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NATIONAL FUEL ALCOHOL AND FARM COMMODITY
PRODUCTION ACT OF 1979

GOVERNMENT
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HEARINGS

BEFORE THE

SUBCOMMITTEE ON AGRICULTURAL CREDIT AND
RURAL ELECTRIFICATION

OF THE

COMMITTEE ON AGRICULTURE,
NUTRITION, AND FORESTRY
UNITED STATES SENATE

NINETY-SIXTH CONGRESS

FIRST SESSION

ON

S. 850

A BILL TO AUTHORIZE THE SECRETARY OF AGRICULTURE
TO GUARANTEE LOANS FOR THE CONSTRUCTION AND OPERA-
TION OF FUEL ALCOHOL PLANTS, TO PROVIDE FOR A SECURE
SUPPLY OF FEEDSTOCKS FOR THE OPERATION OF SUCH
PLANTS, TO AMEND THE AGRICULTURAL ACT OF 1949 WITH
RESPECT TO THE SET-ASIDE PROGRAM FOR FEED GRAINS,
AND FOR OTHER PURPOSES

JULY 17 AND 19, 1979

Printed for the use of the
Committee on Agriculture, Nutrition, and Forestry

DOCUMENTS

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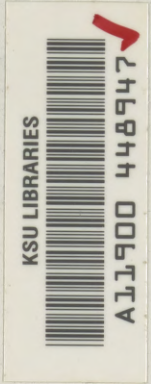
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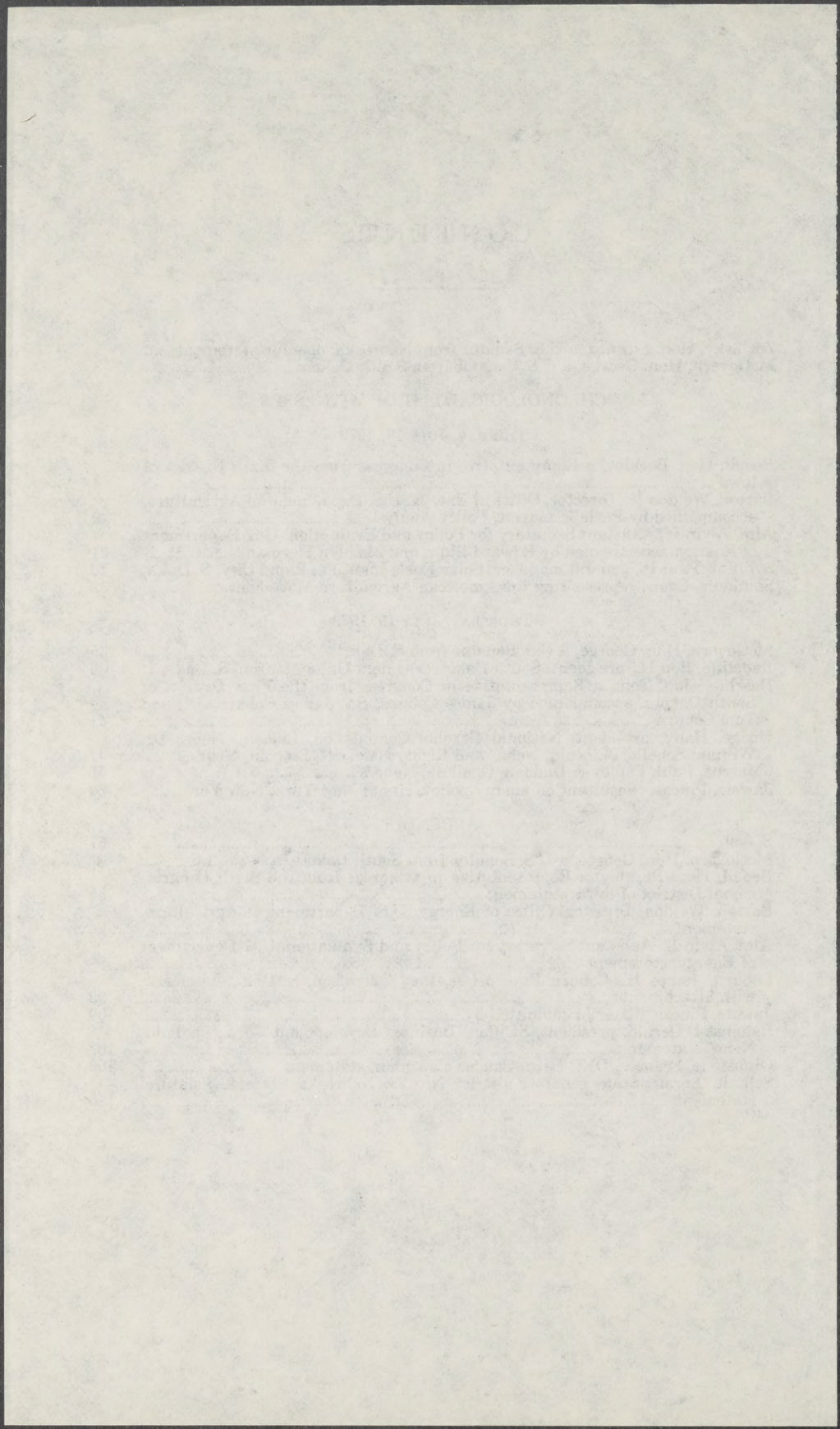
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NATIONAL FUEL ALCOHOL AND FARM COMMODITY PRODUCTION ACT OF 1979

TUESDAY, JULY 17, 1979

U.S. SENATE,
SUBCOMMITTEE ON AGRICULTURAL CREDIT AND
RURAL ELECTRIFICATION OF THE
COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9 a.m., in room 324, Russell Senate Office Building, Hon. Edward Zorinsky (chairman of the subcommittee) presiding.

Present: Senators Zorinsky, McGovern, and Jepsen.

STATEMENT OF HON. EDWARD ZORINSKY, U.S. SENATOR FROM NEBRASKA

Senator ZORINSKY. Good morning. The Subcommittee on Agricultural Credit and Rural Electrification is meeting this morning to hear testimony on our Nation's gasohol programs. Earlier this session, Senator McGovern introduced the National Fuel Alcohol and Farm Commodity Production Act of 1979, S. 850.¹

S. 850 is a comprehensive and innovative approach to both our country's energy problems and our grain programs. The bill is multifaceted and contains several distinct sections. At the outset, I would make it clear that this subcommittee has jurisdiction over the credit provisions of the bill, but not over those portions of the bill which deal with agricultural production. Those sections fall under the jurisdiction of the Subcommittee on Agricultural Production, Marketing, and Stabilization of Prices.

Moreover, in discussions with the sponsor of the bill, Senator McGovern, it has become clear that S. 850, in its present form, may not present the most beneficial vehicle for gasohol legislation. Rather it is intended that the bill should serve as a starting point for further discussion and examination of possible legislative initiatives. These hearings should serve a factfinding function, to examine both the commitment our country has already made to the production of fuel alcohol and what further steps we may take to assist its development.

Gasohol, a blend of ethyl alcohol and gasoline, is growing rapidly in popularity. Where once gasohol was little known outside a few Midwest and Plains States, now one sees bumper stickers advocating its use scattered all over the country. In addition, gasohol is now being pumped by filling stations in many States, including stations in nearby Virginia and Maryland.

¹ See p. 67 for a reprint of S. 850.

But while gasohol has caught the American public's imagination, it has not yet received the attention it deserves in terms of public policy. Nearly 2 years ago, Congress passed the Food and Agriculture Act of 1977 including authorization for four pilot plant loan guarantees. Over the next 2 years, preliminary regulations were formulated, published and reviewed, final regulations were published, applications were solicited and reviewed, and finally this past spring, announcement of the four selected applicants was made.

Over this same period of time, our Nation's energy situation has changed dramatically. We have moved from the brink to the center of a national emergency crisis. We no longer have the leisure of long delays and timetaking regulatory processes. Instead, both Congress and the administration should take prompt, immediate steps to further gasohol use as part of a national commitment to alternative energy source development.

One step which should be taken without delay is to improve the information available to the general public. My office receives letters every day from constituents who are interested in constructing alcohol production facilities ranging in size from small on-farm stills to large commercial facilities. They want information on a wide variety of subjects, including how to build a small still and how and where financial assistance is available. A major component of a national commitment to gasohol should be a conscientious effort to educate citizens and communities on how they can participate.

A second area which should be addressed is the current Treasury Department regulation of alcohol production. According to many of my constituents, the single greatest obstacle to increased gasohol production is the burdensome and complicated Bureau of Alcohol and Firearms application procedure for building a still. Senator Bayh and I, along with several other Senators have recently introduced a bill, S. 1200, which would give the Treasury Department the necessary flexibility to simplify the regulations for small producers of motor fuel alcohol.

Third, we need to create greater incentives for communities and private industry to invest in motor fuel alcohol production. Not long ago the President announced a new initiative to promote the creation of 100 new small gasohol plants. The Economic Development Administration and the Community Services Administration will devote \$11 million of the next 2 fiscal years, and the remainder of fiscal year 1979, to assisting the gasohol effort.

The program is a good start, but is hampered by the requirement that the Economic Development Administration operate in economically distressed regions.

We are here today to accept testimony from several witnesses, including representatives of the Department of Energy and the Department of Agriculture on gasohol development. It is my hope that these hearings will give us greater direction in formulating national programs to promote gasohol development and use.

Before we hear from our first witnesses from the Department of Energy and Agriculture, I wonder if Senator McGovern would care to make any comments?

STATEMENT OF HON. GEORGE McGOVERN, A U.S. SENATOR
FROM SOUTH DAKOTA

Senator McGOVERN. Thank you very much. I do have a prepared statement. I ask that it be made part of the record. I will just note a few excerpts from it.¹

I want to thank you, Mr. Chairman, for not only scheduling this hearing, but for the interest and leadership that you have provided here in the Senate on this issue. I know how vitally the people in Nebraska are interested in the whole matter of conversion of grains to fuel, and you have helped not only lead, but to inspire that interest.

I am also glad to see Congressman Berkley Bedell here from Iowa. He has been my leader on this issue more than anyone else in the Congress. Over here in the Senate, Mr. Chairman, we sometimes have a tendency to get involved in so many different committees and so many interests that we do not follow as intensely as we should a particular issue.

Every time my schedule has become crowded to the point where I have not given this issue of gasohol the attention it deserves I get a telephone call from Congressman Bedell. If I do not return it in 30 minutes he calls back. He has kept me moving ahead on this issue. I am tremendously indebted to him for not only his persistence, but the great knowledge that he brings to this field. So I am glad that he is here.

Just less than 18 months ago the Department of Energy issued its formal position paper on alcohol fuels. Despite the fact that several Midwestern States have already begun selling gasohol and demand exceeded supply, the Department's position on the future of this resource was decidedly cool. But regardless of the Department's lukewarm response, today over 28 States, including my State of South Dakota, are actively selling gasohol in some 800 retail outlets. So as a result of increased congressional and public interest in the rapid commercialization of alcohol fuels, the Department of Energy embarked on another analysis which was released just last week. This report thankfully represents a marked departure from the previous position, and concludes that alcohol fuel production has a positive net energy balance and can make a significant contribution to minimizing fuel imports.

I was glad to see the President include gasohol as one of the things that they are looking at sympathetically in the administration.

Now, the Congress over the past year has acted to ease alcohol fuel development. They have exempted the Federal motor fuel excise tax for fuel containing alcohol, and the Senate has recently passed a major loan guarantee program which will assist in the rapid development of alcohol fuel plants.

We have also established the National Alcohol Fuels Commission which is charged with the development of a strong Federal alcohol fuels policy. I am pleased to be a member of this commission, representing the Senate Agriculture Committee.

¹ See p. 85 for the prepared statement of Senator McGovern.

Despite these recent successes, alcohol fuel production and gasohol use face several serious barriers. As the chairman has already reminded us, there are serious barriers yet to be removed.

Let me just say this, we know how to produce alcohol fuels. We know how to market them. We know how to use them. We know it is an efficient form of fuel. I do not think there is any question there is a growing grassroots commitment in the country committed to gasohol, and given our critical national energy situation, we have to make every effort to move ahead.

Let me just say that the legislation that I have introduced, S. 850, which is a companion bill that Congressman Bedell introduced in the House, may be one vehicle to encourage such development. I continue to have some reservations about this particular proposal, which I have discussed with Congressman Bedell, but I have no doubt that the bill is a good vehicle and we can make amendments and modifications to strengthen it.

I look forward to the testimony we are going to receive throughout the hearings, and in the interest of establishing truly effective legislation I hope that all the witnesses will stay in touch with the committee in the coming months.

I regret that the national nuclear regulatory bill is over on the Senate floor this morning, and rollcalls are scheduled. I have an amendment of my own that will be voted on after 10, so I have to be there for part of that debate. I will stay as long as I can.

Senator ZORINSKY. Thank you.

Less than 2 weeks ago this Nation celebrated Independence Day. Unfortunately, we are not independent in the area of energy.

You and Berkley Bedell came to the U.S. Senate, long before me and did a lot of the pioneer work on gasohol, far before it became the popular thing to do. I want to commend the two of you for having that initiative and the foresight at a time when the pure economics may not have looked that good. Certainly gasohol has become a lot more attractive, and with the development of gasohol in the future, Independence Day, the July 4 celebration, may be much more meaningful than it was 2 weeks ago.

With that, I would like to call on Congressman Berkley Bedell, a member of the Sixth Congressional District in Iowa.

STATEMENT OF HON. BERKLEY BEDELL, A REPRESENTATIVE IN CONGRESS FROM THE SIXTH DISTRICT OF IOWA

Mr. BEDELL. Thank you. I have a prepared statement which I would ask be made part of the record.¹

Senator ZORINSKY. Without objection, so ordered.

Mr. BEDELL. I would just like to speak off-the-cuff and candidly on where we stand, and what I see happening in regard to alcohol fuel programs.

This really started from the fact that certain States, particularly our State of Iowa, and your State of Nebraska, proved that gasohol was a fuel that motorists would not only buy, but would continue to buy, and come back for more. As we looked at the situation existing in the agricultural sector, it seemed to us that it did not make sense for the Government to pay, year in and year out, an average of over \$1 billion a year for farmers to set land aside when

¹ See p. 85 for the prepared statement of Congressman Bedell.

we could use that productive land to grow crops that could be converted.

So we first introduced a bill which provided for a sizable subsidy, and our thought was that we would take the subsidy we were then paying for farmers to take land out of production and instead use that subsidy to get an alcohol fuel industry started in order to solve both problems, the overproduction, and our energy problems.

The more we looked at it the deeper we got into it, the less of a need it appeared there was for any substantial subsidy. When you add 10 percent alcohol to gasoline you increase the octane by two or three points. This is worth around 2 cents per gallon of gasohol. Since we are talking about 10 percent alcohol, that means it is worth 20 cents per gallon of alcohol.

We have a Federal tax, which is waived, of 4 cents, which is really 40 cents. So we are talking about a 60-cent advantage of alcohol as compared to gasoline. The present cost of alcohol is about \$1.20, which means the net dollars after you deduct 60 cents, is 60 cents, which is right where we are today in refinery prices of gasoline.

So right now, economically, it would appear that the only problems really are the fact that we are not producing very much alcohol, and for that reason there are great costs of transportation, and the refineries are not refining their gasoline to the best type to which to add alcohol and get the maximum benefits, and this sort of thing.

So as we look at the problem we see less need for a subsidy. We also find that it will not solve the problem of overproduction as much as we had thought, because when you produce alcohol you do not lose any of the protein from the grain.

There was an experiment down at the University of Kentucky, where they took a group of cattle and they fed them a given amount of hay, plus 100 bushels of corn. Then they had another group of cattle to which they fed the same amount of hay, and then they took 20 bushels of the corn and ran it through an alcohol still, and took the alcohol off, and fed the cattle the remaining 80 plus the byproduct from the 20 bushels, and they found that they actually had greater gain from the cattle fed the grain from which they had taken the alcohol than those which they had not. That is because of the fact that cattle do not digest all of the carbohydrates that are in the corn or grain, and the byproduct is an extremely good high protein feed.

But the fact is that the distillery's distillers dried grain is more digestible, and increases the digestibility for the feed for the cattle. So we also found that the people that were saying that we were taking food out of the mouths of people in order to put gasoline in our automobiles are incorrect.

The other problem that has been brought up is the energy balance. The fact is that right now Arthur Daniel Midland has certified that they have a positive energy balance. But there are two things that we have to remember.

People who construct new plants, if we build new plants for alcohol, as compared to the present plants, which were built for beverage grade alcohol, tell us they can get an energy balance of

roughly 4 to 1. We do not know that, but that is what they tell us they can do.

But certainly it is true that there is technology coming forward which is going to have a positive effect, and further increase production. But even if that were not the case, in the production of alcohol you can use any source of heat that you want to. You can use solar energy to create some heat. You can burn corncocks, you can burn cornstalks, you can burn wood, you can burn coal.

Anytime we can take 100 Btu's of coal and convert it into 80 Btu's of gasoline, it would be a pretty tremendous thing to do, because of the large amount of coal we have in our society.

I was in Des Moines last Saturday, where we had a meeting to disseminate information in regard to the production of alcohol on farms in small units. We had expected 300 people at that meeting. We had over 3,000 farmers there. One of the people that was there, was Mr. Zehammer from Minnesota. They have been producing alcohol fuel on their own farm for 18 months. They claim their costs are approximately 50 cents per gallon for a production of 160 proof alcohol, 80 percent alcohol and 20 percent water. They burn this in their tractors, in their cars, and in their home, as well.

So I think that that information is going to be made available by the people. I see it moving in that direction. There was also in attendance, in Des Moines, a gentleman from 4 miles outside of Des Moines, that has a small alcohol still, and this was one in which he was using a vacuum to increase the efficiency of the unit.

One of the arguments against using a vacuum is that it would take so much energy to run the vacuum pump. This farmer found if you do have a vacuum process, if you turn off the pump the vacuum stays in the process. So these are the types of things we are going to learn if we go forward with an alcohol fuels policy in our country, and in the industry, particularly the farm industry.

The activity of those farmers and the others that become involved will constantly improve this process, so when those people talk about the present technologies, and what it has been, I hope we realize the advancements that are going to come.

There was a gentleman from Columbia University last Tuesday who told us about the work they are doing in regard to membrane technology, wherein this shows great promise, not only for alcohol fuels from farm products, but other products, such as garbage and sewage.

So the thing we learned in Des Moines is people are going ahead. All they need is encouragement.

I have to agree with the statements that have been made. I think we need changes in the legislation. I think one of those changes would be to see that we have more encouragement for onfarm units, and small units in communities and co-ops, because I think that is the way it will come first and develop into bigger units.

I told you I would be candid. I would be doing you a disservice if I did not tell you I am terribly frustrated by the attitude of the Department of Agriculture. It appears everyone else in the Government favors it. The President supports it. But it is one constant battle with the Department of Agriculture in trying to get them realistically to look at the opportunities we have for alcohol fuels. The reason I think it is such a great opportunity is that the

technology is already here. That technology is going to improve, but the technology in terms of economics is already economical, and it is going to get better and better.

Second, if we will take our food products that we have, our grains, and so on, from which we lose very little, and use this as a base to get started, and to learn more and more from it, then when we get the technology, which estimates are that it will be within 2 or 3 years, we can also economically and feasibly convert wood waste, garbage and sewage into alcohol fuel and you will still use the same technology for the production of alcohol. The only difference is that we need the technology to convert the wood waste.

When we get to that, then we have the potential because of the tremendous tonnage available to take care of from 20 to 40 percent of our total liquid fuel needs in this country. I think it is a tremendous opportunity for us to move forward.

I am delighted that you are considering this legislation. I hope we use it as a vehicle to move forward, and I hope we will not let those who say, you cannot do it for this reason, and for that reason, prevail as we look at this legislation.

I can tell you this, the farmers of the Midwest are going to do it regardless of what we do. We can either help to see that it moves forward to help solve this problem, or we can throw up a lot of problems by those wise people that say, you cannot do this.

Senator ZORINSKY. Thank you very much, Congressman, for being with us to participate in these hearings.

Senator McGovern, do you have any questions?

Senator MCGOVERN. Congressman Bedell, thank you for your excellent statement.

One of the barriers that farmers in my area talk about is the Bureau of Alcohol, Tobacco, and Firearms, because they say the permits required, the regulations which were really not set up for alcohol production for fuel, but for beverages, impedes their efforts to move in this area.

Do you have any recommendation to make on that score to the committee?

Mr. BEDELL. Yes, I do. Strangely, the people like the Zeehammers, say they have had quite good cooperation from the BATF. However, the Bureau is just swamped with applications from people who would like to go into the business of producing alcohol.

Second, I think we have to recognize that BATF is charged with one responsibility, and that is to see that they see that all taxes that should be collected from producers of alcohol are collected. For that reason, they are only going to focus on what they are going to do to make sure that happens. They are not going to focus on what happens to make us develop an alcohol fuel program.

I think we need to make it easier, particularly for farm producers, to be able to sell that to their neighbors or to other large companies. I see a possibility that we will see a lot of farm units selling their alcohol fuel to others, and maybe to processing plants. It is below 160 proof, and to make gasohol you really need it almost at 200 proof.

I think we do need legislation that will direct BATF in the direction of what I think is the direction of our total society, and what I think is the idea of the Federal Government, and that is to

help make this possible without undue restrictions in efforts to try to collect the taxes. The fact is if a farmer is going to spend \$50,000 to put up his own unit, then it is not very likely he is going to try to avoid, or break Federal law by a few dollars that may be saved in regard to taxes.

My understanding is, in order to try to drink this stuff, you are kind of out of your mind, because somebody tried it, and I understood they had a hangover for 3 or 4 days. Most of the people I know would be better off going down to the liquor store.

Senator MCGOVERN. You mentioned the foot dragging at the Department of Agriculture. I notice increasing indications that the Department may not call for a set-aside next year because of expanded export demand. What does that do to this legislation which depends in part on grain grown on set-aside acres?

Mr. BEDELL. We have recognized this before this came to be. As I told you, I personally am of the opinion that this will not solve the problem simply because of the fact that the distiller's dry grain, which is the byproducts that we get from the plants are such an excellent feed of its own, like the Zeehammers, who are producing their own, and feeding their DDG from their own stills.

If it is true, we can take the alcohol, and still have as much feed value in corn or wheat as before we put it into the still, then whether or not we have a surplus is not a significant factor in this industry. Indications certainly are that we can take, not all of our corn, but we can certainly take 10 or 20 percent of that, and if we feed it then to the livestock, then we will not have that loss.

The changes we have made in the bill would make it at the discretion of the Secretary, that he can move to where he would take part of a set-aside, if he has one, and pay farmers to buy those crops from them. The flexibility needs to be put into the bill.

Senator MCGOVERN. Are you willing to consider the addition of wheat to this bill? It is now confined to corn. In some areas of the country it makes more sense to use the wheat residue than it does corn.

Mr. BEDELL. Not only willing to, we think we should. We should be able to use whatever CCC stocks are viable. We think if they have extra potatoes, that they are going to go to rot, and throw them away, it makes sense to run them through an alcohol plant. We believe if they have sugar that will spoil they are better off running it through to make the alcohol fuel.

Senator MCGOVERN. Thank you very much.

Senator ZORINSKY. I would just like to say, Congressman Bedell, that I thank you very much for taking the time from your schedule to come over and help us support what I feel is a critical piece of legislation, especially at this point in time.

We are transferring the wealth of this Nation to OPEC nations. I think this bill will give us an opportunity to substitute support for American farmers for the OPEC nations, American farmers who in turn will pay taxes on the profits they gain, which will go through our own economy, rather than those of another nation.

I think a lot can be said, in view of the projections that \$70 billion that this country anticipates spending in imports of fuel from OPEC nations—

Mr. BEDELL. I think we have shown, time after time, give the American farmer the chance to come up with answers, and they will.

Senator ZORINSKY. Thank you very much.

Mr. BEDELL. Thank you.

Senator ZORINSKY. Our next witness will be Mr. Weldon Barton, Director of the Office of Energy, U.S. Department of Agriculture.

STATEMENT OF WELDON V. BARTON, DIRECTOR, OFFICE OF ENERGY, U.S. DEPARTMENT OF AGRICULTURE; ACCOMPANIED BY EARLE E. GAVETT, POLICY ANALYST

Mr. BARTON. I have Earle Gavett from the Office of Energy, a policy analyst accompanying me. I have a relatively brief statement. I would like to summarize the first part, and perhaps read the end.

Senator ZORINSKY. Your statement will be put in the record in its entirety.¹

Mr. BARTON. The Department of Agriculture vigorously endorses the development of a domestic alcohol industry, including gasohol containing ethanol made from agricultural and forestry feedstocks. We have taken several steps to encourage alcohol production.

First, we have the guaranteed loan program, and the 1977 Food and Agricultural Act, where you mentioned earlier that the Secretary has the authority to guarantee loans for four projects. We have made commitments of \$42.7 million of loan guarantees. Two of those four involve the production of ethanol, and those two involve \$30 million of the \$42.7 million total.

Second, the Department is expanding its research and development work in this area. We have proposed for fiscal 1980 some \$6 million of funding in the alcohol fuel area.

Third, we have committed ourselves consistent with the 1978 Emergency Agricultural Act to make set-aside land available when there is a set-aside, or where there would be set-aside acreage otherwise, and where there is a demonstrated need for acreage and crops for fuel production, to cut back on the set-aside in those areas that there would be otherwise additional set-aside acreage, to make land available to the extent possible for crops to be produced as feedstock for alcohol production. The Secretary is fully committed to that.

Fourth, the Department is prepared and will take into consideration in setting grain reserve targets and levels, the need for a plentiful supply of grain; to the extent that grain is used for alcohol production.

We think that, for instance, increasing the levels of grain reserves can help to provide a stable feedstock supply for alcohol distilleries.

With respect to S. 850, we have not in our prepared statement commented section by section on the bill. We do understand, as you have indicated, and as Senator McGovern has indicated, the bill is subject to revisions. It is a starting point rather than a final legislative measure at this time.

Consequently, we have limited the remainder of our statement to some basic points which, in our view, should be considered in

¹ See p. 86 for the prepared statement of Mr. Barton.

handling this or any alcohol fuels program legislation. I am at the bottom of page 3 of my statement. I will read the rest of the statement.

First, in view of the uncertainty about future land availability and productivity in U.S. agriculture—and therefore about the production resources that can be devoted to biomass production for fuel use—any initial goal or commitment to fuel ethanol production should be limited to a volume which will not have substantial impacts on the price of meats and other foods, the availability of corn for export, and the markets of soybeans and other high protein foodstuffs.

Second, Government support should be primarily in the form of generic incentives, such as tax waivers and investment tax credits, which leave the detailed decisions to the private sector on how best to develop and manage alcohol fuels plants and an alcohol fuels industry. A very powerful general incentive is already in place—the waiver of the 4 cents Federal excise tax on gasohol. This amounts to an incentive of 40 cents per barrel, or \$16.80 per barrel, about the price of a barrel of crude oil.

The President announced in Des Moines, Iowa, on May 4, 1979, that the administration supports extension of the 4 cents-per-gallon excise tax exemption beyond its October 1, 1984, expiration date. Such an action would be highly conducive to new plant construction, since it would provide a reliable basis for continuation of the 40-cents-per-gallon incentive on ethanol during the productive life of new plants.

Third, the USDA does not support the attachment of financial incentives on a selective basis to particular ethanol feedstocks—for instance, to grains as feedstocks, for at least two reasons:

No. 1. If the Government provides a particular commodity to alcohol distilleries at below-market prices, this will disrupt the normal market forces which encourages the lowest cost materials to be used as feedstocks for fuel alcohol production. Whereas, residues—citrus pulp, dairy residues, sulfite liquors from wood pulping, et cetera—would ordinarily be used as feedstocks for ethanol prior to the use of agricultural commodities as such, attachment of a special incentive to agricultural commodities, such as corn, could induce the bypassing of the lower cost residue material in favor of the commodities themselves as feedstocks. Such an incentive would also slow down the development of technology for utilization of cellulosic residues, wastes and new commodities for alcohol fuel production.

No. 2. The Department would not support the attachment of incentives to a particular feedstock, if the Government provided corn or other agricultural commodities at below-market prices to fuel alcohol distilleries, use of those commodities for food and feed would become a residual claimant after the alcohol feedstock requirements were satisfied. This could have adverse consequences to domestic food prices and on the meeting of U.S. export obligations.

Fourth, a stable supply of feedstocks for alcohol distillation can be achieved without involvement by the Secretary in the buying and selling of feedstock materials. If residues rather than agricultural commodities per se are used as feedstocks, the private firm would necessarily have to manage dependable feedstock arrange-

ments without the Secretary's intervention. If grains were used as feedstock material, adjustments in the farmer-held grain reserve targets to take into consideration fuel alcohol plant needs, supplemented with hedging practices by the distilleries, can provide the necessary stability of feedstock supply for fuel alcohol distilleries.

Fifth, we endorse the practice followed in the enactment of the Food and Agriculture Act of 1977, whereby provisions related to alcohol fuels and other agricultural energy provisions were considered as adjuncts to the periodic extension of farm program legislation. The USDA does not support changes in the feed grains program or other basic farm programs at this time. Such changes are unnecessary and would be premature.

Sixth, with respect to loan guarantees for the construction of alcohol distilleries, as an incentive to encourage a fuel alcohol industry, we are currently carrying out the loan guarantee authorities under section 1420 of the Food and Agricultural Act of 1977. The Farmers Home Administration has existing loan authorities which can be applied to alcohol plants, and FmHA has made a commitment to assist an on-farm facility in South Dakota, and has disbursed that money, \$140,000, to finance a small distillery in South Dakota.

Mr. Chairman, the administration will be submitting legislation to create an independent Energy Security Corporation with overall Federal responsibility for the development of new energy supplies from coal, oil shale, gasohol from plant products and other sources. The Department of Agriculture recommends that action on legislation such as S. 850 which would treat gasohol from agricultural materials separately from other new fuel sources be deferred, until such legislation can be considered with the administration's proposal to create the Energy Security Corporation.

We would be pleased to work with you and this committee on policies to encourage gasohol production within the context of overall new fuels policy proposals including the Energy Security Corporation.

This concludes my prepared statement, Mr. Chairman. We would be pleased to respond to any questions that you or members might have.

Senator ZORINSKY. Thank you, Mr. Barton.

Senator Jepsen?

Senator JEPSEN. I, first of all, compliment you on your statement. It is very well thought out and I would like to pursue some of the materials that you have in your statement.

As a summary, do I hear you saying, and as I read the statement, that with the legislation that is now on the books and the activities and actions that the USDA is taking, that you are indeed promoting the development of gasohol and you have, in fact, loaned money to that effect. You have loans now going to—I will ask the question.

Do you have loans to plants?

Mr. BARTON. We do have, Senator, as part of the program under the 1977 Food and Agriculture Act. We have two loans—two loan guarantees—that are going for the construction of alcohol plants. One will go to a combination of U.S. Sugar and Savannah Foods Corp. to construct a plant in Florida with a \$15 million loan

guarantee, a tentative commitment has been made. That plant will produce ethanol from the stocks from sugarcane. The other loan under that program will be a \$15 million loan to go to Midwest Solvent Corp. from Kansas. They will construct a plant in Santa Rosa, Tex., to use a combination of molasses from a sugarcane factory, that will be co-located with the plant, and from sorghum grain. The plant will use about 80 percent grain sorghum and about 20 percent will be made out of the molasses from the sugarcane factory.

In addition, I mentioned that we have begun loaning for construction of on-farm ethanol plants under authority of the Farmers Home Administration. In fact, USDA has authorized and encouraged the State units of the Farmers Home Administration to give priority or to give major attention to applications for alcohol distilleries, small scale, on farm. We have now made one loan.

Senator JEPSEN. You granted one in South Dakota. That is Senator McGovern's State. That is \$140,000 to one farmer?

Mr. BARTON. That is correct. This is a new program.

Senator JEPSEN. Do you have any additional applications under that program?

Mr. BARTON. Let me clarify the Farmers Home Administration program. This is not in any sense a national program similar to our real estate program or farm operating program. It is, as I mentioned, encouragement to the State offices, to the South Dakota or Iowa Farmers Home Administration office to take applications and, frankly, at this point, we do not have collective information on what applications have come into those State and county Farmers Home Administration offices. So I am not in a position to tell you specifically what applications we have pending.

Senator JEPSEN. This farmer in South Dakota, does he raise corn?

Mr. BARTON. He is going to use corn and potatoes primarily as feedstock materials. I believe he is a corn farmer. He is in the northeastern part of the State of South Dakota. But I would have to confirm that. I think he is producing potatoes but his primary feedstock would be corn and potatoes which are grown in that area, within about 30, 35 miles of his farm and he does think that in the short term, he can secure a great deal of spoiled and below market grade potatoes in particular.

Part of the reason this farmer was funded was because part of the loan will be for constructing a feed pelleting mill besides the alcohol distillery. This mill will take off the protein that Congressman Bedell was referring to and squeeze that into feed pellets that will then be used on the farm for sale to other livestock feeders. So, it is a combination of a small alcohol distillery and a feed pelleting plant that will be financed by the loan.

Senator JEPSEN. He was given this \$140,000 through the Farmers Home Administration of South Dakota?

Mr. BARTON. It is the U.S. Farmers Home Administration but, again, the primary discretion in this area is with the State and county offices.

Senator JEPSEN. But the loan is from your Department. It is Federal money?

Mr. BARTON. Absolutely. It is a direct loan. It is an emergency loan under the Farmers Home Administration.

Senator JEPSEN. It is an emergency loan?

Mr. BARTON. I believe the category is called an economic emergency loan. It is at the prevailing rate of interest as money from the Treasury. I believe that loan is made at either 8½ or 8¾ percent.

Senator JEPSEN. Is that part of the program now available to corn farmers in Iowa and Nebraska?

Mr. BARTON. It is part of an ongoing Farmers Home Administration portfolio of lending authority. The answer to your question is if a producer from Iowa applied to the Iowa Farmers Home Administration office, it would be given full consideration. If the applicant qualified under one or another of the existing program authorities of the Farmers Home Administration he could be funded.

Senator JEPSEN. Does the Farmers Home Administration now have a program to develop gasohol?

Mr. BARTON. I would say that we have not identified a separate national program for gasohol. What we have done through the Farmers Home Administration is get the word out and give the authority, if you will, to the State offices of the Farmers Home Administration. If they receive applications for funding alcohol distilleries on farms, and they have the authority under the existing lending authority, whatever specific authority, whether it is the operating loan authority or the economic emergency authority or whatever, they are to give firm attention to that application and certainly are encouraged to make that kind of loan. We do not have a separately identified national program at the present time through the Farmers Home Administration for the alcohol production facilities.

Senator JEPSEN. This \$140,000 in South Dakota, would that be considered a pilot project? You have no program but yet you loan—you state you are in the alcohol business—encouraging alcohol plant construction. You made a commitment to one farmer in South Dakota. Yet, you say you have no authority or program for it.

Mr. BARTON. All I am saying is we are using existing authorities. There is no separate program. We are using existing lending authorities of the Farmers Home Administration.

As you know, the Farmers Home Administration has a large number of categories whereby they can make loans to farmers.

Senator JEPSEN. Do they have more money available for the alcohol plant development on an individual basis?

Mr. BARTON. The Farmers Home Administration has substantial lending authority.

Senator JEPSEN. You have \$140,000 in South Dakota to develop an alcohol-gasohol plant from Farmers Home Administration. Is there more money? Is there money available for Iowa and Nebraska farmers?

Mr. BARTON. Let me distinguish between grant funds in that sense and lending authority. We basically have no grant authority but there is lending authority. Consequently, if qualified applications are received through the Iowa Farmers Home Administration, lending authority is available to make that sort of loan.

Senator JEPSEN. But how do we do this? You say there is no program. I know farmers in Iowa would be interested in this. Congressman Bedell said there were several thousand on Saturday. I saw pictures in the paper about the individual stills or whatever you call them.

How would they do this? Do you have forms established?

Mr. BARTON. The State, to some extent, have varied criteria. We have not established specific criteria at the Federal level. Again this goes along with not having a national program. We have not determined nationwide criteria for applicability especially for alcohol plants. But the criteria have been determined by the individual States. I cannot tell you this morning but we can put into the record the determinations that the Iowa Farmers Home Administration office have made and the guidelines they use.

Senator JEPSEN. For the record, would you please provide this committee with the directions and set up instructions of how Iowa farmers might be able to apply individually for a loan such as the farmer in South Dakota has of \$140,000 to promote gasohol?

Mr. BARTON. Surely. We will provide that for the record.

[The following information was subsequently submitted by Mr. Barton:]

Farmers in Iowa may go to their local FmHA County Supervisor who serves the area in which they live. All applications for farmers are made through that office and is usually located in a county seat or where there is a USDA Service Center. The FmHA is listed in the telephone book under U.S. Government. The address for the Farmers Home Administration Office in Iowa is Room 873 Federal Building, 210 Walnut, Des Moines, Iowa, 50309. Telephone 515-284-4663.

Senator JEPSEN. That would be very exciting for the farmers in Iowa.

Mr. BARTON. May I just add one thing to that?

I think this is saying it in other words. You understand that alcohol plant applicants would have to qualify under one or more of the existing loan authorities. Any distillation plants that would be funded would have to qualify for emergency loans or operational loans, et cetera.

I mention that only in the sense that I am told, for instance, that the Farmers Home Administration office in South Dakota was as interested in terms of those lending authorities in that feed pellet operation, as they were in the distillery. That helped, if you will, in that application qualifying for a loan under the existing program.

Senator JEPSEN. I am not questioning or trying to isolate. I am pleased to see this, and I am sure Congressman Bedell and Senator McGovern are, too. I am sure the Iowa farmers, as interested as they are would probably have many applications. If you just tell us how.

I want to pursue this, Mr. Chairman, back to the enabling legislation and programs that you have now. Do you have any money from the loan program, specifically for promoting gasohol now.

Do you have money left to loan? Is there any money available now that is under the 1977 act, or 1978 act?

Mr. BARTON. We have exhausted the authority under the 1977 act. There was authority there for four pilot projects and those four have been approved.

Senator JEPSEN. You told me about two.

Mr. BARTON. I mentioned the other two only because section 1420 provided for four projects. The act also was broad in the sense of providing for conversion of agricultural commodities and forest products. It went beyond ethanol. So the other two projects, one is a wood pelleting operation for direct burning of wood; and the fourth is a unit, a mobile unit that would produce out of wood material a low Btu gas, a heavy wood oil.

So two out of the four are ethanol projects.

Senator JEPSEN. Do you have any applications at the present time from anyone to produce ethanol that would use corn?

Mr. BARTON. Yes, we do.

Senator JEPSEN. But they were not approved?

Mr. BARTON. The Commodity Credit Corporation Board did approve the project that I mentioned earlier to use grain sorghum which is a direct substitute for corn.

Senator JEPSEN. I know what it is.

Mr. BARTON. There is a predominantly feed grain project. As a factual matter, no corn facility was approved; that is correct.

Senator JEPSEN. And none was approved under the 1978 act. Do we have any corn, specifically corn for gasohol loans, approved?

Mr. BARTON. There are not. There is a large plant in Decatur, Ill., an existing plant that is using corn for gasohol. But this was not a recipient for a loan guarantee.

Senator JEPSEN. Did they apply?

Mr. BARTON. Yes; they did apply for another plant at a different location.

Senator JEPSEN. But they were not granted?

Mr. BARTON. That is correct.

Senator JEPSEN. Mr. Chairman, didn't we recently pass some additional money for this?

Senator ZORINSKY. Yes, we did. It is in the Senate bill.

Senator JEPSEN. We recommended and passed enough for 12 plants?

Senator ZORINSKY. \$500 million, for an unspecified number of plants.

Senator JEPSEN. So we have \$500 million that we have already recommended. This bill recommends \$600 million; is that correct?

Mr. BARTON. That is correct; up to \$600 million of outstanding loans.

Senator JEPSEN. That would be in addition to the \$500 million?

Mr. BARTON. It is a separately standing bill. The \$500 million, I might clarify, is an extension of the 1977 legislation.

Senator JEPSEN. So that 1977 legislation, which appropriated how much, \$45 million?

Mr. BARTON. The 1977 legislation authorized up to four projects using up to \$15 million each or a maximum of \$60 million.

Senator JEPSEN. \$60 million cap?

Mr. BARTON. That is correct.

Senator JEPSEN. And we added an additional \$500 million by way of recommendation. So we have \$560 million to develop by way of loans?

Mr. BARTON. But this has not passed.

Senator JEPSEN. But we have this, and this committee has already acted on that \$500 million?

Now, Senator McGovern is recommending we have \$600 million more. I just want to make sure, while you are here—have you studied this?

Mr. BARTON. Yes; we have studied the bill, Senator.

Senator JEPSEN. You understand the Secretary is to determine terms, conditions, and so forth, amount of repayment to meet the standards to protect the financial interests of the United States—in other words, he has sole discretion over his loans, as I understand it.

Is that correct? He determines whether the applicant is eligible?

Mr. BARTON. That is essentially correct. I know the Bedell version. The program would be administered, I think, under the legislation through the Farmers Home Administration. In any case, it would be the Secretary of Agriculture who would have the predominant responsibility and authority to guarantee the loans.

Senator JEPSEN. It says the applicant will pay 1 cent a gallon for fuel alcohol produced. Can you advise me what that means?

Mr. BARTON. As I understand it, Senator, any recipient of the loan guarantee under this legislation would be required to pay into a revolving fund, so to speak, 1 cent for each gallon of ethanol produced from that plant that was supported by a loan guarantee.

And the legislation does have authority for establishing a separate lending fund that would provide an ongoing basis for funds on which to continue loan guarantees.

Senator JEPSEN. And in addition to that—let me see if I get the mechanism. The Secretary is authorized to enter into sales contracts for 5 years with the individual that receives the loan?

Mr. BARTON. Yes.

Senator JEPSEN. Has the Department of Agriculture ever operated such a program where they are to go into the individual contracting business? They are lending the money. They have a contract. They enter into a 5-year contract now to buy from them.

Is that right? Is that your understanding?

Mr. BARTON. That is correct, sir.

We have not implemented such a program. There was permissive authority in section 1420 of the 1977 act for up to 5-year contracts with distilleries. The Secretary elected, in that case, to carry out the loans but as a factual matter, he did not enter into any such contracts with the plants. Therefore, we have not carried out such a program.

Senator JEPSEN. Then I understand also the proposal would require some kind of arrangement where the Secretary acquires the distilled dry grain and sets it aside for exporting—in other words he sets up a reserve through this?

Mr. BARTON. Yes; there is authority. I think it stems from a concern over whether one would produce too much distiller's dried grain as a byproduct of ethanol too fast and impact adversely on the market for soybean meal and distiller's dried grain itself.

As Congressman Bedell was referring to, this is a high protein substance. This would authorize the Secretary, or direct the Secretary, as I read it, to acquire such amounts of distiller's dried grain as necessary to prevent market disruptions.

Senator JEPSEN. Is this substitute now on page 11, line 1 through 24—in the feed grain loan rate—does this set up a separate loan as part of this total arrangement that you would have?

Mr. BARTON. This, Senator, would be in fact an extension of the regular, nonrecourse loan program, and established price programs that are in effect under the Farm Commodity Act.

Senator JEPSEN. Would it replace our present set-aside program?

Mr. BARTON. Congressman Bedell's version of this legislation would extend those programs beyond the termination date of 1981.

Senator JEPSEN. It is not clear to me whether it replaces, or is in addition to, the feed grain set-aside.

Is this an additional addendum to it?

Mr. BARTON. It would amend substantially the feed grain program, changing the loan rate and the established price rate and making some other changes including the extension of the disaster payment provision.

Senator JEPSEN. I was going to get to that. There was a disaster insurance provision in this. Has the Secretary established that because of drought, flood, or other disaster or condition beyond the farmers control, so forth and so on, that he, the Secretary then can pay for such crop acreage—so he is in the insurance business too?

Mr. BARTON. This is in effect an extension of the agricultural disaster assistance provision under the 1977 Food and Agricultural Act.

I might mention, or reiterate, Senator, that we have taken a position in our testimony that it would be unnecessary and premature, in our view, to get into this at this point. And that we recommend simply leaving in place these feed grain programs and other commodity programs through their expiration date of 1981, rather than making substantial changes in the farm commodity programs as such at this time.

Senator JEPSEN. I just would like to ask a few questions more. On page 11, please interpret lines 8 and 9—what does that say?

Mr. BARTON. "The Secretary shall make available to producers on farm loans and purchases on each crop of barley, oats, and rye"—

Senator JEPSEN. Is that barley, oats, and rye? Is that included too?

Mr. BARTON. Yes. This again tracks the existing feed grain program so that the Secretary has authority to make loans on barley, oats, and rye if he determines that those crops should be included in the feed grain programs.

Senator JEPSEN. I had heard the colloquy between Congressman Bedell and Senator McGovern that they were making a decision as to whether they should let the wheat farmers in on this. So they are not included here. It is barley, oats, and rye, but not wheat?

Mr. BARTON. I think the bottom line on this is that fundamentally the emphasis is on the feed grains. This would include grain sorghum, so that, for example, the Midwest Solvents plant could use, corn, grain sorghum, and then barley, oats, and rye.

But this legislation would not change the wheat commodity program, and in the other sections would not place emphasis on wheat as a possible feed stock but rather on corn and other feed grains.

Senator JEPSEN. Do we have applications on file for gasohol pending receipt of additional funds, for gasohol development?

Mr. BARTON. No, except, for applications that might be pending through the Farmers Home Administration that we talked about earlier. Otherwise, we have no authority at the present time. We have exhausted our authority under the 1977 legislation, and therefore we have no active applications pending.

Senator JEPSEN. I certainly want to, for the record, state that I am supportive, completely supportive, of the development of gasohol and the continued research on it as you have now underway. I understand even though there are no loans out, you have research projects specifically on gasohol?

Mr. BARTON. Yes; we do have research. Let me say this, Senator, if I may. From the Department of Agriculture, we view our responsibility in this activity partly as providing feed stocks, and trying to help provide feed stocks as an alcohol program develops, if it uses feed grains. And I mentioned the additions that are underway on the set-aside program making acreage available, also adjusting the research accordingly.

So the USDA intention is to actively support an ethanol industry that evolves and develops. We would be doing what we could to try to make sure there is a stable supply of feed stocks available.

Senator JEPSEN. Who regulates the content of gasohol that is being sold now?

How do people buying gasohol now know it is 10 percent ethanol and 90 percent gasoline?

Mr. BARTON. I don't know that that is regulated. That may be a question that you might want to pose to the representatives of the Department of Energy. I am not aware of Government regulations as to the quality of the product.

Senator JEPSEN. Somebody could be buying gasohol, or paying for gasohol, and be getting regular gas, maybe?

Mr. BARTON. I suppose that is possible.

Senator JEPSEN. We do not know. Do you know? Are you in charge of that?

Mr. BARTON. No, sir.

Senator JEPSEN. It would be DOE?

Mr. BARTON. That is correct.

Senator JEPSEN. Thank you very much.

Senator ZORINSKY. Inasmuch as there is a vote on in the Senate Chamber right now, and Senator Jepsen and I want to maintain our voting percentage, I will recess the hearing for about 10 minutes and then we will resume immediately thereafter.

[A brief recess was taken.]

Senator ZORINSKY. The hearing will come to order.

Mr. Barton, I would like to start off with a question concerning the four pilot loan gasohol guarantees.

As I understand, there were 30 formal applications for them. This demonstrates widespread interest from the private sector in stimulating gasohol production.

The Senate recently has produced S. 892, which authorizes an additional \$500 million in loan guarantees. In your opinion, would there be enough innovative proposals to utilize these guarantees over the next year?

Mr. BARTON. I think there will be proposals. I suspect that one would want to, in addition to entertaining new applications, reconsider those made under the 1977 program.

I suspect that the Department would get a large number of proposals.

As you know, the last program—and this would apply to the \$500 million—the final departmental authority for decisions lies with the Secretary and the Commodity Credit Corporation. It would be their final determination. You know, the CCC Board is composed of the Secretary, the Deputy Secretary, and the Assistant Secretaries of the Department. It would be their final decision on the projects.

Senator ZORINSKY. Do you feel there will be enough innovative proposals to utilize the \$500 million?

Mr. BARTON. I would hate to try to give you any final answer on that. I suspect that we would receive a number of innovative proposals. Whether they would be in sufficient numbers and of the type for the \$500 million, I would hate to say that in advance.

Senator ZORINSKY. You have received 30 formal proposals?

Mr. BARTON. There were 30 formal proposals.

Senator ZORINSKY. How much in loan guarantees would be needed to fund those, the ones that you received, if they were all approved under that assumption?

Mr. BARTON. If you were assuming \$15 million, that would be \$450 million. Those that were approved were not all for \$15 million. The four were for a total of \$42.7. Two of the four were for the full \$15 million. So if you assume they were the full \$15 million, it would be about \$450 million.

The total, I suppose, for the 30 proposals would run \$350 million.

Senator ZORINSKY. Then the 30 proposals, total, if they were approved, maybe \$350 million?

Mr. BARTON. About \$350 million of loan guarantees I would say is a rough estimate.

Again, there were some proposals including in the 30 for one reason or another which were not qualified. They did not meet the basic criteria.

Senator ZORINSKY. You referred to the various lending programs of the Farmers Home Administration which may be used for building alcohol plants.

My understanding is that the primary lending program would be the Farmers Home Administration business and industry program? Is that correct?

Mr. BARTON. This is one of the types of lending authorities the Farmers Home Administration has. This happened not to be the authority for the loan we were talking about earlier.

Senator ZORINSKY. This was not the authority that was used in South Dakota?

Mr. BARTON. That is correct. However, the business and industry program is a program under which the Department of Agriculture has—and let me correct the record, if I may—perhaps \$2 billion of lending authority. There is much lending authority under the B. & I. statute. It is one that could be used.

Senator ZORINSKY. I hope so. Several weeks ago I held hearings in Nebraska, and the Farmers Home Administration told me they could use B. & I. for railroad line rehabilitation. A few weeks ago I

held hearings on rural electrification, and they told me they could use the B. & I. program for that also.

So certainly the program is multifaceted.

Mr. BARTON. It certainly is.

Senator ZORINSKY. As you described the loan to the farmer in South Dakota, have you made the Farmers Home Administrations in the various States aware that that type of lending authority is available to them? Or are they expected to know that on their own or make their own jurisdictional determination of that?

Mr. BARTON. The general encouragement to consider this kind of loan instruction has gone from the national office of the Farmers Home Administration. So all of the States have been alerted to consideration of qualified applications in this area.

Senator ZORINSKY. When did that go out?

Mr. BARTON. I would say about 6 weeks ago, roughly, 6 or 8 weeks ago.

Senator ZORINSKY. Could I receive a copy of what information was sent alerting these State agencies of their lending capability in that area?

Mr. BARTON. Mr. Chairman, I would be happy to take a look at what was sent out and see what could be provided.

Senator ZORINSKY. I have a feeling that there was not a great deal of information, or very specific information, in that area sent out. That is why I would like to receive a copy of what was sent out 6 weeks ago.

Also, your statement on page 6 says the Department of Agriculture recommends that action on legislation such as S. 850, which would treat gasohol from agricultural materials separately from other fuel sources, be deferred until such legislation can be considered with the administration's proposal to create the Energy Security Corporation.

Is aiding the administration in the creation of their Energy Security Corporation a precondition for further gasohol development? Is there a linkage?

Mr. BARTON. Senator, as you know, the President has announced that he will be recommending to the Congress the establishment of a separate, independent agency, the independent Energy Security Corporation to essentially provide financial and other kinds of assistance for synthetic fuel development, including within that certainly alcohol fuels.

That independent agency which will be proposed will have a wide range of authorities including the authority presumably to guarantee price, to make direct Government purchases, to provide direct loans, loan guarantee authority, and direct operational authority.

In other words, it will have a wide range of authorities to provide financial and other incentives to encourage the development of synthetic fuels, new fuels.

What we are suggesting here is that the new Corporation would have authority to make loans and loan guarantees and that it would be appropriate in the ethanol area for the loan guarantees to be handled by them; and I think it will be the administration's recommendation that loan guarantees in the ethanol area be handled by the Energy Security Corporation.

Senator ZORINSKY. From the outset this administration has supported gasohol. Even during the campaign stages this administration has supported gasohol.

According to your testimony, in April of this year in Iowa the President made a commitment to continue the exemption of the 4-cent gasoline Federal tax.

Mr. BARTON. The President made that commitment?

Senator ZORINSKY. Yes. It appears to me that at that time he had not created, or even thought of creating, the Energy Security Corporation.

If gasohol is good, it is good with or without the formation of a Corporation.

Mr. BARTON. Senator, let me correct myself. The President committed himself to support the extension of the 4-cent Federal excise tax waiver. That does require congressional action to extend the tax waiver.

I think what we are talking about here is the mechanism, that is, how you do it.

Senator ZORINSKY. How was he going to do it 2 years ago?

Mr. BARTON. What the administration has done primarily up to the present time is to support general incentives, a 4-cent tax waiver, investment tax credits and other incentives. They had not focused upon the organizational arrangement through which synthetic fuels, fuel from shale, biomass, and so on would be considered as a part of the overall new fuel development policy.

The President has now announced, and the Secretary of Energy will be proposing, a separate independent Energy Security Corporation to have full leveraging to carry out this kind of program. Therefore, within the context of that recommendation, as I mentioned, this Corporation will have the full authority to guarantee loans as well as provide the kinds of incentives to speed synthetic fuels development. It will also tend to prevent duplication of effort to go through this single mechanism.

Senator ZORINSKY. Are you saying, in the event that this Energy Security Corporation is not approved by the Congress, that gasohol should not be a viable product?

Mr. BARTON. In answer to your question, I don't think this is saying that at all.

Senator ZORINSKY. Then you mean gasohol, from agricultural materials, should be treated separately while other new fuel sources be deferred until legislation can be considered with the administration's proposal to create the Energy Security Corporation.

Mr. BARTON. Senator, we would anticipate, and the representatives of the Department of Energy can probably comment on this more specifically, that the legislation from the administration to create the Energy Security Corporation will be on the Hill probably within a couple of weeks.

And what this is saying is that we would recommend that the legislation that you have before you be considered in concert with the consideration of this broad corporation. By so doing there can be a coordination of effort and prevention of duplication of efforts between the agencies and departments. This would not reflect on the merits of gasohol and methanol as such. Indeed, we do indicate

that we would be pleased to work with you and the committee to try and encourage gasohol production within the context of that overall administration proposal.

Senator ZORINSKY. Was there duplication of effort with the four plants previously approved?

Mr. BARTON. No, I do not think we have had a great deal of duplication of effort up to the present time.

However, with a much larger scale program and new fuels being proposed, there certainly could be a proliferation of authorities and a duplication of effort unless one has a mechanism for pulling it together.

Senator ZORINSKY. How long have you been with the Department of Agriculture?

Mr. BARTON. Since January 1977.

Senator ZORINSKY. January 1977?

Mr. BARTON. That is correct.

Senator ZORINSKY. We got here at the same time.

I, with the cooperation of Senator Curtis from Nebraska and many other Senators, were instrumental at that time with section 1420 of the Food and Agricultural Act of 1977 to establish the four gasohol plants.

If we had any idea at that time that the administration would not at least utilize one of those plants in the area of producing gasohol from wheat or corn, we would not have proposed this pilot project.

Let me assure you that I will do everything I can to stop these types of proposals if we are not assured by the administration that there will be more than rhetoric accompanying pledges to produce gasohol based on the agricultural products of this country.

Those four plants are a travesty, a mockery of the original intention of the people that sat around this table.

Certainly you must be aware of what the agricultural economy was at that time. It has improved, but the fact remains that while we continue to transfer \$70 billion a year to OPEC nations, our farmers could be in much better condition to regenerate the economy of our own Nation with dollars that we would purchase surplus agriculture from them.

It concerns me that there is a linkage between gasohol development and the Energy Security Corporation. You go to Brazil and you can see people producing gasohol. It did not start with an administration that created an Energy Security Corporation. It started in Brazil long before that.

When I went to the Ambassador's house for dinner, at the South African Embassy, and the Ambassador tells me, Senator, our country produces over 50 percent of the gasoline from liquefaction, and your country has not even asked us how we do it.

Here we sit day after day wondering what to do about energy in our country. We have items like gasohol, liquefaction of coal, synthetic fuels, and maybe other things, but we wait until we create an energy corporation, or we wait until the moon is full, so to speak, before we have an opportunity to do those things that need to be done.

I would hope you will take back to the administration my sincere hope that they very seriously and earnestly consider using feed grains and such items as corn and wheat specifically.

It is the direct intent of many of us on this committee that agriculture be looked at primarily in the production of gasohol.

Mr. BARTON. May I make a brief comment?

Senator ZORINSKY. Certainly.

Mr. BARTON. One of the four projects that we approved will use predominantly grain, 80 percent grain sorghum. The other thing is, given only four projects, and there was that absolute limit on those projects in the 1977 legislation, there was a feeling from the Secretary and the CCC Board that we ought to emphasize as much as possible innovation and new technologies.

There was one major reason why the U.S. Sugar-Savannah Foods group got a project, because it would use sugarcane material. The Midwest Solvents project was selected because they have committed themselves to using sweet sorghum the first 3 months of the operation, and therefore to test it and get it into the commercial operation.

Then also the legislation was written so that it included forestry and agricultural products and, as a practical matter, as it turned out, there were two projects approved in the forestry area and two in the grain area.

But the emphasis was on technology, trying to develop new and less expensive ways of producing ethanol. That was the major reason why you did not see more direct grain projects among those four.

Senator ZORINSKY. I do not want to leave the impression that I am precluding the consideration of any other products, but I do want to leave a strong impression that we anticipate the inclusion of some grain projects in the future plants.

Obviously, that is the reason for the \$500 million.

Mr. BARTON. As I recall, you have some language in the committee report to the new legislation in that regard.

Senator ZORINSKY. That is right, but sometimes we do not all speak the same language, even though we all use English.

Thank you very much.

Senator JEPSEN. Is there a problem with supply of raw materials? In other words, is there a problem of the supply of raw materials in pursuing gasohol and gasohol production?

Mr. BARTON. Obviously, it depends on how much ethanol one is talking about. But there is a lot of residue material around. The Department of Energy in their recently released report pointed to the large amount of citrus residue and residue from dairy and other agricultural and forestry materials.

It becomes much more efficient in terms of how much direct agricultural commodities are available. The primary thing, Senator, that we have suggested, is that we do not make any really large, long-term commitments in terms of using agricultural commodities.

We gave testimony last week on Senator Church's legislation, and suggested that a commitment to 10 percent nationwide, which would require 11 billion gallons a year of ethanol—that one simply does not know at this point whether you are going to have the land

and the resources available. Therefore, we suggested that it would be advisable to forego that kind of long term really large commitment, and focus perhaps on a substantial commitment, but one that is a first step, so to speak, and keep the options open. Then if we need the land for feed and food, and feed production, it will not be foreclosed from having a much longer term large commitment.

There is a lot of uncertainty in that regard. We don't know from year to year whether we are going to have set-aside acreage, and if so, how much set-aside acreage.

Senator ZORINSKY. I have a feeling if you told the farmers of America, gave them the goal and a target with the assurance of a fair profit, they will produce what you ask for.

Mr. BARTON. They have a record of producing.

Senator ZORINSKY. We always seem to approach it from the negative, saying, it depends on how much is set-aside and how much you would need for food production, yet our farmers seem to have the ability to produce what is necessary.

Senator JEPSEN. Are you aware of Secretary Schlesinger's figures that have indicated that if all corn together in Iowa and Illinois was used, we would produce gasohol and we would come up with approximately 4 percent of the gas that is consumed in this country?

Mr. BARTON. I have not seen those particular figures, but a 1-percent program would require something like 5 million acres of land.

A 4-percent program would require about 20 million acres of land. That is not accounting for the byproduct feed you get back, the high protein feed supplement. You can discount that by 2 percent, but 4 percent gasohol—replacement would require something between 20, 23 million acres of land, assuming 100 bushels to the acre.

Senator JEPSEN. What percentage would be total land in corn every year?

Mr. BARTON. About 70-75 million acres of corn. So that would be 30-35 percent of the total corn acreage.

Senator ZORINSKY. Thank you very much.

Next we will have Alvin Alm, Assistant Secretary for Policy and Evaluation of the Department of Energy.

STATEMENT OF ALVIN L. ALM, ASSISTANT SECRETARY FOR POLICY AND EVALUATION, U.S. DEPARTMENT OF ENERGY; ACCOMPANIED BY EDWARD BLUM AND MARILYN HERMAN

Mr. ALM. On my left is Mr. Edward Blum, and on my right is Marilyn Herman. Both are my gasohol people.

If you would like, I can briefly summarize my rather long statement and leave some time for questioning.

Senator ZORINSKY. I appreciate that. Your statement will be included in its entirety in the record.¹

Mr. ALM. Thank you, Mr. Chairman.

I would like to just review very briefly our current energy situation with respect to petroleum products.

In my opinion, the U.S. dependence on OPEC is perhaps the most serious single threat to the Nation's security. As we look

¹ See p. 88 for the prepared statement of Mr. Alm.

ahead and look at the OPEC both productive capability and willingness to produce, this Nation is faced with a very grim dependence unless we develop our own domestic sources of energy and, particularly, sources which can substitute in the transportation sector.

For that reason, gasohol, as well as other types of synthetic petroleum products, have great importance as this Nation moves ahead into the next decade, next two decades.

The Department conducted a review of alcohol fuel policy, which was released recently. I would like to cover, if I may, the major findings of that study.

The study concluded that alcohol can make a contribution to U.S. energy supplies. Ethanol is not only a substitute for gasoline per se. It is also an octane booster. We predict alcohol production, ethanol portion, could go up to \$85 million with 5 percent of U.S. gasoline that could be in the form of gasohol.

That is only an estimate. The country could do better. We hope it does do better.

I will come to the Energy Security Corporation at the end and talk about how that might help also.

The regional impact of gasohol is even more significant. Today, even today in Iowa, for example, alcohol displaces 2.5 percent of the State gasoline market. Gasohol represents a true grassroots movement in this country.

Over the last few years the Nation has seen no alcohol—no gasohol outlets to the point of having 800 retail outlets, a very substantial increase in a short period of time.

Production has increased from 8 million gallons of alcohol in 1978 to 60 million gallons in 1979. That continues to climb.

The policy review looked at the issue of energy balance. We concluded that production of gasohol—production of ethanol—can have a positive energy balance.

A couple of points are important. One, new plants that are designed for fuel-grade alcohol will be much more energy-efficient than some of the plants used in the past.

Second, when coal, utility waste heat, biomass or other materials, are used for the basic fermentation processes again you can have a much more positive impact.

It is possible, of course, to have a negative energy impact if you use petroleum for the fermentation process. It could be negative, but it need not be negative. And we think in our report that the plants we see in the future ought to have a positive net energy balance.

In terms of the issue of food versus fuel, our study indicated that there was a combination of using waste materials, distilled dry grains, or the coprocessing of agricultural products, corn, which has produced up to 1,600 million barrels of gasoline.

As an upper limit of ethanol, the report also indicated that there is the potential of 4.7 billion gallons of ethanol being produced by implementing food programs, distressed and substandard, sugarcane, and bringing all unused acreage into production.

Based on these figures, we think that the 500 million gallons a year production of ethanol is clearly an achievable proportion.

In terms of the economics of ethanol production, we estimate that the production costs will be around \$1 a gallon. One must remember that because ethanol is an octane booster, it has a greater value than a comparable gallon of gasoline.

For this reason, even without a subsidy, gasohol was being sold competitively with premium unleaded gasoline, for example, in the State of Illinois. Other States have provided State subsidies along with the Federal subsidy, which gives gasohol an even better market.

The administration has put forth a number of policy proposals in the area of gasohol. Let me speak first about the most important one.

In the development of a National Energy Act, there was an amendment that would have allowed the 4-cent gasoline tax to be eliminated for gasohol.

Unfortunately, that particular provision expires in 1984. What that meant simply was that no one would use that incentive to build a new plant. By the time the plant was built, there would only be a few years of the subsidy available.

On April 5 the President indicated that he will seek legislation to move the time limitations so the 4-cent gasoline tax exemption would be a permanent exemption. This provides a larger subsidy for gasohol than any other fuel source in the country. It is \$16.80 a barrel of alcohol.

Coupled with State incentives, for example, in the State of Iowa, the total subsidy comes to a level of \$40 a barrel, which combines the Federal and States subsidies, plus an additional 10 percent investment tax credit which is available for gasohol production.

So you do have very substantial financial incentives for the production of gasohol.

In addition, the President indicated that the administration would provide \$11 million in low-interest loans, grants, and loan guarantees, through the Economic Development Administration, and through CSA.

Senator JEPSEN. Would you repeat that, please.

Mr. ALM. The President indicated that \$11 million worth of loans would be made available through EDA and CSA.

Senator JEPSEN. For what, gasohol development?

Mr. ALM. That is correct. For small plants, small operations. It would include funds for 100 projects.

Senator JEPSEN. When was this announced?

Mr. ALM. May 4. It was in the President's rural initiatives package.

The President also announced on April 5 that gasohol would be used in the Federal fleet when it was commercially available, when the gasohol was commercially available. The Department of Energy has taken a number of regulatory steps to promote alcohol fuels.

For example, we have provided through our regulatory program entitlement benefits for gasohol. This is worth about \$2 a barrel, and allows alcohol fuels to compete better with petroleum products.

We have allocated gasoline to marketers that needed gasohol to blend with alcohol fuels. We have taken other regulatory steps, and in administrative steps, the President has directed the simple requirement for alcohol fuel production.

Mr. Barton mentioned the fact that the President is creating an Energy Security Corporation. That Corporation will have very broad powers in terms of issuing price guarantees, loan guarantees, will have authority for Government buys and for a limited number of direct Government plants.

Senator ZORINSKY. What will that Corporation be able to do that cannot be done by the Secretary of Agriculture under the emergency powers that he currently has; and I would imagine, a crisis which is the moral equivalent of war would indicate an emergency.

Mr. ALM. I, unfortunately, do not know the precise powers the Secretary of Agriculture has.

Senator ZORINSKY. I meant DOE, not the Secretary of Agriculture.

Mr. ALM. The DOE has a loan guarantee authority in the 1978 nonnuclear authorization. Unfortunately, that legislation has a cumbersome process that could never be equated with the moral equivalent of war.

We concluded that to give a loan under that authority would take about 2 years. The restrictions were written in by the Congress at that time because of concern over large synthetic fuel plants, an attitude that I perceive is changing in the Congress.

But nevertheless, our particular authority is so cumbersome that I have real question that we could move ahead very quickly with these processes.

We did, by the way, submit legislation last year to streamline this authority. We may do this year, or we may decide that the Energy Security Corporation would be a better mechanism.

That is an issue we have to sort out in the near future. But the Energy Security Corporation would have very broad tools. It would have discretion in terms of the type of projects it would fund, and the type of mechanism it would use.

The whole idea of the Corporation is to move projects ahead quickly, so that the normal bureaucratic delays can be overcome.

I think that is something of concern to the committee from the discussion I heard this morning.

Overall, let me sum up by saying, in terms of the Department of Energy, we are enthusiastic about gasohol. It is one synthetic source that is here and now and not a decade away.

We believe that the economic incentives provided by the President, coupled with the very positive actions taken by States is beginning to work and is a workable strategy. It does not mean it is the last thing one does. But I think we are making real progress in this area.

It is an important area, and we support it very much.

Senator ZORINSKY. Thank you very much.

We are going to recess for 10 minutes to go vote, and when we return we will have questions. By necessity, I am going to adopt the 10-minute rule.

I thought because the number of witnesses was so small this morning, we could have limitless questions, but inasmuch as we just had to call and get permission from the Senate to extend for an additional hour, I would like to complete the hearings within the next hour.

We have Mr. Alm and two other gentlemen that have to testify.

[A brief recess was taken.]

Senator ZORINSKY. The hearing will come to order.

Mr. Alm, in your testimony you indicated the possibility that the Energy Security Corporation would be a panacea to be able to make more effective the gasohol program or to make many other synthetic fuel programs, more effective.

Do you feel that there are some departments, within the Department of Energy, that could be utilized in that same manner if the laws were changed to some degree?

Mr. ALM. Mr. Chairman, the purpose of creating a separate entity was to develop an organization with flexibility to move.

Senator ZORINSKY. What does your organization do?

Mr. ALM. Any organization like the Department of Energy is subject to a myriad of requirements, all of which are well-intentioned, all of which had good purposes. But collectively, they simply make it more difficult to progress ahead expeditiously.

On any project, for example, you have auditing requirements, procurement requirements, and on and on and on. It takes a certain amount of time.

Second of all, we do not have most of the authorities that the Energy Security Corporation would have. We do not have the authority to guarantee prices. We do not have authority for Government buying.

I indicated earlier, our loan guarantee authority is severely restricted. So that most of our activities have been in the area of direct grants for demonstration projects. Presumably the Department could run a program like this. That is an option that has some advantages.

Obviously, you have an existing group of people. But in evaluating the alternatives, the President chose a Corporation with the single thrust of moving these projects forward quickly. And I think he chose that out of a sense of urgency, the urgency that this country move ahead quickly and develop a synthetic fuel capability.

Senator ZORINSKY. I would submit to you, if the President submitted to the Congress tonight a bill which would authorize a division or department within the Energy Department to act, I think you would see a record on how fast a bill of that nature would pass.

I am concerned that every time we find a new problem to solve, we set up a committee or department or commission to deal with it when we many times overlook what we already have going for us.

If you are constrained in any way from accomplishing a mission, I think we can more readily change the rules than construct a new building and staff it with more people to accomplish a new job.

Mr. ALM. Clearly, if a new entity were erected within the Department, it would need to be exempt from a number of Federal requirements, or it would not get the job done quickly.

Then you have the situation of no part of the Department running under one set of rules, and the rest of it running under another.

The option you suggest was considered by the President, the option—gave us an option. He chose the Corporation, I believe, in

the belief that it would move these projects ahead most expeditiously.

Senator ZORINSKY. That is why he is President and I am not.

Thank you very much. I don't know if Senator Jepsen will be returning, but I do want to thank you for your presentation, and hopefully can seek your continued support in the future to create additional sources of synthetic fuel through gasohol.

Mr. ALM. We are enthusiastic.

Senator ZORINSKY. The next witness I would like to call upon to testify is Paul Sybrant, general manager of Solar Fuel Institute of Rapid City, S. Dak.

**STATEMENT OF PAUL D. SYBRANT, GENERAL MANAGER,
SOLAR FUELS INSTITUTE, RAPID CITY, S. DAK.**

Mr. SYBRANT. After your pointed remarks, I think I could go back to South Dakota and feel much more comfortable because I do believe that we have at least one friend in Washington.

I don't have a very long testimony. I am not a very good speaker, so I would like to read it.

I am here to testify at the request of Senator McGovern. I wish he was able to be here.

I was also glad to see Congressman Bedell commenting on the problems caused by the USDA, although I think some of the blame should rest on him. It was his bill, and in it he gave them broad powers. Be that as it may.

I am testifying with the hopes of seeing a new market open up for cereal-grain products, as well as to produce ethanol for blending into motor fuels, that will back out millions of barrels of OPEC crude, now necessarily brought into the country at exorbitantly inflated prices.

Solar Fuels, Inc. is in the process of constructing a wheat alcohol plant in Rapid City, S. Dak. In conjunction with this we will produce a protein product for animal feed and a vital gluten for human consumption. Needless to say, we are vitally interested in all legislation concerning the production of alcohol for gasoline blending or any other type of motor fuel use.

The prime consideration of any type of renewable or alternate energy source legislation should be expediency. The time is now. The need is now. The incentive for action is now. The public demand for action is now. The legislation is proposed and the time for that action is now.

The potential for alcohol fuel development is practically unlimited with the multitude of renewable resources available for its production, namely, all of the cereal grains and most other agricultural products, forest products, cellulose, municipal wastes, animal wastes, et cetera.

Solar Fuels, Inc. feels, by applying modern technology, we can build an economical alcohol motor fuel plant. We have accepted a design in which the fossil fuel energy for processing a bushel of wheat to alcohol is about 100,000 Btu.

There is also, of course, the possibility of using other fuels in the future. But at the present time, we would like to get it going.

From this we get approximately 2.6 gallons of alcohol, which has 200,000 Btu's when burned as fuel. In addition to this we recover a

high calorie vital gluten and a livestock feed meal. These products contain 4 Btu's per calorie, to a total of 137,184 Btu per bushel, for a total recovery of 337,184 Btu's per bushel. This calculates out to an overall energy efficiency of 70 percent for the plant, only slightly less than the efficiency of a petroleum refinery which uses a totally nonrenewable resource.

These numbers you can play with in any direction you want. But if you want to be realistic, that is about where it comes out.

Dr. Scheller can make it look like 127 percent efficiency.

This plant will process 39,000 bushels of wheat per day; run 330 days per year; 24 hours per day; 7 days per week; with an output of products of 100,000 gallons of ethanol alcohol; 400 tons of feed protein meal and vital gluten per day. Employment will be approximately 75 local people in the plant, as well as the contingent employees to supply the plant feed and to disperse the products, thereby being a real asset to the community.

When this committee, or Congress, considers a bill, there are six important things to consider:

First, the plants must be economically sound. Not the poor risk type which would require funding by the USDA.

Second, plants must meet an energy balance equal to oil refineries or comparable plants.

Third, fuel alcohol must be quality controlled and blended properly for consumer protection. There was a conversation awhile ago I would question, when the question was put, who controls it?

I am sure no one is controlling it other than the filling stations who mix it.

Fourth, fuel alcohol must be produced at a price competitive with gasoline, which can definitely be done at today's prices.

Fifth, plants must use a renewable resource—cereal-grain grown annually—rather than a depletable resource, such as coal oil, et cetera, synthetic fuels being advocated I guess by the oil companies.

Sixth, fuel alcohol plants must be free from the application of the Alcohol, Tobacco, and Fire Arms Act. This is a must. There is no reference to this act in bill S. 850, but it does apply, and places most unreasonable restrictions on fuel alcohol producers, the same as those applied to potable alcohol producers. Our proposed plant would require posting of a \$21 million bond, and/or employing Government inspectors on a 24-hour-a-day, 7-day-a-week basis. These forms are abominable. A local farm resident, who proposes to build a solar fuel plant in his own backyard to produce 10 gallons a day for his own use, was required to post a \$2,600 bond. How ridiculous can we be?

Solar Fuels, Inc. is of the feeling that the Secretary of the USDA is worried that we will create a market that will increase our prices to a level of the cost of production.

Apparently, the USDA wants control of the amount of grain it supplies these plants. With this hand on agricultural cereal-grain products, the USDA can continue with their "cheap food policy" at the expense of the producer.

The consumer need not worry that we are going to use up the cereal-grains for alcohol. We are producing a fuel to grow more food and to enable us to become less dependent upon foreign crude.

In addition to the production of alcohol, the wheat and corn processing plants produce protein suitable for livestock and human consumption.

For the production of alcohol, we are extracting only the starch—a carbohydrate, or fat—which is not essential in a balanced protein diet. Therefore the peddlers of gloom, who say we will use up valuable food products, have a very mute point. Instead, it will actually create an incentive for the American farmer to produce to his capacity, which at this date has never been challenged.

If that challenge is put before them, we will have the product by alcohol plants. South Dakota has land out there that has never been touched, and will grow wheat.

Feedstocks need not be guaranteed by the USDA. We are told there is a surplus of grain and that is why cereal-grain prices are below the cost of production. We have a set-aside program today, because we are overproducing.

Why is this committee providing for a secure supply of feedstocks for the operation of alcohol fuel plants? Producers will produce as long as there is an incentive to do so. They will not continue to produce at below the cost of production.

PRIME EXAMPLE

Beef production is down because prices, over the last 4 years, were below the cost of production. That is about as long as the farmer or rancher can stay in business. Why does the Secretary need to have a reserve supply of distilled grain?

We have bankers out there who would loan the money if the guarantees were there.

Does the Secretary want to be in the protein business competing with the producer of the product, or is this another attempt to maintain the Secretary's cheap food policy? With continued attempts like this, the Secretary is nailing the lid on the coffin of the producer.

Let's put incentive back with the voting public to own the alcohol fuel plants without the controls, redtape, and tons of paperwork to justify jobs in the USDA. Let's get back to square 1—productivity and efficiency.

There are three things needed in the success of these plants: (1) Money; (2) marketing; and (3) management. There are qualified people, outside of Government bureaucracy, to carry out this program.

Solar Fuels, Inc., feels that for proper quality control and the most economic and efficient use, alcohol should be blended into gasoline by refineries, where specially tailored base stocks will give the proper product quality, and protection to the motoring public.

Solar Fuels, Inc., has letters-of-intent, from purchasers, for the alcohol products from its plant. They are with Sinclair Oil Co. of Denver, Colo., and Husky Oil Co., Cheyenne, Wyo., a couple of the larger independents. We also have letters-of-intent from Loomix Co., Arroyo Grande, Calif., to purchase the feed protein meal.

The act states that the Secretary of Agriculture will receive 1 cent for each gallon of alcohol produced by these plants. This 1 cent should stay with the plant for future improvement, research,

and market development. The Secretary has spent enough, I believe, on research.

Solar Fuels, Inc., feels that alcohol fuel plants should not be subsidized by the USDA. Plants should not be built that are economically unsound, that is, poor loan risks. Plants can be built that are economical. Free enterprise should be doing this, not the USDA.

Alcohol has been used for years. Why does the USDA spend millions of tax dollars for more research to justify the production of alcohol? The Third International Alcohol Symposium, which I recently attended in Monterey, Calif., where 70-some technical papers were presented, from some 14 different countries, supplies proof that research is indeed being taken care of. Why should this committee even consider letting this duplication of research be charged to the taxpaying public?

Solar Fuels, Inc., would like to see this committee work with cereal-grain and livestock producers, to achieve a simple loan guarantee with the financial institutions in the area where plants are to be built. I have heard the mention of wheat used for ethanol. I think it should be incorporated in any bill.

Federal loan guarantees to the banks would enable the local communities to prosper and the general public, in these communities, to participate in the ownership of the plants. As an example, this could be accomplished on a local basis, through the FmHA, with approximately 300-400 participating shareholders.

Senator ZORINSKY. Thank you, Mr. Sybrant, for your very articulate description of the possibilities that currently exist without Federal involvement. The private sector apparently has many of the answers to the synthetic fuel production concerns of this Nation.

I would like to thank you for coming the long distance that you did, and certainly would seek your continued input as we move along to create a more optimistic atmosphere for the production of ethanol alcohol.

Mr. SYBRANT. I appreciate the chance to be here. We will produce the ethanol with the help of the Government or without.

I, as I said before, am going to go back and tell the people we do have some friends here.

Senator ZORINSKY. Next we will hear from Louis Saunders, representing the American Agriculture Movement. He is the final individual to testify this morning.

STATEMENT OF LOUIS SAUNDERS, REPRESENTING THE AMERICAN AGRICULTURE MOVEMENT

Mr. SAUNDERS. Due to the fact that I was not aware that I would be testifying until yesterday afternoon late, I do not have written testimony.

Senator ZORINSKY. Is there any statement you would care to make in summary of your feelings concerning this bill and gasohol in general?

Mr. SAUNDERS. We looked over S. 850, and to us, it gives too much power and authority to the Department of Agriculture. As a farmer in Michigan, and across the United States, we certainly feel that the Department of Agriculture is not credible with farmers.

So we are not interested at this time in seeing them be our lender, or in us being their supplier. In Michigan I would like to relate to you a little bit of what we have done.

We have three corporations in Michigan now: Michigan Agrifuel in the midpart of the State; AgriPower Alcohol, Inc., in the eastern part of the State; and the corporation of which I am president, Food & Energy, Inc., in Saltwater, Mich., all interested in developing and building an alcohol plant.

Michigan Agrifuel is now building a \$10 million alcohol plant. One of the few I know that farmers are putting up. They are doing that through a million dollars that 20 farmers raised themselves with \$50,000 mortgages on their farms. The rest of it is borrowed money.

They hired a distiller, James Reynolds, and they are going to build a \$10 million plant. The other two are interested in 20-million gallon facilities. I have with me a \$30,000 feasibility study from Kemp Peck Engineering in Woodbury, N.Y.

We have presently underway a feasibility study with Magee Engineering from Cleveland, Ohio. Just recently, Magee incorporated with another company, Davey from England, so at the present time they have a large engineering firm all over the world capable of building alcohol plants.

For almost a year we have been involved with alcohol feasibility studies, engineering companies, probably up to a dozen of them. We picked out the two best companies we could find in the Nation.

Kemp Peck is a Swiss-oriented company, and as I say, Magee now relies for a lot of expertise on Davey, who is also a European company.

The two corporations in the southern part of Michigan decided that one would opt to go with Kemp Peck and we would have Magee, and we would have a wide range of feasibility studies.

So we come down here prepared with land bought, feasibility studies in our briefcases, grain in the bins, and are ready to go.

Now, we do have two sources of financing available. One of them I believe is an insurance company requesting 10 percent down. They will carry 90 percent. So we need a guaranteed loan somewhere in the area of 10 percent of \$50 million.

The other source will go 100 percent of the financing. They claim they have up to \$105 billion available. They won't tell us from where. They want about 10 percent of the action in order to give us that kind of money.

We don't feel we need foreign investment in our alcohol. If this Government is not willing to go along with us on that, maybe that will be the route we will have to go.

The money is there. The man lives in Bowling Green, Ohio. It is unlimited money. We met with their representatives. They have it.

We would like guaranteed loans. We don't want grants or gifts. We want guaranteed loans. That is the basis we hope to operate on. That is the reason we are down here. We called our company Food & Energy, Inc., simply because it is a total food processing plant.

We are going to the wet-mill process; dry mill would run us \$25 to \$28 million. For wet we will need another \$20 million, but it is a total food processing plant with ethanol as a byproduct.

I guess at this time if you have any questions I would answer them. Other than that, I thank you for your time. We are very interested in doing something now, not tomorrow. We are ready to go.

Senator ZORINSKY. Mr. Saunders, I congratulate you for your taking the initiative and not waiting for the Government to do it all. Based on the past performance of Government lately, it has not had much of a track record in being able to react to crisis situations.

I am sure the private sector, if given a fair shake by this Government and not burdened with impediments such as paperwork and other requirements can get the job done far better than we can in Government.

I hope to work toward that end with you and with the farmers of America, and I want to thank you for being here and participating in our hearing.

I certainly would look forward to any future comments you have concerning gasohol. Thank you for coming.

The hearing will now be in recess until 9 a.m., Thursday morning, when we will have six more witnesses testifying on S. 850, the bill to promote fuel conversion of feed grains.

Thank you.

[Whereupon, at 11:55 a.m., the hearing recessed, to reconvene on Thursday, July 19, 1979, at 9 a.m., in room 324, Russell Senate Office Building.]

NATIONAL FUEL ALCOHOL AND FARM COMMODITY PRODUCTION ACT OF 1979

THURSDAY, JULY 19, 1979

U.S. SENATE,
SUBCOMMITTEE ON AGRICULTURAL CREDIT AND
RURAL ELECTRIFICATION OF THE
COMMITTEE ON AGRICULTURE, NUTRITION, AND FORESTRY,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9 a.m., in room 324, Russell Senate Office Building, Hon. George McGovern, presiding.

Present: Senators McGovern and Zorinsky.

STATEMENT OF HON. GEORGE MCGOVERN, A U.S. SENATOR FROM SOUTH DAKOTA

Senator MCGOVERN. The subcommittee will come to order.

Our first witness today is an old friend of mine, Ben Radcliffe, president of the South Dakota Farmers Union. Ben, if you can come forward now, we will be glad to hear your testimony.

Before President Radcliffe begins, I would just like to say that I am pleased to announce that last night, the Senate, during its consideration of the agriculture appropriations bill, passed an amendment to that bill providing for more than \$500 million in federally guaranteed loan guarantees for the construction of alcohol fuel plants.

As one of the prime sponsors of that amendment, I am also pleased to advise you that the Senate Agriculture Committee added strict language mandating that a major portion of these loan guarantees, this half billion dollars, be made available to those firms processing alcohol fuels from agricultural commodities.

This language should resolve the problem we experienced with previous USDA alcohol fuel loan guarantees which were not used for the conversion of crops or crop residues.

This is the most far-reaching action ever taken by the Congress, frankly, to promote rapid development of alcohol fuels and gasohol.

Now, that is the good news. We have these good and bad news jokes going around town. The bad news is that the administration which committed itself to rapid development of gasohol, has now released the outline for its renewable and synthetic fuel program. And, although the President had previously announced that alcohol fuels would play an important role in our Nation's energy future, the administration's program, as revealed yesterday, consists of a very small alcohol fuel program, one could almost say at the pilot level.

Specifically, their program will provide far less energy from biomass than from oil shale and tar sands. And in this program, I regret to say, the emphasis is not on alcohol fuels from agricultural commodities, but, rather, from other sources.

So, what I am saying is that we had very good news from the Congress yesterday and not so good news from the preliminary indication of what the administration is going to get behind.

With that brief opening statement, I am happy to welcome President Radcliffe, who has been before this committee many times. He is well known to the members of the Senate Agriculture Committee, and we are always pleased to hear what you have to say, Ben. You may proceed in any way you see fit.

**STATEMENT OF BEN H. RADCLIFFE, PRESIDENT, SOUTH
DAKOTA FARMERS UNION, HURON, S. DAK.**

Mr. RADCLIFFE. Thank you, Senator.

For the record, my name is Ben Radcliffe. I am president of the South Dakota Farmers Union, our State's largest farm organization. I am here today to testify in behalf of our 15,000 South Dakota farm and ranch families who are members of the Farmers Union.

I want to congratulate you, Senator, on the introduction of the National Fuel Alcohol and Farm Commodity Production Act of 1979. Enactment of this concept would move us down the road on the important quest for viable alternative energy sources. While I do not see gasohol as a panacea for either stabilizing farm income or for meeting this Nation's energy needs, I am nonetheless enthusiastic about the contributions that an effective gasohol program could make.

In his recent address to the Nation, President Carter did not overstate the energy crisis that now confronts this country. The OPEC States and the major oil companies have us in a virtual stranglehold. And if we do not make a much more serious effort at conservation and the development of alternative energy sources, especially renewable sources, such as methanol and ethanol, they are going to bleed our economy dry.

Gasohol has an important immediate advantage over other alternative energy possibilities. While a considerable amount of research still must be conducted to realize the full potential of solar energy, or wind energy, for example, the technology for production of ethanol and methanol already is in existence. We have been producing methyl and ethyl alcohol for a long time.

We know that in the 1920's many U.S. automobile models were running on alcohol. We know that today the nation of Brazil has committed itself to a 10-year program aimed at converting that country into the world's first alcohol-based fuel economy by the year 1985.

We know that the production of ethanol also results in a valuable byproduct—distiller's dried grain plus solubles. Each bushel of wheat sent through the distillery will produce two-thirds of a bushel of protein-rich mash. When combined with other feeds, this mash makes an excellent cattle feed. This process thus preserves the food value of the grain while extracting a motor fuel.

Charles Fricke, administrator of Nebraska's Agricultural Products Industrial Utilization Committee, says, and I quote, "That's the beauty of the concept." About 90 percent of Nebraska's grain goes into livestock feeding; the grain that goes through the distillery would come out as alcohol with the protein and nutrient content virtually unchanged.

But there are questions that have been raised and hurdles that must be crossed before we move ahead with a full-scale national gasohol program.

Among the questions I would like to address are:

Will the consuming public accept gasohol even though the price tag may be more than that of unleaded gasoline?

Should we concentrate our efforts on development of small on-the-farm projects or major regional gasohol plants or a combination of the two?

What impact will a major gasohol production program have on the price of farm commodities, the Nation's supply of food and conservation?

What about the criticisms that production of alcohol would consume more energy than it produces?

What will we do if the major oil companies tell their franchised dealers not to handle gasohol?

One of the prime arguments used by opponents of gasohol development has been cost. They insist that production of gasohol even at today's prices cannot compete with the price of unleaded or regular gasoline.

A year ago that argument may have had some validity. But, during the past year we have seen the price of gasoline soar to as much as \$1 per gallon, and unless price controls are instituted it will go still higher.

That fact alone makes gasohol a much more competitive possibility. But, in addition, if we really want to encourage a renewable domestic energy source and loosen the grip of OPEC and big oil, Government can step into the picture and improve that competitive position. That action has been taken in the reduced Federal tax on gasohol.

Several States have also moved to reduce or eliminate their taxes on gasohol. In Iowa, the entire tax has been removed and we have been informed that the price of gasohol at the pump in Iowa is now competitive with regular gasoline and lower than premium and unleaded.

In 1979, the South Dakota Legislature acted to reduce the tax on gasohol by 4 cents per gallon.

In South Dakota the question of public acceptability of gasohol is being answered every day at the pumps. In December 1978, not a single service station or farm cooperative in the State was marketing gasohol. Today, local Farmers Union cooperatives affiliated with the Farmers Union Central Exchange (Cenex), are pumping gasohol at several stations, including Watertown, Gregory, Doland, Gettysburg, Britton, Sisseton, Clear Lake, Wilmot and Wecota. In addition, the Taylor Oil Co. in Sioux Falls announced recently that they will be selling or are selling gasohol.

Sioux Valley Co-op manager, Russell Porath told us his cooperative began marketing gasohol in Watertown on January 15. He

expects to sell 25,000 gallons of the alcohol-gasoline blend during the month of July. In addition Porath says customers who keep careful records on fuel economy have told him that use of gasohol has made significant improvements in their gasoline mileage.

The question of small versus large scale gasohol production poses a tougher problem. There are sincere proponents of expanded gasohol production on both sides of this question.

There is a growing body of research and practical application that demonstrates the economic feasibility of small on-the-farm production of ethanol and methanol. Much of the work done by Dr. Paul Middaugh at South Dakota State University has centered on small-farm production of gasohol.

The Farmers Home Administration has already approved at least one loan in South Dakota. A farmer in Roberts County received a \$140,000 loan to construct a small-scale ethanol production facility. He expects to have that still on line in August producing ethanol from sour corn and potatoes. The byproduct will be used both on the farm and marketed as a pelletized high protein livestock feed.

This is indeed an area where increased availability of Farmers Home Administration loan funds could generate almost immediate results in meeting at least a small part of agriculture's need for energy.

But if gasohol is to be a significant part of the overall national answer to meeting our energy needs of the coming decade, we must consider a combination of small- and large-scale operations.

This leads us to a third area of dispute. Farmers have been victimized by a national cheap food policy for the past generation. It would be an ironic tragedy if the development of gasohol should lead to making family farmers the victims again—this time of cheap energy policy.

I cannot support a full scale gasohol program if that program should be allowed to become an excuse for holding down the price of wheat and feed grains.

At the same time it must be recognized that gasohol development is unlikely to result in significant increases in farm prices. Now, that is a qualified statement. We, therefore, are adamantly opposed to any suggestion that a gasohol program could be substituted for existing Federal farm programs. Acreage set-aside and federally sponsored conservation programs should be continued.

It would appear that full parity farm prices for wheat and feed grains would result in increased costs for production of ethanol. That may mean that plants may have to be constructed in such a manner that some shift could be made in grain stocks used for fuel production. It may also mean that methanol production utilizing a variety of nonfood sources, such as cornstalks, manure, and so on, may have an ultimate economic advantage.

Some of the most telling and political criticisms of the ultimate value of gasohol development have centered on the assertion that production of either ethanol or methanol result in an energy deficit. In other words, that it takes more energy to produce than is produced.

In an article in the New York Times, the consulting firm of David, Hammaker, Buzenberg, & Wagner claimed that approxi-

mately 172,000 Btu's of energy would be consumed in producing 1 gallon of ethanol with an energy value of only 84,000 Btu's and a feed grain byproduct with an energy value of 50,000 Btu's. If those statistics are accurate, that would be a deficit of 38,000 Btu's.

But those statistics are based on current techniques and current fuel consumption in distilleries. A report prepared by the Indiana Department of Commerce for the State legislature contends that "using new efficiencies, present fuel consumption in alcohol plants could be reduced by 60 percent, resulting in fuel costs averaging about 12.6-cents-per-gallon fuel costs and thus fermentation grain ethanol from existing plants could be competitive by next year."

Another hurdle facing gasohol development has been opposition of the major oil companies. According to Dr. Thomas Reed, a methanol researcher at the Massachusetts Institute of Technology, "the use of methanol as a motor fuel is no longer a technical question but a political one." When Dr. Reed began publicizing the results of his research program on alcohol fuels he reports that his grant money including \$1 million from Ford and Exxon began drying up.

The oil companies have also charged that blending problems have not been resolved and that cars will experience operating problems. Ken Bossong of the Citizens Energy Project in Washington, D.C. reports that oil interests have been working to discourage gasohol oriented legislation in both California and Nebraska as well as elsewhere.

We visited with Dick Tripler of the South Dakota Independent Oilmen's Association and found that group has no formal or official position on gasohol. Tripler said the group would probably oppose any effort to make gasohol sales mandatory, but would have no objection to legislation aimed at giving major oil franchise freedom to market gasohol.

Representative Tom Daschle of South Dakota has introduced the Gasohol Marketing Freedom Act which would allow managers of franchised retail gasoline stations the right to sell gasohol. Many of the major oil companies now require that their franchises handle no products other than franchiser products. Thus, if Mobil, Texaco, or Exxon is not marketing gasohol, it is likely that their franchises are effectively blocked from doing so.

This bill could remove at least one hurdle and pave the way to wider sales of gasohol.

However, I want to make one point quite clear. It is imperative that we be assured that production of alcohol fuels will not become another facet of the oil monopoly in this country. During the past several years big oil has systematically grabbed control over one form of alternative energy after another. They are in coal. They are in geothermal. They are in uranium. We cannot allow them to spread their horizontal energy monopoly over alcohol fuels as well.

In conclusion, Mr. Chairman, there are questions that remain to be answered. But we feel that none of them are insurmountable and we are convinced that gasohol can play a role in meeting our future energy needs. Mr. Chairman, Farmers Union agrees with you.

Let us get on with the job.

Thank you.

Senator MCGOVERN. Thank you very much, President Radcliffe. As president of the South Dakota Farmers Union, I know how closely you have followed the development of alcohol fuels and gasohol in our State.

You have indicated there are several retail outlets in our State?

Mr. RADCLIFFE. Right.

Senator MCGOVERN. However, it is my understanding that most of the ethanol used in these operations is being produced in other States. What could be—maybe I should say what should be done to encourage rapid fuel production in South Dakota?

Mr. RADCLIFFE. Senator, I think it is a matter of being able to find financing to build plants. I know there are a lot of farmers or groups of farmers who are willing and anxious to get involved in ethanol production. Up until now financing has been difficult.

Senator MCGOVERN. The Department of Agriculture testified that they believe the grain you referred to in your testimony would compete adversely with soybean mills if grain alcohol production reached a significant level.

Do you feel that that is the case, that the distiller's dried grain would, in fact, complicate the soybean market, or do you see some useful role it can play in the feed supplement market?

Mr. RADCLIFFE. Well, obviously, or likely, at least, it would compete with other protein supplement commodities, but I guess I would have to go back to the basis for agricultural production. It is all produced by farmers, and it might cause some kind of a production shift, but I see no problem in that if it becomes economically feasible to shift crops. The same farmers could produce wheat that are now producing soybeans. I see no real problem.

Senator MCGOVERN. One of the concerns that I have had about some of the legislation now pending, including my own bill, it depends partly on crop set-aside to provide the grain. If the Secretary announces there is not going to be any crop set-aside next year, where does that leave us? You have seen the projections on exports and demand. They indicate there is a possibility that we will not have any set-aside next year.

Mr. RADCLIFFE. We have seen those projections and heard those rumors. Our organization supports a set-aside of up to 10 percent.

We will be more than pleased, obviously, if the world market situation is such that the price of wheat goes above \$4, but we would like to have the assurance that we are going to be protected in the event the world supply in the end is greater than it appears to be. But without a set-aside, this type of program may become much more meaningful. It will provide a use for the excess product that we have.

Senator MCGOVERN. Thank you very much, President Radcliffe for your testimony. We may have some additional questions for you that we will submit in writing. We do appreciate your appearance here today.

Mr. RADCLIFFE. Thank you.

Senator MCGOVERN. Congressman Daschle, my colleague from South Dakota, has been one of the leaders ever since he arrived in the House of Representatives in the development of alcohol fuels.

He has talked to me constantly about it and has very quickly emerged as one of the strongest voices in the Congress on this

subject. I do not know anyone in the House of Representatives or the Senate who is any better informed on both the opportunities and some of the problems that we face in gasohol development.

I am going to call on Congressman Daschle to come up to the witness table here and bring with him the Coburns from Garretson, S. Dak., who have been working in this field for a long time.

The Coburns are farmers from our State. They have been trying for a number of months to establish an alcohol fuels plant in the State and, in that process, they have become experts on Federal redtape and on the barriers that it faces. But Congressman Daschle has been working very closely, not only with the Coburns but with people all across our State who are interested in this problem.

So I thought before we called on you, Mr. Coburn, we could have a few words from the Congressman who can tell us why you are here and a little bit about your background, and anything else he wants to say.

Congressman Daschle.

STATEMENT OF HON. TOM DASCHLE, REPRESENTATIVE IN CONGRESS FROM THE FIRST DISTRICT OF SOUTH DAKOTA, ACCOMPANIED BY JAMES COBURN, SR., JAMES COBURN, JR., AND TOM COBURN

Mr. DASCHLE. Thank you, Mr. Chairman. I, first of all, want to thank you for your leadership in the Senate as a member of the National Alcohol Fuels Commission. I think South Dakota can be very proud. I may have taken some leadership in the House but it is certainly modeled after the kind of direction you give alcohol fuels in the Senate. Holding this hearing and being as active as you are on the Bipartisan Alcohol Fuels Caucus, and for your work in establishing the priorities that we have seen in alcohol fuels, I really feel honored to be present at a hearing such as this to further promote I think one of the most, at least potentially, the greatest source of additional fuel that we have in our country.

I think with the potential that is there, to have people like the Coburns to provide us with their expertise is a real opportunity. I have worked with the Coburns now for over 3 or 4 months and the progress that they have made, I think it has been clear to me that people from South Dakota have a great deal to offer when it comes to providing improved technology, improved methods for developing alcohol fuels and I think right in the same cast that Dr. Paul Middaugh has demonstrated, the Coburns have equally demonstrated a capacity to show what potential there is for alcohol fuels.

My prediction is that within the next year we are going to see a major alcohol fuel facility in South Dakota and I believe very strongly that the Coburns will be the ones running that facility.

So, as I say, I am quite honored to be here and I want to thank you for allowing me to be here today. And I would like to introduce the Coburn family at this time. I think Jim Coburn, Jr., will be their spokesman.

Mr. TOM COBURN. I am Tom.

Mr. DASCHLE. I am sorry.

Senator McGOVERN. Before you start, I would just like to ask Congressman Daschle, do you have the feeling that I do that gasohol is inevitable; that it is no longer a debate whether we are going

to have it as an important part of our energy supply, it is a question of how effectively we can deal with some of the inertia and the redtape and foot dragging that is holding it back?

Mr. DASCHLE. Oh, absolutely. I think that by 1985, there is no question, if we set our mind to it, we could be using alcohol fuel for at least 10 percent of our transportation industry. We are talking in that case of about 10 million gallons—excuse me, 10 billion gallons of gasoline. And I think that is fully within our potential. We have stumbling blocks, of course. We have to get the biomass inventory established. We have to eliminate what you have been working on so hard, the redtape. I think we need adequate financing. That is one of the biggest problems we face, financing. And, finally, I think we have to ensure the big oil company philosophy is not one that pervades in the matter. I think we have to ensure that we keep this away from big oil and allow people like the Coburns to develop it.

Senator MCGOVERN. Thank you.

Mr. Coburn.

Mr. TOM COBURN. My name is Tom Coburn.

First of all, I would like to thank Senator McGovern for inviting us out here to testify. I would also like to thank Congressman Daschle for the introduction.

We feel that we need an ultimate source of energy. And we believe it is ethanol alcohol. Now, I am not saying that ethyl alcohol is the answer for the whole energy crisis, but I think we should look at what we have to give our country.

And, you know, you look out and drive down the road and field after field, you look all over and you see a very important renewable resource, and most of it is corn. The same corn that most people feel they can use and produce ethyl alcohol. It is all over the Midwestern States.

Now, it may not be the answer for everyone, but it is an answer for a portion or a part of our energy crisis.

Now, the farmer can use this ethyl alcohol in his farming operations and many other aspects.

Coburn Enterprises plans to build several plants, this mainly for bringing it together and transportation problems. Now, we are going to include other States due to the fact of the locations that we are in.

We have done a lot of studies on the production of ethyl alcohol and there are some problems, as they said, with the redtape. Some of these are Federal regulations, misleading information, energy conservation in plants and marketing regulations.

At this time in our testimony, I would like to turn this over to my brother Jim.

Jim.

Mr. JAMES COBURN. First of all, I would like to have our written testimony listed as part of the record.¹

Senator MCGOVERN. Without objection it will be made part of the hearing record.

Mr. JAMES COBURN. Rather than reading that testimony, I want to basically elaborate on four points that Tom mentioned.

¹See p. 93 for the prepared statement and additional material of Mr. Coburn.

In respect to Federal redtape, we are basically talking about the redtape involved in licensing, in bonding and I guess if ethyl alcohol is to survive, we are going to have to take steps to make modifications in this area. I do not know whether we are talking about a different Commission or whether we are talking about a subdivision of that Commission. But alcohol fuels, we believe, should be a separate entity from ethyl alcohol for spirits.

We are talking about entirely two different processes. And I think, basically, due to the manner in which the denatured was added, we could alleviate a lot of those problems that they are concerned about. Unless we get a separate entity, I think we could have some problems.

OK, second item, with respect to misleading information, and this makes it very, very difficult for somebody that has researched in the field of ethyl alcohol, the fact you will get study after study coming across showing some facts, but we really do not have anything very concrete we can put our hands on.

We do not have much in existence producing ethyl alcohol for fuel sake. Therefore, they make comparisons with distilleries, there again a different process.

That is just like comparing the energy needs of a farmer to raise corn to what it will be to raise small grain. We are talking about entirely two different facilities.

Another problem is you are talking about, basically, test tube and beaker-type statistics. When you get this into a plan, you start talking about continuous fermentation and some of these things, you end up with a tremendous cost difference and you end up with changes in production.

Here, again, we basically are going to have to get some labs in operation so that we have something where we can really tie these statistics down.

Second, we are basically taking a membership route to involve area farmers in the construction of our facility. In doing this, we are working with an area farmer who is feeding the grain. Therefore, rather than putting up a large plant to serve a large area, we will concentrate probably on serving an area of 30 or 40 miles, therefore, cutting down our transportation of grain to the facility; transportation of the byproduct, the mash, back to the farmer. And in this case, the alcohol will be the property of the farmer and, therefore, the alcohol will be available in his own farming operation.

When you make this availability to the farmer of alcohol at an extremely low price, there will be an incentive for him to basically make the changes in his farming operation to become more self-sufficient, and use more of his own product.

Another great consideration is in respect to marketing. I think we are going to have to have some guidelines in the marketing of this ethyl alcohol. When you drive up to the pumps and get what we term "gasohol," the consumer has to have some sort of an idea—are we talking about 10 percent alcohol? Are we talking about 20 percent alcohol? Are we talking 5 percent alcohol and 20 percent of something else along with that? I think the consumer has to be protected to get a quality fuel to that consumer so,

therefore, the consumer is not going to come back and say, "My mileage is deteriorating to no end."

Those are our concerns and rather than rambling on, I would just as soon answer some questions.

Senator MCGOVERN. Maybe, Mr. Coburn, you can just give us a little capsule of the steps you and your family have taken to date to try to establish a plant and underscore some of the principal barriers that you have come up against.

In other words, how do we begin clearing the way to accomplish the kind of plant that you would like to see operating in our part of the country? What are the biggest stumbling blocks?

Mr. JAMES COBURN. OK, our biggest stumbling block is basically the regulations as far as the Government is concerned for an ethyl alcohol plant. Well, the permit and the redtape involved there is appalling and the figures that are stated in bonds almost makes it—

Senator MCGOVERN. Is the Bureau of Alcohol, Firearms and Tobacco—that Bureau really was not set up, was it, to deal with this problem? I think Congress is going to have to take a look at the guidelines that that Agency is operating under. Also, I do not think they have the personnel to process the hundreds of petitions that are coming in, or applications that are coming in for alcohol fuel permits and so on. It may not be entirely their fault that they are being asked to carry out a mission now that was not in their original mandate. I am not sure they know how to do it or have the personnel to do it. Do you agree with that?

Mr. JAMES COBURN. I would definitely agree with that, Senator. In fact, they definitely do not have the personnel to handle the demands that the alcohol industry is putting on them.

Senator MCGOVERN. In your part of the State, the Garretson area is primarily a corn area and you have concentrated on the conversion of corn. Do you think that wheat also ought to be brought into the picture in those parts of the State or those parts of the Nation where that is the big available crop?

Mr. JAMES COBURN. Yes; I think when we talk about ethyl alcohol production, we should maybe look in our own backyard and see what energy means are available. If we are talking about cellulose extraction, corn is in abundance in our locale, as with Iowa and Minnesota.

Now, as you travel basically to the West, I am sure you would be looking at wheat as definitely a possibility.

We return to grain for the fact that our facility is designed to work through a feeding program. Therefore, we get basically 100 percent utilization crop. So you bring corn in and extract the alcohol. The farmer has the alcohol to use and the byproduct we are talking about, distillery dried grain is basically returned to the farmer in the form of feed.

We get excited about this because our facility is designed to also save energy in this respect. We can offer the product back to the farmer in a liquid form if he has a hog operation, for example. We can bring it back in a dry feed with a little higher moisture content or give it to him in the form of pellets. It is a matter of drying the grain down to meet his own individual needs.

Senator MCGOVERN. Last night, as I indicated here earlier, the Senate passed legislation that would provide \$500 million in Federal loan guarantees. Is this the kind of financing assistance that you think is required—maybe I should say is adequate—to help you in the construction of the kind of plant you have in mind?

Mr. JAMES COBURN. Yes; what we are basically looking at here is the fact, as I mentioned earlier, the misinformation that is out in the form of studies, it makes people very, very apprehensive as far as getting into this type of operation.

When we talk about our membership, we have all kinds of farmers that basically want to process 4,000 or 5,000 bushels of grain, but that only represents a very, very small portion of grain which they feed their livestock. We feel like if our facility is going to survive, it should be a percentage of the corn that they are now feeding their livestock—not corn off the market—I will say it again—directly related to their feed, and, therefore, we are going to have to have financing of this nature to get the program off the ground and get it to the farmer in the percentage form which we feel is going to be successful and prove elsewhere that this is a tangible and very, very feasible operation.

Senator MCGOVERN. Some of the gasohol proponents have said that alcohol fuel production can only be feasible on a large scale, say the capacity for 100,000 gallons a day or more. Do you agree with that, or do you think it is feasible to think of smaller onfarm plants?

Mr. JAMES COBURN. Well, I would say probably when you talk about the production of a alcohol itself, they may be right. The larger you get in volume, probably the more efficient you are going to be. But when we tie this down again, basically using a grain commodity, we have to take into consideration transportation to and from that facility. OK, if you are talking about a large facility, say, for example, if our facility were to be large enough to process corn in a three-State area, our transportation costs for that grain to be delivered to the plant would be appalling, along with the transportation of the feed back to the farmers and also getting the alcohol back.

So your energy expenditure gets to be unreal along with the idea you basically develop a very impersonal type of business. You know, we are basically working with the farmer. We are putting the alcohol in his hands, and he is going to basically create the market for development of engines that are going to burn this commodity. We are taking it from the grassroots approach.

If you take a complete commercial approach to establish a price, then somebody is going to have to buy it and the development of engineering technology to produce the type of equipment we are talking about, I think it would take too long.

Senator MCGOVERN. Your plant, of course, would serve principally a local market, as I understand it, the farmers in your immediate area. We have been told that in order for gasohol to make a significant dent on regional or gasoline markets, you have to have a widespread network for distribution.

Mr. JAMES COBURN. Right.

Senator MCGOVERN. Turning it over to the major oil companies—the more I look at our energy future, the more I hope we will not

have to become more and more dependent on these major oil companies. I do not think their track of serving the public has been all that impressive.

We have had this long history of arguing that you cannot go to alternative sources of energy, whether you are talking about gasohol, biomass, or solar energy, or whatever, because it is not competitive with oil and gas. Yet, they keep raising the price, escalating that all the time, and holding hostage these other kinds of fuel.

Do you see any problem in completely involving the oil companies in yet another aspect of our energy system? Would it not be better if we could keep some local control over both production and distribution of gasohol?

Mr. JAMES COBURN. Definitely; yes. We would want a plant as we are proposing working with the grassroots. We basically are eliminating the distribution problem and, therefore, we are basically restricting, I guess, our market to a definite locale. But as we prove, you know, the feasibility and cost of this alcohol to this community, I am sure you are going to see thousands and thousands of plants very, very similar to the ones we are looking at; you know, not so large they get impersonal, and not so small that you end up being a financial disaster on behalf of the farmers.

We are talking about a new technology. And as we get into this, there is going to be constant change and the facility has to be able to meet these constant changes. I think it is going to be a beautiful, beautiful field.

Senator MCGOVERN. Mr. Coburn, I would like you and your family to know Congressman Bedell of Iowa, if you do not already know him. He is one of the most energetic and effective proponents of gasohol for a long time in our working on companion bills in this area.

We do want to thank you for your appearance here today. I personally am very much interested, as Congressman Daschle is, in watching the development of your efforts in the Garretson area. You know you have our support in trying to break through the redtape and secure what you are trying to do there. It is going to set an example for a number of others in the State.

Mr. DASCHLE. Mr. Chairman, lest we all get the impression that the two men who have spoken are the more articulate, the father of this group is by far and away the most articulate of the bunch. He is letting them have their day in the sun today.

Senator MCGOVERN. Thank you, Mr. Coburn. We do appreciate all of you appearing here today.

Mr. JAMES COBURN. Thank you for your time.

I might probably mention the fact of our organization just briefly something about this. Our organization, basically, consists of, like has been commented here, not necessarily just Tom and myself and Dad, but we also have two other members who have been very, very vital to the development of our organization.

I have a brother-in-law who is a medical doctor. He has his masters in biochemistry and has, therefore, been a tremendous asset to us. I also have another brother-in-law who is a general contractor in Sioux Falls for a considerable amount of time. And these two gentlemen have been unreal.

When you sit down to talk to an architect and you have a contractor in the group, you can visualize how the conversation changes.

When you sit down to talk to a professional in his field, and you have a biochemist with you, you really get down to talking shop.

And I think we have to uncover a lot of this information and get rid of a lot of misleading information and, therefore, this gives us the ability to do this.

Thank you for your time.

Senator MCGOVERN. Thank you so much for being here. You are doing a good job.

Senator Zorinsky, maybe I can turn the gavel over to you at this point. We have had the first two sets of witnesses on. We are now at three, where we get into Nebraska.

I might just say the Senate Foreign Relations Committee is continuing its hearings on the SALT Treaty that began at 10 o'clock. We have Ambassador Harriman as the leadoff witness today. That is why I am leaving the hearing at this time. But it is in good hands with the subcommittee chairman, Senator Zorinsky.

Senator ZORINSKY. Thank you, Senator McGovern. I trust I can merit that confidence.

I would like to now call on Mr. Holly Hodge, president of the National Gasohol Commission, Inc., from Lincoln, Nebr., and Dr. William Scheller of Lincoln, Nebr., also.

Mr. Hodge and Dr. Scheller, we want to welcome you to our subcommittee hearing on gasohol. I know you have had a long interest in gasohol as an alternate energy source and possible solution to our current energy problems for many, many years.

I welcome you to this panel. You can present a statement in full or if you want to summarize it and have the statement put in the record in full, as you choose. At the conclusion of your presentation and Dr. Scheller's, then we will ask questions.

Thank you.

STATEMENTS OF HOLLY HODGE, PRESIDENT, NATIONAL GASOHOL COMMISSION, LINCOLN, NEBR.; DR. WILLIAM SCHELLER, LINCOLN, NEBR., AND RICHARD MERRITT, LINCOLN, NEBR.

Mr. HODGE. Thank you, Senator Zorinsky. I have with me also Richard Merritt, adviser to the National Gasohol Commission. He has been long involved in the gasohol program as adviser to Nebraska Gasohol Committee. He would like to say a few words. He has been a big help to our program from the Washington level.

Of course, Bill will touch on the more technical aspects. My statement is fairly short, so I will get into it and then I will turn it over to Bill Scheller.

I appreciate the opportunity of appearing before this Senate Agriculture Committee to discuss Senate bill 850. I intend to address the goal and purposes of this legislation and to make recommendations for changes and additions that might clarify the intent of the bill and bring about an orderly attainment in the goal of using agriculturally derived alcohol fuels in the United States.

I would first appreciate the opportunity of informing this committee of the activities of the National Gasohol Commission which will provide a background for my testimony.

The National Gasohol Commission headquarters is located in Lincoln, Nebr. Our membership extends from coast to coast and border to border within the United States and we have several foreign visitors attending our meetings to learn about the gasohol program.

The purpose of the National Gasohol Commission is to encourage worldwide use of agriculturally derived alcohol blended fuels as a viable energy source of fuel by: (a) accumulating and disseminating information concerning alcohol blended fuels, and (b) exploring, analyzing, and coordinating Federal and State legislative and administrative policies, programs, and procedures to maximize the use of alcohol blended fuels.

The National Gasohol Commission was preceded in their activities by several individual midwestern States in which studies and research were conducted to determine the technical and economic feasibility of using agriculturally derived ethyl alcohol in gasoline.

The early emphasis came from the State of Nebraska where State legislation was passed in 1971 to establish an Agriculture Products Industrial Utilization Committee to do research to determine if renewable agriculture products could in fact provide a partial solution to the demand for fuel additives and extenders in Nebraska and to work with industry to produce those fuels.

The technical feasibility of using alcohol fuels in late model automobiles was initiated in a 2 million mile road test in Nebraska under the auspices of Dr. William Scheller, professor of chemical engineering, with the University of Nebraska. The consumer acceptance of using gasohol is being proven in Nebraska, Iowa, Illinois, and many other States across the United States today.

The members of the National Gasohol Commission are strongly in support of the basic intent of S. 850 which is to allow surplus grain grown on set-aside acres to be utilized into energy.

The main support for S. 850 is in the provision to allow up to \$600 million in Federal loan guarantees to provide financial assistance in building alcohol plants to produce alcohol for gasohol.

In many discussions that I have had on this bill with interested parties, I am finding less general support of the USDA getting involved in negotiating raw material contracts between the Secretary of Agriculture and the alcohol producers, especially at a subsidized rate. Most people are saying the cost of energy will generally rise faster than the costs of agriculture products thereby reducing the need for a negotiated contract for raw material supplies.

In light of the energy crisis, I suggest that rigid time frames be written into S. 850 in which the Secretary of Agriculture has to implement the Federal loan guarantees of the bill.

I recommend that the Secretary of Agriculture be instructed to give special consideration to applicants for Federal loan guarantees from States with large surpluses of agriculture products in storage. Many States have large amounts of grain stored in both the 3-year grain reserve and in the 2-year commodity loan program.

This supply indicates a problem in marketing or transportation of the grain. The Secretary of Agriculture should give immediate

consideration to this problem by issuing Federal loan guarantees allowing alcohol plants to be built in those States to utilize those surplus agriculture products.

In summary, I recommend that this committee strongly support the Federal loan guarantee provision of this legislation with more flexibility to the Secretary as it applies to marketing contracts on the raw material and the distillers dried grain byproducts of alcohol production.

The agriculture community stands ready to assist this country in helping solve its energy needs while at the same time producing the food and fiber needs of the United States and portions of the world.

The gasohol program will bring about an increase in the supply of liquid fuels, will supply a high protein food product, will provide more domestic industry and will create more jobs for the people of this Nation.

I would be happy to answer any questions the committee might have.

Senator ZORINSKY. Do you want to make your statement next, Dr. Scheller, and then we can do it more or less as a panel.

Dr. SCHELLER. Thank you, Senator Zorinsky.

The principal bottleneck that we have today in implementing a gasohol program is the fact that we do not have alcohol production capacity. And this legislation, S. 850 would certainly be a major step in bringing alcohol production capacity onstream. I talk specifically of grain alcohol production, ethanol produced from starch and sugar crops.

All of the technology for the production of grain alcohol exists. There is no development necessary before we can start building grain alcohol plants.

There are engineering companies in the United States and elsewhere in the world that have experience in designing and building such plants. So this does not represent a handicap or bottleneck for us.

The last group that testified spoke of interest in small alcohol plants, and small alcohol plants certainly have a place in the overall program. An onfarm plant can provide a specific farmer or a few farmers with alcohol that they need to fill out their fuel requirements.

I think the economics of such a plant are very different from looking at a large commercial plant where an entirely different type of accounting system is used.

I support the concept that for certain farmers small plants may have a place and may be desirable. But I think if we are going to really put gasohol into the marketplace, we are going to have to develop large production capacity for grain alcohol. This would mean plants capable of producing 20 million gallons a year or 50 million gallons a year or larger plants.

In such case, I would like to see the largest plants possible being built because this does, in turn, mean the lowest cost of production for grain alcohol.

In our own region, Nebraska, South Dakota, Minnesota, Iowa and Kansas, for example, we use about 6 billion gallons of gasoline a year. Ten percent of this would be 600 million gallons. It would

take about 240 million bushels of grain to produce that quantity of alcohol, and this is about 8 percent of the starch grain production for those five States.

The arguments that there is not enough grain at present to produce alcohol is a very weak argument. I think we should remember the gasohol program is a regional program for the starch and sugar producing areas. There are specific States which do not produce raw materials that can result in the production of grain alcohol.

I think I will simply close by saying that Nebraska's 2 million mile road test program was a pioneer testing program to bring to light any benefits and any problems that might exist in using gasohol.

The benefits are those of improved octane, increased miles per gallon and improved driver satisfaction. There are other tests that have been conducted since then. A large number of these support the findings from the State of Nebraska. Some tests do not support the findings of the State of Nebraska and it is not clear why those testers came up with different results.

Most recently, there is a test with city vehicles going on in the city of White Plains, N.Y. I had an opportunity last week to speak with the mayor of White Plains who, fortunately, is a mechanical engineer, a former university professor and whose field dealt with internal combustion engines. He told me that the findings in White Plains agree with the findings in Nebraska. So we think our tests have shown the viability of gasohol in the car and in the marketplace.

Thank you.

Senator ZORINSKY. Thank you very much, Doctor Scheller. I would like to ask Mr. Merritt if there is something that he would like to say?

Mr. MERRITT. Senator, thank you. I would just like to say briefly that I think it should be emphasized that gasohol is the synfuel that is here right now, and I think it is on-the-road and it is cost-effective.

I think that certain people, especially those of us in the gasohol movement, are very concerned about this new-found excitement and enthusiasm for synfuels that is now present, and many in Congress seem to have developed.

I trust that there will be a balance on synfuels and a recognition, as the Department of Energy's recent alcohol fuels report has indicated, that there are no synfuels from coal that are going to be available before 1985, at best. But we can make an awful lot of alcohol and gasohol long before they can get these coal plants going.

The President talks about \$88 billion for synfuel funding, and I am yet to discern just how much of that would go to gasohol. I trust that the door will be kept open for gasohol as one of the synfuels.

The other point that I believe is being neglected is that coal as a raw material is most surely to escalate dramatically in cost because the price of coal seems to be tied to OPEC crude oil, and by the time you get these coal plants going to make coal liquids, I

really think their cost of production will be greater than biomass alcohol.

We will have years to get technological improvements in place, and with the right tax incentives our plants should be written off. I think that in 1985, biomass alcohol will be dramatically cheaper than coal alcohol, and if we are given a fair chance I think we can make more of it.

Thank you very much, and I would like to participate in any questions.

Senator ZORINSKY. Mr. Merritt, are you related to Paul Merritt?

Mr. MERRITT. No, maybe distantly. I would like to meet him and perhaps we can get acquainted.

Senator ZORINSKY. I just did not want to be accused of nepotism.

I would like to have an answer from any or all of you, if you wish to comment. What is your response to a comment that every now and then I read about concerning evidence, supposedly, that it takes more energy to create gasohol than what gasohol produces in the way of energy.

Dr. SCHELLER. This has certainly been a piece of misinformation which the opponents to the program have circulated widely. The energy requirements in producing grain alcohol fall mainly into three parts of the plant—the cooking of the grain, the operation of the distillation columns to separate the alcohol from the other components and the drying of the distillate grains—the byproduct cattlefeed.

The alcohol plants, with the exception of the ADM plant, that are operating today were built a long time ago—20 years or more, at a time when energy was very, very cheap. As a result, there was little or no effort at energy conservation or heat recovery in such alcohol plants. Those people who said it takes more energy to produce a gallon of alcohol than is contained in the gallon of alcohol, have simply looked at outdated plants.

Midwest Solvents in Kansas, for example released energy balance information on their plant showing what was required to operate their plant, which was built about 1938.

I think what we really have to do to answer the question is look at a current design of a modern alcohol plant for producing fuel grade ethanol for gasohol.

If we look at that energy balance, we find that it takes about 70,000 Btu's of fossil energy to produce 1 gallon of alcohol which contains 84,000 Btu's. So the energy consumed is less than the energy content of the alcohol produced.

If we look at the fossil fuel energy content contained in corn that is fed into the plant, we find it to be 46,000 Btu's per gallon of alcohol produced and we find that the byproduct cattlefeed has an energy content of 45,000 Btu's per gallon of alcohol produced. So we have a gain of 14,000 Btu's on the one side between alcohol and energy used to run the alcohol plant and we have a loss of only 1,000 Btu's going from the corn to the byproduct. So we have a net energy gain of 13,000 Btu's per gallon of alcohol.

These are figures that relate to a modern, up-to-date plant, the kind that will be built for producing grain alcohol for a gasohol program.

Anyone that says it takes more energy to make a gallon of alcohol than is contained in the alcohol is simply 20 years out of date.

Thank you.

Mr. HODGE. I would like to make a comment. You have not only energy balances, but you have economic balances, and I think the economic balance as it applies to using coal as a raw material energy source rather than importing oil and the effects it would have on the balance of payments is very significant also.

I think anytime you improve your fuel, you know, you have the possibility of a net energy loss. I think when you go from crude oil to gasoline you have somewhat of a net energy loss. But I think the overall impact of utilizing our own domestic product, and developing our own industry and developing more jobs versus importing, you know, oil and the imbalance of payments is certainly significant.

Mr. MERRITT. I would like to say that I think you have to measure energy conversion efficiency differently when you use a renewable resource. The energy conversion of gasoline is 80 to 90 percent efficient from crude oil, and that is consuming a non-renewable resource. We are talking about a maximum extent of renewable resources for gasohol. The Canadian Government has done a study and come up with a "quotient of renewability." I think mankind has to start thinking in "quotients of renewability" and that the renewable energy forms should have some preferential consideration to those that are nonrenewable.

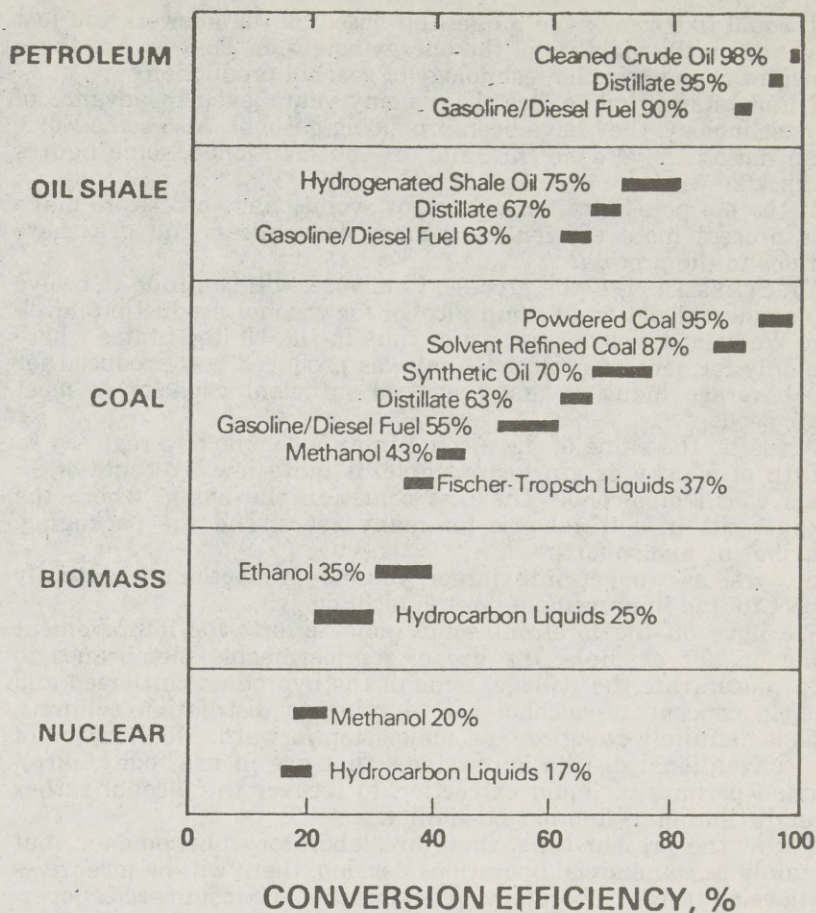
I have some material on energy balance that I would like to discuss, along with Dr. Scheller, and perhaps submit for the record. One is data presented in Germany at a conference held by Volkswagon, which Dr. Scheller and I were at, wherein they say of all the conversion processes from solids to liquids that biomass alcohol is far and away the most efficient—much more efficient than any of the synthetics from coal and so forth.

General Motors has numbers of a similar nature. And Mobil Oil put together some numbers that indicate that, under what I think is a reasonable assumption, that alcohol from corn, even in obsolete plants, is 94 percent annually energy efficient. I think this makes grain alcohol look pretty good, using Mobil's own data submitted to the Senate Republican Conference.

Senator ZORINSKY. Without objection, if you will leave those with us, we will put those into the record of the hearing.

[The General Motors material referred to follows:]

[Reprint from General Motors Research Publication 2733, "Automotive Fuels—Outlook for the Future," June 15, 1978, p. 25]



Mr. MERRITT. The other thing that is not considered is that alcohol is by far the highest form of liquid energy. It puts out the most power per Btu. It is the cleanest burning, and an excellent octane booster for gasoline. We are not converting a low grade energy form into another low grade. We are taking low grade energy, which is coal and corn, and making the highest, which is grain alcohol. I think Dr. Scheller would concur in that. And this is very important. We are not making something equivalent to gasoline; we are making something that is better. Alcohol is the frosting on the cake.

Senator ZORINSKY. In the final analysis there is indeed something to be said for the regeneration of the economy, through domestic agricultural production, leading to the payment of additional taxes by American industry which manufactures this prod-

uct, together with the production of other byproducts which, would be beneficial to our own economy and add to the strength of our own dollar.

I would like to ask you a question based on the answers you just gave me on the viability of the energy equation. That is: Are there constant changes in the technology of gasohol production?

I understand that in Brazil for many years, even in advance of our technology, they have been producing gasohol. Also some European nations have done this, and, as you mentioned, some figures go back 20 years.

Is there a possibility for a constant evolutionary process to make this process more efficient and more economical; and are there options in the process?

Dr. SCHELLER. Yes, the process, I am sure, will continue to evolve as commercialization of grain alcohol for gasohol production develops. We went through a period of time in the United States where the only fermentation alcohol that was produced was produced for the beverage industry, and they had sufficient capacity to meet their needs.

Actually, the value of the alcohol in an alcoholic beverage say in a fifth of whisky or gin for example, is quite low, 12 cents or 15 cents worth of alcohol. The cost comes in the aging, where the product sits in a warehouse for many years, and the packaging, distributing and so forth.

So, yes, as we get into larger volume production, I certainly expect to find improvements in the technology.

We have on the forefront some major efforts for improvement going on, for example, the use of semipermeable membranes to help concentrate the stillage, some of the byproduct cattlefeed and to help concentrate alcohol before going to distillation columns. This is definitely going to be a major step forward. Modification of the conventional distillation systems that are in use today; introduction perhaps of liquid extraction to recover the alcohol rather than distillation is another possibility.

But at the present time, these are laboratory phenomenon, but certainly as commercial operations develop, there will be incentives to develop these laboratory phenomenon for commercial operations.

All of these methods are very energy efficient and since today energy efficiency is a significant part of the goal to produce alcohol, there is an incentive to develop and commercialize them.

Senator ZORINSKY. Anything further?

Mr. HODGE. I have a couple comments that Senator McGovern asked the questions earlier that I would like to address.

This bill that we are hearing today, S. 850, is basically, the way I interpret it anyway, designed to do away with set-aside, and grow crops on normally set-aside acres.

His question was what will happen if we had no set-aside in the farm program. In other words, if there is no set-aside in the wheat program, what affect will that have on the gasohol program.

Well, the fact that the Secretary of Agriculture determines no set-aside does not mean that we are not going to have surplus. He has to anticipate, you know, the needs quite a bit ahead. And, particularly in the Midwestern States, we need a gasohol program

because we have a tremendous supply situation and transportation problems. For instance, I think our carryover of a 3 year grain reserve from last year was 300 and some million bushels, with a 1 year commodity reserve we had over 402 million bushels of surplus carryover grain in Nebraska.

Senator ZORINSKY. In a recent hearing it was pointed out that when the call level is reached on the grain in storage, the railroads themselves admitted they could not find enough grain cars to come close to moving that grain to market or port. As a matter of fact, elevators are refusing to buy grain because they cannot get a commitment on grain cars to move it. Even the railroad that uses the term "We can handle it," says they cannot handle it.

Mr. HODGE. We are going to have a very serious problem this fall as it applies to harvesting of feed grain. A lot of the terminal elevators are full and, like you say, the transportation situation is tough.

So we feel that we definitely need Federal loan guarantees that are provided in this bill to build plants in those areas that have surplus agricultural commodities and will for quite sometime.

Another thing, you know gasohol just isn't made from grain that is grown on agricultural land. It is also made from many other products—cheese whey, for instance. You can make gasohol from cheese whey. We need Federal loan guarantees to build plants to utilize these products that are now going to waste. So, I guess my answer to that is, no, I do not think we should stop this bill in light of the fact there may be no set-aside provisions.

We need to develop an industry to utilize the products that we have.

Senator ZORINSKY. Thank you, Mr. Hodge and thank you, gentlemen. I appreciate your taking the time from your schedule to come here to testify.

Hopefully, we are entering a new era of not only rhetoric concerning gasohol, but actual implementation of some of these ideas.

I would like to call on Paul Merritt from Padley & Dudden Co. in Ogallala, Nebr. Our welcome to you, Mr. Merritt.

**STATEMENT OF PAUL MERRITT, PADLEY & DUDDEN,
OGALLALA, NEBR.**

Mr. MERRITT. As you stated, my name is Paul Merritt. I am with the law firm Padley & Dudden, in Ogallala, Nebr.

Initially, I would like to thank you personally, Senator, for asking me to testify at this committee, and also for the committee itself for allowing me to have the opportunity to express some opinions. I have not had an opportunity since my notification to put together any written testimony.

Senator ZORINSKY. Fine, just present your statement.

Mr. MERRITT. It will be off the cuff here and we will see if it is understandable.

First, I will give a basic background of myself and how I have become involved in gasohol. Approximately 2 years ago, some people for whom I work asked me to start attending meetings with respect to gasohol and I became very interested in it—gasohol being a very emotional issue 2 years ago in Nebraska.

I attended meetings, and in the last 2 years those meetings culminated in forming a corporation, the Nebraska Ethanol Corp. for my particular people which are 11 agri-businessmen in southwestern Nebraska.

That corporation has let a contract for an engineering study for construction of an ethanol plant which should be back in a couple—we expect the first of August to the 15th of August, to have that study done.

I have, therefore, been looking at the last 3 or 4 weeks at the possible financing of a plant. We are looking at a 10 million gallon a year ethanol plant. The estimated cost, prior to receiving the study, ranges between \$12 and \$15 million.

I have been contacted by three brokerage firms and by various individuals who have expressed an interest in putting money behind this type of venture. However, almost all of them have wanted some form of a guarantee since they consider an ethanol plant at this point in time, at least, as Dr. Scheller said, we do not have the capacity; we do not have the plants producing ethanol per se.

They consider such a venture to be a risk venture and so they want some type of a guarantee on their investment.

I feel that S. 850, at least in part, provides that type of guarantee up to the 50 percent that is referred to in the bill.

Nebraska has a bill currently going—well, currently being reviewed by the attorney general, that would also provide that type of guarantee that would be acceptable to the people with whom I have discussed this matter.

I would like to just go down the bill, if I may, Senator, with a couple of comments I have on it.

First, I noticed in the bill that it requires that the grain be sold to the Secretary of Agriculture. Again, we are getting to the same thing Mr. Hodge was talking about, the set-aside.

It is my opinion, and the opinion of the people whom I represent, that maybe a better alternative approach would be to allow them to have the same benefit as if it was being sold to the Secretary; however, to let them plant that set-aside land and sell the grain directly to the ethanol plant. Once they make a showing that they sold it to the ethanol plant, they would receive the benefit on their set-aside rather than having to again try to keep it out of too much control by the Secretary as to distribution to the plants.

That also goes to the Secretary's rules and regulations. I totally concur with Mr. Hodge that I feel it is imperative in this bill that there be some type of a time frame in which the Secretary must act to get the program initiated. Otherwise, we could be looking at a year and a half before there is an implementation of the rules and regulations, as to who would be eligible and what type of information they must supply.

On page—and I will make references to pages, if I may, S. 850, page 4, line 1; subsection (2) deals with some of the information the bill feels should be supplied by the applicant. And some of that information is information concerning the cost of construction of the plant. A question that I wrote myself here: Will there be money available? To get that kind of information available for the report, the concept to 50 or 60, or a large plant \$100,000 to get that

type of information available. We are talking about necessity at that point in time, probably, for an engineering study and due to the fact of operating costs and income to be derived from that, also the possibility of a financial study being done. So you are telling—you are asking for somebody to put \$150,000 into a study with no guarantees. My question there was whether or not there might be a necessity or way of providing money to allow the entrepreneur, basically, to come in.

Senator ZORINSKY. I think as we progress in the establishment of gasohol plants of this nature, those figures will become more reliable and valid, and there would be less preparation; but, at the outset, I think you have a valid point.

Mr. MERRITT. The problem right now appears to be an awful lot of Midwest, at least—and I am from the Midwest, so I want to broaden the range—is extremely interested in gasohol, in the construction of ethanol plants, but they are tied down when you go in to talk to people and they want \$50,000 or \$60,000 to put together a feasibility study, they call it. I prefer to call it an engineering study. So you can raise a stumbling block right at the outset.

Senator ZORINSKY. Is this because of lack of experience in the production of this product?

Mr. MERRITT. I feel it is. The company with which I am working has never—with which my people are working—has never done a study of this magnitude before. I am sure once they do the one they are doing for us, there may be two or three more and maybe they can start mimeographing and still make their money, but they will be much more experienced and they will be gaining more technology which Dr. Scheller referred to to maximize their efforts.

It is a novel idea to a lot of these companies with respect to preparing the information that you need to get the financing.

The bill requires that you have to show that you could not get the money someplace else previously. So you have to have yourself a fairly good package to go to any individual or group of individuals to finance it. If you go public, you have to have your prospectus, which is going to require a quite detailed report, which is going to need to be financed. So we are talking about a large expenditure of funds prior to even becoming eligible for this loan guarantee, at least the way I read it.

Senator ZORINSKY. Are you experiencing any problems with the Bureau of Alcohol, Tobacco and Firearms concerning regulations on bonding?

Mr. MERRITT. I have started receiving forms that have to be submitted. The forms cannot be submitted until I get my engineering study. You have to have an engineering study, from what I have been told, from the people in Chicago before you can submit your application.

However, I have a stack, probably 3 inches high right now, forms that need to be filled out and they are just the beginning.

Senator ZORINSKY. From any one particular agency of Government?

Mr. MERRITT. This is from the Bureau of Firearms. We are talking about a plant of 10 million gallons; we are talking about a commercial distribution. You have to get—I cannot remember the correct terminology—the point that it is a commercial distiller's

license, and the initial forms that I have are at least 2 or 3 inches high to get that started.

I was particularly interested in the comment that you brought up, Senator, previously with respect to input energy as opposed to output energy.

I know on page 5 of the bill, starting at line 4, a requirement that you have, the output of the fuel alcohol energy content cannot exceed total energy input. My concern is total energy input from petroleum or petroleum-based products. In the definition section of the bill, I do not see a definition of "petroleum-based products." So I guess I do not know exactly what that means. I am not an engineer and I do not know if that refers to coal. I do not know if it refers to natural gas.

That is a concern that everybody brings up and, as you pointed out, I, obviously, being for gasohol, I readily accept Dr. Scheller's explanation. And, having read his articles, I am sure that it is very accurate information. I am still very concerned as to a definition of "petroleum-based products," in case there is a problem.

Senator ZORINSKY. Possibly we could have that clarified as the bill proceeds.

Mr. MERRITT. On page 7, starting on line 11, deals with the distiller's dry grain feeds that are the byproduct of the ethanol production being given to the Secretary at no cost from the production.

Now, this is for people who buy corn based upon the less than 50 percent of the market value.

To me, and I have noticed in the definition section, the reference in this particular bill distiller's dried grain is, in fact, dried grain. I do not believe it is in the House bill.

To me, this is discrimination in some respect to the larger plants. The larger plants—one of the purposes of a larger plant is for more efficiency and the ability to dry the byproduct, so that you can, in fact, pelletize or whatever you are going to do to the feed supplement and distribute that to livestock owners. That, obviously, runs up the cost to construct and engineer the energy output. However, on the smaller capacity, you have what I call slop that comes out that has a large content of water, but you still have the high protein content that you can pipe right to your livestock that are in your cattle yard right next to the plant or within a very short radius.

The way I read this is that people who have bigger plants, and who are paying the extra amount of money to dry the byproduct, and if they buy the corn, they have to turn that over, that corn over to the Secretary at no cost. However, if I as a farmer or a group of farmers build a smaller plant but we can sell that slop to farmers in the area, we can make our profit because we are not obligated to return that to the Secretary for obvious reasons, because it is mostly water, so they would not want it. But that is, to me, a handicap to the larger operations.

I was also interested in noting on page 8, line 12, with respect to the apparent concern that the distribution of the dried grains on the market will prevent a reduction in the market price for soybean which is right now the main feed supplement for livestock.

We have been informed, in fact, my people have been contacted by people in the State of Nebraska that if we get a plant on line, we have already sold all of the dry grain that come out of that plant.

So, I guess my thinking would be on that, not that there is going to be a reduction, but there is probably a market out there that soybean is not meeting at this time.

I am concerned that there will be some type of controls here through the Secretary to acquire all the dried grain to protect the soybean market when maybe you maintain the soybean market at a high price because of the fact there is no competition at this point with that section there.

Again, the only point that I would make at this point, Senator, is that I would renew the point on the set-aside because we firmly believe that rather than having that grain go to the Secretary and then being turned around and sold through mutual agreement or through less than 50 percent of the fair market price to the plant, that what we should do is let the farmers utilize that 10 percent of the set-aside land and receive credit for it if they demonstrate that they sold it to an ethanol plant.

It would appear that if you have a plant—Dr. Scheller was talking about large plants when he was talking about 50- to 100-million-gallon plants. The plants that I am familiar with, that my people are looking at are 10- and 20-million-gallon plants. They can get their raw product from the region, the area we are in. And there is definitely a demand for another market for grain. So, I think that would be the best benefit. I think it would keep the Secretary and the Government out of it to an extent. The more you can keep the Government out of the work between the farmer and the ethanol plant, the more efficient, I would feel, the plant is going to run.

Obviously, there have to be some guidelines on demonstration that they actually sold it to the plant and they used it for the production of ethanol. I think that would be just as easy as selling it to the Secretary and then having him give it to some plant for the production of ethanol.

I don't have any further questions—statements. Do you have any questions, sir?

Senator ZORINSKY. Mr. Merritt, I appreciate your analysis of this bill because, we want to have a finished product that will be acceptable and workable. I agree with you that we should have the least amount of interference from Federal Government and USDA as possible and still allow the bill to be realistic in nature and to be as efficient as possible.

I appreciate your comments. Certainly the committee will review all these comments with respect to making this a better bill.

Mr. MERRITT. I do not want to sound like I came in to criticize the bill, because I did not. I was asked to come in and review the bill by your office and by you, but I am very strongly in favor of some type of Federal loan guarantee. I do not think it would probably ever be utilized. If it is there just to get the ball rolling, to get the investors started in this. Once you have the line production, it is my opinion that there is a large market in our area for this product.

People are sending to the State of Washington and the State of Illinois just to get ethanol into the State of Nebraska. The market is there. I think that once we can get a couple of these plants on line, the Federal loan guarantee may not even be a necessity at that point in time because it is going to be a good investment for investors and that is the way we want to go. We need the push. They need the guarantee they are going to get something back on their money in case there is a disaster.

Senator ZORINSKY. On the other hand, it is good that you do disect bills of this nature because we can always improve upon what we do back here. As a matter of fact, I think there is an adage which I believe. There are two things you do not want to see made: One is sausage and one is law. Certainly we can continue to improve on what we have based on the experience of others.

The more experience we have in these type of things, the more beneficial we can make this law. Similarly the actual economics of the production of alcohol itself may develop to provide a better incentive for gasohol which, in turn, will make the lenders a lot more secure in their future dealings with those that need financing.

Thank you very much.

Mr. MERRITT. Thank you very much.

Senator ZORINSKY. I would like to call on our final witness to testify on S. 850, and that is Pincas Jawetz, the consultant on energy policy, city of New York.

STATEMENT OF PINCAS JAWETZ, CONSULTANT ON ENERGY POLICY, CITY OF NEW YORK, N.Y.

Senator ZORINSKY. Mr. Jawetz, would you care to present a summary of your statement?

Mr. JAWETZ. I prefer to go over it because it is written very concisely.

Senator ZORINSKY. Fine.

Mr. JAWETZ. I am an independent consultant on energy policy. I was involved for years in studies in the production of liquid fuels from oil shales and coal, and I have been involved in developing plans for U.S. national energy policy while a consultant to the Hudson Institute. Starting the summer of 1977, I got interested in the potential of fermentation alcohols for a U.S. energy policy.

I do not believe that it is possible to compartmentalize policy. It is imperative for a national policy to incorporate and relate such areas as farm policy, energy policy, monetary policy, foreign policy, employment planning, et cetera.

For 1½ years, I was trying to get the Departments of Energy and Agriculture to consider each other's policies in their own policy-making mechanisms. While still connected to the Hudson Institute, I have submitted proposals to DOE for studies on economic impacts of an alcohol fuels policy, but I was laughed at—this was impractical, I was told.

This year, March 26-30, I presented a paper, which I called "The Common Sense Approach in Developing Fuel Alcohols," before the workshop on fermentation alcohol for use as fuel and chemical feedstocks in developing countries.

The workshop was called by the United Nations Industrial Development Organization at its headquarters in Vienna, Austria. Participants from about 40 nations, including government officials, scientists, economical planners and representatives from industry. The speakers were from over 30 nations. From the United States there were only four participants: Professor Scheller from the University of Nebraska and myself speaking favorably on the subject of gasohol, and two employees of Union Carbide who had a negative view on the subject.

Neither DOE nor USDA were represented. As it was quite clear at the meeting, many nations are extremely serious about decreasing their dependence on imported crude and fuel alcohols seem to be part of the proposed strategies.

July 11, 1979, the U.S. Department of Energy has released the long awaited report of the alcohol fuels policy review and among other good background material it states: "ethanol is the only alternative fuel commercially available now and the only one likely available in quantity before 1985."

The following day the assistant secretary for policy and evaluation presented this conclusion before a U.S. Senate panel and estimated that through 1985 alcohol fuels could displace as much as 40,000 barrels of oil per day, for example, 14.6 million barrels per year, if recent Presidential initiatives are put in practice. As we shall show here this estimate is much too low and constitutes, despite the long lists of facts which the Department of Energy has finally come to recognize, only a tiny fraction of the available potential. The present testimony purports to point back at some of those facts in order to restore a better appreciation of the subject.

Returning to the topic of our hearings, the National Fuel Alcohol and Farm Commodity Production Act of 1979, I strongly back the general approach of the bill, though, as it will become clearer during my testimony, different mechanisms can be devised in the implementation of the bill.

In order to make myself better understood, and in order to make a contribution to the subject, I would like to point out what could have happened had farm policy and energy policy been coordinated at the time of the 1978-79 agricultural season.

Our existing farm policy recognizes two routes leading to a subsidized decrease of supply of agricultural commodities:

(1) The basic set-aside of croplands where farmers have to let fallow 10 percent of their usual acreage in feed grains—corn, barley, and grain sorghum—or 20 percent of their usual wheat acreage. The farmers benefit then from a guaranteed minimum target price, from a farmer-owned grain reserve system, and from loans.

(2) Farmers that have agreed to the basic set-aside program can then choose to increase nonproducing lands beyond the minimum requirements and receive direct payments for the additional acreage. The subsidy limits are an additional 20 percent for wheat land, 10 percent for feed grains, and 10 percent for cotton land. The farmers receive then 50 cents per bushel of wheat produced on the remaining 60 percent of their land, 20 cents per bushel of corn produced on the remaining 80 percent of their cornland or 12 cents per bushel of sorghum or barley produced on 80 percent land, or 5

cents per pound of cotton produced on the 90 percent of their cotton land.

Senator ZORINSKY. If I may interrupt your statement, the buzzer and the clock which we previously referred to have just indicated that we have a vote on the Senate floor, so if you will allow me, we will recess for about 10 minutes so I can go to the floor, cast a vote and come right back; and then we will continue your statement right where you left off.

Mr. JAWETZ. Thank you, sir.

Senator ZORINSKY. Thank you. We are recessed for 10 minutes. [Short recess.]

Senator ZORINSKY. The committee hearing will now resume, and I thank you, Mr. Jawetz, for allowing me the opportunity to go cast a vote. I have not missed one yet this year, and you allowed me the opportunity to continue that. Thank you.

Mr. JAWETZ. USDA has certified that in 1978, 13.4 million acres of acknowledged cropland have been left fallow under the basic set-aside program, and an additional 5.3 million acres were left fallow under the diversion program for direct payment.

The basic set-aside program included, in million acres: wheat 8.4, barley 0.6, corn 3.3, and grain sorghum 1.1.

The diversion program acreage included, in million acres: wheat 1.4, barley 0.2, corn 2.8, grain sorghum 0.4, and cotton 0.5.

To calculate the funds tied up in subsidizing the basic set-aside program is not easy. I was told the yet unpublished Office of Technology Assessment report estimates the agricultural subsidies at \$1.6 billion a year. For the diversion program we have had in 1978; \$406.78 million in corn programs, \$64.26 million in wheat programs, \$21.58 million in sorghum programs, \$8.45 million in barley programs, and \$47.25 million in cotton programs. The total payment for diversion programs was thus \$548.32 million.

POTENTIAL FOR PRODUCTION OF ETHANOL

Let us assume for a moment that we could have planted corn on all 5.3 million acres under the diversion program. At 100 bushels per acre—the 1978 national average was 100.8 bushels per acre—and 2.6 gallons of anhydrous ethanol, 200 proof, per bushel of corn, we could have produced over 32 million barrels of alcohol. Over 115 million barrels could have been produced if the basic set-aside acreage would have been included, and when pulling into production additional lands, the potential for production of alcohol from agricultural commodities grown specifically for this purpose could reach up to 200 million barrels. Wood and cellulosic materials, municipal waste materials, animal byproducts, and many other possible sources of alcohols are not included in this amount which could thus be much larger.

THE AVAILABILITY OF SUBSIDY FUNDS

Taking the yields used for the diversion payments calculations—90.8 bushels of corn/acre, 30.6 bushels of wheat/acre, et cetera—one gets 234 gallons of ethanol per acre of corn. If one had planted corn and used the payment for nonproduction in order to create a subsidy for the distiller, one could have made available at least 62

cents to subsidize a gallon of ethanol. Calculating the subsidy as a weighted average of the different agricultural crops, as the other crops receive less subsidy than corn under the diversion program, the average subsidy drops to 44 cents per gallon of ethanol. Let us note here that all these calculations are only for the diversion payments while additional subsidies remained untouched under the basic set-aside program.

ETHANOL AS AN OCTANE BOOSTING ADDITIVE TO GASOLINE

We suggest here to regard ethanol as an octane boosting additive to gasoline rather than as a new source of fuel. The addition of 10 percent ethanol to 90 percent low octane unleaded gasoline, the composition commonly called gasohol, increases the average octane value—average of research and motor values—of the mixture by 3 points. This value will suffice to increase the octane quality of regular unleaded gasoline from its present 87 octane numbers level, to a level acceptable to the fleet of newer cars. The higher octane value of gasohol, as compared to unleaded gasoline, entitles the additive ethanol to a premium value equal to 30 cents per gallon of ethanol.

Also, disallowing the use of lead or manganese compounds for octane boosting purpose, the Environmental Protection Agency has pushed the oil companies to increase their reforming capacity. In the reforming processes benzene and toluenes are manufactured from straight chain hydrocarbons in an energy intensive process. By using ethanol as an octane booster in gasohol one does therefore not replace only 10 percent gasoline by 10 percent ethanol, but rather closer to 16 percent petroleum is being replaced by 10 percent ethanol according to testimony originating with the American Petroleum Institute at the time they campaigned for a deregulation of the price of gasoline.

THE ECONOMICS OF ETHANOL

According to Mr. Lipinsky from Battelle Columbus Laboratories, the net cost of producing a gallon of ethanol is \$1.17. This cost includes the cost of corn at \$2.50 per bushel, conversion costs, capital costs, and byproduct credits. Others have made evaluations that range between \$1.20 to \$1.30 a gallon. Assuming here a \$1.20 a gallon value and crediting 30 cents for the octane boosting value of ethanol, we are left with 90 cents—the net cost per gallon of ethanol.

Introducing now the element of policy planning via a linkage of farm policy and energy policy, one could deduct from the 90 cents, the 62 cents we found as an available subsidy if one would have phased out the diversion program for cornlands alone. One could have produced 18 million barrels of ethanol that costs 28 cents a gallon. This without any elimination of Federal fuel excise taxes and without the elimination of any State taxes. If all the diversion lands were put into production, considering the lower available average subsidy levels, the cost of a gallon of alcohol for a total of 32 million barrels would have been 46 cents. All these calculations assume the cost of a bushel of corn at \$2.50 a bushel while still

allowing to the farmer all the benefits of the basic set-aside program.

If the distiller were to pay only \$2.20 a bushel for corn, without being afraid of sounding ridiculous, I suggest here that the true cost of a gallon of ethanol, within the frame of existing farm subsidy payments, would have been 17.5 cents a gallon if produced on land diverted from corn production, or 35.5 cents a gallon if produced on land from the total diversion program.

If one were to produce ethanol also on all of the available land from the basic set-aside programs, a detailed study of the farm subsidy system would reveal that the existing subsidies, and the 40 cents per gallon of alcohol made available via the elimination of the Federal excise tax, will suffice to guarantee the viability of a national fuel fermentation alcohol program.

To be noted here is the extremely intricate nature of the farm subsidy system and the less than candid attitude taken to the subject by the officials of the U.S. Department of Agriculture when discussing the possibility of using the surplus lands for a productive purpose. This lack of candor was quite noticeable at recent hearings before the Subcommittee on Energy Development and Applications, Committee on Science and Technology, U.S. House of Representatives. At the hearings USDA proposed that as the price of commodities goes up the farm subsidies vanish, and it was only because of a specific question that the existence of the diversion program was mentioned.

Land availability, commodity prices, and other miscellaneous arguments:

One, it is safe to assume that the 1979 set-aside and diversion acreage will not be much different from the 1978 acreage.

Two, the existence of unproductive lands does nothing for food supplies. The argument that the land may be needed as a land reserve has to be viewed rather in the light that only when planted and harvested the land reserve becomes a food reserve. It is possible to return the crop to the use of food and a gasohol program will allow this practicality. The Natural Fuel Alcohol and Farm Commodity Act of 1979 does indeed allow for such an eventuality.

Three, if one constructs distilleries now and finds that later the feedstock is changed from starches to cellulosic materials, the distillery can continue to be used provided that a system is established for the breakdown of the cellulose. As a matter of fact, this particular technology is not economically available yet and the development of such technologies should not be allowed as an excuse for procrastinating in the use of known fermentation technologies.

Four, the manufacturing of alcohol is a product-oriented activity. At present, and foreseeable for some time, the backbone of the program remains a subsidy system. As described above, the distiller could receive his subsidy when he proves that he has produced x gallons of ethanol for which he has to buy, for example, $X/2.6$ bushels of corn. The distiller has thus the responsibility to buy up the corn from the farmer and this corn will not show up on the food market without getting the administration involved in the trade of corn as buyer and seller.

Five, the energy balance question has been unbelievably misrepresented. Starting out with the oil companies objections to a gasohol program, and following through with DOE studies and USDA publications, one encountered arguments that two units of energy inputs measured in Btu's are needed in order to produce one Btu of ethanol.

This argument missed out on several counts:

(a) The analysis was done with installations in mind that were built before one did any energy accounting.

(b) The use of Btu measurements is not justified when one talks of changes of a chemical energy to a mechanical energy in a motor vehicle engine. One has to introduce utility factors to correct for the misuse of the Btu unit. Otherwise one does not allow for credits for the fact that ethanol is an octane booster, and gasohol allows for actual gains in motor efficiency as measured in miles per gallon. All this despite the undisputed fact that ethanol does indeed have only about two-thirds the value of Btu's of gasoline.

(c) The oil industry and DOE have for a long time refused to analyze the end-use of the ethanol and a total energy balance should include both—the production of the ethanol and the replacement value of ethanol at the end-use stage. Studies I have performed in order to establish a factor for this second effect resulted in a value equal to 3.75. This gasoline displacement factor is made up of (I) a factor equal to 1.5 resulting from the difference in heat content between gasoline and ethanol when measured in Btu's; (II) a factor equal to 1.56 which results from the improved performance of the car as measured in miles per gallon by fleets in Nebraska and Illinois; and (III) a factor equal to 1.6 which results from the savings in petroleum when one avoids the manufacture of octane boosters via reforming processes. The DOE report of the alcohol fuels policy review, when compared to previous published DOE stands, went a long way to incorporate a major part of the argument.

To summarize this presentation:

One, it is amazing that we continue to subsidize the nonproduction of agricultural commodities while these could be used as a base for needed fuel additives.

Two, it is possible to design a policy that will allow the production of ethanol for fuel purposes without creating new subsidies, but rather by redesigning the way now existing fuels are being spent.

Three, the energy balance question is moot when viewed in the light of end-use effects of the product.

Four, a policy has to be stated clearly and implemented so that the risks in making capital investments in the construction of alcohol distilleries are minimized. The National Fuel Alcohol and Farm Commodity Production Act of 1979 does provide needed assurance to industry.

Thank you for having given me the opportunity to express my views on a subject that is close to my heart and which, without exaggeration, has indeed caused me an uneasy feeling about the future of this country. I am, though, gratified to find that some arguments I have presented about 1½ years ago are finally gaining acceptance.

Senator ZORINSKY. Thank you, Mr. Jawetz, for your fine testimony and contribution to the hearings which our committee has conducted.

Is there any additional comment other than your prepared testimony you would like to make?

Mr. JAWETZ. I received yesterday a presentation from the TOSCO Corp.—the former Oil Shale Corp.—which was made at a security analysts meeting and which I would like to introduce for the record.¹ Actually it includes all my arguments here about the need for additional crude in order to create an octane boosting fraction, if it is done in the refinery.

TOSCO was sort of congratulating itself for using its refineries highly valued product, and, of course, showing to its investors that this was done in the right way and promises profits for them.

Now, it probably is very correct under present conditions but I would like to submit here that this is a direct result of a lack of national policy. TOSCO actually says they have to use 9 percent more crude for their product which is higher valued, and the refinery, I guess, presents better investment possibilities. I would have preferred to have seen in a national policy rather a decrease in the need of import of crude, which probably would make unneeded this kind of operation. Ethanol could have supplied the needed octane booster while saving crude.

Senator ZORINSKY. Thank you for your testimony, Mr. Jawetz. I appreciate your taking time from your schedule to come here to present the testimony on possibilities of gasohol becoming a viable alternative for energy.

Thank you for coming.

Our committee hearing is adjourned.

[Whereupon, at 11:15 a.m., the hearing was adjourned, subject to call of the Chair.]

¹See p. 100 for above referred to report from TOSCO Corp.

APPENDIX

96TH CONGRESS
1ST SESSION

S. 850

To authorize the Secretary of Agriculture to guarantee loans for the construction and operation of fuel alcohol plants, to provide for a secure supply of feedstocks for the operation of such plants, to amend the Agricultural Act of 1949 with respect to the set-aside program for feed grains, and for other purposes.

IN THE SENATE OF THE UNITED STATES

APRIL 2 (legislative day, FEBRUARY 22), 1979

Mr. MCGOVERN (for himself, Mr. EXON, Mr. ZORINSKY, and Mr. CULVER) introduced the following bill; which was read twice and referred to the Committee on Agriculture, Nutrition, and Forestry

A BILL

To authorize the Secretary of Agriculture to guarantee loans for the construction and operation of fuel alcohol plants, to provide for a secure supply of feedstocks for the operation of such plants, to amend the Agricultural Act of 1949 with respect to the set-aside program for feed grains, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

II—E

1

SHORT TITLE

2

SECTION 1. This Act may be cited as the "National
3 Fuel Alcohol and Farm Commodity Production Act of
4 1979".

5

STATEMENT OF PURPOSE

6

SEC. 2. The purposes of this Act are—

7

(1) to contribute toward the development of a
8 secure liquid fuel supply in the United States by pro-
9 viding the foundation for a viable fuel alcohol industry;

10

(2) to increase the security and enhance the eco-
11 nomic health of the United States;

12

(3) to improve and stabilize agricultural income
13 and reduce the role of the Federal Government in agri-
14 cultural commodity price support programs; and

15

(4) to establish a mechanism for implementing im-
16 proved natural resource practices on a broad scale.

17

FUEL ALCOHOL PLANT LOAN GUARANTEES

18

SEC. 3. Section 509 of the Rural Development Act of
19 1972 (7 U.S.C. 2669) is amended to read as follows:

20

"SEC. 509. FUEL ALCOHOL PLANT LOAN GUARAN-
21 TEES.—(a) In order to assist persons, including any public,
22 private, or cooperative organization, in the construction and
23 maintenance of plants for the production of fuel alcohol de-
24 rived from corn and other agricultural commodities and for
25 purposes of stabilizing and expanding the market for such

1 commodities and products and expanding the Nation's supply
2 of fuel alcohols, the Secretary is authorized—

3 “(1) to guarantee payment of 50 per centum of
4 the loans made by private lenders to such persons for
5 the construction and operation of fuel alcohol plants;

6 “(2) to sell corn to recipients of loans guaranteed
7 under this section and to other persons operating fuel
8 alcohol plants in accordance with subsection (e);

9 “(3) to acquire and use distilled dried grain in ac-
10 cordance with subsection (g); and

11 “(4) to make such regulations, enter such con-
12 tracts, and take such other actions as may be neces-
13 sary to carry out this section.

14 “(b) No loan may be guaranteed under this section
15 unless an application therefor has been submitted to and ap-
16 proved by the Secretary. Such application shall be submitted
17 in such form and according to such procedures as the Secre-
18 tary may require by regulation. Such application shall con-
19 tain—

20 “(1) assurances by the applicant that any loan
21 guaranteed under this section shall be used for the con-
22 struction and operation of plants for the production of
23 fuel alcohol from corn and other agricultural commod-
24 ities;

1 “(2) information concerning the total cost of the
2 construction of the plant for which such loan is sought,
3 estimates of the operating costs and income to be de-
4 rived from the operation of such plant, and any other
5 financial information the Secretary may require;

6 “(3) assurances that the applicant will keep such
7 records and afford such access thereto, and make such
8 reports, in such form, at such times, and containing
9 such information, as the Secretary may require by reg-
10 ulation; and

11 “(4) such other information or assurances as the
12 Secretary may require.

13 “(c) A loan may be guaranteed under this section only
14 if—

15 “(1) such loan is for a term not in excess of
16 twenty years;

17 “(2) the Secretary determines that the terms, con-
18 ditions, maturity, security (if any), and schedule and
19 amounts of repayments with respect to such loan are
20 reasonable and meet such standards as the Secretary
21 determines by regulation as sufficient to protect the fi-
22 nancial interests of the United States, taking into ac-
23 count the range of interest rates prevailing in the pri-
24 vate market for similar loans guaranteed by the United
25 States;

1 “(3) the Secretary determines that the applicant is
2 unable without a guarantee under this section to obtain
3 sufficient credit elsewhere to finance the construction
4 and operation of the plant for which such loan is
5 sought at reasonable rates and terms, taking into con-
6 sideration prevailing private and cooperative rates and
7 terms for loans for similar purposes and periods of
8 time;

9 “(4) the applicant for such loan guarantee demon-
10 strates to the satisfaction of the Secretary that such
11 applicant has taken steps, including using cogeneration
12 heat from existing energy facilities, generation of
13 energy input by the use of solar or other renewable
14 energy sources, or the burning of crop residues and
15 other renewable resource residues, to insure that the
16 total energy content of the fuel alcohol and byproducts
17 to be manufactured by such applicant will exceed the
18 total energy input from petroleum or petroleum-based
19 products to be used in the manufacture of such fuel al-
20 cohol and byproducts;

21 “(5) such applicant will pay to the Secretary 1
22 cent per gallon of fuel alcohol produced at such plant;
23 and

24 “(6) such other conditions as the Secretary deems
25 appropriate to achieve the purposes of this section and

1 to protect the financial interests of the United States
2 are met.

3 “(d) For the period beginning on October 1, 1979, and
4 ending on September 30, 1984, the cumulative total of the
5 principal of and interest on loans outstanding at any time
6 guaranteed under this section shall not exceed \$600,000,000.

7 “(e)(1) In order to assure that the recipients of loans for
8 plants guaranteed under this section and other persons oper-
9 ating plants for the production of fuel alcohol have a depend-
10 able supply of agricultural commodities at a stable price for
11 use in such plants, the Secretary is authorized to enter into
12 long-term sales contracts, not exceeding five years, with such
13 recipients and such other persons to sell annually to such
14 recipients and such other persons a specified quantity of corn
15 at a specified price and upon specified terms of delivery. Such
16 corn shall be sold at a mutually agreed upon price not in
17 excess of 50 per centum of the established price for such
18 corn. For purposes of this paragraph, the established price of
19 corn means the established price for corn under section 105
20 of the Agricultural Act of 1949 (7 U.S.C. 1444b) for the crop
21 year of such corn.

22 “(2) Any sales contract under this subsection shall
23 provide—

24 “(A) that any buyer of corn under this subsection,
25 except persons receiving loan guarantees under this

1 section, will pay to the Secretary 1 cent per gallon of
2 fuel alcohol produced from such corn;

3 "(B) that any corn purchased under such contract
4 shall be used primarily for the production of fuel
5 alcohol;

6 "(C) that fuel alcohol produced from such corn
7 will be used only for the blending with and extension
8 of gasoline or other fossil fuels for use as fuel in inter-
9 nal combustion engines or for use as other industrial
10 fuel; and

11 "(D) that any buyer of such corn shall make
12 available at no cost to the Secretary such amounts of
13 distilled dried grain produced from such corn as the
14 Secretary may request.

15 "(3) Any distilled dried grain acquired by the Secretary
16 under this section shall become a part of the stocks of agri-
17 cultural commodities of the Commodity Credit Corporation.

18 "(f) The Secretary shall make available for sale under
19 subsection (e) in any fiscal year an amount of corn equal to
20 no less than 50 per centum of the amount of corn acquired by
21 the Secretary pursuant to section 105(d)(2) of the Agricultur-
22 al Act of 1949 (7 U.S.C. 1444b(d)(2)) in the last two crop
23 years immediately preceding such fiscal year. No corn shall
24 be sold under this section in any fiscal year to any person
25 other than a loan guarantee recipient under this section until

1 after all obligations of the Secretary to supply corn to such
2 loan guarantee recipients under contracts for such fiscal year
3 have been met.

4 “(g)(1) The Secretary may acquire under subsection
5 (e)(2)(D) and use such amounts of distilled dried grain as may
6 be necessary—

7 “(A) to maintain a reserve of distilled dried grain
8 for purposes of meeting obligations of the Secretary for
9 export of agricultural commodities; and

10 “(B) for such other purposes consistent with this
11 subsection as the Secretary may determine.

12 “(2) The Secretary shall acquire under subsection
13 (e)(2)(D) and use such amounts of distilled dried grain as may
14 be necessary to prevent a reduction in the market price in the
15 United States for soybean and other agricultural commodities
16 used in the production of protein supplements.

17 “(h) For purposes of complying with contracts entered
18 into under subsection (e), the Secretary shall supply corn—

19 “(1) from Commodity Credit Corporation stocks;
20 or

21 “(2) from corn purchased by the Secretary from
22 domestic producers.

23 “(i) This section shall be carried out by the Secretary
24 through the Commodity Credit Corporation.

1 “(j)(1) There is established in the Treasury of the United
2 States a revolving fund to be called the Fuel Alcohol Plant
3 Loan Guarantee Fund (hereafter in this section referred to as
4 the ‘Fund’) which, to the extent provided in advance by ap-
5 propriation Acts, shall be available to the Secretary without
6 fiscal year limitation to carry out the purposes of this section.

7 “(2) There shall be deposited in the Fund—

8 “(A) amounts received pursuant to subsections
9 (c)(5) and (e)(2)(A);

10 “(B) amounts appropriated for use by the Secre-
11 tary to carry out this section; and

12 “(C) interest which may be earned on investments
13 of the Fund.

14 “(3) There shall be on deposit at any time in the Fund
15 an amount sufficient to cover no less than 10 per centum of
16 the amount of principal of and interest on loans guaranteed at
17 such time under this section.

18 “(4) If the Secretary determines that the moneys of the
19 Fund are in excess of current needs, he may request the in-
20 vestment of such amounts he deems advisable by the Secre-
21 tary of the Treasury in obligations of, or obligations guaran-
22 teed by, the Government of the United States, and, with the
23 approval of the Secretary of the Treasury, in such other obli-
24 gations or securities as the Secretary deems appropriate.

1 “(5) With the approval of the Secretary of the Treasury,
2 the Secretary may deposit moneys of the Fund in any Feder-
3 al Reserve bank, any depository for public funds, or in such
4 other places and in such manner as the Secretary and the
5 Secretary of the Treasury may mutually agree.

6 “(6) Effective for the fiscal year ending on September
7 30, 1980, there is authorized to be appropriated \$60,000,000
8 for deposit in the Fund.

9 “(k) For purposes of this section—

10 “(1) the term ‘corn’ shall have the meaning pre-
11 scribed for it in section 105 of the Agricultural Act of
12 1949 (7 U.S.C. 1444b);

13 “(2) the term ‘distilled dried grain’ means the
14 dried, coarse residue of corn remaining after initial
15 screening in the production of fuel alcohols which con-
16 tains digestible protein and which can be made suitable
17 for human and animal consumption; and

18 “(3) the term ‘fuel alcohol’ means the chemical
19 compound represented by the following formula:
20 C₆H₅OH.”.

21 AMENDMENTS TO THE AGRICULTURAL ACT OF 1949

22 SEC. 4. Section 105 of the Agricultural Act of 1949 (7
23 U.S.C. 1444b) is amended to read as follows:

24 “FEED GRAIN LOAN RATES AND TARGET PRICES

25 “SEC. 105. Notwithstanding any other provision of law:

1 “(a)(1) The Secretary shall make available to producers
2 on farms loans and purchases for each crop of corn at such
3 level, not less than \$2.10 per bushel, as the Secretary deter-
4 mines will allow for the export of feed grains and provide a
5 sufficient stock of feed grains for the production of fuel alco-
6 hol but will not result in an excessive stock of feed grains in
7 the United States.

8 “(2) The Secretary shall make available to producers on
9 farms loans and purchases on each crop of barley, oats, and
10 rye, respectively, at such level as the Secretary determines is
11 fair and reasonable in relation to the level that loans and
12 purchases are made available for corn, taking into considera-
13 tion the feeding value of such commodity in relation to corn
14 and other factors specified in section 401(b) of this Act, and
15 on each crop of grain sorghums at such level as the Secretary
16 determines is fair and reasonable in relation to the level that
17 loans and purchases are made available for corn, taking into
18 consideration the feeding value and average transportation
19 costs to market of grain sorghums in relation to corn.

20 “(b)(1)(A) In addition, the Secretary shall make availa-
21 ble to producers on farms payments for each crop of corn,
22 grain sorghums, and, if designated by the Secretary, oats and
23 barley, in an amount computed as provided in this subsection.
24 Payments for any crop shall be computed by multiplying (i)

1 the payment rate for such crop by (ii) the number of bushels
2 of such crop produced on the farm.

3 “(B)(i) The payment rate for corn shall be the amount
4 by which the higher of—

5 “(I) the weighted average market price received
6 by farmers during the first five months of the market-
7 ing year for such crop in the respective State in which
8 each farmer resides, as determined by the Secretary, or

9 “(II) the loan level determined under subsection
10 (a) for such crop
11 is less than the established price per bushel.

12 “(ii) For purposes of clause (i), the established price for
13 corn shall be \$2.50 per bushel in the case of the 1980 crop.
14 For each crop thereafter, the established price shall be the
15 established price for the previous year’s crop adjusted to re-
16 flect any change in (I) the average adjusted cost of produc-
17 tion for the two crop years immediately preceding the year
18 for which the determination is made from (II) the average
19 adjusted cost of production for the two crop years immediate-
20 ly preceding the year previous to the year for which such
21 determination is made.

22 “(iii) The adjusted cost of production for a crop year
23 shall be determined by the Secretary on the basis of such
24 information as the Secretary finds necessary and appropriate
25 for the purpose and shall be limited to (I) variable costs, (II)

1 machinery ownership costs, and (III) general farm overhead
2 costs, allocated to the crops involved on the basis of the pro-
3 portion of the value of the total production derived from each
4 crop.

5 “(C) The payment rate for sorghums, and, if designated
6 by the Secretary, oats and barley, shall be such rate as the
7 Secretary determines fair and reasonable in relation to the
8 rate at which payments are made available for corn.

9 “(D) The total number of bushels on which payments
10 would otherwise be payable to producers on farms for any
11 crop under this paragraph shall be reduced by the number of
12 bushels on which any disaster payment is made to such pro-
13 ducers for such crop under paragraph (2) of this subsection.

14 “(2)(A) If the Secretary determines that because of
15 drought, flood, or other natural disaster, or other condition
16 beyond the control of producers on farms, such producers are
17 prevented from planting to feed grains or other nonconserv-
18 ing crops any acreage intended for feed grains, the Secretary
19 shall make a prevented planting disaster payment to such
20 producers on the number of acres so affected. The amount of
21 any prevented planting disaster payment to producers on
22 farms shall not exceed an amount computed by multiplying (i)
23 $33\frac{1}{3}$ per centum of the established price per bushel for feed
24 grains by (ii) 75 per centum of the farm program payment
25 yield for feed grains established by the Secretary for the

1 acreage planted by such producer to feed grains for harvest
2 (including any acreage which the producers were prevented
3 from planting to feed grains or other nonconserving crop in
4 lieu of feed grains because of drought, flood, or other natural
5 disaster, or other condition beyond the control of the produc-
6 ers) in the immediately preceding year.

7 “(B) If the Secretary determines that because of
8 drought, flood, or other natural disaster, or other condition
9 beyond the control of producers on farms, the total number of
10 bushels of any crop of feed grains harvested by such produc-
11 ers from acreage planted to such crop on any farm is less
12 than 60 per centum of the farm program payment yield es-
13 tablished by the Secretary for such crop for such acreage, the
14 Secretary shall make a farm disaster payment to such pro-
15 ducers in an amount equal to 50 per centum of the estab-
16 lished price per bushel for each bushel by which such 60 per
17 centum exceeds the actual number of bushels harvested from
18 such acreage.

19 “(c) The Secretary shall provide for the sharing of pay-
20 ments made under this section for any farm among producers
21 on such farm on a fair and equitable basis.

22 “(d) If the operator of a farm desires to participate in
23 the program under this section, the operator shall file an
24 agreement to do so no later than such date as the Secretary
25 may prescribe. Loans, purchases, and payments under this

1 section shall be made available to producers on such farm
2 only if—

3 “(1) the producers agree to devote and devote the
4 total acreage of such farm to approved soil conserving
5 uses and best management practices as the Secretary
6 shall prescribe; and

7 “(2) the producers agree to sell to the Secretary
8 after harvest no less than 10 per centum of any crop
9 produced on such farm in any crop year at the estab-
10 lished price for such crop for such crop year.

11 The Secretary may, by mutual agreement with the produc-
12 ers, terminate or modify any agreement entered into pursuant
13 to this subsection if the Secretary determines that such action
14 is necessary because of an emergency created by drought or
15 other disaster, or in order to prevent or alleviate a shortage
16 in the supply of agricultural commodities.

17 “(e) In any case in which the failure of a producer to
18 comply fully with the terms and conditions of the program
19 under this section precludes the making of loans, purchases,
20 and payments, the Secretary may, nevertheless, make such
21 loans, purchases, and payments in such amounts as the Sec-
22 retary determines to be equitable in relation to the serious-
23 ness of the default.

1 “(f) The Secretary is authorized to issue such regula-
2 tions as the Secretary determines necessary to carry out this
3 section.

4 “(g) The Secretary shall carry out the program author-
5 ized by this section through the Commodity Credit
6 Corporation.”.

7

GRANTS FOR RESEARCH

8 SEC. 5. Section 1419 of the Food and Agriculture Act
9 of 1977 (7 U.S.C. 3154) is amended by inserting after the
10 first sentence the following new sentence: “At least 25 per
11 centum of the amount appropriated in any fiscal year for pur-
12 poses of carrying out this section shall be made available for
13 grants under this section for the purpose of conducting re-
14 search relating to the identification and development of agri-
15 cultural commodities, including alfalfa, sweet sorghum, and
16 black locust, which are useable in the production of agricul-
17 tural chemicals and fuel alcohol, the production of which
18 commodities performs a natural soil conservation function, in-
19 cluding nitrogen fixation, and for the production of which
20 commodities croplands used in the production of other agri-
21 cultural commodities for which there is a chronic oversupply
22 may be diverted economically.”.

23

CONFORMING AMENDMENTS

24 SEC. 6. (a) Section 105A of the Agricultural Act of
25 1949 (7 U.S.C. 1444c) is amended—

1 (1) in subsection (a)(1) by striking out "1981" and
2 insert in lieu thereof "1979";

3 (2) in subsection (a)(2) by striking out "1981" and
4 insert in lieu thereof "1979";

5 (3) in subsection (b)(1)(A)—

6 (A) by striking out "1977 through 1981"
7 and inserting in lieu thereof "1977 through
8 1979"; and

9 (B) by striking out "1978 through 1981"
10 each time it occurs and inserting in lieu thereof
11 "1978 and 1979";

12 (4) in subsection (b)(1)(B) by striking out "through
13 1981"; and

14 (5) in subsection (d)(1) by striking out "1978
15 through 1981" and inserting in lieu thereof "1978 and
16 1979".

17 (b) Section 101 of the Food and Agriculture Act of 1977
18 (7 U.S.C. 1308) is amended in paragraph (1)(C) by striking
19 out "feed grains,".

20 (c) Section 501 of the Food and Agriculture Act of 1977
21 is amended by striking out "SEC. 501. Effective only for the
22 1977 through 1981 crops," and inserting in lieu thereof the
23 following: "SEC. 501. Effective only for the 1977 through
24 1979 crops,".

1 (d) Section 502 of the Food and Agriculture Act of 1977
2 is amended by striking out "1977 through 1981" and insert-
3 ing in lieu thereof "1977 through 1979".

4 (e) Section 503 of the Food and Agriculture Act of 1977
5 is amended by striking out "1977 through 1981" and insert-
6 ing in lieu thereof "1977 through 1979".

7 EFFECTIVE DATE PROVISIONS

8 SEC. 7. (a) The amendments made by section 3 of this
9 Act shall take effect on October 1, 1979.

10 (b) The amendments made by section 4 of this Act shall
11 be effective beginning with the 1980 crop of feed grains.

12 (c) The amendments made by section 5 of this Act shall
13 apply with respect to grants made under section 1419 of the
14 Food and Agriculture Act of 1977 (7 U.S.C. 3154), as
15 amended by section 5 of this Act, beginning with the fiscal
16 year ending on September 30, 1980.

17 (d) The amendments made by section 6 of this Act shall
18 take effect on the date of enactment of this Act.

STATEMENT OF HON. GEORGE MCGOVERN, A U.S. SENATOR FROM SOUTH DAKOTA

Less than eighteen months ago, the Department of Energy issued its formal position paper on Alcohol Fuels. Despite the fact that several midwestern states had already begun selling gasohol and demand exceeded supply, the Department's position on the future of this resource was decidedly cool.

The report implied that ethanol production from agricultural commodities resulted in a negative energy balance and concluded that:

Research and development are being conducted to increase crop yields, reduce processing time, and utilize energy conservation and other approaches which would increase energy use and economics, but it is not likely that these will give savings large enough to enable ethanol to compete national with other alternatives.

Regardless of the Department's initially lukewarm response to alcohol fuels and gasohol, today over twenty-eight states, including my state of South Dakota, are now actively selling gasohol in over 800 retail outlets.

As a result of increased Congressional and public interest in the rapid commercialization of alcohol fuels, the Department of Energy embarked on another analysis which was released just last week. This report thankfully represents a marked departure from their previous position and concludes that alcohol fuel production has a positive net energy balance and can make a significant contribution to minimizing fuel imports.

Over the past year, Congress has acted to ease alcohol fuel development. We have exempted the Federal motor fuel excise tax for fuel containing alcohol and the Senate has recently passed a major loan guarantee program which will assist in the rapid development of alcohol fuel plants.

We have also established the National Alcohol Fuels Commission which is charged with the development of a strong Federal alcohol fuels policy. I am pleased to be a Member of this Commission, representing the Senate Agriculture Committee.

Despite these recent successes, alcohol fuel production and gasohol use face several serious barriers. Major disagreements have arisen among both supporters and critics of gasohol as to whether production should be accomplished through large corporate owned facilities—or whether special incentives should be provided to encourage on farm production or through farmer cooperatives.

There is no doubt in my mind that under existing Federal regulations and policies, that large scale corporate production of alcohol fuels has the distinct advantage.

To my way of thinking, however, it is the responsibility of this Committee and the Administration to determine the feasibility of smaller plant development and to determine if special economic benefits would accrue to alcohol fuel development located in or near agricultural producing areas. If we find this to be true, then we must take steps to encourage rapid development.

The jury is in on alcohol fuel potential. The old arguments of negative energy balance, cost of production, and significant motor vehicle adjustments necessary for continued use of this fuel no longer hold any water.

We know how to produce it, market it, and use it—and we know that it is efficient. There is a growing grassroots movement in this nation committed to gasohol and given our critical national energy supply situation, we must make every effort to move ahead.

The National Fuel Alcohol and Farm Commodity Production Act (S. 850) may be one vehicle to encourage such development. I continue to have several reservations about this particular proposal, but I have no doubt that it can be amended to achieve many of our needs.

I look forward to the testimony we will receive throughout these hearings, and in the interest of establishing truly effective legislation, I hope you will stay in touch with the Committee in the coming months.

STATEMENT OF HON. BERKLEY BEDELL, A REPRESENTATIVE IN CONGRESS FROM THE SIXTH CONGRESSIONAL DISTRICT OF IOWA

Mr. Chairman, it is with a great deal of pleasure that I appear before the subcommittee today in support of S. 850, "The National Alcohol Fuel and Farm Commodity Production Act of 1979." As you know, I have authored a companion bill, H.R. 3905, which is scheduled for mark-up tomorrow and Thursday in the House Agriculture Committee.

Mr. Chairman, I believe that S. 850 is needed for two basic reasons. First of all, it provides for loan guarantees for the construction of alcohol fuel plants both large and small. I believe that it is absolutely critical that we recognize that the construc-

tion of these alcohol plants must be our number one priority. Advocates of alcohol fuels, including you, myself, and a number of others, have spent considerable effort in the past several months dispelling myths from the detractors of alcohol fuels. Now that we have addressed the concerns of those who claimed that alcohol production resulted in a negative impact on our energy supplies, was not economically feasible, and posed a substantial threat to our food and feed stocks, it is imperative that we act immediately to encourage the construction of alcohol production facilities.

Second, the legislation changes the basic thrust of our established farm policy so that agriculture may better accommodate a national alcohol fuels program. In order that farmers may become producers of energy as well as food and feedstuffs, S. 850 provides for the gradual replacement of our feed grain set-aside program. In its place, the measure encourages farmers to produce to their maximum potential, as long as they adhere to specified conservation practices. By reversing a national agricultural policy that for almost 60 years relied on production adjustment as a means of increasing farm commodity prices, S. 850 advances a mechanism for the government to withdraw from its traditional price support activities.

There is no solution to our present energy crisis. There are solutions. Alcohol fuel production is one means by which we can begin to reduce our dangerous dependence on foreign oil. It is important to recognize, however, as the recently-released Department of Energy alcohol fuels report concluded, that ethyl alcohol "is the only alternative fuel commercially available now, and the only one likely to be available in quantity before 1985." Farmers can become energy independent by producing alcohol in small on-the-farm distilleries, and burning that alcohol straight in their tractors and pickups. Alcohol produced by the larger facilities can prove of critical immediate importance as an octane-boosting additive in unleaded gasoline. Alcohol is a renewable, environmentally sound fuel whose potential is limited only by our ability to secure and process cellulosic materials.

I welcome the subcommittee's timely hearings on S. 850, and I am hopeful that the legislation will soon win the committee's attention. I am looking forward to the opportunity to work with the committee in assuring the bill's prompt enactment into law.

STATEMENT BY WELDON BARTON, DIRECTOR, OFFICE OF ENERGY, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman, members of the committee, I am Weldon Barton, Director of the Office of Energy of the Department of Agriculture. I am pleased to testify today on S. 850.

The Department of Agriculture vigorously endorses the development of a domestic alcohol industry, including gasohol containing ethanol made from agricultural and forestry feedstocks. We have taken the position that emphasis should be placed upon residue materials for feedstock, in order to minimize feedstock costs and energy consumption in producing the ethanol and to reduce the impact upon commodities per se (corn, sugar, etc.) which are used as food and feed sources.

The Department of Agriculture has taken or is taking several actions specifically in support of gasohol. First, the Department is assisting pilot projects for fuel-grade ethanol production under Section 1420 of the Food and Agriculture Act of 1977. USDA has made tentative commitments of \$42.7 million loan guarantees, which will assist in financing four pilot projects to convert agricultural and forestry commodities into energy. Two of these projects will produce fuel-grade ethanol. One is designed to produce ethanol out of cellulose materials from sugar cane, using a new conversion technology. The other will demonstrate the commercial use of sweet sorghum as a feedstock for ethanol production. Together, these two projects, involving \$30 million in government loan guarantees, should assist significantly in the development and testing of new technologies and feedstocks for the production of fuel-grade alcohol.

Second, the Department is expanding its research and development work on alcohol fuels. For fiscal year 1980, we are programming almost \$6 million of Department of Agriculture funds for this work. About \$3.9 million of this is programmed for the field testing of new crop varieties suitable for use as ethanol feedstocks and for the development of more efficient methods to convert agricultural materials into ethanol. An additional \$2 million is programmed for design work on small-scale, on-farm technologies for producing fuel and combustible methane.

Third, the Congress in Title II of the Emergency Agriculture Act of 1978 authorized the Secretary of Agriculture to scale back, or use, set-aside acreage in order to make land available to grow crops for use in the manufacture of fuel ethanol. The Department intends to use that authority to the full extent that there is a demon-

strated market demand for additional production to provide feedstock to alcohol distilleries. The need for agricultural commodities for fuel alcohol feedstocks will be fully taken into account in decisions on set-aside acreage, so that insofar as possible we will make sure that feedstock availability is not a delaying factor in the production of alcohol fuels.

Fourth, the Department is prepared to take fully into account the feedstock requirements of fuel alcohol distilleries, in determining and maintaining the proper level of grain reserves. The fluctuations in grain supplies and prices will be a problem for alcohol distilleries throughout the life of the distillation plants. Our grain reserve policy can accommodate grain alcohol production for fuels, by providing a measure of year-to-year stabilization of grain feedstock supplies and costs. If the reserve availability is then supplemented with hedging practices by the distilleries, probably this will provide the most effective support to gasohol, from the grain feedstock perspective, that is possible under the circumstances.

In sum, the Department of Agriculture intends to take constructive action toward making land and feedstocks available to support fuel alcohol production. Congress, in our view, has provided sufficient authority in the 1977 and 1978 Agricultural Acts to enable the USDA to meet those responsibilities.

Mr. Chairman, with respect to S. 850 which is before the committee, I will not go into detail in this prepared statement. In considering specific ways to develop alcohol fuels, it is incumbent upon all of us to make sure that we do not make changes in agricultural policy that might prove counter productive to farm producers or other segments of the economy.

We are aware that you are currently considering certain changes in S. 850. Rather than comment on specific details of S. 850, therefore, we have limited the remainder of this statement to the following basic points, which in our view should be considered for any alcohol fuels program:

First, in view of the uncertainty about future land availability and productivity in U.S. agriculture—and therefore about the production resources that can be devoted to biomass production for fuel use—any initial goal or commitment to fuel ethanol production should be limited to a volume which will not have substantial impacts on the price of meats and other foods, the availability of corn for export, and the markets of soybeans and other high-protein feedstuffs.

Second, government support should be primarily in the form of generic incentives, such as tax waivers and investment tax credits, which leave the detailed decisions to the private sector on how best to develop and manage alcohol fuels plants and an alcohol fuels industry. A very powerful general incentive is already in place: the waiver of the 4 cents Federal excise tax on gasohol. This amounts to an incentive of 40 cents per gallon of ethanol, or \$16.80 per barrel; about the price of a barrel of crude oil.

The President announced in Des Moines, Iowa, on April 5, 1979, that the Administration supports extension of the 4 cents per gallon excise tax exemption beyond its October 1, 1984 expiration date. Such an action would be highly conducive to new plant construction, since it would provide a reliable basis for continuation of the 40 cents per gallon incentive on ethanol during the productive life of new plants.

Third, the USDA does not support the attachment of financial incentives on a selective basis to particular ethanol feedstocks—for instance, to grains as feedstocks, for at least two reasons:

(a) If the government provides a particular commodity to alcohol distilleries at below-market prices, this will disrupt the normal market forces which encourages the lowest-cost materials to be used as feedstocks for fuel alcohol production. Whereas residues (citrus pulp, dairy residues, sulfite liquors from wood pulping, etc.) would ordinarily be used as feedstocks for ethanol prior to the use of agricultural commodities per se, attachment of a special incentive to agricultural commodities such as corn could induce the bypassing of the lower-cost residue materials in favor of the commodities themselves as feedstocks. Such an incentive would also slow down the development of technology for utilization of cellulosic residues, wastes, and new commodities for alcohol fuel production.

(b) If the government provided corn or other agricultural commodities at below-market prices to fuel alcohol distilleries, use of those commodities for food and feed would become a residual claimant after the alcohol feedstock requirements were satisfied. This could have adverse consequences on domestic food prices and on the meeting of U.S. export obligations.

Fourth, a stable supply of feedstocks for alcohol distilleries can be achieved without involvement by the Secretary in the buying and selling of feedstock materials. If residues rather than agricultural commodities per se are used as feedstocks, the private firm would necessarily have to manage dependable feedstock arrangements without the Secretary's intervention. If grain was used as feedstock material,

adjustments in the farmer-held grain reserve targets to take into consideration fuel alcohol plant needs, supplemented with hedging practices by the distilleries, can provide the necessary stability of feedstock supply for fuel alcohol distilleries.

Fifth, we endorse the practice followed in the enactment of the Food and Agricultural Act of 1977, whereby provisions related to alcohol fuels and other agricultural energy provisions were considered as adjuncts to the periodic extension of farm program legislation. The USDA does not support changes in the feed grains program or other basic farm programs at this time. Such changes are unnecessary and would be premature.

Sixth, with respect to loan guarantees for the construction of alcohol distilleries, as an incentive to encourage a fuel alcohol industry, we are currently carrying out the loan guarantee authorities under Section 1420 of the Food and Agricultural Act of 1977. The Farmers Home Administration has existing loan authorities which can be applied to alcohol plants, and FmHA has made a commitment to assist an on-farm facility in South Dakota.

Mr. Chairman, the Administration will be submitting legislation to create an independent Energy Security Corporation with overall Federal responsibility for the development of new energy supplies from coal, oil shale, gasohol from plant products and other sources. The Department of Agriculture recommends that action on legislation such as S. 850 which would treat gasohol from agricultural materials separately from other new fuel sources be deferred, until such legislation can be considered with the Administration proposal to create the Energy Security Corporation. We would be pleased to work with you and this Committee on policies to encourage gasohol production within the context of overall new fuels policy proposals including the Energy Security Corporation.

This concludes my prepared statement, Mr. Chairman. I would be pleased to respond to any questions.

STATEMENT OF ALVIN L. ALM, ASSISTANT SECRETARY FOR POLICY AND
EVALUATION, U.S. DEPARTMENT OF ENERGY

Mr. Chairman and members of the Committee, I am pleased to be here to discuss the Department of Energy's policies with regard to alcohol fuels. Before talking about the specific Department of Energy policies and findings on alcohol fuels, I would like to take a moment to discuss the Administration's broader energy policy and President Carter's recent statements on gasohol.

Our Nation is in a period of transition. Soaring OPEC oil prices and estimates of future world oil production capacity underscore the need to reduce dependence of foreign sources of petroleum and to increase domestic production. Future petroleum shortages will impact most heavily on the transportation sector. In 1978, 10 million barrels per day, or more than half the total U.S. Petroleum consumption, was used for transportation. Of this amount, about 75 percent, or 7.4 million barrels of oil per day was consumed by automobiles.

This Administration is developing a long term national energy policy that will reduce dependence on foreign oil in the short term and develop renewable and essentially inexhaustible sources of energy in the long term. In order to meet these objectives, development of alternative sources of liquid fuels will be necessary.

RECENT INITIATIVES IN SUPPORT OF ALCOHOL FUELS

In recognition of alcohol fuel's potential to help extend liquid fuel supplies, the Administration over the past several months, has taken major steps to increase the availability and use of gasohol.

These major actions include: Presidential recommendation to extend permanently the exemption from the Federal motor fuel excise tax for fuel containing alcohol made from sources other than petroleum, natural gas, or coal.

A 10 percent additional investment tax credit for facilities that convert alternate substances or feedstocks (including coal and biomass) into "synthetic liquid fuels" (Title III of the Energy Tax Act of 1978).

Federal assistance of \$11 million in loans, grants, and loan guarantees to help construct 100 small-scale plants to produce alcohol fuels.

A Presidential directive to use gasohol in the Federal fleet where available.

Presidential directive to simplify and reduce Federal reporting requirements for alcohol fuels producers.

Allocation of Comprehensive Employment and Training Act (CETA) positions to help build energy production facilities, including small-scale alcohol conversion facilities.

In addition to these actions, President Carter further underscored the Administration's commitment to the development of alcohol fuels from agricultural resources in his address to the nation on July 15. The development of alcohol fuels will continue to receive high priority in our efforts to reduce dependence on foreign sources of petroleum.

ALCOHOL FUELS POLICY REVIEW

The President's initiatives are based in part on the extensive information and recommendations developed by the Department of Energy in a comprehensive evaluation of alcohol fuels conducted by the Department's Alcohol Fuels Policy Review. This Department-wide task force was established by the Under Secretary of Energy in July 1978. As head of that task force, I was charged with the responsibility of assessing the full potential of alcohol fuels through a series of key policy studies, and for determining what additional Federal steps should be taken to further the development of alcohol fuels.

As part of its study, the Alcohol Fuels Policy Review conducted extensive public hearings to give interested members of the public an opportunity to present their views on key issues, relating to alcohol fuels. Members of Congress, State legislators, industry officials, farmers, private citizens, consumer groups, and representatives of States organizations and agencies testified. Department officials travelled in the field to talk with large and small scale producers to ensure that adequate information was received from all sources. We consider the information and recommendations received as part of these public meetings a valuable input into the Department of Energy's recommendations on alcohol fuels.

PRIVATE SECTOR INITIATIVE

Over the past year, we have witnessed a growing support and enthusiasm for alcohol fuels. A genuine grass roots movement has developed, giving alcohol fuels and unprecedented broad base of support. This growth in alcohol fuels production and use has already begun to augment the nation's supply of liquid fuel. Equally important, it has visibly demonstrated the importance of States and private sector efforts in developing energy supplies.

The Department of Energy welcomes and encourages the initiative demonstrated by the public and private sector to augment our energy supplies. We feel that this kind of public involvement in developing new energy resources should be continued, and is vital to securing a sound energy future for this nation. States, localities, companies, and individual citizens have played a key role in increasing our awareness of the potential of alcohol fuels by taking steps to produce and market the fuel. Their efforts are essential.

In assessing the contribution of alcohol fuels, it is important to note that no one energy source alone can solve our national energy problems. While it is clear that alcohol fuels cannot be a total or, in the near-term, even a major solution to our national energy needs, they do represent an important energy component and building block for the longer term. Our national energy needs must be met by actively conserving and aggressively developing contributions from a large number of energy supplies, building on our nation's abundant resources. Alcohol fuels represent important supplies based on the strength of the American agricultural system.

SUMMARY OF MAIN FINDINGS OF DEPARTMENT OF ENERGY STUDY

Last week, it was my pleasure to release officially the Report of the Alcohol Fuels Policy Review. I would like to note here some of its principal findings and recommendations.

Alcohol fuels (both ethanol and methanol) can contribute to U.S. Energy Resources by using domestic, renewable resources and coal to extend supplies of high-quality liquid fuels. Indeed, ethanol is the only alternative fuel commercially available now, and the only one likely to be available in quantity before 1985. Methanol can be made from coal using commercially available technology, and could be produced in large quantities in the mid-to-late 1980's, when plants—if begun soon—could be completed and begin operating.

Maximizing ethanol's contribution will require minimizing the use of oil and gas in producing feedstocks and in converting them to alcohol.

ALCOHOL'S POTENTIAL FOR PETROLEUM SAVINGS

Blended with gasoline, alcohols can supplement U.S. oil supplies as motor fuel extenders and octane improvers. Indeed, in the near term (1979 to 1985), the contribution will come primarily from alcohol blends with gasoline, especially gaso-

hol, a mixture of 10 percent ethanol and 90 percent gasoline. Gasohol can be burned in present motor vehicles with, at most, very minor materials or engine modifications. Adding the ethanol to unleaded gasoline not only extends gasoline supplies but also raises the octane.

This is particularly attractive at a time when higher octane leadfree gasolines are in short supply and other octane enhancers such as MMT and lead are under restrictions. Through the early 1980's, when U.S. octane-producing capacity may be limited, alcohol fuels may help to increase U.S. capability to produce unleaded gasoline and reduce energy losses that occur in the severe reforming of gasoline components.

For most of the 1980's, production capacity for converting raw materials to ethanol will limit the production and use of gasohol; supplies of raw materials will not be a limit.

Abundant supplies of raw materials are available, and far exceed the production capacity of alcohol plants expected to be operating by the mid 1980's.

Present incentives appear likely to increase ethanol fuel production from a current level of approximately 60 million gallons per year (4,000 barrels per day) to a level of approximately 300 million gallons per year by 1982, (20,000 barrels per day) with gasohol use thus reaching 3 billion gallons or 3% of present gasoline consumption. This increase in production capacity is likely to come predominantly from use of present unused distillery capacity and expansion of present facilities.

A permanent extension of the \$.04 per gallon Federal motor fuel excise tax exemption, for fuel containing biomass alcohol, as the President has proposed, would encourage investors to build new alcohol fuel facilities. By 1985, stimulated by these incentives, biomass, alcohol fuel production may be able to reach 500 to 600 million gallons per year. This quantity would be more than twice total U.S. ethanol production in 1977 (two-thirds of which came from petroleum) and five to eight times the biomass alcohol fuel production estimated for late 1979. It would substitute for 30,000 and 40,000 barrels per day of petroleum, and could result in reducing petroleum imports by as much as 0.3 to 0.4 percent if minimal petroleum is used in its manufacture.

In the long term, beyond 1985, ethanol use will depend on the amount of new conversion capacity built, on the availability of inexpensive feedstocks, on new developments in technology and their impact on costs, and on the relative costs of competing fuels. As crude oil and gasoline prices continue to climb, the cost of alcohol fuels may become more competitive with petroleum. Costs for ethanol fuels should be reduced by new technologies, especially those that reduce the capital and energy needed for conversion and those that improve the value of the coproducts produced with the alcohol.

Methanol from biomass and from coal is expected to play a larger role in the long term, as its use in turbines and other stationary equipment increases and as materials and engines are adapted to facilitate its extensive use in motor vehicles.

CURRENT FEDERAL INCENTIVES

Alcohol fuels now enjoy a wide range of government incentives. These include: The National Energy Act motor fuel excise tax exemption on gasoline/alcohol blends, worth \$0.40 per gallon of alcohol or \$16.80 per barrel of alcohol in ten percent blends (some states have also exempted these blends from state excise taxes).

Eligibility of alcohol fuels for Department of Energy's entitlements, worth roughly \$1.00 per barrel of ethanol or 2 to 3 cents per gallon.

Loan guarantees for alcohol pilot plants, administered through USDA.

In addition, alcohol fuels facilities will soon qualify for the 20 percent investment tax credit enacted in Title III of the Energy Tax Act of 1978.

The government also gives support through its research and development programs. The Department of Energy's research and development funding relating to alcohol fuels has increased from \$2.9 million in fiscal year 1977 to \$24.9 million in fiscal year 1980.

The Department of Energy has already taken steps to remove regulatory and institutional barriers to alcohol development. In 1978, the Department of Energy's Economic Regulatory Administration (ERA) adopted pricing regulations that encourage gasohol production by permitting the full cost of ethanol in gasohol to be passed through by retailers. To facilitate gasohol production, the Department's Office of Hearings and Appeals recently proposed to grant an exception to gasoline allocation rules to assure gasoline supply for gasohol blending to a gasohol marketing firm. ERA has proposed to permit the costs of alcohols added to gasoline to be allocated across all gasoline production, rather than only to gasohol, per se.

The Office of Hearings and Appeals also recently granted a stay of the refiner petroleum price regulations to permit a major petroleum refiner to begin marketing gasohol and reflect the cost of the alcohol directly in the gasohol selling price. The stay was granted pending adoption of a rulemaking by ERA to permit the same pricing flexibility for all refiners.

RAW MATERIAL SUPPLIES

The Department of Energy has devoted serious attention to assessing the potential of raw material supplies for alcohol production.

As discussed earlier, a key finding of our analysis is that through much of the 1980's, U.S. alcohol production will be limited by the capacity of the facilities that convert raw materials into alcohol. Supplies of surplus, distressed waste, and by-product materials suitable for alcohol production already greatly exceed the capacity to convert them, and are likely to continue to do so until the mid 1980's.

Through the mid-1980's, then there appears to be sufficient surplus and waste raw materials to meet any realistic projected level of alcohol production. Utilizing commercially available technology, there are enough raw materials available to yield 660 million gallons of ethanol per year (44,000 barrels per day) or 6.6 billion gallons of gasohol if conversion capacity were available. These feedstocks include food processing wastes and either distressed or substandard grain, which represent only 5-7 percent of existing corn and grain sorghum stocks.

The feedstocks that will be used to make alcohol fuels in the 1980's are not likely to be foodstuffs but rather waste materials and distressed products, as they are the lowest-cost feedstocks.

Very little food material need be consumed in producing alcohol fuels. In many instances, the alcohol is a coproduct of other food production processes. In fact, current practice is to produce alcohol from the by-products of corn sweetener plants, or from food processing wastes such as cheese whey and citrus wastes. This appears to be sound business practice, since the net costs of these waste materials could be quite low.

In addition, alcohol production from grain and municipal solid wastes yields a by-product that can potentially extend feed supplies. Recovering as co-products the proteins and nutrients present in many raw materials can improve alcohol economics and reduce possible conflicts between needs for food and needs for fuels. Producing ethanol by fermentation uses large fractions of the carbohydrates in vegetative material, but leaves proteins and minerals for the by-products and animal feed. Distillers Dried Grains and other similar high-quality by-products can be produced with the alcohol from many materials. Research is currently underway to use these as a food supplement.

There does not now appear to be a need to grow additional crops for alcohol production. Farmers may however, choose to grow crops specifically for that purpose; such decisions should be left to the private sector.

In the longer term, if alcohol fuel conversion capacity exceeds levels readily sustained from wastes and by-products, then it may be worth considering encouragement of additional crops—including energy crops, such as sweet sorghum, which do not compete with food, feed, and fiber, or of utilizing set-aside acreage for alcohol crop production. From our analysis, it appears that an upper limit of approximately 4.7 billion gallons per year (310,000 barrels per day) of ethanol could be produced from raw material supplies using existing technologies, if conversion capacity capable of processing these feedstocks existed. This upper limit assumes production from grain grown on set-aside acreage. However, USDA informs us that it is uncertain whether such acreage would be available in coming years, depending on domestic and foreign demand for food and feed. This upper limit would involve supplementing food processing wastes with sugar surpluses and fermentable municipal solid waste. Achieving this limit would be expensive, and would reduce the flexibility of U.S. agricultural land and restrict options for food production.

To accelerate the technical base for the longer term, the Department of Energy is sponsoring research to develop processes to convert cellulosic materials to ethanol. The design and development of alcohol plants with multifeedstock capability may become increasingly important to enable use of diverse feedstocks, and to avoid problems with fluctuations in supply that may occur as a result of planting variations, weather, domestic market fluctuations, variable export demands, and fluctuations in world prices. The potential that cellulosic materials offer for ethanol production could be quite large; how large depends on the technologies developed to convert them and on competing demands to use them for soil maintenance, direct burning, gasification, and methanol production.

THE NATIONAL FUEL ALCOHOL AND FARM COMMODITY PRODUCTION ACT OF 1979

I would now like to address S. 850, the National Fuel Alcohol and Farm Commodity Production Act of 1979. This bill would establish a \$600 million loan guarantee program for the construction of plants for production of alcohol made from agricultural commodities used for motor fuel. This bill would also eliminate the existing set-aside/land diversion control program for feed grains. Grain producers would be encouraged to go to full production with an established target price of \$2.50 per bushel (for corn) and a loan rate of \$2.10 per bushel of corn. Producers would be required at the request of USDA to make available 10 percent of their grain production for use as a feedstock for alcohol production.

The Department of Energy fully supports and encourages the production of alcohol fuels from renewable resources. And as I am sure you know, the President recently announced support for an Energy Security Corporation which would further support the development of gasohol. This proposed corporation would make investments in the production of synthetic fuels, including production capacity from biomass. Several key initiatives have already been taken to increase the availability and use of alcohol fuels. The extension of the \$.04 a gallon excise tax exemption for alcohol fuels/blends from renewable resources, the 10 percent additional Investment Tax Credit, and the newly established program to provide loan guarantees and low interest loans to construct 100 small scale alcohol facilities are important incentives designed to bring about increased alcohol production and use. We feel that current and proposed Federal and State incentives for alcohol fuels are sufficiently powerful to stimulate increased alcohol production and use. Accordingly, we feel it would be appropriate to take no further action on this type of legislation at this time. However, should it become necessary to take additional steps to stimulate further the development of alcohol fuels, we would work to ensure that appropriate measures are taken.

ALCOHOL PRODUCTION ECONOMICS—ETHANOL

With improvements in technology and economies of scale, alcohol fuel costs can be reduced. Ethanol is currently selling in the marketplace for \$1.20 to \$1.60 per gallon. Employing advanced available technology, optimized for energy and cost savings, our studies show that ethanol *could readily be produced for less than \$1.00 per gallon and sold profitably for around \$1.00 per gallon if produced in a plant with as much as a 50 million gallon per year capacity.*

Cost reductions appear possible through: Use of continuous fermentation processes.

Design of energy-efficient (e.g., vacuum) distillation and use of advanced extractive techniques.

Economies of scale.

Coupling conversion facilities with supplies of low-cost waste materials.

Improvements in production and feedstock collection technology and by-product uses.

Another key is reducing net feedstock costs. Corn, for example, now sells for roughly over \$3.00 per bushel. Since one bushel of corn yields about 2½ gallons of ethanol, the feedstock cost alone would be \$1.20 per gallon unless the value of co-products are recovered. Feedstocks thus need to be viewed as part of a processing system—not as raw materials for ethanol alone.

METHANOL

Cost projections for methanol are considerably less—in the range of \$0.30 to \$0.60 per gallon from coal, higher from biomass. But the capital investment to produce methanol is substantially more than that for ethanol, and the energy content of methanol is lower so that significant quantities of methanol from coal or biomass are not currently produced in the United States.

SMALL SCALE OPERATIONS

Though economies of scale can notably reduce conversion costs, costs of collecting, transporting, and storing raw materials may make some smaller plants more economical overall. A special niche may exist for alcohol fuel production at quite a small scale—less than 1,000 gallons per day—by local cooperatives and individual farmers.

Where distribution systems enable such production to be sold readily, it may be used for gasohol. Otherwise, it may find use locally—in farm vehicles, in crop drying equipment, and the like. Since farming uses a great deal of energy, such production could provide a measure of local energy self-sufficiency. Small-scale

operations are, however, particularly sensitive to capital availability and to Federal requirements concerning operations and reporting.

NET ENERGY BALANCE

One question often raised about ethanol production is whether it yields a net energy gain. This is an important question, for it would be unwise national policy to encourage development of a fuel manufacture consumed more useful energy than it delivered.

The question arises because some older distilleries (designed for beverage rather than fuel alcohol) use more Btu's of oil and gas to make alcohol than there are Btu's in the alcohol product. Including the oil and gas used to grow and transport the raw material worsens this balance. If all ethanol producers were to use so much oil, the Nation might end up importing more oil than it would save.

Ethanol, however, can be produced to yield a net gain in liquid fuel. New ethanol conversion facilities can have much greater energy efficiency than existing facilities, which were built when energy costs were much lower than they are now. Indeed, a modern facility could have a clearly positive (though small) net energy balance even if all the fuel used were oil and gas, taking credit for the "free" solar energy stored in the raw materials.

Second, ethanol conversion facilities can readily be designed to use fuel sources other than oil or gas. Then they can be viewed as means of converting less scarce energy forms (such as coal, wood, agricultural residues, solar energy, or waste heat) into high-quality transportation fuel. In this view, ethanol production could be seen as similar to electric generation, in which 9,000 to 10,500 Btu's of coal are converted into 3,413 Btu's equivalent of electricity.

Clearly both approaches must be followed so that ethanol fuels can be produced to yield a significant net gain in fuel. Increasing the net oil displacement value of alcohol depends on reducing the petroleum and natural gas used in growing and converting materials. As described below, national benefit also depends on technical details of ultimate use, including automobile mileage using gasohol and the value of incremental octane additions.

To minimize petroleum use, alcohol production facilities (which require only relatively low temperature heat) should be designed or redesigned to run on coal, on agricultural or wood wastes, on solar heat where economic, or on waste heat from industry or utilities, where it is available.

The energy required to grow and transport crops may amount to a significant fraction of the resulting alcohol energy value. Therefore, the materials used to produce alcohol should in general be wastes, by-products, or spoiled products, since additional energy is not required to produce them. Where virgin materials are used, alcohol should be one of many coproducts, to minimize the energy cost of the alcohol.

When alcohol fuel production uses minimal oil, or natural gas, net energy balance need not be a concern.

CONCLUSION

The Department of Energy is firmly committed to maximizing the net contribution of alcohol fuels to the Nation's liquid fuels supply and to helping alcohol fuels achieve their potential in the Nation's energy future.

STATEMENT OF JAMES H. COBURN, COBURN ENTERPRISES, INC., GARRETSON, S. DAK.

The following testimony is presented in behalf of Coburn Enterprises and represents the interests of the farming communities of southeastern South Dakota, southwestern Minnesota and northwestern Iowa. As we are all aware, ethyl alcohol is currently being considered among the so-called synthetic fuels which hold great promise as alternative energy sources. Coburn Enterprises is currently proposing to build a corn alcohol plant near Garretson, South Dakota. Our proposal is based on the premise that ethanol can be produced from a renewable grain resource to render an economic and efficient fuel.

The production technology for fermentation and distillation of ethanol from grain sources is well established. The process involves basically four steps. The initial step is that of enzyme pretreatment and simply renders the carbohydrate molecules stored in corn more available to the yeasts for efficient fermentation. The following step is that of fermentation, and this is the process by which yeasts metabolize the carbohydrate substrate in corn to produce ethanol and other by-products. This

biological system is coaxed to its highest efficiency by using modern technology to monitor and modify the critical rate limiting factors.

The third step involves the distillation or similar means of separating alcohol from the other fermentation products. In the proposed operation, the recovered alcohol would be of the hydrous form at 190 proof, i.e. 95 percent ethanol and 5 percent water.

An equally valuable product of distillation is the mash residue. Mash residue, commonly referred to as distillers dried grain, is a high protein source which has been utilized as food supplementation for livestock feeding. The mash residue, through not equal in volume or weight to the bushel of corn from which it was derived, has nearly an equal nutritive value. Simply stated, even through the corn has been processed to retrieve 2.6 gallons of ethanol per bushel, its value as a livestock feed is little changed.

Numerous studies have repeatedly demonstrated the ability of mash residues to out perform unprocessed corn in terms of greater and more rapid weight gain in controlled livestock feeding programs. Dairy cattle fed mash residues as a supplement to traditional feeds produce significantly more milk with significantly greater butterfat content than those control groups fed unprocessed corn. Thus the argument that usage of corn for the production of ethanol would decrease world food supplies and contribute to the starvation that presently plagues over one-fourth of the world's people is based on ignorance of the facts.

Of major concern to environmentalists is the impact of discharged waste products on the environment. The production of alcohol from corn and other grains is unique in that the by-products including the marketable items ethanol and mash residues are completely bio-degradable. In fact the other two by-products of fermentation and distillation are water and carbon dioxide, both of which are strictly non/pollutants.

The fourth step involves the return of ethanol and mash residues to the farmers. It should be remembered that this plant will be a farmer controlled operation and will serve only to process their grain to useable products and return them for his use. In its production of a fuel and a livestock feed supplement the plant neither competes with the farmer nor with traditional corn markets.

The corn alcohol plant we envision will operate on a membership basis. This membership will give each individual farmer the right to process a given number of bushels per year. The advantages of using a membership program in establishing a plant are as follows:

1. Allows flexibility for the individual changing needs of the farmer in his livestock feeding program.
2. It provides a dependable and continuous supply of grain for processing.
3. The plants will be located to conserve energy. Each corn alcohol plant will serve a radius of approximately 30 miles.
4. It negates the need for an elaborate grain handling system.
5. It cuts the initial capital investment of the plant thus decreasing overall costs of production.
6. It provides a good investment and security for the small family farmer.

It is envisioned that the farmer through his ability to obtain ethanol at an economical price will create a demand for equipment that will use ethanol as its primary fuel source. In time this will make the farmer less dependent on conventional fuel sources. The production of alcohol for fuel purposes is a new venture in this energy starved era. Consumer protection in the marketing of ethanol mixtures (termed gasohol) is inevitable if the industry is to survive. Regulations will need to be enacted which will set the mixing ratio of ethanol to gasoline as well as the type of denaturant used. Denaturants of a combustible type such as gasoline could be added in the distilling process thus alleviating some of the major concern.

It is also suggested that the licensing and bonding regulations of ethanol for fuel purposes should differ from those for beverage purposes as this presently constitutes a major barrier in the growth of this vitally important industry.

It is not our intention to suggest that ethanol is the answer for the whole energy crisis; but it is at least a partial solution for the people in the midwest corn-producing states.

We have presented the specifics of our corn alcohol plant proposal in much greater detail to the farming communities of the upper Midwest and it has been received with much enthusiasm. Should the use of ethyl alcohol as a fuel approach its expectations, we foresee the construction and operation of numerous corn alcohol plants throughout the grain and livestock producing states.

The future of alternate energy sources such as corn alcohol depends not only on the ability of the American consumer to make changes in his energy consumption habits, but also in the ability of government to enact legislation to promote such changes.

We wish to thank Senator McGovern and others on the committee for this opportunity to express our views. We also wish to thank Congressman Daschle for his support.

Attachments.

[From the Argus-Leader]

FAMILY AIMS TO SOAK FUEL FROM CORN

(By Chuck Raasch, Argus-Leader Staff Writer)

GARRETSON, S. DAK.—Five southeastern South Dakota men believe they can use corn to help solve farm fuel problems and they're betting \$500,000 they can prove it.

Garretson oil company jobber James Coburn, Sr., his two sons and two sons-in-law will build an alcohol plant one mile east of Sherman, S. Dak. They hope the plant will begin production this fall.

The plant, with an estimated cost of \$500,000 will be able to produce more than 1 million gallons of alcohol fuel each year.

"Our main objective is to show people this will work, and to get farmers to burn alcohol in their operations," said the senior Coburn, adding that alcohol will not solve all the energy problems but could become a major source of fuel.

Coburn said his company, called Coburn Enterprises, will take farmers' corn, distill the alcohol out of it, and give back a protein concentrate. He estimated that the cost to the farmer for the entire process will be about 60 cents a gallon of 190-proof alcohol.

Coburn's son James Jr. said alcohol fuel burns cleaner than diesel fuel or gasoline. And he said the 60 cent-a-gallon price is cheaper than the 70-80 cents farmers are now paying for gas and diesel fuel.

"We think we can produce at that price," the younger Coburn said. "But another big advantage we're stressing is that we make the alcohol and still have a by-product for feed after the process is done."

First District Congressman Tom Daschle, D-S.D., has been working with the Coburns. Daschle aide Roger Andal said federal money may become available later this fall under a national private program.

But until then, the Coburns will finance through personal sources. They said they can make the operation pay and still give farmers a bargain.

"I've gone over the process with them and there's no doubt in my mind they're going to make it a viable operation," Andal said. "As far as I know, they're the only operation with this type of approach. All the other alcohol operations are strictly commercial—(who are) in it for the bucks."

Under the Coburn's plan, farmers will deliver corn to the distilling plant and conceivably be able to take a load of alcohol and protein concentrate home, all in the same trip.

Farmers then would mix the alcohol with gasoline, or might adjust their tractor engines to burn pure alcohol.

The distillation process takes three-to-five days. But the plant will run continuously, meaning there will be a steady supply of alcohol and by-product.

The younger Coburn said farmers have a choice on how to take the by-product. They can take it in a semi-liquid form to feed to hogs, or can request pellets for cattle.

Coburn's other son, Tom, a biochemistry student, said distillation removes the carbohydrates from the corn but it leaves the proteins and vitamins.

The mesh has about 80 percent of the bulk of the corn but is more protein concentrated, he said.

Interest in the plan apparently is high—about 50 persons came to an informational meeting in Garretson Tuesday night.

Already, enough farmers have signed up for the process to take up about 20 percent of the plant's capacity, James Coburn, Jr. said.

The plant will be on five acres and will include a 50-by-100 foot building, an 80-foot storage elevator, a still, cooking vats, and a place to unload the corn.

"Making alcohol itself is a simple operation," James Coburn, Jr. said. "But to make it to a particular proof, like we'll be doing, is very delicate."

In the process the corn is allowed to ferment, is heated to four different temperatures (up to 190 degrees) for specific periods of time, and is treated with special enzymes.

Besides the three Coburns, Sioux Falls residents Dr. Ed Clark and Loren Peterson are part of the corporation.

[From the Jasper (Minn.) Journal, June 14, 1979]

RESIDENTS INVITED TO DISCUSS PLANS ON BUILDING GASOHOL PLANT

Area residents have been hearing more and more about gasohol. But how many know what it's all about?

Sunday during the Garretson celebration, literature was distributed on gasohol and plans were announced about construction of a gasohol plant.

James Coburn, Garretson, said there will be an information meeting held June 19 and 20 at 8 p.m. at the Bowling Alley in Garretson.

"We are looking at a plant that will produce one million gallons of gasohol a year," Coburn said. "Our peak production once the plant is in full operation will be twice that."

Plans are to have the plant in operation to make use of this fall's harvest, he said. The size of the plant will depend on community support.

He explained the plant will be entirely for the farmers. The farmers will bring in their grain and corn, the mash will be given back to the farmer to feed to his cattle and the farmer will be able to burn the end product, gasohol, in his machinery.

"The cost will vary from farmer to farmer," Coburn said. "It will depend on how much he utilizes the plant.

"Farmers will get more feed utilization and higher protein content from the mash, thus it will require less feed," Coburn said.

"Gasohol might not be the total answer to the energy situation, but it is the one asset we can utilize on the farm level.

"We are talking about farmers feeding their livestock and profiting. Also of getting the gasohol into the hands of the farmer at the least expense.

"In the future we see farmers making changes in their farm operations, but not today," Coburn said. "Today gasohol is selling at \$1.74 a gallon on the market, but that consists of 10 percent alcohol and 90 percent gas. We are looking to make that 90 percent alcohol and 10 percent gas, thus making it cheaper for the farmer to use.

"We are looking for the farmer to improve his efficiency all the way around, with the farmer using all his grain and corn in alcohol and feed.

Coburn said that 90 percent of the red tape is out of the way for the construction of the plant. It will be located east of Sherman, S.D. toward the Minnesota state line.

He encourages anyone wanting to know more about the plant and gasohol to attend either of the two meetings scheduled.

[From the Garretson (S. Dak.) Weekly, June 14, 1979]

INDUSTRY FINALLY WILL TAKE ADVANTAGE OF WHAT WE HAVE TO OFFER IN THIS AREA, AS LOCAL FAMILY ANNOUNCES DEFINITE PLANS FOR LARGE ALCOHOL PLANT

For years this vicinity has dreamed about an industry which might locate in this area. Now, all of a sudden we are informed that these golden dreams will become a reality by plans of the construction of one of the first and largest alcohol plants in the midwest.

About a year ago James Coburn Sr. dreamed about a possible vicinity alcohol plant, so he decided to organize the Coburn family with that goal in mind. With the fuel shortage coming on they decided to act immediately with the initial planning.

This family group will be known as Coburn Enterprises. They include Mr. and Mrs. James Coburn Sr., Mr. and Mrs. James Coburn Jr., Tom Coburn, Mary and Dr. Ed. Clark, and Rosie and Loren Peterson.

They looked into it basically to see just what was involved and how feasible. They also evaluated information available and any other literature pertaining to such projects which included tests and results from several universities and experiment stations.

After much family discussion it was decided to construct an alcohol plant in this vicinity—"We think we are being backed into a corner by the OPEC nations and major oil companies. It is about time we put some of our American technology and know how to help us help ourselves in solving our energy situation.

"We don't believe an Alcohol plant is the total answer—we will also have to expand on other forms of energy such as solar, wind, hydro, atomic and also a form of heated water and others. However, we will have to look at our own community or backyard to decide which energy source will best suit our needs."

It is felt with the abundance of corn and feeding of livestock would combine in making a local Alcohol plant extremely feasible.

CORN GOOD SOURCE

It has been estimated that one bushel of corn will yield 2½ gal. of alcohol without changing the feed value of the grain. Actually, the fermenting process will aid in breaking down the feed therefore having a tendency to increase the over-all TDN (total digestible nutritional value of feed).

Under present conditions, this alcohol can be produced cheaper than gas, according to the Coburn family.

The Coburns feel they are well qualified to establish this plant as James Sr. has been connected with the gas and oil business for 27 years in this community. James Jr. has a Masters in Administration from S.D.S.U., with science as a supporting field.

Tom majored in Science and Chemistry at Briar Cliff College at Sioux City. Dr. Ed Clark has a Master in Bio-chem from U. of N. Dak. at Fargo.

Loren Peterson has been a general contractor in the Sioux Falls area for over 5 years.

The Coburns feel that the above accomplishments provide them with the expertise to make this project successful.

After much investigation, a tentative site has been picked. This site is approximately 1 mile east of Sherman on the Don Smith farm.

WE NEED THIS PLANT

A gasohol plant built in this area could help realize these benefits NOW!!

In creating a new outlet for surplus corn, the processing of grain will not only yield an economical and efficient fuel, but will also return to the farmer a "processed" form of protein residues to be used as feed supplement for livestock consumption.

Besides these opportunities the following advantages and benefits will be available to this area.

- Gasohol produced from renewable agricultural resources
- Can be burned in any internal combustion engine, regardless of age, without carburetor modification
- Burns cleaner than leaded or unleaded gas
- Provides a domestic outlet for surplus corn production
- Will help reduce imports of foreign oil
- It is a farmer-operated energy system
- Provides a new and sizable market for the farmers' energy needs
- Causes no unusual engine wear
- More efficient energy with at least 5 percent better mileage than gasoline fueled vehicles
- Will help reduce our energy dependence on the OPEC countries
- Byproducts is a yield of high protein food which can supplement livestock feeding

There will be an informational meeting June 19 and 20 at 8:00 p.m. at the Garretson Bowling Alley. All those interested in this development are urged to be present.

Super Corn says "for more information call Coburn Enterprises, Garretso, S.D. 57030, (605) 594-3705."

[From the Worthington (Minn.) Daily Globe, July 13, 1979]

KENNETH CROWD TOLD OF GASOHOL PROJECT

(By Jeanine Ryan, Daily Globe Internist)

KENNETH (Special)—From field to fuel and feed in 24 hours was the proposal to farmers from Coburn Enterprises at Thursday's Kenneth Town Hall meeting.

Grain alcohol, or gasohol, "can come from anything you grow on your land," the farmers seated on folding chairs and benches on the town hall's front lawn were told. Corn, wheat, milo and sugar beets are among the crops from which alcohol can be extracted. Jim Coburn, Sr., his sons and sons-in-law explained the process which they hope to implement in a Sherman, SD plant this fall.

"What happens to your corn when it comes in the door?" asked Ed Clark, Coburn's son-in-law. Supplying grain to the plant is the first of four steps. "That's up to you people," he said. The plant's size and its success or failure will be determined by the community, he said. The proposed plant could process 1,300 bushels of grain per day, distilling some 3,200 gallons of alcohol; its capacity could be doubled by adding another distilling apparatus.

The second step, which would occur upon delivery of grain to the plant, is pretreatment with enzymes that act on grain sugar. The enzymes cut fermentation time from five-seven days to 22-24 hours. Clark said.

Following pre-treatment is the actual fermentation which must be closely monitored to maintain proper temperature, acidity and electrolyte concentration.

Finally, distillation would separate the grain mash from the liquids and vapors. The final alcohol product would be 190 proof, or 95 percent alcohol, four percent water, and approximately one percent denaturant, which would make the alcohol unfit for drinking. The actual percentage of denaturant added would be government regulated.

"That mixture is a very efficient fuel," Clark told the farmers, adding that the mash residue can be fed to animals and "essentially makes the alcohol almost a gift."

"It's at least as good as the original bushel of corn and in many cases it's better" because the nutrients are more highly concentrated, he said.

In an effort to persuade the farmers to process their grain with the plant, the men, whose wives are also involved in the project, distributed pamphlets listing the supposed benefits of gasohol:

It can be burned in any internal combustion engine and burns cleaner than leaded or unleaded gas.

It will help reduce imports of foreign oil.

It is a farmer-operated energy system.

Its production yields a high protein food to supplement livestock feeding.

Jim Coburn, Sr., has been in the oil business for 27 years and wants to build the half million dollar plant with a government loan so it will be in operation at harvest time. Fifty farmers could supply the plant, which would be just across the South Dakota border, and Coburn was looking for support Thursday evening.

Farmers could grow their own fuel and still have corn for feed, according to Tom Coburn, whose pleas made the session seem a bit like a gospel meeting.

"We're not saying gasohol is the answer for the whole energy crisis, but it's the answer for us here in the Midwest," he said.

Coburn compared a farmer's need for fuel to a mosquito's need for blood. The mosquito uses resources which are close at hand, he said. "If he had to fly all the way to the Middle East just to get a little energy, don't you think he'd get a little tired of it?" Coburn asked. He urged the farmers to follow that philosophy and use the crops they already grow as their energy source.

"Some people don't realize the potential they've got out in their fields," he said.

After the pleas for support and discussion of how the plant would operate, Jim Coburn, Jr. explained the economics of the project.

While answering questions, Jim Coburn, Jr. passed a clipboard through the audience, asking for signatures of those who would support the project.

"You better believe our number one problem is going to be the lack of support," he said.

Membership in the plant would cost \$1 per bushel of grain that the farmer expected to process. A \$50 fee to get one's name on the membership list would prevent people from rushing into the project, Coburn said.

Each bushel of corn produces 2.5 gallons of alcohol at a cost of about 60 cents per gallon, depending on whether the residue is left as mash or is processed into powder or pellets. Coburn, scrawling figures on an easel, multiplied the 2.5 gallons by 60 cents and added that \$1.50 to the \$1 membership fee and told the farmers what they saw on the board: Aside from the \$50 fee, they would have a \$2.50 per bushel investment in the gasohol and feed supplement products. The second year, he said, would be less expensive because the \$1 per bushel membership fee would not be charged to old members.

Farmer support of the plant would not require additional grain acreage nor would it deny food to livestock or humans as the farmers would simply determine the number of bushels they now use to feed their livestock and pledge some or all of that for processing at the plant.

The amount of gasohol used on the farm and the percentage of its mixture with gasoline would also be determined by the farmer, Coburn said. The fuel-powered plant would have a commercial license so excess gasohol could be sold.

Farmers were concerned about taxation, corn moisture and storage, but Coburn Enterprises had answers for all their questions.

"They can't tax alcohol you already own," Coburn's son-in-law Loren Petersen told a farmer.

FIVE SOUTH DAKOTA MEN INVEST IN CORN ALCOHOL PLANT AT SHERMAN

GARRETSON, S. Dak. (AP).—Five southeastern South Dakota men are betting \$500,000 that they can use corn to solve some farm fuel problems.

The men are sinking the money into an alcohol plant with a production capacity of 1 million gallons of alcohol fuel a year.

Garretson oil jobber James Coburn, Sr., his two sons and two sons-in-law hope to begin construction on the plant, to be located one mile east of Sherman, this fall.

"Our main objective is to show people this will work, and to get farmers to burn alcohol in their operations," said the senior Coburn.

The plant will distill alcohol from farmers' corn and give back a protein concentrate. Coburn estimated the cost to the farmer at about 60 cents per gallon of 190-proof alcohol. That's cheaper than the going rate of 70-80 cents a gallon for gasoline and diesel fuel, James Jr. pointed out.

"We think we can produce at that price," he said. "But another big advantage we're stressing is that we make the alcohol and still have a byproduct for feed after the process is done."

The men are working with First District Rep. Tom Daschle, D-S.D., to locate federal funding for the project.

Under Coburn's plan, farmers would deliver corn to the distilling plant and conceivably be able to take a load of alcohol and protein concentrate home in the same trip.

The alcohol could be mixed with gasoline for gasohol or tractor engines could be adjusted to run on pure alcohol.

The younger Coburn said farmers have a choice on the form of the byproduct. He said farmers can take it home in a semi-liquid form for hogs or in pellet form for cattle.

Coburn's other son, Tom, a biochemistry student, said distillation removes the carbohydrates from the corn but leaves in proteins and vitamins.

Enough farmers have signed up for the process already to take up about 20 percent of the plant's capacity, James Jr. said.

In the process, corn is allowed to ferment, heated to four different temperatures (up to 190 degrees), then treated with special enzymes.

[From the Garretson (S. Dak.) Weekly, June 28, 1979]

ALCOHOL PLANT PLANS PROGRESSING AT RAPID PACE

"We know how to make alcohol and if changes should become necessary, we will do it," was the confident conclusion of James Coburn Sr. as he opened the second meeting last Wednesday evening to about 75 interested listeners to information concerning the Coburn Enterprises project of a local construction of a gasohol plant.

With an introduction and a slight background, he introduced the members of the Coburn family who are all connected with the project. He then turned the meeting over to his son Tom who discussed the energy problem of this country along with questioning the necessity of importing so much oil. He stressed the simplicity of their proposed system of production of alcohol and explained how corn can be used for alcohol and still retain its feed value.

He also forecast a continued rise in gas prices along with a strong hint that "money men" are building alcohol plants in Iowa "only for propaganda purposes" by falsely informing the public of their inefficiency.

Loren Peterson, Coburn's son-in-law and a contractor explained that the plant will be about 50-by-100 foot building with an 80-foot storage elevator, a still, cooking vats and a corn unloading system. The construction will be built on a 5-acre plot of ground one mile east of Sherman. Plans are to start construction soon enough to be in running order to handle this year's crop.

FARMER CONTROLLED

Ed Clark, another son-in-law, gave a continued explanation of the procedure along with his maintenance that "alcohol is a clean efficient fuel and is now competitive to gas." He also stressed the importance of this project being "farmer controlled" but too costly on an individual basis.

He also informed the audience of what he considered 5 important steps to be taken in order for a successful gasohol plant to function.

First is the supply, which is certain to be plentiful in this vicinity. It is estimated that 1300 bushel of corn will produce 3200 gallons of alcohol. It is their intention to run the plant 24 hours a day.

Pretreatment is very important in order to break down the chain of carbohydrates present in corn.

This is followed by the fermenting process "which differs very much from the old fashioned still." Temperature control is extremely important as well as the correct sort of yeast suited for the corn on hand.

Correct installation is also vital in order to properly separate the alcohol which is boiled off, then cooled. This method will produce 190 proof when finished and will be capable of running an engine with a mixture of 95 percent alcohol and 5 percent gas.

The mash residue which will be left over will then be treated, water extracted, then used in several ways. It will have the same food value as the original corn. Results have showed this residue to show even better animal gain results than the original. "It is more efficiently utilized and the alcohol can be described as a 'Free Gift,'" said Dr. Clark.

DISTRIBUTION NO PROBLEM

The plans for distribution was explained by Jim Coburn Jr. His suggestion of "there being too much propaganda in negative attitudes" seems to be backed up by our own Sen. Pressler who recently wrote—"When so much contradictory information is sent out to the American people, it's no wonder that there has been an erosion of credibility and public confidence. We need clarification by the President so Americans can get the facts from one source."

The Coburns, however seem to have waited for no one as they have already spent almost a year and a half on their own investigation of the feasibility of their plan and are convinced it will work. They have set up a membership type of philosophy, with tentative plans of a price per bushel which can be sold back at any time to Coburn Enterprises.

"We must keep this farmer controlled—it is very important to do this," maintains the Coburns. "We will expect negative propaganda from big oil companies, but this is definitely the farmers answer to the energy problem," they concluded.

ENTHUSIASM RUNNING HIGH

"There evidently seems to be much local enthusiasm for the project as there has already been enough farmers signed up for the process to take up over 20% of the plants capacity," James Coburn Jr. continued.

There were about 60 in attendance at the Tuesday night meeting and about 75 at the following Wednesday night's meeting—totalling about 135.

Prizes were given at both meetings with Norman Eide of Garretson winning a cook book and Craig Bruggeman of Larchwood, Ia., winning \$10.00.

Wednesday nights winners were Vern Granberg of Valley Springs winning the cook book and Ted Rolling of Ivahoe, Minn., winning the \$10.00 prize.

Questions and answers followed each meeting.

This community (Sherman-Garretson) is exceedingly interested in this new industry as it will be a tremendous boost to our local economy. We also give the Coburn family a big congratulations for having the confidence and initiative to go ahead with a project of such magnitude.

[The following information was submitted by Pincas Jawetz, see p. 60 for his oral presentation.]

TOSCO CORPORATION—A PRESENTATION TO SECURITY ANALYSTS IN LOS ANGELES, NEW YORK, DENVER AND CHICAGO—SPRING 1979

CORPORATE DESCRIPTION

Tosco Corporation (until 1976 known as The Oil Shale Corporation) is a diversified energy company, engaged in refining and marketing of petroleum products, coal production and development of technologies to refine clean fuels from oil shale, coal and other solid materials. In 1976, Tosco established itself as a leading independent refiner following the acquisition of Phillips Petroleum Company's West Coast refining and marketing properties. With its other refineries in Bakersfield, California, and El Dorado, Arkansas, Tosco's total processing capacity is now rated at 213,000 barrels per day. From its refining start in 1970, it has become the second largest independent gasoline manufacturer in the U.S.

The company operates coal mines in Pennsylvania and Maryland, and maintains a strong position in Colorado and Utah oil shale properties and in oil shale technology. The Tosco II oil shale system has been licensed to other companies. Process

adaptions also provide for the recovery of oil, gas, char and by-products from coal and wastes containing hydrocarbons.

In 1978, Tosco's sales were \$1.2 billion and net income was \$18.0 million. Earnings per share were 81 cents, up 53 percent from the prior year.

REMARKS BY JOHN H. CHEQUER, EXECUTIVE VICE PRESIDENT (FINANCE)

I would like to welcome you all here today. We are looking forward to an informal, lively discussion regarding Tosco. I have just five or six points I'd like to make, and three of them are reviews of information from our 1978 Annual Report that should be underscored.

FINANCIAL REVIEW

The first item involves looking back at our financial history. I would like to call your attention to Table 1 (page 17 of the Annual Report). Please note in the Table the line called Operating Contribution, which is, in my opinion, the best indication of how the company has been progressing in terms of operations, before interest expense and taxes.

Table 1: Operating Contribution and Revenues

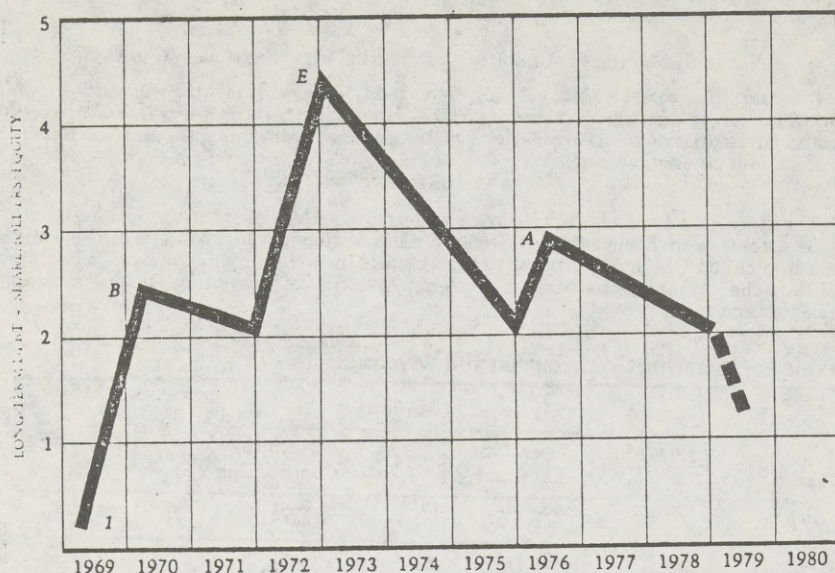
Year	\$ Million		
	Operating Revenues	Operating Contribution	%
1978	\$1,166	\$54.8	4.7%
1977	1,068	41.2	3.9
1976	848	27.7	3.3
1975	438	18.0	4.1
1974	362	14.6	4.0

Although our quarterly results have been erratic, partially because of the difficulty we had until mid-1978 with the entitlements program, the Table shows that Tosco's annual Operating Contribution has been growing quite steadily, and at a 40 percent compounded annual rate. It is very difficult to judge our performance quarter to quarter, but from a year-to-year perspective, that clear annual trend is one with which we are very pleased.

External growth as well as internal growth is in evidence. In the middle of that five-year period, Tosco doubled its refining capacity by the acquisition of the Avon, California refinery. The internal growth has been partly from added increments of volume, and partly fueled by inflation in crude oil and other costs. We'll come back to that a little later when we talk about Tosco's Development Plan.

Another financial review point is our debt to net worth ratio, or our leverage. The comment is frequently made that Tosco uses an extraordinary amount of leverage. This hasn't been done willy-nilly; rather, it has been part of a conscious, deliberate growth plan. As Table 2 indicates, in early 1979 we showed something less than a 1 to 1 debt to worth ratio; at the time of the Bakersfield acquisition early in 1976, we went up to about 2.5 to 1, then we brought the ratio down to just under 2 to 1 within a year. When we acquired the El Dorado and Avon refineries the figure rose again, but by the end of the first or second quarter of this year, we will be back down somewhere between 1 to 1 and 1.5 to 1.

While we're on the subject, I might just note again that we arranged on the 23rd of January a \$45 million addition to our bank lines to take care of the Development Plan. I'm not sure whether we'll use much of it this year; it depends to some degree on how strong business is. But I think we'll see, even with these added credit facilities, that our debt to worth ration will stay down in the range of 1 to 1, although it may jump up, especially, if we use debt for further acquisitions.

Table 2: Trends in Tosco's Capitalization Ratio**Notes:**

I: \$9.6mm of Subordinated Notes which converted in early 1970 shown as equity.

B: Bakersfield acquisition.

E: El Dorado acquisition.

A: Avon acquisition.

One other point about our debt that I would like to make is that it is extremely well structured. Table 3 (page 27 of the Annual Report) shows our long-term debt maturities for the next five years. You will notice that not much comes due in 1979 and 1980. Our cash flow from operations in 1978 substantially exceeded Tosco's debt coming due. Moreover, our cash flow in the last two years has been greater than the debt maturing in the next four years. Although our debt may be high in absolute terms, we are comfortable with its structure and satisfied with its recent downward trend.

Table 3: Long-Term Debt Maturities

Year ended December 31,	Thousands of Dollars
1979	\$12,222
1980	19,972
1981	26,364
1982	25,846
1983	83,629*

*Includes retirement of the company's \$60 million revolving credit which in recent months has seen only limited usage.

DEVELOPMENT PLAN

The second topic I want to discuss is our Development Plan, which again is covered at great length in the Annual Report. We are in this current two year period investing \$100 million, largely on high payback projects, the last of which are to come on stream by late 1980. Obviously, we expect the Plan to have a good profit

impact. To try to be a little more specific about that, I refer you to Table 1 once again, describing our Operating Contribution as a percent of revenues. We stated in the Annual Report that the objective of the Development Plan is to produce a pretax, pre-interest return of about 6 percent of revenue. I can only guess what OPEC will do to the price of oil, but I believe our revenues will increase very close to \$1.5 billion by 1980 due to inflation alone, even without increases in unit throughput. Six percent of that is \$90 million. Our 1978 level of Operating Contribution, as Table 1 shows, was \$55 million. The difference is \$35 million—that is what we had in mind when we said that the Development Plan should allow us to accomplish that 6 percent goal. This is before consideration of what may happen to the present pattern of rising gasoline margins or to other product margins or crude costs. This profit growth is solely based on 1978 operations, expanded by expected returns from the Development Plan.

We had been until recently very cautious about making capital expenditures because of the entitlements problem and our high debt to worth ratio, so we deferred projects as long as we could until our liquidity position improved. Now that we have at last undertaken a number of projects, we've seen their payback potential become even more attractive as the price of the energy we consume has increased.

For example, we use about 9 percent of our total revenues for energy at the refinery. (Because all refining is basically heating up crude oil and processing it, energy is a large component of costs). Our energy costs are no doubt higher than average industry figures right now. These projects will bring them sharply down.

The projects also will substantially increase our capability to produce high specification gasoline. I'll come back to that a little bit later because gasoline constitutes an important part of our business.

CRUDE SUPPLY

The third point I'd like to touch on is the security of our crude oil supply. Oil Daily published a recent article mentioning that Tosco currently is extremely well situated in this respect. That well-placed position is not by accident. As Table 4 indicates, roughly 95 percent of our crude comes from United States sources while only 5 percent derives from foreign suppliers.

Table 4: 1978 Sources of Tosco Refinery Charges	% Total
Home state of refinery	62%
Alaskan North Slope	24
Other domestic crudes	9
Foreign crudes	5
	100%

There are a number of ways that refiners can look at their crude sourcing problems. John D. Rockefeller, when he began Standard Oil, though the key was to control transportation so that one didn't get rid of it without Mr. R. anyway. That is akin to the more modern (and lawful) approach we follow at our El Dorado refinery. Tosco has a gathering system in Arkansas providing a natural affinity for local producers of crude to do business with us. Therefore, while that crude is not under long-term contract, we have unique access at competitive market prices to every barrel that is produced in the Arkansas fields, thus providing the highest degree of supply security over a long period of years.

Another popular way of controlling crude for refineries is to acquire one's own. We have felt, since we have been in business, that the return on direct investment in exploration and conventional production assets isn't all that attractive. Tosco has believed that we could find better returns inside the gates of our refineries, particularly after considering the inflated P/E ratios that the producing companies enjoy today, and given their disappointing results as a group. It is doubtful that we would in the near future change this position.

Tosco's view is that the best answer to the crude supply question for us is contractual arrangements. We think they are every bit as secure as owning one's own crude. (Don't forget that when you own your own, the government can redirect it away from you very quickly with allocation programs as it has in the past, so there's nothing sacred about the supply consequences of owning oil.)

Under one of our major contractual arrangements we purchase 105,000 barrels a day of crude at market price under a multi-year contract with Phillips Petroleum. That contract is in turn partly backed by a contract that Phillips has with a major California producer. Contracts such as these are the route we've chosen for the major part of our crude sourcing.

Another alternative I might mention is the road chosen by another large independent, which recently sold all of its producing facilities and decided not to worry about owning crude. If that company ever runs out of crude, its management believes that customers will make such a hue and cry that Washington will allocate crude to the company. They are probably right about that. But for Tosco the problem with that approach is that one can never be sure that the government will allocate fairly-price crude. The government might very well say "there's a \$20 barrel of crude in Iran—go buy it." Obviously, that would be a painful move at a time when other refiners are paying \$14 or \$15 a barrel.

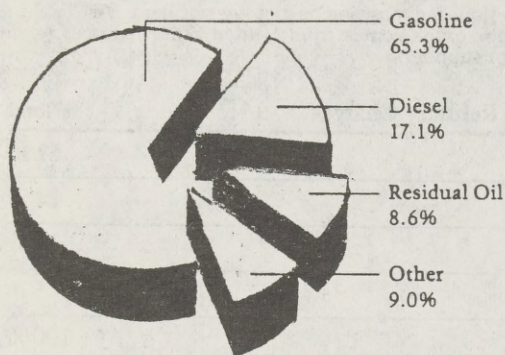
For the rest of this year our figures indicate our program has been so successful that we have crude available slightly in excess of our planned runs.

GASOLINE

All the preceding points were touched on in the Annual Report. I'd like to break a little new ground now in two remaining areas. One is the motor gasoline business and, lastly, I'll talk a little bit about the risks in our business.

Tosco sold just under 1.9 billion gallons of gasoline in 1978—we plan to be about 8 to 10 percent over that this year. As Table 5 shows it's a highly important part of our business.

Table 5: 1978 Product Slate of Tosco Refineries



Do we have concern therefore with what industry observers refer to as the peaking of gasoline demand? They used to say peaking would happen in 1979; now it is generally pushed off into 1980 or 1981. Still, there is much informed concern about the issue. Tosco is quite confident that it isn't going to happen right away for a number of reasons.

First of all, the assumption that gasoline demand is going to peak and then trickle off rests principally on the belief that Detroit will be successful in achieving its federally mandated mileage standards. To date, they have been *moderately* successful. Detroit has progressed perhaps halfway from the starting point to the goal, and has reached this halfway point relatively easily—by such technological feats as punching holes in fan belt pulleys and by using plastic in automobile bumpers for example. The difficult part of the job is yet to come. Detroit will have to develop further fuel savings from the implementation of major changes such as redesigned drive trains.

Now, the automotive industry is one of the most conservative in the U.S., next only perhaps to the steel business. They don't readily change their highly successful ways of doing things. So we suspect that Detroit will experience great difficulty in going further on mileage standards.

One of the reasons we believe that the automakers will have difficulty making further progress is that every time they are forced by Washington to do something they don't like, both management and labor raise the spectre of millions of potentially unemployed UAW workers, and Congress then frequently reconsiders its position. Remember the particulate emissions standards? Whenever they couldn't be met, the standards got conveniently pushed forward. The same thing may well happen to the mileage standards when the crunch comes.

Moreover, autos are using almost the same amount of *crude* as ever, although there is a bit less *gasoline* used per mile. This is because the gasoline now being used is a higher specification gasoline, of a higher octane rating, that yields better mileage but requires more crude as raw material. Thus the mileage gains reported to date tend to be highly deceptive.

Nevertheless, if we *do* stipulate that demand might peak, there are other reasons why we don't see this as a critical problem for Tosco. It really isn't *demand* with which we are so concerned, it is the relationship of *supply and demand* and the margins that result from that balance or imbalance. And one thing is clear, the capacity in this country to produce light products—gasoline in particular—is declining markedly. Nobody is spending the required money to build material amounts of new capacity. Indeed, capacity has been *declining* for a couple of reasons.

First of all, Detroit—to go back to a point I just touched on—has achieved some of those mileage gains by building cars that require higher and higher octane gasoline. The auto industry has been increasing the efficiency of automobiles in part through higher compression-ratio engines. Thus the problem has been conveniently passed from Detroit to Houston.

Drivers entirely inspired by Detroit, have gone to a higher specification gasoline. This means that refiners have to run a given amount of feedstock through the plant again and again before it's up to marketable grade. In turn, this means a given plant can produce less gasoline in a 24 hour period, so capacity is, therefore, lower.

A second factor in the apparent decline in national refining capacity is that the crude oil we're using is getting heavier and heavier and more and more sour every year. (This one can't be blamed on Detroit!) The standard crude used to be Saudi Light, 34 degrees API. I do not know precisely what the average gravity is now, but I'm sure it's dropping, perhaps a quarter to half-a-degree a year, as OPEC seeks to push the use of its heavy, sour crudes.

Alaskan North Slope crude came to California in 1977 and refiners backed out light Middle East crude, causing perhaps a 5 degree API drop in average supplies of crude to the West Coast. This in turn resulted in a 5 to 10 percent drop in the gasoline manufacturing capacity of refineries in California. Other parts of the country will be affected differently, and I'm not able to be precise as to just how much decline this long-term trend toward heavier and more sour crudes portends in terms of gasoline capacity, but I venture to say the nation must be losing at least one percent a year of that capacity.

To repeat, even if one were to stipulate (which we are not prepared to do) that demand is going to peak, *capacity to manufacture* gasoline is falling at a relatively stiff pace. So we expect to see a continuation of what we think we saw last summer—namely a demand for gasoline that exceeded the industry's capacity to satisfy the consumer.

In order to satisfy that increased demand for gasoline there's going to have to be more capacity added or else we'll have to import more. Imports, which were a threat a year or two ago, really are not an immediate threat today because the motoring public in Europe and Japan has grown so substantially that refineries (in Europe, in particular) are enjoying very strong markets for their own products. There is not a lot of gasoline left to come into this country and, even if there were, it is the leaded type that we cannot freely use anymore and is now in good supply here. Refineries in Europe, Singapore and elsewhere cannot readily satisfy the Detroit-inspired high octane demand of the American motoring public and it will take a very heavy capital investment abroad to change that situation.

The only sensible move left, then, was for the government to get out of the way and allow the industry to respond to this problem—which it did in part this spring with installation of the "Tilt" rule. The real significance of "Tilt" is that Washington indicated for the first time the realization that continued price restraint is not the way to get refining capacity up to meet requirements.

In summary, we are reasonably confident the business that we are focusing on at the present time—the manufacture of high specification gasoline—is the right end of the business to be in for the next few years.

RISKS

The last point I want to touch on is the area of risks and, as I already implied, there's really only one risk that concerns us in this business and that is the fear of greater government intervention. This is not a paranoid fear; we don't believe the government is "out to get us" or the energy industry per se. Instead, it's the well-meaning bureaucrat who drafts a regulation and omits a comma or two that unintentionally damages us. I talk this way because that's just what happened to Tosco in 1976, as you may know, with the entitlements program.

We have tried to control that risk by staying aggressively on top of relevant government activities and anticipating federal actions before they occur. We work closely with the Energy Department, especially when a new program is being considered, freely offering our opinions on the effects of that program on the refining and the producing business. This requires a high degree of credibility, which is something that the oil industry has never had in Washington, but which Tosco has tried very hard to achieve and sustain. These anticipatory efforts now appear to be bearing some fruit.

That concludes what I wanted to say about our business. I'm now open to your questions, comments or reactions.

QUESTIONS AND ANSWER SESSION

Question. If Sohio gets a pipeline, how will that affect you? Will it materially affect your deliveries?

Answer. The direct impact on us should be near zero. We presently have under contract the full Phillips and Getty output from the North Slope, which is about 35,000 barrels a day. That is about all the Slope crude that we buy, except for occasional spot cargoes, and that status wouldn't be altered by the Sohio pipeline. Our thoughts about crude are simply this—we want to make sure that we can buy competitively. We really don't care what the price is as long as we're paying about what Chevron and most of the other California majors have paid. A potential crude glut, or a local shortage, isn't directly a problem, therefore, as long as nobody else has access to underpriced crude.

Question. With respect to the gasoline price situation, where do you stand regarding pass-through ("bank") costs?

Answer. As a general statement, our "bank" position is probably a little looser than that of the majors in our trading area (for arcane reasons relating to the way we acquired Avon and Bakersfield). Our biggest problem is when our competition runs into "bank" problems and has to restrain its prices. If Chevron can't raise its prices, we won't have to much luck in raising ours.

The Tilt rule is a major solution to the "bank" problem. In effect, Tilt removed for at least the near-term future, a part of the restraints on gasoline prices. This should have the beneficial effect of stimulating needed capacity expansion.

Tosco and most other refiners are in favor of adding capacity because the present situation is so tight that it raises the risk of increased governmental intervention. If there are massive outages of gasoline this summer and next summer the free market will never have a chance to respond to the problem. Instead, Uncle Sam will lumber in. We would like to see current shortages of gasoline satisfied through normal market forces. We would like to see needed capacity expansion. We were distressed when Exxon recently announced the cancellation of a major expansion of its Benicia, California refinery because it cost too much to build, given today's margins. We hope now Exxon will change its mind.

Question. With your earnings apparently going up rather dramatically and given the critical sensitivity of gasoline prices, do you envision that there will be any problems with the DOE or any governmental body regarding the level of profitability of refiners?

Answer. It's not out of the question. However, it may turn out that not everyone in the industry benefits from the current situation as much as independent refiners, some of whom are quite concentrated in gasoline. Tosco's 65 percent gasoline make (I'm sure that nobody else of our size is anywhere near that) will result in a very beneficial effect on us.

Recent figures have indicated that the national average gasoline make for the large independent is 39 percent. For all refiners it's about 43 percent and for the majors it's 46 percent. So you can see Tosco is substantially in excess of that; we are heavily oriented toward gasoline.

Washington is going to have to remember that the kinds of depressed margins which the industry has had recently are going to lead to shortages. Margins will have to be more attractive to prevent shortages.

Question. When will you know what is going to happen with entitlements this year? I think you have to apply for relief every year if I remember correctly.

Answer. We look at the exception relief we had under the entitlements program as a bridge between the time when the entitlements system went haywire (mid-1976) with respect to California heavy crudes, and last June 1st when rules changes corrected the imbalance in California, although that bridge didn't exactly line up with the banks of the river from our point of view—it was started a little late and ended a little late. Because of the rules change, there was no relief for the fourth quarter of 1978, and Tosco didn't apply for any for 1979.

Question. What would be the effect on Tosco if the EPA caused the prices of unleaded gasoline to be very similar or exactly the same as regular, in order to stop motorists from "misfueling"?

Answer. How are they going to do that? Are they going to do it on the street, or at the refinery? Currently, at the refinery level, the spread is under four cents; however, the street spread must be closer to eight or nine cents, so whatever abuse there is, is at the retail level. Gasoline stations may be using leaded regular as a loss leader, and that certainly encourages misfueling. One proposal to correct that problem—through the excise tax mechanism—certainly makes eminent sense to us. That proposal recognizes that misfueling is a social problem insofar as lead is a social problem and, therefore, why not have the government alter the relative taxes and move the greater tax to leaded regular so that the price incentive is neutralized at that level?

Question. What are the prospects for a commercial oil shale project moving ahead soon?

Answer. That's a very subjective area. There are committed "oil shalers" and there are those who think it is a waste of time. You won't find very many people who are dispassionate about the subject, especially around Tosco. Most of us feel oil shale is now in the wind. The Administration, pressed by the Iranian situation, recently made two statements. Secretary Schlesinger said that it was time for the government to get behind some of the technologies that were ready to go in shale, and he also said that it was time for the implementation of the \$3 per barrel tax credit. We think the likelihood of a commercial plant getting off the ground this year is good, but one certainly cannot speak with certainty on that point. We believe that Tosco's technology is ready to go, and it is no longer a question of economics. The numbers which we put in our 1977 Annual Report indicate that the return on required investment is not unattractive at all, even at today's prices. I think that the major oil companies, especially those that have that big cash flow coming from the North Slope, are going to invest in commercial shale plants in the not-too-distant future. Of course, we hope they would use Tosco's technology, although that is not essential because our big downstream play may be as much in our reserves as in our technology.

Question. Is there any chance of any equity financing in the next year or so?

Answer. Yes, it is a possibility. It is something that was seriously considered last year during the third quarter. We think that our stock price is going to improve. We are at a size now where it's most unlikely that we will ever go back to a 3 or 4 to 1 debt to worth ratio. Therefore, a layer of equity financing, possibly as a base for further acquisition or expansion, is increasingly attractive.

Question. Are you looking at some acquisitions right now?

Answer. We always are. In the last eight years or so, we bought three refineries which were either losing money or unsatisfactorily operated by the preceding owners. Today they're all strongly profitable. There are prospects and possibilities of doing more of that, and a number of situations have been brought to our attention from time to time. A year ago we were in no position to do much about it except look hungrily at some of the opportunities; that is no longer the case. Occasionally we discuss the possibility of broadening our basic economic activity—diversifying—but the opportunities we see in *this* business suggest that diversification, at least away from the heart of the energy business, would be a questionable strategy at this time.

Question. Are you happy with your over-the-counter status as far as the shares are concerned, or are you planning to apply for Big Board listing?

Answer. Well, I have talked about this to people in your business from time-to-time. I have been told constantly that we have very good market makers, broad distribution and a lot of liquidity in the shares, so we don't really see much reason to change.

Question. Some 65 percent of your barrel goes into gasoline. How about the bottom of the barrel—what's happening with your residual oils?

Answer. For all intents and purposes we don't make any, especially here in California. The refinery we own in Bakersfield is an astonishing machine. We can

take 17 degree API crude, which is like shoe polish—it's black sticky stuff, you almost buy it in bales—and we can turn it into nearly 90 percent gasoline. That refinery might have a replacement cost of \$8,000 a barrel or thereabouts; it's unbelievably sophisticated. Avon is a large scale model of Bakersfield, not quite as sophisticated, but it doesn't make much residual oil either. Our total West Coast production of residuals is a few thousand barrels a day and we could use almost all of that internally if we wanted. Tosco, therefore, is unusual in that basically it does not have a "bottom of the barrel" problem.

Question. Can you use Alaskan crude in all of your refineries?

Answer. Yes. The California crudes we have been running typically are about 1½ percent sulphur; compared with that, Alaskan crude is sweet, although the rest of the country views it otherwise.

Question. What do you figure that the world price of oil has to be per barrel for the production of oil from shale to be economical?

Answer. The studies we made and presented in the 1977 Annual Report were for a zero-sulphur distillate, about like kerosene, which is a beautiful product. If that is sold at about \$20 or \$25 a barrel, the return on equity, in an all-equity financial structure, would be over 15 percent, given estimated production costs of \$8.63 per barrel as outlined in last year's Annual Report. Today, such a product sells for well over \$17 a barrel. So as I say, the economics are there. There are still environmental barriers (such as those that Sohio became enmeshed with in its pipeline-building efforts) that are the real hold up, although eventually some price will solve those barriers, too. That explains the need for the \$3 tax credit—to get past those barriers.

Question. How much refining capacity for gasoline is required on the West Coast to bring things into balance? How much is currently on the drawing boards here and how long will it take to complete construction?

Answer. Gasoline capacity on the West Coast is approximately 1.1 million barrels per day, which is more or less in balance with current demand. Demand is probably growing at the annual rate of 4 to 6 percent. That requires, then, between about 40,000 and 70,000 additional daily barrels of gasoline manufacturing to keep things from getting out of hand. There isn't anywhere near that much capacity being added on the coast of California. While there are all sorts of little things refiners can do to add a thousand or two thousand barrels a day—by changing catalysts and removing bottlenecks, for example—we know of no plans to add capacity in the amount that appears to be required.

STATEMENT OF GERALD BAHENSKY, PRESIDENT, ST. PAUL BUSINESS DEVELOPMENT CORP., ST. PAUL, NEBR.

MR. CHAIRMAN AND MEMBERS OF THE COMMITTEE: We, the undersigned, are officers of the St. Paul Business Development Corporation. We represent approximately 200 stockholders and many corn producers in Central Nebraska. For the past 20 months the Development Corporation has been actively promoting the construction of an alcohol plant in the St. Paul, Nebraska area. Our interest in this endeavor is encouraged by our abundant supply of resources directly suited for alcohol production.

We believe in the concept of "grass roots" plants located through out the rural areas of agricultural area. These plants are not only necessary for the economic health of the rural areas but vital to the national interest by supplying a renewable fuel. Historically, such decentralization of plants for the manufacture of such alcohol started in revolutionary days and was halted by the acts of the government leading to the "Whiskey Rebellion" in the late 18th century. Government encouragement is tardy but welcome, and, considering the problems of taxation, needed.

The stated purpose of Senate Bill 850 is well taken, however, we do not consider it necessary for the federal government to either 1. guarantee construction loans, 2. attempt to secure the supply of feedstocks or 3. control the supply of distiller's dried grains. However, some groups will no doubt find these provisions helpful to them. If this legislation would include the additional provisions of Senate Bill 906 previously introduced by Senator Dole, its beneficial impact would be improved.

Our group has raised a considerable amount of promotional money. We have had engineering and marketing feasibility studies completed for our proposed plant site. We have a progressive grain company that has agreed to provide the management, marketing, transportation and inventory financing for our proposed plant. We have contacted numerous investment bankers in the New York City area and are confident that we can obtain the necessary financing. The results of our efforts indicate to us that the alcohol industry can be highly profitable and can stand on its own two feet in the free enterprise system. The technology has now advanced to where

plants can operate with energy efficiency and human-consumable protein can be extracted directly from the grain prior to fermentation. Our engineering studies have convinced us that the processes generally in use in the United States are antiquated and archaic. Their efficiency is low. We believe that this industry can now begin taking advantage of new technology, and with that new technology it can compete in the marketplace.

Certainly the assistance of the federal government is welcomed by all of us. We understand that our needs in developing this industry, locally, may not be the needs of others. For our purposes tax incentives are more important than loans and the proposal with relation to distiller's grains is based upon old technology and may be desirable for inefficient plants but is not needed for the type of plant we are contemplating building.

Of far more concern to us, as we move beyond the tax credit matter, is the estimated four years time lapse necessary to obtain the permits to build plants. This estimate comes from the Department of Energy. Isn't it time that the Government did something beyond the proposal of the Office of Management and Budget (published at 44 Fed. Reg. 37094, June 25, 1979). Surely the over 700 permits needed by Sohio's proposed Long Beach-to-Midland pipeline have a redundancy. Of what good is it that citizens are willing to undertake these projects of alternate fuels when our hands are tied by bureaucratic red tape? The proposals of this bill and of the legislation proposed by Senator Dole are beneficial, but scarcely useful if it takes four years to do anything. This problem needs addressing as much as that of assisting us in establishing sources of alternate fuel.

STATEMENT OF FRANCES OHMSTEDE, DNC FARM CAUCUS CHAIRMAN

The following items should be addressed in any law that is intended to get alcohol into the tanks of American motorists and off of the Jet Stream of words without action.

1. Loans and loan guarantees should be written into law like the grain storage facility loans were written when the country needed more storage on the farm. These could be made available thru the CCC, ASCS, Small Business Administration, Farmers Home Administration, or any other government entity that can be trusted not to impede the dissemination of the loans and guarantees.

2. Loans should be at the lowest rate of interest possible * * * not over 8 percent. We do, after all, need the fuel that these plants could be producing within 4 or 5 months after the bill is implemented.

3. Repayment on the loans should be set up to start 1 year after construction is finished and should run for 10 years. They probably could pay out in 8 years like the storage facility loans, but 10 years would be better.

4. Alcohol plants built on the farm or by local small cooperatives will produce alcohol much sooner than large plants and will use the dry grain solids much more efficiently without adding a burden to the shipping capacity of the railroads and highways, therefore: Loans should cover plants producing 1,000 gal. per year to 1,000,000 gal. per year. A 1,000 gal. plant represents the production from 400 bu. of corn and will produce 133 bu. of dry DGS with about 27 percent protein (3×original protein content of the corn). This would feed about 7½ cows. A 1,000,000 gal. plant will use 400,000 bu. of corn and produce 133,333 bu. of DGS and is enough to feed 7,500 cows. These are rule of thumb figures since there is a difference in the amount of feed cows of various sizes need and the amount of protein in the grain. Plants smaller than 1,000 gal. per year could be financed some other way and wouldn't produce 200 proof alcohol, yet a 1,000 sized plant would let a single farmer produce his own fuel. If plants are larger than 1 million gal. size they are too large to handle local cattle, are too large to be considered cooperative size, and should be financed some other way.

5. Loans should cover facilities to grind, cook, ferment, distill and store alcohol and grain for alcohol. They should also cover housing for the process. They should probably say for starch conversion since not only grains but also sugar beets and potatoes should be covered.

6. Loans should stipulate that plants must produce at least 190 proof alcohol to qualify for the loans. Some will say 160 proof since this could be used in cars, tractors, and trucks—even furnaces by modifying the motors slightly. However, 160 proof will not burn with gasoline too well in all weather. By stipulating 190 proof or better you will get a grade of alcohol that will burn under most conditions. At the same time by not requiring 200 proof you allow small plants to be built much more cheaply since an extra column is needed to extract that remaining 5 percent of water. Furthermore, some people believe that 190 proof alcohol burns as well or better than 200 proof.

7. Any law promoting the production of grain alcohol should tie in with a law that guarantees 90 percent of parity loans on grains and stipulates a reasonable storage reserve period of about 18 months. This will guarantee grain production enough to meet alcohol production needs and at the same time keep the pipeline supplied so we are not short of food.

STATEMENT OF STATE SENATOR LORAN SCHMIT, DISTRICT NO. 23, NEBRASKA STATE LEGISLATURE

Eight years ago, as a State Senator, I introduced the first Gasohol legislation in this country; the state of Nebraska has since that time led the country in the development and the use of Gasohol. Today, Gasohol is sold widely in Nebraska; indeed, demand exceeds supply. During the past eight years, however, little has been accomplished on the Federal level to encourage the development of Gasohol. Senate bill 850 would be a strong step in the proper direction, especially as it would provide Federal loan guarantees to private industry for the construction of alcohol plants.

While I strongly approve of this bill in general, I would make two specific recommendations. First, after the recent decision of the Commodity Credit Corporation to award four loan guarantees to non-agriculturally related projects in direct contravention of legislative intent, I urge that this bill be so clearly written that there be no doubt of the intent that the loan guarantees go only to plants utilizing grain whose products will be used for Gasohol. Secondly, I suggest that the Secretary of Agriculture, in awarding loan guarantees, give preference to those states with a large surplus of grain in the Federal Three Year Reserve Program. This surplus could readily be used for conversion into alcohol fuels for Gasohol use.

In conjunction with legislation like Senate bill 850, the United States would do well to study closely the Brazilian National Alcohol Program. Brazil is attempting, through its alcohol production and its Gasohol programs, to travel quickly down the road towards energy independence. In a country with similar abundant resources of agricultural land, sunshine, and water, the United States could also, if it is willing, travel in the same direction.

Eight years ago, at the public hearing for my Gasohol bill, the opponents to LB 776 said that the public would not pay an additional 3½ cents for Gasohol, that petroleum supplies were plentiful, that if there were a problem, the Federal Government would take care of it. They argued then, as many still did as recently as a few months ago, that Gasohol was not economically feasible. Today, no informed person can argue that we are not in the midst of a severe energy crisis; a crisis which will only worsen as long as we persist in our dependence on petroleum. The production of grain alcohol as encouraged in Senate bill 850 will, through its use for Gasohol, lessen our dependence on imported oil.

I would like to read for you a short statement taken verbatim from the floor debate on LB 776 in the Nebraska Unicameral on May 14, 1971:

Senator Schmit: * * * If it is ever going to work, it ought to work now. And I don't think we need to be concerned about the difference in the price of alcohol produced from grain as versus that produced from petroleum because the grain is a renewable resource and petroleum is not. We have been told, and I also have in the pack, information that tells us that the supplies of petroleum are very short. I have been told that the north slope discovery in Alaska, as great as it is, would only supply the needs of this nation for three years, if we had to depend totally upon that. As you know, the near East and the Middle East oil supplies have been increased in price tremendously in the last two years; in fact, as recently as the last month or two. While in the case of grain, we have an expandable resource and a renewable resource and a resource that is produced within this State. Petroleum is a diminishing resource, is a resource which has enjoyed over the years tax breaks—I think you will recognize that. I think it is only feasible and that it is only right and just that we give a tax break to grain alcohol in an attempt to see once and for all if it will work and I am not going to stand here and tell you that it will work. There are persons in this room who have seen it work and may testify to that effect. I am going to say today, with the nation's concern about the pollution problem and the concern about the shortage of fuels, that we should give it a try.

The events of the past years have only intensified my belief in Gasohol. Since 1971, the energy crisis has grown in severity, petroleum has more than quadrupled in price, and our trade deficit has mushroomed in large part due to oil imports. During this time, however, Gasohol has been proven viable as an energy alternative that needs to be acted upon now!

Reading this transcript of a debate eight years ago is frightening. What irony there is in my statement that "oil supplies have been increased in price tremendous-

ly in the last two years; in fact, as recently as the last month or two." Spoken in the days when gasoline at the pump cost about 30 cents, today those words have a prophetic ring about them.

The solution to today's energy crisis must lie in the immediate exploration of several options. The United States should solicit the cooperation of its neighbors to the north and south, Canada and Mexico, in order to help the western hemisphere become energy independent. In the long range, the future of this country depends on our ability to develop alternative and renewable sources of energy. In the future there will undoubtedly be more efficient sources of energy developed; but at this time alcohol is an alternative whose time is long overdue. Alcohol can serve as an interim source of energy while technology develops better alternatives. And certainly, money for alcohol plants is more wisely spent than for increasingly expensive imported oil. I therefore urge the passage of Senate bill 850, a bill which could make it easier for alcohol to be produced on the scale necessary for Gasohol to become a national fuel.

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