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95-107 BIKINI ATOLL AND GUAM AUTHORIZATIONS

GOVERNMENT

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HEARING BEFORE THE COMMITTEE ON

ENERGY AND NATURAL RESOURCES

UNITED STATES SENATE

NINETY-FIFTH CONGRESS

SECOND SESSION

ON

S. 2821

A BILL TO AUTHORIZE \$8,868,000 FOR GRANTS TO THE GOVERNMENT OF GUAM FOR CONSTRUCTION OF PUBLIC FACILITIES, AND FOR OTHER PURPOSES

S. 2822

A BILL TO AUTHORIZE THE APPROPRIATION OF FUNDS FOR THE REHABILITATION AND RESETTLEMENT OF BIKINI ATOLL, TRUST TERRITORY OF THE PACIFIC ISLANDS, AND FOR OTHER PURPOSES

APRIL 17, 1978

Publication No. 95-107



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Committee on Energy and Natural Resources

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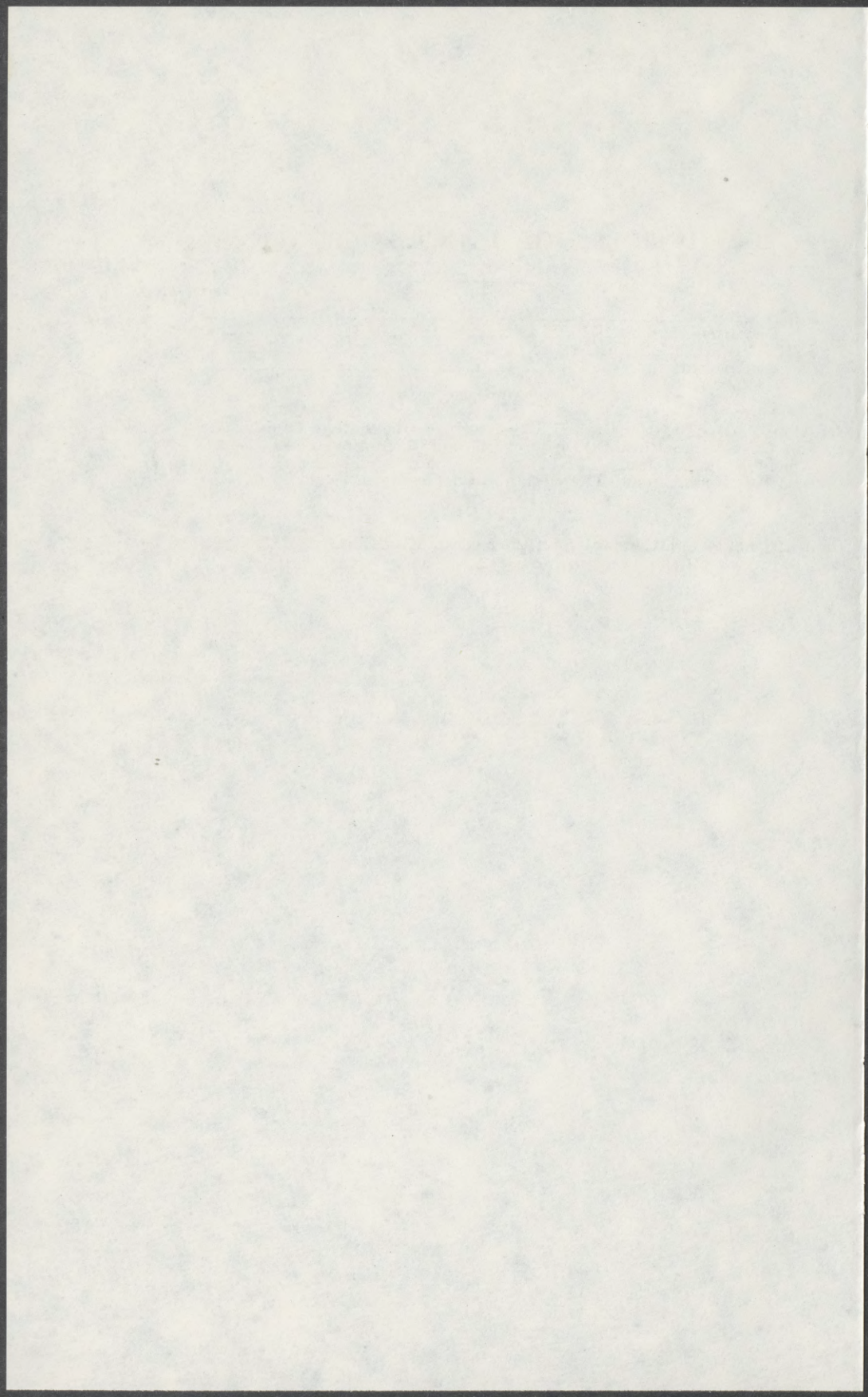
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BIKINI ATOLL AND GUAM AUTHORIZATIONS

MONDAY, APRIL 17, 1978

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, D.C.

The committee met, pursuant to notice, at 9 a.m., in room 3110, Dirksen Office Building, Hon. J. Bennett Johnston presiding.

Present: Senators Johnston and Hansen.

Also present: James P. Beirne, counsel.

OPENING STATEMENT OF HON. J. BENNETT JOHNSTON, A U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator JOHNSTON. The hearing will come to order.

This hearing has been scheduled to consider two administration proposals, as well as any proposals which may have an impact on fiscal year 1979 budget. This hearing must adjourn by 10 o'clock. Therefore, I will ask all witnesses to submit their formal statements for the record so we can cover all subjects comprehensively.

The bills and the department reports will be included at this point.
[The information follows:]

(1)

95TH CONGRESS
2D SESSION

S. 2821

IN THE SENATE OF THE UNITED STATES

APRIL 4 (legislative day, FEBRUARY 6), 1978

Mr. JACKSON (by request) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To authorize \$8,868,000 for grants to the government of Guam for construction of public facilities, 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,*
3 That there is hereby authorized to be appropriated to the
4 Secretary of the Interior (hereinafter referred to as the Sec-
5 retary), an amount not to exceed \$8,868,000 for a grant
6 to the government of Guam to assist in the rehabilitation,
7 upgrading, and construction of public facilities.

8 SEC. 2. Funds provided under this Act may be used as
9 the matching share for Federal programs and services.

10 SEC. 3. The government of Guam in carrying out the
11 purpose of this Act may utilize, to the extent practicable,

1 the available services and facilities of agencies and instru-
2 mentalities of the Federal Government on a reimbursable
3 basis. Reimbursements may be credited to the appropriation
4 or fund which provided the services and facilities. Agencies
5 and instrumentalities of the Federal Government may, when
6 practicable, make available to the government of Guam
7 upon request of the Secretary such services and facilities as
8 they are equipped to render or furnish, and they may do so
9 without reimbursement if otherwise authorized by law.

10 SEC. 4. Funds appropriated pursuant to this Act shall
11 remain available until expended, and the Secretary may
12 place such stipulations as he deems appropriate on the use of
13 these funds.

14 SEC. 5. No request by the Governor of Guam for the
15 payment of funds pursuant to this Act will be accepted
16 unless the territorial legislature has concurred in the Gov-
17 ernor's request.



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

FEB 6 - 1978

Honorable Walter F. Mondale
President
United States Senate
Washington, D.C. 20510

Dear Mr. President:

There is enclosed a draft bill "To authorize \$8,868,000 for grants to the Government of Guam for construction of Public facilities, and for other purposes."

We recommend that the bill be referred to the appropriate Committee for consideration, and that it be enacted.

The draft bill would authorize the appropriation of \$8,868,000 to the Secretary of the Interior for a grant to the Government of Guam for the purpose of rehabilitating and upgrading existing public facilities and constructing new facilities. Many of Guam's public facilities were severely damaged or destroyed by Typhoon Pamela which devastated Guam in May 1976. In addition, many of the territory's public facilities were constructed by the United States military after World War II and are no longer adequate to met the needs of Guam's growing civilian population.

For fiscal year 1977, this Department received a \$500,000 supplemental appropriation which is being used to develop a program plan to help the Government of Guam deal with its short and long range needs. The plan will cover a broad range of activities, including governmental operations, financial management, economic development, and alternative proposals for Federal Government assistance.

However, until the program plan is completed and final recommendations and alternatives have been evaluated, this proposed \$8,868,000 construction grant will provide for the improvement of the territory's water system which the government of Guam has identified as the



highest priority for capital improvements. The requested funds will permit Guam to start on some of the more immediate projects thus providing some immediate assistance to Guam until the overall assessment plan is completed and a more comprehensive program for the territory can be developed.

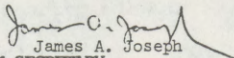
Local revenues are forecasted to be deficient over the insuing period and thus will provide for only the basic operating programs of the Government of Guam. This then leaves no funding to provide for priority capital improvement needs.

Since Typhoon Pamela, this Department has assisted the Guam Government in obtaining direct Federal financial assistance of \$45.2 million for the rebuilding of the island. This assistance consisted of a \$20.0 million emergency grant following the typhoon to maintain essential government services; a \$10.2 million grant to reconstruct and upgrade power and water facilities damaged by the typhoon; and a \$15.0 million grant to supplement Guam's reduced revenues.

In addition, approximately \$64 million in grants and loans has been received by Guam from other Federal agencies, such as the Department of Health, Education and Welfare and the Federal Disaster Assistance Administration as a result of the damage created by the typhoon. The grants for which this authorization is being requested will allow Guam to continue on its program of typhoon rehabilitation and general infra-structure improvement and development.

The Office of Management and Budget has advised that the enactment of this legislation would be in accord with the program of the President.

Sincerely,


James A. Joseph
Under SECRETARY

Enclosure

A B I L L

To authorize \$8,868,000 for grants to the Government of Guam
for construction of Public facilities, and for other purposes.

Be it enacted by the Senate and House of Representatives of
the United States of America in Congress assembled, That there is
hereby authorized to be appropriated to the Secretary of the Interior
(hereinafter referred to as the Secretary), an amount not to exceed
\$8,868,000 for a grant to the Government of Guam to assist in the
rehabilitation, upgrading and construction of public facilities.

SEC. 2. Funds provided under this Act may be used as the matching
share for federal programs and services.

SEC. 3. The Government of Guam in carrying out the purpose of this
Act may utilize, to the extent practicable, the available services and
facilities of agencies and instrumentalities of the Federal Government
on a reimbursable basis. Reimbursements may be credited to the
appropriation or fund which provided the services and facilities.
Agencies and instrumentalities of the Federal Government may, when
practicable, make available to the Government of Guam upon request of the
Secretary such services and facilities as they are equipped to render
or furnish, and they make do so without reimbursement if otherwise
authorized by law.

SEC. 4. Funds appropriated pursuant to this Act shall remain available until expended, and the Secretary may place such stipulations as he deems appropriate on the use of these funds.

SEC. 5. No request by the Governor of Guam for the payment of funds pursuant to this Act will be accepted unless the territorial legislature has concurred in the Governor's request.

95TH CONGRESS
2D SESSION

S. 2822

IN THE SENATE OF THE UNITED STATES

APRIL 4 (legislative day, FEBRUARY 6), 1978

Mr. JACKSON (by request) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

A BILL

To authorize the appropriation of funds for the rehabilitation and resettlement of Bikini Atoll, Trust Territory of the Pacific Islands, 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,*
3 That there are hereby authorized to be appropriated not
4 more than \$15,000,000 (December 1977 prices) plus or
5 minus such amount, if any, as may be justified by reason of
6 ordinary fluctuations in construction costs as indicated by
7 engineering cost indices applicable to the types of construc-
8 tion involved, for rehabilitation and resettlement of Bikini
9 Atoll.



United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

FEB 6 - 1978

Honorable Walter F. Mondale
President
United States Senate
Washington, D.C. 20510

Dear Mr. President:

There is enclosed a proposed bill "To authorize the appropriation of funds for the rehabilitation and resettlement of Bikini Atoll, Trust Territory of the Pacific Islands, and for other purposes."

Bikini Atoll lies among the Marshall Islands, which are a part of the Trust Territory of the Pacific Islands administered by the United States pursuant to an agreement with the Security Council of the United Nations. The United States carried on atomic testing there between 1948 and 1958 which severely damaged Bikini Atoll and rendered much of it uninhabitable.

The United States had committed itself to returning the atoll to its original owners when security purposes no longer required its use for testing or defense purposes, and from 1958 onward the people of Bikini increasingly pressed for a return. Between 1966 and 1967, the former Atomic Energy Commission conducted several radiological surveys, and reported that after cleanup, a certain number of the islands of the atoll were safe for civilian habitation. Accordingly, on August 12, 1968, President Johnson announced that Bikini Atoll was no longer required for the nuclear testing program or for defense purposes, and that the atoll would be returned to the people of Bikini following cleanup and rehabilitation.

In June 1975 an intensive ground radiological survey was conducted by Energy Research Development Administration (ERDA) and it revealed that the original recommendations concerning resettlement on Bikini Island needed major revision. It became evident that radionuclide intake in the plant food chain had been significantly miscalculated



in terms of human consumption. The results of the 1975 ERDA survey led to the decision that an aerial radiological survey be done for Bikini Atoll also. This kind of aerial survey can reveal residual results not available from ground techniques, particularly the presence of plutonium in the soil. The aerial radiological survey is expected to be carried out in early 1978, and results for Bikini Atoll will be available shortly thereafter.

The 1975 ERDA radiological survey demonstrated conclusively that the interior of Bikini Island should not be used for residential purposes; that well water should not be used for human consumption; and that locally grown food products must be placed on a restricted basis as far as consumption by the people is concerned. By late 1976, it was evident that coconut trees, formerly not expected to pose a recycling danger, were also suspected. The restriction on the use of coconut products produced on Bikini Island for food and export additionally make the island of Bikini unrealistic as a permanent place of settlement and for agricultural use.

It is now clear that the use of Bikini Island (the largest island on the Atoll) cannot be considered at the present time as the site for permanent resettlement for the approximately 500 Bikinians who seek to return, or for immediate agricultural purposes. In short, a complete recasting of the Bikini Resettlement Program is required.

A Master Plan for Bikini Resettlement, completed in 1974, revised the original 1969 plans for development of the atoll. This 1974 Master Plan envisioned using both Bikini Island and Eneu Island for habitation and for agricultural purposes.

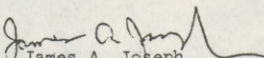
Since action on the Bikini resettlement problem is urgently needed, a number of alternative plans currently are being considered. The most feasible, at present, appears to be to concentrate the major resettlement project on Eneu Island. This Island, which lies approximately 12 miles south of Bikini Island, did not, in contrast with Bikini, receive significant amounts of radiation fallout, and radiation exposure of people living there would meet U.S. Federal safety standards. A preliminary recasting of the 1974 Bikini Master Plan indicated that approximately \$13 million will be required to rehabilitate Eneu Island and to develop suitable residential community facilities there. 21,000 coconut trees already have been planted on Eneu Island and are bearing. Analysis reveals that these Eneu Island coconuts can be used for food and possible future copra export. Additionally, there are smaller islands available which must be planted with coconut groves and other food crops to replace the coconut groves and garden plots on Bikini Island which, for the foreseeable future, will continue to be restricted as to use.

Experimental garden plots for vegetables, breadfruit, and other crops have been established on Eneu Island and are flourishing. Analytic test results of these garden crops will be available by early summer, 1978. Since coconuts on Eneu Island already have been tested and are safe, it is expected, in view of the vastly lower radioactivity level of the Eneu soil, that other food crops also will be useable.

The restrictions on the use of Bikini Island, however, do pose the question as to whether all of the approximately 500 Bikinians who have indicated a strong desire to return to Bikini Atoll, can be adequately accommodated on Eneu Island. Even if they can it is anticipated that a small group of Bikinians will elect to remain on Kili Island. Estimates for rehabilitation of the Kili Island community facilities are set at a minimum of \$2,000,000, thus making the overall Bikini rehabilitation project estimate \$15 million at 1977 prices.

The Office of Management and Budget has advised that enactment of this legislation would be consistent with the Administration's objectives.

Sincerely,


James A. Joseph
Under SECRETARY

Enclosure

A. B I L L

To authorize the appropriation of funds for the rehabilitation and resettlement of Bikini Atoll, Trust Territory of the Pacific Islands, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there are hereby authorized to be appropriated not more than \$15 million (December 1977 prices) plus or minus such amount, in any, as may be justified by reason of ordinary fluctuations in construction costs as indicated by engineering cost indices applicable to the types of construction involved, for rehabilitation and resettlement of Bikini Atoll.

Senator JOHNSTON. I'm sorry I'm late. I had a meeting this morning over at Watergate and I could not get back in time. We ought to be able to proceed until 10:15.

The first witness will be our good friend the Honorable Antonio B. Won Pat, Delegate from Guam, whom we are always glad to welcome to this committee. Tony, glad to have you.

**STATEMENT OF HON. ANTONIO B. WON PAT, DELEGATE TO
CONGRESS FROM GUAM**

Mr. WON PAT. Good morning and thank you very much for the greetings. In the interest of time, I have summarized. I think you have a copy of my statement.

Senator JOHNSTON. Yes; and it will be included in the record.

Mr. WON PAT. I am here, principally, at the request of the administration for \$8,868,000 for a water development program on the island. This will extend the water supply and services to the southern part of the island. I don't think I have to go into great detail about that. I think the subsequent witness will be able to further justify that.

In addition to that, I want to take the matter up of the—and to particularly thank you, Senator, for your assistance in getting the authorization bill, Public Law 95-134, which involves the \$25 million for the hospital. That is a matter of record now.

But, as you probably know, we are having a lot of problems in connection with a transaction. While we do have the authorization already, we have yet to get the money, the appropriation. For that reason, I am calling your attention to this matter and soliciting your assistance in trying to get this legislation through the Senate.

The \$25 million originally was the estimated cost of the Marianas Medical Center. That was the amount expected to purchase by the Guam Government. Because of the delays in getting the transaction, the negotiations through, and meanwhile, because of obligations of the Marianas Medical Center, has continually, of course, increased and it will continue unless, of course, the money is forthcoming.

For that reason, I am pleading for your help to try to get this to the Senate and, hopefully, to the House. I will be appearing at the House sometime tomorrow or the next day in that connection.

I don't think I have anything further to say except to answer any questions you may ask.

Senator JOHNSTON. You say that further delay costs you \$1,250,000. Is that per year?

Mr. WON PAT. That is correct.

Senator JOHNSTON. You are urging quick support of the \$25 million appropriation?

Mr. WON PAT. Yes, sir.

Senator JOHNSTON. We will certainly try to hurry that through. Of course, it would be part of the regular appropriation bill, and I would not see any problem which we would have with the \$25 million. An effort to increase it would, perhaps, give some problem, because we would have to have an additional authorization.

Mr. WON PAT. That's right.

Senator JOHNSTON. I would like to welcome Senator Hansen who is here this morning. Tony Won Pat has just testified and we are talking about the money for the medical center.

He's urging us to get the \$25 million approved for that medical facility as quickly as possible. I was telling him that I hoped we would and that we will try to get it as quickly as we can.

Mr. WON PAT. We sincerely appreciate that, Senator.

Senator JOHNSTON. Do you have any questions?

Senator HANSEN. I don't have, thank you, Mr. Chairman.

Senator JOHNSTON. Tony, we appreciate your coming over to the committee. Keep us advised of your needs and we will try to do what you say in every instance.

Mr. WON PAT. Thank you. You are very, very gracious. Thank you, Senator Hansen.

[The prepared statement of Mr. Won Pat follows:]

STATEMENT OF HON. ANTONIO B. WON PAT, DELEGATE TO CONGRESS FROM GUAM

Mr. Chairman and honored members of this committee, I deeply appreciate this opportunity to appear before you today in support of S. 2821, a measure which seeks to authorize \$8,868,000 in grants for the Government of Guam.

Before I proceed, however, I must take this opportunity to publicly express my deep gratitude to this Committee, and in particular, to my good friend, Senator J. Bennett Johnston, for the overwhelming show of support you have provided Guam in the past several years.

This Committee has been most generous in its time and support since Typhoon Pamela struck Guam in May, 1976. The funds that you have readily provided the Government of Guam have been wisely and swiftly used to put the island back on the road to economic recovery. And, while our problems remain in considerable magnitude, I must share with you our feeling of immense consolation that the mightiest country in the world does not ignore the plight of its citizens, even though they be 9,000 miles away from the center of our national power.

The funds requested in S. 2821 are an extension of the Government of Guam's efforts to provide our people with decent public services. Services that we desperately need to increase the standard of living from marginal in many instances to acceptable by mainland standards. The funds requested today will provide the Territorial Government with financial support to bring many of Guam's remote areas with fresh water for the first time in history. During the typhoon and during our dry spells on Guam, these areas often run out of water and must be serviced by special trucks—a method that is highly inefficient and expensive.

Another factor complicating our water problem was the rapid population growth of Guam during the 1960's and early 1970's. This factor, coupled with a rise in the use of water to meet the needs of modern technology such as commercial air conditioning, has placed a heavy strain on Guam's fresh water supplies. It is imperative that the island put into effect in the near future a well designed delivery source to ensure that those areas not now being serviced will have a reliable water source. For these reasons, I urge that this Committee adopt the provisions of S. 2821.

Earlier in this statement I noted my thanks for the help this Committee has extended recently to Guam. Last year, this Committee was instrumental in the passage of the Omnibus Territories Act (Public Law 95-134). As you know, this Act carries authorization for a number of special programs designed to expedite Guam's recovery.

One of the most important sections of the measure, was that authorizing \$25 million for health care needs of the island. More specifically, this money was earmarked for Guam to purchase the Medical Center of the Marianas to replace the archaic Guam Memorial Hospital. As we all noted last year during the proceedings on Public Law 95-134, the typhoon left Guam without an adequate intensive care facility. About the same time, the opportunity to purchase a nearly new medical facility, complete with the most modern of intensive care equipment arose. The \$25 million approved by this Committee and my own Committee on the Interior in the House was for the purchase of the facility.

We on Guam are presently completing final negotiations for the purchase and have in fact taken over the hospital and are now using it for intensive care purposes. But we are facing a new crisis. The money you approved last year has yet to be forthcoming. This week, I have the opportunity of testifying before the

Senate Appropriations Subcommittee on the Interior in support of the \$25 million. Even were the Senate to agree to my request, however, I must note that the Interior Department's request is still before OMB awaiting their sanction.

The delay in funding has led to skyrocketing costs for the Marianas Medical Center. Each month of delay in completion of the transaction results in another \$250,000 in interest charges on debts owed for the MCM facility. Even by the most optimistic forecast further delay, however unintentional, will cost Guam a minimum of \$1,250,000 from this point until that time.

I therefore urge your quick and favorable support of our request for the \$25 million appropriation lest Guam finds itself priced out of the hospital we so desperately need. For this reason, I respectfully request that this Committee give every consideration towards approval of an additional sum of monies necessary to cover the costs incurred by the complex budgetary process we must go through to obtain the hospital funding.

It goes almost without saying that no community, and particularly one the size of Guam's, can long survive without adequate medical care. We not only service the health needs of our own constituents, but are the focus of major medical care for the entire Trust Territory. Without a decent hospital, our intensive care patients on Guam are forced to seek services in either Hawaii or the states—a most expensive prospect that few can afford.

Again, we call on you for understanding and assistance. But our recourse is either this action or face the prospect of Guam not having an intensive medical care facility.

I appreciate your interest in the welfare of Guam and thank you for your time this morning. I will be pleased to respond to your questions, if any.

Senator JOHNSTON. We are glad to welcome now Mrs. Ruth Van Cleve who is the Director of the Office of Territorial Affairs in the Department of the Interior.

Glad to have you, Mrs. Van Cleve.

STATEMENT OF HON. RUTH G. VAN CLEVE, DIRECTOR, OFFICE OF TERRITORIAL AFFAIRS, DEPARTMENT OF THE INTERIOR

Mrs. VAN CLEVE. Thank you, Mr. Chairman.

I understood you to say that you would prefer to have my statement made part of the record. I would be pleased to give you a very quick summary, if that is your pleasure.

Senator JOHNSTON. Yes, please.

Mrs. VAN CLEVE. We are here to support the two administration bills that are before you, an authorization of \$15 million for a rehabilitation program for Bikini Atoll and the island of Kili and an authorization of \$8,868,000 for a program of capital improvements for Guam.

The Bikini program is one that you are, I believe, in general familiar with. We have found it necessary to recast the Bikini rehabilitation program in light of recently discovered new evidence. The program, we foresee, will cost, in the case of Bikini Atoll, about \$13 million.

But we are asking for an additional \$2 million to rehabilitate Kili, our thought being that some of the Bikinians now living there are likely to remain on Kili rather than move back to Bikini Atoll.

We have asked, in my prepared statement, that the bill before you be amended to make specific reference to Kili. We overlooked the desirability of that reference earlier and would be grateful to you if you could add a suitable reference to Kili in the bill.

In the case of Guam, as the Delegate has just stated, the bill before you would authorize the appropriation of the funds for which we testified last week in both the House and the Senate, all for water projects in Guam.

Guam has a series of capital improvement needs. It is our belief that the most pressing needs are the four water projects that are a part of our budget justification. Accordingly, it is our hope that both of these authorization bills can be enacted. We have sought funds based on the hope that they will be.

The letter inviting us to come this morning also asked about our expectations with respect to further authorizations. As my statement makes clear, we do not anticipate, at this time, seeking a greater authorization for the meeting of hospital needs in Guam.

You have also asked about our plans in connection with hospital requirements in the Virgin Islands. And that matter remains under review. We have received a great deal of information from the Virgin Islands government about it. And we have, ourselves, prepared an authorization vehicle but it is still being reviewed by the executive branch.

I am not in a position to tell you anything definitive about it this morning. We have no further expectations with respect to authorizations—additional authorizations requirements—during the current fiscal year.

I think that completes the summary of my statement, Mr. Chairman. Senator JOHNSTON. Thank you very much, Mrs. Van Cleve.

I understand that the rehabilitation program for Bikini would still leave some islands off limits and there would be a continuing danger of agricultural products grown on some parts of Bikin Atoll, itself.

Can you assure this committee that, if we permit a resettlement of Bikini, we will not have a Rongelap situation in another 10, 15 years?

Mrs. VAN CLEVE. I can assure you that our prime objective is to avoid any further complications with respect to these much beleaguered people in the Marshalls, yes. We have concluded that Bikini Island is not a safe site for resettlement. We are undertaking a series of actions, including a radiological aerial survey, that will assist in establishing exactly which islands are safe for rehabilitation.

We will move with abundant caution because we are also aware of the problems that arise.

Senator Johnston. So you are not urging the resettlement of Bikini?

Mrs. VAN CLEVE. We are urging the resettlement of Bikini Atoll, but not of Bikini Island, itself. The initial plan had been to use Bikini Island, since that is the long-standing home of the bulk of the people who were displaced back in 1946.

It has developed, however, that Bikini Island is, itself, unsafe, having suffered serious fallout damage.

Senator JOHNSTON. Can you allow the resettlement of the rest of the atoll and effectively limit them coming onto Bikini Island?

Mrs. VAN CLEVE. We believe we can do that. We have, as I have said, other investigations still incomplete that will tell us, definitively, which of the islands of the atoll are safe. We believe, for example, that Eneu Island, which is 12 miles south of Bikini, will be a safe site for resettlement.

Senator JOHNSTON. How do you keep people off Bikini?

Mrs. VAN CLEVE. We believe, and the High Commissioner testified last week, that when the Bikinians now resident on Bikini Island are told precisely, straight out, what the problems are, that they will be willing to resettle on other safe islands.

It will be difficult because they feel very nostalgic about their ancestral home.

Senator JOHNSTON. What will be the total cost of a total cleanup of Bikini Island?

Mrs. VAN CLEVE. I don't, myself, have that figure. You will appreciate that the total cost of our rehabilitation program would be the \$15 million contained in the bill before you. If the question is the cost of cleaning up Bikini Island, per se, I think it is almost infinite. But there are others here who can speak better to that point.

Mr. Deal from the Department of Energy is, I think, the most expert person in the room on this subject.

Senator JOHNSTON. Mr. Deal, can you tell us what the cost of a total cleanup would be?

Mr. DEAL. Senator, I don't believe that a total cleanup of Bikini would be feasible. What we are talking about is cleaning up the strontium cesium which is in the soil and taken up by the food chain. We are not even attempting that in the big cleanup.

The only thing that takes care of that is time. And in about 30 years, it will reduce half—the half-life effect. That strontium cesium will be taking up about half the amount. In several decades, it will be down to a point where even if someone grew some food on Bikini and ate it, it would not be a situation like it is now.

Senator JOHNSTON. You are saying it's practically impossible to clean up Bikini Island. Is that your testimony?

Mr. DEAL. Yes, sir. You would just have to remove all the soil and start all over. And that's very expensive. I don't know how deep the plants' roots go down, but you have to find a way to keep the plants from taking up the radioactive strontium in the soil. And that's the difficulty.

Senator JOHNSTON. Is this just for agricultural products or for people living there as well?

Mr. DEAL. The problem on Bikini Island today is the eating of local foods grown on the island. And it's just living on the island, itself. The dose the people would receive would be within the radiation standards.

Senator JOHNSTON. Its agricultural products.

Mr. DEAL. The agricultural products are a problem, yes, sir.

Senator JOHNSTON. What is the fiscal situation, Mrs. Van Cleve, on the Virgin Islands?

Mrs. VAN CLEVE. The short answer is that we are not certain. We expect to know, quite definitively, by the end of June. The Government comptroller for the Virgin Islands, who is present this morning, is conducting at this time a full-scale investigation of that question.

He has, in fact, ceased run-of-the-mill comptroller activities, auditing, and the like, and has brought all of his forces to bear upon an investigation of this question. I think he has a general feeling, at this time, of the results that he will discover, and that is that for the last several years there have been what we are inclined to call deficits. The Virgin Islands are inclined to call it unconventional financing. So that we will probably find, by the end of June, that a series of deficits has brought the Virgin Islands into a deficit position of many millions of dollars. There is a foreseen deficit this year of something in the range of \$17 million.

Senator JOHNSTON. We had Federal funds going in there these last 2 or 3 weeks on this special tax program.

Mrs. VAN CLEVE. That is correct.

Senator JOHNSTON. Without that, they would have been in deep trouble; would they not?

Mrs. VAN CLEVE. That is correct. It is possible to say that they are in trouble, notwithstanding that aid.

Senator JOHNSTON. Senator Hansen.

Senator HANSEN. What is the population of the Virgin Islands?

Mrs. VAN CLEVE. Approximately 100,000.

Senator HANSEN. Do these bed numbers total up—I suspect there are some beds there, some hospitals already in existence. So these would just complement what are presently in place. Is that right?

Mrs. VAN CLEVE. The expectation, and I speak unofficially now because we do not yet have an official position, the expectation is that the new hospitals that would be constructed, if Congress were to provide Federal funding for them, would replace the existing hospitals.

There are three quite deficient structures now in existence; one on each of the major islands. They are badly designed because they have been added to for a period of about 30 years, and they are in undesirable geographic situations. They are, without question, inadequate hospital facilities.

The plan would be to use the existing structures for other purposes, and to replace the existing hospital facilities totally with new buildings.

Senator HANSEN. Is oil the major, or practically the only source of energy on the islands?

Mr. DEAL. I don't know the answer to that question.

Mr. FLEMING. It would not be considered the major source of energy on the islands.

Senator HANSEN. What is the major source?

Mr. FLEMING. Through powerplants—

Senator HANSEN. How are they powered? My question was is oil the major source of energy?

Mr. FLEMING. I'm sorry. I really can't answer that.

Senator HANSEN. What runs the powerplants? I mean coal fired or oil fired?

Mr. FLEMING. Those are oil fired, and I guess I could assume that that is the principal, but I don't really know.

Mrs. VAN CLEVE. The person who has just spoken is Mr. Fleming, the Comptroller of the Virgin Islands.

Senator HANSEN. You intend only to warn people of the dangers of radioactivity of this strontium and cesium still in the soil. Is that what I understood you to say?

Mrs. VAN CLEVE. If the warnings alone are not effective, we will have to do more. It is our belief, and we hope we are correct in the belief, that when the people of Bikini are told the facts with respect to residence on Bikini Island, that they will voluntarily choose to live elsewhere.

Senator HANSEN. Maybe the Surgeon General will be interested in knowing the specific approach that you use there. He has not persuaded everyone to stop smoking yet. And I was just wondering how effective it might be. It occurs to me that, probably because of the insidiousness

of this sort of danger, that you might, indeed need, to exercise further means to dissuade people from going on living there and using food produced there.

That would be my guess, but I don't know. I have no further questions, Mr. Chairman.

Senator JOHNSTON. Do I understand they are proceeding with plans to make a college in Micronesia?

Mrs. VAN CLEVE. A report has been submitted to the Congress by the President, such report having come forward last July or August, outlining the steps that should be taken with respect to the creation of a college, and outlining, particularly, the steps that should be taken before funds are committed for the construction of physical facilities.

Progress is being made in connection with those early steps. A board of regents has been appointed. An acting chancellor has been appointed. We have not, however, had any official requests for funding for the college.

Some have come to our attention through the Congress of Micronesia. But by official requests, I mean that the High Commissioner has not, himself, made to the Interior Department any requests for funds.

Senator JOHNSTON. As I recall, back some months, maybe over a year ago, we had a hearing on the question of a college for Micronesia. We figured that you could get a better education with a broader outlook for a fraction of the cost by sending every student who wanted to go to the University of Hawaii, or elsewhere, statewide.

Was that judgment correct at that time? And is it still so?

Mrs. VAN CLEVE. I think it is considered desirable that an institution be created in Micronesia called the College of Micronesia.

But there is a general attitude that the construction of a campus facility is not what Micronesia needs most at the moment. What it needs most, first of all, is a very clear understanding of the particular curriculum that would lend itself best to Micronesia.

Senator JOHNSTON. That was not my question. My question had to do with cost. Is it a fact that you could educate at the University of Hawaii, or some other school, every Micronesian who wanted a college education at a fraction of the projected cost of the University of Micronesia?

Mrs. VAN CLEVE. I don't think that that is a fact. I would be pleased to have an opportunity to expand upon that answer in the record. But it is very expensive to send Micronesians to Hawaii or to mainland institutions. It seems to me almost certain that it could be done far more cheaply if they could be educated at a site within Micronesia.

Senator JOHNSTON. That is a surprise and I wish you would do a comparative workup on that. We had testimony on that and they had a request for a certain number of dollars. And we divided that among the number of students. We thought one of the purposes of education is to give a broadening view to students.

Every politician wants to build more institutions in his own town, and that's what we are about in politics. But, if you are going to do it with Federal money, as opposed to Congress of Micronesia money, which I assume wouldn't be the case because it was for a Federal grant last time.

And I think we have to give some view to the relative cost and what you achieve with it. If the purpose of education is to be broadening, as

I say, I think it would be a better thing to send the students outside of the trust territories so that they will see the rest of the world and then come back.

One of the problems is the insularity of the island chain as far as education is concerned.

Mrs. VAN CLEVE. I certainly agree that that's true. I would point out that we have no requests pending for funds for the College of Micronesia at this time.

Senator HANSEN. Is English spoken all over the islands?

Mrs. VAN CLEVE. Yes, it is the general language of the bulk of the Micronesians. There are, certainly, some who do not speak it particularly well. But most speak English to some extent.

Senator HANSEN. Is English used in all of the public schools on the island?

Mrs. VAN CLEVE. Yes. It is the language of instruction.

Senator JOHNSTON. I would like to receive that information on the university there. Once you get the university started, you will have it, from now on out. It may be a good thing, but my own feeling is that it would not be. In the first place, you would have it on more than one island. If it's only on one island, they will be wanting community colleges on every one of the islands, which is fine if it's not done with Federal money, if it's not one of the capital improvements projects.

It seems to me we have a much greater priority in building the infrastructure up on these islands. By the way, I am a little concerned about the infrastructure. It appears that the administration's request to eliminate the docks in the Marshalls, and other elements, are included from the administration's request.

I am concerned about that and I have some questions in writing I would like to submit. Although the general question has to do with who administers the capital improvements program in Micronesia. I know it is a matter of some sensitivity, but I think your office ought to talk to the Micronesians about getting the Corps of Engineers to administer this program.

It has been very mishandled, as you know. It is the age-old problem of the local politicians wanting to administer their own programs on a very decentralized basis. And you can't do that and have a good program.

So, I wish you would speak to them about that.

Mrs. VAN CLEVE. We do have an arrangement by which the Navy Department is now responsible for all of the major capital improvement construction in the trust territory. The High Commissioner entered into an agreement with the Navy in February 1976, I believe, by which they Navy undertook, for a fee, to perform this service for the government of the trust territory.

So all of the major capital improvements are being constructed by the Navy, except for the area of the Marshalls where I understand the Corps of Engineers has jurisdiction. For some reason, the military has split the Pacific. So the corps is in the eastern portion and the Navy is in the Carolines and northern Marianas.

Senator JOHNSTON. Is the Navy doing the long-range planning?

Mrs. VAN CLEVE. The Navy has done all of the architectural and engineering work and has, in cooperation with the trust territory government, done the long-range planning. That is correct. There

remains a department of public works in the trust territory and in each of the districts of the trust territory. But their responsibilities are pretty limited to small projects and to the maintenance of existing projects.

The major task has been transferred to extremely competent experts——

Senator JOHNSTON. That's good. We had an oversight hearing in 1974, 1975 that showed, at that time, the need for that oversight. I was aware that the Navy was doing that and had forgotten it. But I am glad they are, because we need their expertise.

Senator HANSEN.

Senator HANSEN. I have no further questions, Mr. Chairman.

Senator JOHNSTON. We will submit some questions in writing, Mrs. Van Cleve, and thank you very much for being our guest today.

[The prepared statement of Mrs. Van Cleve follows:]

STATEMENT OF HON. RUTH G. VAN CLEVE, DIRECTOR, OFFICE OF TERRITORIAL AFFAIRS, DEPARTMENT OF THE INTERIOR

Mr. Chairman, I appreciate the opportunity to appear before you with respect to legislation providing for the rehabilitation of Bikini Atoll and for certain construction projects on Guam. The Bikini legislation has been introduced as S. 2822 and the construction grants for Guam as S. 2821.

With respect to Bikini, recent radiological and medical surveys demonstrated conclusively that the interior of Bikini Island should not be used for residential purposes nor can it be used for the immediate future for the production of food crops. The 1974 Master Plan for Bikini resettlements had contemplated the use of Bikini Island, as well as Eneu Island, as resettlement and agricultural sites. The Master Plan must now be revised to provide for a shift to other islands within the atoll and for the development of housing and other community facilities on Eneu. We estimate that approximately \$13 million will be required for these purposes.

In addition we expect that a small group of Bikinians will remain on Kili Island. We estimate that the rehabilitation of Kili community facilities will be a minimum of \$2 million, thus making the total of \$15 million that we have requested be authorized.

On re-reading S. 2822, we believe that Kili should be specifically mentioned and we, therefore, suggest that the period at the end of the bill be stricken and the words "and Kili Island" be inserted. This would clearly authorize the expenditure of a portion of the \$15 million for the rehabilitation of Kili.

With respect to S. 2821, the \$8,868 million authorized as a grant will provide primarily for urgently needed water system facilities and the development of water data to enable the Government of Guam to complete a Master Plan for the island's water system.

We have included in the FY '79 budget request for the Department of the Interior \$8,868,000 for a grant to Guam for these water facilities and we have also included in the FY '79 budget request \$6 million as the first increment of the Bikini-Kili rehabilitation work.

We have also been requested to discuss at this hearing the probability and magnitude of any request for additional funding with respect to the territories.

The Department has received a request from the Government of the Virgin Islands for grants for the construction of hospital facilities on each of the major islands of that territory. The territorial government has proposed the construction of 250-bed hospitals on St. Thomas and St. Croix for a total cost of about \$26,000,000; a twelve bed facility on St. John for a cost of \$640,000; and community health centers and clinics on a territory-wide basis for an estimated cost of \$5,000,000. The total estimated cost of the proposal as requested by the Virgin Islands is \$51,640,000. The Department of the Interior has this request from the Virgin Islands Government under review.

The Administration is not proposing at this time additional funding authorization for the health care needs of Guam. We presently have under review several documents relating to the health needs of Guam and specifically to the fair market value of the Medical Center of the Marianas. The Administration has not com-

pleted its review of these documents and the Department is not now in a position to comment further.

The Chairman of the Committee also asked what might be requested to offset any anticipated deficit for the Virgin Islands. At this time I can state only that we are very concerned about the seemingly intractable deficits of the Virgin Islands and Guam. The Congress in the 1950's authorized a financial arrangement with funding coming from what would otherwise be Federal revenues with the expectation that these financial resources, plus local resources, would be sufficient to enable the territorial governments to meet their requirements. On the whole this arrangement worked well until the economic recession and inflation of the 1970's. With respect to both the Virgin Islands and Guam, we are attempting to analyze the economic situation and their revenue and expenditure situations in an effort to devise a system that will hold to a minimum special patchwork efforts which, however essential, may treat only the symptoms but do not get at the basic problem.

In this connection, we are nearing completion of a Guam Needs Assessment that we believe will help us and the Government of Guam to work together in developing strategies and programs to meet in a more rational way that territory's development needs and to help overcome its current deficit situation. We shall, of course, be glad to supply the Committee with copies of this report when it is completed.

Similarly, in the Virgin Islands we are started on a comparable review. The Government Comptroller is currently analyzing the fiscal condition of the Virgin Islands. At this time no one can state with certainty what it is. We expect this analysis to be completed by the end of June. We also plan an intensive analysis of the government's revenue structure and expenditure requirements.

Senator JOHNSTON. We received a statement from Mr. Leo Falcam, for the record. It will appear at this point.

[The statement follows:]

STATEMENT OF LEO A. FALCAM, LIAISON OFFICER, MICRONESIAN WASHINGTON OFFICE

Mr. Chairman and members of the Senate Committee on Energy and Natural Resources.

Speaking on behalf of the Congress of Micronesia, I welcome the opportunity to appear before you to lend support for the resolution of the resettlement problems facing the people of Bikini.

For over 30 years, the people of Bikini have been awaiting the day when all of them would finally return to their home atoll. While a few of the Bikinians have resettled in Bikini, uncertainties of the safety of Bikini Island for human habitation lingers on and on. Mr. Chairman, this remains a major obstacle in the resettlement program. When former President Johnson declared in 1968 that Bikini was safe for resettlement, the message was a welcome relief to a people long displaced from their home atoll.

Since then a considerable amount of money has been spent to make the resettlement possible. About 112 people have returned to the island of Bikini since 1970 and an additional 400 living on Kili and other areas in the Marshalls have expressed desire to return. The hopes of nine years ago are now turning to despair with the recent findings that Bikini Island remains unsuitable for habitation. It appears that the administration of the Bikini resettlement program will have to be reviewed to insure that no radioactive materials are left on the island.

Mr. Chairman, the Bikini dilemma has been with us for many years now and I am hopeful that a solution is found soon to put this issue behind us. I urge your favorable consideration of the 6 million dollar appropriation in fiscal year 1979 to proceed with the proposed resettlement plan envisioned by the Department of the Interior and the Office of the High Commissioner.

I appreciate the opportunity to speak on this very important issue on behalf of the Congress of Micronesia. The people of Bikini will no doubt look forward to the day when they can safely return to the atoll they call home.

Mr. Chairman, we shall be happy to provide additional information which your committee or the staff may require.

Thank you.

Senator JOHNSTON. The hearing is adjourned.

[Whereupon, at 9:55 a.m., the hearing was adjourned.]

APPENDIX

ADDITIONAL MATERIAL SUBMITTED FOR THE RECORD

OFFICE OF THE GOVERNOR,
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS,
Saipan, Mariana Islands, April 14, 1978.

HON. HENRY M. JACKSON,
*Chairman, Committee on Energy and Natural Resources, U.S. Senate, Dirksen
Office Building, Washington, D.C.*

DEAR MR. CHAIRMAN: We are jointly writing this letter of request for your consideration for the inclusion of \$12 million in the budget for the Commonwealth of the Northern Marianas for fiscal year 1979 for the design and construction of a permanent power plant on Saipan. We are seeking your support and consideration for the approval of this additional funding because of the urgency and critical nature of the project.

The construction of the permanent power plant on Saipan has been planned for several years now, but has not been carried out due to the unavailability of funds. Construction of the plant must be undertaken to ensure growing demand for power on Saipan, the population center as well as the industrial and economic center for the Commonwealth. Such construction will alleviate the recurring electrical generating problem associated with the operation and maintenance of the present power plant, a 35-year old military power barge on loan to the Government of the Commonwealth of the Northern Marianas from the U.S. Army Corps of Engineers on a year to year lease agreement. In 1979 the barge must be dry docked and overhauled and is subject to be returned to the Department of Defense. This transfer will leave the island of Saipan without a reliable and adequate power generating plant capable of even providing the minimum power demand of current public consumers. Power supply would have to be shifted to the existing standby plant which consists of an assortment of aged, military surplus portable diesel units and second-hand units, with power production capabilities ranging from 450-2,240 kilowatts (kW). Collectively, these units can produce a theoretical peak demand of less than 10,000 kW. However, because of old age and chronic maintenance problems associated with the units, the standby source can only produce a peak demand of 9,000 kW or approximately 6,000 kW less than the anticipated peak power demand in 1979. Present peak power demand is nearly 12,000 kW but within a few months, with the completion of several commercial buildings and new residences, the peak demand will approach between 13,000 kW to 14,000 kW.

With the anticipated accelerated growth in the commercial, industrial and residential sectors, it is estimated that by 1984-1985, the peak demand will reach between 22,000 kW to 23,000 kW. Realization of our long-range socioeconomic goals and physical infrastructure improvements will depend almost entirely on the availability of sufficient power source to meet demands. Thus, we strongly feel that the development of an economical, efficient and reliable power generating plant would provide the necessary incentive for diversification of both commercial and industrial activities by way of encouraging active local and foreign investments which we believe is the only viable way to foster a broader economic base for the commonwealth's economy.

Without the provision of a permanent and reliable power plant in Saipan it is doubtful that the new U.S. Commonwealth will obtain its long-range objective of economic self-sufficiency, nor will it provide for an improvement in the standard of living and other basic amenities which are commonplace in the United States and its territories.

We request that the full amount of \$12 million which is the best estimate of our consultants be approved for the design and construction of the plant, for the upgrading throughout the populated island of the power distribution system, including the design and installation of permanent concrete power poles, underground utilities and appurtenances. It is estimated that approximately \$3.5 million to \$4 million will be requested to upgrade the distribution system on Saipan alone. An additional \$1 million to \$2 million will be required for the other islands of Tinian and Rota. These improvements are necessary to protect the system from the constant threat of typhoons and from infestation of the wooden power poles by termites. It is also felt that the islands aesthetic environment would be greatly improved by eliminating overhead electrical wires and transformers which scar the natural beauty of the islands.

For the information of the Committee we have attached a pertinent section of the physical development master plan for Saipan which describes the power situation, the recommended improvements and the estimated cost.

Lastly, we wish to thank you and your Committee for your understanding and support of our power generation problems in Saipan.

Sincerely yours,

CARLOS S. CAMACHO,
Governor.
BENJAMIN T. MANGLONA,
Senator.
PLACIDO M. TAGABUEL,
Congressman.

ATTACHMENT I

MISCELLANEOUS INFORMATION AND PROBLEM AREAS ABOUT THE SAIPAN POWER GENERATION

A. *Power barge*

"Impedance" is owned by the U.S. Corps of Engineers and is on loan to the Department of the Interior for use in Saipan.

(1) The Impedance was built in 1942. It was designed to last for 30 years. It is now 35 years old and continues to malfunction and requires constant maintenance and repair.

(2) Impedance total generating capacity is 30,000 kW. It takes both boilers on board, however, to produce the total load.

(3) Impedance has only one turbine generator with a capacity of 30,000 kW.

(4) There are two boilers on board the Impedance. Each boiler is capable of producing steam for the turbine to generate 15,000 kW. The plant can generate 30 MW with two boilers operating simultaneously.

(5) The Impedance was put into service in Saipan in November 1975 and as of March 25, 1978 it has total operating hours in excess of 23,000.

(6) As of March 27, 1978, five compartments of the Impedance underwater hull section were leaking, posing a constant danger of pollution of the environment.

(7) The long operating hours plus the leaks in the underwater hull will necessitate overhauling/drydocking of Impedance within a very short time.

(8) Because Saipan lacks the necessary facilities any major overhaul and drydock work will have to be done at a place where such facilities are available (possible places are: SRF, Guam, SRF, Subic Bay in Philippines, Japan, Korea, etc.). It would be necessary to tow away the Impedance from Saipan for this major work.

(9) If the Impedance is taken out of service, Saipan will be subjected under power rationing because of the inadequate diesel plant back-up capability (see input on existing diesel plan, below).

(10) Impedance can be recalled by the Army Corps of Engineers with only a short notice in the event of national emergency.

B. *Existing diesel plant*

(1) This plant is made up of the following units :

	Kilowatts
Nordberg (2—2,240 kW units)-----	4,480
White Superior (3—1,500 kW units)-----	4,500
Caterpillar (1—600 kW units)-----	600
Total gross load-----	9,580

NOTE.—There are two GM's units—600 kW capacity each. Both units, however, are very old, inefficient and no longer reliable equipment.

(2) Present peak power demand in Saipan is in excess of 11,000 kW with the completion of new commercial buildings and new homes. It is expected that the peak demand will increase to 12 to 13 MW within six months.

(3) Presently, whenever the Impedance is out of service the diesel plans are incapable of carrying the Island's total load. Should the Impedance be towed away for overhaul/drydock, power ration will have to be instituted on Saipan until the work is completed.

(4) The existing diesel plant is made up of different makes of units, thus making replacement and availability of overhaul parts, and keeping adequate parts inventory a constant source of problems. This problem is compounded by the fact that the manufacturer of the Nordberg units is already out of business.

(5) The existing plant site lacks land space to accommodate any meaningful expansion program in the immediate or distant future. Note: The present set up is very inefficient primarily because the various units are spread out into adjoining areas.

C. Proposed Saipan permanent powerplant

(1) Total capacity of the proposed plant is 20–25 megawatts. And for economic reasons, residual oil or bunker "C" will be used as fuel for the units (Fuel cost comparison: Diesel \$20.118/bbl and residual oil \$15.174/bbl.)

(2) At load growth of 9.5 percent annum, the 20–25 MW plant should be able to accommodate the Island power demand through 1984 or 1985. In 1982 or a period no later than 1983, however, planning should commence for plant addition.

(3) In view of the various problems associated with the Impedance and the existing diesel plant, it is essential that the Proposed Saipan Permanent Power Plant be constructed as early as possible. Adequate and reliable power supply in Saipan is needed in order to provide new demands for power due to construction of new commercial and industrial facilities, private homes and residences.

ATTACHMENT II

POWER—EXISTING CONDITIONS

Saipan's power system presently suffers many shortcomings which have to be corrected. The primary power source, "Impedance" suffers frequent and prolonged outages and is scheduled to be dry-docked by 1979. The distribution system suffers from poor maintenance. Frequent outages are caused by lightning, failing transformers, and storms. Wires are corroded, hardware is old and difficult to replace, and poles are rotting.

Electrical energy conservation practices are not in effect. The present metering and billing procedures run contrary to reasonable conservation efforts.

Growth of electrical demand is anticipated to be significant. The annual growth rate will probably approach 9½ percent, but due to the relatively small size of Saipan's system, growth will occur in quantum jumps. At best, therefore, growth will be dramatic and must be analyzed with respect to development project.

Management/operation

The Public Works Division of the Northern Mariana Islands (NMI) government now operates the entire electric power system. The Saipan Utilities Agency has been established with this division to operate the electric power, water and sanitation systems in Saipan. Current peak usage is about 11.2 MW (11,200,000 watts or 11,200 kW). During fiscal year 1976, about 50 million kWh were generated by the system.

Power generation

Table 24 summarizes the present generation capability of the power system. Plate 23 shows the location of these facilities. The army power barge "Impedance" is the primary powerplant.

TABLE 24.—*Saipan power generation capability*

	<i>Megawatts</i>
Central powerplant: Power barge "Impedance" (commissioned in 1943) ---	30
Standby powerplant:	
2 Nordberb units (2.2 MW each) -----	¹ 4.4
2 White Superior units (1.5 MW each) -----	¹ 3.0
1 White Superior unit (1.5 MW (1971)) -----	^{1,2} 1.5
Miscellaneous power equipment:	
1 Caterpillar -----	0.6
2 GE units (0.6 MW each) -----	1.2
11 Caterpillar (0.8 MW) (being overhauled) -----	.8
3 GE units (0.6 MW each) (being overhauled) -----	1.8

¹ Indicates units considered suitable for retention as stand-by power, capacity of 8.9 MW. Units to be phased-out by 1990.

² Unit is to be relocated to the stand-by powerplant.

Commissioned in 1943, she has 2 boilers capable of delivering 30 MW. The barge is on loan at no cost to the NMI, but must be kept in good repair and is examined yearly by a team of army engineers.

At best, the "Impedance" is inefficient. Since its installation in November, 1975, the "Impedance" has had unscheduled outages for repair approximately once per month. Its age and present condition indicate a high maintenance cost in the near future, and it is due for drydocking in 1979.

A standby power plant consisting of 2 Nordberg and 2 White Superior generators is capable of supplying 7.4 MW. The plant in which these diesel units are located was designed so that it could be expanded by 2 more small diesels, adding up to a total capacity of 10.0 MW. A third White Superior 1.5 MW unit is scheduled to be relocated to the plant. Miscellaneous equipment include five (5) GE 0.6 MW units and two Caterpillar units totaling 4.4 MW.

Only the Nordberg and White Superior Units should be considered for operation as stand-by units. After about 1990 the Standby Plant and the miscellaneous equipment should be retired as they are too inefficient to operate.

Power distribution

The distribution system on Saipan consists of about 72 miles of primary line (13.8 kV) and approximately 96 miles of secondary lines. Plate 23 shows the location of the 13.8 kV circuits. These circuits consist of various size conductors. Circuits 3 and 4 which serve the area south of the power plant carrying 80 percent of the system load.

The condition of the lines ranges from fair to poor, with numerous unscheduled outages caused by lightning, burned out transformers and storms. Maintenance is less than optimal, with repair and replacement of corroded wires, hardware, and rotten poles occurring less frequently than reasonable maintenance schedules call for.

PLANNING FACTORS

Load growth

The 7 percent annual load growth projection given in the basic power consultant report was re-examined with respect to Saipan's unique growth prospects. The constant percentage basis of projection can be applied to relatively large systems having a historical data base. Saipan, in contrast, is a relatively small area facing dramatic quantum growth from international interests such as the economy of Japan and United States military plans. It should be noted that load increases on a system the size of Saipan's 500 kW capacity, requires special consideration. Therefore, projections of anticipated load growth based on anticipated socio-economic factors were developed. These are summarized in Table 25.

The new Nauru office building is projected to add a minimum of 500 kW to the system peak load. Design calls for two 500 kVA transformers. This alone represents a system load increase of 4.5 percent. The Grand Hotel will add a similar load. These two projects alone will increase peak load by about 9 percent in 1978.

Table 26 synthesizes the gains and losses through the planning period. These data indicate an average annual growth of 9.5 percent in Saipan's power requirements. In 1985 the peak demand is expected to reach 22.98 MW. If the 9.5 percent growth is projected, the system will peak at 30 MW in 1989 and 40 MW in 1992. Moreover, major social and economic changes would affect these projections.

TABLE 25.—Saipan power demand 1977-85 for probable major construction

	Estimated load kilovoltampere
1978:	
Nauru building (under construction)-----	500
White Sands Hotel (60 rooms completed)-----	120
Grand Hotel (under construction)-----	400
150 new single-family homes-----	300
Hook up of Sugar King I (approximately 160 homes)-----	320
10 new elementary classrooms-----	10
Total-----	1,650
1979:	
New junior high school (25 classrooms)-----	100
Public health center—10,000 sq. ft.-----	50
160 new single-family homes-----	320
Total-----	470
1980:	
New hospital 90 to 100 bed (phaseout of old)-----	500
1st 15 room correctional facility (maximum security)-----	25
5 new elementary classrooms-----	5
170 new single-family homes-----	340
Far East Broadcasting-----	750
Total-----	1,620
1981:	
New commercial center—Garapan size, of town house-----	750
180 new single-family homes-----	360
Total-----	1,110
1982:	
200-room hotel-----	400
190 new single-family homes-----	380
New fire station (Garapan)-----	50
Total-----	830
1983:	
Canning processing plant (maximum 8,000,000); lime plant (size unknown)-----	1,500
200 new homes (20 percent apartments and/or condominiums)-----	400
Total-----	1,900
1984:	
New harbor facilities—Lighting (600 ft. berth—breakbulk warehouse)-----	600
210 new homes-----	420
Total-----	1,020
1985:	
220 new homes (20 percent apartments and condominiums)-----	440
Miscellaneous: Probably more commercial area; potential for another 100-room hotel; and increase in light industrial-----	700
Total-----	1,140

Alternate generator configuration

The load projections indicate that the initial plant requires a basic delivery capacity of at least 20 MW (Megawatts). Table 26 shows a 1985 demand of nearly 23 MW, which if projected at the 9.5 percent growth rate would neces-

sitate a delivery capacity of 30 MW in 1989, and 40 MW in 1992. The statistical risks of projecting linear increases for small areas still remains, however, and it is emphasized that deviations from these projections can be dramatic. System flexibility is therefore an important consideration.

TABLE 26.—SAIPAN SYSTEM GROWTH THROUGH 1985

[In megawatts]

Year	Existing gross plant generator	Estimated new construction	Other increase (1 percent)	Sta. loss (new), 8 percent	Total increase	New demand	Percent increase
1977	11.2						
1978	11.2	1.65	0.11	0.13	1.89	13.09	16.88
1979	13.09	.47	.13	.04	.64	13.73	4.89
1980	13.73	1.62	.14	.13	1.88	15.61	13.69
1981	15.61	1.12	.15	.09	1.36	16.97	8.71
1982	16.97	.83	.17	.07	1.07	18.04	6.31
1983	18.04	1.90	.18	.15	2.23	20.27	12.36
1984	20.27	1.00	.20	.08	1.28	21.55	6.32
1985	21.55	1.14	.21	.08	1.43	22.99	6.64
Average increase							9.48

In developing alternate plant configurations, back-up power and stand-by power must be considered. Besides generating the required projected load, the plant should have back-up generators which permit periodic maintenance to be performed on individual units. In other words, an additional unit is needed to allow "rotation" for maintenance and inspection. Stand-by capability is also required for unscheduled failures of on-line units. As a minimum, another unit is required for stand-by. The existing two Nordberg units and three White Superior units can provide the stand-by requirements until about 1989/1990. At this time they will have to be replaced.

Table 27 details alternate plant configurations based on 7.5 megawatt (MW) and 10.0 MW units. Each configuration uses multiples of an identical unit, which is considered necessary for operation and maintenance efficiency.

TABLE 27.—ALTERNATE PLANT REQUIREMENTS

	1979	1985	1989	1992
7.5 MW units:				
Demand	14 MW	23 MW	30 MW	40 MW
Basic units 2	(15 MW)	3 (23 MW)	4	6
Backup	1 (7.5 MW)	1 (7.5 MW)	1	1
Total	3 22.5 MW	4 30 MW	5 37.5 MW	7 52.5 MW
Standby	8.9 MW plus miscellaneous standby equipment.	8.9 MW plus miscellaneous standby equipment.	1 at 7.5 MW	1 at 7.5 MW
10 MW units:				
Demand	14 MW	23 MW	30 MW	40 MW
Basic units 2	2 (20MW)	3 (30 MW)	3 (30 MW)	4 (40 MW)
Backup	Standby plant 8.9 MW	Standby plant 8.9 MW	1 (10 MW)	1 (10 MW)
Total	3 28.9 MW	4 38.9 MW	4 40 MW	5 50 MW
Standby	Miscellaneous standby equipment.	Miscellaneous standby equipment.		

Both alternative configurations are currently under study by Office of Transition Studies and Planning and Public Works personnel. During the initial years of the planning cycle, there appears to be a relative advantage in using multiples of 7.5 MW units. However, toward the end of the Short Range planning horizon (1985) and beyond, the relative advantage tends to support multiples of 10.0 MW units. Adoption of one of the alternatives will depend on further analyses of relative costs, system performance, and possibly on fuel type.

Fuel type

Presently two types of fuel are being considered for utilization in the proposed power plant, diesel fuel No. 2 and No. 6 residual fuel. In essence either fuel can be utilized; however, No. 6 residual fuel does have problems which should be considered. The use of residual (black oil) fuel will result in higher maintenance

costs, a more complicated plant to operate even with experienced operators, a need for duplicate (DF-2 and residual) fuel systems and the necessity to startup, shut down and operate at lower loads on DF-2.

In conclusion, despite lower cost the utilization of No. 6 residual fuel should be carefully weighed prior to commitment to its usage.

The current U.S. effort to curtail the use of oil and gas as fuel sources and substitute coal, nuclear power, sun, wind or thermal power will, in practice, have little effect in the Northern Mariana Islands. While the costs of power will undoubtedly increase, there presently is no practical alternative to the use of oil in the generation of power in the Northern Mariana Islands. For the small population involved, coal/steam plants are uneconomical and other sources such as wind, sun, nuclear and thermal power are still in the development stage and will lack practical application during the plan period (1985). However, they should not be discounted as potential future sources of Northern Mariana Islands energy needs.

Powerplant location

Three alternate locations are being considered in the vicinity of the Industrial Park (Lower Base). The preferred location appears to be the Outer Seaplane Ramp area and sufficient lands should be set aside for the plant location at that site. Impact assessments of the potential sites are presently being made and will be available shortly.

Hardening

Recent experience has emphasized the need to "harden" the power system against tropical storms and typhoons. Both on Saipan and neighboring Guam, the distribution system is the first to fail. Therefore, as lines are extended or replaced, an evaluation of the cost effectiveness of various hardening techniques will be made. The eventual burial of the line on Beach Road from Micro Beach to Wallace Road, for example, has already been identified. This action will markedly reduce the recovery time of restorative operations to customers throughout the entire area.

Conservation

Forced dependence on oil fuel will mean drastic increases in Saipan's energy bill throughout the planning horizon and beyond. Although technological breakthroughs may come any time, it is almost certain that energy will remain an ever precious commodity. Therefore, an electrical energy conservation plan similar to the type in the planning stage in the United States must be implemented on Saipan. The plan would establish a power budget for various types of clients with a heavy penalty for any power consumed beyond the established budget. As stated, there are no existing conservation programs in use today although some states and territories have completed initial studies with federal grants. Guam has completed the first phase of its study and will proceed into the second phase, implementation of the plan, shortly.

CAPITAL IMPROVEMENT RECOMMENDATIONS

The short-range recommendations for the development of the Saipan Power Generation and Power Distribution Systems include:

Construct a diesel power generation plant from alternate plant configurations consisting of units between 7.5 MW and 10.0 MW. Initial plant should be at least 20 MW.

Develop a program for the systematic replacement of primary and secondary lines. Redundancy and hardening of essential primary lines should be considered.

The "Impedance" and all standby units should be phased out by 1979 and 1990, respectively.

The proposed system shown in Plate 23 will serve island growth to the 40 MW level, matching the proposed powerplant's ultimate capacity. All four circuits will have a 10 MW capacity. Circuits are expected to run along major roads. Major developed areas and facilities such as the airport, new hospital, industrial area, resort area, and commercial area will have a back-up circuit. One circuit from the new powerplant paralleling West Coast Highway should be hardened immediately to provide assurance of rapid renewal of power service and long-lived capital investments in the generation and distribution subsystems.

The estimated cost for the system is \$15,580,000, which includes \$12,000,000 for power generation and \$3,580,000 for power distribution. Detailed costs are depicted in Table 28.

Beyond the planning horizon

About 5 years before the 40 MW system peak is reached, a study should be made to determine new requirements for a powerplant and the distribution subsystems.

When the system's load exceeds 40 MW, a major change must be made to the distribution systems. If the southern half of the island exceeds 20 MW, then a higher voltage transmission line must be built and a substation located as near as possible to the load center.

TABLE 28.—*Power generation and distribution, estimated costs 1978–85*

POWER GENERATION	
Option 1:	
1978: Three 7.5 MW units installed cost \$400 per kilowatt, total \$9,000,000.	
1985: One 7.5 MW unit installed cost \$400 per kilowatt, total \$3,000,000.	
Total cost, \$12,000,000.	
Option 2:	
1978: Two 10 MW units installed cost \$400 per kilowatts, total \$8,000,000.	
1985: One 10 MW unit installed cost \$400 per kilowatt, total \$4,000,000.	
Total cost, \$12,000,000.	
POWER DISTRIBUTION	
New line construction:	
Primary line 10 miles at \$50,000 per mile (10 times 50,000) -----	\$500,000
Secondary line 20 miles at \$25,000 per mile (20 times 25,000) -----	500,000
Commercial and residential hook ups estimated 1,400 during plan period at \$200 (1,400 times 200) -----	280,000
Total -----	<u>1,280,000</u>
Replacement of existing line: Estimated replacement needs in short term are 33 percent of existing primary and secondary lines:	
Primary line 22 miles at \$50,000 per mile (22 times 50,000) -----	1,100,000
Secondary line 30 miles at \$25,000 per mile (30 times 25,000) -----	750,000
Primary line—Hardening approximately 7.5 miles at \$60,000 per mile (7.5 times 60,000) -----	450,000
Total -----	<u>2,300,000</u>
Power distribution cost -----	<u>3,580,000</u>



