only 36.4 percent of employees will work in a coal gasification complex or mine. Over one-half of the employees will be in the secondary economy and nearly 9 percent will be employees of the Navajo Indian Irrigation Project.

The corporate role in the field of housing cannot be tied directly to the number of households. Employees of the three companies will be paid an average salary above the average for all employees in the town, and therefore will be able to pay a larger share of their housing needs than employees of the agricultural, construction and secondary sectors of the economy. Our analysis in Chapter IV indicates that non-Navajo families will be able to meet their housing costs under Scenarios A and B. Under Scenarios C, the small deficit is attributable to employees of non-base enterprises, and would therefore be the responsibility of the NIIP or the Navajo Nation.

All employees of the coal gasification companies will be able to meet their housing needs under Scenario A. The deficits in this category are also primarily attributed to non-base employment, and in Set 3 to agricultural workers. For all three scenarios, we did not calculate the Set 1 share for coal gasification employees on the assumption that the one plant, company town was entirely attributable to the coal gasification plants.

For Scenario B -- the reasonable expectation -- only 39.0 percent of the housing deficit in Set 2 is assigned to coal gasification employees, even through they represent 54.3 percent of total employment. By Set 3, the largest town, the share assigned to coal gasification employees drops to 17.2 percent for several reasons. Agricultural workers are added, and even with two wage-earners, these families cannot, on the average, afford the housing they need. Also, the larger town size has added opportunities for second wage earners in the family making company employees able to afford better housing than in Set 2. Agricultural families with the same opportunity can undoubtedly do better than they could in a separate and much smaller irrigation project settlement.

Under Scenario C, the amount made available by households for housing is much lower than under Scenario B. Even two-wage earner families with coal gasification workers will on the average pay slightly less than needed for housing. The share assigned to Navajo coal gasification employees is 47.6 percent for Set 2. By Set 3, with more agricultural and non-base employment, the share declines to 26.0 percent.

In every case, as shown in Table VIII-17, the housing deficit attributable to coal gasification employees is considerably below their share of total employment. The factors developed in this table will be useful in developing a financing strategy and assigning appropriate role in creation of a new town.

Table VIII-17
FACTORS TO CONSIDER IN CORPORATE SHARE OF FINANCING

TOTAL EMPLOYMENT	Set 1	Set 2	Set 3
Coal Gasification	62.0%	54.3%	36.4%
Navajo Indian Irrigation Project	0.0	0.0	8.9
Construction	1.3	1.2	0.8
Non-base	36.7	44.5	53.9
	100.0%	100.0%	100.0%
HOUSING DEFICITS[1] -- COAL GASIFICATION HOUSEHOLDS			
Coal Gasification Households			
Scenario A	N.A.	0.0%	0.0%
Scenario B	N.A.	39.0	17.2
Scenario C	N.A.	47.6	26.0

[1] The housing deficit is the difference between total housing cost and the amount, available from households to pay for housing. The percentage presented here is the share of that deficit attributable to households with an employee of a coal gasification plant or mine.

Source: Development Research Associates

In discussing financing responsibilities, then, the following guidelines may be useful:

- o Front End Costs - Amounts to be financed may be split among the development entity partners in the ratio of their investment in the new town.
- o Infrastructure - Amounts to be financed may be split in proportion to the households represented by various employers.
- o Housing - Amounts to be financed may be split with regard to the share of the housing deficit represented by employee households.
- o Public Facilities - Amounts to be financed may be shared in proportion to the share of households represented by various employers.
- o Commercial - Amounts to be financed may be shared based on investment in the new town by partners in the development entity.

These guidelines are based on the assumption that every effort will be made to obtain significant support for the new town from the Bureau of Indian Affairs under the unique concept outlined above.

MUNICIPAL OPERATIONS

A local government body established for the new town would have responsibility for fire, streets, sanitation, parks and recreation services. Police services would be largely the responsibility of the Navajo Police, but a small local force could be created to assist them. Water and sewage disposal utilities would be the responsibility of the Navajo Tribal Utility Authority.

A preliminary municipal operating budget is presented in Table VIII-18 based on the municipal employment projection of the economic system model and pertinent costs and revenues in the State of New Mexico. All revenues generated would require approval of the Tribe, preferably in the charter creating the city. Under all three sets a gap exists between projected revenues and expenditures. This gap could be met, however, by several means, including additional local fees, state subventions and federal revenue sharing.

TRANSITION

The elements of a financing program have been identified and described in this chapter. Gaps between the total capital costs and the financing available from other sources will have to be met in one of several ways, including:

Table VIII-18
MUNICIPAL OPERATING BUDGET

	Set 1[1]	Set 2	Set 3
	(In Thousands of Dollars)		
Revenues			
Property Tax	10	31	47
Gasoline Tax	20	59	93
Cigarette Tax	9	25	40
Auto Licenses	8	24	39
Sanitation	40	118	186
Gross Receipts	48	175	262
Total	135	432	667
Expenditures			
Administration	37	88	124
Police	33	78	93
Fire	50	98	109
Streets	43	127	202
Sanitation	40	118	186
Parks and Recreation	20	59	93
Miscellaneous	22	57	81
Total	249	625	888
GAP	114	193	221

[1]For comparison purposes only as no city government is anticipated.

Source: Development Research Associates

- o Strong support for the new town by the Bureau of Indian Affairs.
- o Assignment of a share of the coal royalties to Navajo housing and businesses.
- o Efforts to increase Navajo family ability to meet housing costs.
- o Reduction of capital expenditures in selected areas.

The manner in which an implementation strategy is adopted and carried out, the form and ability of the planning group and the development entity and the commitment to the new town concept by the Navajo Nation in concert with the coal gasification companies -- and perhaps the NIIP -- will determine the potentials for the successful financing of the new town. The concluding chapter of this report, Chapter IX - Preliminary Implementation Strategy, will outline the key actions required in the next few months.

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IX
PRELIMINARY IMPLEMENTATION STRATEGY

The findings of this study have shown that there are infinite mixture of assumptions which may be made about the economic base, the schedule of plant construction, Navajo/non-Navajo mix, town attractiveness, family size and retail sales capture rates. The economic system model was developed to project town size and characteristics under any combination of assumptions. The actual nature and rate of growth of the town cannot be known, however, until the town is built. For that reason, a town concept was developed which can respond to and accommodate a new town development under any conditions.

In a like manner, the overall implementation strategy must be designed to respond to the complexities of organization and financing, just as the town concept accommodates the yet unknown physical characteristics of the town. In this concluding chapter of this study on the potential for a new town on the Navajo Reservation, the consultant team presents its recommendations in the form of a preliminary implementation strategy. Each of those three words was carefully chosen to convey the following meanings:

- Preliminary - the recommendations presented in this report are those of the consulting team, Development Research Associates and Gruen Associates, which have not yet been reviewed or adopted by the client companies. Furthermore, this study has demonstrated that the entire setting in which this new town would be created is so novel, so full of unknowns, and so subject to change that it is not possible to ever have a "final" strategy.

- Implementation - the new town can be created. There are many problems facing those who would plan and build it, but these appear to be solvable under certain conditions of size and location, full cooperation of all parties and strong outside support. Decisions must now be made by the coal gasification companies and the Navajo Nation on whether to implement the concept or not. Certainly it must be noted that the companies can still build and operate their plants and mines without a town. The Navajo Nation, on the other hand, will have great difficulty improving its economy without the new town.

- Strategy - an overall general approach to the actions yet to be taken by the companies and the Navajo Nation if they decide to proceed. This study presents no physical plan for a new town, it chooses no site, and sets no population number. It sets up no organization and no plan for financing the town. These plans can be created only as the town is created and only in full partnership with the Navajo Nation.

With a full partnership with the Navajo Nation, and with the leadership and total commitment of the gasification and mining companies, the preliminary implementation strategy outlined in this chapter is the appropriate and sufficient way in which to create a viable new town. The strategy presented in this chapter, then, consists of four major elements:

- Implementation Events - those decisions and actions which must be taken in order to create the new town, based on an activity sequence diagram which will interlock with the development schedules of the EPNG and WESCO coal gasification complexes.

- Organizational Strategy - the recommended framework of organization which must be created in order to plan, construct, finance and operate the new town.

- Financing Strategy - the approach to financing designed to insure the fullest internal and external support of the new town.

- The Town Concept Strategy - the concept designed to assure that the physical planning and development of the new town is responsive to change and creates a viable community at any level of development.

This strategy does not present the details on who designs street systems, or whether streets are built before sewers, or how the geologist will work in concert with the soils engineer. Rather, it concentrates on the critical decisions and actions which must be taken within the next few months, to set up the town philosophy, organization and financing which will assure the success of the town.

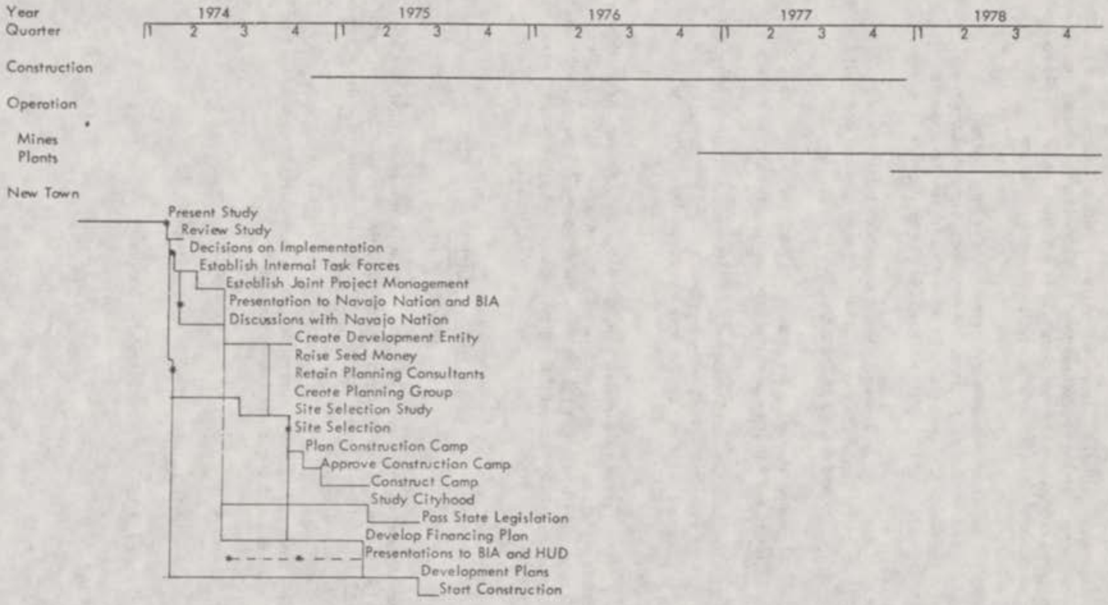
INITIAL ACTIVITIES

Today is not too soon to begin on building the new town. It may, if tight schedules are not met, even be too late. This section provides an activities diagram, shown in tentative form in Exhibit 25, which identifies and links the critical decisions and activities which must occur in order to create the town.

Three critical dates are important to consider in linking the development of the new town to the construction of the coal gasification complexes:

- End of 1974 - Start of construction
- End of 1976 - Start of mine operation
- End of 1977 - Opening of complex

Exhibit 25
ACTIVITIES DIAGRAM



The bulk of housing and community services must be in place by 1977 in order to serve operating employees of the two plants and mines. A year prior to that some housing should be available for mine and initial plant employees as they begin to be hired. A most critical date, however, is the start of construction of the complexes. A vital element of our town concept strategy is to integrate the construction camp and permanent town development to achieve a number of town objectives. By the time the construction begins, therefore, the town must be approved, the site selected, a development entity created and initial infrastructure provided. This will allow the construction force to be the initial residents of the new town.

The activities diagram presents the major decisions and events which must take place within the next one and one-half years. Detailed planning and engineering must begin quickly and be pursued intensively, but do not require attention in this diagram. The experience and expertise required is available for this task. Attention must rather be directed to the unique approval, organizational and financing activities required for a new town in a Navajo environment, which include:

GETTING UNDERWAY

- Presentation of study findings to EPNG and WESCO (by DRA)
- Review of study (EPNG and WESCO, separately)
- Presentation of study to Utah International
- Corporate decisions on implementation (EPNG, WESCO and Utah separately, and then jointly)

  Go - No Go Decision

  - New town or not
  - Joint town or not
  - Position with Navajo Nation
- Establish internal task force to plan and coordinate corporate efforts (EPNG, WESCO and Utah, separately)
- Establish joint project management team of EPNG, WESCO and Utah personnel assigned to project, if a joint effort is approved (EPNG, WESCO and Utah)

- o Presentation of study findings and corporate decisions to The Navajo Nation and Bureau of Indian Affairs.
- o Begin discussions with Navajo Nation on decision to build town and on creation of planning group and development entity. (Project team)

  Go - No Go Decision

  - . Navajo Nation approves or not
  - . Navajo Nation determines extent of their involvement

INITIAL PLANNING

- o Create development entity of Navajo Nation, El Paso Natural Gas Company, Western Gasification Company, Utah International and Navajo Indian Irrigation Project. (This assumes the Set 3 town, and membership and subsequent steps would be modified for other sets.)
- o Create planning group, as discussed later in this chapter.
- o Budget and raise initial seed money (Navajo Nation, EPNG, WESCO, Utah and NIIP)
- o Select and contract with planning consultants (Project team)
- o Create planning group (Project team)
- o Site selection deliberations (Planning group)
- o Site selection (Planning group, and Navajo Nation)
- o Preparation of development plans (Planners)
- o Plan construction camp (Planners)
- o Approve construction camp (Development entity)
- o Construct camp (Development entity)

FORMAL ORGANIZATION AND FINANCING

- Study local government (Development entity)
- Secure necessary state legislation (Navajo Nation)
- Develop financing plan and begin implementation (Development entity)
- Presentations to Bureau of Indian Affairs, Housing and Urban Development and other potential outside supporters (Development entity)

CONSTRUCTION OF NEW TOWN

- Start construction (Development entity)

This activity diagram has only identified what has to be done and in what sequences. The schedule can be met on all of these, except...discussions among the parties will likely take more time than scheduled. Every effort must be made therefore to conduct these discussions as quickly and effectively as possible.

ORGANIZATIONAL STRATEGY

The primary organizational strategy is to get all the involved parties working in concert to build a new town within the time required by plant construction. Criteria for developing a strategy include the following:

- Involvement of all interested parties:
  - basic employers
  - approval agencies
  - service agencies
- Catalytic role for gasification companies, but not full responsibility.

- o Broad charter for planning and development groups to operate independently on most decisions.
- o Reducing need to go to partners of the development entity for approval on day-to-day development decisions.
- o Providing broadest range of options for financing.

The proposed organizational strategy centers on three bodies -- a development entity, a planning group and a city government. The roles of each have been illustrated in the schedule outlined above.

DEVELOPMENT ENTITY

The entity recommended is a non-profit corporation chartered under the laws of the State of New Mexico. Among the parties creating and owning the development entity would be:

- o The Navajo Nation
- o Navajo Agricultural Products Industries (Navajo Indian Irrigation Project)
- o El Paso Natural Gas Company
- o Western Gasification Company
- o Utah International, Inc.

We believe it important that each partner invest capital in this development corporation in order to assure a sense of participation and responsibility. Financing of the corporation, coming from the three coal gasification and mining companies, could be provided in the form of notes to the development entity which have the potential of being paid back from fees earned in the development process.

PLANNING GROUP

The Navajo Tribal Council should take the lead in the creation of the planning group, extending invitations to the following organizations to be members:

Development Entity

Navajo Nation
El Paso Natural Gas Company
Western Gasification Company
Utah International
Navajo Agricultural Products Industries (if largest town is chosen)

General Governmental Agencies

Bureau of Indian Affairs
State of New Mexico
County of San Juan
Navajo Office of Program Development
Burnham Chapter

Service Agencies

Navajo Tribal Utility Authority
Navajo Housing Authority
Navajo Housing and Development Enterprise
Navajo Police
Bureau of Indian Affairs
Indian Health Service
Central Consolidated School District
Navajo Community College

LOCAL GOVERNMENT

It is possible and desirable to incorporate a city government on the Reservation under the laws of the State of New Mexico. Navajo Nation approval is undoubtedly required. Concerns of the Navajo Tribal Council will relate to political control of the council, land use controls, taxes, financing capabilities. We suggest the companies discuss with the Navajo Nation amendments to state legislation concerning incorporation on Indian Reservations, possibly providing for:

- Tribal council representation on the City council.
- Limited land use controls.
- Restrictions on types of taxes or service charges.
- No lien on property or leaseholds.

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- o Limitations on taxes imposed on resource processing facilities.

- o Boundaries to be set by the Navajo Nation.

FINANCING STRATEGY

The financing strategy is oriented to providing long-term financing of the community as independent as possible of the basic employers. Elements of this strategy then include:

- o Necessary seed money

- o Private mortgage financing of the majority of housing

- o Full responsibility for schools by Central Consolidated School District; health, water and sewage disposal by Indian Health Service and access roads by state and county.

- o Fullest possible Federal support with grants, because of concern for energy and Indians.

- o Seeking of BIA New Town Grant to cover all items not included in other programs.

- o Initial construction camp facilities provided by construction contractors.

TOWN STRATEGY

The strategy for the physical creation of the new town was well outlined in Chapter V - Town Concept, and Chapter VI - Setting for the Town. We recommend, therefore, that the strategy adopt those concepts and also consider these intermediate steps to town development:

- o Adopt the regenerative town concept.

- o Do more detailed analyses of the two preferred town locations described earlier in order to provide more detailed cost and design information. The actual location decision, however, will be made by the interested parties, including the coal gasification and related companies, the planning group and approved by the Navajo Tribal Council. A decision to include the irrigation project in the town development entity will to a large extent determine the town location.

- o A development gasifier is proposed to be built by EPNG prior to the main complex. Housing for its employees should be provided on a temporary basis nearby and have no relationship to a new town, as our site selection process will not take place in time to provide any coordination.

- o The plant construction camp(s), on the other hand, should be planned and located to be fully integrated with the new town development. Construction workers will be initially housed in mobile homes. Their mobile parks can be the first neighborhoods of the new town, sized to anticipate the mobile home needs of the "steady state" town. Mobile homes above that need would be placed in temporary camps, such as built in Page, Arizona.

  Construction workers will number approximately 7,000 at the peak period. The buying power of these workers and their families could support retail businesses and have them in full, profitable operation by the time permanent housing is built in the new town.

  The construction work force will be largely non-Navajo, so the construction camp would have a distinctly non-Navajo influence. This, and the presence of retail and service facilities, could be critical in decisions by non-Navajo operating employees and their families to move into the new town. Without this transition from construction to operations within the new town, it may not be possible to create an integrated community and a major objective of the companies will not be achieved.

CONCLUSION

This study has shown how difficult, complex, unique, unprecedented and frustrating creation of a new town can be. We conclude, however, that a new town on the Navajo Reservation -- jointly sponsored, broadly based and as large as possible -- can be built and can be successful.

NOTES

Chapter I

1. Transwestern Coal Gasification Company is a wholly-owned subsidiary of Transwestern Pipeline Corporation, which in turn is a wholly-owned subsidiary of Texas Eastern Transmission Company.

Chapter VII

1. "The Current Governance of New Towns", American County, November 1971 reprinted from New Towns: Laboratories for Democracy, listed in Bibliography.

APPENDIX A
INTERVIEWS

Name	Title/Officer	Organization	City
Robert Bacon	County Manager	County of San Juan	Aztec, New Mexico
Hildreth Barker	Architect	The Albuquerque Collaborative	Albuquerque, New Mexico
Bahe Billy, Ph.D.	Planning and Training Administrator	Navajo Agricultural Products Industries	Farmington, New Mexico
John Bokan	Real Property Management Officer	Bureau of Indian Affairs	Window Rock, New Mexico
John Benally	Area Roads Engineer	Bureau of Indian Affairs	Gallup, New Mexico
Roger Boyd	Intern	Office of Navajo Economic Opportunity	Fort Defiance, Arizona
Gerald Boyle, Ph.D.	Chairman, Department of Economics	University of New Mexico	Albuquerque, New Mexico
David Brunt	Economic Development Planner	Navajo Agricultural Products Industries	Farmington, New Mexico
J. Y. Christiansen	Project Engineer	Navajo Indian Irrigation Project (BIA)	Farmington, New Mexico
Cathy Ciardullo	Economics Masters	University of Kansas	San Jose, California
Gerald Conley	Administrator	Shiprock Hospital, Indian Health Service	Shiprock, New Mexico
Frank Coppler	Executive Director	New Mexico Municipal League	Santa Fe, New Mexico
James Daniel, Jr.	Assistant to Director	Office of Revenue Sharing	Washington, D.C.
Beverly Drewood	Placement Specialist	Four Corners Power Plant (APS)	Fruitland, New Mexico
L. Mike Doran	Office of Program Development	Navajo Tribe	Window Rock, New Mexico
Warren Downs	Plant Personnel Supervisor	Four Corners Power Plant (APS)	Fruitland, New Mexico
C. Mac Eddy	Town Site and Plant Engineer	Navajo Forest Products, Inc.	Navajo, New Mexico
Julian R. Franklin	Assistant Area Director	Bureau of Indian Affairs	Gallup, New Mexico
Dennis Freeman	Plant Manager	General Dynamics	Fort Defiance, Arizona
Bill Gibbons	Transportation and Planning Officer	Four Corners Regional Commission	Farmington, New Mexico
William W. Grant	Assistant Manager	Navajo Mine (Utah International)	Fruitland, New Mexico
John C. Gundershaug	Industrial Relations Manager	Fairchild Semiconductor	Shiprock, New Mexico
David Hamilton	Department of Economics	University of New Mexico	Albuquerque, New Mexico
Vernon Haragara	Indian Desk	Department of Housing and Urban Development	Los Angeles, California
Graham Holmes	Land Administrator	Navajo Tribe	Window Rock, New Mexico
David Howell	Municipal Service Officer	Bureau of Reclamation	Page, Arizona
Larry Irvin	V.P. and Manager, Shiprock Branch	First National Bank of Farmington	Shiprock, New Mexico
Elliott Jacobsen	Mayor	City of Fort Yates	Fort Yates, North Dakota
Norma Jones	Resident Manager	South Shiprock Housing Project	Shiprock, New Mexico
Robert Karlin	Superintendent	Central Consolidated School District	Kirtland, New Mexico
Allen King	Personnel Manager	Navajo Mine (Utah International)	Fruitland, New Mexico
Willie Kutac	Soils Scientist	Bureau of Indian Affairs	Shiprock, New Mexico
Betty Lameman	Project Manager	Navajo Housing Authority	Shiprock, New Mexico
Raymon Lara	Chief, Local Government Division	State of New Mexico	Santa Fe, New Mexico
Bert Levine	Project Construction Engineer	Bureau of Reclamation	Farmington, New Mexico
Jerry Levy, Ph.D.	Chairman, Department of Anthropology	University of Arizona	Tucson, Arizona
Mac McWhirter	Home Builder		Farmington, New Mexico
Robert Moffin	Executive Director	National Association of Housing and Redevelopment Officials	Washington, D.C.
Bernie Martin	Industrial Development Program Officer	Bureau of Indian Affairs	Shiprock, New Mexico
David Mayberry		Navajo Tribal Utility Authority	Fort Defiance, Arizona
Pat Chee Miller	Executive Director	Navajo Housing Authority	Window Rock, New Mexico
Robert Murphy	Program Development	Navajo Tribe	Window Rock, New Mexico
Don Myer	Chief, Environmental Health	Indian Health Service	Window Rock, New Mexico
Eric Natwig	Economic Planner	Office of Navajo Economic Development	Fort Defiance, Arizona
L. M. Parrish, Jr.	Division Supervisor	El Paso Natural Gas Company	Farmington, New Mexico
Tom Pattison	Production Supervisor	General Dynamics	Fort Defiance, Arizona
Bill F. Pearson, P.E.	Chief, Sanitation Facilities Construction Branch	Indian Health Service	Window Rock, New Mexico
Ed Raymond	Environmental Engineer	Navajo Mine (Utah International)	Fruitland, New Mexico
Phil Reno	Acting Director, Shiprock Branch	Navajo Community College	Shiprock, New Mexico
Phil Saucedo	Manager	FedMart	Window Rock, New Mexico
Roedell Schmidt	Executive Director	San Juan Council of Governments	Farmington, New Mexico
Roy Scrivner	Dir., Office of Navajo Land Admin.	Navajo Tribe	Window Rock, New Mexico
John Sipe	Social Services Representative	Bureau of Indian Affairs	Window Rock, New Mexico
John W. Snyder	General Manager	Navajo Forest Products, Inc.	Navajo, New Mexico
Charles Swanson	Construction Division	Environmental Protection Agency	Washington, D.C.
David C. Thompson	Housing Development Officer	Bureau of Indian Affairs	Window Rock, New Mexico
Ken Townsend	Executive Director	Navajo Housing and Development Enterprise	Window Rock, New Mexico
Abraham Tucker	Education Program Administrator	Bureau of Indian Affairs	Window Rock, New Mexico
Mary Jo Walters	Realtor	Mary Jo Walters Real Estate	Farmington, New Mexico
Henry L. Whipple	Assistant Area Housing Development	Bureau of Indian Affairs	Window Rock, New Mexico
Sam Wilkinson	Senior Engineer	Salt River Project	Page, Arizona
Paul C. Winter	Personnel Supervisor	Salt River Project	Page, Arizona
Mel Wise	Office of Information and Statistics	Navajo Tribe	Window Rock, New Mexico
Martin Wistisen	Dir., Center for Business & Econ Research	Brigham Young University	Provo, Utah
Emmett Wood	Credit Officer	Bureau of Indian Affairs	Window Rock, New Mexico
John Wright	Environmental Improvement Agency	State of New Mexico	Santa Fe, New Mexico

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APPENDIX C

BACKGROUND TO THE STUDY

The construction of coal-gasification plants on the Navajo Reservation creates a meeting of two cultures. The modern technology of the United States requires vast amounts of energy. Rising demands and dwindling supplies have created a shortage whose dimensions are currently being impressed on every American. Cutbacks, shortages and threats of more -- conditions unknown since World War II -- give urgency to the plans for creating substitute natural gas from coal. All this is needed in order to keep a modern society moving.

The People, "Dineh" as the Navajo call themselves, have in the past lived in isolation from the mainstream of modern America. However, this isolation has begun to break down during the past few decades, yielding to pressures both from within the Navajo Nation and from outside the Reservation. The introduction of electric power, telephones, radio and television into Navajo homes across the Reservation has produced dramatic changes in the Navajo's social characteristics. Attainment of the Nation's goal to return to tribal self-sufficiency through educational and economic development will require even greater social upheaval. Thus, "the great problem of the contemporary Navajo is that of living in two worlds at once, trying to see what is best in both, and then trying to integrate this conglomeration into a living whole".[1]

Economic development of the Navajo Nation has come primarily through the establishment on the Reservation of manufacturing and energy plants -- using the people and natural resources available on the Reservation to enhance the life-style of the Navajo. These major plants are:

- Navajo Forest Products Industries
- Four Corners Power Plant/Navajo Mine
- Fairchild Semiconductor Plant
- General Dynamics Navajo Facility
- Navajo Generating Station/Black Mesa Mine

The coal-gasification plants and the Navajo Indian Irrigation Project under development nearby, are discussed in Chapter III - Nature of the Town.

Within the Navajo Reservation there are very few communities in the "village" sense. Rather,

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[1] Christian, J.M., "The Navajo, A People In Transition", Southwestern Studies 2(4): 39-69 (1965).

the Navajo occupy their land in a dispersed settlement pattern. Under pressure of industrial development, though, larger settlements are emerging on the Reservation:

- Fort Defiance, Arizona - General Dynamics
- Window Rock, Arizona - Navajo capitol
- Shiprock, New Mexico - Fairchild
- Navajo, New Mexico - Navajo Forest Products

Two communities are growing off the Reservation, based on recent industrialization at sites just within the Reservation boundary:

- San Juan Valley, New Mexico - Four Corners Power Plant
- Page, Arizona - Navajo Generating Station

In this Appendix, we expand upon each of these items in order to set the stage for evaluating the impact of the coal gasification plants upon the Navajo Nation:

- Energy Outlook -- shortages of fuel and the need for additional natural gas.

- The Navajo -- the Reservation, Nation, the Navajo culture and social organization.

- Industrialization -- plants and mines which have been built on the Reservation.

- Navajo Community Development -- the few urban settlements resulting from governmental and service locations, and from recent industrialization.

ENERGY OUTLOOK

The planning for coal gasification plants started in a period when it was known that eventually demand for energy would outrun known and available supply. That long-range potential has become -- by the end of 1973 -- a short-run actuality. The "energy crisis" is triggered perhaps by the withholding of foreign oil supplies but caused by a variety of factors. The outlook a year ago is described in U.S. Energy Outlook,[2] and quoted below in this section.

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2 U.S. Energy Outlook, a Report of the National Petroleum Council's Committee on U.S. Energy Outlook, December, 1972. A three year study of 300 representatives of industry and government prepared for the Secretary of the Interior.

DOMESTIC ENERGY SUPPLY OUTLOOK

For many decades, the United States has enjoyed abundant low-cost supplies of domestic energy. These fuel resources have contributed significantly to the country's economic growth, national security and quality of life.

In more recent years, because of various political, economic and environmental developments, domestic fuel supply has not grown as fast as domestic energy demand. During the next three to five years, a further deterioration of the domestic energy supply position is anticipated, and, as a result, fuel imports will have to be increased sharply. The nation's dependence on imports of oil and gas increased to 12 percent of total energy requirements in 1970, and is likely to be 20 to 25 percent by 1975. The long lead times requires to provide new domestic supplies make this development virtually certain.

OPTIONS FOR BALANCING ENERGY SUPPLY AND DEMAND

The nation must face now the fundamental issue of how to balance energy supply and demand most advantageously in the term beyond 1975. The major options involve: (a) increased emphasis on development of domestic supplies; (b) much greater reliance on imports from foreign sources; and (c) restraints on demand growth.

To some degree, all of these courses of action could contribute to solving the nation's energy problem. The advantages, disadvantages, and feasibility of each option are evaluated in this report.

Restrictions on energy demand growth could prove expensive and undesirable. Among other things, they would alter life-styles and adversely affect employment, economic growth and consumer choice. Despite possibilities for extreme changes or revisions in existing social, political and ecomomic institutions, substantial changes in life-style between now and 1985 are precluded by existing mores and habits, and by the enormous difficulties of changing the existing energy consumption system. More efficient use of energy is desirable, and some improvement is possible and likely as energy becomes more costly. However, there are some inherent limitations in how much energy demand growth can be reduced during the next 15 years through efficiency improvements. These include the difficulties and high costs associated with altering existing equipment and the long lead times necessary before more efficient equipment can be developed and put into use.

INCREASING DOMESTIC ENERGY SUPPLIES

The U.S. Energy Outlook analyses indicate that actions taken soon could increase domestic supplies in the longer term, thus reducing additional dependence on imports. No major source of U.S. fuel supply is limited by the availability of resources to sustain higher production.

Oil and Gas

Oil and gas resources are sufficient to support a substantial increase in production. According to authoritative estimates, U.S. oil and gas resources, much of which remain to be discovered, are sufficient to provide twice the 93 billion barrels of oil and three times the 393 trillion cubic feet (TCF) of gas produced through 1970. However, a substantial part of the undiscovered portions of these oil and gas deposits is believed to be located in less accessible areas and, thus, will be generally more costly than prior discoveries.

Coal

Coal is abundant. The U.S. Geological Survey estimates the nation's coal resources at 3.2 trillion tons. Of this total, about 150 billion tons of recoverable coal are presently known to be located in formations of comparable thickness and depth to those being mined by present technology. Maximum projected production in the next 15 years would use less than 10 percent of the 150 billion tons. This modest utilization of total coal reserves includes the output of coal for making synthetic fuels.

It is concluded that increasing the availability of domestic energy supplies is the best option available for improving the U.S. energy supply and demand balance. This approach requires increased development of domestic supplies, many of which may cost substantially more than in the past. The increased development will depend on margins between costs and prices being sufficient to attract the necessary additional investment. Accelerated development of domestic energy supplies would benefit all segments of society: employment would increase, individual incomes would rise, profit opportunities would improve, government revenues would grow, and the nation would be more secure.

RELYING ON IMPORTS TO MEET DEMAND

The alternative of relying to a greater extent on imports would not well serve the nation's security needs nor its economic health because of uncertainties regarding availability, dependability and price. Greater reliance on imports would also result in major balance of trade problems that could adversely affect the value of the dollar. The options of reducing energy demand growth would provide only limited help for the reasons enumerated below.

REDUCING DEMAND GROWTH

Decreases in demand resulting from efficiency improvements were considered as were possible reductions from variations in the other principal factors influencing energy consumption: economic activity, population, cost of energy and environmental controls. It was judged unlikely that growth in consumption would depart significantly from the average 4.2 percent per year rate during the 1971-1985 period, as was projected in the Initial Appraisal. This is the intermediate demand growth rate used in this study. A range of 3.4 percent to 4.4 percent annual growth embraces the probable changes which could be effected. The lowest growth rate would reduce 1985 demand by 10 percent (or the equivalent of 6 million barrels per day (MMB/D) of oil) from the intermediate projection and 13.5 percent from the high projection.[3]

THE NAVAJO

The Navajo Indian Reservation is the largest in the United States, covering 19,400 square miles, primarily in Arizona, with smaller portions in northwest New Mexico and southeast Utah. The Reservation stretches from the Grand Canyon on the west to near Farmington on the east, and from U.S. 66 on the south to Aneth Mesa on the north. Within this vast area are located Monument Valley, Canyon de Chelly, the Chuska Mountains, the valley of the San Juan River, the Hopi Reservation and the upper deserts of the San Juan Basin.

The Navajo Nation is one of the fastest growing groups in the United States. Population in 1973 is estimated by the Bureau of Indian Affairs at 135,852, an increase of 12.7 percent over the 120,518 of June, 1969.[4] Projections by the BIA indicate populations of 209,000 by 1988 and 345,000 by 2009 on the Navajo Reservation.

Of those persons counted in the 1970 Census, 55 percent were under 18 years of age. This extremely young population is typical of poor, developing nations. Average family size is in the range of 5 to 6 persons. The 1970 Census showed 5.1 persons per occupied unit, while the BIA estimate is 5.58. Family size is discussed in more detail in Chapter III - Nature of the Town.

Employment of Navajos has been extremely low. The U.S. Public Health Service reported in 1972 that of 39,359 Navajo men and women who need and want work, only a few more than 12,000 are regularly employed. More than 20,000 persons are non-employed, want a job and are not physically, mentally or otherwise restrained from working. Earlier estimates prepared for the Navajo Tribal Council are shown in Table C-1.

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3. U.S. Energy Outlook

4. In contrast the 1970 Census counted only 64,675 on the Navajo Reservation (including Hopi joint use area). Undercounting is typical in minority urban or rural areas, but this staggering difference is difficult to comprehend.

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Table C-1
NAVAJO NATION UNEMPLOYMENT

Navajo Labor Force	1965[1] No.	1965[1] %	1965[2] No.	1965[2] %
Fully employed	8,000	25.6	8,375[3]	26.2
Underemployed	3,475[3]	11.1	3,625[3]	11.3
Employed	11,475	36.7%	12,000	37.5%
Traditional Pursuits	3,825[3]	12.2	4,000	12.5
Unemployed	16,000	51.1	16,000	50.0
Total Labor Force	31,300	100.0%	32,000	100.0%

[1] Estimated by Harmen, O'Donnell and Henninger
[2] Estimated by Sterling Institute
[3] Breakdown estimated by DRA

The Navajo Office of Program Development estimated 1973 unemployment at 60 percent of the labor force. Of the Navajos employed full-time, well over one-half are employed in the government sector, by the Navajo Nation, BIA, Indian Health Service, or other state and federal agencies.

Because of the lack of full-time wage employment and the low potentials for traditional pursuits, the income of the Navajos is extremely low. Table C-2 below demonstrates the difference between the Navajo Reservation and the off-Reservation world according to the 1970 Census.

Table C-2
INCOME CHARACTERISTICS

	Navajo Reservation	San Juan County	New Mexico	United States
Per Capita Income	$ 831	$2,176	$2,330	$3,119
Median Family Income	3,484	8,137	7,845	9,586

Source: 1970 U.S. Census

NAVAJO CULTURE

The Navajo culture and life-style has been quite different from the non-Navajo culture and life-style. Some of the important elements of the traditional Navajo culture include:

- Harmony with nature and the earth
- Respect and love for the land, and a reluctance to leave
- Concentration on the present, and great patience
- Emphasis on the clan, with responsibilities to the clan and with protection and support from it
- A cooperative, non-competitive, communal sharing attitude toward other Navajos
- A non-materialistic approach to life
- Relig:on as a way of life rather than a segment of life
- Respect for others' religion [5]

Historically, little is known of the original People (Dineh), as the Navajo call themselves. Linguistic evidence suggests a northern origin, for they, like their cousins the Apache, speak a tongue which is closely related to the Athabaskan languages spoken by certain Indian tribes in the interior of northwestern Canada. No date can be set with any certainty for the Navajo's arrival in the Southwest, but their migration was probably completed about six hundred years ago, following many centuries of slow travel south along the eastern edge of the Rocky Mountains. During this migration the Navajo were only a series of clans and never felt themselves to be, nor operated as, a Tribe. Families lived by hunting animals and collecting wild plants. Rarely did they settle long enough to establish a home territory.[6]

It is not unreasonable to assume that these early hunters and gatherers borrowed cultural practices from the Plains Indians as they moved south across western Canada and the United States, but the People owe their greatest debt to the sophisticated Pueblo villagers who already inhabited the Southwest when the Navajo arrived. It was the Pueblo who taught them weaving and agricultural techniques and who inspired them to elaborate their ceremonial system and religious lore. From the Pueblo, Navajos learned to make jewelry, and perhaps more important, the Pueblo contributed many significant elements of the Navajo religion. The Pueblo, however, apparently had little influence on Navajo housing styles.

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[5] Adapted from Navajo Indian Urban Migration, which in turn adapted this material from "Observations Concerning the Causes of Poverty Among Reservation Indian People," by C. Mayland Parker (unpublished article prepared for Indian Community Action Project, Arizona State University, Tempe, Arizona, undated).

[6] Much of this section comes from The Fifth World of Forster Bennett, by Vincent Crapanzano.

By the seventeenth century, according to Franciscan missionaries in the area, the Navajo were already agriculturists who probably supplemented their economy by hunting, gathering edible plants, and raiding their Pueblo neighbors. It was from these raids that Navajo obtained their first sheep and horses, which had been introduced into the area by the Spanish in the sixteenth century and which were to revolutionize Navajo social and economic organization. Sheep were quickly acquired by the Navajo, becoming important for wool and mutton. The horse gave the Navajo tremendous mobility, allowing him -- in response to New Mexican provocation -- to become the most feared raider of the Southwest. The Spaniards were never able, despite the combined efforts of priests, soldiers and settlers, to convert a significant number of Navajos to their religion.

The recent life-style of the Navajo has been a pattern of sporadic employment, low wages, poverty, illness, large families and a lack of even the necessities which non-Navajos expect, e.g., adequate housing, utilities, medical care, access to shopping and even paved roads. In the past -- and for traditional Navajo families -- this has been true. There is substantial evidence, however, that Navajo life styles are changing. This is not a new phenomenon, for Navajo culture and life-styles have always been changing, coming into contact with many cultures and adopting from each those elements the Navajo desires and rejecting those he does not. While open to change, the Navajo has been selective about the extent and rate at which he changes.

SOCIAL ORGANIZATION[7]

It has been generally recognized that the single most important social unit historically in Navajo social organ ization is the residence group or camp. Such residence groups have primary responsibility for the care and socialization of Navajo children and for exerting pressure on camp members who do not conform to local social standards.

The Navajo clan system is based on "kin groups whose members acknowledge a traditional bond of common descent in the maternal line," [8] but it is not a kinship system. While an individual is born a member of his mother's clan, he is "born for" his father's clan. Thus, throughout a Navajo's life he feels a close relationship not only with members of his own clan, but also with members of his father's clan.

Though there is no straightforward pattern of clan localization by area or within communities, the Navajo clan nevertheless is important in shaping the Nation's social structure. The clan has two primary functions: the regulation of marriage and the prescription of proper behaviour between members of the same clan. Clans may be much interspersed and widely diffused -- with individual members living apart over an extensive area, totally unrelated genealogically,

[7] Batelle, Detailed Environmental Analysis - WESCO Plant and Mine, February, 1973

[8] G. P. Murdock, Social Structure, New York: Macmillan, 1947

and claiming descent from a common ancestral tie. Proper behavior between members of the same clan generally refers to extending hospitality and friendship to each other. Even when meeting a fellow clan member for the first time, the Navajo is expected to treat him as if they belonged to the same family unit. When in strange surroundings, clan responsibility for the welfare as well as the actions and behavior of individual members is common.

Chapter organizations are becoming increasingly important in community social organization as Navajos are forced to work within this chapter structure in order to defend their individual grazing rights, obtain many medical services, and be heard in the tribal political arena. Other than family-oriented traditional ceremonies, most Navajo group activities today occur at the chapter level. For example, the Burnham chapter holds an annual rodeo and conducts fund-raising events, and chapter women meet for crafts classes, health services, and education. The bi-monthly chapter meetings also serve as a unifying social event for Burnham area residents.

INDUSTRIALIZATION ON THE RESERVATION

Recent population estimates for the Navajo Reservation range as high as 135,000, according to the Bureau of Indian Affairs. Only 35,000 Navajos can be adequately supported by the traditional livelihoods of raising sheep, growing melon, squash and corn, weaving rugs and silversmithing. A major part of the gap between need and reservation resources has been made up by federal, state and local welfare and free services of the Bureau of Indian Affairs and Indian Health Service.

Until the 1960's, the only significant wage employment for Navajos was either for governmental agencies on the Reservation or railroads off the Reservation. The Navajo Tribal Council determined that the economic self-sufficiency of the Nation required the establishment of new Tribal and private employment on the Reservation. Royalties paid for natural gas and oil discovered in the 1950's enabled the Navajo Nation to invest in a program of industrial development.

The first major basic employer is a Tribal enterprise harvesting and milling lumber. More recently, private corporations have established electronics plants to utilize the Navajo People resource. Electric power plants use coal mined on the Reservation to create energy for use primarily off the Reservation in New Mexico, Arizona and Southern California. These major basic employers are described below.

NAVAJO FOREST PRODUCTS INDUSTRIES (NFPI)

For many decades, timber on the Navajo Reservation has been harvested for use by the Navajo Nation or for sale off the Reservation. These efforts were sporadic, however, until construction of a small Navajo-owned mill at Sawmill, Arizona, after World War II. Success of that project and surveys of potential employment generators led the Tribal Council in 1958 to initiate a planned, long-range program involving:

- o A sustained yield program for the pine forests of the Chuska Mountains.
- o Creation of Navajo Forest Products Industries, a Tribal enterprise
- o Initial capital financing by the Nation (ultimately over $8.5 million).
- o Construction of a modem mill with a capacity of 35 million board feet a year
- o Construction of a new town -- Navajo, New Mexico -- to provide housing and community facilities for mill employees.

NFPI now sells over 50 million board feet of lumber annually, with a value nearing $9 million. "Navajo Pine" is marketed in 25 states. The 485 employees eam $2.4 million, while the Navajo Nation receives stumpage payments for timber and a retum on its "initial" investment.

FOUR CORNERS POWER PLANT/NAVAJO MINE

A major investment on the Reservation by private enterprise was the Four Corners Power Plant, dedicated in 1963. The plant is located about nine miles south of Fruitland, New Mexico, just inside the Reservation boundary. This facility is operated by Arizona Public Service Company for itself and five other electric utilities, which contributed the capital and obtained a share of the output, as detailed below in Table C-3.

Table C-3
FOUR CORNERS POWER PLANT

Unit	Year Completed	Capacity (Kilowatt Hours)	Participating Utilities
1, 2 & 3	1963	575,000	Arizona Public Service (APS)
4	1969	755,000	Southern California Edison (48 percent), APS (15 percent), Public Service of New Mexico, Salt River Project, Tucson Gas and Electric
5	1970	755,000	Same as Unit 4
Total		2,085,000	

Source: Arizona Public Service

The Four Corners Power Plant currently employs 305 persons, of whom 113 are Navajo. Navajo employees generally live on the Reservation along the San Juan River, from Bloomfield to Shiprock. Non-Navajo employees live off the Reservation from Fruitland to Farmington.

Coal for the Four Corners Power Plant is provided by Utah International from the Navajo Mine adjacent to the plant. This mine is the largest strip coal mine in the world in terms of production, currently providing over 9 million tons annually for the Four Corners Power Plant. Utah employes 474 persons, of whom 303 are Navajo. Utah will, from further south on this same lease, be supplying coal for the WESCO gasification plant.

There are no plans for expansion of the Four Corners Power Plant but substantial work will be done on pollution control.

FAIRCHILD SEMICONDUCTOR

In 1965, Fairchild Camera and Instrument Corporation started operation of a semiconductor assembly plant in Shiprock, New Mexico. Using the community center as its first facility, Fairchild moved into a modern plant in south Shiprock in 1969. This plant was built by the Navajo Nation, financed by an Economic Development Administration grant, as the first building in the Shiprock Industrial Park. There has been no additional building in the industrial park.

Fairchild currently employes 950 persons of whom 922 are Navajo. About 60 percent of the work force is female, primarily on the assembly line. Employment has been as high as 1,200 with fluctuations caused by conditions in the electronics industry. This is Fairchild's only semiconductor assembly plant in the United States and is exceeding corporate expectations for production and profitability.

Navajo employees of Fairchild have come from throughout the Reservation, but most have now moved to the Shiprock area. Non-Navajo employees live in the Farmington area. Fairchild is the only major manufacturer attracted to the Reservation which has made special efforts to provide housing for residents of their community, through spearheading creation of the South Shiprock Housing Project. Residents of the housing project do not have to be Fairchild employees.

GENERAL DYNAMICS

General Dynamics followed Fairchild in 1967 by establishing the Navajo Facility in Fort Defiance. This was an offshoot of the Pomona, California plant, designed to assemble components of guidance systems, computers and test and calibration systems. The General Dynamics plant was constructed as the first unit in the Fort Defiance Industrial Park.

General Dynamics employment in the fall of 1973 was 100 persons, 92 percent of whom are Navajo. Employment levels have varied depending on the award of contracts to the Pomona Plant. The majority of General Dynamics employees are women. All non-Navajo employees live in Fort Defiance.

NAVAJO GENERATING STATION/BLACK MESA MINE

Just east of Page, Arizona, the Salt River Project of Phoenix is constructing the Navajo Generating Station, which will burn coal to produce 2,250,000 kilowatts of electricity. The electricity will be shared by the participating utilities, which are: Salt River Project, Los Angeles Department of Water and Power, Arizona Public Service, Nevada Power Company, Tucson Gas and Electric Company, and the U.S. Bureau of Reclamation.

The first unit is projected to begin operation in May, 1974 with the final unit operational in May, 1976. Employment during construction has peaked at approximately 2,500. Following construction, approximately 300 people will be employed to operate the station. The town of Page provides housing and community services for employees. Nearly all Navajos to date choose to continue to live on the Reservation.

Coal for the Navajo Generating Station is provided from the Black Mesa Mine, located 78 miles southeast (near Kayenta) and operated by Peabody Coal Company. A railroad delivers the coal to the Page plant. Average daily usage will be 17,000 tons of coal. Black Mesa also provides coal, delivered by pipeline in a slurry, to the Southern California Edison Mojave Generating Plant in southern Nevada. Approximately 225 employees are required to meet the needs of the Navajo Station. Navajo employees live nearby on the Reservation. Most non-Navajo employees live in a company initiated trailer park at Kayenta.

NAVAJO COMMUNITY DEVELOPMENT

In the past, and in isolated sections of the Reservation today, matriarchal extended families occupy clusters of hogans or cabins to form residence groups or camps. The recent increased dependence upon wage work by the men instead of sheep-herding by the family has led to the replacement of such matrilocal (mother-centered residence groupings) camps by patrilocal and neolocal residence patterns in many areas. Patrilocality (father-centered residence groups) has been found to increase not only in the agricultural areas, but also in transitional communities (e.g., Shiprock, Fruitland) and Reservation border areas where the Navajo have been brought into prolonged and intensive contact with non-Navajos.

The first urbanization occurred at the capital and at the agencies, where there was governmental employment and rudimentary public services (e.g., Fort Defiance, Window Rock, Shiprock). Later growth came with concentrated irrigation agriculture along the San Juan River (e.g., Shiprock, Fruitland). Most recently, communities have developed with industrial employment (e.g, Fruitland, Shiprock, Fort Defiance, Page and Navajo).

Life-styles of Navajos in the transitional and bordertown communities are generally different than Navajos residing in the more remote sections of the Reservation. Virtually all of these Navajos in transition live in cabin-type homes rather than in hogans. Residential groupings are limited to nuclear families instead of the matriarchal extended family system found in the Burnham area. Schools are usually close enough and accessible enough so that children can attend day classes and still live at home instead of being sent to boarding schools. Perhaps the greatest difference between life-styles of Navajos is that in transitional communities most men and many of the women are employed in wage work. That is, they are employed in fairly steady jobs having regular working hours for which they are paid a set cash salary. This, too, contributes to more rapid acculturation into modern urban society. Several of the more significant urban settlements of the Navajo Reservation are discussed below.

FORT DEFIANCE, ARIZONA

Upon the return of the Navajos from Fort Sumner in 1868, Fort Defiance was designated the first Navajo Agency headquarters. The first school on the newly created Reservation was started at Fort Defiance in 1869, the first mission was built in 1871, and the first regular medical service begun in 1880. Fort Defiance was for many years the only settlement of any size on the Reservation, as a center for governmental agencies and services.

In 1935, the Navajo Agency was transferred to Window Rock and Fort Defiance declined in importance. It did, however, retain an important government hospital. In 1955, it was designated one of five sub-agencies (now agencies) on the reservation, restoring some administrative functions. In the past few years, Fort Defiance has gained several Tribal offices which could not find space in Window Rock, such as the Office of Navajo Economic Development (ONED) and Navajo Tribal Utility Authority (NTUA), and a new industry -- General Dynamics. Development is scattered up and down the highway from the hospital to General Dynamics. There is no defined central area and circulation is difficult. There is no land use plan and the chapter is the only local government. New housing has been provided by the Navajo Housing Authority, by a subsidized home-ownership project and by a private trailer park.

WINDOW ROCK, ARIZONA

In 1935, the Commissioner of Indian Affairs declared the area next to "The Rock with a Hole in it" should be the new headquarters for the Navajo Tribe, replacing Fort Defiance. Stone and log buildings were constructed to house Tribal and BIA offices and officials. The octagonal Council House was planned to represent a great ceremonial hogan.

As the Tribal activity expanded in the past decade, a mixture of new buildings -- modern stucco and modular offices -- departed from the original concept of Window Rock. Commercial activity is centering around the highway intersection south of town, with a FedMart, Window Rock Inn (Tribally owned) and a small shopping mall. New housing has been built in Window Rock and the St. Michaels area to the west.

SHIPROCK, NEW MEXICO

Shiprock is the largest community on the Navajo Reservation. Founded in 1903, it served first as a site for a BIA boarding school and later a hospital. Agricultural activity along the San Juan River provided an early economic base. In the 1950's, oil was discovered around Shiprock, providing employment for Navajos. Later, a helium plant and uranium plant, both now closed, were large employers.

The biggest employer now in Shiprock is Fairchild Semi conductor, with 950 employees. Many of these employees are Navajos who moved to town from elsewhere on the Reservation, often into shacks or trailers. For Navajos there are several housing projects created by the Navajo Housing Authority and the non-profit South Shiprock Housing Corporation project of 255 units. Trailers are scattered around the town, and many "tracts" with new houses have unpaved streets and no utilities.

The majority of non-Navajos in Shiprock live in BIA or Indian Health Service housing projects near the agency or hospital. These neighborhoods look transplanted from a small mid-western town. There are several commercial activities, including a bank, but most shopping is done in Farmington, off the Reservation, 30 miles east. Public schools are provided by the Central Consolidated School District. The major forces -- BIA, IHS, and the Nation -- have not yet created an appropriate development plan for the future of Shiprock.

NAVAJO, NEW MEXICO

The only really planned community on the Reservation is the town created to serve the new sawmill of the Navajo Forest Products Industries (NFPI). With the decision in 1958 to build the plant, the Tribal Council and NFPI started a cooperative planning effort to select a site and plan a town. Site selection and town concept factors included:

- Requirements of the sawmill
- Proximity to the plant
- Location in only one state (Arizona/New Mexico line runs through the lake)
- Area of 500-600 acres for community growth
- Upwind from mill
- Mill not be visible from town

All but the last criteria were met in selecting the site for Navajo. In 1960, 860 acres were withdrawn from the chapter for the town site and a plan prepared by a firm of city planners. The plan called for two residential neighborhoods, combining low density and clusters of adjoining homesites. Areas are set aside for apartments, churches, schools and parks. The town center was planned as a focal point of community life, including a shopping center, post office, clinic and service station. A police and fire building has just opened and a motel is planned.

Governance of the town site is by NFPI, with most decisions being made by a locally elected advisory council. Housing in Navajo has been provided by NFPI and the Navajo Housing Authority (NHA). There is a great demand for housing, but employees of the plant have incomes too high to be eligible for NHA units.

SAN JUAN VALLEY, NEW MEXICO

Just off the Reservation in the San Juan Valley, west of Farmington, lie the communities of Fruitland, Kirtland, and Waterflow. Largely non-Navajo farming communities, they do include Navajos who have farming rights on the Navajo side of the San Juan River. The construction of the Four Corners Power Plant and opening of the Navajo Mine in 1963 provided wage income for both Navajo and non-Navajo farmers. Many new employees settled in the San Juan Valley area as it was the closest to the plants with available land. Others moved to the larger established city of Farmington.

Neither the plant nor mine provided housing for employees, relying rather on the community. The entire area lies within the Central Consolidated School District. The Reservation portion of this valley is part of the Fruitland and Nenahnezad Chapters. Off the Reservation is an unincorporated community governed by San Juan County.

PAGE, ARIZONA

On land withdrawn from the Navajo Reservation by Congress, the Bureau of Reclamation built the town of Page as a residential/administrative center for the construction of Glen Canyon Dam on the Colorado River. Population was high during construction in the early 1960's but declined rapidly thereafter. Slow increases came with the development of recreation facilities. Current construction of the Navajo Generating Station has boosted population far above that of the dam construction period. Following completion of the plant in 1974, population is again expected to decline, probably to a level in the range of 3,500 to 4,000 persons. Population trends to date are shown in Table C-4.

Table C-4
PAGE POPULATION, 1960-1973

Year	Population	Phase
April 1960	2,960	Census - Early dam construction
April 1961	6,035	First peak of construction
November 1962	6,106	Highest construction
April 1964	3,241	Construction ending
July 1967	1,322	Lowest population
April 1971	2,374	Beginning of Navajo Generating Station
April 1972	5,584	Construction increasing
April 1973	8,664	Near peak of construction

Source: Bureau of Reclamation

This population does not include many Navajos, for only 12 Navajo families live in the town of Page. There are government employees of BIA or the Bureau of Reclamation. Navajo employees of the power plant live in bachelor quarters at the plant or on the Reservation.

Page has provided housing in these major ways:

- o Permanent employees of the Bureau of Reclamation and established secondary businesses own or rent housing built in the early 1960's.
- o Newer employees live in mobile homes in several mobile home subdivisions.
- o Construction workers chiefly live in a 700-space construction trailer park which will be closed after plant construction is complete.

The community of Page has been governed and operated by the Bureau of Reclamation. Since employment has expanded beyond reclamation operations (especially since the start of the Navajo Generating Station), the Bureau wants residents to assume responsibility for the town. Special legislation has been introduced in Congress to allow incorporation of a new city under Arizona state law. This new city would take over the police, fire, water, sewer and street functions currently provided by the Bureau of Reclamation.

Public schools are provided by the Page School District which includes the townsite and nearly 4,800 square miles of the Navajo Reservation. A hospital is provided by a religious order.

APPENDIX D
ECONOMIC SYSTEM MODEL

An economic system model is used to project the population, composition, and development costs which would result from alternative new town concepts. The principal inputs to this model are the number and average pay of employees at mines and gasification plants (base employment), plus a series of assumptions about the characteristics of non-base employment. Outputs from the model are detailed breakdowns of total employment (base and non-base) in the new town, population size and characteristics, the physical facilities necessary to house and support the population, and the costs of developing these physical facilities.

CONCEPTUAL CHARACTERISTICS OF THE MODEL

The economic system model used in this study is a unique model developed specifically as an analytical tool for use in achieving the objectives of the study. Although the detailed model is unique, the economic concepts on which it is based are universal to all freestanding economic systems ranging from large regional economic systems (such as the Albuquerque metropolitan region) to communities of the size that might be developed on the Navajo Reservation in conjunction with the coal gasification complex.

The basic concepts of the economic system model are embodied in the flow diagram provided in Exhibit D. This flow diagram describes the way dollars flow through the economic system of any freestanding community. The economic system can be divided into three major sectors of economic activity, and the dollar flows into, out of, and between each of the sectors defined in flow diagram form as shown in Exhibit D.

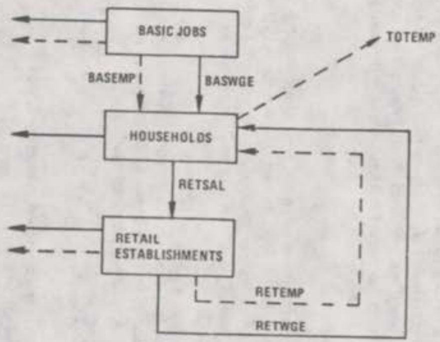
Basic Jobs: This sector provides the dollar inflow into the community which fuels all economic activity in the community. Basic jobs are defined as the jobs provided by economic units (business firms or government agencies) having the following characteristics:

- o The economic units produce goods and services.
- o The dollars that pay for the goods and services are provided by buyers and other sources located outside the community.

These dollars thus flow into the economic units from outside the community, either from purchasers of the goods and services or from government organizations located outside the community. The economic units receiving such dollar inflows are often called: "basic" units because the communi y's whole economic system operation is based on their activity; or "export units" because the goods and services produced inside the community are in effect exported outside the community in return for the dollar flow which is imported into the community.

Exhibit D

CONCEPTUAL ECONOMIC SYSTEM MODEL



OBJECTIVE: SOLVE FOR STEADY STATE TOTEMP AS A FUNCTION OF BASEMP:

TOTEMP = f(BASEMP)

BASIC EQUATIONS

TOTEMP = BASEMP* + RETEMP

RETSAL = (OC*)(BASEMP*)(BASWGE*) + (OC*)(RETEMP)(RETWGE)

EMXPNS = (β*)(RETSAL)

$$\text{RETEMP} = \frac{\text{EMXPNS}}{\text{RETWGE*}}$$

* = INPUTS TO MODEL

EXAMPLE

BASEMP = 1,000	TOTEMP	= 1,000 + 632	= 1,632
BASWGE = \$10,000			
RETWGE = \$5,000	MULTIPLIER = $\frac{1,632}{1,000}$		= 1.632
α = .4			
β = .6			

SOLUTION

$$\text{RETEMP} = \frac{(\beta^*)(\text{RETSAL})}{\text{RETWGE*}}$$

$$\text{RETEMP} = \frac{[\beta^*]\,[(\text{OC*})(\text{BASEMP*})(\text{BASWGE*}) + (\text{OC*})(\text{RETEMP})(\text{RETWGE*})]}{\text{RETWGE*}}$$

$$(\text{RETEMP})(\text{RETWGE*}) - (\beta^*)(\text{OC*})(\text{RETEMP})(\text{RETWGE*}) = (\beta^*)(\text{OC*})(\text{BASEMP*})(\text{BASWGE*})$$

$$\text{RETEMP} = \frac{(\beta^*)(\text{OC*})(\text{BASEMP*})(\text{BASWGE*})}{[\text{RETWGE*}]\,[1 - (\beta^*)(\text{OC*})]}$$

$$\text{TOTEMP} = \text{BASEMP*} + \frac{(\beta^*)(\text{OC*})(\text{BASEMP*})(\text{BASWGE*})}{[\text{RETWGE*}]\,[1 - (\beta^*)(\alpha^*)]}$$

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The prime example of a basic economic unit in this study is a coal gasification plant and the mine associated with it. Part of the dollar flow into the basic economic units from outside the community is used to pay workers who reside inside the community, part is used to pay workers who reside outside the community, and part is used to purchase goods and services from outside the community that are used as inputs to the basic units' production processes. The last two uses of the imported dollars result in the dollars flowing directly out of the community's economic system, but the wage flows to workers residing inside the community flow into the community's households, which is the second major sector of the community's economic system.

Households: The household sector of the community's economic system is defined as consisting of all the persons residing inside the community. Most of these persons will reside in the socio-economic unit called households (but some may be people living in group quarters). The household sector of the community provides the workers who work in the basic economic units. The wages paid these workers are dollar flows into the household sector which provide a large part of the household income received by the community's residents.

Part of the household income is spent by the households to purchase goods and services produced outside the community, with these dollars flowing outside the community's economic system. Another part of the household income, however, is used to purchase goods and services from establishments located inside the community, which in this flow diagram have been aggregated into the third major economic sector of the community's economic system, "retail establishments".

Retail Establishments: Retail establishments in a community typically consist of stores, shops, service establishments such as medical facilities, gas stations and barber shops, and local government organizations which provide services to the community. Part of the dollars flowing into the retail establishments are used to pay the wages of workers who live outside the community, and part of the dollars are used to pay for goods and services produced outside the community. These dollars flow directly out of the community's economic system. Another part of the dollars flowing into the retail establishments, however, are used to pay the wages of workers who reside inside the community. These wages flow directly into the community's households and provide part of the household sector's income.

Using the descriptions of the three major sectors of the community's economic system given above, and using the flow diagram of Exhibit D, it is possible to trace the way in which a typical dollar (or any number of dollars) flowing into the basic economic unit sector (Basic Jobs) flows through the community's economic system. After a dollar flows into the basic economic unit sector, part of that dollar flows into the community's household sector as a wage payment to a worker residing inside the community. Part of each dollar flowing into the household sector in turn flows into the retail establishment sector of the community as payment for goods and services sold by the retail establishment sector to the household sector. Part of each dollar flowing into the retail establishment sector is used as a wage payment to a worker from the community's household sector, meaning that part of the dollar which originally came from the household sector flows back into the household sector again to comprise part of the household sector's income. Part of this wage income received by households in turn flows again into the retail establishment sector. It can thus be seen that a closed dollar flow loop is established inside the community's economic system between the household sector and the retail establishment sector.

Once a dollar flows from the household sector into the retail establishment sector, part of it flows back into the household sector, than back into the retail establishment sector, etc., etc. Diminishing portions of a given dollar can flow around this loop numerous times until the whole dollar ultimately flows outside the community's economic system by leakage from the household sector and the retail establishment sector.

Each time a portion of the dollar flows around this loop it generates an increment of employment in the retail establishment sector of the community because it is a retail sale that is made by an employee. The additional increment of employment generated by this closed loop flow of dollars from the household sector to the retail establishment sector and back to the household sector produces what is called the employment multiplier effect in the community's economic system. Total employment in the community is the sum of basic jobs plus jobs in the retail establishments. The number of jobs in the retail establishments is in turn a function of not only the number of basic jobs, but also of the magnitude of the dollar flow around the closed dollar flow loop connecting households to retail establishments and back to households.

Total employment in the community is the major determinant of the community's population, since in a freestanding community most households migrate into and out of the community in response to the number of jobs available in the community. Total employment and total population are, in turn, major determinants of most other socioeconomic characteristics of the community.

The conceptual economic system model shown in Exhibit D and described above is an accurate description of the fundamental economic system mechanisms found in any freestanding community. The composition of the flows and sectors in a real community is, of course, much more complex than indicated in the simplified model described above. The complexity, however, does not affect the basic flow mechanisms of the community's economic system as described. The basic mechanisms remain the same no matter how many detailed subsectors comprise each of the three major sectors, and no matter how many specific flows comprise each of the major flows described above and shown in Exhibit D. This conceptual economic system model thus simulates accurately, in simplified form, the basic mechanisms of the community's economic system, and thus provides a basis for developing a more detailed model that can be used to quantify the size and characteristics of a given community for a given number of basic jobs located in the community.

The size and characteristics of the community can be quantified by describing the conceptual economic system model in the form of a set of mathematical equations. The conceptual model has already been described in Exhibit D in the form of a flow diagram. Exhibit E also includes a set of equations which describe the flow diagram, and thus the conceptual economic system model, mathematically.

The basic parameter that has to be produced by defining the equations and then solving them is the total number of employees residing in the community. The total number of employees is the sum of the employees in the basic economic units plus the employees in the retail establishments that reside in the community. Once the total number of employees is computed, almost any characteristic of the community can be computed from total employment, such as: number of households, total population, number of housing units, household income, square feet of retail structure space, square feet of office building space, acres of land used in different kinds of land uses, infrastructure construction costs, structure construction costs, local government revenues and expenditures, etc., etc.

The major mathematical problem is one of expressing in correct mathematical form the closed loop around which dollars circulate from households to retail establishments and back to households. For a given number of basic jobs, the characteristics of this closed loop determine the number of retail jobs. Since the number of basic jobs is given as an input, the mathematical problem becomes one of solving for an equation which correctly expresses the total number of employees resident in the community as a function of the number of basic jobs.

The important parameters of the conceptual model that must be included in the equations have been given abbreviated names in Exhibit D. These parameters are defined as follows:

- <u>BASEMP</u>: The average annual number of persons employed in basic economic units who reside inside the community (provided as the input variable).
- <u>BASWGE</u>: The average annual dollar wage paid to each basic employee (BASEMP) - - (provided as an input constant).
- <u>RETSAL</u>: The dollar value of the annual sales made to the community's households by the community's retail establishments.
- <u>EMXPNS</u>: The total number of dollars paid each year as wages to all employees of the community's retail establishments.
- <u>RETEMP</u>: The number of employees of the retail establishments who reside inside the community.
- <u>RETWGE</u>: The average annual dollar wage paid to each retail employee residing in the community (RETEMP) -- (provided as an input constant).
- <u>ALPHA</u>: A constant (provided as an input) which expresses the proportion of total household sector income that is spent in the community's retail establishments.
- <u>BETA</u>: A constant (provided as an input) that expresses the proportion of the total sales of the community's retail establishments that is paid as wages to the retail employees who live inside the community.

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Four basic equations have been formulated to express the conceptual economic system model mathematically. These equations are shown in Exhibit D, and define the way in which the following parameters are computed:

- Total employment (TOTEMP)
- Annual retail sales by the community's retail establishments (RETSAL)
- The total dollars paid annually to the retail employees who reside inside the community (EMXPNS)
- The number of retail employees who reside inside the community (RETEMP).

These four basic equations are manipulated mathematically to produce an equation which expresses the total number of employees residing in the community (TOTEMP) as a function of the number of basic employees (BASEMP) and of all the constants provided as inputs to the model. The steps by which the four basic equations are manipulated to solve for the final total employment equation are also shown in Exhibit D. The solution/manipulation procedure is essentially one of developing an equation which expresses retail employment (RETEMP) in terms of basic employment and the other constants provided as inputs. This equation for retail employment is then substituted in the equation for total employment (TOTEMP) to produce an equation where total employment is a function only of basic employment and the constant parameters provided as inputs. Once this equation is produced, and numerical values are provided as inputs for basic employment (BASEMP) and the constant parameters (BASEMP, BASWGE, RETWGE, ALPHA and BETA), the magnitude of total employment (TOTEMP) can be computed. As mentioned earlier, once total employment is computed a great variety of other community characteristics can be computed from total employment.

Exhibit D also includes an example where numerical values have been provided for basic employment and the constant parameters. For a basic employment of 1,000 employees, and the other input parameter magnitudes shown, retail employment is computed as 632 employees. Total employment is 1,632 employees residing in the community, and the multiplier which expresses the relationship between total employment and basic employment has a value of 1.632.

It should be pointed out that the equations shown in Exhibit D and described above provide a static solution for total employment as a function of basic employment, not a dynamic solution. A static solution is one which defines the conceptual economic system model, and total employment, mathematically at a given point in time; that is, it mathematically describes the status of the community's economic system, and all the parameters that describe the system, at one point in time. A dynamic model, in contrast, would have been one in which the mathematical equations describe the community's economic system, and all the parameters which make up that system, as a function of time. In a dynamic model, many parameters are expressed as functions of time as well as functions of other parameters, which means the parameter values vary with time as well as with variation in other parameter values. A set of dynamic equations describing the conceptual economic system model would be serveral orders of magnitude more complex than the set of static equations shown in Exhibit D, and are not necessary for the purposes of this study.

In the economic system of a real community, economic system parameter values do vary over time. For example, if the number of basic jobs were to increase by 20 percent in one month a period of many months would pass during which retail employment would slowly climb to the new level represented by the static multiplier which relates total employment to basic employment. In other words, in a real world economic system parameters rarely change in magnitude instantaneously, but usually change slowly over time. However, the objective of this study is not to compute the time-phased patterns by which the community will grow over time in response to development of mines and coal gasification plants, but rather to compute the size and characteristics of the community after its size has stabilized at the final level supported by the basic employment provided by a given number of coal gasification plants and mines.

The fundamental set of static equations presented in Exhibit D can compute the size of the community (in term of the parameter total employment) that will be produced by the basic employment associated with any given number of plants and mines. It was therefore not necessary to become involved in the extremely difficult task of developing a set of dynamic equations for the economic system model. Exhibit 7 in Chapter III illustrates graphically the difference between the dynamics and statics of the community. In Exhibit 7, the number of employees residing in the community is shown as it would change over time. A set of dynamic equations for the economic system model could be used to compute the exact shape of the curves shown in Exhibit 7 as these curves vary over time. However, the total employment magnitude of primary interest in this study is the one that occurs at approximately Year 5 because it is this total employment that determines the size and characteristics of the permanent community that will remain during the many years of plant and mine operation. The static equations for an economic system model constructed along the lines of Exhibit D can be used to compute the total employees residing in the community in Year 5.

THE ECONOMIC SYSTEM MODEL FOR THE GASIFICATION COMPLEX COMMUNITY

The conceptual economic system model described above is not the economic system model developed to compute the size and characteristics of the gasification complex community. The economic system model developed for the gasification complex community has the same fundamental structure and mathematical relationships described for the conceptual economic system model, but the model for the gasification complex community was designed to include many more specific economic sectors and parameters needed for the study. The flow diagram for the economic system model actually developed for the gasification complex community is shown in Exhibit 4 in Chapter III.

The model of Exhibit E operates in exactly the same way as the conceptual economic system model of Exhibit D, but the equation system which mathematically describes the model of Exhibit E contains hundreds of terms compared with the few terms involved in the equation system for the conceptual economic system model presented in Exhibit D. Despite their length and complexity, the equations for the model of Exhibit E were solved to produce an equation for total employment by following exactly the same steps of mathematical manipulation shown for the conceptual economic system model in Exhibit D.

The flow diagram of Exhibit E is organized in approximately the same way as the flow diagram of Exhibit D. The correspondence between the Exhibit D blocks and the Exhibit E blocks is the following:

Basic Jobs (Exhibit D): The "Basic Jobs" block in Exhibit E includes all the economic units that potentially will provide basic jobs inside the community. Most of the economic units having this potential are listed to the right of the block, but in addition the block "Tourism Demand" also provides basic jobs. In the Exhibit 4 model, the total number of basic jobs has been divided into four categories as a function of employee residence inside or outside the community, and whether the employees are Navajo or not. The total number of basic jobs is the fundamental input provided to the model when the model is used for computation of total employment. The percentage splits of employees resident inside/outside the community and Navajo/non-Navajo employees are also provided as numerical input factors to the model during computation.

Households (Exhibit D): In the Exhibit E model the household sector is represented by the "Resident Population" block. The resident population is divided into two categories in the model, Navajo population and non-Navajo population, and the percentage split between these two categories is provided as an input factor to the model during computation. Resident population means the population that resides inside the boundaries of the community.

Retail Establishments (Exhibit D): In the model of Exhibit E this sector is comprised of the following subsectors: Retail Enterprises, Other Population Based Activities, Hotel/Motel (in part), Wholesale Activity, and Local Service Jobs. In the model the demand for retail enterprise activity (retail sales) is computed from the income of the Resident Population sector. The employment of the Other Population Based Activities and Hotel/Motel subsectors are computed primarily from ratios of the number of employees for each specific activity per 1,000 Resident Population. In addition, some of the Hotel/Motel employment is estimated from tourism demand for rooms and the demand for rooms generated by business visits to the community's basic industries. The employment in Wholesale Activity is estimated as a function of the employment in the other subsectors and the demand for wholesale goods generated by the basic industries. The Local Service Jobs block in the flow diagram of Exhibit is included only to show that summation of all local service jobs in the community (the equivalent of retail employment in the Exhibit D conceptual model). Just as with basic jobs, the local service jobs are divided into four categories as a function of residents' location and racial characteristics.

The flow diagram of Exhibit E includes one other major sector not included in the conceptual economic system model of Exhibit D. This sector is the community construction sector, and is comprised of the following blocks: Non-Gasification Structures, Infrastructure, Housing, Other Structures, Previous Construction Cost, Status, and Construction Cost. This sector was included in the model so that the following important parameters for the community could be computed:

- o The number of housing units and the square feet of other structure space required to house the residents, business activities, and local government activities of the community.

- o The cost of constructing all the infrastructure, housing, other structures, facilities, and improvements on the land required for the community.

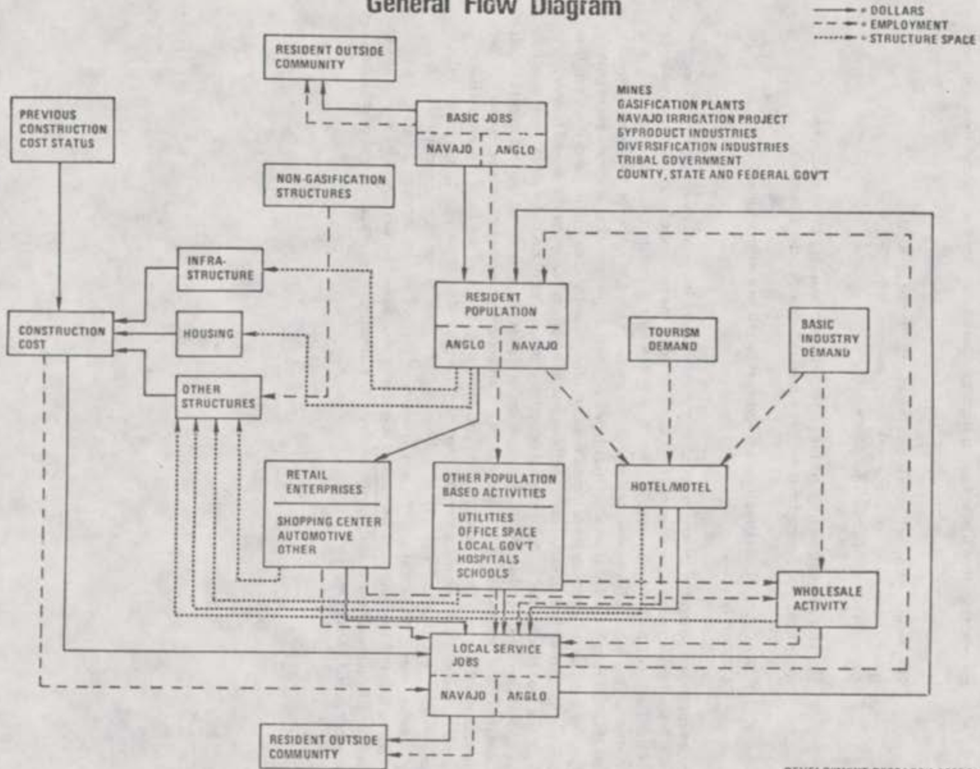
- o The number of construction employees required to construct the community.

The employment generated by construction of the community is temporary employment, and these jobs disappear once the community is constructed. The number of construction employees and the length of their employment is a function of the cost of constructing the community and the time period required for construction. If the model is used to compute total employment (and then other community characteristics based on total employment) at a steady state point after the community is constructed, then the cost of community construction and length of the construction period are automatically defined because nothing exists at the townsite now. Since the model was used in this study to compute communities of only the sizes generated by one or two coal gasification plants, the community size is not very large and the period required to construct the community is relatively short. Consequently, construction employees will be temporary and not permanent in the town, and these employees do not have the same effect on the community's economic system as permanent local service employees in the community. Accordingly, in computations made with the model, community construction jobs were not included as part of the local service jobs since the objective was to compute the size and characteristics of the long term permanent community that would be supported by one or two plants. The quantities and costs of the community's infrastructure, housing, and other structures were computed, however.

Exhibit E.

ECONOMIC SYSTEM MODEL FOR GASIFICATION COMPLEX COMMUNITY

General Flow Diagram



DEVELOPMENT RESEARCH ASSOCIATES

APPENDIX E
INITIAL PREMISES
(Dated September, 1973)

Early in the study, before creation or running of the economic system model, preliminary estimates were given to the land planners of the likely range of employment and population at projected levels of development:

1977 - Two plants under construction

1979 - Two plants complete and two more under construction

Mid 1980's - Four plants complete and one more under construction

Ultimate - Seven plants complete

It was the conclusion of the economic and planning consultants that, if the aim of improving the Navajo economy by retaining a major share of earned income within the Reservation is to be successful, then at least the following is necessary:

- By 1977, immediate provisions must be made for 2,600 workers, primarily construction, who will be living in the area.

  Many of these workers will have families. These workers and their families will require goods and services. Those that provide goods and services need the same kinds of facilities as do the construction people. Development Research Associates estimates that for the construction and operations workers employed by 1977, facilities for 12,500 people will be required. It is improbable that conventional building and management techniques could meet this immediate demand.

- By 1979, this initial program will probably double.

  In addition to the continued high rate of growth, the new town will now be faced with additional problems of administration and government, social and economic differences, a changing population mix, increasing services, and political differences between varying segments of the population.

- By 1979, the new town might have a population of 26,000.

  After a short life span of only four to five years, it must be capable of almost instant economic and operational maturity.

Beyond that, it must be capable of viable survival at something considerably below the anticipated figures, creating a requirement for a new town that is economically and functionally viable. even at a level of 12,000 to 15,000.

- With a population growing from zero to 32,000 in ten years (or something less), with a positive shift to a Navajo majority, with a changing economic status, and with expanded expectations on the part of the residents, this town will face tests such as no new town before it has had to even consider.

Exhibit E-1 is a graphic display of the dramatic growth and change that this very special new town might be called upon to accept. While the chart shows the differential between Navajo and non-Navajo, and employee and family, it does not show the heritage, the massive shifts in residency time, the modified life styles, economic status, or future expectations.

HOUSEHOLDS

One of the most significant measures of the rate of growth and change is the number and type of households formed during the successive stages of development of the new town.

Exhibit E-2 translates the population growth to households by considering relative family size and the change in mix between Indian and non-Indian residents.

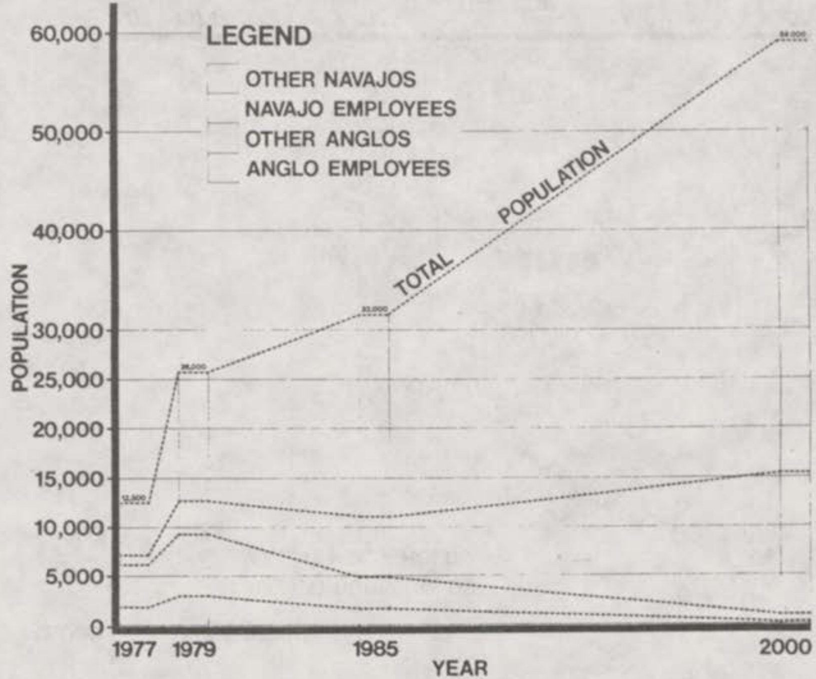
Growth during the early years is expected to be unusually high, while a high growth rate continues throughout the period of resource development.

However, as the total population ratio shifts between Navajo and non-Navajo, the number of households does not shift dramatically. The large Navajo family size means that, although the total population may be increasing at a very high rate, the actual number of dwelling units may increase only nominally.

Planning for the new town must therefore take into account that the mix of housing developed during the initial years will not be appropriate for the residents even some five years later. Since the life span of any modern, adequate housing physically exceeds five years, at least one other aspect of the new town plan is very clear, the premature obsolescence of much of the initial housing mix.

Not only must the new town be capable of accommodating growth rates greatly exceeding those experienced in the conventional U.S. urbanization process, but it must also be capable of accommodating major changes in life style, family size, and economic status, long before physical obsolescence of the housing inventory.

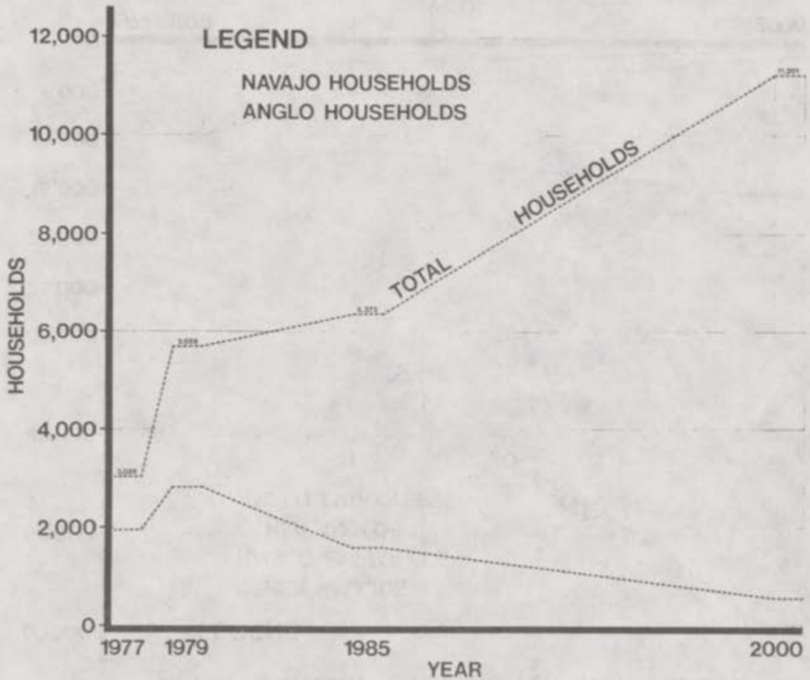
Exhibit E-1
NEW TOWN EMPLOYMENT AND POPULATION



SOURCE: DEVELOPMENT RESEARCH ASSOCIATES

NEW TOWN EMPLOYMENT AND POPULATION GRUEN ASSOCIATES

Exhibit E-2
HOUSEHOLD ESTIMATES



SOURCE: DEVELOPMENT RESEARCH ASSOCIATES

HOUSEHOLD ESTIMATES GRUEN ASSOCIATES

Exhibit E-3 indicates Gruen Associates' tentative estimate of land requirements at selected population milestones. The derivation of these figures comes initially from averages of Gruen Associates' actual experience in new town planning, the experience of other new communities, information and data from existing literature, and a translation of this experience to the Navajo situation.

The "land requirement" chart is general in nature. Certainly, land space will be slightly different during various stages of the new town's evolution. Initially, the educational requirements will be low, and the residential density will be relatively high. Off-reservation trips will probably be frequent, with a consequent drop in all commercial activities. As the town grows in time, size and social maturity, the "temporary" characteriatics will decline and most of the major needs should be satisfied on-site.

This particular problem is certainly an important one, but to keep it in perspective, one must think of a town of 3,000 families by 1977, with double that number in 1980. In view of this pace, it is unrealistic to be overly concerned about interim shifts. Before the engineers can close a survey for the first 1,000 families, the second 1,000 families will be on their way.

Therefore, this analysis has tended to generalize the land requirements to achieve perpetual balance and not be overly concerned about weekend adjustments for each week's operation.

The aggregate balance suggests an overall land requirement of about ten persons per acre. However, as stated before, the town plan must contain maximum flexibility in this regard, along with many others. It is difficult to project a situation of the density increasing much beyond ten persons per acre, and, in fact, it may be slightly less. All plans reflect averages with ample opportunities for adjustments within the ranges presented by the averages.

Land requirements indicated are "net" for development purposes. They do not include lands that should be avoided because of hydrological or geological constraints. Further, the figures do not include belts of reserved lands that might be required for future growth; nor do they include land for protection against uncontrolled settlement. These additional land requirements can be supplied once a location is selected and an ultimate size is determined for the town.

Exhibit E-3
LAND USE PROJECTIONS

(Based on mid-range DRA population estimates; all numbers are approximate.)

LAND USE	SQUARE FEET PER PERSON	%	1977 POPULATION 12,500 (Acres)	1979 POPULATION 26,000 (Acres)	1985 POPULATION 32,000 (Acres)	2000 POPULATION 59,000 (Acres)	ULTIMATE POPULATION 71,000 (Acres)
RESIDENTIAL	1,640	37.0	471	979	1,205	2,221	2,673
EDUCATION	320	7.0	92	191	235	433	521
RECREATION	1,250	28.0	359	746	918	1,693	2,037
COMMERCIAL	120	3.0	34	72	88	163	196
GOVERNMENT	20	.5	6	12	15	27	33
HEALTH	20	.5	6	12	15	27	33
INSTITUTIONAL	80	2.0	23	48	59	108	130
INDUSTRIAL	270	6.0	77	161	198	366	440
UTILITIES	30	1.0	9	18	22	41	49
TRANS. & CIRCULATION	650	15.0	187	388	478	880	1,059
TOTAL	4,400 (Sq. Ft.)	100.0 (%)	1,264 (Acres)	2,627 (Acres)	3,233 (Acres)	5,959 (Acres)	7,171 (Acres)

APPENDIX F

CONSTRUCTION COST AND LAND COVERAGE FACTORS

LAND USE	Construction Cost Per Square Foot or Unit	Land Coverage Percent Structure
Infrastructure		
Roads - Access	$ 225,000 per mile	-
Major	2,500 per acre	-
Internal	1,800 per acre	-
Storm Drains	500 per acre	-
Water - Source	20,000 per mile	-
Distribution	1,800 per acre	-
Sewage Disposal - Treatment	500 per acre	-
Collection	1,100 per acre	-
Electric	1,700 per acre	-
Natural Gas	600 per acre	-
Housing		
Single Family	$15 per square foot	3 per acre
Multi Family	19 per square foot	8 per acre
Mobile Homes	10 per square foot	12 per acre
Group Quarters	15 per square foot	.400
Public Facilities		
Schools	$40 per square foot	.100
Medical	40 per square foot	.400
Local Government - Office	20 per square foot	.325
Other Structures	19 per square foot	.450
Recreation/Parks	250 per capita	10 acres per 1,000 population
Social	200 per capita	5 acres per 1,000 population
Commercial		
Retail	$18 per square foot	.250
Office	20 per square foot	.325
Hotel/Motel	17 per square foot	.400
Commercial Recreation	18 per square foot	.400
Wholesale	10 per square foot	.500
Mobile Home Parks	2,700 per pad	Under Housing
Transportation, Communications and Utilities	210 per capita	N.A.