RECORD

OF

INITIAL PUBLIC MEETING

FOR THE

TIDAL POWER STUDY

COBSCOOK BAY, MAINE, USA

Meetings

Eastport, Maine	10 July 1978
Augusta, Maine	13 July 1978
Lubec, Maine	27 July 1978

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U. S. Army Corps of Engineers
New England Division
424 Trapelo Road
Waltham, Massachusetts 02154

September 1978

PREFACE

The initial Public Meetings for the Tidal Power Study, Cobscook Bay, Maine, U.S.A. were conducted to obtain public expression and input to assist the Study Management Team in the preparation and development of a Plan of Study for the project.

Attached are the records of meetings and workshops as well as copies of written statements submitted by various persons and organizations.

These public comments will be considered and utilized in the tidal power study program.

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RECORD
OF
INITIAL PUBLIC MEETING
FOR THE
TIDAL POWER STUDY
COBSCOOK BAY, MAINE, ~~USA~~
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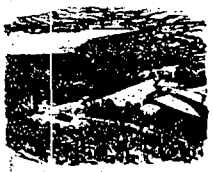
NEWS RELEASE
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

ENVIRONMENT

RIVER SYSTEMS

RECREATION


FLOOD CONTROL

NAVIGATION

SHORE PROTECTION

9 JUNE 1978/78-457

MEETINGS SET ON TIDAL POWER STUDY

FOR RELEASE MONDAY, JUNE 12, 1978

WALTHAM, MASSACHUSETTS -- TWO PUBLIC MEETINGS HAVE BEEN SCHEDULED BY THE NEW ENGLAND DIVISION OF THE U. S. ARMY CORPS OF ENGINEERS TO DISCUSS ACTIVITIES RELATED TO A THREE TO FOUR YEAR STUDY OF TIDAL POWER GENERATION IN COBSCOOK BAY ON THE NORTHERN MAINE COAST.

"THE TWO PUBLIC FORUMS WILL PROVIDE AN OPPORTUNITY FOR CITIZENS TO COMMENT ON THE STUDY AND TO BECOME INVOLVED IN THE CORPS' OPEN PLANNING PROCESS," COLONEL JOHN P. CHANDLER, REGIONAL HEAD OF THE CORPS, SAID.

THE FIRST SESSION WILL BE HELD IN THE EASTPORT MUNICIPAL AUDITORIUM ON MONDAY, JULY 10 AT 7:00 P.M., AND ON JULY 13TH A MEETING WILL BE HELD IN AUGUSTA AT THE CIVIC CENTER AT 1:30 P.M.

MORE

"WORKSHOPS CONDUCTED BY THE UNIVERSITY OF MAINE, ORONO, IN PREPARATION FOR THE PUBLIC MEETINGS HAVE DEVELOPED INFORMATIONAL MATERIALS DESIGNED TO GENERATE OPEN DISCUSSION. I WANT TO EMPHASIZE, HOWEVER, THAT TOPICS WILL NOT BE RESTRICTED TO THOSE DEVELOPED BY THE UNIVERSITY. ANY AND ALL RELATED ISSUES MAY BE PRESENTED," COLONEL CHANDLER SAID.

THE STUDY PRESENTLY GETTING UNDERWAY WILL INVESTIGATE ALTERNATIVES FOR TIDAL HYDROELECTRIC POWER GENERATION ONLY IN UNITED STATES TERRITORIAL WATERS. THIS STUDY WILL EVALUATE THE POWER GENERATION POTENTIAL IN TERMS OF POWER MARKETING AND ENVIRONMENTAL, ECONOMIC, SOCIAL, HISTORIC, ARCHEOLOGICAL, TIDAL, AND FISH AND WILDLIFE CONCERNS. IN ADDITION, AN ENVIRONMENTAL IMPACT STATEMENT WILL BE PREPARED FOR BOTH THE GENERATION PROJECT AND THE ELECTRICAL TRANSMISSION FACILITIES REQUIRED TO CONNECT IT TO THE NEW ENGLAND POWER GRID.

"I HOPE THESE INITIAL PUBLIC MEETINGS WILL SET THE STAGE FOR A PRODUCTIVE STUDY IN WHICH THE PUBLIC WILL PLAY A MAJOR ROLE," COLONEL CHANDLER SAID.

INTERESTED INDIVIDUALS UNABLE TO ATTEND EITHER PUBLIC MEETING MAY SUBMIT THEIR COMMENTS IN WRITING TO COLONEL CHANDLER NO LATER THAN 28 JULY 1978. IN ADDITION, AN INFORMATION PACKAGE CONTAINING BACKGROUND DATA MAY BE OBTAINED IN ADVANCE BY WRITING TO HIM AT THE NEW ENGLAND DIVISION, U. S. ARMY CORPS OF ENGINEERS, 424 TRAPELO ROAD, WALTHAM, MASSACHUSETTS 02154.

-30-

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

18 July 1978

SPECIAL MEETING NOTICE

At the invitation of officials of the Town of Lubec and neighboring communities, the U.S. Army Corps of Engineers, New England Division, will conduct an Informational Meeting on:

Thursday Evening, July 27, 1978 at 7:00 PM
in the Consolicated Gymnasium, Lubec, Maine

to discuss plans for a study of tidal power generation in the Cobscook Bay, Maine region. The meeting is open to all interested citizens.

Part of the agenda will be designated as an extension of Public Meetings held earlier this month in Eastport and Augusta, Maine, so that citizens who wish to comment formally at this time will have an opportunity to do so.

Information about the study is available at the:
Town Office, Lubec, Maine - Telephone (207) 733-5532
or may be obtained by contacting:

NEW ENGLAND DIVISION ENGINEER, U. S. Army Corps of Engineers
Waltham, Massachusetts 02154

TIDAL POWER STUDY

Miscellaneous Document

Summary of Workshop Proceedings

This document is furnished for information purposes only. Its contents do not necessarily reflect official Corps of Engineers policies. Data are subject to adjustment as a result of technical review and should be verified prior to any republication by contacting the Tidal Study Manager, U. S. Army Corps of Engineers, 424 Trapelo Road, Waltham, Massachusetts 02154.

August 1978

Dear Workshop Participant:

Enclosed are the minutes of all of the workshops which were held by the University of Maine, Orono, for the Tidal Power Study and Cobscook Bay. Also included is a brief summary of the major results as interpreted by us. We are submitting copies of this to the Corps of Engineers but would welcome further comment by you. We will forward all correspondence.

Thanks for your participation. Your involvement has been crucial to the development of a good Plan of Study.

Sincerely,

Gordon A. Haaland

Gordon A. Haaland

Arthur M. Johnson

Arthur M. Johnson

THE WORKSHOPS

As part of their concern for informed public involvement, the U. S. Army Corps of Engineers contracted with the University of Maine, Orono, to organize a series of workshops on topics of major importance in developing a Plan of Study for a tidal power project in Cobscook Bay, Maine. The workshops were:

Eastport	May 31	The Tidal Power Concept, Local Concerns, and an Introduction to the Study
Orono	June 5	Natural Resources and Environmental Considerations
Augusta	June 7	Energy Alternatives
Portland	June 9	Social-Cultural Considerations
Boston	June 12	Economic Factors

The people invited to the workshops represented special expertise in one or more of the issues to be discussed by the workshop. The composition of the workshop group varied according to the topic but typically included local residents, scientists, professionals, State agency personnel, representatives from public and private utilities, Federal agencies, and other relevant groups.

The goals of the workshops were to familiarize the participants with the Plan of Study process and to provide an opportunity for the participants to help identify issues of concern and thereby to shape the studies and research necessary for a thorough Plan of Study.

The workshops were semi-structured discussions which revolved around a series of issues and questions relevant to the workshop topic. The participants refined the questions and issues and raised pertinent points for the consideration of the U. S. Army Corps of Engineers as it pursues the Plan of Study.

Major Results of Cobscook Bay Tidal Power Project Workshops

This section on major results of the workshops represents the distillation of workshop discussion by the workshop coordinators, Dr. Arthur Johnson and Dr. Gordon Haaland. These results do not represent conclusion of the U. S. Army Corps of Engineers. They represent the workshop coordinators' judgment of the primary issues raised in the several workshops.

1. Public Interest

There appeared to be a high level of public interest in the project. Attendance relative to invitations was substantial and many who did not attend sent regrets. Almost all of the people who attended the workshops appeared to believe that tidal power is an energy alternative well worth investigating. Comments and criticisms were offered in a friendly vein rather than as an effort to discredit the concept.

2. Economics

The economics of the project are very unclear. Much will depend on the future rate of inflation and technological developments. While considerable interest was expressed in the life cycle cost approach, it was pointed out that its validity depends on its assumptions. Skepticism was expressed about the accuracy of any long term fuel cost predictions. It was further noted that technological development may make fundamental changes in the economics of power generation. In addition, the life cycle approach raises many questions about appropriate comparisons between tidal power and other alternative energy sources.

It was suggested that any economic analysis, whether BCR or life cycle, should include a comparable economic analysis for the environment. This project might be used to establish appropriate guidelines for such an analysis.

3. Key Environmental Issue

The potential physical changes in Cobscook Bay and its waters is the key environmental issue. This issue came up in every workshop in one form or another. There were informed comments about the Bay possibly being a unique marine habitat and that changes in it would have far-reaching repercussions. It was also pointed out that much remains to be done to determine the population of birds and marine life now in the Bay.

4. Private Participation

In several workshops it was suggested that private, and possibly State, participation in the project would make it more interesting and probably more valuable for Maine. This was one approach to a frequently expressed interest in having at least some of the power generated available for industrial and other purposes in the State.

5. Community Considerations

It was generally agreed that the project would have

major short and long term effects on communities in the Cobscook Bay region. Particular concern was expressed about the type of housing that would be provided construction workers and its potential for local use after they are gone. While employment at good wage scales for local workers was regarded as a positive consideration, concern was expressed about these people's employment opportunities after construction is completed. The relatively small number of permanent operating personnel does not appear to offer a significant local labor demand. For this reason the possibilities of using some of the power generated to attract industry to the area seemed to be favorably regarded.

6. Pittston and Half Moon Cove Projects

It is clearly important at each stage of this project to consider its relationship to the proposed Pittston refinery and to the pilot tidal project at Half Moon Cove. Concern about these matters was expressed at all workshops and each of these projects has important local constituents. No federal tidal power plan would be acceptable locally if it did take these projects into account.

7. Canadian Tidal Power

The idea of an all-U.S. tidal power project has widespread appeal. However, the need for appraising its effects when combined with those of the Canadian tidal power project was stressed by numerous workshop participants. Special concern was expressed about their combined effects on tidal range.

PUBLIC PARTICIPATION PROGRAM
COBSCOOK BAY TIDAL POWER PROJECT

Eastport Workshop
The Tidal Power Concept, Local Concerns,
and an Introduction to the Study

Eastport Branch of the Bangor Savings Bank
May 31, 1978

Dr. Arthur Johnson led the discussion and Dr. Gordon Haaland served as recorder. A general introduction to the Workshop purpose was made by Dr. Haaland. Following this, Colonel John Chandler gave a general outline of the project and the role of the U. S. Army Corps of Engineers. He explained that the reason for this Plan of Study phase is the need for a good Environmental Impact Statement and the opportunity for some early work on engineering design. He reported that Canada has officially noted that it is not interested in pursuing an international project at this time, making the project entirely a United States operation in Cobscook Bay. The Colonel further noted that there is Congressional and Presidential interest and that the amount of planning dollars (over $600,000 for the next year), represents a high level of interest. Although there has been some discussion at the Federal level of cost sharing by local areas for federal water projects, this has not yet been determined.

James Callahan of the U. S. Army Corps of Engineers, Project Director, provided some information on the specifics of this tidal power project. He noted that the Corps was re-evaluating all project designs and he outlined the various alternatives and options. The Plan of Study will include an evaluation of all reasonable alternatives except experimental alternatives, including comparisons on cost and environmental impact. The total cost for the ultimate project will be between $200,000,000 and $650,000,000 not including transmission lines costs.

The general process for planning a project such as this is as follows:

Stage I - The preparation of a Plan of Study requiring six to eight months.

Stage II - Formulating intermediate plans, approximately 18 months.

Stage III - Refining alternative plans, an additional 24 to 30 months.

The purposes of the Plan of Study include (1) identifying specific study items, (2) assigning responsibility for various elements, and (3) establishing a budget and timetable.

From this point, Dr. Johnson led a discussion on matters of concern as identified by the participants from Eastport. A list of participants is included in this part of these minutes.

The following issues were discussed:

Project impact.

It is important that both the construction phase impact and the long term impact of the project be evaluated. The potential consequences for the local communities, both positive and negative, are great.

Regional politics.

The participants felt that the New England region must be involved in order for this project to develop. They expressed the belief that Congress does not have much concern for Eastern Maine.

Housing.

Housing does not now exist for the size of work force needed to build this project. In fact, Eastport is having some difficulty providing housing for the new boat building school opening this year. The housing which is developed ought to be of good quality, and not just a barracks, so that it might be useful in the future for tourism or other economic development schemes.

Employment.

This question was considered to be of crucial importance. Not only were questions raised about the availability of construction and long term jobs but also about the impact on existing businesses and wage rates. Some inflation on these is bound to occur and could prove troublesome. On the other hand, if new employers came to the area as a consequence of the project, it could be beneficial. Other economic benefits could come from improved transportation, tourism, and a possible short road link to Lubec.

Commercial fishing.

Although there are not many local people engaged full-time in commercial fishing, fish processing is important to Eastport. The possibilities of future fisheries must be examined, however, including mariculture and aquaculture.

Services.

It was understood that the construction phase would include the bringing in of needed professional services.

There was concern, however, about who would be responsible for the other needed services, such as sewage treatment, water, law enforcement, etc. This would need to be clarified for the local residents.

Local development.

The town of Eastport is currently studying the feasibility of a deep water port facility in Eastport. The impact of the tidal project on such a facility as well as on the proposed Pittston refinery and the Half Moon Cove tidal project must be examined.

Lifestyle.

There are potentially major changes that would occur if such a large project as proposed were built. While the participants were somewhat interested in the economic opportunities that the facility might generate, they were uncertain about the impact on the community, particularly on the style of life available to the residents.

Transportation.

There is considerable interest in improving transportation, including railroads, a small airport, and better highway access.

Involvement.

The participants agreed on the importance of local involvement in the planning phase, including persons from all the communities surrounding Cobscook Bay.

PUBLIC PARTICIPATION PROGRAM
COBSCOOK BAY TIDAL POWER PROJECT

Orono Workshop
Natural Resources and Environment Considerations
North Lown Room, Memorial Union
University of Maine at Orono
June 5, 1978

Opened at 9 A.M. with Dr. Gordon Haaland as Discussion Leader and Dr. Arthur Johnson as Recorder. A list of those present is attached.

Dr. Haaland opened the meeting with a summary of what the workshop was intended to accomplish. After each person introduced him or herself, James Callahan of the Corps of Engineers summarized the project and the Plan of Study approach. He was followed by Dr. Barrett of the Corps who elaborated on the requirements for the National Economic Development Plan and the Environmental Quality Plan.

Dr. Haaland then directed attention to the questionnaire relating to participants' evaluation of the importance of various environmental and resource areas. The results were as follows:

	Highly Important	Important	Moderately Important	Unimportant
Geology	2	9	1	0
Seismology	3	8	2	0
Hydrology	10	5	0	0
Soils and erosion	2	6	5	0
Water quality	8	3	3	0
Air quality	2	1	4	7
Aquatic, marine ecosystem	15	0	0	0
Terrestrial ecosystem	2	4	8	0
Mariculture, aquaculture	4	10	1	0

Dr. Haaland asked for additional categories and the following were suggested:

Recreation as water and resource-related	11	3	0	0
Commercial fishing	11	3	0	0

Based on these results, Dr. Haaland suggested that the group saw the following priority for study:

1. Aquatic, marine ecosystems
2. Commercial fisheries
3. Hydrology
4. Water quality
5. Geology, seismology, recreation, aquaculture.

Discussion, largely resulting from questions, followed. Specific questions included:

A. Aquatic, Marine Ecosystems

What changes in terrestrial systems will follow from location of dams?

Is the territorial ecosystem really separable from the marine ecosystem?

Comment — The project would lower high water mark and raise low water mark.

Discussion — There would be possible impacts on the "nursery" role of Cobscook Bay and effects on bird life. Title to "new" land would presumably rest in the owner of land, not the government.

What is the anticipated effection of Canadian tidal project?

Discussion — Forecast 6-inch change in tide at Boston, but no really specific information.

Will impact studies be limited to U. S.? Ans.: Yes. The Corps will reevaluate some 35 studies on Cobscook and do new ones.

Comment — If tidal range is raised 5-6 feet, it might affect the seal population.

Summary — The study of terrestrial ecosystems should be on a par with marine. In large measure the impacts of the project on Cobscook Bay will depend on dam location.

B. Commercial Fisheries

What will be effect on specific fisheries?

Discussion — Study should take into account scallops, blue mussels, shrimp, squid, alewives, herring, lobster, weir fisheries, clamming. In looking to future possibilities, green urchins, periwinkles, and worms should not be overlooked.

Would the project destroy "nurseries" for adult commercial fish?

Discussion — This was identified as a key question. A representative of Suffolk University indicated they are studying this question now under an NSF grant. We must look to future potential on the basis of past records. We don't know enough about what goes on now in Cobscook Bay.

Summary — After we know how construction and impoundment configuration will affect the physical picture (e.g. tidal range and water quality), we will know much more about the biological (fisheries) impact. Among the things that should be considered are changes in:

1. Salinity
2. Maximum and minimum water temperatures
3. Sedimentation (change of bottom)
4. Current speed and direction
5. Access and egress for indigenous species

Related Discussion

Should the Corps have a physical model for the project?

Discussion — There has been very good luck with a computer model relating to Sheepscot River, done by James Fay of MIT in connection with Maine Yankee Atomic project. This suggests a physical model is not always necessary.

What will be the effect of turbines on fish at various stages of development? (re ingress and egress)

Discussion — Answer will hinge on size, type, speed of turbines.

Will there be provision for accommodating tankers serving any Pittston refinery development?

Discussion — This matter will be studied.

What will be the project's effect on bird life--migratory, seabirds, endangered species like Bald Eagle?

Discussion — This will be studied. It may require an ecological simulation model that will cover temperature and other changes over the life cycle of the project.

C. Hydrology

Will seasonal run-offs from rivers in the area be affected? How about ground water and ground water table?

Discussion — Doubtful that seasonal run-offs will be affected. Probably no slowdown. Specific effects could be affected by the type of pool (one- or two-pool) system adopted.

What is the relationship between the Canadian tidal power project and effects on tides at Cobscook Bay and along the U. S. Coast?

Discussion — Combined Passamaquoddy and Cobscook projects will probably have a 1-2% effect on Bay of Fundy and perhaps 6-inch tidal effect at Boston. The Canadian project would have some effect at Cobscook but probably minimal. Solid information not available at this time.

One participant asked if Canadians could be minimizing the reported tidal effects of their proposed project on U. S. shores. Study of present tidal range shows it moves from 6-8 feet at Boston to 10 feet at Blue Hill Bay to 18-19 feet at Cobscook. Effects could be serious.

Will a project in Cobscook Bay have any significant offshore effects?

Discussion — The primary effect would probably be through its role as a fish "nursery." It is unlikely that it would have significant effects on sedimentation, current, temperature and the like in the Gulf of Maine. It would probably be worthwhile to construct a model including the Canadian input to see what the possible impact of both projects might be. Ken LeMay at UMO has an interest in this kind of modelling.

What will be effect of physical changes on climate? If the water warms, would it reduce fog in the area?

Discussion — Climatological changes, short- and long-run, deserve investigation.

Summary — Hydrology study should cover substantially the same things as aquatic, marine environment--sedimentation, salinity, temperature changes, overall water quality; transfers from territorial to aquatic environment; effects of diminished flushing from Cobscook on existing species; current effects in Head Harbor Passage.

D. Geology and Seismology

Does the project have to be concerned about earthquake potential?

Discussion — The past record should be studied. Bay of Fundy is a Triassic Basin similar to one in New York where a nuclear plant was built on a fault. A recent issue of Science suggests that fault danger may be greater than generally appreciated. In fact, there has been fault quake activity in the Lubec area within the last 10 years.

There is a lot of information available. Machias has a station in the seismic net; there is (or may be) one at St. Andrews. Quakes potential is not nearly as serious with this project as with a nuclear plant or even Dickey-Lincoln due to the lower head of water that might be released.

Will the Study look at the impact of the "fill" source for dams?

Discussion — Yes. Based on 1930's experience, this is probably not a major problem. Excavation for power houses provided all the fill that was needed and left a surplus.

Who will have title to land created or destroyed?

Discussion — Based on Great Pond's experience in Maine, title will probably remain vested in owner of existing land. State owns from low water mark.

Summary — Geology and seismology important but probably not to same degree as in the Dickey-Lincoln project.

E. Aquaculture

Discussion — Study of the potential for mariculture and aquaculture should not be federal responsibility. Once the federally-sponsored study of the geology and physical outline is done, private parties should look into these economic potentials. Seaweed products might offer possible commercial potential. Temperature changes in water could affect mariculture substantially. Study should look at marine, anadramous and catadramus species.

Dam would probably help fixed gear mariculture (e.g. slow down current velocity and tidal range). Sea ice a threat to gear. Reservoir might act as nutrient pool. There is significant time frame: construction period and then impact of resulting facility.

Questions — What will be the effect of sedimentation in the water over 7-8 year construction period?

What will be effect of construction on air quality?

What will be the effect of blasting during construction period on fish and birds?

What will be the effects of noise pollution?

Summary

Physical probing and establishing what is now biologically in Cobscook Bay will help to give mariculture answers. Must look separately at impact of construction period and then long-term facility. Water temperature and quality are keys to what can be done in mariculture. Sea ice is a very important factor when considering success of mariculture. Ice can destroy gear and cause mortality. This is well worth studying in terms of project configuration.

PUBLIC PARTICIPATION PROGRAM
COBSCOOK BAY TIDAL POWER PROJECT

Augusta Workshop
Energy Alternatives

Augusta Civic Center
June 7, 1978

Energy Alternatives

Dr. Arthur Johnson led the discussion and Dr. Gordon Haaland served as recorder. Dr. Haaland introduced the concept of the workshop and explained the goals of the workshop. Following this introduction, James Callahan of the U. S. Army Corps of Engineers reviewed the entire Plan of Study concept and the current status of design and preparatory work for the Cobscook Bay project.

In response to general questions as a first part of the workshop, Mr. Callahan noted that:

(a) the power generated will go to preference customers since that is currently the law.

(b) the question of how energy alternatives are defined will be a matter of discussion and is an area where people who are interested can attempt to help define the scope of the Plan of Study.

(c) the Department of Energy has responsibility for transmission lines and marketing the electricity.

(d) the Corps would report a life cycle analysis to Congress on the Cobscook Bay project.

The participants added a few general observations:

(a) a general question was raised concerning the way in which the Cobscook Bay plan would relate to the larger energy plan for the region. It was considered important by some participants that the larger plan be considered with regard to Cobscook Bay.

(b) there was a concern that other work that the Corps of Engineers is doing might affect what this project would be, particularly with regard to Dickey-Lincoln.

(c) concerning alternatives, it was noted that one should predict not only the cost of fossil fuels but their relative availability. In this conjunction it was noted that the Hardy-Whitman Index to Cost Fuel Increases might provide some basis for comparisons.

In response to a series of general questions which had been submitted to the participants prior to the workshop, the participants essentially agreed on the following:

(1) The question of the load growth for electric power in New England over the next 20 years would be a very important matter for a Plan of Study to include.

(2) The alternatives that should be considered include nuclear, petroleum, solar, coal, wood, Canadian tidal, small hydroelectric plants, load management, energy storage, conservation, solid waste and gas.

(3) The question was raised whether or not there are technical dimensions which need to be tested by a project such as this, or whether or not the technology in fact does exist. A decision ought to be made, therefore, whether this is a demonstration project or would become an integral part of NEPOL. The Corps ought to have this option. Another possibility would be to use the Half Moon Cove project as a demonstration for Cobscook Bay.

(4) The group generally agreed that it would be important to determine whether a large scale tidal project is a cost effective contribution to solving some of New England's long term energy problems. With regard to comparisons with other alternatives, this group of participants did not see much importance in a physical model. Computer studies were viewed as cheaper and possibly even more effective. In addition, there was a sense that alternatives and their availability ought to be examined with respect to which sources of possible power might be displaced by a tidal project, and the purchase of Canadian tidal power ought to be considered as a viable alternative. This is primarily because of the potentially larger and thus more efficient project available in the upper Bay of Fundy.

(5) As a brief aside, Dr. Harold Young, UMO, discussed wood as an alternative. He noted that by using residuals from wood production we could provide 50% more energy than is currently being produced by all of the power companies and paper companies in the State. This involves using the whole tree with the most valuable parts going to lumbering operations and forest products and the remainder serving as a biomass energy source. There were some questions raised, however, about the efficiency of this type of material. There was some question about what the net energy balance on wood as fuel would actually be, given the cost of transportation, utilization, and storage handling of it. It was suggested that there may be other more valuable uses to wood. It was also noted that the price comparisons of alternatives ought to include a comment on environmental costs as well.

(6) It was generally agreed, although this was not considered a crucial question, that the Federal government had a role in meeting New England's long-term energy problems.

(7) The Corps was encouraged to provide good cost estimates of the project, including costs of transmission lines, since the costs of tranmission would necessarily be large for the Cobscook Bay project. A question was also raised as to whether other energy sources might be precluded by the development of Cobscook Bay.

(8) It was noted additionally that alternative and concurrent uses of Cobscook Bay ought to be included in any Plan of Study.

(9) There was a question about whether or not energy would be the best use of the Cobscook Bay resource and a recognition that there is a need to develop some standard guidelines for the relation between environmental impact and energy values. This is a crucial issue for all agencies (private, Federal, and State) involved with energy development.

(10) A question was raised about the value of tidal energy as a periodic function. Some participants suggested that this should average out over time, but others felt that the periodicity of tidal power might be a problem regardless of re-timing. Since energy is of different economic value at different times of the day, there was a question about the over-all efficiency of tidal power. Tidal power was generally viewed, however, as a desirable substitute for fossil fuels.

(11) There was a question raised about whether or not Maine should be a net supplier of power to other states. Given the current laws, it is not clear whether the local area will be able to benefit from a public power project.

(12) A very important question was raised whether or not the project could be a Federal, State, and private joint venture. James Callahan of the U. S. Army Corps of Engineers asked that this question be transmitted directly to him. It was suggested that representatives of the two major utilities at the meeting, Central Maine Power and Bangor Hydro, formally transmit this request to the Corps.

PUBLIC PARTICIPATION PROGRAM
PASSAMAQUODDY-COBSCOOK BAY TIDAL POWER STUDY PROJECT

Portland Workshop
Socio-Cultural Considerations

Center for Research and Advanced Studies
University of Maine at Portland-Gorham
June 9, 1978

Dr. Gordon Haaland led the discussion and Dr. Arthur Johnson acted as Recorder. The meeting opened with a brief introduction by Dr. Haaland followed by introductions and a short discussion of the project by James Callahan of the U. S. Corps of Engineers. There were 16 participants aside from Corps representatives and Drs. Haaland and Johnson. The list is attached.

Discussion was initially focused on a questionnaire distributed in advance. Views were solicited with respect to the following time frames: (a) during construction and (b) after completion of the facility. Answers were given as:

1 = highly beneficial
2 = beneficial
3 = no impact
4 = problem
5 = serious problem

Perceived Importance

Category	Construction 1	2	3	4	5	Most Important	Completed Facility 1	2	3	4	5	Most Important
Housing	0	4	0	6	2	X	3	4	2	1	0	
Cultural resources historic archaeology	0	3	1	5	3		0	2	3	4	0	X
Social structure	1	2	0	4	5	X	0	4	3	3	1	X
Recreation	1	3	1	5	1		3	2	1	3	1	
Aesthetics	0	0	1	5	3		0	2	4	3	2	
Noise	0	0	6	3	1		0	0	9	0	0	
Work force, employment	4	8	0	1	0	X	1	9	1	1	0	
Inflation, local	0	0	2	8	2		0	1	9	2	0	
Local government & public services	0	2	0	5	4	X	0	3	1	2	2	X
Transportation	0	2	0	7	1		0	10	1	0	0	
Role and rights Native Americans	0	1	0	4	5		0	4	0	6	1	
Land & Sea Use	1	0	1	6	4	X	0	2	0	7	3	X
Indus. Development & goods & services	1	2	6	2	0		2	9	2	0	0	
Treaty relations with Canada	0	1	5	4	0		0	2	6	4	0	

Informational Questions Raised at Beginning of Meeting

1. What is the relation of this project to Dickey-Lincoln?
   Ans.: It will be evaluated independent of Dickey-Lincoln.

2. What will be the size of construction work force?
   Ans.: About 2500.

3. What will be the effect of the project on tidal range?
   Ans.: This is a matter that will be carefully investigated.

4. Did Stone & Webster do a study of the potential project?
   Ans.: Yes, but it was a limited one.

5. What would be relation of the project to Pittston refinery if approved and built?
   Ans.: This is a matter that will receive attention. It is quite possible that the requirements for the refinery could be compatible with an all-US project.

6. Where will construction materials be obtained and how will they be moved?
   Ans.: We have good knowledge of local sand, gravel, etc. Other materials will probably be moved by water.

Discussion based on Questionnaire

A. Land and Sea Use

This is probably the key to most questions since it affects the basic economy of the area such as fishing.

1. Question: What will be the effect of tidal range changes on area occupations?

   Discussion: Discussion was similar to that in the Natural Resources Workshop. Clams were especially mentioned. It was pointed out that handling in Passamaquoddy Bay is still important part-time occupation. Further, while impacts in one line of marine employment might be minor, due to multiple employment of local people, the total impact might be significant.

2. Question: What will be the effect on area property values and land use?

   Discussion: Economic effects in terms of employment and income will probably be positive. It was suggested TVA experience might provide insights on this question.

3. Question: Will the project have positive or negative effects on the area standard of living?

   Discussion: Economic effects in terms of employment, income probably positive. It was suggested TVA experience might provide insights on this question.

4. Question: What are the legal impacts of this project?

   Discussion: Land use rights may be affected. Access to the shore is a case in point.

5. Question: Will increased recreational boating be a possibility?

   Discussion: There appears to be increased activity in Whiting Bay now. Impoundment might create better recreational boating conditions.

6. Question: Will the project create aquaculture possibilities?

   Discussion: This is a good possibility and will be investigated.

B. Work Force and Employment, Local and Regional Impacts

Questions:

1. What percent of construction force will be hired locally?
   a. Who will do the work, contractors or Corps?
   b. If contractors, can they be required to hire a certain percentage of workers locally?
2. Will training be provided for local workers? If so, will their higher skill level cause them to leave the area after construction is completed? (It was noted that only about 100 federal employees would be required to operate the completed facility.)
3. What will be the impact of construction wages on local and regional wage rates?
4. Will unionization be promoted as a result of the construction phase which might employ union workers?
5. What types of industry and services might be attracted to the area as a result of the possible availability of power?

a. What are the assets and liabilities of the area in attracting industry, assuming power would be available as a result of the project?

b. What will be the benefits of the project to Maine outside the Cobscook Bay area? Who will be getting the power? (i.e. Will Southern New England reap the benefits?)

6. What will be the effect on the composition of the area population (e.g. age distribution) and on the occupational structure?

a. How will area residents perceive the project?

b. If the project blocks access to the sea, will it destroy their independence?

c. Will it threaten those who chose to live in the area because it is isolated, quiet, etc.

Discussion: The basic assumption of the workshop group appeared to be that the source and amount of income are key determinants of land use, social structure, and the like. One point of view was that people now in the area are there by choice and would regard the project as threatening. Another point of view was that the economic benefits of the project would be regarded favorably as offsetting changes required in lifestyles. There was concern expressed that the state might not benefit from the power and that providing 100 jobs long run would not be an adequate offset to costs and changes in the area necessitated by the project. If states participate in funding water projects, as currently under discussion, Maine might be able to insure that it gets proportionate benefits.

C. Social Structure and Government Services

1. Question: Won't decisions on how construction force will be accommodated have major effect on social structure and demand for government services?

Discussion: There appear to be two major choices--either integrate the construction force housing, etc. with the local community or segregate the work force. If the latter, it might take the form of a "trailer/mobile home city" which would be removed after construction is completed. Eastport people suggested the desirability of better quality, permanent housing

that might be used by local people and for tourists after construction. A third possibility suggested at this meeting is that large, old houses be converted back to their original function as boarding houses. The way in which the construction force is handled appears to be a key to both short- and long-run socio-cultural impact of the project.

2. Question: What kinds of local governmental problems will the project create?

Discussion: As a corollary to question 1 above, it was noted that major problems of law enforcement might accompany injection of a large work force into the area. This led, among other things, to the suggestion that there might be interesting possibilities for regional cooperation or even regional government.

D. Industrial Development

1. Question: Will multiple uses for dams be investigated?

Discussion: Among other things, there is a possibility of reducing driving time between Eastport and Lubec by road across dam. What would be effects on each community as a result?

2. Question: What types of industry might be attracted as a result of the project?

Discussion: [See B5 above.] Would the availability of power and economics of water transportation encourage development that might make the area an industrialized one? This is a possibility that should be studied.

E. Historic Archaeology

Prior workshops have suggested that Cobscook Bay is probably a unique marine resource. Is the area unique in other ways?

Observation:

1. The Eastport area has some relatively unique 19th century characteristics. It has changed little over the past century. There is good material from structural remains on how fishing was conducted in the past.

2. This is an area of rather unique cultural interface between Canada and the U. S.

3, The real uniqueness of area relates to relatively unchanged lifestyle. This observation led to a discussion of tourism.

Question: Why do tourists come to Maine? Will present patterns change in the future?

Discussion: Maine's uniqueness as an economically under-developed state of great natural beauty is its chief attraction for tourists. People come here because they want to see what cannot be seen in more developed states. In this sense unchanged lifestyle is a positive economic asset, The nature of tourism is already changing; group visits (e.g. bus tours) are replacing the family visit; tourists tend to be older people with the time and money to take such trips.

Comment: While the project may attract tourists, there will be an opportunity cost in the sense that some of the uniqueness that has been the basis of present and past tourist visitation will be lost.

4. The area is unique in its relationship to native Americans.

F. Overall

The Plan of Study should:

1. Investigate socio-cultural impacts from the standpoint of the effects of changes in sources and amounts of income locally available as a result of the project. Such investigation should pay particular attention to the fact that area residents derive income from multiple employment which is heavily dependent on the unique character of the local marine environment.

   Recommendation: An attitudinal survey of area inhabitants should be included.

2. Investigate alternative ways of accommodating the construction work force since the way it interacts with the local population will have a significant impact on changes in the socio-cultural environment.

3. Examine the pluses and minuses of each major issue. For example, if traditional fisheries are destroyed, can that loss be offset by aquaculture? Is attraction of a different type of tourist than present and past a net gain for the area if it is at a cost of a chosen lifestyle?

4. Examine alternative methods of local governmental cooperation as a means of coping with problems created by the project.

5. Examine ways of maximizing local benefits from the need to provide housing for construction workers.

6. Explore possibilities for employing as many local residents as possible and ways of utilizing their improved skills after construction is completed.

7. At least suggest what industries might, given area assets and liabilities, realistically locate in the area if power were available at favorable rates.

8. Delineate possible local-state-federal relationships in the generation, transmission, and utilization of power from the project.

PUBLIC PARTICIPATION PROGRAM
COBSCOOK BAY TIDAL POWER PROJECT

Boston Workshop
Economic Factors
President's Office, University of Massachusetts
June 12, 1978

The workshop on economics began at 1:30 with Dr. Gordon A. Haaland introducing the workshop purpose and Dr. Arthur M. Johnson serving as discussion leader. Colonel John Chandler of the U. S. Army Corps of Engineers presented the general aspects of the proposed project including a brief history and review of its current status. Mr. James Callahan, Corps of Engineers, discussed the details of the project itself.

Dr. Arthur Johnson led the discussion and outlined three major factors for consideration:

1. Project economics, or the cost of the construction and operation.

2. Energy economics, or the relative economic advisability of this project when compared to alternatives and future need.

3. Economic impact, or the value to the region of the construction and operation of the project.

Project Economics

The costs of the project were outlined by the Corps of Engineers. Project costs vary from 250-600 million dollars, depending on ultimate size. There was some discussion that consideration be given to capital structure, repayment schedule, and the impacts on tax rate.

There were a number of specific issues raised by the participants with regard to Project Economics. In response to the question on the navigational lock and its relationship to the Pittston Refinery Proposal, the Corps noted that they had been in touch with Pittston with regard to possible sites and alternatives. It was also noted that the relationship between the Project Economics and the economic impact on the region ought to be part of the decision of whether or not to build. Within the current guidelines for projects of this sort, it was noted that regional benefits may be displayed as part of Project Economics. This currently is a political question, however, and the executive branch of the Federal government does not like to use this form of justification.

Energy Economics

The most important discussion involved the various methods of analyzing future need for energy and the economic viability of this project. Four areas were identified for major discussion.

1. Benefit/Cost Ratio. The BC Ratio is based on the current allowable Federal Interest rate of 6 5/8%. At this rate, the project does not appear to be economically viable, since the ratio is less than one. This, however, led to a discussion of alternative economic analyses.

2. Alternative Economic Analyses. The primary alternative considered was life cycle costing. In this analysis, the potentially rising cost of fuels (e.g. oil, coal, nuclear) for alternative power generating facilities are considered over the life-time of this tidal project. Since fossil fuels are expected to increase in price substantially, tidal power becomes more economically attractive since operating costs are relatively constant.

   There were several problems noted with this method, however. For example, changes in technology may make other alternatives more attractive (e.g. solar) and thus the project may continue to be relatively uneconomic. Also, current life cycle costing is only looking at fuel inflation, assuming inflation in this sector to be more severe than in other sectors of the economy.

   The advantage of sea water as a source of energy is that it is a resource for which one does not have to pay. Thus operating costs for a tidal power project are low relative to other types of power generation. This is important given the assumption that fuel costs will increase at a much more rapid rate than prices in other sectors of the economy.

   The whole issue of forecasting prices a decade and more in the future was the subject of considerable skepticism. It was noted that the various confidence levels for forecasts over 20, 30, 40 years ought to be considered. The further out in time, the less confidence can be placed in predictions.

3. New England Grid. The participants also recommended that the role of this tidal project be carefully considered within the New England regional energy picture, particularly with regard to its operation as a source of base load, intermediate, or peaking power capacity. There was considerable discussion, consequently, about the relationship of tidal to the NEPOOL system.

There was substantial agreement among the participants that the analysis should be done looking at the NEPOOL system with the tidal power and without tidal power. The real benefit of a tidal power project would be clearer with such an analysis available.

Questions were raised about the dollar value of the power from this project and the relationship of the re-timing of power within the grid. There was some discussion and agreement that the basic importance of tidal power will be energy-savings, not in base load capacity. There was no real agreement among the participants, however, about how to place a value on energy savings versus basic capacity. Perhaps the major benefit of this project would be to slow down the existing fossil or nuclear fuel use and to defer construction of new fossil or nuclear plants.

It was noted that some projects which are uneconomic given current prices may, as a result of continuing inflation and escalation of fuel prices, be economic in ten years. In this context, it could be more economic to defer construction of a tidal project for some length of time.

The Department of Energy is projecting a major decline in the use of oil for electrical generation. In predicting costs and benefits of electrical generation by alternative means, projections ought to be based on a mix of generating systems, not just comparing one system (e.g. oil) against tidal power.

NEPOOL is not considering oil as a viable alternative for the future, thus comparisons for tidal power are more properly made with coal and conventional nuclear. Both of these will show real price increases in operating costs over time. However, in the case of nuclear power, the development of breeder reactors may change that picture.

4. Financial Feasibility. The discussion of financing indicated that three factors must be considered - the capital structure, the repayment schedule, and the tax rates.

The project is expected to be able to pay for itself provided fuel costs escalate more rapidly than general inflation and provided that a technological development does not provide electricity as cheaply as is possible today. As noted above, the future market for power in New England and the type of power produced has an impact on the repayment schedule, since there must be an interest on the part of preference customers and

public utilities to purchase this power (it must fit the needs of the users). The possibility of the sale of power to private utilities would have a major impact on marketing.

Discussion on life-cycle costing also raised questions about comparisons based on a return on investment. This was thought to be best handled by the current discount rate. The current recommendation of the Corps is that the dollars for this project will be discounted for 50 years rather than 100 years.

The question was raised, as it had been in the Augusta Workshop, about whether or not joint funding would be possible, involving private, State, and Federal dollars. There was a general sense that the comparisons made in an economic study of the tidal power project should include some of the problems that private utilities would face, including corporate income taxes.

Economic Impact

The economic impact a tidal project such as this was viewed as substantial on the local and regional economy but not very important for New England as a whole. The economic impact will be most substantial during construction, and has both positive and negative local consequences.

Other Comments

It is recommended that a Benefit/Cost Ratio analysis be done on the navigation lock itself.

There was some discussion about the life-span of the dams and other facilities resulting in the recommendation that the Corps consider alternatives other than 100 years as a benchmark. The Plan of Study ought to be used to establish a reasonable life-time frame, which is likely to be shorter than 100 years.

It was suggested that the Corps should consider a series of small projects as an alternative to a large Cobscook Bay one. It was argued that this approach would have the advantage of being a demonstration with minimal social-cultural impact and permit the development of some special technology.

It was noted that it might be useful to couple the Cobscook Bay project with the Dickey-Lincoln project. This was an earlier plan for this project but was separated in the 1965 approval of Dickey-Lincoln. It might prove useful to consider this project with and without Dickey-Lincoln.

PASSAMAQUODDY - COBSCOOK BAY REGION WORKSHOPS

Eastport Workshop - May 31, 1978

The Tidal Power Concept, Local Concerns,
and an Introduction to the Study

Name	Address
Chester E. Allan	Retired
B. E. Barrett	U. S. Army Corps of Engineers
James C. Bates, M.D.	Physician - Eastport
James E. Callahan	U. S. Army Corps of Engineers
Col. John Chandler	U. S. Army Corps of Engineers, NED
Merrill Conti	Fire Chief - Eastport
Winifred French	Editor & Publisher "Quoddy Tides" - Eastport
John Pike Grady	Quoddy Tides Foundation - Eastport
Gordon A. Haaland	U. of Maine at Orono - Orono
George Harris	Eastport
Arthur M. Johnson	U. of Maine at Orono - Orono
Dr. Norman Laberge	Half-Moon Cove Tidal Project - Pleasant Point Reservation
Russ Lawson	Half-Moon Cove Tidal - Passamaquoddy Tribe
James Logan	Division Manager, Bangor Hydro Electric
Harry A. Richardson	Eastport
Andrew M. Seeley	Manager, Bangor Savings Bank - Eastport
Gordon E. Torrey	Consultant, City of Eastport
David B. Turner	Eastport City Council
Harry L. Vose	President, Eastport City Council

PASSAMAQUODDY - COBSCOOK BAY REGION WORKSHOPS

Orono Workshop - June 5, 1978

Natural Resources and Environmental Considerations

Name	Address
B. E. Barrett	U. S. Army Corps of Engineers
Bob Bayer	Animal Veterinary Sciences - Univ. of Maine at Orono
William Beardsley	Bangor Hydro Electric Company
Marvin F. Boussu	National Marine Fisheries Services
James Callaham	U. S. Army Corps of Engineers
Barbara Cettrell	State Department Conservation
Dick Clime	Dodge Cove Marine Farm - Newcastle, Maine
John H. Dearborn	U. of Maine at Orono - Zoology
Water S. Foster	Maine Department Marine Resources - Augusta
Margie Lee Gallagher	U. of Maine at Orono - ANU, Lobster Project
Larry Grossman	U. S. Army Corps of Engineers
Terry Haines	U. of Maine at Orono - USFWS, Zoology
Bradford Hall	U of Maine at Orono - Geology
Alan E. Hutchinson	Maine Dept. Inland Fish & Wildlife - U. of Maine at Orono, 202 Nutthing Hall
Arthur Johnson	U. of Maine at Orono - Orono
Thomas Kellogg	U. of Maine at Orono - Geology
Donaldson Koons	Colby College - Geology - Waterville
Robert MacKay	U. of Maine at Orono - Archaeology, Room G, South Stevens - Orono
Ann F. Mason	Maine Dept. Inland Fish & Wildlife
Michael Morse	Maine Dept. Inland Fish & Wildlife
Frank Roberts	U. of Maine at Orono - Zoology
David Sanger	U. of Maine at Orono - Archaeology, Room G, South Stevens - Orono
Arthur West	Cobscook Bay Lab.
Richard Will	U. of Maine at Orono - Archaeology, Room G, South Stevens - Orono
Bruce D. Sidell	U. of Maine at Orono - Zoology

PASSAMAQUODDY - COBSCOOK BAY REGION WORKSHOPS

Portland Workshop - June 9, 1978

Social-Cultural Considerations

Name	Address
James Acheson	Pemaquid Harbor, Maine 04560
Lawrence C. Allin	U. of Maine at Orono, 6 Coburn Hall, Orono
Edwin H. Bates	U. of Maine at Orono, Cooperative Extension Service, Winslow Hall, Orono
John Battick	U. of Maine at Orono, Dept. of History, 204 East Annex, Orono
Charles E. Bodman	U. of Maine at Machias, M/S Dept.
James A. Callahan	U. S. Army Corps of Engineers - 424 Trapelo Street, Waltham, Mass. 02154
Russ Conway	Half-Moon Cove Tidal Power - Eastport, Maine 04631
Joel W. Eastman	U. of Southern Maine, Dept. of History, Portland, Maine
Sandra Garson	Five Islands, Maine 04546
Sherry Huber	430 Blackstrap Road, Falmouth, Maine 04105
Bob LeBlanc	U. S. Army Corps of Engineers
Robin Peters	U. of Maine at Orono, Center for Marine Studies, 14 Coburn Hall, Orono
Steve Rubin	U. S. Army Corps of Engineers
Alvin H. Streeter	Energy Impacts Projects, M.I.T., Cambridge, Mass.
George Tibbetts	Office of Energy Resources, 55 Capitol Street, Augusta, Maine 04330
Richard Will	U. of Maine at Orono - Archaeology Lab., South Stevens Hall
James Wilson	U. of Maine at Orono - Dept. of Economics, 225 Stevens Hall, Orono
John S. Wilson	U. S. Army Corps of Engineers

PASSAMAQUODDY - COBSCOOK BAY REGION WORKSHOPS

Augusta Workshop - June 7, 1978

Energy Alternatives

Name	Address
William Beardsley	Bangor Hydro Electric Company - Bangor
William Bisson	Stevens Architects - Portland
Charles E. Bodman	U. of Maine at Machias - Machias
James Callahan	U. S. Army Corps of Engineers
Charles S. Colgan	Maine State Planning Office
Russell I. Fries	U. of Maine at Orono - Orono
Mary M. Gros	China 04926
Larry Grossman	U. S. Army Corps of Engineers
Gordon A. Haaland	U. of Maine at Orono - Orono
Philip C. Hastings	Central Maine Power Company
Thomas B. Hyde	The Jackson Laboratory - Bar Harbor
Arthur M. Johnson	U. of Maine at Orono - Orono
John Joseph	Office of Energy Resources
Normand Laberge	Half-Moon Cove Tidal Project
Bob LeBlanc	U. S. Army Corps of Engineers
Roland Patneaude	W. S. Libbey Co., Mill St. - Lewiston
Bruce Probert	Sprague Energy - Searsport - 04974
John B. Randazza	Central Maine Power - Augusta
George Tibbetts	Office of Energy Resources
David Wihry	Dept. of Economics, U. of Maine at Orono
Harold E. Young	Complete Tree Inst., U. of Maine at Orono, Nutting Hall - Orono

PASSAMAQUODDY - COBSCOOK BAY REGION WORKSHOPS

Boston Workshop - June 12, 1978

Economic Factors

Name	Address
George Antle	U. S. Army Engr. Institute for Water Resources
Paul H. Bedrosian	EPA, JFK Fed. Bldg. - Boston
S. L. Blum	Mitre Corp.
Richard F. Burns	USEPA, Fed. Bldg. - Boston
James E. Callahan	U. S. Army Corps of Engineers - Waltham
R. M. Campbell	Stone & Webster Eng.-Corp.
Col. John P. Chandler	U. S. Army Corps of Engineers - NED
Robert E. Chase	DOE Region I CS&RA
Charles S. Colgan	Maine State Planning Office
Thomas D'Avanzo	EPA - Env. Impact Office
Richard Denton	Shawmut Bank of Boston
W. E. Feero	DOE/EES
Antonio Ferreira	NEPOOL
Larry Grossman	U. S. Army Corps of Engineers - NED
Gordon A. Haaland	U. of Maine at Orono - Orono
Philip C. Hastings	Central Maine Power Co. - Augusta
Jonathan B. Hill	Markham & Hill (The Pittston Co.)
Joseph L. Ignazio	U. S. Army Corps of Engineers - NED
Arthur M. Johnson	U. of Maine at Orono - Orono
Judy Kany	Waterville (Rep. to Maine Legislature)
Normand Laberge	Half-Moon Cove Tidal Power Project
Bob LeBlanc	U. S. Army Corps of Engineers - Waltham
Peggy McDonald	Northeast Solar Energy Center
Kevin M. McMahon	U. S. Army Corps of Engineers - Waltham
David C. Major	Institute for Water Resources
Fred Nemergut	New England Regional Commission
Daniel Peaco	Mass. Energy Facilities Siteing Council
Steve Rubin	U. S. Army Corps of Engineers - Waltham
William D. Shipman	Bowdoin College - Brunswick
James R. Smith	NEPOOL
George Tibbetts	Maine Energy Office
W. W. Wayne, Jr.	Stone & Webster Eng.-Corp.

UNITED STATES OF AMERICA
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

PUBLIC MEETING
for the
TIDAL POWER STUDY
COBSCOOK BAY, MAINE, USA

Eastport Municipal Auditorium
Shead Memorial High School
Eastport, Maine

Monday, July 10, 1978
7:30 o'clock p.m.

BEFORE:

COLONEL JOHN P. CHANDLER, Division Engineer,
New England Division, Corps of Engineers

JIM CALLAHAN, Project Engineer,
New England Division, Corps of Engineers

JOSEPH IGNAZIO, Chief, Planning Division
New England Division, Corpos of Engineers

DR. BUD BARRETT, Manager, Environmental
Impact Statement, New England Division
Corps of Engineers

SAUL COOPER, Deputy Chief, Engineering
Division, New England Division
Corps of Engineers

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P R O C E E D I N G S

MR. COHEN: May I have your attention, please. Hi to everybody. I'm Nate Cohen, Chairman of the Eastport Economic Development Committee. On behalf of Harry Vose, Chairman of the Eastport City Council, who cannot be here at this time, I'd like to make a few introductory remarks.

For many, many years, the Quoddy Tidal Power Project has been kicked around. Hopefully this tidal power study of Cobscook Bay will be proven to be feasible and will be constructed. It is my pleasure to welcome you, Colonel Chandler, and your staff back to the City of Eastport, a warm welcome to our port city. Colonel Chandler.

COLONEL CHANDLER: Thank you, Mr. Cohen. Thanks to Mr. Cohen very much for that introduction, and I will introduce my staff here shortly and also describe briefly the format.

As he indicated, I'm Colonel Chandler. I'm in charge of the U. S. Army Corps of Engineers program in the six New England states. And our interest tonight is going to be energy, and in keeping with one aspect of that which is conserving, I've the license plate and description of a car with

its headlights on in the parking lot. It's a Buick Skylark, New York license plate 316-KGJ. Your lights are on in the parking lot. There is also a Massachusetts car parked behind the school bus with its lights on.

Mr. Cohen mentioned welcoming me back to Eastport. I have been here a couple of times. Most recently on a workshop, but some of you here may also recall a meeting on a very cold December morning a year and a half ago when we were discussing the Pittston Oil Refinery application for a permit, and at that time I was co-chairing the hearing with Mr. John McClennan of the Environmental Protection Agency, headquarters in Boston.

All of us who live in New England, getting back to electrical energy and I hope we'll keep the discussion on electrical energy and not drift off into petroleum too much anyway. All of us in New England pay a penalty for our dependance on imported fuel. The cost of that fuel we expect to see rise particularly as supplies are used up. And of course if we are to avoid an energy crisis should these supplies be abruptly cut off, we need to examine every resource we have as a potential source

1 of energy in the future. Water is one of New
2 England's few natural resources capable of producing
3 energy. And one of the ideas that we are looking at
4 again is the possible use of the powerful tidal
5 forces in Cobscook Bay region of Maine to see if
6 indeed we can make a case for development of that
7 tidal power as economically justified and as a
8 source essentially of hydroelectric power.
9 As was mentioned the notion of using
10 tidal power up here has been around for a good long
11 time, and some I think can date it back to probably
12 around the timeframe of 1918, if you want to go far
13 enough. Most recently, those of you who are here
14 know that there is tangible evidence of work in this
15 area in the middle 30s. So it's a notion that has
16 been around for a long time. And it's gone through
17 some significant changes, and we hope to discuss
18 that a little bit more with you.
19 The problem has been that in the past,
20 and it's not really changed at the present time, the
21 capital investment in tidal power still looks very
22 expensive. What may be different is that we are
23 seeing that alternative fuels, alternative sources
24 of electrical energy are becoming terrifically

1 expensive on a maintenance basis; that is, to
2 provide the fuel for generation of power on a
3 year-to-year basis you have to build the plant, and
4 as a result tidal power where essentially the power
5 itself, the energy, is from the natural forces, and
6 having very little cost over time once the initial
7 investment has been made, may prove to be an
8 economic alternative.
9 Congress ordered this study and ask us
10 simply to look at the old studies that had been done
11 and update the engineering and the feasible,
12 economic feasibility. We have completed that
13 portion and have concluded that we should proceed
14 further, and that's what we are here to discuss
15 tonight. But not only will we be looking at the
16 engineering aspects and the economic feasibility of
17 the project, we will also be looking at the
18 ecological, social and cultural character of the
19 area and the impacts that such development might
20 have.
21 We're at that stage that's called the
22 development of a plan of study which is simply a
23 road map that says who gets involved, what are the
24 things that we are trying to accomplish, how much

1 manpower does it take, how much money does it take,
2 and how long will it take. Obviously, as I
3 mentioned, development itself could be terrifically
4 expensive, so also can be the study that we're
5 talking about. So we want to be sure through this
6 plan of study that that investment of perhaps three
7 million dollars and the study itself will be a
8 worthwhile investment and actually lead to some
9 conclusions.
10 We feel in the Corps of Engineers that
11 this is the ideal time at the very first stage to
12 develop public involvement, and public involvement
13 really depends upon the public being interested in
14 the project itself and also, I think, having some
15 degree of understanding of what can be accomplished
16 and what perhaps cannot be accomplished through such
17 a project. So though while tidal power has been
18 around some time, it's probably got as many
19 misconceptions today as it has understanding by the
20 general public. And I've seen quite a few comments
21 in the press recently that make me feel that it is
22 important that we get off on the right foot as to
23 just what it is we're trying to undertake, what
24 things may have changed technilogically since

1 earlier studies, what sort of energy can be
2 generated from the tidal project. And we hope that
3 this evening's discussion we'll be able to give you
4 a little insight into what we see as the problem to
5 study and then invite your participation to sharpen
6 up our thinking and to be able then to finalizes
7 this plan of study.
8 Not only, of course, will you as
9 members of the public be involved in the development
10 of this study, but we also of course will try to
11 involve agencies of the Federal Government, the
12 state government and local groups, nongovernmental
13 business groups, whatever, that would be interested
14 in such a development as the development of tidal
15 power.
16 I'd like to keep our meeting this
17 evening on an informal basis, and I think with the
18 size group we have it will work out very smoothly.
19 We normally do in a meeting such as this provide an
20 opportunity for formal comment, but at the present
21 time I have a rather limited number of cards. And
22 so what we propose to do in the spirit of
23 informality and exchange of information is to have a
24 period of time after our brief introduction to you

1 for you to ask us some questions to clarify your
2 understanding, some question about what we may have
3 said or may not have said. And after we have had
4 and opportunity to develop a little dialogue as to
5 just what it is we're talking about in the concept
6 of tidal power and the plan of study, we'll then go
7 to the period of formal comments. And I have a
8 tentative time schedule that we'll try to follow,
9 but I think it will all lead up to being able to
10 accomplish the meeting this evening in a very
11 reasonable period of time.
12 When you came into the auditorium this
13 evening, you received this booklet, I hope, each of
14 you. I think you'll find this is a fairly handy
15 reference for the definition of the project and what
16 we intend to undertake at the present time, and I
17 hope you'll hang on to that and certainly you are
18 invited to ask questions about what may have
19 appeared in this document tonight.
20 You were also offered two cards, white
21 cards and gray cards. The white card is important
22 for several reasons to me, one it gives me your name,
23 your address and shows you're interested in the
24 project and give us then the opportunity to put you

1 on our mailing list so that we can keep you posted.
2 From time to time we'll be putting out some periodic
3 news letters about the developments on the project.
4 And secondly, you've indicated on these cards
5 tonight whether you desire to speak or not to speak.
6 So I'll be using them for that purpose. And
7 incidentally as those were submitted at the desk,
8 they were serial numbered, and I'll be using those
9 cards essentially in the order in which they were
10 received.
11 We have a short audio-visual
12 presentation which is about 12 minutes in length,
13 and we hope that will set things in perspective for
14 you. It's not that I don't like to talk,
15 unfortunately I do like to talk, but I think by
16 using this audio-visual background that we can cover
17 a lot of ground in a much shorter period of time
18 than either I or my staff members would take up if
19 we tried to explain this endeavor to you. And I'll
20 introduce members of my staff that are going to make
21 some presentations. But before we go any further I
22 would like to just indicate who they are. Over on
23 this side, the far end is Dr. Bud Barrett. He'll be
24 discussing briefly with you some aspects of the

1 environmental impact studies that will be done in
2 conjunction with the engineering of the project.
3 And next to him is Mr. Joe Ignazio who is Chief of
4 my Planning Division, and it's within the Planning
5 Division that this study will be undertaken. Mr.
6 Jim Callahan, who is the Project Engineer, and he'll
7 be describing the engineering and the economic
8 analysis of the project, and Mr. Saul Cooper who is
9 the Deputy Chief of my Engineering Division, and
10 will be involved in much of the designs and cost
11 estimates and certain other water quality aspects of
12 such an undertaking.
13 The gray card, just to get back to
14 cards for a moment, the gray card which I hope you
15 still have, we'll use to facilitate the question and
16 answer period. I don't expect you now to have
17 questions in mind, but if you do, this is a good
18 time to jot down the question. We would like you to
19 put your name and address on the card. If we are
20 unable to answer the question at the present time,
21 we'll keep that card in our suspension file, if you
22 will, and provide you with the answer as soon as we
23 can. We'll be asking for these cards after the
24 audio-visual portion, and my staff will be

1 circulating in the group. You can hand them to them.
2 They will bring them forward.
3 I will not necessarily identify the
4 author unless he wants to be identified at that time.
5 Normally I simply state what the question is, and
6 then call upon a member of my staff or I will try to
7 answer the question myself. Very often our
8 experience at this stage is that additional
9 questions will be generated; that is, somebody has
10 asked a question, we give you an answer, that
11 stimulates another question. So we'll have cards,
12 and you can keep writing questions down and we'll
13 keep trying to answer as long as you have questions
14 about the project.
15 Before I proceed on, though, I would
16 like to acknowledge the great assistance that we had.
17 We've tried some innovative approaches to this whole
18 planning process which we thought would facilitate
19 it for you. We held a series of four or five
20 workshops on the project, one of which was held here
21 in Eastport. And we discussed with some selected
22 members of your community what they thought should
23 be involved in the study and what they thought would
24 be the concerns in Eastport as well as the interests.

1 Others were held in Augusta on different subjects.
2 We had one in Boston also on project economics and
3 on the marketing of power and that sort of thing.
4 With the help of some 70 people who
5 have already become involved in this project, we
6 have done some refining of our initial plan of study,
7 and it will be that refinement that we are
8 presenting to you. These people we expect will
9 remain involved in the project. They have indicated
10 an interest in participation where we are working at
11 the workshop level. I would assure any of you who
12 are here that if you too would be interested in the
13 less formal sort of get-together of workshops in the
14 future that if you make that information known to us,
15 we would be glad to consider inviting you to
16 workshops in the future. And anybody who is
17 interested in that sort of involvement, please let
18 us know and we will tell you about the various topic
19 areas that are discussed and what our future plans
20 in this area might be.
21 At this point, I think it's getting
22 dark enough now that if we dim the lights you'll be
23 able to see our audio-visual presentation. We'll go
24 a head with that next.

(Audio-visual presentation.)

COLONEL CHANDLER: As you can see, some of your neighbors are already involved in the project, and we certainly appreciate their participation. At this point I'd like to turn the microphone over to Mr. Jim Callahan who is the Project Engineer and have him give you a brief description of the study.

PRESENTATION BY JIM CALLAHAN,

PROJECT ENGINEER

MR. CALLAHAN: Thank you, Colonel. Good evening, ladies and gentlemen. There are no doubt many people in this room whose personal knowledge of the history of this project will provide a special human dimension to what appears in the official files. One of the reasons we are here tonight is to obtain your viewpoint, and hopefully you will share with us some of the insights that you possess.

It's almost half a sentry since the idea of harnessing tides for electricity in the Bay of Fundy region first attracted serious attention. There are first-hand reminders of the uncompleted effort initiated by Franklin D. Roosevelt in his

first term to build a tidal generating facility in this very location. The memories and emotions remain. But now although we are concerned about local economic conuitions, we are also concerned about energy for the future and about preservation of our natural environment and in utilization of our natural renewable resources. The audio-visual presentation you just saw provides an overview of our current interest in Cobscook Bay as a possible site for tidal power development.

In the recent past tidal power development has been reevaluated from time to time to determine whether or not it was economically competitive with other types of power generation. By our conventional methods of economic evaluation, the idea still does not appear to be fully economically justified. But in the new study we have been authorized to also analyze the economics using new measures which give added weights to benefits due to inflation and escalation trends. Another factor which is different from circumstances existing in the 30s, 40s or 50s is the fact that just about all of New England's power is interconnected to a regional grid that draws upon a

1 mixture of various power sources.

2 These sources serve diversified

3 demands on the system, which vary from hour to hour,

4 day-to-day, and season to season. This pooling

5 means more reliability in service and savings to

6 customers. Investor-owned and publicly-owned

7 utilities belong to the system, but unlike other

8 systems around the country, there are no federally

9 financed generating facilities contributing power to

10 the New England system.

11 It should be understood that any

12 public investment the Federal Government makes to

13 produce energy is recovered through the sale of

14 power over the life of the project. I should also

15 point out that arrangement of the transmission and

16 marketing of the federal power are the

17 responsibility of the U. S. Department of Energy.

18 And these aspects will be incorporated into the

19 overall study the Corps will be undertaking. Beyond

20 power, additional economic benefits may accrue from

21 development of a tidal power facility. These are:

22 recreation, area redevelopment, and fisheries

23 mariculture.

24 At this point in time we are in the

1 process of developing a plan of study, and this plan
2 is flexible. It is most useful in determining
3 specific items that need to be addressed, the
4 assignment of responsibility for various work and
5 study tasks and a timetable and a budget to manage
6 the study. One of the key items mentioned in the
7 audio-visual presentation, and I think Dr. Barrett
8 will refer to it when he speaks, is the timeframe
9 required to obtain basic data about the existing
10 ecosystems in the Bay.
11 Depending on what we can obtain from
12 secondary sources and of course depending upon
13 continued funding by Congress, we expect that this
14 study will run between three and four years. Until
15 the plan of study is completed, it will be difficult
16 to be precise about its exact schedule and its exact
17 cost. However it should be understood by all that
18 should early studies fail to indicate that a tidal
19 generating facility is economically feasible or if
20 it is determined that there is no need for power
21 that would be generated, planning could be
22 interrupted at any time. Please keep in mind also
23 that the Congress has only authorized us to study.
24 They have not authorized advanced design or

1 construction.

2 With your permission, I would like to
3 take the rest of my time to describe with the use of
4 slides some background about the area and tidal
5 power and then outline the planning process that
6 will guide our study. Following my presentation,
7 Dr. Barrett will be coordinating our environmental
8 investigations, will outline procedures to meet the
9 National Environmental Policies Act. If we could
10 have the lights, I'll go through some slides with
11 you.

12 The first slide is the title of our
13 study, called the Cobscook Bay, Maine, U. S. A Tidal
14 Power Study. It's going to be a study which is
15 entirely within Cobscook Bay and the United States.

16 This slide shows the study area. You
17 see the Gulf of Maine, the Bay of Fundy, the
18 peninsular of Nova Scotia, and also our study area
19 in Cobscook Bay. You'll also notice that up above
20 St. John, the Canadians are presently involved in a
21 $33 million study on tidal power in a spot called
22 Cumberland Basin. In the vicinity of Eastport here
23 we have an average tide of 18 feet, 27 foot maximum
24 at the high tides of the month, and 13 feet high at

1 the low tides of the month.

2 This photograph shows some vessels in

3 Eastport Harbor at high tide. The next film shows

4 the same location at high tide, and you can see the

5 variance in the height of the tide itself. Remember,

6 an average of an 18 foot tide.

7 This next slide shows some of our

8 relationships, the faces of the moon in relation to

9 the sun and the earth and the moon when the sun and

10 the moon are in a direct line with the sun -- wait a

11 minute, when the moon and the earth are in direct

12 line with the sun. We have our highest tides, at

13 the full and the new moons. At the quarter points,

14 on the quarter moons, the gravitational attraction

15 is not as large, and we have our less higher tides.

16 Remember, the tidal cycle is 12 hours and 25 minutes.

17 This next slides show the height of

18 the tides and the ocean tides and the heights of our

19 bay if we were using a two-pool scheme. You'll

20 notice that the shaded area reflects one of the good

21 points about a two-pool scheme where you can provide

22 varying amounts but continuous power throughout a

23 24-hour period.

24 This next slide here shows sort of a

1 generation of New England and what a tidal power
2 project, if it's used for peaking power, on the
3 international scale might be equivalent to. You can
4 see where the peaks generally coincide.
5 Many of you are probably familiar with
6 this slide here which is basically the tidal power
7 project that was conceived and developed in 1935 to
8 1936. You use the causeway that comes over two of
9 the dams that were constructed in that period just
10 sort of south and east of Pleasant Point Reservation.
11 Those two projects that were constructed, or dams I
12 should say, would be usable and salvagable in any
13 proposed plan in the future.
14 This is an aerial shot about 7 o'clock
15 one cold winter morning in 1976, and you can see the
16 sea smoke that you people are so familiar with
17 rising off the water.
18 In your tidal power project, you would
19 have various structures which would be fundamental
20 to all schemes, concepts or configurations. You
21 would have dams, navigational locks to provide
22 access for fishing and commercial fisheries, you
23 would have emptying and filling gates or channels to
24 bring the water in and the water out. You would

1 have fishways, power house, switch yard,
2 transmission lines, roads and service areas and
3 ground facilities for maintenance purposes.
4 This is a cutaway of a typical
5 generator bay. You see a turbine. It's called a
6 slant-type turbine which is the latest thought for
7 use in this project, and it is connected to a
8 generator with a speed increasor. Diameter of the
9 turbine at the blade point where the blades are and
10 the runners are, about 33 feet. This generator
11 would be a 12.5 megawatt size unit. So you can see
12 that those blades are quite a size propeller, 30
13 feet or so. This is a cutaway of an emptying and
14 filling gate that would allow the water to come into
15 a bay or also any excess water that wouldn't be used
16 in the turbines could go out.
17 Here you see some cutaways of earth,
18 rock and clay filled dams. These dams would be used
19 to impound the water and make the various bays.
20 Here again Cobscook Bay with its various bays,
21 inlets, peninsular, islands provides a wonderful
22 opportunity to come up with various concepts and
23 configurations for your review and also your comment.
24 This shows a bulb type of turbine.

1 Remember, I just showed you a slant type of turbine.
2 This is another type of turbine for generating
3 electric power. However the water goes around all
4 sides of this bulb-type turbine. It is mainly used
5 in the European area.
6 The slide I'm going to show you now up
7 there is an existing tidal power project in the
8 LaRance estuary in France. It has twenty-four
9 10-megawatt generating units, gives you a total of
10 about 240 megawatts which is one of the sizes of a
11 proposed plant that could be installed in Cobscook
12 Bay. There are 24 units across it. This project
13 was completed about 1968 and is currently generating
14 electricity. You'll notice in one corner a
15 navigational lock and the project also has a public
16 road across the top of it adjoining each side of the
17 river.
18 This interesting photo here is a photo
19 of a prefabricated power house unit. A little
20 earlier I showed you a single bay with the
21 slant-type turbine in it. This is one of those bays,
22 similar to one of those bays except this bay and
23 unit was built in Russia, and it's being transported
24 60 miles down a Russian river, north of Murmansk to

1 a point where it's going to be installed in place.
2 This is a 400 kilowatt generating unit. It isn't
3 too large, but it shows what we can do with some of
4 the newer techniques of construction, float-in type
5 construction which can possibly save us large
6 amounts of money in a tidal project we might
7 envision here.
8 This slide shows the power house in
9 its installed position. The bottom of the river bed
10 was prepared and the caissons or the power house
11 unit was settled into place, and the crib walls and
12 the sides were filled in to it. It is a small unit,
13 but it's operating and it does show that tidal power
14 is feasible from an engineering standpoint.
15 Next I'm going to show you a few
16 slides which have more wording to them, and it's
17 going to show you some of the items that we propose
18 to study. The first slide shows our three stages of
19 the study, a development of a plan of study, which
20 is a document to guide us during the study period.
21 This period to prepare this plan of study normally
22 takes six to eight months. The next step, Stage II,
23 would be an 18-month period where we would develop
24 intermediate plans. In other words we would look at

1 Cobscook Bay, look at all the various configurations,
2 lay outs of dams, number of power houses, amount of
3 water available to generate electricity and present
4 them all to you for discussion and selection. We
5 would look at them from an engineering point of view
6 and an environmental point of view.
7 The third stage, Stage III,
8 development of final plans, would be where we would
9 take three or four of the intermediate plans that
10 looked like they were the best from an environmental
11 point, economic point, and a publicly accepted point,
12 and develop these into final, more detailed plans.
13 We would put more efforts into engineering costs,
14 greater design effort and also greater
15 investigations into the environmental points of view.
16 In our water resources planning, we
17 have sort of four steps that we go through to try to
18 assure a proper study. First of all, we try to
19 identify what the problem is. Next, we try to
20 formulate or develop plans. This is looking at
21 various tidal configurations, looking at maybe
22 fossil fuel plants, nuclear plants, river hydro,
23 conservation, and various other methods of saving or
24 producing electricity. The third point of view is

1 an impact assessment where we go out and we assess
2 each of these alternative plans, and we find out how
3 each way compares to each other from an
4 environmental, economic, social, cultural,
5 historical point of view. And finally the last one
6 is an assessment which we come up with as a final
7 review of all the impact assessments, the
8 engineering points of view, and all the other points
9 that we consider in a study, some of them being
10 marketing, looking at institutional arrangements,
11 the financial arrangements of the project, all of
12 these weighed relatively in selecting maybe a final
13 plan or final plans.
14 This colored slide shows the various
15 stages that we went through, plan of study,
16 development of intermediate plans, and final plans,
17 and it shows the regulations of the four tasks:
18 problem identification, plan formulation, assessment,
19 and evaluation. And you can see as the steps
20 progress, from one to three, we drop out and make
21 the evaluation sort of the largest amount of effort.
22 So it's a progressively changing study all the time.
23 We are looking at the same things but pronouncing
24 and giving more weight to evaluation and assessment.

1 At the same time we also look at some
2 of these what we call systems of accounts, and we're
3 trying to improve our environmental quality, our
4 national economic development, our regional
5 development and our social well being. These
6 studies must address all of these points. If we
7 find any of the alternatives that do not, they will
8 have to be dropped. We'll have to verify why they
9 are dropped and record why they are dropped as well
10 as the plans that we continue with further study.
11 On our plans of study, as I said
12 before, we will identify specific study items.
13 We'll assign responsibility for various elements,
14 we'll establish a budget and a timetable, and we
15 will also prepare our plan of study and a report on
16 it.
17 Some of our investigations that we are
18 going to consider are on the slide there, and they
19 are environmental, feasibility, economic feasibility,
20 engineering feasibility, and the last one, public
21 acceptability. We'll be looking at all of these
22 things when we are developing our plans.
23 Some of the typical impacts on a
24 project are land use -- should we look at your land

1 as maybe a tidal power project; should we also look
2 at it from the point of view of some other kind of
3 industrial use. We would have to see what other
4 private developments or public developments maybe
5 going on. We'll look at it from the cultural points
6 of view, mariculture. We know that may be if we put
7 in these impoundments, these bay impoundments that
8 may be conducive to fisheries and maricultures.
9 Of course, we would be looking at
10 public health, looking at tourism action and looking
11 at the impacts on the community. Dr. Barrett will
12 speak more of these environmental concerns in a
13 moment.
14 This slide is a slide which shows you
15 as the public being in the center, the public being
16 the focal point, and all of our planning being
17 ultimately for the public. And we establish our
18 goals, we look at our problems, we develop
19 alternative plans, we present these alternative
20 plans, we send them out for your review, for your
21 comments, we come back with your comments, and we
22 adjust them the way you would like us to. And
23 finally we try to implement the plan that you people
24 and all of the engineering and environmental

1 concerns say is best or most acceptable. But the
2 big focal point is the public right in the center.
3 And right from the beginning, like you are here
4 tonight, and some of the workshops that we recently
5 completed, we're trying to get you involved in the
6 early beginnings, not to try to develop a plan then
7 ask you to come in and say what do you think. We
8 want you as part of the planning process with us.
9 That completes my portion of the
10 presentation. I know it was quite hasty in many
11 parts, but I'm sure that you may have some questions
12 later on. Thank you.
13 PRESENTATION BY DR. BUD BARRETT
14 DR. BARRETT: Good evening ladies and
15 gentleman, I think tonight for the environmental
16 concerns, I'd like to make two points and discuss
17 them to some little extent. First of all your
18 participation in this entire planning process is
19 vitally important. Your input tonight, your
20 concerns, your questions tonight and in the future
21 will in fact be used to help us determine what
22 should be studied at a later date. We go through
23 all forms of participation with state and federal
24 agencies and the public. The second point that I'd

1 like to discuss a little bit about is the structure
2 of the Environmental Impact Statement. I think that
3 it's important that you understand what we are
4 planning to do and what your impact or part will be
5 in it.
6 To the first point, as I indicated we
7 need your views and we need your concerns. We are
8 not infallible. We never claimed to be. We can sit
9 down and think of all of our past experiences and
10 other projects and try to determine what we should
11 study. But each situation is new and each situation
12 is unique, and you are part of it, and because it is
13 unique there are things which you have in your minds
14 and in your concerns which we need to know about.
15 Such subject as social and economic impacts. We
16 need to know what your views are and your concerns
17 are, say, pertaining to tourism, construction work
18 force impacts, municipal services, what will it do
19 to your town in terms of, say, town meetings. Are
20 you concerned? Do you have other thoughts about
21 this particular subject such as involving social and
22 economics? Will it have an effect on your economic
23 structure? What should we do and what would you
24 like us to do in being able to address these impacts?

1 How about the natural environment?

2 Most everybody feels, by the way, that

3 an Environmental Impact Statement deals strictly

4 with the natural environment. To quote someone once,

5 the bugs and bunnies. But the environment that we

6 are charged to address is our environment, and

7 people are part of it, and their institutions are

8 part of it. But the natural environment is what I

9 suspect a good number of you people are involved in

10 to a great extent. We know, for instance, that

11 we're going to have to investigate the endangered

12 species of this area. You've seen earlier in the

13 slide show a mention made to bald eagles. We know

14 that we are going to have to work on that, but are

15 there other endangered species that we are not aware

16 of? Are there some that you think should be placed

17 on the endangered species list federally? We have

18 those concerns.

19 How about fisheries? In one area I

20 hear that there are no fisheries in this area. In

21 another area I hear that they are going strong. So

22 we need to know what is going on and your views and

23 your impact has a lot to do with it. How about

24 cultural? That subject is a little bit different

1 from what some people would think, but it deals with
2 the archaeology and the historical aspects. There
3 is federal legislation on the books that protect the
4 cultural and natural heritage that we have and I'm
5 sure that this area has quite a bit. We need your
6 views. And we need your concerns about this.
7 The second point, the structure have
8 the Environmental Impact Statement. Many people of
9 seen environmental impact statements, starting with
10 1970 when the first ones came out. They were maybe
11 a quarter of an inch thick and they covered
12 everything with one sentence. And they evolved into
13 litigation proof documents that weighed in the
14 hundreds of pounds. The Council on Environmental
15 Quality has decided that they don't like that type
16 of an Environmental Impact Statement, and they have
17 proposed new guidelines which would in fact reduce
18 the size or the bulk of an impact statement and
19 reduce it to those elements which are most important
20 and put it in a verbiage which is readable and
21 understandable by all people of all walks of life,
22 including people in Washington.
23 Now what are the new guidelines?
24 Recently we completed some rather extensive EISs

1 which had nine major component. The new CEQ
2 guidelines have six. That right there is a
3 reduction in weight, if you wish. But I think more
4 striking than this is the first section which is a
5 rather lucid statement of the purposes of the
6 project and the need for the project.
7 Now the need comes from all walks of
8 life and all places. The purpose for this project I
9 think is rather straight forward. We have to
10 justify or explain or not justify the project and
11 the need. The second and largest of all the
12 sections is the alternative section. This now
13 becomes the major portion of the EIS and the major
14 part of it. And in this EIS that we are
15 contemplating now, we will deal with all of the
16 alternatives that are feasible for generation of
17 power to the level and to the intensity of
18 generators that we can obtain with this project. We
19 must deal with them to the same level of intensity
20 on all aspects -- social, economic, environmental,
21 cultural, and whatever else may crop up.
22 Another section and much reduced is
23 the affected environment. One complaint about most
24 environmental impact statements is that they spend

1 their entire time telling you what the project is
2 going to be and what the environment is like and
3 very little time telling you what the costs or the
4 impacts are. After that then they are going to put
5 everybody on the line. A list of preparers, all the
6 people who were involved in the preparation of the
7 EIS essentially have to give their name, rank and
8 serial number. That makes for a good system of
9 accountability.
10 And last but not least then would be
11 coordination. And that would be a documentary
12 guideline, if you wish, or documentary route through
13 the coordination process that we have carried out
14 starting with our workshops earlier and this being
15 our first public meeting, right straight through all
16 state and federal coordination.
17 The level of detail that we have in
18 this impact statement is one of qualitative in
19 nature. We deal with all alternatives to the same
20 level. Hopefully there will be a selected plan
21 evolve. There may or may not be. At this time
22 though we deal with them all to the same level, and
23 in this case we're going to be able to deal with
24 them to a qualitative nature. We'll be able to have

1 quantitative evidence to identify an impact and to
2 establish that it exists. After that we must wait
3 then until project authorization is determined. If
4 the project is authorized, then we go into a very
5 sophisticated and highly technical and detailed
6 evaluation of the impacts of the selected plan. So
7 there will be a second environmental impact
8 statement which is essentially an update of one of
9 the alternatives that has been selected.
10 One other note that I would like to
11 conclude with in light of recent guidelines that
12 we've received from the Council on Environmental
13 Quality, their feeling and stating that they feel an
14 impact statement would not be beneficial to the
15 process if it exceeded 300 pages in length. I doubt
16 that very many people would spend the time to read
17 an impact statement much larger than that. I would
18 like to repeat one more time. We need your input,
19 we need your views and concerns, and please feel
20 free to either write them or state them, ask
21 questions. I'm sure that the Division Engineer is
22 more than willing to accept your letters any time.
23 And you will see us in the area much more frequently
24 now as we start to generate our impact studies.

1 Thank you.

2 COLONEL CHANDLER: Thanks to Jim

3 Callahan and Dr. Bud Barrett for the remarks. We

4 may have left you at this point with a feeling that

5 we haven't done anything and that our study is the

6 blank sheet of paper that I have in front of me on

7 the table top. That is not really so. A great deal

8 of effort, as I indicated at the workshops, has gone

9 into this.

10 I think the best way we are going to

11 get the dialogue going is to get into the question

12 and answer period that I was talking about and which

13 I want to proceed to next. This way you can feel us

14 out as to whether or not perhaps an issue has been

15 addressed or how it will be addressed. There is a

16 great deal of work that has already been documented,

17 and at this point in time we are interested in

18 finding out whether we are fairly close to the work

19 by hearing from you tonight on the gray cards which

20 are the ones for the question and answer period.

21 And I would propose to spend about 30 minutes on

22 questions and answers, and if we haven't answered

23 all of them to perhaps shift then to comment, and

24 then we can come back to questions and answers.

1 The gray card for the question and
2 answer period, you'll notice that if you write your
3 question on here and put your name and address and
4 zip code so the mailman will be happy, you can put
5 it in the mail box, and you don't have to put a 15
6 cent stamp on it and it will get to me. And it can
7 be answered outside of this meeting if you don't
8 choose to submit it at this present time. So you
9 will have an opportunity after the meeting is over
10 to use the cards and to go ahead and ask additional
11 questions through the mails. And as I indicated,
12 periodically there will be news letters that will
13 come out, and we'll try to respond to the questions
14 as answers are available.
15 I should make one other point for the
16 purpose of the record of this specific meeting that
17 we're having or rather the two meetings -- this one
18 and the one on Thursday in Augusta -- the record
19 will be open through July 28. So any questions that
20 you submit between now and that time will become a
21 part of the record of this particular meeting and
22 the one in Augusta. That means that transcript is
23 available to you. I'll describe it a little later
24 on, but not only do we have it available for

1 official inspection as we say in our office in
2 Waltham, that's a long way from here, we'll also try
3 to find a repository here in Eastport where we can
4 make a copy of the verbatim record available for
5 your use. If you have a particular reason for your
6 own personal copy, arrangements can be made with
7 Barbara Happeny, our certified recorder, for a
8 personal copy and you can see her during the break.
9 So I'd like now then to move into the
10 question period. As I indicated to you if you have
11 questions that you'd like answered, I do have a
12 couple of members of my staff who will be
13 circulating around. We'll try to answer your
14 questions, and as new questions are generated, we'll
15 answer those as we go along.
16 The first question I have here comes
17 to me. It is perhaps not as easy to answer as you
18 would want it to be. This is the question though.
19 I'll read that verbatim. It says: Why is the
20 Pittston oil refinery receiving the go ahead -- the
21 go ahead is in quotes -- (PSD) before the TPS (Tidal
22 Power Study)?
23 First of all, there are two agencies
24 involved in licensing the Pittston refinery; that is,

1 two federal agencies -- the Corps of Engineers and
2 the Environmental Protection Agency. Only thing
3 that has formally happened recently is the filing of
4 the Final Environmental Impact Statement which the
5 Corps participated in with the Environmental
6 Protection Agency, and that was filed in Washington
7 somewhere around the ninth of this month. I
8 personally have not read all parts of that. But I
9 believe as was discussed here in that meeting that
10 there is a proposed permit from EPA that was
11 included in that document, and that is out for
12 comment.
13 On the other hand, the Corps
14 procedures are somewhat different from those of EPA
15 and there is no draft Corps permit included in the
16 document. My regulations require that I not even
17 complete an evaluation of the application for the
18 permit until a formal 30-day review period has
19 passed after the filing of that Final Environmental
20 Impact Statement. And that has not yet passed. So
21 I do not, the Corps does not at this point in time
22 have -- it has not made its findings as to whether
23 or not a permit would be issued to the Pittston oil
24 refinery. And I'm not spokesman for EPA, but I can

1 only say that which did appear in the final impact
2 statement is only a draft, and it is subject to
3 comments that come in during the formal 30-day
4 comment period which is on-going at the present time.
5 The author apparently does construe
6 that as implying, and I gather that is what the
7 quotes mean, a go ahead for Pittston. I can't
8 comment on that. That may be his impression. But I
9 would like to get back to the other point and that
10 is, it's interaction with tidal power. I expressed
11 concern during those hearings myself that the
12 Pittston application could encumber the tidal power
13 development that we contemplated at that time. I
14 would comment to you at this point in time that
15 since the Canadians have withdrawn and we're not
16 looking at an international project, therefore we
17 are not looking at Passamaquoddy Bay but we're only
18 looking at Cobscook Bay, the impact of a oil
19 refinery as proposed by Pittston is greatly reduced;
20 that is, the impact directly on the project. The
21 interference with the project is greatly reduced.
22 There are conceivably alternatives.
23 Indeed there will be alternatives under the tidal
24 power project that would not use the dam that was

1 initiated between Eastport and Lubec through Trent
2 Island. And it might only concern itself with
3 embayments such as Half Moon Cove. If that were so,
4 there would not be any interference between a tidal
5 project of that description and a refinery operation.
6 On the other hand, if a full development in Cobscook
7 Bay were used with perhaps two pools which means
8 several dams, one of which would probably be from
9 Eastport to Lubec, then there would be interaction
10 with the refinery because I suspect you recall that
11 Eastport and Shackford were going to be used as
12 docking facilities, and that would probably involve
13 some sort of locking device for shipments to and
14 from the refinery.
15 When that question came up even in the
16 context of an international project, the Pittston
17 Company's official response to the Corps of
18 Engineers which appears in that Final Environmental
19 Impact Statement that I referred to states that the
20 company will take steps at such time as a tidal
21 project might become imminent to modify it's
22 operations in order to reduce the impact. And
23 specifically they were concerned with the
24 possibility of removing any of the docking

1 facilities from the tidal pools altogether. And
2 it's technically possible.
3 So the bottom line from the standpoint
4 of Pittston interfering with the tidal project or
5 some how encumbering it, I think that's greatly been
6 reduced since we are just only discussing Cobscook
7 Bay options, and I don't think that one should
8 necessarily be a precondition of the other.
9 I've a couple of other questions here.
10 This question really pursues the same one and it
11 says: Do you plan to object to the Pittston Final
12 Environmental Impact Statement, and it's Pittston
13 with an apostrophe on it meaning possessive.
14 However that's the Federal Government's Final
15 Environmental Impact Statement on the Pittston
16 application, and as I indicated was prepared jointly
17 by the Environmental Protection Agency and the Corps.
18 No, I do not intend to object to it. I am a
19 contributor to it.
20 How can you plan to build this project
21 if feasible if the refinery is built since the
22 entire air emissions will be incurred by the
23 refinery? And I can't answer that question. The
24 air emissions question, of course, is the province

1 of the Environmental Protection Agency. A decision
2 on that, as you probably know has been on again off
3 again, and as I understand is still over 30 days away
4 . As to whether or not that usurps all of, if you
5 will, the air pollution in the region that can be
6 accepted and whether that would interfere with the
7 tidal project, I don't know. I don't know, one,
8 that it's going to use up all of the air quality
9 pollutability, if you will, that's acceptable in the
10 first place. Secondly, I don't know what this
11 project's demands might be.
12 Why do we need another study? There
13 should be some way to bring the previous studies up
14 to date. That one, I think, is a little easier to
15 understand, and I don't mean in any way to be
16 flippant about that. All we did in the previous
17 studies up to this point was to look at options that
18 had been investigated before, either the so-called
19 Plan D that was partially implemented in 1935, or
20 that which the various options that were shown in
21 the international project when the IJC undertook
22 this as a joint examination in Cobscook and
23 Passamaquoddy Bays. Those were based on the state
24 of the art that was available at that time.

1 As of right now, we are completely
2 departing from those. Those are not the options.
3 Those are not the beginning points for the study
4 that we are now proceeding into. We only know that
5 looking at those that had previous been examined,
6 costed, and those costs then being brought up to
7 date are still no longer feasible by traditional
8 analysis. But they are not the options, the only
9 options that are left for examination at the present
10 time. So a new study is really needed at the
11 present time. Also because now we can focus our
12 attention entirely on Cobscook Bay and not concern
13 ourselves with the Passamaquoddy options. They are
14 just not available for consideration.
15 That you're frustrated that it takes
16 time to get decisions is something that all of us as
17 taxpayers share. On the other hand, the slow
18 deliberate process is supposed to reduce the
19 opportunity of error and increase the opportunity
20 for a lot of public interaction in challenging and
21 questioning so that the final thing that is achieved
22 and is found to be acceptable to the public is
23 acceptable environmentally and is economically
24 justified. And things like that just take time,

1 certainly in a bueaucratic form of government that
2 we have in our country. And it may be slow, and it
3 may be expensive, but we, I think, generally believe
4 that we finally get to the right place by that
5 process, and it will take time. No question about
6 it.
7 I would assure you though, that the
8 system also provides for stopping at any point that
9 it becomes obvious that one of these acceptable
10 levels are not going to be achieved; that is, that
11 the new models that we're planning to use for
12 economic justification, if you cannot satisfy that
13 threshold of economic justification, but under a
14 slightly different formula, that will be the end of
15 the proposal, and we'll wrap up the report and
16 forward it to the Congress indicating that it is not
17 economically justified. If for some reason we were
18 to find in the environmental analysis or in terms of
19 public acceptability that there is no desire for the
20 project, the project can be stopped at that point in
21 time. We don't have to go through all three stages.
22 And a very important part, which
23 incidentally goes back to this earlier question
24 about why another study, there never was a study,

1 believe it or not. Maybe we do things better than
2 we use to. There never has been a study on
3 marketing any tidal power generated from this area
4 of New England. There never has been one. We don't
5 know at this point in time that there is a market
6 out there, and if there is a market, whether it
7 wants peaking power or wants firm power, whether it
8 wants 40 megawatts in 1995, for instance, or whether
9 it wants 400 megawatts in 1995, or whether perhaps
10 it doesn't want that until the year 2000. So these
11 are some of the things that have to be found out in
12 the study. And again if there is no market out
13 there, the study would have to be terminate because
14 there simply wouldn't be the benefits.
15 Okay, I'm going to let somebody else
16 have a crack at a question now, and I think the
17 mikes are on at the table and I would ask my staff
18 to use the mikes. First one is for Dr. Barrett:
19 What will this do to the shellfish and marine life?
20 DR. BARRETT: Well right now I
21 couldn't say for sure what it will do. I could say
22 this it certainly will have an impact on the
23 shellfish of this bay as it is now. If you are
24 talking about, say, clams, soft shell clams, perhaps

1 it could reduce the overall acreage or it could
2 shift the zonation of it. But this is one of the
3 things we have to look into at a future date or
4 during our studies. And at that time we should be
5 able to give a definitive answer. That's where we
6 are right now.
7 COLONEL CHANDLER: You know, I don't
8 want to keep you from asking the kinds of questions
9 that are in your minds but remember we are very
10 early on. And the first question is what is out
11 there now in Cobscook Bay? And we definitely need
12 to talk to you about that. We're hoping that the
13 station here from Suffolk University will contribute
14 information on that. I'm sure we'll be undertaking
15 some studies, contract studies in the area to find
16 out what is out there now in terms of the fisheries.
17 Then as we go into this process that Mr. Callahan
18 was talking about and that multi-colored chart may
19 be a little bit confusing, but what it's trying to
20 show you is that we go through those four steps
21 three times in Stage I, Stage II, Stage III.
22 In Stage I the emphasis is problem
23 identification. That's what we're talking about.
24 What's out there now in terms of the marine life.

1 By the time you get to Stage III, that emphasis now
2 and how you distribute the work has gone to
3 evaluation, which is answering the other half of
4 this question. But it's not until we get to Stage
5 III that we can tell you what would happen to the
6 marine life if option so and so were pursued. So
7 that's to come out of the study.
8 Next question, Mr. Callahan: How much
9 power will the system generate?
10 MR. CALLAHAN: Right now we are
11 looking at from past experience the project that was
12 developed in 1935-36, some of the other concept that
13 were thought of, and we haven't thought of them all.
14 There are new concepts to be look into, investigated
15 and reported on. But from what we know today the
16 power projects in Cobscook Bay could be of sizes
17 between 40 megawatts and about 250 megawatts.
18 That's from the best available information we have
19 to date. That's the size.
20 As far as annual electrical generation
21 is concerned, it looks like it would vary somewheres
22 between 290 million kilowatt hours a year to
23 somewheres around 615-20 million kilowatt hours a
24 year.

1 COLONEL CHANDLER: Again, you know,
2 we're at the point where this can only evolve from
3 the study itself. The answers are not here, but
4 we're trying to give you range of capacity and a
5 range of energy as best we know at the present time.
6 There is certainly an upper limit to potential in
7 the project area of Cobscook Bay. There is only so
8 much of this energy that can be harnessed.
9 The next question is a question for
10 Mr. Callahan: Could the additional expense of
11 building locks in the dams for passage of
12 supertankers kill the tidal project?
13 MR. CALLAHAN: We would look at the
14 construction costs and tidal power concepts this way.
15 We don't know as if the Pittston proposal will be
16 built. We don't know if the tidal power project
17 would be built. So what we'll proceed on is this:
18 One thought being that the tidal power project will
19 be built alone and another assuming that the
20 Pittston refinery is built. So with all of these
21 concepts we would calculate in there the additional
22 cost for larger sized locks and then equate that and
23 evaluate our overall economic assessments of the
24 project. So we'll be looking at it two ways. We

1 will be looking with a refinery and without a
2 refinery. And all of our projects will look at, say,
3 single-pool concepts, two-pool concept, one and two
4 weigh turbine flows. So we have a lot of sort of
5 alternatives within the alternatives to look at.
6 COLONEL CHANDLER: Okay, another one
7 for Mr. Callahan. This is a good question,
8 incidentally. How will the project affect the tides?
9 Will there rhythm be interrupted? Will the
10 interruption of this rhythm be detrimental to marine
11 life?
12 MR. CALLAHAN: Here again we are here
13 tonight because we don't know all the answers.
14 However, I'll try to give you what answers I do know
15 to give you some kind of a feeling without saying I
16 don't know, plainly I don't know. We are going to
17 be evaluating the tidal effects, what they call
18 tidal resonance effects with the project. Now we
19 know that wherever the dams are located and
20 depending upon the size and area of the bay,
21 impoundments that we construct, it certainly will
22 affect the tides in the project area and up and down
23 along the coast. So we'll be looking into this very
24 strongly, and we'll also be looking into and

1 considering what effects the Canadian project would
2 have on this area, and then if we build a Cobscook
3 Bay project, what do the two projects do in the area?
4 What are those impacts? So we'll be looking into
5 that subject very strongly.
6 COLONEL CHANDLER: I hope, if I could
7 just interrupt you for a second, I think the
8 dialogue is beginning to develop. You're asking
9 questions. We're not giving you the answer to your
10 question, but I hope you're understanding that we
11 hear you communicating. This individual is
12 concerned about the tidal rhythm, and it's certainly
13 an extremely important matter to be totally
14 investigated in the study. It may be the most
15 important. And what that does not only on marine
16 life but on erosion of banks, so forth, is of
17 concern to us, and as Mr. Callahan mentioned, we
18 cannot leave the Canadian development out of our
19 minds in this because we will have to investigate
20 simultaneously with the Canadians what's known as
21 cumulative impacts; that is, if they are changing
22 rhythms in the upper Bay of Fundy under one regiment
23 and we're changing them in Cobscook Bay on another
24 one, I don't know what happens out in Head Harbour

1 Passage, and we obviously have to know those things.
2 So it's going to be very complex, and I assure you
3 there is the mechanism, incidentally, which we have
4 to maintain, technical dialogue both in the
5 engineering and in the -- well, engineering,
6 marketing and environmental areas with the Canadians
7 so that we'll keep in step with one another and know
8 where we are going.
9 Next question for Mr. Callahan: How
10 long would such a system last and will it ever for
11 some reason have to be discontinued?
12 MR. CALLAHAN: Our water resource
13 projects normally, and in this case a power project,
14 Corps of Engineers federal project, would have a
15 life span of a hundred years. This is what we
16 submit it at. In that period we know that some of
17 the machinery -- the generators, the turbines --
18 would break down, need replacement, and we figure
19 the replacement of those parts would be like this.
20 We would replace about 25 percent of the mechanical
21 equipment ever 30 years. So the life of our project -
22 dams, major civil structures -- would be a hundred
23 years.
24 COLONEL CHANDLER: Again, I remind you

1 we have a short history to extrapolate from. The
2 structure is not going to self-destruct or return to
3 a natural state at the end of a hundred years. It's
4 quite possible that maintenance will make it
5 possible to maintain such a facility indefinitely,
6 as far as that goes. But for the purpose of working
7 out project economic, we use nominally a hundred
8 year sort of definition for it. But if I were to
9 tell my engineers to design a project that would
10 last 75 years or a hundred years, probably be a very
11 imperceptible difference.
12 All of you who own your own homes,
13 your homes were built for a nominal life. If you're
14 like me, that life has long been exceeded. I have a
15 nice wooden frame house in New Hampshire that's 200
16 years old, and I suspect they were building it for
17 about 25. So I think what we've got to understand
18 is that such a project probably would be reasonably
19 indefinite with normal maintenance and a continuing
20 need for the facility.
21 At those periodic points when some of
22 the mechanical equipment is due for replacement,
23 such as turbines which may happen after 30 or 40
24 years, in all probability one would upgrade to the

1 best state of the art for highest efficiency at that
2 time, and it would not be direct replacement in kind.
3 Could this power plant possibly
4 destroy -- this is for Dr. Barrett. Could this
5 power plant possibly destroy much of the fishing
6 industry around Eastport?
7 DR. BARRETT: I doubt that it would
8 kill it, but I'm sure it would change it's nature
9 and character. If you're talking about lobstering
10 or say a dragging operation within Cobscook Bay, I
11 suspect it would change it. However if you're
12 talking about outside Cobscook into the Gulf of
13 Maine or Bay of Fundy, then the difference would be,
14 I suppose, going through ship locks.
15 Another aspects that it might change
16 that you don't have around here yet or if you do
17 it's in a very small way, and that's mariculture.
18 Tidal power projects make themselves look very
19 attractive to various forms of mariculture because
20 of the protection they afford.
21 COLONEL CHANDLER: Next question is
22 for Mr. Callahan. Could the Cobscook Bay project be
23 designed so it could be enlarged later into an
24 international project including Passamaquoddy Bay?

1 And then apparently parenthetically, which would be
2 approximately four times as large, evidently. Do
3 you want to respond to that one?
4 MR. CALLAHAN: In our evaluation of it,
5 we'll consider probably one of the alternatives in
6 that viewpoint, where we could ultimately maybe make
7 the project an international project. So we could
8 evaluate that quite easily in our study.
9 COLONEL CHANDLER: It's possible. I
10 think there may be some options that could be lost
11 by developing to the full potential of Cobscook Bay
12 that might be lost in terms of what the combined two
13 bays may have -- Passamaquoddy and Cobscook. But
14 again we would be looking at that as we go along.
15 And the implication was that it was
16 about four times as large. Actually it's more like
17 perhaps three. A thousand megawatts as I recall was
18 the international upper level project.
19 MR. CALLAHAN: Generation capacity and
20 size, yes, sir.
21 COLONEL CHANDLER: We're back to
22 Pittston again. Will the Pittston Oil Company of
23 New York foot the bill for the massive supertanker
24 docks? If not, why not? How can the public pay

1 this bill for private industry?

2 Well let me just go back and say, I'm

3 hopeful that isn't an issue about the supertanker

4 anyway; that is, if we're concentrating on Cobscook

5 Bay that any supertanker facility that Pittston

6 might ultimately be authorized to undertake would

7 actually result in the supertankers remaining

8 outside of Cobscook Bay. And that is an option and

9 Pittston has indicated a willingness to exercise

10 that option if such a project were developed.

11 So the question really comes down to

12 the product ships, ships which are much smaller.

13 We're talking about perhaps 30-40,000 dead weight

14 tons. And such a lock as that would probably

15 service not only Pittston. Some sort of locking

16 facility will be required I'm sure anyway, just to

17 service any fishing needs that come up of fisheries

18 that may develop in there. So it's not a question

19 probably in the final analysis of building a lock

20 for only Pittston if Pittston were constructed in

21 the area, and that burden would be shifted to the

22 taxpayer.

23 On the other hand, it is true that if

24 Pittston were established in the area at the time

1 the project was authorized, then it's considered
2 only equitable that the project accommodate the
3 existing operations in the area or show cause why it
4 should not. And that would have to be determined at
5 that time.
6 There are several question, I know,
7 that are coming around to this same point about the
8 economics of this, why the taxpayer should pay for
9 it, and they are iffy questions, which at the
10 present time we can still talk about them because
11 nothing is final on Pittston and certainly nothing
12 is final on tidal development projects. And I think
13 the hard questions will have to be answered some day,
14 but they can't be answered yet at this time.
15 This question is for me. It's a long
16 question. How can you not approve this tidal
17 project in view of the socioeconomic standard it
18 would create for all concerned? The Pittston oil
19 refinery would create an unfavorable environmental
20 impact far greater than the Army Corps could do. I
21 thank you for that.
22 The further discussion in here is
23 talking about the development of renewable resources
24 versus investments and non-renewable resources.

1 I've a PS here. I think really in all fairness I
2 should answer some of these questions in a letter to
3 the questioner. But yes, those are all important
4 issues. But I hope you understand that my role
5 vis-a-vis this project and Pittston are two
6 completely separate roles.
7 In the case of this project, first of
8 all we're in the study. We don't have a project to
9 approve or even to recommend approval on, which I
10 would do, and ultimately that would go to the
11 Congress. That's what we're saying is three to four
12 years away. In the case of Pittston, I'm the
13 individual responsible in the regulatory role to
14 pass on a permit application. And the relationship
15 is quite difference between the two. I may have my
16 own personal feelings about renewable and
17 non-renewable resources, but again the test Pittston
18 is put to is not necessarily the same test as a
19 tidal project.
20 We're starting from zero as a federal
21 agency presumably undertaking a project that must be
22 in the public interest since we're spending your
23 money on it. So we have to optimize. We have to
24 show we're optimizing if we undertake the tidal

1 project in whichever component, whichever option we
2 undertake, we're optimizing it in the public
3 interest. It's not necessary for private enterprise
4 to optimize. Private enterprise has some rights to
5 proceed with those things which are acceptable, even
6 though they not be optimal, and so you really can't
7 put the same test of the one against the other.
8 On the other hand, I wouldn't want to
9 pass up the opportunity to emphasize that when we
10 were talking about the Corps' interest now in
11 development of hydroelectric power, we in New
12 England have a very interesting hydro picture. One
13 of the reasons that it is not so lucrative, the
14 conventional hydro, is the fact that most of our
15 water comes down in the spring melt. And six months
16 of the year is feast and six months is famine. Six
17 months in the spring and summer is feast and we get
18 our reservoirs all filled up, and then we start
19 emptying them during the winter months. That's an
20 annual cycle. It really doesn't make much
21 difference what you do today or tomorrow, whether
22 you take the water out today or take the water out
23 tomorrow from a particular impoundment if you are
24 trying to generate power from conventional hydro.

1 What's so particularly unique about
2 this tidal project is that ever 12 hours and 25
3 minutes you want to get the pool empty for the next
4 tidal cycle to come in. And when you empty it you
5 have power at your disposal, energy, which can be
6 transmitted some place. Here minutes can make a
7 difference. If you're holding back water for
8 minutes and the next tide starts coming in, forget
9 it you just lost irrevocably some of this renewable
10 resource. So it's a very exciting renewable
11 resource that we're talking about. Tidal power.
12 Not once a day, we get the benefit twice a day, the
13 benefit of that tidal rush.
14 Okay, Dr. Barrett: What will happen
15 to seals on Cobscook Bay? We live on Straight Bay
16 and our bay abounds with seals and their pups in the
17 summer.
18 DR. BARRETT: Well, I don't really
19 know what will happen to the seals. It could depend
20 upon the alignment of the dams or dikes, but I can
21 say that certainly the outcome will be directed by
22 the National Marine Fishery Service and the Corps of
23 Engineers in their studies.
24 COLONEL CHANDLER: Let me ask you the

1 hard question then. I've heard that there is no way
2 of predicting the environmental affects of the power
3 project. Is this your opinion also?
4 DR. BARRETT: No. No, I think we can
5 predict some of the impacts. There may be some of
6 them that we can't, but if I went under the
7 assumption that we could not predict any of them, I
8 don't think I would be doing anybody a service and I
9 think more importantly I'd be doing our environment
10 a great disservice. And so with people's help and
11 cooperation both the state, federal and public,
12 we're going to try and predict as much as we
13 possibly can. Hopefully it will be enough for
14 somebody to make a decision as to whether the
15 tradeoffs are worth it.
16 COLONEL CHANDLER: In deference to the
17 questioner, probably behind that though is a fairly
18 valid question. Going back to that point I made
19 before, we really don't have a long history of
20 knowledge to work with in a lot of these instances.
21 So we'll be predicting impacts, we hope fairly
22 accurately for the short range, but there is always
23 that question of long-term impacts for which any
24 amount of base line that we develop now is not

1 probably going to be statistically significant in
2 projecting what might happen over 50 or 60 years in
3 the life of the project. So it's a valid concern.
4 For me: What will the tidal power
5 accomplish for the people? What will the hydro
6 rates accomplish for the people? How many -- I'm
7 not sure how the rest of that goes. I think simply
8 said here was the comparison of the economics. The
9 economic analysis is not yet complete. What we do
10 know is that an investment, the initial capitol
11 investment in a tidal power project is very high.
12 We also know that the fuel though that feeds that
13 from then on is what we say is free. I don't like
14 the term free water and I don't like the term cheap.
15 Neither one of them is quite right. I think we're
16 going to come to recognize that it's a very precious
17 resource. But essentially it's not metered. Nature
18 is going to put it out there every 12 hours and 25
19 minutes for us to use. And if the social impacts
20 and the environmental impacts are acceptable, we can
21 take advantage of it. So you have to balance the
22 difference between. In the long term then, what's
23 that going to do in terms of electrical rates? What
24 does it mean at the meter on your house and the bill

1 that you get at the end of the month?

2 For the federal undertaking we do have

3 to undertake what is also called a financial

4 feasibility analysis which uses the marketing

5 studies to determine and it is required that such a

6 federal project show that it can recover through the

7 sale of power the full investment in 50 years. So

8 while Mr. Callahan says the nominal life of the

9 project is one hundred for purposes of the

10 engineering designed and the economic analysis, the

11 financial feasibility depends upon 50 years. And

12 incidentally the power that is marketed from such a

13 project is sold by the Department of Energy to

14 utilities in the marketing area, wherever that is,

15 obviously starting closest to the project though.

16 And through their charges then to the rate payers

17 the money is recovered.

18 And the financial feasibility simply

19 says, is it feasible? Can you recover the cost, the

20 capital cost of the project in the first 50 years of

21 its life? And if it is, then you can go ahead and

22 build it. Implicit in that statement is "and at a

23 rate that is below the prevailing rates in the

24 area." If it's not below the rates, in other words

1 we're not talking about jacking the price of
2 electricity up so that we can recover the investment
3 in 50 years. We're talking about selling it at a
4 lower rate not quantified, a lower rate than you
5 would be paying otherwise for an alternative over 50
6 years of the project. So I think that's the best
7 answer I can give you of what that means to you as a
8 rate payer for your house or your industry.
9 Dr. Barrett: If dams are built
10 resulting in less interchange between local and
11 ocean waters, would this tend to increase or
12 decrease average temperatures of local waters?
13 DR. BARRETT: I would say right now
14 without going into any kind of analysis that you
15 could expect the temperatures to be elevated and
16 salinities reduced. I'm sure there will be
17 variations on that but that would be my guess right
18 now.
19 COLONEL CHANDLER: There will have to
20 definitely be studies to determine what happens in
21 terms of changing of temperature regimes, though,
22 because of this change in the rhythm.
23 I don't know whether someone can help
24 me with the answer to this. The question is: What

1 is the latest development on the hydrolysis of sea
2 water? I suspect that this means of actually using
3 the saline water as a fuel cell concept, and the
4 question, would this be studied as an alternative?
5 If that's what's intended, the concept while it's
6 something that we, I guess we all did in chemistry
7 class at sometime, is not one that has the
8 technology that is anywhere near at hand for bulk
9 power production and probably would not be addressed
10 in the study as an alternative. The National
11 Environmental Policy Act, NEPA, and our regulations
12 for studies, both require that you essentially only
13 address reasonable alternatives, and it's understood
14 by that to mean within the state of the art. So I
15 doubt very much that this would be studied per se.
16 Mr. Callahan: What cost reduction in
17 the total project can be expected since the revamped
18 project will be less mammoth?
19 MR. CALLAHAN: The estimated costs of
20 about a year ago of the international project, 500
21 megawatts, was around 1.7 billion dollars. On the
22 one thousand megawatt plant it was approximately 2.2
23 billion dollars, construction cost. On the U. S.
24 plans in Cobscook Bay, the lowest project looks like

1 it would cost somewheres around 250 million dollars.
2 The largest size plan that we just
3 envision now, and this is not confirmed, looks like
4 it would cost somewheres around a little over 500
5 million dollars. You can see that the project is
6 approximately, in the smaller project is, oh, maybe
7 about an eighth less, and on the larger project
8 about 25 percent of the larger international size
9 project. Here again these projects, the
10 international project looked like it would be
11 constructed over about a seven to an eight year
12 period. And I would assume with the United States
13 plan, you might be able to save, a smaller United
14 States plan you might save one to two years on that
15 construction period.
16 COLONEL CHANDLER: Now I have over-
17 extended the time on questions and answers because I
18 think as you saw they started going a long here
19 fairly well. But I think I perhaps owe it to those
20 who have formal comments that they want to make to
21 acknowledge that it is now 9 o'clock, and perhaps
22 suspend the questions and answers long enough to
23 hear I believe some ten comments, and then we can
24 return to the question and answer period. And if I

1 do that, however, I'd like to answer the next
2 question which I think should be answered. I'll try
3 my best to answer it. This is the question: Why is
4 this meeting being held in Eastport and not in Lubec
5 or other surrounding towns? Are there any plans for
6 a Lubec meeting? And if not, why not?
7 The meeting was held in Eastport,
8 well, I suspect more out of convenience. My
9 estimate would be that Eastport is a little more
10 accessible than Lubec. It was something, however,
11 that was of concern to us in scheduling the meeting
12 up here, and rather than leave Eastport and perhaps
13 go to some place like Machias and suggest that
14 everybody travel, we felt we should come here and
15 accommodate part of the group.
16 Are there plans for meeting in Lubec?
17 At the present time there are not. But as I said
18 earlier, we would certainly welcome an invitation
19 from any constituency, and if, I mean it in all
20 sincerity, if you feel that Lubec has not been
21 adequately represented because the distance is
22 considerable, we would entertain a request to come
23 and talk to Lubec before we wrap up our plan of
24 study. So I don't know if that question can be

1 answered for Lubec. I'll be going out to Lubec
2 tomorrow morning, as a matter of fact, and perhaps
3 could follow up out there with the town manager and
4 selectmen. At the present time there is not a
5 meeting now planned in Lubec. The other meeting
6 that is planned on the plan of study, a meeting such
7 as this, is planned for Augusta next Thursday.
8 Is there anyone who has a serious
9 objection to switching over to the formal comments
10 and then returning to question and answers?
11 Normally what we hope to accomplish in the formal
12 comments is to avoid long lengthy statements. If
13 the statements are lengthy, we ask you to summarize
14 them orally to bring out the pertinent points that
15 you want to get across and submit the entire
16 statement to me in writing. It will appear in it's
17 entirety in the record of the meeting tonight, and
18 will be given the same value. A written statement
19 is given the same value as an oral statement.
20 I have a good deal of experience in
21 this. Normally such statements can on the average
22 be expected to run about three minute. I have ten
23 here, so that would take perhaps 30 to 40 minutes of
24 these formal comments, and then we would be able to

1 return to questions and answers. Does any one
2 object to that?
3 (No response.)
4 I'd like to make that shift then if I
5 may. All right, very quickly, we'll have a property
6 to Colonel that we follow on prepared statements.
7 Normally we call them in a protocol, calling on
8 elected officials first, federal, then state, then
9 local level, then we go to appointed officials,
10 federal, state and then local. At the present time
11 I have no evidence of any elected officials. Are
12 there any elected officials at the federal level who
13 desire to be heard or their representatives in their
14 behalf?
15 (No response.)
16 Any at the state level
17 (No response.)
18 Any at the local level? At the local
19 level now elected officials I'm talking about any of
20 the communities to include the Passamaquoddy Tribe?
21 Any elected officials that desire to be heard? Yes,
22 I see you back there. Come forward, Mr. Vose.
23 If when you come forward, you would
24 take the microphone over here, state your name, and

1 who you are representing, this will facilitate the
2 stenographer's record.
3 STATEMENT OF HARRY VOSE
4 MR. VOSE: I'm sorry if I'm late
5 tonight. We had a council meeting. Unfortunately
6 the 4th of July sort of fouled us up you might say,
7 but we had a good time. The name is Harry Vose.
8 I'm president of the Eastport City Council.
9 I just have a brief word to say
10 tonight in that the Eastport City Council does in
11 fact support all of your efforts, and as you know,
12 when you came down here for a premeeting, so to
13 speak, I made a statement to you, Colonel Chandler,
14 I thought this was all a waste of time and money. I
15 thought it was another political play at this time.
16 However, in view of your new formular that you can
17 go and figure your long term benefits, I've real
18 hopes that this is one time that we've got one heck
19 of a shot getting this thing done. Other than that,
20 we'll support your efforts and help you in any way
21 possible that we can. Thank you so much.
22 COLONEL CHANDLER: Thank you very much,
23 sir.
24 Are there any other elected officials

1 who desire to be heard?

2 (No response.)

3 If not, let me turn to appointed

4 officials. Are there any appointed officials at the

5 federal level?

6 (No response.)

7 Are there any at the state level?

8 (No response.)

9 Are there any at the local level who

10 desire to be heard at this time?

11 (No response.)

12 Dr. Laberge, do you want to speak as

13 an appointed officials, or do you want to speak in

14 your other capacity? Okay.

15 Very good, if that is so, then we'll

16 move toward number one and Mr. Thomas Fullham.

17 STATEMENT BY THOMAS FULLHAM

18 MR. FULLHAM: May name is Thomas

19 Fullham, I'm the President of Suffolk University,

20 Boston, Massachusetts. My interest concerns the

21 University's marine station on Cobscook Bay. I'm

22 pleased to accept the open invitation of the Corps

23 of Engineers to participate in this meeting this

24 evening for it provides an opportunity for me to

1 discuss some of the opinions of my colleagues at the
2 Friedman Laboratory of Suffolk University at
3 Cobscook Bay in relation to the tidal power project.
4 As might be anticipated, our interest
5 must be academic as opposed to economic or social.
6 This should not be interpreted to mean disinterested
7 except as a study topic, but in the broader sense
8 our interest is related to our location and the
9 research and teaching carried on there. It is of
10 vital interest to us to know what changes might
11 occur as a result of the activity of others.
12 Our field station is located where it
13 is because the area offers a singular opportunity to
14 introduce students to a unique and unaltered marine
15 environment. The abundance of specimens, the
16 variety of geologic formations, the movement of the
17 currents, the great rise and fall of tides, and the
18 ocean bottom and beach characteristics contribute to
19 the makeup of a highly desirable outdoor marine
20 classroom.
21 To alter or remove any of these
22 natural attributes would substantially change the
23 basic character and mission of our station. However,
24 we are ever mindful that we are visitors and guests

in your neighborhood. And will whenever possible conform to the wishes of our hosts. If it can be shown that the project under study is in the best social and economic interest of our neighbors, we would be more than willing to assist in any manner that would enhance their interests.

We do have some specific apprehensions which we think should be addressed and feel that we would be remiss as academics if we didn't mention them. We note on page 17 of the public information brochure that in the paragraph on Elements of the Study that the construction features the impacts on aquatic and terrestrial ecosystems. Economic, social, cultural, esthetic, historical, and archeological factors will be careful scrutinized. The need will be examined, transmission routes will be studied, and legal and institutional arrangements will be accomplished.

The following page list 13 key issues which have been noted or raised by participants in the public meetings. Yet if you return to page 17 and read the italicized paragraph, the only reasons given for a recommendation not to implement a proposed project or to terminate the study, rather

1 the go or no go factor, is when and I quote "There
2 is evidence that no need or economic justification
3 can be established for additional generating
4 capacity or that a tidal power facility cannot be
5 economically justified." I have no quarrel with
6 these provisions, but I would suggest that equal
7 weight could be given to considerations that grave
8 ecological damage or severe social disruption would
9 be reasons of important equal to the soundness of
10 that of economics of the project.
11 I cannot emphasize too strongly my
12 support of the in depth study outlined in the letter
13 by Colonel Chandler. The three to four year time
14 requirement may seem long to anyone anxious to get
15 along with the project, but it would border on the
16 irresponsible not to construct a profile of the
17 ecosystem now in place. Once altered, it is
18 virtually impossible to restore.
19 In conclusion, we shall be pleased to
20 offer the facilities of our station and the
21 experience and knowledge we have gained over ten
22 years' exposure in the Bay to the planners and
23 investigators wherever it may seem applicable.
24 Thank you, Colonel.

1 COLONEL CHANDLER: Thank you Mr.
2 Fullham, and I assure you that's an oversight on our
3 part. A no go decision can be arrived at if it's
4 determined that the environmental impacts, of course,
5 are unacceptable. And we appreciate your
6 cooperation with our undertaking and look forward to
7 that.
8 Doctor Garrett.
9 STATEMENT BY DR. EDITH VOGL GARRETT
10 DR. GARRETT: My name is Edith Vogl
11 Garrett. I've been a resident of Eastport since
12 1941 which is almost a generation, and I've seen the
13 up and downs of Quoddy, and I've seen the sentiment
14 of Eastporters. I've seen their disappointment and
15 if you look around there should be many more
16 Eastporters here today. And if you had a request to
17 have it held in Lubec, maybe Lubec would turn out
18 better than Eastport.
19 We have fought for it and have been
20 told always, oh, it's just a political football.
21 Now it must not be again. It is heart warming to
22 see such a constructive meeting and the hope that it
23 will come about this time. But please don't wait
24 too long. You know, the the costs are going up, we

1 are getting all older who have fought for it.
2 Perhaps as you perhaps know we founded four years
3 ago with a meeting of the history of Quoddy, and
4 which was opened by the widow of Dexter Cooper, an
5 organization called Passamaquoddy Tidal Power
6 Project Advocates, or something like this. And we
7 have worked very hard. And I must say I'm very
8 proud that you are continuing, and please let us
9 race just like we race the Russians to the moon,
10 let's us race them to Passamaquoddy before they
11 finish their project. Thank you.
12 COLONEL CHANDLER: Thank you, Dr.
13 Garrett.
14 Doctor Laberge.
15 STATEMENT BY DR. NORMAND LABERGE
16 DR. LABERGE: Well, let me explain
17 first of all, I'm speaking for the Passamaquoddy
18 Tribal Council in reference to the Half Moon Tidal
19 Power Project. We have prepared formal comments on
20 the Cobscook Bay tidal project, and in this period
21 I'll summarize the major points contained within
22 that document.
23 First of all, let me explain the basic
24 objective of the Half Moon Tidal Power Project.

1 It's meant as a demonstration project to show the
2 technical, engineering, environmental and
3 operational feasibility of tidal power. The basic
4 objectives are directed at lowering the costs of
5 tidal power plants so they are economically feasible.
6 In that regard, it's directed at both the large
7 tidal power project, Passamaquoddy or Cobscook
8 project, or as an option to that mode of development
9 as a series of small link basins capable of
10 producing dependable power.
11 What we would like to see in the
12 Corps' study is, as an alternative to the large
13 tidal power project, to consider a series of small
14 projects with not the total capacity of the large
15 project but an amount on a cost basis which is
16 comparable. And also within the same regards
17 consider the project impact of a series of small
18 projects in terms of environmental impact,
19 adaptability for agricultural development, potential
20 for economic growth and compatability with existing
21 life styles.
22 Our premise is that a series of small
23 projects will be easier absorbed into the lifestyle
24 of Washington County and Eastport and that the first

1 Half Moon Cove demonstration project could serve as
2 either a forerunner to the larger project or as the
3 first system of small basins.
4 The other comments pertain to the use
5 of economic analysis. We feel that an equal weight
6 should be given to the different types of analysis
7 applicable to tidal power projects. These include
8 the conventional benefit-to-cost analysis, life
9 cycle, plus others which would turn up during the
10 course of the study. One way of economic analysis
11 we have looked into is the inflation index on bond
12 which make it feasible to operate a tidal plant
13 during the first years of operation when annual
14 costs are greater than tidal power income.
15 We feel that the development of
16 renewable resources is an important aspects of this
17 area and that assistance should be made in
18 developing plans and studies for all national sites
19 of tidal power development. We also request that
20 there be a realistic appraisal of the oil refinery
21 in terms of how the tidal power project is
22 compatible with the oil refinery. I feel personally
23 that on a realistic viewpoint that the large tidal
24 project at Shackford Head would not be compatible.

1 And during the study we would like to see the Corps
2 investigate certain areas outlined in this document.
3 And the last point, we would like to
4 see in the Corps of Engineers' study is to look at
5 the social, sociocultural and socioeconomic effects
6 of the Cobscook Bay project on the Passamaquoddy
7 Tribes' lifestyle. And in general accurately
8 evaluate the project's impact on the socioeconomic
9 parameters controling the region's socioeconomic
10 characteristics. This would include archeological
11 considerations, regional rights and assessment of
12 new transportation densities on the reservation.
13 In conclusion we believe that the most
14 effective method of coordinating planning at the
15 Half Moon Bay Project with the Corps' Cobscook
16 Project is to work like in the areas most pertinent
17 to larger installations associated with research and
18 development objectives at a demonstration project.
19 We welcome the opportunity to do so in the coming
20 year. Thank you.
21 COLONEL CHANDLER: Thank you very much,
22 Dr. Laberge.
23 Steven Weiss.
24 STATEMENT BY STEVEN WEISS

1 MR. WEISS: Thank you. My name is
2 Steven Weiss. I'm a resident now of Bucks Harbor,
3 Maine. I'm speaking tonight as a regional biologist,
4 five years experience, perhaps one of the only
5 people with full time, year round field experience
6 in the Cobscook Bay area. And I emphasize year
7 round.
8 I'll list my credentials in a summary
9 or in a lengthy discussion which I will send to the
10 Corps after the completion of my giving this oral
11 presentation. I'll summarize my points herewith.
12 The first is that the biological,
13 economical and physical data is patchy, incomplete,
14 and inconclusive on a year round basis; and that now
15 most recently there is a network for field data
16 gathering locally, and in lieu of the high cost of
17 travel and logistical difficulties, I feel that such
18 facilities as the University of Maine at Machias,
19 local field investigators with the research
20 experience and background to do the work that feel
21 utilization of this resource can provide a cheaper
22 and more effective data gathering basis than someone
23 from away.
24 The second point emphasizes the

1 systems involved in that there is a great deal more
2 to it than just looking at current energy and tidal
3 cycling. Some of the things that don't occur in the
4 literature available within those local resources.
5 The final point really reflects on
6 aquaculture. My present appointment is in a project
7 consultant capacity with the Cobscook Bay Marine
8 Study Committee of Eastport as project consultant,
9 and I'm presently completing a paper which is a
10 study of the feasibility of aquaculture in Cobscook
11 Bay. The remarks from Dick Klein who is the head of
12 the aquaculture workshop in Maine suggested that
13 while the tide power damming would have an effect,
14 summer raising of termperatures and decreasing
15 salinity, the ultimate alternate effect is that in
16 winter it would lower temperatures, and with the
17 decrease in salinity would increase sea ice which
18 would have a hazardous effect both on gear and on a
19 lot of organisms which could be prospective subjects
20 for aquaculture in the Bay. So I'm not offering a
21 condemnation or criticism but just as a document
22 I'll send will emphasizes that there are a number of
23 points that I feel should be emphasized in the
24 coverage in the study. Thank you.

1 COLONEL CHANDLER: Thank you very much,
2 Mr. Weiss.
3 Kevin Callahan.
4 STATEMENT BY KEVIN CALLAHAN
5 MR. CALLAHAN: I'm a recently
6 graduated high school student and my statement is
7 not so much to the Army Corps of Engineers but to
8 the people present here of Eastport itself. While
9 everybody is here and is in their minds considering
10 the possibility of the Quoddy tidal project in
11 opposition to the Eastport oil refinery, I would
12 like to say that I feel that Eastport should make a
13 final decision on how it is to marshal its resources.
14 Eastport has a number of important resources, and
15 they are its location, its deep harbor, it's marine
16 life, it's historical value, it's scenic value, the
17 tides, and it's people.
18 Taking into account these resources,
19 the city should then consider its options. The
20 first option is the Pittston oil refinery, the
21 second is the Quoddy Tidal Power Project, and the
22 third is simply its own resources in establishing a
23 shipping industry or something for themselves.
24 The first one, the Pittston oil

1 refinery uses only a few of the resources I've
2 mentioned -- the location and the deep harbor.
3 However, at the same time it uses these two
4 resources, it obliterates the marine life and does
5 damage to the scenic value with a possible damage to
6 historical value and to the people. The second
7 option, the Quoddy tidal project uses more of
8 Eastport's natural resources, it's deep harbor and
9 tides. It does not obliterate marine life. It
10 instead opens a new possibility of mariculture. It
11 does not damage historical value, and it doesn't
12 damage scenic value. And it leaves open many other
13 options and possibilities for new industry.
14 I would like to point out that
15 Eastport is not a dying city, and I've heard that
16 mentioned many times, and it agitates me extremely
17 when I hear that said, and I feel that Eastport
18 residents should step back with a clear conscious
19 and set of values decide what is theirs and what
20 they are are going to allow to be used and how they
21 are going to allow it to be used. They should not
22 allow a large corporation to take something which is
23 there and use it unless they want that corporation
24 to do so. They should be careful how they use their

1 marine resources, and if they allow the Army Corps
2 of Engineers to construct something here which could
3 do possible damage to marine resources or might have
4 effects not yet calculated. I am confident that
5 Eastport will make the right decision and not be
6 influenced by anyone but themselves and what they
7 truly want according to their values. Thank you.
8 COLONEL CHANDLER: Thank you, Mr.
9 Callahan.
10 Hank Stence.
11 STATEMENT BY HANK STENCE
12 MR. STENCE: My name its Hank Stence
13 from Lubec, President and master diver of a newly
14 formed undersea services company, Skybird Unlimited.
15 And, Colonel Chandler, you basically covered many of
16 the items I had originally planned to talk about,
17 but I think the big concern about the drastic
18 feeling right now about the Pittston oil refinery is
19 the fact that final EIS must be stated, there must
20 be comments made to the final EIS by the 19th. So
21 there is where the problem lies as far as the
22 immediacy and the fact that Pittston, if they use
23 4.99 of the 5.55 cubic micrograms of the 5.55
24 allowed, there might be some problem there with the

1 no growth moratorium, being the fact that they might
2 not be able to construct the tidal power. But
3 enough about that and I'll submit this paper for the
4 record including a couple of other questions
5 concerning that.
6 One question raised before was the
7 hydrolysis of sea water. I meant to say the
8 electrolysis of sea water. In other words, has
9 there been any study on, you might address this
10 later, producing hydrogen from sea water by running
11 AC current through it? And there is a possibility
12 in that. And if you could have some comment on that,
13 I would appreciate it. Thank you.
14 COLONEL CHANDLER: Thank you, Mr.
15 Stence. There are a couple of questions in my deck
16 still on the air quality issue. It's not the last
17 we've probably heard of it, and I guess I did
18 interpret your question electrolysis as the way you
19 asked the question and we have your question.
20 David Spinney.
21 MR. SPINNEY: I just wanted to ask one
22 question. I filled out the wrong card. I didn't
23 want to make a statement.
24 COLONEL CHANDLER: All right. I

1 believe it's Robert E. Galley. No. 8, is he here?
2 MR. GALLAGHER: As a concerned citizen----
3 I sir, would you identify yourself again and who you
4 represent, and if yourself, just indicate yourself.
5 STATEMENT BY ROBERT E. GALLAHER
6 MR. GALLAGHER: Robert E. Gallagher
7 from Campobello, and I've been in the fishing
8 industry over in Campobello quite a few years. And
9 the way I feel is that this hydro project plan would
10 be all right here in the State of Maine. But now
11 there are a few questions I would like to ask which
12 I'd like answered. Now, if the people around here
13 that's in the fishing industry and other jobs, if
14 there is a mistake, what would the people be
15 compensated from it? Would they be compensated for
16 the money that they got in the fishing industries
17 and would they have any compensation for what they
18 lost? And I'm kind of wondering if this state or
19 the United States would compensate for what the
20 people would lose?
21 Now there are a lot of people around
22 here that's got a lot of money in this town, in this
23 city, in Washington County which they would lose a
24 lot if this oil company or this hydro project came

1 through. There are a lot of people that wouldn't,
2 but I would like to know who would benefit and who
3 would lose if it did go through. And that's with
4 the couple of questions I asked on paper, and in a
5 way I'm for it, but in a way I'm against it because
6 I would like a lot of questions answered from you,
7 the Corps of Engineers, like how many jobs is going
8 to be filled, and once it's built, how many people
9 here in the Washington area is going to have jobs
10 after it's finished, and how many ain't. And I
11 would like to know how many people in this area
12 that's going to have to be moved, they might even be
13 put out of this Washington County on account of this
14 project. And that's a few questions I'd like to
15 have answered. Thank you.
16 COLONEL CHANDLER: Thank you, Mr.
17 Gallagher. I think essentially we've perhaps
18 addressed one or two of those questions. Again,
19 remember what stage we are in the process. We have
20 your questions recorded, and I think they
21 essentially will evolve from the study. I might
22 just emphasize for the benefit of any Canadian
23 interest that in the Canadian declination of
24 participation, and this is a joint study, they did

1 designate an official on the federal level as an
2 observer for the study and offered cooperation so
3 that our analysis will include Canadian interests as
4 well as the American interests.
5 John Chappell.
6 STATEMENT BY JOHN CHAPPELL
7 MR. CHAPPELL: My name is John
8 Chappell. I teach geography at Mankato State
9 University in Minnesota. I guess if you speak of
10 people from away, I must be from way away, but I
11 used to live in Boston, and I'm interested, I've
12 been interested in tidal power for several years
13 back, and my contribution today is to try to
14 discuss the issues in the context of broad scale
15 energy policy. I guess I can only outline what
16 I'd like to say.
17 But if you pay attention to the energy
18 policy debate, over the world in general, you find
19 that there is a growing consensus among a large
20 number of people in favor of what's called sometimes
21 the soft or flexible energy path, emphasizing
22 diverse, clean, renewable, small, localized, low
23 technology sources of energy. And I think tidal
24 power does meet most of these criteria. It does fit

1 into this increasingly as a desirable path of energy
2 development. Especially if we consider smaller
3 scale tidal power development.
4 And I'd like to point out that in
5 talking with a retired geologist of Wayland, a
6 geographer from Wayland, Massachusetts who is a
7 specialist on old tide mills, he points out to me
8 that a Frenchman connected with the LaRance project
9 said that tidal ponds of only ten hectares or 25
10 acres, with only ten foot tidal range can be
11 economical if there is a relatively small opening to
12 the bay. That means there is a lot of little tidal
13 power projects that could be developed along the
14 coast of New England and Long Island and New York
15 and New Jersey.
16 It appears to me that as we move in
17 the direction of a Cobscook Bay project from the
18 larger Quoddy project, we might be moving in this
19 direction towards the development of smaller tidal
20 power projects, and I want to point out that this
21 doesn't necessarily mean that what we're doing is
22 bad. On the other hand, it's probably a good idea
23 too, as long as there is a clear diseconomy of scale
24 to get as much power out of each basin as you can,

1 and so personally I remain a little bit sad that
2 we're not developing the larger international
3 project, and I kind of wonder whether anybody has
4 even evaluated the claims by the Russian Levernstien
5 (phonetic) who wrote a very large and impressive
6 book on tidal power that has been translated into
7 English. He calculated that you could get 2.3 to
8 three million kilowatts out of the Passamaquoddy-
9 Cobscook complex together.
10 And I'm a little bit concerned over
11 the apparent unwillingness of the Canadians to
12 cooperate, and the breakdown of international
13 cooperation with Canada. And I wonder in addition
14 as to why more effort hasn't been made by the
15 American government to cooperate at least in terms
16 of financing with the Canadians in developing
17 projects up at the head of the Bay of Fundy, because
18 after all we're likely to get a large share of this
19 power if it's ever developed.
20 Another reason for favoring tidal
21 power, I think, which may not come out in the
22 traditional economic analyses -- cost-benefit, life
23 cycle, costing or whatever -- is a full
24 consideration of the drawbacks of all the

1 alternatives. The alternatives that are being
2 offered to us now by most of the power companies
3 include basic nuclear power and fossil fuels, mainly
4 coal. There are so many drawbacks in terms of
5 pollution, in terms of the danger of waste disposal,
6 weapons proliferation, the cost of decommissioning
7 nuclear power plants which have to be decommissioned
8 very careful. They can't just be left to go idle
9 when their life span is finished.
10 All of these costs and dangers, I
11 doubt very much if they are being fully considered,
12 and they are certainly not being considered in
13 calculating the cost of nuclear power which is
14 always claimed to be cheaper without even knowing
15 what the cost of waste disposal is going to be.
16 It's a problem that has never been solved.
17 So it seems to me if you fully
18 consider the drawbacks of the alternatives to tidal
19 power in future years, we're going to have to
20 replace fossil fuel power with something, and
21 nuclear power seems to be the main alternative a few
22 decades in the future. It seems to me that tidal
23 power comes out looking even better in ways that
24 mere quantitative analyses can't indicate in

1 comparison with these very harmful alternatives of
2 nuclear power and fossil fuels. So that's the
3 summary of what I would like to say. Thank you.
4 COLONEL CHANDLER: Thank you very much,
5 Mr. Chappell. David Colton-Manheim. Is he here,
6 David Colton-Manheim?
7 I hope you're not going to read that
8 to us. We're on schedule, so I've one more card
9 after you. So if you would please go to the
10 microphone and we would like to have you summarize
11 your statement if you would.
12 STATEMENT BY DAVID COLTON-MANHEIM
13 MR. COLTON-MANHEIM: Do you mind if I
14 leave the major portion of it here?
15 COLONEL CHANDLER: That's quite all
16 right. When you get through, I'd like to know if
17 you want some of that entered into the record or
18 whether that's just a resting place, however.
19 MR. COLTON-MANHEIM: The document the
20 Colonel is so humerously referring to is the Final
21 Environmental Impact Statement on the Pittston oil
22 refinery which apparently he hasn't read. It's only
23 part of it. Although there's only about a week and
24 a half or a week left for public comment on that

1 matter, the full document isn't even available in
2 the Eastport public library.
3 I think these two projects are
4 intimately related; that one is good and the other
5 is bad. It's as simple as that. I'm a kind of a
6 seat of the pants ecologist, and the questions which
7 have been asked of Dr. Barrett and presumably would
8 be answered by documents and research like the
9 Colonel made fun of, I could probably answer now in
10 a kind of tentative way. I think the direction
11 we're going in tidal power will probably enhance in
12 the long run not just the energy situation but also
13 the lives of fishermen and the general level of
14 biological activity that is on both sides of the
15 weir. That's kind of a guess but I suspect even
16 though tidal areas are in the natural state, the
17 highest producers of biomass, biological activity, I
18 suspect with a weir, it could even be increased.
19 There would be a short term while disruption was
20 going on. There would be a short term siltation
21 problem, and reduction of biomass but in the long
22 run I suspect it would increase it. This is a
23 tentative way of answering some of the questions
24 which other people have had which they addressed to

1 the experts.

2 There is a petition outside for local

3 people to sign for those who are opposed to the oil

4 refinery, and I'd like to urge all of you to sign

5 that because unless something is done, this is all

6 we've got so far on tidal power. And the

7 documentation for what could produce an oil spill

8 which would hurt the whole coast of Maine, the two

9 just aren't balanced. Unless people do something to

10 say no to the oil refinery, it's going to go through.

11 On the other hand, I think writing the

12 Congressmen, trying to get more congressional

13 support for tidal power would not be inopportune at

14 this time. Some people may favor it quite strongly,

15 think that it's a good idea, like some people may

16 want it checked out thoroughly. But the laws now

17 because there have been so many adverse human

18 effects in the environment, the laws now are such

19 that it will have to be done carefully and with due

20 consideration. I'm referring to the tidal power.

21 I think perhaps everybody understands

22 the import of what I was saying and I see a

23 gentleman looking at his watch. It's getting late.

24 I'd ask you to write those letters and to sign that

1 petition.

2 COLONEL CHANDLER: Thank you Mr.

3 Colton-Manheim. I assure you that there was no

4 intend on my part for levity at your expense as an

5 individual. I did perhaps inappropriately choose to

6 be just a little lighter when I saw your

7 documentation. But there was no intent on levity at

8 your expense on my part nor did I know what your

9 documentation was to be poking fun at it.

10 The last card that I have at this

11 point is Beth Nagusky-Trocco. Is she here?

12 STATEMENT BY BETH NAGUSKY-TROCCO

13 MS. NAGUSKY-TROCCO: Well, I started

14 out with a lot of questions tonight but you answered

15 them. My basic question was about the seals in

16 Straight Bay, and I think that the second point I

17 wanted to make was about the Pittston oil refinery

18 and just emphasize the point that I think it's

19 incredible that you don't really know what's going

20 on here in terms if Pittston is approved, that

21 you're going to have a lot of trouble even in the

22 construction phase because of the increment of

23 sulfur dioxide that can be put into the air.

24 And I want to encourage people here

1 who are interested in tidal power that the two are
2 not compatible, and I'm not even sure that the two
3 can be constructed simultaneously, and we do have a
4 petition here which I would like people to sign on
5 their way out if they agree with us about the oil
6 refinery.
7 And also I'm the person who said that
8 there is no way of predicting the ecological
9 ramifications of a tidal power project on Cobscook
10 Bay. I just want to emphasize again that I'd be
11 willing to help with any kind of studies on the
12 seals or anything else because I'm living on the Bay,
13 and I think that it is very important to know, well,
14 in terms of the population of seals whether it will
15 sustain this kind of a project. That's all I wanted
16 to say. Thank you.
17 COLONEL CHANDLER: Thank you very much.
18 I don't have any other cards. I do have the
19 question cards of course. I would invite anyone
20 else who wishes to make a statement at this time to
21 come forward. Is there anyone else who wishes to
22 make a statement for whom I do not have a card?
23 All right now, I'll give you another
24 option. I would offer you a full-fledged break, but

1 I suspect some of you will not come back and there
2 are some good questions here.
3 I should have mentioned early on that
4 there are some very limited toilet facility in the
5 side entrance over there. I say limited, it's about
6 one at a time as best I can determine, and I think
7 in the interest of time we might go ahead with the
8 questions rather than take a formal break. And at
9 this point I would pick up the questions. If you
10 don't mind, I might have a member of my own staff
11 leave for a moment since the time is getting on.
12 This first question that I have is a
13 rather long question and I would propose to answer
14 it for the individual by letter because it's of
15 considerable technical detail, talking about the
16 type of turbines that might be used, the capacity of
17 them, variable pitch and so forth.
18 The next one that I have, for Dr.
19 Barrett: How much consideration do you intend to
20 give to the economy of Cobscook Bay which surely
21 must be unique?
22 DR. BARRETT: I read that one as being
23 ecology, did you say economy?
24 COLONEL CHANDLER: I take that back.

1 That is the ecology of Cobscook Bay indeed.

2 DR. BARRETT: I'd say we'll give as

3 much consideration as possible to the ecology of

4 Cobscook Bay and certainly enough to generate an

5 adequate assessment for decision makers to make

6 decisions. I would say that from my experience

7 anyway as an ecologist that all ecosystems are

8 unique. Each one is different, one from another.

9 And if we're going to make an assessment of the

10 impacts on this ecosystem, then, yes, sir, we will

11 have to study it. And the limitations are somewhat

12 powerful, but if it's necessary to carry it out for

13 any length of time, we'll do it.

14 COLONEL CHANDLER: Okay, the next two

15 questions that I have pertain to the question of air

16 pollution and Pittston and essentially the question

17 is along the line if the Pittston consumes the

18 maximum range of pollution, how can the tidal

19 project be constructed? Dr. Barrett, do you want to

20 address that?

21 DR. BARRETT: Well, I suppose what you

22 have to do is look into ways of mitigating the air

23 pollution. EPA is the one that's in charge of that.

24 They of course will be the ones who make either

1 exceptions to or place restrictions on. We
2 certainly will be generating an assessment of the
3 construction equipment necessary and doing a
4 climatological as well as meteorological assessment
5 of the area. And I suspect that when we have all of
6 facts together, then we will be able to make a
7 decision as to what we'll do.
8 COLONEL CHANDLER: I would make the
9 observation to you that I didn't intend to imply
10 that we are not necessarily concerned about the
11 problem, but rather that it has yet to be quantified.
12 You certainly as citizens have the opportunity of
13 commenting at the present time on the air quality
14 certification by EPA, and if your concerns are as
15 they are expressed in these cards, I would suggest
16 you take the opportunity. But you are not
17 commenting to the Corps on this issue but rather to
18 EPA
19 The question I think for Jim Callahan:
20 What marine culture projects are proposed at this
21 stage? All right, Dr. Barrett, do you want to try
22 it?
23 DR. BARRETT: We have no mariculture
24 programs proposed at this stage. But we will be

1 investigating as many different types as possible.
2 We have a good number of people involved in
3 mariculture both in Canada and the United States as
4 well as Japan, to give you some idea of what might
5 be looked into, muscle, snails, oyster, trout,
6 salmon, and two or three different species of algae.
7 Certainly the possibility of mariculture is very
8 powerful in this kind of situation. And we'll
9 investigate it intensively.
10 COLONEL CHANDLER: The next question I
11 have is: Could you explain briefly how the Corps
12 can construct a two-pool system in Cobscook? And I
13 don't have the name of questioner here but if you'd
14 come up after the meeting and talk to Mr. Callahan,
15 there are several options actually, and we can
16 explain to you but I think it would help with the
17 benefit of the map.
18 If this is the the first federal
19 project -- this is for me -- that will be sold to
20 the New England power pool, will there be federal
21 regulations that would come into effect on that
22 power, i.e., it's usage priorities, price
23 regulations to consumer, region, local, regional, et
24 cetera that would be of benefit to this region?

1 That's kind of multiple question.

2 Yes, there are federal regulations

3 that govern the sale of power from federal projects.

4 As I mentioned, the sales are undertaken by the

5 Department of Energy, not by the Corps of Engineers,

6 the Department of Energy. What they might be in the

7 timeframe of the completion of this project, I could

8 not predict and I doubt that they would predict for

9 you. But they would affect to whom the power is

10 sold. The rates actually are determined at the time

11 of the sale, through the contract itself, is very

12 sensitive to prevailing rates at that time. So I

13 could not predict the rates to you.

14 Whether the inference is that all of

15 this of course must be to the benefit of the

16 individual, and I can't address that. I mean that's

17 it's got to be your judgment as to whether you see

18 that as a benefit or not, depending upon your

19 posture. As I mentioned earlier, it is presumed

20 that this power would be marketed at a rate lower

21 than the prevailing rates.

22 The next question is: How many

23 Georgia Pacific paper mills could be run off the

24 power from the dam? I don't think we can answer the

1 question because we don't know what amount of power
2 we might be trying to generate from a tidal project.
3 As we mentioned, it might be as low as 40 megawatts;
4 it might be as large as 240.
5 There is a question here that appears
6 twice for Mr. Callahan, reference using the Stone
7 and Webster reports, and the question here is: Is
8 the information from the Stone and Webster report
9 part of the source of your answers now?
10 MR. CALLAHAN: The Stone and Webster
11 Engineering Corporation out of Boston was contracted
12 concurrently at the same time by the Corps of
13 Engineers, our office, and also the Department of
14 Energy which was known a few years ago as ERDA. The
15 study that they accomplished for the Corps of
16 Engineers was to review the international project to
17 look at some new construction methods, and make up
18 to date construction cost. This they did for us,
19 and I've quoted you some of the ballpark figures of
20 the international project, and some of its
21 generating capacity in annual production.
22 At the same time in order to avoid
23 duplication, we furnished these figures to the
24 Department of Energy, ERDA, that was prepared by the

1 Stone and Webster firm. The ERDA study was more of
2 a broad brush study of tidal power on a world-wide
3 basis and the contract that Stone and Webster had
4 with us was sort of pinpointed into the
5 Passamaquoddy region. So both of those studies were
6 compatible and the information that they prepared
7 for us is the same that you see in the ERDA report.
8 COLONEL CHANDLER: Okay, the other
9 question I had relating to that: What effect does
10 the original study by Stone and Webster have on your
11 study, and will you be using it at all? I think you
12 probably pretty well answered that.
13 MR. CALLAHAN: I think so. We would
14 be using some of the basic production costs, maybe,
15 but our new study in Cobscook Bay would be entirely
16 new.
17 COLONEL CHANDLER: Okay, next question
18 is really two questions. I'll try to answer them as
19 best I can. Isn't it true that a change in the
20 lifestyle of cities would change the peak load
21 period and the need for the dam? And second: Won't
22 the billion dollars of tax money going into the dam
23 be better spent in insulating the buildings of New
24 England, and won't the latter produce more available

1 energy?

2 There is no question of the truth of
3 the first statement. And a conservation alternative
4 certainly will be addressed in the study. Whether
5 or not, and this is a suggestion, this project could
6 cost a billion dollars. It may not be of that order
7 of magnitude, that large anyway; it may be a quarter
8 of a million, maybe less. A quarter of a billion
9 rather. But would that be better invested in
10 insulating of buildings? That question has been
11 raised a couple of times and various surveys have
12 been done by certain agencies. I've undertaken some
13 investigation of that question associated with
14 Dickey-Lincoln.

15 The Federal Energy Administration now
16 absorbed into the Department of Energy investigated
17 the question. It clearly will not produce any more
18 energy to insulate buildings. The question is
19 whether it will reduce inefficiencies, that it
20 conserves energy that we have and reduces the more
21 or less uncontrolled growth.

22 It's my understanding that the
23 investigations that have been undertaken on a gross
24 basis in New England tend to show that New England

1 is not that deficient in insulation. We are
2 deficient to a point but not to the point where by a
3 wholesale program of insulating houses one could
4 save the kinds of energy that we're really looking
5 for in New England to get off dependance on oil.
6 Some insulation programs are underway. And some are
7 and some are not working too successfully in terms
8 of consumer interest on the part of the people who
9 pay the bills.
10 So there is another question, I
11 suspect, that comes up on that as to whether you can
12 realize those savings even if you were to make a
13 change in national strategy towards insulation. The
14 bottom line, I'm afraid, to that question though
15 resides in whether the Executive and the Legislative
16 Branches end up in this session of Congress with an
17 energy plan, since the President clearly indicated
18 conservation was the cornerstone of his proposal.
19 Next question, Mr. Callahan: Assuming
20 the refinery is in operation, could supertankers
21 navigate through the construction area of a tidal
22 project near Shackford Head, or would the refinery
23 have to cease operations during a portion of the
24 study? I think you mean during a portion of the

1 construction phase if it were built. Mr. Callahan.
2 MR. CALLAHAN: In this case, assuming
3 that the Pittston refinery was in place, and we were
4 subsequently authorized and construction commenced
5 on a tidal power plant with a dam across from the
6 Shackford Head to the Cooper Island area, I would
7 assume that we would have to make some kind of an
8 adjustment so that the large tanker carriers would
9 not pass through the construction area, that some
10 kind of a temporary piping arrangement would be made
11 that would be outside of the construction area and
12 remain that way until a navigation lock or a
13 permanent facility was constructed.
14 COLONEL CHANDLER: Okay, the next
15 question: The Environmental Impact Statement done
16 by the Corps for Dickey-Lincoln project was
17 criticized for being simplistic and inadequate. How
18 many pages were allowed for that impact statement?
19 Dr. Barrett.
20 DR. BARRETT: There were 196 pages in
21 the draft EIS, which is a condensation of
22 approximately 14 volumes or 6,000 pages of
23 documentation. I might also add that it has also
24 been criticized as having been too lengthy, too much

1 detail, and too highly technical for people to
2 understand. So I guess I've answered the question.
3 COLONEL CHANDLER: The next question:
4 Mr. Cooper, we've got one for you. What type of
5 modeling systems do you use as aids in decisions
6 about such questions as tidal resonance problems?
7 How accurate are these modeling systems?
8 MR. COOPER: We have not at this point
9 in time gone into any of these modeling systems on
10 the resonance, but when we did study Quoddy back in
11 the 60s, we did have a model study performed by MIT,
12 and at that time I think it was both a hydrolic
13 dynamic type model as well as a computer model and
14 we would expect as we get further into these studies
15 that we would continue in this vein of getting into
16 some type of a sophisticated hydronamic model as
17 well as as a computer model in coming up with the
18 answers to the problem.
19 COLONEL CHANDLER: I think that
20 question, first of all, it's a very good question.
21 It's also one that's got a high price tag with it,
22 and certain it is one of the objectives of the study
23 itself to determine whether or not mathematical
24 models, which are much less expensive, will give us

1 the confidence we'll need, or whether we will have
2 to go to physical models which, as I say, are very
3 expensive. It's a good question.
4 Evidently I missed someone when I was
5 wrapping up the comment period. A gentleman
6 apparently did indicate he would like to make a
7 comment. Bernard Gallagher. Do you desire to make
8 your comment at this time, and then I'll come back
9 to the questions. I just have about six more
10 questions here. We can wrap those up very quickly.
11 STATEMENT BY BERNARD GALLAGHER
12 MR. GALLAGHER: Ladies and gentlemen,
13 I'm Bernard Gallagher from Campobello. And I've
14 been a fisherman quite a few years. And I can't see
15 where this power will hurt anybody. But I am
16 against the oil company. And a few of you people
17 here know me and perhaps you don't agree with me,
18 but I have seen what oil will do to fish, and I've
19 seen what it will do. But the power, I can't see
20 why anybody will condemn it.
21 In time we ain't going to have no oil,
22 but the tide is going to come full in and full out.
23 I just can't put it in words, but it will be here as
24 long as any of us is here and won't hurt no fishing.

1 If I was a young man, I'd say build it here just
2 same because it ain't going to hurt me nor nobody
3 else, and we'll have power. And perhaps it won't
4 cost us as much as what it costs us now. And I hope
5 that I see it built. That's all I can say, and I
6 thought there would be more Canadian boys over here
7 tonight, but there are not. I hope it's built.
8 COLONEL CHANDLER: Thank you very much,
9 Mr. Gallagher.
10 MR. GALLAGHER: The only thing I can
11 say, thank you all, ladies and gentlemen.
12 COLONEL CHANDLER: Thank you, sir.
13 Mr. Callahan: Where is the closest
14 hookup to the New England power grid?
15 MR. CALLAHAN: I think that maybe the
16 size of the project might have an effect on where
17 the closest point is. Right at this point in time,
18 I sort of think that it would be somewheres in the
19 Bangor area right at this time.
20 COLONEL CHANDLER: That will depend
21 and the transmission studies will be done in
22 connection with the various alternatives that are
23 looked at, and it's not known where the destination
24 might be of a particular amount of energy that might

1 be generated. The study will determine that however.
2 Who will get the power generated by
3 the tidal project? I've tried to answer that before.
4 I can't be totally specific because the Department
5 of Energy will market it. It will be according to
6 their statutory requirements, their principal
7 statutory requirement being that it goes to
8 preference customers before it goes to
9 investor-owned utilities. And it will depend, of
10 course, on the size of any installation that might
11 be built. A very small installation, one can assume
12 will be consummed very close to the project. At the
13 other end of the spectrum, a very large one might be
14 consumed throughout the region, generally throughout
15 the New England power grid. However that all
16 depends on whether we're talking about firm power or
17 whether we might be talking about peaking power.
18 What effect on the electrical bill
19 would the project have before and after it is built?
20 I don't think any effect before. After, I think we
21 can all hope and I think it's reasonable to assume
22 that those people, at least, who are getting
23 eligible for blocks of power from such a project,
24 that it would result in their rates being lower than

1 it would be if some other source were generating the
2 same energy.
3 Mr. Callahan: Will wind power be
4 considered as an alternative energy procedure for
5 the area?
6 MR. CALLAHAN: We've been asked by
7 many people to consider wind power in conjunction
8 with the tidal power because of many prevailing
9 winds that are in the East Coast of Maine. And we
10 are going to attempt to see how many wind generated
11 units we might have to build to compensate or
12 equalize a certain number of tidal power generating
13 units.
14 COLONEL CHANDLER: And Dr. Barrett:
15 What precautions will be made to insure that the
16 anadromous fish flows will not be interfered with?
17 DR. BARRETT: I'm not sure exactly
18 what precautions will be taken now. Some could be
19 fishways or traps, but again we'll be in
20 coordination with the Fish and Wildlife Service to
21 work out problems such as this. And at that time
22 once we have made the decision, then we'll be able
23 to tell. Until then, I don't know now. It's their
24 responsibility to assist us in this. And they have

1 already started in that responsibility.

2 COLONEL CHANDLER: I think essentially,

3 it will be important in the study to determine if a

4 project were built what sort of fisheries would be

5 desired within any impoundments and what outside.

6 And if it's desired that the anadromous fish would

7 be able to move from the outside inside, then it

8 will be necessary for the project to provide

9 whatever sort of fishway will produce that. On the

10 other hand, it is conceivable that such an

11 impoundment might be consciously used to develop a

12 totally separate type of fishery from the anadromous

13 fish. In which case, one would want to lock them

14 out.

15 A good question. What bureaucracy in

16 the bureaucracy could handle the question or give

17 answers regarding oil versus tide? If we're talking

18 about as a source of energy, that's not probably too

19 difficult to address the question. The question

20 would be appropriately addressed by U. S. Department

21 of Energy, however. That has overall interest in

22 what the mix of energy sources would be to New

23 England. And I suspect that basically what the

24 question is.

1 If we're talking about Pittston, which
2 is a refinery for refining products which may be
3 used as gasoline and kerosene and fuel oils, versus
4 a tidal project, which is generating electricity,
5 that's a little bit more difficult question to
6 answer. And I don't know that I have the answer.
7 As a point of interest, the last one,
8 Dr. Barrett, I hope you have a response to this: We
9 have heard from qualified marine biologists that if
10 you dam the Bay, the temperature will be raised, and
11 if the temperature is warmer shipworms are bound to
12 make the Bay their home. Shipworms love wooden
13 hulls. Obviously this needs more study. Do you
14 want to comment on that?
15 DR. BARRETT: I agree. It does need
16 more study. One of the ramifications though is the
17 reduced salinity a point below which shipworms don't
18 like. But just about every change in the
19 environment causes something. I'm brought to mind
20 on that one that further south they cleaned up the
21 pollution in one of the major harbors and did a
22 wonderful job on that. All of their pilings for all
23 of their docks and everything were made out of wood,
24 and once they received all that good clean water,

1 they also received shipworms and their docks fell
2 down. So, yah, we'll be studying it. You can
3 believe that.
4 COLONEL CHANDLER: Are there any other
5 questions then at this time? Yes?
6 FROM THE FLOOR: The electrolysis and
7 the water power and producing hydrogen. What about
8 sea water producing the hydrogen for use as fuel?
9 COLONEL CHANDLER: Okay, Mr. Callahan,
10 do you want to try that one around again. This is
11 electrolysis of sea water producing hydrogen for use
12 as a fuel.
13 MR. CALLAHAN: What I'm going to say
14 to that is, right at present it might not be a
15 reasonable alternative to tidal power. However, it
16 is one of these new technical advances that we'll
17 investigate and report on. We might have a very
18 difficult time in equating its cost with tidal power
19 or a fossil fuel plant, but we'll give you the
20 particulars on the technology of it.
21 FROM THE FLOOR: Also, a system
22 involving no dams at all.
23 COLONEL CHANDLER: That's right. Well,
24 there will be alternatives looked at that won't

1 involve any tidal projects at all. Conservation,
2 wood, solar, wind, they'll all be addressed as
3 alternatives, beside alternative tidal projects.
4 Yes, a question in the rear.
5 FROM THE FLOOR: Why all the nuisance
6 of all the photographers throughout the entire room?
7 What do you do with their films?
8 COLONEL CHANDLER: What do I do with
9 their films? They are their private property. This
10 is a public meeting.
11 FROM THE FLOOR: Are they a part of
12 the Corps?
13 COLONEL CHANDLER: No, they are not.
14 There are no photographs here from the Corps of
15 Engineers. This is an open public meeting which it
16 is the press's prerogative to attend. The only
17 requirement that I have as Hearing Office of the
18 press is that their activities do not interfere with
19 the orderly process of conducting the meeting, and
20 there may have been some interference over here. I
21 know I could not see some people here because of the
22 bright lights. But I don't know of any other
23 interference that it may have caused with the
24 meeting.

1 FROM THE FLOOR: Well, I don't agree.
2 COLONEL CHANDLER: Any other questions
3 at this time or any other statements that
4 individuals wish to make? If not -- yes, sir.
5 FROM THE FLOOR: It's been said that
6 the Shepard Bay tidal power project will be more
7 economical than the Quoddy.
8 COLONEL CHANDLER: Yes, I'm sorry.
9 Mr. Callahan has that question. There is also a
10 question on the Japanese system of wave power, I
11 believe it is. Mr. Callahan, would you comment on
12 both of those?
13 MR. CALLAHAN: On your question, Mr.
14 Spinney, I didn't know if you meant Shepardy in the
15 Bay of Fundy or Shepard Bay.
16 MR. SPINNEY: Shepard Bay.
17 MR. CALLAHAN: Where is that, sir?
18 MR. SPINNEY: I don't know myself.
19 MR. CALLAHAN: There is a Shepardy Bay
20 in the Bay of Fundy study which has probably eight
21 specific or nine specific sites in it. And it's
22 something like the Cumberland Basin project. It's
23 just one of eight or nine systems that the Canadians
24 have been studying, and they have selected the

1 Cumberland Basin project because it's the smallest
2 project. It's sort of politically the most
3 acceptable and they feel it's the least costly. So
4 it's the best one for them to go forward with as the
5 first initial tidal power installation.
6 I have another question here
7 pertaining to some Japanese inventions, and of
8 course our tidal power study is not going to look
9 into, if I might call it, patent type of products or
10 mechanical type products. The Department of Energy
11 through it's former ERDA program is evaluating all
12 invention type of energy procedures -- tide boblers --
13 there are hundreds of them. And as I understand it,
14 the ERDA people have found that about one invention
15 in about every 4,000 has merit, and they are working
16 to take this one out of the 4,000 and give that man
17 additional money to investigate the things further.
18 But we will not be looking into these invention type
19 of tidal power alternatives.
20 COLONEL CHANDLER: Are there any other
21 questions or comments at this time? Yes, ma'am.
22 FROM THE FLOOR: I was just told or
23 you just told me the photographers had no connection
24 with the Corps. I was just told that they were

1 hired by the Corps.

2 COLONEL CHANDLER: Who told you that?

3 FROM THE FLOOR: A young lady just

4 told a friend of mine.

5 FROM THE FLOOR: I went to sign the

6 petition. They said they were with the lab. They

7 were taking pictures and they said they were with

8 the lab and they were with the Corps. I have been

9 out here. I'll ask them.

10 FROM THE FLOOR: Well, if they aren't,

11 maybe they will identify their newspaper.

12 COLONEL CHANDLER: I stand corrected.

13 You are correct. Through a contract arrangement --

14 they are not from my staff, and I did not recognize

15 them. Through a contract arrangement there are

16 evidently two photographers here who have been

17 taking some pictures documenting the meeting this

18 evening who are under contract to my offers. I

19 stand corrected. However there are other members of

20 the working press here.

21 Yes ma'am?

22 FROM THE FLOOR: I'd like to explain

23 my criticism. During the time of the Pittston

24 hearing, we were harassed by photographs.

1 Apparently some of them were hired by Pittston. And
2 you get very uneasy -- you get a very uneasy feeling
3 sitting at a meeting when these people are darting
4 around with their strobe lights and zooming in on
5 you. And as a member of the community, I'd just
6 like you to know.
7 COLONEL CHANDLER: Thank you very much
8 for your comment.
9 FROM THE FLOOR: There are many
10 private investigative agencies that works with
11 methods similar to the CIA and some of them are
12 illegal. So I think it's worthwhile being concerned
13 about them.
14 COLONEL CHANDLER: Are there any other
15 questions or comments at this time? Mr. Colton-
16 Manheim.
17 MR. COLTON-MANHEIM: You must be
18 getting tired. Maybe you want a drink of water or
19 would you like to take a break? Would any of you be
20 available for a less public, less general
21 interchange after the meeting?
22 COLONEL CHANDLER: Yes, indeed. Those
23 who do not care to discuss in an open forum can
24 write letters to us, can call us on the telephone,

1 can corner us here before we leave this evening, if
2 that is your pleasure. I think that's probably --
3 all right, Mr. Gallagher.
4 MR. GALLAGHER (Inaudibly.)
5 COLONEL CHANDLER: I'm sorry, I can't
6 hear you, and I don't think the stenographer can. I
7 know you are Mr. Gallagher. Could you come up
8 forward where we could here your question or comment?
9 MR. GALLAGHER: Out of these hydro-
10 plants, how much mercury and pollution goes into the
11 Bay of Fundy and the waters of the coast of Maine,
12 and how would that mercury and pollution affect the
13 fishing industry -- the scallops and the clamming
14 industry in the State of Maine, and the Provinces of
15 New Brunswick and Novia Scotia?
16 COLONEL CHANDLER: I do not have the
17 answers to those questions. They will be developed
18 in the study as part of the baseline, and if the
19 project were built, any impact it might have and the
20 same will be addressed, but I do thank you for the
21 question.
22 Are there any other questions or
23 comments at this time?
24 (No response.)

1 COLONEL CHANDLER: If not, I'd like to
2 remind you again that the transcript will be open
3 through July 28 and you can send questions or
4 comments to my office in Waltham for inclusion in
5 that record prior to that date. The record
6 officially will be available for inspection in our
7 Waltham office. We'll also make it known to you up
8 here where it may be seen locally. If you desire
9 your personal copy, please see the public
10 stenographer and you can make arrangements with her.
11 The other public meeting on this
12 subject will be held Thursday afternoon in Augusta
13 Civic Center at 1:30, July 13. We'd be delighted to
14 have any of you come to Augusta who would like to.
15 And finally I thank those of you who have remained
16 and those who have departed for your interest in our
17 meeting tonight.
18 I will not engage in whether Lubec
19 would have had a larger turnout than Eastport, but
20 we're delighted to see a turnout as large as this,
21 because rarely at this early stage of planning do
22 you get as enthusiastic and interested a group as we
23 have had this evening. And I thank you all very
24 much for your interest, your patience, and it will

1 contribute greatly to our effort. We'll be in touch
2 with you if you have given us white cards, we have
3 your name and your address hopefully and we'll keep
4 you posted periodically as information bulletins are
5 made available as the study gets underway. If there
6 are other workshops or meetings, public meetings to
7 be held from time to time, you will also be advised
8 of those. Thank you very much. The meeting is
9 adjourned.
10 (Whereupon, at 10:30 p.m. the meeting
11 was adjourned.)
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Department of the Army
New England Division, Corps of Engineers
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PUBLIC MEETING
for the
TIDAL POWER STUDY
COBSCOOK BAY, MAINE, USA

Augusta Civic Center
Augusta, Maine

Thursday, July 13, 1978
1:30 o'clock a.m.

BEFORE:

COLONEL JOHN P. CHANDLER, Division Engineer,
New England Division, Corps of Engineers

JIM CALLAHAN, Project Engineer,
New England Division, Corps of Engineers

DR. BUD BARRETT, Manager, Environmental
Impact Statement, New England Division
Corps of Engineers

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1 P R O C E E D I N G S

2 MR. JOSEPH: Good afternoon. My name
3 is John Joseph, and I'm Director of the Maine State
4 Energy Office. I'm pleased that each of you was
5 able to come to Augusta today to this meeting.
6 It's going to be my responsibility
7 today to introduce the key staff of the Corps of
8 Engineers that will be working on the Cobscook
9 project.
10 Before making an introduction, however,
11 I'd like to make a few remarks regarding the project
12 from our point of view. You all realize that the
13 utilization of hydro power from the tides is nothing
14 new. It was done all along the Maine coast and
15 small harbors in the sawing of timber. Basically
16 they dammed, they let the water in the inlets, small
17 bays, and build dams and generated mechanical power
18 as the tide subsided.
19 It wasn't until 1919 that people
20 started thinking about generating electricity from
21 the tides, and it was a man named Dexter P. Cooper
22 who came up with the idea. He was a hydroelectric
23 engineer, and he spent most of his life trying to
24 get the project built. It was his idea to join

1 forces with the Canadian government and to build a
2 joint project in Cobscook and Passamaquoddy Bays.
3 The project that we're now looking at
4 is only in Cobscook Bay. The Canadians, as far as
5 tidal power is concerned, seem to be turning their
6 attention to the Bay of Fundy. I don't believe this
7 necessarily reflects on this project, however.
8 I think it is appropriate at this
9 point before starting the meeting to ask ourselves
10 why the project was never built. In the 1930's the
11 project had the support of the President of the
12 United States, President Roosevelt, who made trips
13 to Eastport and assured the citizens up there that
14 the project would be built. However it wasn't. It
15 was studied six times. Three small dams were built,
16 one half completed, and I think that if you ask any
17 observers why this was true, the answer would be
18 economics. The economics just weren't right.
19 Fossil fuel was becoming more and more
20 available. The electricity that was being generated
21 from fossil fuel in terms of real prices was
22 declining, and tidal power just wasn't competitive.
23 But the world economics in energy have changed
24 considerably since that time. Real energy prices

1 are starting to increase for most all fuels, and
2 tidal power is becoming more attractive. The rules
3 of energy accounting have changed.
4 I think for the first time in history
5 we're viewing a real increase in the price of energy
6 based upon non-renewable fuels. Not only is the
7 price increasing because of the nonrenewability of
8 the fuel and the limited finite resources but also
9 because countries, OPEC countries who have the fuel
10 are coming to recognize the value of that fuel and
11 taking advantage of the international markets, and
12 we're all beginning to recognize the environmental
13 costs of generating power.
14 In addition to that the President is
15 now working out policies with Congress that could
16 substantially increase the price of oil. I don't
17 think that there are any forces that are really
18 mitigating this increase in prices, and I think our
19 strategy has to be to circumvent these price
20 increases, and one way of doing that is by building
21 projects that do not demand fuel. A tidal project
22 is such a project.
23 We believe that this project must be
24 evaluated in a life-cycle basis, which means that

1 when we do the economics, we have to give serious
2 thought to increasing prices of fuel. Governor
3 Longly recommended this to the Corps. They have
4 done work in this area, and it is my understanding
5 that they are going to continue to do so. We feel
6 very strongly that the accounting mechanisms for
7 these types of projects are going to have to be
8 adjust to the realities of the economics of today.
9 Of course, the Corps study is going to consider much
10 more than economics, and I will let them explain to
11 you exactly what their study entails.
12 My point is that the economics are
13 changing, and I believe that at this point we
14 definitely have to look at this tidal project and it
15 certainly warrants study on a life cycle basis.
16 At this point I'd like to turn the
17 meeting over to Colonel Chandler, who is the
18 Division Engineer of the Army Corps of Engineers.
19 Thank you.
20 COLONEL CHANDLER: Good afternoon.
21 John Joseph, thank you very much for the
22 introduction and giving us a brief historical sketch
23 of some of the background of tidal power here in the
24 area of the State of Maine and Northeastern United

1 States.

2 As Mr. Joseph indicated, I'm the
3 Division Engineer for the Corps in the New England
4 area. He's mention to you the dependance on oil
5 that we have in the New England area. It's reaching
6 that point where over half our electricity is being
7 generated from imported oil. And the uncertainties
8 about the availability and price of that oil is what
9 caused the Congress to direct the Corps to take a
10 look again at the old studies of tidal power that
11 were on the shelves collecting dust, update them
12 without doing any new investigation, simply update
13 them, bring them up to date in terms of what the
14 cost would be and what the benefits would be and to
15 report back to the Congress as to whether or not
16 further study was warranted.

17 Very simply said, we did do that. We
18 investigated the old plans, particularly the plan of
19 the middle '30s that President Roosevelt sponsored
20 but was terminated without completion, and several
21 others that had been looked at by the International
22 Joint Commission.

23 The conclusions from those endeavors
24 were that the project would not yet be economically

1 feasible; that is, the cost would exceed the
2 benefits. But as Mr. Joseph indicated, the Governor
3 had asked us to take a look at it from the
4 standpoint of what some people do call life-cycle
5 costing, but simply said permits you the luxury of
6 looking at what projected alternative fuel costs
7 might be.
8 And from that standpoint, we feel that
9 the further investigation of tidal power is in deed
10 warranted. I testified to that effect last February
11 before the Congress when I was presenting my program,
12 and the Congress gave me the authority and the
13 funding to proceed with the investigation which we
14 are now undertaking.
15 This investigation is really
16 altogether different from that which has preceded it.
17 Those plans that were on the shelves were plans
18 based on the state of the art at that time. Some
19 were international projects, and as Mr. Joseph
20 indicated, the Canadians have opted not to join us
21 in the study but merely to maintain an observer
22 status with us.
23 The state of the art is changed. We
24 are going to be looking just at the United States,

1 and so in effect today is a whole new ball game.
2 But how we got there, we'll be recounting to you to
3 some degree in our presentation today. The facts
4 that we know, if you will, are those which really
5 come from researching previous studies.
6 Really what lies ahead then are
7 questions to be answered. And the purpose of our
8 plan of study which we are now finalizing is to
9 decide what are the things that need to be
10 investigated in the next three to four years in
11 order to submit a report to the Congress as to
12 whether or not actual construction of such a project
13 should be undertaken.
14 The doors is wide open, as you will
15 hear during the explanation. We have a full range
16 of physical opportunities within the Cobscook area,
17 and also in terms of capacity of the plants
18 themselves. But it is essentially going to be a new
19 ball game. It's not simply economics. We'll be now
20 dealing with all of the ecological, social, cultural
21 problems that could be associated with such an
22 undertaking.
23 And indeed one of the interesting
24 things about this project in all the previous

1 studies and even the orders to build in the middle
2 '30s, no one ever undertook a marketing study for
3 the power that could have been generated from that
4 plant. So there is nothing in the history that
5 tells us how this energy would be used, if indeed
6 such a plant were built.
7 And I think you also find out that
8 technology has brought us to a point where we have
9 some wide selections on the kinds of energy that we
10 can obtain from firm to peaking, for instance;
11 whereas before it was only peaking that people saw
12 coming from a tidal project.
13 However, before we get to the study
14 itself, before we really commit major resource to it,
15 and the study itself may cost taxpayers something on
16 the order of three million dollars, we want to be
17 sure that we know just what it is we should be
18 studying. We have a great deal of work that has
19 been done already. Some of that is fairly automatic.
20 We want to be sure through this public
21 meeting and the meeting we had Monday night in
22 Eastport and through a series of workshops that we
23 have had that we are actually going to look at all
24 the questions that are of concern to you, the public.

1 And the public consists to us anyway, the Corps, of
2 other federal agencies, state agencies and not just
3 necessarily in the State of Maine but throughout New
4 England, and can be regional mechanisms for that
5 matter, and also down, of course, to the local
6 interest level of Eastport, Lubec, Perry, Whiting
7 and the communities that are in the immediate area,
8 not to exclude the Passamaquoddy Tribe itself, which
9 has a reservation in that area.
10 And before we undertake that study, we
11 want to be sure we have our plan of study together,
12 going in the right direction and we're asking you
13 today to participate in that process with us. We
14 will tell you as much as we can as to where we are
15 and we'll give you the opportunity of expressing
16 your concerns which we can then put back into
17 refining our plan of study.
18 The procedures today are perhaps a
19 little different than some you may be used to. We
20 found it very profitable and we find that it
21 encourages a more informal type of meeting to have a
22 question and answer period. So after some
23 introductory remarks and descriptions of the project,
24 we will go into a question and answer period.

1 When you came in, you picked up a
2 public information brochure, this one, and also a
3 white card and a gray card. The brochure we hope
4 you'll retain, use for reference. You can use it
5 during the meeting today. The white card, we are
6 anxious to have information, your name, your address,
7 not just if you are going to speak or submit a
8 statement but in order to develop our correspondence
9 file because we do intend in the future to have
10 publications go out that will keep you posted on
11 progress on the project, and this is our way of
12 keeping in touch with you. And the gray card we'll
13 be using during the question and answer period.
14 That question and answer period, I
15 propose to allocate about an hour to it. And then
16 we'll proceed into the formal comments period and I
17 suspect from the number of cards that I've seen so
18 far, that we'll be able to accommodate that to. So
19 tentatively looking at my schedule, we should be in
20 the question and answer period from approximately
21 2:30 to 3:30. We'll take a short break and at 3:45
22 go into the formal comment period.
23 The individuals who will be helping me
24 answer the questions that you pose, that may not be

1 the proper choice of words because really your
2 participation here today is going to be to pose
3 questions for which answer probably do not now exist,
4 but the way in which you pose that question may be a
5 question in itself. And anyway, the individuals who
6 will be helping me respond to your questions are Mr.
7 Jim Callahan, who is the Study Manager, and Dr. Bud
8 Barrett, who will be in charge of environmental
9 studies associated with the project. And you'll be
10 hearing from both of these gentleman in just a
11 moment.
12 To get to this point not only did we
13 review the old studies and update engineering and
14 the cost figures and benefits from those studies, we
15 also conducted a series of workshops, as I mentioned.
16 And some 70 men and women from throughout not only
17 Maine but some of the other New England states
18 participated with us in these workshops and posed
19 many questions which have already caused some
20 refinement of our plan of study. And I certainly am
21 indebted to those individuals and to members of the
22 staff of your University at Orono for putting on
23 those workshops that have brought us as far along as
24 we are today.

1 I'd like next then to go to a short
2 audio-visual presentation, about 12 minutes. Mr.
3 Callahan will explain a little bit about the study,
4 and Dr. Barrett something about the environmental
5 concerns. And then we'll go to the question and
6 answer period. So be thinking as we go through our
7 presentations here what questions you may have, and
8 at the end of their presentations, a couple of
9 members of my staff will be circulating through the
10 room picking up the cards and bringing them down
11 front, and we'll beginning responding to those
12 questions which you have.
13 It's been our experience that one
14 question leads to another. So that initially we may
15 only have a half dozen questions coming down here,
16 but that probably will lead to 50 or 60 questions
17 before we get through, so that's why I plan to
18 allocate an hour to the question and answer format
19 if we need it. So be thinking between now and the
20 end of the presentations of the kinds of questions
21 that you want to pose to us expressing the sorts of
22 things you feel should be addressed,. In our
23 response we may be telling you that yes, that is a
24 concern that we share with you, and we've already

1 provided for that in the plan of study or it may
2 represent a new concern or it may represent a
3 reinforcement of a concern that was brought up
4 before and that we'll be able to respond in that
5 vein.
6 There may be some specific questions
7 for which we can give you direct answers today. If
8 so, we will. If the answer is available but not
9 available to us here today, by putting your name and
10 address on your card, we'll be able to give you a
11 written followup response to your question. So it
12 would help also on your gray cards if you would
13 include your name and address. However, it's not
14 necessary.
15 During the question and answer period,
16 I also do not propose to identify the questioner. I
17 find that, I guess, we fall perhaps into two groups.
18 There are those of us who like to get up before the
19 microphone and be identified as to who we are and
20 say our piece, and then there are others of us who
21 would just as soon write it down on a card and have
22 somebody else state the question and have somebody
23 answer it, and as they say, maintain a low profile.
24 So we're offering you both types of situation,

1 whichever suits your needs.

2 I'd like to ask then the lights be

3 dimmed at this time, and we'll present the short

4 audio-visual presentation on the project.

5 (Audio-visual presentation.)

6 COLONEL CHANDLER: I'd like to now

7 call on Mr. Callahan who will give you a little

8 further discussion into the project itself.

9 PRESENTATION BY JIM CALLAHAN

10 MR. CALLAHAN: Thank you, Colonel.

11 Good afternoon, ladies and gentlemen. One of the

12 reasons we are here today is to obtain your points

13 of view and hopefully that you will share with us

14 some of the insights you possess for improving our

15 study.

16 It's almost a half century or

17 thereabouts since the idea of harnessing tides for

18 electricity in the Bay of Fundy region first

19 attracted serious attention. There are first-hand

20 reminders in Eastport of the uncompleted efforts

21 initiated in Franklin Roosevelt's' first term to

22 build a tidal generating facility in that very

23 location.

24 But now, although we are concerned

1 about local economic conditions, we are also
2 concerned about energy for the future and about
3 preserving our natural environment and utilization
4 of our natural renewable resources.
5 The audio-visual presentation you just
6 saw provides an overview of our current interest in
7 Cobscook Bay as a possible site for a tidal power
8 development. In the recent past tidal power
9 generation has been reevaluated from time to time to
10 determine whether or not it was economically
11 competitive with other types of power generation.
12 By our conventional methods of
13 economic evaluation, the idea does not appear to be
14 fully economically justified under current methods.
15 But in the new study we have been authorized also to
16 analyze the economics using new measures which give
17 added weight to benefits due to inflation and
18 escalation trends. Another factor which is
19 different from circumstances existing in the '30s
20 and '40s and '50s is the fact that just about all of
21 New England power generating facilities are
22 interconnected to a regional grid that draws upon a
23 mixture of various power sources to serve
24 diversified demands on the system. And these

1 demands vary from hour to hour, day to day, and
2 season to season. This pooling means more
3 reliability and service and savings to customers.
4 Investor-owned and publicly-owned
5 utilities belong to the system. But unlike other
6 systems in the country, there are no federally
7 financed generating facilities contributing power to
8 the New England region. It should be understood
9 that any public investment that the Federal
10 Government makes to produce energy is recovered
11 through the sale of that energy over the life of the
12 project.
13 I should also point out that
14 arrangements for the transmission and marketing of
15 the power are the responsibility of the United
16 States Department of Energy. These aspects will be
17 incorporated into the overall study the Corps will
18 be undertaking.
19 Beyond power, additional economic
20 benefits may accrue from development of a tidal
21 power facility. And these could be of particular
22 significance to residents of the area. These
23 benefits could be in the form of recreation, area
24 redevelopment, and fisheries or mariculture.

1 At this point in time, we are in the
2 process of developing a plan of study, and the plan
3 is flexible. It always will be. And it is most
4 useful in determining specific items that need to be
5 addressed -- the assignment of responsibility of the
6 various study task and a timetable and budget to
7 manage the study.
8 I think one of the key items in the
9 audio-visual presentation will be discussed by Dr.
10 Barrett, and this is pertaining to the environmental
11 concerns.
12 Until the plan of study is completed,
13 it will be difficult to precisely indicate the
14 finish scheduling and the funding level. However,
15 it should be understood by all that should early
16 studies fail to indicate that a tidal power facility
17 is not economically feasible, or if it is determined
18 that there is no need for the power that would be
19 generated, planning could be interrupted at any time.
20 In addition to tidal power, we'll be
21 investigating and comparing other alternatives, such
22 as fossil fuel plants, nuclear plants, river hydro
23 plants, load management, conservation, et cetera.
24 Please keep in mind that Congress has authorized a

1 study only, and that no funds have been appropriated
2 for advanced design and/or construction. The study
3 will be under the direction of the Division Engineer
4 and will be accomplished utilizing various federal
5 and state agencies, universities, private contract
6 consultants, and Corps of Engineers staff.
7 With your permission, I would like to
8 take the rest of my time with the use of slides to
9 give you some background about the area and tidal
10 power, and then outline the planning process that
11 will guide our work. Following my presentation, Dr.
12 Barrett, who will be coordinating our environmental
13 investigations, will outline procedures to meet
14 requirements of the National Environmental Policies
15 Act. May we have the lights.
16 As you see the slides, you may have
17 questions. If you would defer them to the question
18 and answer period, I would appreciate it. And we'll
19 answer them at that time.
20 The title of our project is going to
21 be the Cobscook Bay, Maine, U. S. A, Tidal Project.
22 The study area is shown here. You see the Eastport
23 area, Cobscook Bay, on the most easterly shores of
24 Maine. It's at the Gulf of Maine, near the

1 intersection of the Gulf of Maine and the Bay of
2 Fundy.
3 As we proceed up the Bay of Fundy
4 above St. John and up toward Moncton and Amherst,
5 near Amherst in a location called Cumberland Basin
6 is the location of the proposed $33 million study
7 that the Canadians are going to commence very
8 shortly. They are trying to organize that study at
9 this time.
10 The study area itself in Eastport in
11 Cobscook Bay has a drainage area of about a 405 or
12 410 square miles. That takes in all of the area of
13 the Bay which is about 39 square miles at high tides,
14 plus the drainage area behind it.
15 This slide shows high tides, see the
16 fishing vessels and the other vessels at high tide,
17 and the next photo shows the low tide. Now the
18 differential tide, the average differential tide is
19 18 feet. And we have maximum tides of 27 foot
20 differential and a minimum of 13 feet differential.
21 All of the tides are based on the
22 gravitational aspects of the earth, the sun and the
23 moon, and when the earth and the moon are lined up
24 perpendicular to the sun, when we have our new and

1 full moons, we have our greatest tides. These are
2 called the spring tides and they occur approximately
3 twice a month, and it's when we get our maximum
4 height of tides. That's when your 27 foot high tide
5 occurs. Every other two weeks when our moon is at
6 the quarter points, we have the neap tides, the low
7 periods of the month, the 13 high foot tides.
8 On the bottom portion you see the
9 tidal cycle. You see the tidal range of the neap
10 tide and you see how much higher the spring tide is,
11 and you also see that the average tidal cycle is 12
12 hours and 25 minutes; for two periods, 24 hours and
13 50 minutes. And this variance in time does not
14 quite coincide with our solar day of 24 hours a day,
15 and it offers some problems, so I'm integrating a
16 tidal power project into the electrical system.
17 Here you see a typical tidal plant
18 operation for a two-pool concept. In tidal power we
19 have a single-pool concept and we can have a
20 double-pool concept. The heavy line shows the
21 following of the tides. The dash line shows on the
22 top one the high pool level, and on the bottom one
23 the dash line is the low pool level. And you can
24 see how these are planned and manipulated during the

1 day and during the tides. The shaded area shows the
2 amount of tidal plant electric output.
3 Now this output in a two-pool scheme
4 can be continuous over a 24-hour period, where in a
5 single-pool concept, you cannot have continuous
6 tidal power.
7 This shows how our tidal power
8 production could fit into the overall needs of the
9 New England area. You can see that the tidal power
10 is a lot less and probably would amount to
11 somewheres around a half to one percent of New
12 England needs.
13 This slide shows the all American plan,
14 all United States plan that was conceived in the
15 1935-36 era. You see the dams that were constructed
16 that John Joseph mentioned, the Pleasant Point Dam,
17 Karlo Dam and the Trent Deadly Dam was partially
18 completed before construction was stopped. No power
19 house was built under this project. This was an all
20 United States plan.
21 This photograph was taken in December
22 of 1976, the temperature with the chill factor was
23 somewheres down around 25 or 30 degrees below
24 Fahrenheit and shows part of the isthmus going out

1 to Moose Island, Eastport. This sea smoke is going
2 up into the air about 50 feet. It was a very
3 interesting morning.
4 In a tidal power project, we would
5 have various structures. We would have dams,
6 navigational locks, filling gates, channels,
7 fishways, power houses, switch yards, transmission
8 lines, various roads, and service facilities to
9 support the installation. These are going to be
10 quite common to all tidal power projects. Their
11 size will vary for the various concepts and
12 configureations that can be rendered out of the
13 Cobscook Bay area.
14 This is a power house, a typical power
15 house bay showing a slant type turbine generator,
16 the turbine and the generator with the speed
17 increaser, and it shows the civil structure and also
18 the water passage draft tube where the water goes
19 through the turbine and generates, turns and
20 generates electricity for a project.
21 This unit you see here we envisioned
22 at one time would be somewheres around the size of
23 10-12 megawatt capacity. All projects, tidal
24 projects would need a filling or emptying gate,

1 gates that would allow the water from the ocean to
2 pass into the pools, and then to be shut down so
3 that when the tides receded, the water would pass
4 out through the turbines and turn the generators.
5 These structures are quite large. The
6 service gate slot there would be about 30 feet high
7 and the width of the gate would be about, I mean 30
8 feet high and the width of it would be about 30 feet
9 wide.
10 These are typical earth and rock
11 filled and clay filled dams that would be needed for
12 the construction of the project to make the
13 impoundments, to hold back the ocean waters from
14 entering the low or high pools, and also to dam the
15 water up so that the high pool could be maintained
16 higher than the ocean. These dams would be
17 constructed in some cases in Cobscook Bay in depths
18 approaching 180 feet. On the international plan we
19 had real deep depths up to 400 foot debts.
20 Some of the velocities in the area,
21 Cobscook area offer some construction hazards and
22 problems due to extreme high velocities, and also
23 the increasing and high rapid rate of rise of tides.
24 This is a photograph of a bulb type

1 turbine. Remember, you just saw a slant type
2 turbine. And this is a bulb type where the water
3 passes around the entire unit and the motion turns
4 the blades and propeller in the rear. These are
5 quite large in diameter. This sample here was taken
6 on one that was about 15 feet in diameter.
7 These turbines are going to be quite a
8 study as far as we are concerned, because they are a
9 costly item, and we want to investigate them
10 thoroughly. So we'll be investigating the bulb type,
11 the vertical and the horizontal types and the
12 inclined type that you saw previously.
13 This photograph is at LaRance, France.
14 It is a tidal project. It was built in about 1968.
15 It is in operation. It contains 24 ten megawatt
16 generating units. Now the size of this project is
17 about equivalent to our largest size that we see
18 right at this time of a Cobscook Bay project,
19 somewheres around 240-250 megawatts. We can go down
20 to somewheres around 40 megawatts.
21 Here again in Cobscook Bay with its
22 various and numerous inlets and peninsulars, small
23 islands, the area offers a great amount of
24 alternative layouts and configurations of dams,

1 power houses, et cetera, that can be made. We
2 certainly can come up with 10 or 12 configurations
3 that if we come back to you in a year or 18 months
4 time you will be able to see them. So you'll have a
5 great choice of configurations to select from, all
6 giving or most giving different capacities and
7 giving different outputs of electrical production.
8 You'll notice on my side of the screen
9 here there is a small navigational lock to permit
10 local fishing boats and some commercial vessels to
11 pass through. There is a highway across the top of
12 this structure which permits greater access for the
13 people living on the two sides of the estuary.
14 This interesting photo is of a
15 prefabricated power house unit. It's a concrete
16 structure that is being floated down a river north
17 of Murmansk, Russia. The unit was prefabricated on
18 land, put on to the water on large pontoons and
19 floated 60 miles down stream. You can see the
20 pontoons, the round units beside the structure and
21 you can see a tug pulling the unit down.
22 This shows the power house set in a
23 prepared foundation and being set up for generation
24 of electricity. The size of it is a 400 kilowatt

1 unit. It's quite a small unit, and there is also
2 space in the area there for them to put in a second
3 unit beside it. The walls and the impounded dams
4 there are built on either side, and that opening in
5 the river is only about 150 feet. It's a lot
6 smaller than the dams or shorter than the dams that
7 would be proposed in the Cobscook Bay area. This is
8 a working tidal power project.
9 On our new tidal power study, I would
10 just like to show you a few slides on some of the
11 steps that we are going to go through, some of the
12 things that we are going to look at. And here again
13 we are calling this the Cobscook Bay Tidal Study.
14 In our water resources plan, we have various
15 development stages that we go through. All Corps
16 projects go through this and the other agencies,
17 including state agencies, go through something quite
18 similar.
19 First of all, we develop a plan of
20 study, a document to guide us through the three to
21 four year effort. That is the stage that we are in
22 now. Normally that period takes about six to eight
23 months. It lines up what is to be studied, who is
24 going to study it, consultants, agencies or who,

1 sets up a timetable and maybe assigns a dollar
2 budgetary figure for accomplishing it.
3 In Stage II, we try to develop
4 intermediate plans. What we do is, we go out and
5 look at alternatives. We look at the alternatives
6 in tidal power for configurations of dams. We'll
7 look at should we make one-way flow turbines,
8 two-way flow your opinions; one-pool systems,
9 two-pool systems, link basins; and then we will also
10 compare these with fossil fuel plants and nuclear
11 plants. And currently the Corps is involved with
12 your state agency and the Department of Energy in
13 investigating small hydro power. So we will have
14 that as an alternative to present to you.
15 How much does the small hydro power
16 contribute or how does it relate to the amount of
17 production that the tidal power project can produce?
18 These intermediate plans, we'll probably have about
19 12 or 13 plans that we can all array, see how it
20 could be integrated into the New England energy
21 picture. We'll look at each one from an
22 environmental-economic point of view, and we'll
23 screen them, and then finally in Stage III we'll
24 come up with detailed plans from an economic point

1 of view, an environmental quality project and also
2 one that might be either one of them or a
3 combination or a separate project that might be the
4 most publicly acceptable to all.
5 In our planning task, carrying out the
6 study, we will be identifying the problems. Is
7 there a need for electricity? Where is it needed?
8 How much is needed? We will be developing these
9 alternatives that I just mentioned. We will be
10 preparing an assessment, impact assessment on them,
11 looking into the adverse and the good points of them
12 and arraying these so that decision makers, and you,
13 the public, can help to make decisions and choices.
14 Finally we'll be evaluating all of
15 these alternatives and these various impact
16 assessments, see how it all relates, see which one
17 is really wanted. This shows the three stages that
18 I mentioned before -- plan of study, development of
19 intermediate plans, and final plans -- and it also
20 arrays the various tasks. And what it does, it
21 shows the degree of intensity, how it progresses.
22 In the beginning we are looking at
23 problem identification. That's the largest block in
24 Stage I. Then in Stage II it gets a little smaller,

1 and in the last stage it's the smallest, and you can
2 see in your second stage a development of
3 alternatives is the largest. And it progresses down
4 to smaller. So that in your last stage, your impact
5 assessment and evaluation is sort of the largest
6 task that you are working on.
7 We have what we call a system of
8 accounts that we look into to see if our projects
9 meet various goals. We try to stimulate national
10 economic development, environmental quality,
11 regional development and social well being. We try
12 to relate our project to each of these points. Here
13 again in our plan of study, we are going to be
14 looking at the various study items, the task to be
15 accomplished, the various timetable budget and also
16 we'll be preparing along with our plan of study a
17 reconnaissance report, information as we're going
18 along and developing our study indicating economic
19 background, social background, cost on some of the
20 known alternatives that we have at this time.
21 Our overall investigation has four
22 main points that we'll be looking into. The
23 engineering feasibility, and probably the United
24 States plan is a little more engineering feasible

1 than the international plan due to the depths of
2 water not being so great.
3 We'll be looking into economic
4 feasibility, naturally, environmental feasibility
5 and public acceptability, typical impacts to be
6 investigated, and these columns, these items are
7 just listed. They shouldn't be in any one column
8 specifically and they often interrelate with other
9 columns. And you see such things as social,
10 cultural, public health, fish migration, navigation,
11 land use. That's an important one. Maybe in the
12 Eastport area, do people want a tidal power project?
13 Do they want a refinery? Do they want a deep water
14 port? Do they want the area the way it is? We'll
15 have to look at these things. And there are many
16 more than are on that list. And the same with our
17 transmission studies.
18 Tourism, what does a project like this
19 do to the community? How is the community impacted?
20 Do they need more police force? Do our trucks
21 building such a project damage the roads? Who's
22 going to repair them? Who's going to build the
23 extra school classrooms for workers coming into the
24 area? Things like that.

1 This shows, and I always like this
2 slide although this isn't the best slide we have,
3 and I have to apologies for it a little. This shows
4 you, the public, on the inner square. And the
5 public here in our case is sort of an agency person
6 that really isn't the Corps. And it shows the
7 planning process, how the public is involved. The
8 public can help us identify the problems. They can
9 help us to select the different alternatives. They
10 can help us to assess and evaluate the alternatives.
11 They can help us to select a recommended plan that
12 we might be able to go forward and say, look, here's
13 a plan that looks acceptable and is feasible, and it
14 could be recommended for future design or
15 construction. Or we might say there aren't any
16 plans that meet all those criteria. And then
17 finally you can help us to get the project into the
18 implement stage, build it.
19 So by all these circles keep going
20 back and forth like the arrows indicate, you always
21 keep coming back to your public to try to get a
22 feedback, to try to get an input. They also expect
23 to be informed about the project, not only once in a
24 while but all of the time, be kept up to date, and

1 one of our purposes for being here today is to sort
2 of kick off this study with you so that you have a
3 direct input or an input at any time to help us
4 guide the study or to present your interests or
5 concerns. So we are involving you just as we are
6 preparing the document which would say how we all
7 should accomplish this study.
8 And here again, you the public and
9 your constituents from top governmental agencies
10 down to the man on the sidewalk, the farmer, the
11 fisherman, we want his input, and we all have to
12 participate and work together to come up with a good
13 study which we can say, yes, we have a good project
14 here or recommend that we don't have a project here.
15 I wish to thank you very much, and
16 we'll hold questions off on these technical matters
17 and also study tasks until the question and answer
18 period. Next I would like to introduce Dr. Bud
19 Barrett who will discuss some environmental concerns
20 with you.
21 PRESENTATION BY DR. BUD BARRETT
22 DR. BARRETT: Thanks, Jim. Good
23 afternoon ladies and gentlemen. Mr. Callahan has
24 pretty well covered a number of things that come

1 into my area of concern, but I would like to mention
2 two points that I feel are quite important for you,
3 and one is that your participation is vitally
4 necessary for a complete EIS. And the second point
5 that I would like to touch upon is the nature of the
6 Environmental Impact Statement.
7 First of all, your input is necessary
8 to help us determine what types or scope of services,
9 what shall be in the scope of services for our
10 contractors and for other agencies that will be
11 doing studies for us. Concerns such as
12 socioeconomic, such as municipal services -- who
13 handles them? What kinds of impacts?
14 As Mr. Callahan mentioned, tourism,
15 what about construction impacts? People moving into
16 an area, do they live there for any length of time?
17 And if so, do they become part of your public and
18 municipal government? If in fact a good number of
19 them are there and they out number the citizens for
20 a short period of time, they can change the whole
21 nature of your public or governmental action within
22 a town.
23 The natural environment is another
24 concern. We have questions on fisheries, endangered

1 species, mariculture, the process that we go through
2 requires your input.
3 The second point is what the structure
4 of the environmental impact will be. The rules of
5 the game are changing. The Council on Environmental
6 Quality has a new set of proposed regulations that
7 we are following, and we have been given direction
8 to develop this particular Environmental Impact
9 Statement as all others coming up in the future
10 along these guidelines.
11 Basically they have required that the
12 Environmental Impact Statement be reduced from a
13 litigation proof document to one which is readable
14 to all people from all walks of life. It is to have
15 as backup data the scientific studies. In
16 accomplishing this, they have recommended and given
17 us guidance to produce a document which in their
18 view, no matter what the project, would never exceed
19 300 pages. Claiming that no one reads more than 300
20 pages anyway.
21 The structure of it would be basically
22 six major parts. The first part is the purpose and
23 the need for the project. That is the lead section
24 in the EIS. The second section and the largest in

1 terms of its intensity is the alternative section.
2 At this stage of the game where we do not have an
3 authorized project, we are to treat all alternatives
4 at the same level of detail in the study. We may
5 have ten alternatives, we may have two alternatives.
6 They may be all tidal or they may be nontidal when
7 we are done with our study. But your input will
8 help us determine that. And all areas of
9 investigation should be carried out to the state of
10 the art and to as equal an intensity of
11 investigation.
12 The third section would be impacts or
13 as they put it, the changes incurred by the
14 alternatives. We have to assess the impacts for all
15 of the alternatives. The fourth section would be
16 the affected environment which is another way of
17 putting it as the project setting without the
18 project.
19 CQ as well as many agencies have
20 become, I think, a little bit tired of seeing
21 environmental impact statements that have a project
22 description this thick, an environmental setting
23 this thick, and impacts statements three pages long.
24 And they are directing us, in fact, to change this.

1 Another interesting item is that they
2 require a list of preparers, and in this list you
3 essentially are giving your name, rank and serial
4 number; in other words, your qualifications to be a
5 preparer, whether you be a private contractor or a
6 staff employee of any state or federal agency. And
7 last an appendix and coordination.
8 One other thing to expect about the
9 Environmental Impact Statement is that it will not
10 be prepared immediately. We are approximately three
11 years from a draft EIS on this project or on this
12 study. It will be qualitative in nature. There is
13 no authorized project, and the EIS will assist in
14 making this determination. It will not be
15 quantitative. Once a selected plan has been
16 identified, then further and more highly intensive
17 studies will occur on that selected plan. And that
18 would be then the final EIS for the project,
19 proposed project. Thank you.
20 COLONEL CHANDLER: Thank you Jim
21 Callahan and Dr. Barrett. It's a little warm in
22 here down front. I suspect it must be even warmer
23 up back. You have been very patient. We're a
24 little bit behind the schedule that I thought we

1 would be on, and I would like to quickly directly
2 move into the question and answer period. I have
3 about three or four questions here to get the ball
4 rolling.
5 I remind you again that these
6 questions will lead to other questions. We have a
7 couple of gentleman here from my staff who have
8 cards. If you want another card, raise your hands.
9 If you want to ask questions as we're going along,
10 please keep cycling them in to me. And we'll move
11 right a long.
12 Our purpose here is to get a dialogue
13 going with you. You may have questions on things
14 that have been asked or stated so far, and you are
15 certainly welcome to ask questions about that. As I
16 indicated the tenure of your question does give us a
17 feel for what your concerns are and give us the
18 opportunity then to build those into the direction
19 which the study will take us.
20 The very first question that I have
21 here. I may have trouble with some of the words
22 written in it, but I'll ask Mr. Callahan to address
23 this: News reports site power generated mostly on
24 lower tide levels -- word missing -- if constant

1 power devices are used. The question is: Have they
2 been investigated? And the statement then following:
3 Water storage not the only system. I think we're
4 talking about the question as to whether it is
5 necessary to have head in order to have tidal power.
6 Mr. Callahan, do you want to address that question?
7 MR. CALLAHAN: Well, on tidal power we
8 are up against something where the heads, the height
9 of the water above the turbines is not always great
10 and it's always varying and it produces a problem
11 for steady generation and also a continuous amount
12 of steady generation. What we'll be looking into is
13 the various equipment that we can help to compensate
14 for some of these fluctuations. We will also be
15 looking at some reverse pumping principles and also
16 in the alternatives, we'll be looking at pump
17 storage above ground and below ground alternatives
18 to help the tidal power project.
19 COLONEL CHANDLER: How about the
20 notion that you can generate energy by using the
21 tidal current as opposed to tidal head, or relying
22 primarily on the tidal current?
23 MR. CALLAHAN: There are some
24 inventions mechanical devices where you can generate

1 electricity from the flow of water, not due to the
2 head of water. And you could put this into sort of
3 like a stream or river where you get the river flow.
4 You could generate electricity through different
5 veins. However, our principal will be sort of a
6 conventional type of hydro power project where we
7 are going to rely on the differential head of the
8 water from the ocean, between the ocean and the high
9 pool.
10 The Department of Energy has invited
11 and is receiving and awful lot of these inventions
12 through different patent people, people who are
13 processing patents, and they are evaluating them. I
14 understand that they say that out of about ever
15 4,000 invention patents that they receive or
16 recommend for a project, that about one out of every
17 4,000 is being investigated more thoroughly. They
18 are giving that person funds to look into that
19 device that they are preparing. In our project,
20 we'll not be looking at these inventive type
21 mechanisms. One thing is that they often interfere
22 with navigational aspects.
23 COLONEL CHANDLER: Basically you
24 should understand that we're working really with the

1 state of the art in the timeframe of the project.
2 So those alternatives that would not be available in
3 the timeframe of the study would not be, that is,
4 the timeframe of implementation of the project would
5 not be addressed.
6 This question, I'll let Mr. Callahan
7 try this one also. It says: You say, and it refers
8 to the public information brochure, on page 5 that
9 the New England electricity rates are high. CMP
10 says in the newspaper ads their rates are low.
11 Which is right?
12 Before he answers that question, I'd
13 like to just say I don't think that is our purpose
14 here today to be in debate as to what's high, what's
15 low, but I think Mr. Callahan can comment on why we
16 indicate the rates are highe, why we indicate in the
17 brochure that the rates in New England are generally
18 high.
19 MR. CALLAHAN: Well, across the
20 country, compared with across the country, most of
21 our electrical rates here in the New England region
22 are higher than other states. In our tidal power
23 project, and we are not proposing that it is the
24 complete answer to New England or the State of

1 Maine's energy problems. We're saying it's one of
2 our regional renewable resources that can contribute
3 to helping us solve our problems, something like
4 wood, peat, et cetera.
5 We know that in the tidal power
6 project, just like in most hydro power projects
7 where they are capital intensive, they cost a lot of
8 money in the beginning. We feel that the actual
9 cost of the electricity will not be as low as other
10 existing types of generation of electricity at this
11 time. Over the period of years with the changes in
12 the fuel and energy picture, I think that the tidal
13 power project and the river hydro projects will all
14 start to produce cheaper electricity. Here again
15 the Corps of Engineers, if we develop the tidal
16 power project, will not be the agency that is
17 responsible for marketing or selling the power.
18 COLONEL CHANDLER: The next question,
19 and we'll give you a break and go to Dr. Barrett on
20 this one: How would the transmission lines linking
21 Cobscook with NEPOOL compare in terms of length,
22 width and environment impacts with Dickey-Lincoln
23 transmission lines?
24 DR. BARRETT: I'd have to say that

1 more than likely they'd be shorter, but this again
2 is the responsibility of the Department of Energy,
3 and we're in coordination or conference or
4 discussions with them right now to scope out their
5 requirements to study the transmission line
6 alignment for the various alternatives that we may
7 come up with. But you are a lot closer to the load
8 source and the grid at Cobscook Bay than you are at
9 Dickey-Lincoln. So I'd have to say my guess would
10 be it would be a lot less.
11 COLONEL CHANDLER: I think another
12 point, and this can only be determined as the study
13 proceeds, one where the market place is for the
14 power. The size of the facility that is to be built
15 will govern greatly what the connection point will
16 be into the New England grid, and that of course
17 then will limit the opportunities for the routes
18 that would be associated as well as with the
19 physical structures that would be in the route,
20 because that is a function of the voltage being
21 carried.
22 Mr. Callahan: In estimating future
23 energy demand, will you look at the uses for which
24 energy is needed to determine whether some

1 nonelectrical energy would be more efficiency, for
2 example, space heating?
3 MR. CALLAHAN: In our study, we are
4 going to examine all of the reasonable alternatives
5 to tidal power. At the same time we are going to
6 investigate conservation. We are going to look into
7 some of the other aspects of conserving electricity,
8 where the demands are going. We'll have to work
9 closely with industry, also, on future projections
10 and markets, where the market is changing. There
11 may be industrial locations that are changing within
12 our State of Maine or the New England structure
13 where the demands for electricity will vary.
14 COLONEL CHANDLER: I think the area of
15 conservation alternative which is, of course, the
16 cornerstone of the President's plan dictates that
17 electrical demand that's going to be addressed in
18 this study reflect whatever techniques are
19 reasonable that will reduce the demand of
20 electricity in itself.
21 Next question I'll try to answer
22 myself. It says: How does the possible tidal power
23 project affect the proposed Pittston refinery?
24 Well, there was essentially one concern at the time

1 of the public hearing in Eastport in December, 1976,
2 and that concerned itself with the fact that, well,
3 we had some common land use but the major issue was
4 the movement of the BLCC, this is the large crude
5 tankers through Head Harbor Passage, and with the
6 presence of an international project, which was
7 still in consideration at that time, it would have
8 been a requirement to lock the BLCC through the
9 tidal project. And there were some estimates that
10 that lock would be as expensive as 80 million
11 dollars. Obviously of some concern.
12 Now that the Canadians of indicated
13 that they are not going to participate in an
14 international project with us, and we are therefore
15 focusing our attention on Cobscook Bay, it's very
16 improbable that there would ever be a requirement to
17 lock through the BLCC if a Pittston refinery is
18 built in Eastport. It would be anticipated or it
19 will have to be seen further whether the product
20 ships, these are the smaller ships - 30-35-40,000
21 dead weight tons -- would have to be locked through.
22 But in any instance there will be some
23 sort of a locking facility just as there was in the
24 LaRance picture that Mr. Callahan showed you. There

1 will be some kind of locking device in any instance,
2 and it is a question of how much. So there is still
3 an indication that the presence of a refinery in
4 Eastport followed by a tidal project, there will be
5 an interaction in some instances under some plans
6 possibly for locking the product ships. That would
7 be for the largest development where you would have
8 a dam, say, going in the extension from Eastport
9 through Trent Island as was show on that so-called
10 Plan D that was started in the middle '30s.
11 On the other hand, it's conceivable
12 that the development of the tidal project may only
13 involve some of the bays around the perimeter of
14 Cobscook Bay. In which case there would be probably
15 no interaction then between a refinery operation and
16 the movement of the ships to and from that and the
17 tidal project itself.
18 At the Eastport meeting on Monday
19 night, a new concern, however, was raised of
20 possible interaction between this study and a
21 refinery in Eastport and that was in the area of air
22 quality. And the concern expressed in Eastport was
23 that to the effect that the Final Environmental
24 Impact Statement just filed about two or three weeks

1 ago by the Environmental Protection Agency indicated
2 that in the area of air quality the refinery would
3 essentially consume the remaining tolerances in air
4 quality in certain pollutant areas, and therefore,
5 with any further action or proposals, applications
6 for permits that might generate the same pollutants
7 would in all probability have to be denied.
8 That raises the question then
9 primarily during the construction phase of a project,
10 such as the tidal project, as to whether or not it
11 would be able to obtain a permit for the
12 construction phase. The operation phase probably no
13 problem. There shouldn't be any air quality
14 problems during the operational phase of such a
15 project, but there could be during the construction
16 phase.
17 The next question goes back to the
18 transmission rights of way again, and I'll let Mr.
19 Callahan try this one: Transmission rights of way
20 and the loss of prime farmland, what are the
21 priorities and the alternatives?
22 MR. CALLAHAN: When the Department of
23 Energy does the transmission study, the Bonneville
24 Power Administration. They would be under the same

1 guidelines of conducting their study as we are on
2 the tidal power project. First, they would have to
3 start studying where the corridors would be. At
4 this stage of planning, the early stages of planning,
5 naturally the corridors of decisions could be wider
6 than if you were zeroing in and getting ready for
7 purchase of land and construction. They would have
8 to prepare the impacts of each corridor or line that
9 they put in, and weigh it on how much land it takes
10 away from farming or woodland operations or any
11 other kind of an enterprise and evaluate that in
12 their overall assessment and evaluation of the
13 transmission facility. Here again this transmission
14 facility, the length of it and the size of it would
15 vary depending on the size of the tidal power plant
16 that is constructed.
17 COLONEL CHANDLER: The next question,
18 again for Mr. Callahan, concerns itself with the
19 availability of power that might be generated from
20 such a project to people in Maine where customers
21 who would be nonpreference customers, if you will.
22 MR. CALLAHAN: In a tidal power
23 project we have so many different sizes of projects
24 that we can propose between, say, 40 megawatts to

1 around 250 megawatts that the amount of power
2 generated could reach a different number of people,
3 and also at different distances away as I see it,
4 and here again we don't know all the answers at this
5 time. This is why we're doing the study, is to try
6 to find them out, is that, say, I can envision the
7 smaller the tidal power project is the more local or
8 close to the project site the electricity would be
9 used. The larger size project probably would send
10 its electricity further, and when I say further,
11 right offhand I'm saying to the nearest point of
12 connection into the electrical grid which would be
13 somewheres in the Bangor area.
14 Naturally under our current laws for
15 federal power, we have to investigate and give it to
16 the preferential customers, the public utilities and
17 the co-ops and people like that. And certainly we
18 would have to, in each of the alternatives when they
19 are prepared, we will have to address this and show
20 some kind of a map indicating where these customers
21 are and how much of the energy goes where. Right
22 now I cannot answer all of the questions on that
23 exactly where that power would go.
24 COLONEL CHANDLER: I could put a

1 footnote on that, perhaps reading between the lines,
2 but it's conceivable that because of this particular --
3 well, let's put it this way, the way the Federal
4 Power Act is constructed, the bias is towards
5 development of the customer-owned type facility as
6 opposed to an investor-owned type facility. That's
7 apparently been the nature of the Federal Government
8 in passing that Act.
9 Now that raises certain concerns then
10 because in Maine there are not necessarily that many
11 preference customers. One of the alternatives to
12 that is that it's possible, it has been done in
13 other parts of the country for there to be joint
14 financing in a project such as this. In which
15 instance if, let's say it was 50 percent funded by
16 federal funding and 50 funded by private interests
17 in the State of Maine, then only that 50 percent
18 which is the federal investment would come under the
19 statutory requirement of being given preference to
20 the municipally-owned, cooperatively-owned utility,
21 and that other 50 percent which was investment from
22 the investor-owned facilities in the capital
23 investment in the plant would go right back to that
24 utility.

1 So there are various ways in which
2 this can be marketed which is not yet developed.
3 And conceivably there may be some interest in the
4 study in cost sharing between the investor-owned
5 utilities and the federal government.
6 A question for Dr. Barrett: What of
7 the sedimentation as the tidal bore is affected?
8 Will the coastal biography be adversely affected by
9 altering the tidal bore?
10 DR. BARRETT: I would say that if you
11 alter it and with the project, as we conceive most
12 of them, the alteration would be one to reduce the
13 erosional activity of it. So therefore there would
14 be less erosion. But the hydrology and the
15 bathymetry of the Bay is one of the primary study
16 areas that we anticipate looking at, and the
17 baseline data on currents is not all that complete.
18 We will have to complete it.
19 COLONEL CHANDLER: Here is another
20 question for you. What of the mixing of nutrients
21 and the planktonic mixing of marine organisms with
22 respect to their life cycles and marine resource
23 management? What can you say on that subject?
24 DR. BARRETT: What was the question?

1 COLONEL CHANDLER: What of the mixing
2 of nutrients and the planktonic mixing of marine
3 organisms with respect to their life circles and
4 marine resource management? In other words, how do
5 you think that will be affected?
6 DR. BARRETT: Well, the net result of
7 the project would be one of entrapment. So you
8 would have a nutrient buildup, but you would also
9 have a reduction in energy in that the mixing would
10 be reduced. As a matter of fact, it would be hard
11 to conceive of it becoming stratified during parts
12 of the year. You have a salinity gradient as well
13 as a temperature gradient that could develop. But
14 again you are asking me what the impacts are before
15 I know what the project is going to be. And without
16 having had the advantage of investigating that
17 particular system, so my answer is kind of
18 responding based on past knowledge and education,
19 that's all.
20 COLONEL CHANDLER: I think an
21 important point here, if you recall from the
22 audio-visual presentation, the representative from
23 the lab of Suffolk University at Cobscook Bay
24 referred to the need for baseline information.

1 There is very little baseline information of the
2 Cobscook area. So until we know what without-
3 project conditions are, it's going to be very
4 difficult to give any sort of measurement of the
5 with-project conditions. So the without-project
6 investigations will get underway here very shortly
7 in order that we have a better understanding.
8 Just as an example, you may remember
9 from the audio-visual there was some discussion by
10 one of the speakers that there was no problem, no
11 interference with clamming, and yet there was
12 another speaker who was there, showed an individual
13 clamming. That's where we have to find out from our
14 public up in the Eastport area, what do they do in
15 Cobscook Bay. Frankly when I was there Monday, they
16 were clamming, so I now believe there is some
17 clamming going on up there. But I don't know just
18 how much there is, and obviously that's to be
19 quantified.
20 Next question I'll try to handle
21 myself: Does the possible Cobscook tidal project
22 have implications for the Dickey-Lincoln
23 hydroelectric dams? Please discuss whether the
24 Cobscook project is being considered as an

1 alternative to Dickey-Lincoln.

2 Let me answer the second question

3 first. We're in a time warp here and it's not being

4 investigated as an alternative to Dickey-Lincoln;

5 that is, we're talking Dickey-Lincoln, to get

6 everybody up to speed now, Dickey-Lincoln is if

7 funded by the Congress, say, one or two years away

8 from initiating construction.

9 The tidal project that we're talking

10 about here is just initiating study, which is going

11 to be three to four years. There will be a time

12 lapse in there of possibly one to one and a half

13 years before the Congress gets the reports and might

14 choose to authorize it, and probably three or four

15 more years in advanced engineering and design before

16 Congress could even be requested to initiate

17 construction.

18 So the tidal project is probably ten

19 years on an optimistic schedule, about ten years

20 away from initiating construction. In terms of

21 looking at needs, that is, reflected in the analyses

22 of the two projects and the need for the tidal

23 project being looked at is a need more remote than

24 that which the Dickey-Lincoln project was looking at.

1 Beyond that you have to understand
2 there is a difference in the nature of the kind of
3 energy that these two project could generate. The
4 flow from the Dickey Reservoir is entirely for
5 peaking power, simply because that reservoir
6 represents a huge storage battery that captures the
7 spring runoff; that is, the snow, the snow melts
8 from that region, and holds it and then dispenses it
9 throughout the year, and there is very little
10 replenishment throughout the year. So you're
11 working on an annual cycle of replenishment. It's a
12 renewable resource that renews itself once a year.
13 The Lincoln dam downstream of that
14 which produces a smaller amount of electricity, all
15 of which is to be consumed in Maine, is called
16 intermediate load, meaning that it operates perhaps
17 as much as 50 percent of the day. And that's merely
18 taking the large volumes coming out of the Dickey
19 for peaking demands and holding them and spreading
20 them out on a daily basis. So the Lincoln School
21 Dam is somewhat replenished on a daily basis from
22 each one of the releases from the Dickey Dam.
23 When you get down to the Passamaquoddy,
24 there are all sorts of options that are available.

1 As Mr. Callahan indicated, on the two-pool system,
2 you can get some fairly decent firm power. You can
3 be generating power 24 hours a day. Indeed it's a
4 renewable resource that renews itself every 12 hours
5 and 25 minutes. So it's really renewing itself
6 almost every half day. And you can stretch that out
7 so that the plant is generating throughout the day.
8 So you may find that what this project will generate
9 is intermediate power, not competing with, say,
10 peaking power in Dickey at all.
11 The other aspects is simply the
12 capacity. The capacity of the Dickey-Lincoln
13 complex is 830 megawatts. We're talking about a
14 maximum capacity in the Cobscook area of probably
15 240 megawatts. It may be as low as 40 megawatts,
16 depending upon what the demand picture is. So it's
17 pretty hard to say that Cobscook could be looked at
18 as an alternative to Dickey-Lincoln. The nature of
19 the energy, the timeframe just make them really two
20 different things.
21 Now historically there is an
22 interrelationship which perhaps needs to be
23 explained because I find that there is still
24 misunderstanding about that. When Dexter Cooper

1 first came up with tidal power, one of the problems
2 was that the lunar cycle is simply not staying in
3 step with the solar cycle. And we human beings live
4 on the solar cycle. So as a result when the tide,
5 when you have your high tide, that's not when people
6 have necessarily high demands, and there was a
7 timing problem. And in order to solve that timing
8 problem, it was later on thought that an upstream
9 reservoir on the St. John River, initially at Rankin
10 Rapids area, would be an appropriate place then to
11 hold a supply of water that you could then use to
12 fill in the valleys in the tidal cycle; that is, at
13 low tide time you would be pulling out of that
14 reservoir. And at high tide times you could be
15 taking out of the tidal, and as a result you could
16 generate some firm power. That was before the
17 concept of a two-pool system was understood.
18 And as I indicated before, now that
19 there is two-pool technology, it's possible to get
20 firm power out of the tidal project itself by having
21 two pools. And the two projects then have been
22 separated and have remained separated since the 1965
23 studies.
24 Next question, I guess I just answered.

1 Let me read the question though. It says: From
2 page 6 of the brochure, if the timing of power
3 production results in a combination of peaking,
4 intermediate and baseload generation, will the pools
5 be fluctuating at other than on a lunar 24 hour 50
6 minute cycle, or 12-25 cycle?
7 That's kind of an intriguing question.
8 If you have made the capital investment into the
9 tidal project and every 12 hours and 25 minutes you
10 are going to have another high tide, it behooves you
11 to unload your pool in the interim. And timing now
12 becomes a very precise thing to be able to make the
13 releases from your tidal pool, so that you are in a
14 minimum pool situation when the tide starts coming
15 in. This is highly predictable, subject to some
16 fluctuation from abnormal weather. But it's highly
17 predictable, both in terms of the height of the tide
18 and in terms of the timing of the heights at those
19 stages. So quite conceivablebly on the tidal cycle
20 you will be trying to maximize the running of the
21 tidal project to get the pool lowered each and every
22 cycle.
23 As I indicated in a situation such as
24 a peaking facility, there is no requirement,

1 particularly on our river season situation because
2 all of our rain comes essentially in one part of the
3 year, and you only get one replenishment during a
4 year. So whether you take the water out of a Dickey
5 project today or whether you take it out tomorrow,
6 or there might be some pump storage facility, is not
7 nearly as sensitive as it would be with a tidal
8 project. You've really got to use up the potential
9 on that tidal project in a 12 hour and 25 minute
10 period, whereas in a conventional hydro as we have
11 in New England, you can afford to take it out at
12 some time during the year. So I would expect that
13 the basin would be unloaded each and every time in
14 the tidal. But again that will depend a little on
15 the demand, the nature of the demand that it could
16 service.
17 Okay, next question is, this is on a
18 comparison, and I'll give this to you, Mr. Callahan,
19 with the larger international project: What are the
20 relative installed generating capacities and what
21 are the relative costs for installed kilowatts of
22 that capacity? And would this project preclude a
23 larger international project later on at the same
24 site? So the first part of that is what are the

1 relative capacities that you can get at Cobscook Bay
2 versus the international project?
3 MR. CALLAHAN: On the international
4 tidal power project utilizing both Passamaquoddy Bay
5 as the high pool and Cobscook Bay and part of the
6 Head Harbour Passage as the low pool, there were two
7 power plants. Two 500 megawatt power plants could
8 be installed. And it was proposed to install the
9 first one initially and then the second one maybe a
10 year later, or it could be installed at a later time.
11 So our installed capacity, international plan, would
12 be 500 megawatts and a thousand megawatts maximum.
13 On the United States plan, we envision
14 it, and here again the studies are not complete and
15 a lot of it is based on past information which we
16 have to look at with a new approach and look at new
17 possibilities, would be somewheres in the range of
18 40 megawatts up to about 240-250 megawatts. So
19 installation of capacitywise, your United States
20 plan is quite smaller.
21 As far as electrical production on an
22 annual basis, I could give you these figures which
23 might be a little more useful. On the international
24 plan, on the 500 megawatts, we could install about

1 two billion kilowatts. I shouldn't say installed.
2 We would produce about two billion kilowatt hours a
3 year. On the thousand megawatt plan, there would be
4 something like 2.4 billion kilowatt hours a year.
5 On the United States plan, the annual electrical
6 generation would vary somewheres between 290 million
7 kilowatt hours and about 615 or 625 million kilowatt
8 hours.
9 COLONEL CHANDLER: How about the
10 relative cost per kilowatt?
11 MR. CALLAHAN: Relative cost per
12 kilowatt and here again, as I mentioned a little
13 earlier, tidal power is quite expensive frontend and
14 also is like normal river hydro, is somewheres
15 around 27 hundred dollars a kilowatt of installed
16 capacity. It's quite high.
17 COLONEL CHANDLER: Now how does that
18 compare Cobscook versus the international? Was
19 there any difference?
20 MR. CALLAHAN: There is a difference,
21 but it's not that great. It's within I think a
22 realm of a hundred or couple of hundred dollars
23 differences.
24 COLONEL CHANDLER: The last question

1 is----

2 MR. CALLAHAN: I can give that person

3 some exact figures when I open the book here.

4 COLONEL CHANDLER: The last question

5 is: Would this project -- that is to go with the

6 Cobscook Bay project -- precluding going with a

7 larger international project at a later date?

8 MR. CALLAHAN: We'll propose as one of

9 the alternatives a united plan that could be

10 utilized if and when we would want to go into an

11 international plan. It could be proposed in an

12 alternative. There are some alternatives and you

13 could face some of the turbines in a different

14 direction which would sort of preclude a larger

15 international plan. And we'll consider the

16 possiblity of an international plan in our

17 alternatives.

18 COLONEL CHANDLER: Next question for

19 Mr. Callahan: Does the irregular boundary of

20 Cobscook Bay pose a problem in emptying and filling

21 the tidal basin? Note, there is a time phase

22 differential of 50 minutes between the head of

23 Cobscook Bay and its inner most points.

24 MR. CALLAHAN: Cobscook Bay is quite

1 irregular. It has many peninsulars, island, false
2 island. It's sort of an impeding obstruction in
3 entering some of the bays that are further up
4 Cobscook Bay, and we do know that it takes the water
5 more abnormal time to reach some of the far points,
6 say, on the westerly side than it does on the
7 easterly side. After you had your project
8 constructed, remember, we would be controlling the
9 tides within that bay. So the fluctuations or the
10 variances mightn't be as great.
11 At the same time look at it this way,
12 that when you close your gates, when your tide is
13 high, you turn your generators on, you are opening
14 your generator gates, the water near the power house
15 is going to start to run out the turbines, through
16 the turbine draft tubes. And overall in your whole
17 40 square mile bay, the water surface will slope upward
18 from the power house up to, say, the beaches, say,
19 in Whiting or Pembroke, something like that. So it
20 would be on a slight slope. I don't see any real
21 problem after we get the impoundment made,
22 constructed, that this difference in tidal time
23 would affect it too much.
24 COLONEL CHANDLER: There is another

1 aspects to that question though that if you were to
2 take an option that might consist of several
3 impoundments around the periphery of the bay and you
4 do have the tides, high tides occurring at different
5 times, you have an effect of getting a two-pool
6 system in two separate areas because you've got
7 peaks at different times which tend to average out
8 at some other time. So there are some advantages to
9 the fact that there is a lag through Cobscook Bay on
10 that particular option.
11 MR. CALLAHAN: Could I add something?
12 COLONEL CHANDLER: Sure.
13 MR. CALLAHAN: If we went into a late
14 basin system where we took a lot of these subbays of
15 Cobscook Bay, that could very well happen that one
16 bay would fill up a little earlier or sooner than
17 the others.
18 COLONEL CHANDLER: Okay, Dr. Barrett,
19 are you doing the hydrologic studies or is the USGS,
20 i.e., hydraulics, sediments, effects on quality, et
21 cetera? And what will happen to the benthic
22 organisms due to the new shift of water brought on
23 by the dams?
24 DR. BARRETT: The first question,

1 we'll be contracting to several agencies or several
2 contractors for these various aspects. Usually what
3 determines that is availability, cost, and expertise.
4 USGS could be involved in it, and then again they
5 may not be. It could possibly be the Navy, could be
6 a private contractor or could be in House or a
7 combination of any group.
8 In terms of the benthic organisms,
9 again we haven't studied it yet, but if you are
10 asking an opinion, it's kind of risky but I'd say
11 that there definitely would be a change in the
12 benthic community. But I couldn't tell you right
13 now which way or what the organisms would be that
14 would replace them.
15 One thing for sure is that we will be
16 studying it. We do have other tidal power plants in
17 the world that are online. They have had experience
18 with this. Whether or not they have looked at it as
19 intensively as maybe we will remains to be seen.
20 But such as such as LaRance, they have embayed a
21 tidal basin. We expect to get some information from
22 them on an exexperience basis.
23 COLONEL CHANDLER: Going back to that
24 first question, one of the specific things that we

1 need to find out in this study is whether or not
2 physical modeling is going to be required in order
3 to do adequate hydrologic and water quality studies.
4 So that of itself could be a rather massive
5 undertaking.
6 Mr. Callahan: Will the new plans and
7 study be changed much from the old, and with Canada
8 dropping out, what effect will this have?
9 MR. CALLAHAN: One of the reasons we
10 didn't show a lot of configurations on tidal power
11 plant layout in Cobscook Bay is that we really
12 didn't want you to leave here feeling that we had
13 zeroed in to any one concept. We did show you the
14 1935 plan just for historical purposes to show just
15 what were the dams that were already constructed and
16 which are useful and can be salvaged and used in any
17 new tidal power project.
18 Colonel, could you just read that last
19 part again please?
20 COLONEL CHANDLER: It says with Canada
21 dropping out, what effect will this have?
22 MR. CALLAHAN: When Canada dropped out
23 being an active participant in this study, I see it
24 sort of personally as an easier study for the U. S.

1 side of the fence. There isn't the international
2 complicationsd of coordination. It certainly
3 reduces our study area. If we went into an
4 international plan, our study area, including
5 Cobscook area and its backup area, drainage area,
6 400 square miles or thereabouts, if we went into an
7 international plan, it's almost 4,000 square miles.
8 So it reduces the amount of the work and effort in
9 it. From most points of view it will make the study
10 easier for us, and the United States would sort of
11 have better control of the study itself.
12 COLONEL CHANDLER: A question for Dr.
13 Barrett: To your knowledge are there any endangered
14 species within the tidal project area?
15 DR. BARRETT: Yes, the bald eagle is
16 there for sure. There is possibility of the short
17 nosed sturgeon and peregrine falcon. These are
18 federally protected, and I believe there may be one
19 or two state protected species of plant. They are
20 not on the federal list, but we certainly would take
21 them into consideration and assess the impact on
22 them.
23 COLONEL CHANDLER: Next question asks
24 the question: Will the Corps comply with state

1 statutes and regulations or will such statutes and
2 regulations be preempted?
3 That I guess probably depends a little
4 bit. There are some specific areas where compliance
5 with state standards has now been incorporated into
6 what's known as federal consistency. Specifically,
7 you have pending approval, I guess within the next
8 six months or so, your coastal zone management plan.
9 And this is definitely in the coastal zone area.
10 That Act requires that federal agencies comply with
11 such a plan once it is approved. So the Corps would
12 certainly have to comply with your coastal zone
13 management plan.
14 We have a process known as Section 404
15 evaluation which comes under the Clean Water Act
16 which has to do with the placing of dredge and fill
17 materials in waters, which clearly this project
18 involves, in which we must undertake a 404
19 evaluation. And as odd as this may seem, in essence
20 I put on my regulatory hat where I am the regulatory
21 agency for 404 under that Clean Water Act and
22 challenge myself in my other hat as the individual
23 who is proposing the tidal project such as this.
24 And that is subjected to scrutiny and it is

1 consistent. The 404 is usually more stringent than
2 comparable clean water regulations at the state
3 level. Either the state level is as tough as the
4 Federal Government or not quite as tough. So in
5 essence inherent in that process is compliance in
6 that area.
7 Conceivably there are other areas that
8 escape me right now, and the questioner may have
9 some in particular that he wants to raise where
10 there is not necessarily a statutory requirement for
11 the Federal Government to comply with the state
12 statutes, and that usually results in somewhat of a
13 give and take.
14 I don't want to get into all of the
15 politics of approving studies, but the position of
16 the state government itself is a critical
17 determinant in forwarding a proposal to the Congress
18 for implementation. And at that time it is
19 conceivable that the state would perceive some
20 problems where some of its statutes might not be
21 complied with. And those reservations are presented
22 at that time or the governor might indeed be opposed
23 to the project, and that can impact on the project.
24 As I say, inherently there are

1 mechanisms that serve that purpose. Conceivebly
2 though, there might be instances where the so-called
3 public interest as seen from the federal level might
4 preempted some state regulations.
5 We are close to 3:30, in fact we just
6 passed by a minute. I have just a couple of three
7 questions which I think we could quickly go through,
8 and then we'll take the break and come back for the
9 comment period.
10 It says: In your discussion of the
11 relationship between the operational stage of the
12 project and the Pittston refinery, could you please
13 address the situation in which other new enterprises
14 would seek to use additional electricity? What
15 would then be the impact on air quality if Pittston
16 is already at the limit?
17 I can't give you an official position
18 because I'm not the regulatory agency on air quality.
19 And I can only say that I don't know the answer to
20 that question. I have now seen exstract of that
21 Final Environmental Impact Statement and the
22 implication of it, and it's a matter of concern as
23 to just what does happen vis-a-vis this project or
24 any other undertaking in the area. I don't have the

1 answer for you on that one. I would suggest that
2 that's a question that would be better addressed by
3 the Environmental Protection Agency, and if you are
4 really interested in it, the comment period on the
5 EIS for Pittston remains open, I believe, until the
6 18th of this month.
7 Next question is closely related to it.
8 It says: How could the Army Corps start
9 construction on the tidal power project with the
10 Pittston refinery in operation? Would it not take
11 an act of Congress to change the maximum level of
12 sulfur dioxide in the air? And then it says: Is it
13 fair for the government to consider building a
14 project that will violate environmental law by
15 adding an unacceptable pollutant to not only our
16 environment but that of Canada and two of her
17 wildlife sanctuaries as well? And a couple of our
18 own, Moosehorn.
19 I suspect that's not so, but you're
20 asking a question that is not unlike the
21 confrontation, if you want to call it that, between
22 the Endangered Species Act and water resource
23 projects at the present time. Congress has the
24 option obviously of changing the law. And more

1 recently Congress has shown an interest, if you
2 will, in vetoing federal regulations. And what the
3 mood might be in the timeframe we're talking would
4 be very difficult for me to predict. I certainly
5 would say though that the Corps cannot unilaterally
6 proceed with the project and violate the air quality
7 standards.
8 Mr. Callahan: Do you have a two-pool
9 system conceptualized for Cobscook Bay at this time?
10 If so, where would the dams be located?
11 I'd like to ask this questioner if he
12 wouldn't discuss this during the break with Mr.
13 Callahan. Perhaps with the help of a map he could
14 show you. There are several options along this line
15 which he can discuss with you.
16 As I said questions will keep coming,
17 and I hope I'm not going to overextend your patience.
18 This is for Mr. Callahan: Has the Corps considered
19 alternatives to the damming of sea water to achieve
20 sea power extraction, i.e., flotation or
21 displacement?
22 MR. CALLAHAN: We haven't up to date.
23 I can consider that comment as possible, looking
24 into it as an alternative.

1 COLONEL CHANDLER: Okay, how about:
2 Has the Corps considered power conversion to other
3 than electrical power as its continuous flow
4 requirements possess many problems? Mr. Callahan,
5 want to try that?
6 MR. CALLAHAN: Not right now. Not
7 right as of this time we have not, no, but here
8 again, we entertain these questions and we can look
9 at them and try to answer them for you and
10 investigate that possible alternative.
11 COLONEL CHANDLER: On that particular
12 question, inherent in that is a suggestion that
13 continuous flow requirements possess many problems.
14 I'm not sure just what is intended by that. I
15 thought we were emphasizing that with two-pool
16 technology today, it's possible in a single bay such
17 as Cobscook to generate fairly firm electrical power
18 and run it all day long.
19 The next question for Mr. Callahan:
20 Would the Corps entertain a proposal, more generic
21 in form, for harnessing tidal power for power
22 generation?
23 MR. CALLAHAN: I assume by that
24 comment that somebody has some kind of a proposal

1 that they would like to submit to us to look at it
2 as an alternative, and here again we would accept
3 any of them and be glad to look at them.
4 COLONEL CHANDLER: Okay, next question,
5 and maybe I should answer this: Has the Corps
6 concluded, before the study project has started,
7 that damming must be used for the Cobscook, Maine,
8 project?
9 And that's kind of a double barrel
10 shotgun, I think. What has not been concluded is
11 that the energy demands of New England have to be
12 satisfied by tidal power. The tidal power to be
13 generated does require dams. So I think the answer
14 to the question is that the tidal power project
15 which is site specific, going back to the question
16 before, that because that's the mandate in the
17 resolution from the Congress that involves, to
18 develop that tidal or harness that tidal power does
19 involve damming. However the study will study
20 alternatives to tidal power generation to satisfy
21 the needs.
22 Okay, the last question that I have,
23 and we'll get to that break: If the project is
24 built, what effect would it have on possible

1 supertanker traffic? Would oil or water discharged
2 from the refinery have deteriorating effects on the
3 turbines of the tidal project? Why hasn't Colonel
4 Chandler made a decision on whether or not to grant
5 Pittston a water discharge permit it needs to go
6 ahead with its plans?
7 And I'll answer all three
8 of those. Let me start with the last one. I don't
9 issue the water discharge permit. The water
10 discharge permit, the NPDS permit is an EPA permit.
11 The permit that I'm entertaining is under Section 10
12 of the Rivers and Harbor Act of 1899 which deals
13 with dredging and structures in navigable waters.
14 Why the decision hasn't been issued is
15 that federal statute requires that 30 days must pass
16 after filing of the Final Environmental Impact
17 Statement before the federal action can be
18 consummated. The comment period is still open on
19 that Final Environmental Impact Statement, and until
20 it is closed a finding of fact and decision on the
21 action cannot be made. In fact it is prohibited.
22 I think I discussed the issue, what
23 effect would it have on possible supertanker traffic?
24 It's my perception that it will not have any impact

1 directly on the supertanker traffic, that if the
2 opcion that might be implemented does in fact
3 include the supertanker docking facility that is now
4 comtemplated in the Pittston permit, that Pittston
5 will relocate so that the supertanker remains
6 outside that structure. But there is only probably
7 one or two options that such a structure will even
8 come up, and there is no assurance that that is the
9 structure that will be in the recommended plan.
10 There are a whole host of other structures which
11 will not in any way or may not in any way impact on
12 any portion of Pittston let alone the supertanker
13 portion.
14 As far as the -- I'll let Mr. Callahan
15 try this one, I guess: Would the oil or water
16 discharge from the refinery have deteriorating
17 effects on the turbines of the tidal project? Do
18 you want to try that one?
19 MR. CALLAHAN: It all depends what
20 configuration we have. On one or two of the tidal
21 power projects, the water from the refinery could
22 pass out through the turbine draft tubes. Then on
23 the others, on the other configurations the power
24 houses are sort of upstream of the discharge point,

1 and I don't think that they would pass through the
2 turbines.
3 Here again, this tidal power project
4 offers a real good investigation, a need for an
5 investigation into corrosion mitigation to make sure
6 that we install turbine, runner equipment, anything
7 connected with the sea water, such as the gates
8 structures and the slides for the gate structures,
9 that they are really of the best materials so that
10 they withstand the corrosion effects of the salt
11 water.
12 One of the slides that I showed you
13 was a bulb type turbine similar to the ones that
14 they used in the LaRance project. There was a man,
15 Mr. Garrett who was at our meeting in Eastport
16 Monday night, and he told me that he had seen these
17 turbine blades after operation in the LaRance
18 project when one of the bay units was locked off
19 for some repairs, and he said you would never
20 think that the blades were immersed in salt water at
21 all, that they were perfectly clean. So if we have
22 good metals in them, I would think that maybe any
23 kind or that kind of water would not harm our
24 equipment too drastically.

1 COLONEL CHANDLER: Absolutely the last
2 question and then we're taking the break. That
3 doesn't mean that we won't entertain more questions
4 later, but for this period, because I'm overtaxing
5 your indulgence here. But this is a good question
6 that I think should be answered. It says: Tax
7 dollars undoubtedly will be used to construct the
8 Cobscook Bay tidal project -- will the monies
9 derived from the sale of its power be returned to
10 the government treasury?
11 Let me go back to a statement I made
12 earlier. It's conceivable that there might be a mix
13 of funding. But in any instance that portion of the
14 project in which federal tax dollars are invested,
15 which are allocated to the generation of the power,
16 will be recovered through the sale of that power and
17 those monies would be returned to the federal
18 treasury.
19 Let me explain just a little more what
20 that means. We indicated that there might be some
21 other purposes of the project besides energy
22 generation. Mariculture was mentioned. It might be
23 that there is recreation. One of the processes we
24 go through is to allocate costs of the project to

1 then each one of the functions. Obviously the
2 largest share would go to power production. And all
3 of that which goes to power production in which
4 there is a federal investment will be recovered
5 through the sale of that power and ultimately
6 returned to the treasury.
7 There is requirement of financial
8 feasibility of the project, which we have not
9 mentioned up to now, but it's a little different
10 than economic feasibility. It's a test that the
11 Department of Energy puts projects to such as this.
12 And what it asks is this question: Will the cost of
13 the federal investment in the project be recovered
14 through the sale of power within the first 50 years
15 of the project life? And in doing that, they've
16 posed rates that are below the rates that they would
17 expect to be prevailing in other utilities without
18 the project at that time.
19 So it really answers two questions,
20 and this test has to be met by this project. It has
21 not yet been put to this test. And it's a reason
22 why this project might not be proposed if it were
23 found that indeed you could not sell the power at a
24 price below what you would expect to be selling

1 power for without the project in the first 50 years.
2 If you couldn't do it and recover the federal
3 investment, then you can't have the project. That's
4 the statutory requirement.
5 Let's take a 15-minute break, if you
6 will. We'll come back in at 4 o'clock. I have
7 about ten cards of people who wish to make comments,
8 and I think it will be very easy to have our comment
9 period in approximately 30 minutes. We should be
10 able to wrap this up very close to 4:30, and if you
11 have more questions, we'll return to questions and
12 answers after the comments have been heard. Thank
13 you. We'll see you back at 4 o'clock.
14 (A recess was taken.)
15 COLONEL CHANDLER: Very good. If you
16 would take your seats, we'll proceed with the
17 comments. I'd also like to remind you at this time,
18 I guess I did not say it earlier, the record of this
19 meeting is being officially transcribed. When you
20 come forward, I would ask you to identify yourself,
21 give your name and who you represent, or say you are
22 representing yourself. We are making a verbatim
23 transcript. That record will be open until the 28th
24 of July. We will make that transcript available.

1 The official copy for inspection will be at my
2 office in Waltham, Massachusetts. However, we will
3 make a copy available in your state library, state
4 capitol library here in Augusta, more convenient for
5 you. And if you want your own personal copy, you
6 can make arrangements with the public stenographer
7 down front, essentially for the cost of reproduction.
8 The record, again as I say, will be
9 open until the 28th. And if you have any comments
10 that you want to submit or any questions that you
11 want to ask between now and then, please feel free
12 to do so, and to write my office.
13 Now I'm going to the comment period.
14 We in the Corps have traditionally observed a
15 protocol of calling upon first elected officials or
16 their representatives at the federal, then state,
17 then local level, then going to appointed officials,
18 federal, then state, then local level. And as a
19 result, turning first then to elected officials at
20 the federal level, I would only observe that I did
21 provide an announcement of these meetings to the
22 members of the New England congressional delegation,
23 and I received a response from Senator Kennedy of
24 Massachusetts indicating his interest in the study

1 and his inability however to attend. And also from
2 Congressman Beard of Rhode Island, who indicated
3 that since Congress would be in session, he also
4 would be unable to attend this meeting, and these
5 two letters will be in included in the record.
6 I have a card indicating that Sandra
7 Morrell is here representing Congressman Emery. If
8 she would come forward at this time and use the
9 microphone over at this side, we'll hear her.
10 Sandra.
11 STATEMENT OF DAVID F. EMERY, MEMBER OF
12 CONGRESS, PRESENTED BY SANDRA MORRELL
13 MS. MORRELL: I am Sandra Morrell, a
14 field representative for Congressman Emery.
15 I welcome this opportunity to express
16 my support for the U. S. Army Corps of Engineers'
17 study of the feasibility of harnessing and employing
18 one of man's most renewable energy supplies -- the
19 ocean's tides -- in Cobscook Bay.
20 The dream of utilizing tidal power is
21 not a new one, although there are presently no tidal
22 power facilities in the United States. France and
23 the Soviet Union are presently operating tidal power
24 facilities, and both Canada and England have

1 seriously considered tidal power as an alternative
2 source of energy. A number of studies have
3 considered the feasibility of tidal power in this
4 country, and even this area of Maine, but employing
5 the energy of the tides has always seemed
6 economically infeasible.
7 There is evidence, however, that we
8 may have been thinking about the issue in the wrong
9 way. First, there is the French experience. France
10 constructed its pilot project in 1966, and although
11 the cost-benefit ratio was initially poor, it is now
12 favorable. The consistency of the project's
13 performance has fascinated scientists. Secondly,
14 the Stone and Webster Engineering Company of Boston,
15 commissioned by the U. S. Energy Research and
16 Development Administration, used a "life cycle cost
17 analysis" and recently concluded that a tidal power
18 plant in the Cobscook Bay area of Maine is "an
19 extremely attractive project."
20 In addition, we may have been
21 attaching too low a value on the available benefits
22 to be derived from the use of tidal power. For one,
23 the value of reducing our dependence on high-priced
24 foreign oil is difficult to measure, though it is

1 certainly greater than ever. As well as an increase
2 in hydroelectric power and a decrease in our
3 dependence on foreign sources of energy, benefits of
4 a tidal power facility in Cobscook Bay would include
5 a reduction of the disparity in prices which New
6 England states pay for energy and the creation of
7 jobs through investment in an area of traditionally
8 high unemployment.
9 Never before in our history has the
10 need for alternative energy sources been so urgent.
11 The tides seem like an ideal source. They are
12 productive, nonpolluting, and renewable. A tidal
13 power plant in Cobscook Bay certainly does look like
14 "an extremely attractive prospect." Thank you.
15 COLONEL CHANDLER: Thank you very much,
16 Ms. Morrell.
17 Are there any other representatives of
18 elected federal officials here who desire to be
19 heard?
20 (No response.)
21 Are there any state elected officials
22 or their representatives who desire to be heard?
23 (No response.)
24 Are there any local elected officials

1 or their representatives who desire to be heard?
2 (No response.)
3 Turning then to appointed officials,
4 are there any appointed officials at the federal
5 level who desire to be heard?
6 (No response.)
7 Are there any at the state level who
8 desire to be heard?
9 (No response.)
10 Are there any at the local level?
11 (No response.)
12 There being none, then I'll proceed to
13 the other cards that I have. We've marked these in
14 the sequence in which they were received and will
15 then call them up in that order. The number one
16 card that I have is Holly Lehigh, is she here?
17 (No response.)
18 Perhaps not. We have been answering
19 quite a few questions, as a matter of fact, that she
20 has asked. Number two is Charles and Irene Dunbar.
21 Are either of them here and desire to be heard? We
22 have also had questions from them.
23 (No response.)
24 Next, Robert Turner?

1 STATEMENT BY ROBERT TURNER

2 MR. TURNER: Colonel Chandler, members
3 of this hearing body, my name is Robert Turner. I'm
4 the Executive Director of the Economic Resources
5 Council of Maine. I've been asked by our Board of
6 Directors to speak on their behalf regarding the
7 tidal power study on this project.

8 The Economic Resources Council of
9 Maine is a privately supported organization
10 comprised of many of Maine's business and industry
11 leaders as well as many private citizens from a wide
12 variety of occupations and many labor leaders of our
13 state. All of whom are committed to balanced
14 economic growth for Maine. We have members from all
15 areas of the state who are brought together by a
16 common desire to have the positive aspects of
17 appropriate economic growth communicated to the
18 people of Maine.

19 On behalf of the Economic Resources
20 Council of Maine, I want to offer our complete
21 support for this study. There are few projects in
22 Maine which should be more agressively examined than
23 the possibility of using tidal power for the
24 generation of electricity. In spite of the beliefs

1 of the advocates of no growth, Maine needs
2 electricity now and will need more in the future.
3 Our participation in the New England power grid
4 makes this a regional concern, and Maine must
5 contribute its share to the region if we are to
6 continue to use this system.
7 Once in place, this system would be a
8 renewable, nonpolluting source of power that could
9 make a worthwhile contribution to our needs; and
10 while it won't answer all of our energy needs, we
11 must have a diversified system of power generation,
12 a system that has a place in it for tidal power.
13 We urge you to consider this project
14 in light of the future costs of other power
15 facilities. To make the financial analysis solely
16 on the basis of today's costs would be extremely
17 shortsighted and make the entire study one of
18 dubious value. Secondly, we urge you to consider
19 the needs of the citizens of Washington County and
20 the Eastport area. This area of high unemployment,
21 more than any other in this state, has been
22 subjected to the roller coaster of promised economic
23 development followed by unfulfilled projects and the
24 economic stagnation and unemployment that results.

1 The idea of tidal power, as you
2 pointed out, is not new. Plans have been talked
3 about without results for years. The proposed oil
4 refinery in Eastport continues to have road blocks
5 and obstacles thrown in its pat. These are just two
6 examples of opportunities the citizens of this area
7 have been close to but unable to realize. The jobs
8 resulting from this project, both during
9 construction and after the project's completion,
10 would have a positive economic effect in Eastport
11 and Washington County, a positive effect which must
12 be given great importance.
13 It is our hope that this study will
14 result in evidence that urges the project to go
15 ahead. Obviously, careful study is required, but
16 we urge you to keep away from the many items
17 considered trivial by common standards which often
18 delay these studies. The people of Maine are known
19 for their common sense, and we hope that this common
20 sense will be used in the study.
21 The Economic Resources Council of
22 Maine welcomes the opportunity to help with this
23 study in any way we can, and we urge you to proceed
24 with your work as quickly as possible. Thank you.

1 COLONEL CHANDLER: Thank you very much,
2 Mr. Turner.
3 I might add so his offer of assistance
4 and participation that there will be opportunities
5 throughout the study phase for more intense
6 participation than through these meetings. As I
7 indicated we have had some workshops, and we have
8 had a group of some 70 people already who have
9 indicated a willingness to participate. And any
10 other individuals who by subsequently learning of
11 the project wish to be invited to working sessions
12 and make that information known to us, we will
13 extend that welcome to them because we do appreciate
14 additional participation.
15 Daryl Christopher?
16 (No response.)
17 All right, thank you. Doctor Clough.
18 Is it Cleff or Clough?
19 DR. CLOUGH: Sir, Dr. Clough.
20 STATEMENT BY DR. CLOUGH
21 DR. CLOUGH: Colonel Chandler, I'm
22 very happy to have this chance to make a few
23 comments. My name is Garrett Clough. I'm a member
24 of the New England Coastal Oceanographic Group, a

1 small consulting group working on the coast. And
2 I'm also a faculty member, new faculty member at
3 Nasson College in wildlife biology and general
4 zoology. I'm also a member of the Board of
5 directors of the Maine State Biologist Association.
6 I learned a few things just in the
7 coffee break which changed some of my comments. I
8 was going to just make some suggestions. I've
9 already sent a letter for the June 5 workshop, but I
10 don't think that needs to be repeated. I'm
11 interested in the environmental aspect. My remarks
12 will be limited to those.
13 I want to make sure that the plan of
14 study includes terrestrial components of the area.
15 Just to emphasize that again, even though it's
16 primarily concerned with the intertidal marine zone,
17 I think there definitely should be the approach used
18 of the study area as a ecosystem and to emphasize
19 the interrelationship between various components.
20 And an example, a very clear example might be, of
21 course, the endangered bald eagle which eats fish to
22 a large extent. So what happens in the marine
23 intertidal zone and these changes that occur there
24 will have definite impacts on the natural systems on

1 the land. So they shouldn't be overlooked.
2 Then, of course, there is all the
3 human impacts that will come on this terrestrial
4 system too. You talked about tourism, increased
5 hunting, and visitation, general use that will
6 affect the land animals and birds of that area and
7 the forests and other plant communities. I was
8 going to say that the, well, it's easy to find a
9 check list of items for EISs. As Dr. Barrett
10 pointed out, the CQ has new guidelines, regulations,
11 but sometimes those check lists give us too much
12 data to digest, and they shouldn't be any longer
13 just lists of components, like study the marine
14 mammals, study the sea birds, study the benthic and
15 vertebrates. But they should go further than that
16 and go into these interelation topics of functions
17 of the whole system, such as look at energy flow --
18 by energy I mean bioenergy flow here in terms of the
19 otum type of ecology -- nutrient exchanges and
20 dispersal of organisms between habitat. And maybe
21 the best model, I was going to say, was the Fish and
22 Wildlife Service's current project going on on the
23 Maine coast, characterization, and I just found out
24 that the Corps of Engineers are now talking with the

1 U. S. Fish and Wildlife at Newton Corners, and
2 perhaps a continuation of the project which will go
3 on this summer, actually, will be some how
4 integrated. So I'm very glad to hear that.
5 I have also been working as the
6 terrestrial ecologist, a terrestrial ecologist, and
7 mammalogist on that project and was planning a trip
8 to Cobscook Bay this coming month for that. So I'm
9 very happy that these two important federal
10 organizations are integrating that work.
11 And then I want to make another
12 comment, maybe a little aside, but there are lots of
13 opportunities that will open up in the Cobscook Bay
14 area that I've heard mentioned, such as tourism to
15 visit this rather unique and magnificent project.
16 There will be people wanting to see it, and there
17 will be new opportunities for mariculture, for
18 example, those two have been mentioned.
19 But one that hasn't been mentioned,
20 and speaking now as a scientific researcher,
21 thinking of myself as an academic type researcher
22 interested in basic ecology, there will be many new
23 opportunities for scientific research in the area.
24 And some how these opportunities should be more

1 widely announced. One thing that will happen will
2 be alterations in the island connections.
3 And these alterations in the dispersal
4 abilities or potentials for animals and plants are
5 of great interest to general theoretical ecology now.
6 It's a very exciting time in general ecology,
7 because there are a lot of, there are lots of new
8 theories that have been developed just in the last
9 ten years that now need testing, and testing has to
10 be done experimentally on a large scale over a long
11 period of time. Well, what's happening or what may
12 happen in Cobscook Bay will give scientists
13 opportunities to test some of these theories.
14 Topics such as animal community
15 structure and the stability of animal communities,
16 colonization and dispersal of animals, interaction
17 of species, such as competition between related
18 species and predator-prey relations, population
19 relations that has to do with food supply. All of
20 these are basic questions that are being discussed
21 by ecologist in this country and the world.
22 And I would suggest that as the plan
23 of study develops that someone be appointed to make
24 these possibilities known, and one way of doing it

1 would just be through simple notices in state,
2 regional and scientific group publications, for
3 example, the Maine State Biologist Association
4 newsletter, the major universities and colleges in
5 the region of New England and also in Canada,
6 because scientists aren't inhibitied by
7 international boundaries when it comes to research
8 possibilities. And then such organizations as the
9 Ecological Society of America newsletters, American
10 Society of Mammalogists, and so on. Just an
11 announcement that these things are happening, and I
12 think you would find some scientists interested to
13 come. They have their own funds or there would be
14 other funds such as the National Science Foundation
15 funds.
16 I know myself that the island near
17 there, Kent Island, attracts scientists from all
18 over the world, and new opportunities where what
19 will happen there will be large man-made alterations
20 in the environment. Just beautiful opportunities
21 for testing certain changes that may come about.
22 And the time scale is very favorable,
23 the three or four years before anything happens.
24 That's just time the scale that a Ph.D. does his

research in, and then flow changes after that. And I'd be very glad to help at any time in the future with some advice or notification of these organizations, many of which I'm a member. Thank you very much.

COLONEL CHANDLER: Thank you very much, Dr. Clough, and I assure you we are interested and would like to include such agencies on our list and will keep in touch with you.

John Goodwin.

STATEMENT BY JOHN R. GOODWIN, COORDINATOR, MAINE CITIZENS FOR DICKEY-LINCOLN

MR. GOODWIN: Thank you very much, Colonel Chandler, and everybody else for this opportunity to discuss with you today the proposed tidal project on Cobscook Bay.

My name is John R. Goodwin of Bath. I'm the Executive Director of Maine Citizens for Dickey-Lincoln, a group of Maine Citizens from all walks of life and from throughout the state who believe that the hydroelectric power project on the St. John River in the northern part of the state is something that Maine and the rest of region needs to meet its energy demands.

1 This meeting here today has, of course,
2 been called to discuss the tidal project at Cobscook
3 Bay and not Dickey-Lincoln, but we believe that the
4 two projects are related now just as they were more
5 than forty years ago when first conceived, not in
6 the technical sense but in the sense that they are
7 both projects using water as its principal resource
8 to power the generators.
9 We would like to support the planned
10 project at Cobscook Bay for we believe that it along
11 with Dickey-Lincoln and various medium and small-sized
12 hydroelectric plants can and must play a large role
13 in the future of this state and region.
14 Hydroelectric power is clean, renewable, and quite
15 low cost. In a state and a region which has little
16 or no energy resources, water is something we do
17 have in substantial abundance -- not to be wasted of
18 course but to be used careful and in the best
19 interests of all.
20 That water is a low-cost source of
21 electric power is indicated in an advertisement the
22 state's largest utility, Central Maine Power, ran in
23 Maine newspapers recently. Claiming that its rates
24 were well below the average for the top one hundred

1 electric facilities in the nation, CMP sites two
2 basic reasons for this. One is what they call the
3 low-cost nuclear power, the other is even lower cost
4 hydro power.
5 The reason hydroelectric power is so
6 low cost in comparison with other sources is pretty
7 obvious. The water used to turn the turbines is
8 free from the inflationary pressures which push up
9 the cost of alternatives such as oil, coal and
10 nuclear. It is precisely this which appears to make
11 the proposed Cobscook Bay project economically
12 feasible even though by conventional measurements
13 the cost-benefit ratio is less than one half that of
14 Dickey-Lincoln.
15 The preliminary analysis of Cobscook
16 done by the Corps of Engineers that we've read shows
17 a possible cost-benefit ratio of between 31 and 45
18 cents to a dollar. The cost-benefit ratio of
19 Dickey-Lincoln is 1.2 to one.
20 If a dollar invested in Cobscook
21 returns only 31 or 45 cents, why, one might
22 naturally ask, bother with it at all? The answer is
23 that over the long run the project no doubt will
24 make sense. This is because over the life of the

1 project -- that is to say the life cycle, if you
2 will -- the benefits will far outweigh the costs.
3 The reason for this, as we have
4 already mentioned, is that the tidal water used to
5 power the generating turbines is immune for all
6 practical purposes to inflationary pressures.
7 This loss in the short run and very
8 substantial gain over the long run is not all that
9 strange a phenomenon. Countless businesses run in
10 the red for a time after they begin and only
11 gradually begin turning a profit and return on
12 investment.
13 The difference between Dickey-Lincoln
14 and the proposed Cobscook project, in this sense, is
15 that at the St. John River project there is no
16 waiting as we understand it for the break-even point
17 down the road. It's economically viable today and
18 will be even more so in the future, especially if
19 the life-cycle method of analysis is applied. We
20 understand the Corps is now engaged in such a study
21 and that the results will be available later this
22 summer.
23 We would hope that the State of Maine
24 will be treated as a special marketing area for

1 Cobscook Bay power just as it has been so designated
2 in the case of Dickey-Lincoln.
3 Since there are environmental, social,
4 and economic costs involved that are unique to the
5 state, it seems only fair that Maine should get a
6 larger proportional share of the benefit that might
7 otherwise be justified. Maine is scheduled to
8 receive 44 percent of all the power generated from
9 Dickey-Lincoln. Some such allocation from Cobscook
10 would seem to be appropriate.
11 These sources of electric power are
12 crucial to Maine's future. If the state's largest
13 utility can credit hydro power, in part, for its
14 supposed low rates, then it follows that hydro power
15 is something we in Maine and elsewhere in New
16 England should be developing to the extent possible.
17 Every electric power consumer in Maine should be
18 supporting both Cobscook and Dickey for they will
19 all benefit from this low-cost source of energy.
20 Maine consumers are not dumb. They
21 fully realize that there are special interests who
22 want to push up the cost of electric power for their
23 own peculiar reasons. For example, the oil dealers
24 who are terrified of low-cost electric power, the no-

1 growth forces who would put us all back into some
2 sort of a peasant culture, the sociological
3 reactionaries who view broad-scale improvements in
4 the standard of living as some how vulgar and cheap,
5 and the new class of leaders who would take to
6 themselves the task of defining what is good and
7 what is bad for the rest of us.
8 But as we said, Maine consumers are
9 able to see through all that and observe for
10 themselves that what Maine needs is more and cheaper
11 power, not less power that's more expensive.
12 We're convinced that the studies the
13 Corps of Engineers is now undertaking at Cobscook
14 will show this unique project a worthwhile
15 undertaking with benefits spreading throughout Maine
16 and the rest of New England.
17 This idea of harnessing the tides to
18 generate power has long been with us. So has
19 Dickey-Lincoln. It's time both were brought to
20 reality.
21 We have procrastinated so long, in
22 fact, that the Canadians have withdrawn from the
23 original idea of an international tidal
24 hydroelectric project at Quoddy bay. One can hardly

1 blame them. While Maine and New England have
2 delayed in developing any large-scale hydro projects,
3 Canada has moved ahead on a very large scale. In
4 fact, the Canadians sell large amounts of power in
5 this country today and are anxious to sell even more
6 in the future. And why shouldn't they? It's a good
7 way for them to work their own way into energy
8 independence while others -- that is, Americans --
9 pay a large share of the bill.
10 Maine consumers are paying for
11 Canadian power today and will tomorrow. It's not
12 low-cost hydro power, either. The Canadians wisely
13 to keep that for themselves. It's expensive power
14 from oil fired plants. Central Maine Power last
15 year purchased 27 percent of its power from sources
16 outside its own generating system. Much of this
17 came from the Canadians.
18 This dependence on outside sources for
19 power -- outside the state, outside the region, and
20 even outside the country -- cannot be ended entirely,
21 but it can surely be lessened by developing the
22 natural resources we have, and one of them is
23 certainly water. That is why -- barring unforeseen
24 factors or developments that may emerge during the

1 indepth study that is now underway -- we believe the
2 Cobscook Bay project, along with Dickey-Lincoln,
3 ought to be developed and brought on line as soon as
4 possible. Thank you.
5 COLONEL CHANDLER: Thank you, Mr.
6 Goodwin. Mr. Beardsley? Is he here? J. H.
7 Beardsley?
8 (No response.)
9 Mr. Knowles?
10 MR. KNOWLES: I think what I have to
11 say has been said and I will relinquish my time to
12 someone else.
13 COLONEL CHANDLER: Thank you very much,
14 sir. Doctor Laberge.
15 STATEMENT BY DOCTOR NORMAND LABERGE
16 DR. LABERGE: Thank you. I'm speaking
17 this afternoon from my own personal experience with
18 the Half Moon Cove Tidal Power Project. Since
19 January 1976 I have worked with the Passamaquoddy
20 Tribe in developing the plans for the demonstration
21 project at Half Moon Cove. The basic objective of
22 this project is to decrease the cost of future tidal
23 projects not only in Cobscook Bay but other sites of
24 the United States where tidal power development is

1 possible.

2 The basic areas where the

3 demonstration project can decrease the costs of

4 future projects is in the area of turbine equipment

5 of turbogenerating equipment. Presently the

6 difference, the major differences between the cost

7 of a tidal power project with conventional

8 hydroelectric is the cost of the generating

9 equipment, which is two to three times larger. By

10 instituting a demonstration project, we feel that

11 the cost of the equipment itself could be reduced by

12 a large margin and thereby increase the economic

13 feasibility of future tidal projects.

14 I agree that the comparison of scale

15 is not in favor of small projects, but we feel that

16 the research and development objectives can outweigh

17 these drawbacks to small projects versus large. On

18 the other hand, a small project doesn't have some of

19 the costs involved as a large project. For example,

20 the transmission lines in our case could be tied in

21 directly to the system used by Bangor Hydro to

22 supply electrical power to the region.

23 Another area where a small project

24 would cost less than a large one is the annual costs,

1 the total capitol costs for interest during
2 construction, since a small project would take one
3 to two years to construct versus five to six years.
4 This decreases the total capitol needed.
5 Other than these factors, there is the
6 question of the environmental impact of tidal power.
7 A small demonstration project could. Research these
8 different areas at an operating site to sort of
9 reduce the data and develop baseline data for
10 application at large tidal installations.
11 Others areas are in the engineering of
12 the project, the scheduling, the design of the
13 components, the corrosion problems is stressed, the
14 protected measures, the long term concrete
15 deterioration. These are some of the various areas
16 we feel a demonstration project could also reduce
17 the costs of future projects. Also in the
18 operational aspects.
19 Since tidal power has to be in a way
20 tied in with an integrated electrical network, the
21 electrical equipment needed to enable this to occur
22 would have to be researched and developed also.
23 These are the major areas where we see a small
24 project could help large tidal.

1 Also included within the objectives of
2 the Half Moon Cove Project is the aquaculture
3 development of the Basin. We're starting this year
4 a small aquaculture experiment which will serve to
5 produce information which would compare the
6 aquaculture potential before, during and after
7 construction, which should prove informational to
8 any other aquaculture venture in Cobscook Bay. So
9 in summary, we're saying that the demonstration
10 project would serve many uses to the large
11 Passamaquoddy project.
12 Another option available from the Half
13 Moon Cove site is that a step by step implementation
14 could be used whereby a series of small basins could
15 be integrated into one energy network. We have done
16 some studies where we've looked at a pair of Basin
17 systems whereby instead of having a hydraulic link
18 as in a two-pool system, we're proposing an
19 electrical link which would coordinate production
20 from two independent tidal basins to produce
21 dependable power. The central components of this
22 are two single-pool systems, one operating as a high
23 pool, the other as a low pool, with the capacity of
24 the plant determined by available volume flow in

1 both tidal basins so as the time domains or time
2 regimes for local low-pool and high-pool operation
3 are coordinated to get dependable production.
4 We feel this is important also in the
5 development and should be considered within the
6 Corps' scope of work. We welcome the opportunity to
7 work with the Corps during the study, and any
8 information we do have will be available to the
9 Corps. Thank you.
10 COLONEL CHANDLER: Thank you very much,
11 Doctor Laberge.
12 That completes the cards that I have.
13 I will call again Holly Lehigh. Is she here?
14 (No response.)
15 Charles or Irene Dunbar?
16 (No response.)
17 Or J. H. Beardsley?
18 (No response.)
19 Are there any others who desire to be
20 heard at this time who did not submit a card?
21 (No response.) Are there any questions
22 that you would like to ask then if we return to
23 questions at this point in time? Anybody have any
24 questions that they want to ask? You may pose them

1 from the floor if you so desire at this point in
2 time. Okay, yes, Mr. Christopher.
3 MR. CHRISTOPHER: Will all the
4 information you people accumulate appear in the
5 state library for availability for the public?
6 COLONEL CHANDLER: The transcript of
7 this meeting will be made available in the state
8 library. That's specifically. I'm not sure I know
9 what you mean by all the information?
10 MR. CHRISTOPHER: There will be a
11 large data base accumulated undoubtedly.
12 COLONEL CHANDLER: Yes. There is
13 listed in this brochure the Maine State Library as
14 being a repository for all information that will
15 accrue relative to this project. So that there will
16 be a repository here in Augusta. And for those of
17 you who don't live here, on the back flap of this,
18 you'll note the listing here of places where we plan
19 to place documentation as it is developed. Does
20 that answer your question?
21 MR. CHRISTOPHER: Yes. There is one
22 other thing. Will there be additional workshops,
23 and if there are, what kind of notification system
24 will you institute?

1 COLONEL CHANDLER: Basically I have a
2 contract with the University of Maine at Orono for
3 our public involvement activities, and if we find a
4 need for an additional workshop in a particular area,
5 perhaps such as Dr. Clough has mentioned, I would
6 look to the University of Maine to reestablish the
7 contacts. And we would go on a workshop basis.
8 Normally we go out on an invited basis, although
9 there are often times a public announcement with it.
10 That is, it certainly is open to the public, even
11 though it may be on an invited basis.
12 I would repeat what I said a little
13 earlier, anybody who is interested in more detailed
14 participation than they have had, say, as an
15 opportunity in a forum such as we have had today, if
16 they will write my office, we'll see that when such
17 opportunities come up that they are included by
18 invitation.
19 Are there any other questions or
20 comments at this time?
21 (No response.) If not, I'll remind you
22 again of the record that this meeting will remain
23 open until the 28th, and you may write my office
24 questions or comments through that time.

As we have indicated the officials transcript will be available in my office in Waltham for inspection. A copy will be made available up here in the state library. If you desire your personal copy, please see the stenographer down front.

I thank you very much for your participation today. I assure you that the concerns and comments that you have made today will be extremely helpful to us in completing the preparation of our plan of study, and we'll keep you informed through our public involvement program. If we have a white card from you with your name and address, you are in effect then on our mailing list for future reports on the progress of the project. Thank you very much.

(Whereupon, at 4:30 p.m. the meeting was concluded.)

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UNITED STATES OF AMERICA
Department of the Army
New England Division, Corps of Engineers
424 Trapelo Road
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PUBLIC MEETING
for the
TIDAL POWER STUDY
COBSCOOK BAY, MAINE, USA

Consolidated Gymasium
Lubec High School
Lubec, Maine

Thursday, July 27, 1978
7:00 o'clock p.m.

BEFORE:

COLONEL JOHN P. CHANDLER, Division Engineer,
New England Division, Corps of Engineers

JIM CALLAHAN, Project Manager,
New Engalnd Division, Corps of Engineers

JOSEPH IGNAZIO, Chief, Planning Division
New England Division, Corps of Engineers

DR. BUD BARRETT, Manager, Environmental
Impact Statement, New England Division,
Corps of Engineers

PUBLIC HEARING

Mr. Walston: Ladies and Gentlemen, welcome to what most people in Washington generally feel is a very important meeting. Col. Chandler agreed during his meeting in Eastport to come over here and hold a similar meeting and to give information on the tidal power study of Cobscook Bay. So I would like to welcome Col. Chandler and his staff and hope that they feel that we have had a turn-out that, that will meet their needs.

Col. Chandler: Thank you very much Mr. Walston and by all means I do. I came over here after that meeting in Eastport and talked to Mr. Walston and we agreed we should have a meeting and one thing I said to him is don't worry because the comment had been made in Eastport that there weren't enough Eastporters at the meeting but we had a good turn-out but they at least claimed that they were not all Eastporters. I suspect all of you are from Lubec with very few exceptions here tonight. I'm Col. Chandler and I'm the Division Engineer of the New England Division of the Corps of Engineers and I am really very happy to be here tonight. I think that we can say that really we are here at your invitation. We'd like to interact with the public and you'll hear us saying this several times over in tonight's presentation that you represent a very important input to us to to this undertaking. By the same token, we don't like to wear out our welcome. We don't like to try to show up in too many places because, let's face it, it costs you as tax payers some money for us to get up here for such an event but we were invited to come to Lubec for essentially an extension of the meetings that we've had, the one that we had scheduled in Eastport and the other in Augusta; and we certainly are delighted to be here and to have the opportunity to explain this project to you more fully. I've talked to some of you as you came in. I know there are lots of questions in your mind. Lots of you have memories of the history of this pro-

ject and we'll try and make it an interesting meeting and, and an informal meeting where we can have some exchange of ideas as well as getting information from you. I have two members of my staff that will be avalable to answer questions in addition to myself. Jim Callahan is the study manager and Dr. Bud Barrett will be in charge of the environmental studies. Here in the dark blue shirt is Mr. Walter Mackey who's my public affairs officer and will assist in the conduct of the meeting. I think we all know that in New England we pay a penalty for our dependence on the imported fuels and the cost of that fuel seems to be headed upwards endlessly and, if there's truth to the fact that we're approaching something near the end of those supplies, I think we can expect to see some further raises in price; but in any instance, we know they're certainly sensitive to political decisions which makes it even more complicated than if it were strictly a supply and demand type problem. And if we're to avoid an energy crisis as we had in 1974, we've got to be in a position in New England to have looked at and tried to exploit all the available natural resources that we have. Well, water is one of New England's few, unfortunately, natural resources that's capable of producing energy; and as a result, there's been renewed interest in taking a look again at the tidal forces which is certainly one of the unique aspects of this part of our country. There were studies that we undertook and there's a Stone and Webster about a year ago which concluded that there are only about two sites in the United States where tidal power had any potential for being harnessed. One was in Alaska and one was here in the Passamaquoddy Bay area. They recommended of the two, Stone and Webster that this is the one that should be developed. So it truly is unique and, for that reason, I think it's going to be quite a landmark if in fact we can proceed with it. Over the past two years, we've been in-

vestigating the background of tidal power investigations and Mr. Callahan will explain them in much more detail than I will. What the Congress asked us to do is to look at the records, look at the history of the project, look at previous designs that have been done, update the costs to today's cost levels, update the benefits to today's levels, and to decide whether or not we should proceed with the project. Something we call a benefit, the benefit to cost ratio. When that falls below unity, that is the annual cost exceed the annual benefits, we say a project is not economically justified; and this project has been plagued with that problem throughout its history. Indeed, it turned out that the benefits were not greatly improved over the cost when a conventional approach was taken to the problem; and yet in the backs of many people's minds was this challenge that had we known what we knew today and gone ahead with the tidal project in the middle thirties, it would be paying for itself. So why can't we convince ourselves that this is true; and this has been one of the major aspects and, and one of the new aspects of the project that we'll be discussing with you tonight. In my testimony last year before the Congress, I indicated to them that while we found that by conventional analysis, the benefit to cost ratio was still below unity and well below unity in the range of .4 to .6, we still felt or we did feel this time around that we could see a future that was not unrealistic where the price of oil as differentiated from the normal price escalation in the years ahead was such that this project could be expected to pay for itself in perhaps 15 or 20 years of operation; and we talk in this project of nominal life of some hundred years. So that sounds quite attractive. As a result, the Congress agreed that we should proceed with the study and that's the study that we're here to also discuss with you tonight. On the one hand we'll be discussing some of the history

but on the other hand, what we're saying to you this evening is we're on the threshhold of starting off into a new study that has some somewhat different dimensions to it. We will be only looking at Cobscook Bay because as now I think you all know, the Canadians have found a very attractive site in the Bay of Fundi and are not interested in an international venture with the United States at this time; and secondly, we have many, many new constraints if you want to call them that are on all of us who are in the developing business; and as a result, we will be examining many aspects of the project that were not examined in any great depth before. Among those, the ecological, social and cultural characteristics of the area that exist now and as it might look with the presence of such a project. We set out on such a venture such as this which is a study; we're not designing the project now. This is a study; so it will ultimately decide whether we should proceed to authorization of a project for construction. We start this out, and the phase we're in right now is essentially preparing the road map that tells what are the things that we want to do, who's going to do it and how much will it cost, how much time will it take, and we have, and when we do that, we accomplish what we call a plan of study. This plan of study and the study itself is probably going to cost upwards to two to three million dollars before we get through because there are many aspects that have to be looked at before we can come up with a recommended plan if in fact we can continue to support economic justification; and we will try to explain this planning process to you as we go along and show you how you can influence the decision making process as we go through it. At tonight's stage we're really asking the questions. What are the questions that we want answered in this analysis. We find that we don't have too many answers at this point and time. We can answer questions about the history of

the project and I think we can answer some others but essentially we can't give you answers to what this project itself can do for us. Nevertheless, we want you to ask the questions because those questions are the ones that we will try to pursue in the study itself. I talk about involving you in the meeting and, I think that is one of the important reasons for us to be in Lubec tonight, I want you to feel that as individuals you can impact on this whole undertaking. It's not just that the Corps of Engineers is going to coordinate with other Federal agencies or that the Corps of Engineers is going to coordinate with State agencies or that the Corps of Engineers is going to coordinate with environmental groups, nonprofit groups or other interest groups--No. It's all that but it's also you as individuals that we want to interact with during the development of the, of the project itself. We have a small group this evening which makes it the kind of group that we can work with quite informally what we will try to do is give you some information about the project. We will give you the opportunity to pose questions to us and we will try to give you answers to those questions and then we will also get down to formal comments for those of you who wish to make formal comments on the project itself. When you entered into the gymnasium, you were offered this pamphlet and, if you don't have one, if you hold up your hand, we will see that you get one. I think this will give you some very basic information that we can all talk from and you can use this as a handy reference as you're thinking of questions tonight and you can, of course, take it with you and keep it as a reference for the future. We also gave you two cards. I asked you to fill out a white card. On that you indicated your name and your address and whether you wish to present a written statement or to present an oral statement. That card will be useful for us because it will

put you on our mailing list so that in the future, as we have publications about progress on the project itself, we will be able to keep in touch with you. If you have indicated that you wish to speak, that will also then get to me up here and I'll provide everybody an opportunity who wishes to speak. The gray card that you were given presents an opportunity for you , a mechanism for me to receive your questions. I don't expect that you all have even thought that you wanted to fill out that gray card yet, but I think you will find as the discussion goes along in our presentations that follow, some of the questions that some of the people will be asking here, will bring questions into your minds, So at that point in time hold up your hand if you don't have a card. We'll see that you get a gray card and you can jot down your question and turn it in to Mr. Mackie or someone else on my staff and we'll get them up here and we'll answer your question. We found this technique very helpful because there are people who don't like to get up and make formal presentations and, as this mechanism gives you the opportunity to write down on a piece of paper a question that you'd like to ask and you can remain annonymous or you can identify yourself, either way. I will not say who's asked the question and I'll simply state what the question is and we'll try to answer it. So those of you that are perhaps a little hesitant to come up here and go to the microphone, this will be an excellent mechanism for you to also impact on our process. So cards will be available and during the question and answer period, you will have opportunities to ask questions . That will be open for quite some time. Now, the next phase of the presentation then this evening that I would like to go to is a short audiovisual presentation that we have put together on the project which will last about 12 minutes. Following that, we'll go into a question and answer period and

and I'll judge some of these things essentially by the amount of activity that we have but I will limit that question and answer period so that those who, and some have indicated that they wish to make formal statements, will also have a chance to make their formal statements and then if there are questions, we will come back. In any instance, we will be here so long as there are questions that want answers and as long as there are people who wish to make comments on the project. I hope that we can continue in this informal vein and we will have an opportunity to get a good exchange from us to you and back again. Would you dim the lights and we'll go ahead with the audiovisual presentation. I'd like to ask Mr. Callahan now to go a little bit beyond what you saw in that audiovisual presentation and describe some of the history of the project at this time. Mr. Callahan.

Mr. Callahan: Thank you Colonel and good evening Ladies and Gentlemen. One of the reasons we are here today is to obtain your points of view and hopefully you will share with us some of the insights you possess for improving our study. It's almost half a century since the idea of harnessing tides for electricity in the Bay of Fundi area first attracted serious attention. There are firsthand reminders in the Eastport-Lubec area of the uncompleted effort initiated in Franklin Roosevelt's time to build a tidal generating facility in this very location. In the recent past, tidal power generation has been re-evaluated from time to time to determine whether or not it was economically competitive with other types of power generation. By our standard, conventional methods of economic evaluation, the idea still does not appear to be fully justified. However, in our new study, we have been authorized to analyze the economics using new measures which give added weight to benefits due to inflation and escalation. Another factor which is different from circumstances

existing in the thirties, forties and fifties is the fact that just about all of New England's power generating facilities are interconnected through a regional grid that draws upon a mixture of various power sources to serve diversified demands on the system; and these demands vary from hour to hour, day to day, and season to season and this pooling means more reliability and service and generally a savings to our customers. Investor-owned and publicly-owned utilities belong to the system but unlike other systems around our country, there are no derally constructed generating facilities contributing power to the New England system. It should be understood that under any public investment that the Government makes to produce energy is recovered through the sale of power over the life of the project. I should also like to point out that arrangements for the transmission and marketing of the power are the responsibilities of the U.S. Department of Energy; and these aspects will be incorporated into our overall study which the Corps will be undertaking. Beyond power, additional economic benefits may accrue from development of a tidal power facility which could be of particular significance to residents of the area. These benefits could be in the form of recreation, area redevelopment, and fisheries mariculture. One of the key items mentioned in the audiovisual presentation, and I think Dr. Barrett will refer to it in his remarks, is the extended time frame required to acquire basic data about the existing ecosystem in the bay. Depending of what we can obtain from the secondary sources , of course, depending on continued funding by the Congress, we expect that this study will run between three and four years; and until the plan of study is completed, it will be difficult to be precise about our scheduling and funding level. It should be understood that if early studies fail to indicate that a tidal generating facility is not economically feasible or if it is determined that there is no need

for the power that could be generated from a tidal power facility that planning could be interrupted at any time. In addition to tidal power, we will be investigating and comparing other alternatives such as fossil fuel plants, nuclear plants, normal river hydro-plants, load management and, of course, conservation. The study will be conducted in accordance with principles and standards or, which are required for water resource projects; and this involves preparing different alternatives and comparing from different impact situations. The study will be under the direction of our Division Engineer at the Corps, and will be accomplished by various State and Federal agencies, universities, private contract consultants and, of course, in-house Corps staff itself. Please also keep in mind that Congress has authorized a study only. No funds have been appropriated for advanced design or construction. With your permission, I would like to take the rest of my time to describe the use, through the use of slides, some background data about the area and tidal power; and then outline the planning process that will guide our work. Following my presentation, Dr. Barrett will be, who will be coordinating our environmental investigations, will outline procedures to meet requirements of the National Environmental Protection Act. Our study will be called the Cobscook Bay Tidal Power Study in, in Maine, USA and it will be conducted by a Corps of Engineers overall authority of carrying out this study. You see here in red the area of the study where it will be, in Cobscook Bay, which is approximately 39 or 40 sq. miles at full water surface and its entire drainage area which drains into it is somewheres around 400 sq. miles. Beyond St. Johns, sort of northeasterly of St. Johns, in an area called Cumberland Basin, the Canadians are now preparing to conduct a 33 million dollar further study and engineering investigations of a tidal power plant. They have recently completed a feasibility study,

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the type of study that we are conducting now and we hope to obtain the same economic feasibility of the project that they did. As you go up the coastline of Maine towards the Bay of Fundi, the tides increase in height so that in the Cobscook Bay area, the tides average about 18 feet. In the upper points of the Bay of Fundi, they reach into the high forties. This photo here shows that the boats and vessels at high tides in Eastport. Here we have a slide showing the tide at low tide. You see the difference, approximately averaging 18 feet, 27-foot maximum, and on the neap, it's about 13 feet. This shows the tidal cycle and the phases of the moon and, when we have the moon and the sun in the earth all in line, perpendicular in line, we have the greatest gravitational forces and this results in the highest tides of the month. This is often called the spring tide and, when the moon is at the quarter points, the quarter moon points, the tides are not so high and they call that at the neap tides. This also occurs approximately twice a month. These tides are 13 feet high. In the bottom chart, you'll see the neap tide in a white line, and the spring tide in the black line, you'll notice that each tidal cycle is 12 hours and 25 minutes. Here we have a typical tidal plant operation, the heavy black line showing the tidal cycle, the dash line showing the different pool levels and this shows a two-pool scheme, the higher pool and a low pool. The gray shaded area in the middle shows an amount of electricity that can be generated from the plant. It shows it in varying amounts during the course of a day but what it does show is that we can produce from a two-pool basin continuous power during the 24-hour period. Here we have a typical electrical load demand in New England and the higher peaks show the important points of the day like suppertime when we're trying to get home and get the supper and we need electricity at the most and the darker shade on the bottom, we shows some-

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where what the tidal power could produce to help out this load. You recognize this as being Cobscook Bay and Cobscook Bay is made up of many inlets, many smaller bays, many peninsulas and islands. It offers a great opportunity to look at a number of tidal configurations. You can put the dams from many tips of the peninsusuals to different islands. You can lock off different bays and you can have a great amount of different schemes to evaluate and to look into. We have not shown all of the schemes that are possible. We know already of a few, however, during the study, we're going to look at some more. We received a couple of ideas from some of our question and answer periods when we were over in Eastport. The tidal power facility that you see located there and some of you may recognize it is the old 1935-1936 plan showing the power house up there near Western Channel and the two dams that were constructed at Pleasant Point Dam and and Carlo Island Dam. Out there by Dudley-Treat Island, you see the Dudley-Treat dam that was partially constructed when funds were suspended and the project was stopped. The project would also include navigational locks to allow fishing vessels and local commerce vessels and recreational vessels to pass through. We will re-evaluate this whole scheme but we will have many others to re-evaluate along with it. This is a photo showing Route 190 going to Eastport and you see a lot of the seasmoke, as they call it, rising off the water. This was taken on a cold December morning and a very beautiful morning and the picture brings out some of these beautiful characteristics of this area. Some of our project structure which will be common in all tidal power concepts and configurations, will be dams, navigational locks, filling gates and emptying gates, fishways, power houses, switch yards, transmission lines and road service facilities for the facility. Probably some of you have seen this placard up in the rear of the room and we have here a typical

power house, typical main bay of a power house showing an inclined, slant type turbine and this turbine here would operate on a differential of waters between the high bay and the low bay or in some alternatives just the high pool and the ocean. The water passes through the turbine, turns the blades which in turn goes up and connects to a speed increaser which in turn turns the generator to generate the electricity. The sizes of some of these generators would be the 10-12 megawatt capacity in size. The diameter of the turbine tube there, often called the runner, would be about 33 feet in diameter. So you can see that it's quite a large piece of equipment. We would have to have some filling gates and emptying gates to help bring in the water and also to let some of the water out; and these gates are also quite large. The gates are approximately 30 foot square, 30 x 30. So you can see it's a pretty heavy gate structures and needs some good machinery and equipment to raise and lower them. These would be lowered and raised when one would close out the tide and let the water into the pools. Here we have a cross section of typical dams that would be required to impound the water. These would be rock and earth and sand and gravel filled dams and would extend from the bottom of the ocean, of the bays up to approximately 25 feet above the high tide. Ontop of these dams, some roadways can be constructed, possibly public roads and possibly service roads. Here again, this bay area is about 180 feet deep in some points and Cobscook Bay in the international plan would go as deep as almost reaching 400 foot deep. So you can see that it would be quite an engineering feat to construct these dams and also get a certain compaction while the ocean forces were at work. Here we have a different type of turbine. Remember I showed you a slant type turbine. This is called the bulb type turbine. Its mechanism except for the propeller is totally en-

closed, water-proof, water tight and the water goes all around it, all around all surfaces and it is a proven type of generator and unit in Europe.

This style of equipment, would be considered in our tidal power study. I was just trying to look, I thought I had one slide that showed a man inside of the bulb unit so that I could point him out to you so you'd get sort of an idea of the size but basically from the top to the bottom of that bulb type unit is about 20 feet, 20 feet in diameter. Here we see a photograph of an existing tidal power project in the Morance, France estuary. The project has a capacity, installed capacity of about 240 megawatts. Its annual production is approximately 500,000,000 kilowatt hours. It has been quite successful and is presently and still in use.

Construction was completed in 1968. Here you can see the power houses. You can see a navigational lock over on my side of the screen and there is a public roadway connecting the two sides of the, of the estuary there. Now this project with the 240 megawatts and the approximate 500,000,000 kilowatt hours of electrical production is approximately the size of one of the concepts that could be developed in Cobscook Bay; and that's another interesting point. The tides in Lorance area are higher than what they are in Cobscook Bay. Here we see a power plant unit, a bay unit being floated down a river, a Russian river, in a river north of Mamanske, Russia to a site that is 60 miles different, distant, and this unit here is only a small electrical unit but it does produce 400 kilowatts. It's quite a small unit but it has quite a bit of possibilities and some of the things we'll be investigating. This unit is prefabricated 60 miles away, floated down the river. You can see the pontons on the side and it was brought down to its resting place in a prepared base and the side dams were brought in and the power

house was put into operation. The installation is successful and shows what we can do with some prefabricated work onshore and nothing, it doesn't have to be all built out into the water. In our new tidal power study, which will be entirely within Cobscook Bay, naturally we'll have to look at a few environmental affects up and down the coast and in Cobscook Bay but all of the construction and bay impounded areas will be within Cobscook Bay and the United States, the State of Maine; and the next set of slides I'd like to show to you will sort of describe our study. In our water resource plan, we have various development stages. First we develop a plan of study. We try to work up a document telling how we're going to carry the study out. Then we come in and we develop intermediate plans. This would be the seven or eight possible tidal power configurations. We would look at fossil fuel plants. We would look at river hydros. We would look at conservation of electricity and load management; and we would compare all of these and bring out the good and bad points of each. Then finally, we will review those intermediate plans and come up with two or three detailed and final plans. And we will make detailed plans of these final selected concepts. Some of the planning tasks we do in our water resource studies are first, identify the problem. We formulate the alternatives, intermediate, and then we make an impact assessment, and then we make an evaluation of all engineering, economic and environmental concerns. This here shows the magnitude and size of the efforts put into each of these categories, during the different stages of study. During the first stage, we're mainly interested in problem identification. As we go to stage 2 and 3, you'll notice the size of the work drops down and items like formulation of alternatives and evaluation increase finally in the last period, last stage. We naturally will be conducting the study under the

principles and standards for water resource projects which includes looking at how we can stimulate national economic development, preserve and enhance environmental quality, encourage regional development and also maintain social well being. In our plan of study, we want to tell what the specific study items are. We want to assign the responsibilities of the study. Is a university going to study them? Is the Corps going to study them or will we have a contractor do the work? We must, through this, we must establish a budget to find out what the study costs and also make a time table on how these activities should all fit in together and when we should complete our report; and finally it is the preparation of the reconaissance and the feasibility study. We will be looking into the engineering feasibility, the economic feasibility to see if the project can pay for itself. Is it worthwhile building? We will see how the project affects the environment, the marine environment and also the land environment and then we will also look at public acceptability. We will try to find out which plan, if they're acceptable from the other points of view are acceptable from the public's point of view. Some of the typical impacts that we will investigate, and these columns are not necessarily all related to each other or worked down in columns so that they're all under the same heading. There's environmental, social, cultural. archeological impacts, historical, tourism, community, what affects on the community the project would have, transmission, seismic studies, energy and geological and some of the tidal affects in fish migration. Here we have a little chart that sort of sums it all up in many ways and in the middle is really you the public. Now the public can be each one of us sitting in the chairs here or it can be our elected officials. It can be practically anybody. In fact in the Corps we say it's anybody but the Corps and you the people have an input to the study. At the same time,

we have a responsibility to educate and inform you of the study. So in the first point, right above the center public, we see something that says there is a need for a study, in this problem we try to find out what the problems are from you. Then we come around and further going around clockwise we come up with some alternatives for you. We educate or tell you about them and have you give us an input to them. Finally we come around and we predict, make some predictions on future conditions. We advise you of them. You in turn give us your feelings concerning them. We show you the different plans, display the different impacts to you and finally we come up with a recommended plan that seems to satisfy everything, economics, social, environmental and engineering and public acceptability. We keep going back to the center which is the public and finally, if the project is approved, then everything in the project is constructed. But the centerpoint is the public and it's a good thing that we do have the public to help us right from the beginning, like this study here. We haven't even started this study and we're trying to get an input in your viewpoints to help us to make a successful study. Thank you.

Col. Chandler: I'd like to ask Dr. Barrett to just give you a few thoughts from the perspective of environmental concerns. Dr. Barrett.

Dr. Barrett: Thank you Colonel. Good evening Ladies and Gentlemen. I'll be as brief as I possibly can. I really have two points that I'd like to emphasize tonight. One is that your participation is needed in order to develop an adequate and responsive environmental impact statement and the second point that I'll touch on a little bit is just what form an impact statement such as this will take. First of all, as you've seen from Mr. Callahan's slides, we

have a number of things listed which we intend to study and I would suggest that it's not a complete list. We're not infallible. We look at things from a different point of view. It's your backyard that we're looking into, not ours. If you think that you have something to say, by all means, feel free to write it in, call it in, or knuckle onto any of us and talk to us about it. We're developing this plan of study now to go to Congress and say here's what we want to study and the people have had a say in it. Perhaps maybe you have some concerns with municipal services. What happens when you start constructing a project of this size? What kinds of demands are going to be on your police and your fire, your schools, social services, hospitals, things like that. Certainly you have ideas. How about the tourism? Any place you build a big structure of any kind, you've always got sidewalk superintendents coming in. They may be local and they may come from a long way just to see what it is. The natural environment is a concern. We know because of certain pieces of legislation that we have to deal with, endangered species act, anadromous fish, fisheries, this sort of thing; but the environment covers more than just the natural environment. And the National Environmental Policy Act, it is defined as our environment too, what surrounds us and you surround yourselves, cultural and historic. These are sometimes known as the archeological, prehistoric or historic. This area has a history and there's a lot of it in existence and has been. I know for a fact right now that there are people from the University of Maine working near here and have been for years on their archeological points of view. The historical points of view are just as important. The second part, the form or format of the environmental impact statement. We are going to be changing our format somewhat based on the new guidelines put forth by the Council on Environmental Quality. They have

watched an environmental impact statement evolve from approximately two or three-page document which really didn't say an awful lot to what approximates nearly a litigation document, sometimes maybe five, ten thousand pages in length for which maybe a lawyer might be able to read. Certainly our decision makers won't and most lay people on the street couldn't care less because they're overwhelmed by the fact that they have to use a wheelbarrel or some other kind of conveyance to get the thing home to look at. C.E.Q. has given us guidelines and they told us that there isn't any project that we can't and shouldn't be able to succinctly point out the trade-offs in less than 300 pages. We have and are allowed to contain appendices and documentation behind it but the environmental impact statement is going to be a rather short, succinctly, straight-forward document. It will change in another aspect. Instead of having 9 or 10 sections that go on and on and on, it will be pointed out in six. In the first section, the C.E.Q. feels is most important, and I agree, is the need and the purpose of the project. It's at that point there where the impact statement identifies the need of itand what its purpose is. The second one is not the environment or the project description or anything else like that that you've seen nowadays in impact statements but rather the alternatives; and the proposed plan, whatever it is or whatever it may be, is one of those alternatives. That is the meat, the heart or the guts or whatever you want to call it of the impact statement and I think then the last part of it, another very important section is the preparers of the E.I.S. have to put their name, rank and serial number on the line; in other words then, the public and the elected officials have a chance to find out and be assured that the people preparing the E.I.S. are in fact qualified to do so and just what their qualifications and experience is. I suppose last but not at all least

is a documentation of coordination and that's what we're doing tonight. We're coordinating with the public. We have been in the past coordinating or talking if you will with other Federal agencies and State agencies and in the final essence, this E.I.S. will be qualitative in nature at this stage of the game. We must deal with all of the alternatives to the same level of detail whether they're a selected plan or not. This precludes a rather definitive tone on any one subject. It is to point out to Congress what the trade-offs are and and ask them if they wish to go further to study the selected plan. At that time is when the definitive and highly detailed studies will take place. We will then update the first E.I.S. with these definitive studies for the second environmental impact statement to go to Congress to see if they then wish to fund for construction. Thank you.

Col. Chandler: Thanks very much Mr. Callahan and Dr. Barrett. We've I think probably succeeded in convincing you that the slate is absolutely clean and we've done nothing and we're here for you to tell us what you want us to do and having said it that way, let me assure you that that's not where we are at all. Mr. Callahan has got a plan of study which is comparable to a Sears & Roebuck catalog in fact put together from what we already know from reviewing the past history of the project. We conducted a series of some six workshops before we even came to the public openly and concentrated in each one of these workshops on specific areas with the people that were selected from the region and primarily from the State of Maine to get their input so that we would have a fairly good handle on just what it is we should be looking at when we brought this to you. You don't need to know what's in that plan of study; although if you're interested in it, it certainly is available to you to look at. So really we're not starting from scratch at all at this point but rather we

want to wrap up and give you one last chance to ask questions which may signal to us that we may have overlooked something. We are very indebted to the citizens who have already participated in the program. We, I say this in all honesty. If you have a bent for getting more deeply involved in this project in the three to four years that we'll be studying it then you can accomplish a meeting such as this if you'll let that be known to me or to Mr. Callahan, we will be glad to include you in our committee of the large which we will call on from time to time to help us in some of the areas where workshop environments work out better than public meetings but we've been very, that's been very helpful for us and we have used your own university of Maine as the, our agent to bring the forces together to recommend people for participation in the workshops and it's been very helpful indeed. I'd like now to move into the question and answer period and I have two or three questions to start it going and I would remind you again that these gray cards and pencils are available and, as I answer some of these questions or staff do and you think of new questions to ask, please go ahead and fill out a card and Mr. Mackie or someone else will them up and they'll move forward to here and it will I think you'll find provides a very nice dialogue. We'd like to have you include your names if you would and your address on the cards simply because if there is a question we cannot answer for you at this time, that will give us the name and address of the questioner and we can send you a letter after we get back to the office if the information is already available. As I mentioned too, we will also try to get answers to some of these questions out in the future as the answers may evolve in publications that we intend to put out to keep you informed of the project. It's now 8:15 and, as a starting point, I'll say this that we'll take questions and answers for 45 minutes and take a quick

break and those three or four individuals who have indicated a desire to make statements will be given an opportunity to make their statements at that time. It may be that in fact one or two of those people indicating they wish to make statements may have found that their need was satisfied in the question and answer period and we may have only one or two people interested in comments. We'll see at that time. We'll receive the comments then at that time and then go back to questions and answers. I won't hold you exactly to that line because what I found in the past is as you approach that moment, you still get one or two questions that are right on the heels of the one before and it would disrupt things to take the break right on schedule. So we'll play that right along as the time comes. The first question is a good political question I guess that I'll try to answer, two good political questions, what I can, I'll try to , the other one I maybe will try to hedge my answer to. The first one is why wasn't the dam built in the fifties? Is it the intent of the Government to build it now? That's really what we're trying to tell you this study phase will accomplish and that is to get us to the point where we can make a reasonable decision, the Congress can make the decision as to whether or not this project should be authorized and funded for constrcution. Mind you, we're talking about spending two or three million dollars on a study in a three to four-year period. The project, if we were to build it, we're talking about tens to hundreds of millions of dollars and that certainly isn't a decision that we want to move into hastily. It wasn't built really in the fifties because fuel was relatively cheap at that time. The economics, I think the question here probably is referring to the period where the international project was reviewed under the I.J.C.

I guess we'll open up a lot of history here that we

haven't so far but it was at that point in time that looking at the tidal technology we had concluded that the tidal project would be dependent upon a storage facility which at that time was going to be in the area of Rankin rapids on the St. John River, the idea being that the tidal project flucuations in the times at which you were able to produce energy from the tidal project did not match the demand cycle ups and downs. So you needed a reservoir back here to fill in essentially the valleys in tidal production. It the late fifties and early sixties, it was concluded that looking at the two studies together that they could not be justified economically if you looked at the reservoir project, which is the one now known at the Dickey-Lincoln School Project, it was economically justified but the tidal project standing alone was not. As a result, the decision was then progressed in the later sixties to authorize the Dickey-Lincoln School Project for construction and essentially to put the tidal project on the shelf. It was the early seventies, '73 and '74 that we suddenly had misgivings about the availability about imported oil that really brought the question of tidal power back to the forefront again; and now I think we recognize that certainly in the case of fossil fuels, we've got a problem of diminishing supplies. We've got the probability, the problem of being susceptible to political use of the pricing of oil and I'm not so sure that we haven't just in the two years that I've been involved with the New England Division of the Corps studying hydro-development, I'm not sure that we aren't also on the threshhold of perhaps finding that even nuclear fuel is going to be a very expensive fuel in terms of charging to it the cost of the disposal of the waste which has been a cost essentially we've left aside. So it's not just oil that's going to be the alternative whose cost we agree has at least the potential for sky-rocketing. It may

also be in the review of alternatives that nuclear fuels also will escalate rather rapidly. Is it the intent of the Government to build the dam now? It will if we can show that there is reason to believe that this project can start paying for itself in a reasonable period of time, say after 15 or 20 years after construction; and that would make it economically justified and I think if it's economically justified being a natural resource that there's no question that Congress then would authorize it for construction. The next question is the harder one to answer. Why does the Federal Government forget about us here in Eastern Maine and the northeast in general? Well, that's the one I said maybe I should try to hedge. I'm a New Englander though. So from that standpoint, I'm in sympathy with the questioner. You hear all sorts of debates I guess back and forth about where the dollars are collected, our tax dollars and then where they're spent and we feel at times I guess as though we may be opened the west and it's about time for the west to come back in now that it's wealthy and thriving, to come back and do something for us and there are many analyses that try to demonstrate that need and we feel that obviously not just the lack of attention to water resource development projects you in Maine feel and we even down in Massachusetts or New Hampshire feel it in terms of what happens to defense installations that closed down and seem to migrate to the south but I don't know the answer to our question. I think the answer really to the question is that we've got to continue as New Englanders, we've got to continue to lobby and support those things which we need and need badly and if we get to that point with tidal power that is essentially for our use and we feel that we want to, that we can make a firm commitment to it that we can accept the environmental problems associated with it and what other problems may be associated with it and essential-

ly we're going to have to hang together and fight for it and we'll get it that way. Next question that I have up here, I'm trying to keep these in sequence, turns out really to be a statement but I'll read it for the record as we go along. It says I am for the Quoddy Project and finishing of the bulding of the Quoddy Dam. Then we come to another question which I'll throw back to Dr. Barrett. What would be the effect on the tide in Cobscook Bay?

Dr. Barrett: It depends upon where the dams will be built but generally the operation would be such that you would lower the normal high tide range and also then raise the normal low tide range. I suppose graphically if you had a high tide here and a low tide there, the operation characteristics of the project would be such as to make this now the highest high tide in the bay and this the lowest low tide in the bay and the flucuation would then run in between.

Col. Chandler: Would it be a more or less, a permanent level situation? I'll pass that to Mr. Callahan. We're talking about the tides. What would the project effects be on the tides and this questions is are we essentially making it a more or less a permanent level.

Mr. Callahan: It all depends what type of project. By that I mean, some of our concepts will be a single pool scheme similar to the 1935-1936 project. Another scheme will be a two-pool scheme similar to the international plan that was proposed in 1955, 1959 and all of these different schemes, the pools would have different water levels but if I take for the first instance a single pool scheme, we would just have two water levels, the ocean level outside of the impounded area and the level of the pool. What we would do is we would fill the high pool with water which would be the same level as the ocean level and then we would lock off and gate off the water and, when the ocean tide outside went

down, receded, we would start to let the water go through the turbines. The turbines would operate and we feel right now that the cut-off point is about the differential between the high pool and the ocean would be about five feet. We can generate water power down to that point. Then we shut off generators. If you have a two-pool scheme, you alter that some because you can control that third pool which is a low pool. You can always keep it lower and make it different than the ocean. Normally, the high pool in a two-pool scheme would operate between mean sea level and high water. In the low pool, it would normally operate just the opposite between mean sea level and low water. Along the coast, we would have some effects; we call them tidal resonance effects that when we construct the dams and we dam off some of the water, it would cause changes in the water coming along the beaches and would increase the height of the tides; and that is a varying amount; I cannot say exactly what it would be except in the 1959 study, some of the report said that in this area, it would raise the level down along the coast of Maine, somewhere around an inch and a half to two inches. We do have reports, some Canadian reports that say their project might affect tides along Maine and down into the Boston area by greater amounts. Right now that could be one item that we'll have to study. We will also have to study it in relation to the Canadian project to say what if the Canadians build theirs and what if the United States build theirs, how are the tides affected by both projects together.

Col. Chandler: The next question is, do you have any something for Dr. Barrett, do you have any information on the affects of the La Rance Tidal Power Project, that the La Rance Tidal Power Project has had on the flora and

fauna of that area?

Dr. Barrett: No we don't as yet but we're working on it right now to obtain information from them on it.

Col. Chandler: And can that information be used as an indication of what affects could be expected in the Cobscook Bay?

Dr. Barrett: It can be used but you have to be very careful that you don't make a mistake of assuming that it's exactly the same. Any experience that we can obtain in helping us to assess what's going to happen is useful but it's a different area. It has different fauna and different flora there and may in fact react differently. We would use it but it won't be the answer.

Col. Chandler: I think it's fair to say that it's a lot easier to extrapolate the physical actions from a tidal project such as La Rance to a tidal project in Cobscook Bay than it is about the biological impacts. Next question for Dr. Barrett, what are the possibilities of introducing some form of fish, shellfish or algal farming into the impoundment formed in Cobscook Bay?

Dr. Barrett: Very good. It's one of our prime targets for study. We've been looking at it and gearing up to study it quite intensively. At this stage, we anticipate that it would develop into a benefit for the area.

Col. Chandler: Okay. For Mr. Callahan, what would be the affect of a major oil spill on operation of the tidal power facilitity in Cobscook Bay?

Mr. Callahan: Well, I think if there was a tidal, an oil spill, that they would try to contain it. As far as its operation, it all depends where it happened outside of the pools or if it happened inside of the pools, why

that could present a different problem. If the water went through the turbines, blades, right now I don't foresee any real problems with it. It would think that it would continue to operate.

Col. Chandler: The next question, and I'll try to answer this one, it says we will run out of fossil fuel, why waste time in studying something that we'll run out of as an alternative? A couple of things that would help perhaps to answer that question, first, there are some people, of course, who don't believe we're going to run out of fossil fuel that something is going to come and save us from that ever happening. I don't know that I agree with that but there are still some people who hold to that theory. I'd like to think that we're not wasting time studying the tidal power because, as I tried to emphasize, what we're involved in now is an investment of two to three million dollars to find out if we should be investing say a quarter of a billion dollars. That's something we can't take too lightly. Thirdly, one of the things that we'll have to do early on in this study is the marketing study and, believe it or not, nobody had ever done a marketing study before. When the project was undertaken in the middle thirties, there was no marketing study. Somebody decided pragmatically how big a facility to build apparently because you could accommodate a certain sized facility and they started to build it but they really didn't know what they were going to do with the power that came from it somewhere it would be used. I guess big problems are nowadays demand more sophistocated treatment and one of the things that will have to be undertaken is the marketing study and I feel that that marketing study alone will have a great impact on the ultimate choice of a project to be implemented because it will tell a great deal about what the demand

is going to be at a certain point and time and it may indicate that an initial project should be undertaken with an option for an expansion later on and perhaps to undertake it progressively. Remember, tidal power is not really, truly state of the art yet. There's a good deal of risk in this. There's an engineering risk that Mr. Callahan referred to of placing structures in water, of nearly 200 feet depth. You're doing that while the water's there. You're doing it when the tides are moving back and forth twice a day and that is a very serious engineering challenge. I don't think we yet know what the environmental impacts are. There are physical impacts. This will change the whole current structure in the area. On top of that, there are temperature problems, temperature changes to be expected and this will change the biological nature of the area. So that there's a great deal to be learned and I think that it is appropriate to be still proceeding with some caution and not just going off willie-nillie with the notion that we know what we want to do and are ready to say commit a quarter of a billion dollars to it. The next question, if the Canadians have completed their study, why don't we use their data? There's not that much difference geographically. This will save a lot of the tax payers' money as well as save valuable time. The Russians and the "Japs" have had tremendous success in copying, why not use this method to our advantage? Again, I'll answer that question in part. It's easy, as I say, yes, geographically, great similarities. The things that they have learned about the physical behavior of the tidal project are all probably fairly easily translated into the situation down here. The biological concerns are quite different and that will be for two reasons, one the Canadians are not nearly as sensitive yet about their

environment as we are of ours under our National Environmental Policy Act. So even if we took everything that they knew, we would still have to add to it before it would meet the requirements of our own statutes. The Canadians have not really yet made their commitment. That is, they really haven't finished the feasibility study to the point that they're ready to make a full commitment to a project. So they're still having some concerns about it as well. It would be nice just to be able to pick it up and copy it but I think it would be very hazardous indeed. We're not, indeed I can tell that in conventional hydro., on the on the riverine hydro. development. We haven't even progressed in the United States to the point where we have prefabricated plants that you can just plunk down in this river or that river; and we still do it case by case in every instance. There are a lot of people who are indicating that that's perhaps one of our problems that we should be getting into mass production of small hydro. facilities; but this mind you is still a very unique facility that we're talking about in Cobscook Bay. We don't know yet what configuration is the best one. We don't know what kind of energy we want to develop from it and it just would be the wrong time to go rushing into it. We mentioned to you that I think that Mr. Callahan was trying to emphasize in that very blue graphic that you were looking at that we can deliver tidal power now 24 hours a day you see; and that's a new development in the technology. Essentially that's what we call firm power but we still don't know if firm power is what we want to generate from the project but, if we can, that certainly will be great. So there are many decisions yet to be made, what size plant, is it peaking, is it firm power, who is it being marketed to? These definitely have to be, have to be con-

sidered. Next question, it says it seems like we're studying this to death for about 50 years. It seems that the combined cost of the studies could have built the project by now and that I'm sure expresses quite a few people's frustrations. It wouldn't have built the project yet because the project is darned expensive. The international project we estimated would have run very close to two billion dollars for about a megawatt installation and that's a whole pile of money and nobody has spent that kind of money yet on the studies. I agree it's a big investment.

I respect the questioner's line of questioning here but I do hope that you recognize though that there are a great many uncertainties that are the basis for continuing to study rather than moving to the decision to build. Next question, is the current status of the Pittston Oil Refinery and terminal compatible with the Cobscook Bay Tidal Power concept and I'll try to answer that question. Our initial concern for the tidal power project with the Pittston application stemmed largely from the fact that we're looking again at the international proposal and one of the major concerns was that the BSCC, these are the large, 300,000 gross dead-weight ton oil, crude oil carriers would be coming into Head Harbor passage and would have to be locked through Head Harbor Passage; and that's the area where we were talking about depths of water of nearly 400 feet and strong currents; and we estimated at the time of the Pittston hearing that that lock for VLCC, and mind you, damn few locks have been built in this world for VLCC's. It was an eighty million dollar tab alone and there was much concern about having to add that cost of the project. Now that the Canadians have chosen not to participate further in our study but they are an observer status, and

we are focussing on Cobscook Bay, the current Pittston plan does not, would not require ultimately require any way for locking through the VLCC. There is a statement that the Pittston Company gave us in direct response to this challenge that if the configuration for a tidal project essentially followed the Dudley-Treat Island dam line, which brings you in towards Esty Point, that would then re-align their operation so that the VLCC's would remain outside of that dam. Therefore, and not have to be locked . The only thing that would have to be locked through would be the product ships that are around by Shackford Head and even that might be changed. So they said they would make that commitment that they certainly would not expect, and I think this is fair to say, I know a lot of people maybe have their own thoughts about how much they want to believe Pittston; but I think it's fair to say that we're in a time in our country where these decisions are made with public involvement and regulatory decisions are also made with public involvement and there's probably no way that Pittston could stand up and weather a storm of protest from the public to leave the configuration they have and expect us to lock them through a dam that might be built through Dudley or Treat Island just to get to a pier facility that was a matter of a few hundred yards inside. I mean they would simply have to bend to that pressure to realign the VLCC unloading to accommodate it.

I think we can accept that that would occur in the future. Now I think it's also important to understand though that only one or two of the options would probably involve the dam through Dudley and Treat Island. There are other options, particularly ones of smaller sizes, less than the maximum that we could generate out of Cobscook Bay that would

not involve dams across the, either Dudley and Treat Island or even indeed including Shackford Head and that the Pittston Company would not in any way with their traffic interfere with any of the structures of the project itself. So these are things that remain to be seen but I think you can be assured that their requirements would not interfere with the economic justification of the project. The next question I have is why should the economics of this project have priority over potential survival. Well, that's because that's the law I guess. Well, let me put it this way. It's not really the law. It's the administrative process. My regulations simply say I cannot make a recommendation for authorization for a project unless I can show that it's economically justified first of all; and that's usually the first test we put any project to, is it economically justified and if it is not, the study stops there. If it is, then we go in and see if it's acceptable to the public if it contributes to social well being, to regional development, is it environmentally acceptable as well. So economics has always been the prime consideration. Now, President Carter has also though just this month issued some new instructions that follow on from his release of a new water policy for the country, given some guidelines that relax that a little bit and he says things that give more weight to the environmental considerations and here I take back to what, to Dr. Barrett said, remember when we're talking about the environment, we're not simply talking about everybody but us. We're part of the environment. And so if the justification, even though it might not be economically justified, if there was overwhelming indication that it was still needed to improve the environment, our environment, the project still could be

looked at from the standpoint of making a judgment to authorize it. As I indicated, the economic analysis, however, is not as constrained as it used to be in the traditional technique. We've been authorized to proceed with an economic analysis on this project which is unique but I suspect will be a precedent setting as well. Some people call it life cycle costing and that's a misnomer because the Corps has always had life cycle in the sense that when we cost this project, we add into it not only to construct the design cost, the construction costs but the annual maintenance cost and the replacement of plan throughout the life of the project. What is different is we are permitting ourselves the luxury of projecting for the future the costs of alternative sources of fuel and when you're comparing, when you're doing that with a hydroproject, you've essentially got a winner for hydro. Fuel for any hydro facility today is free. We don't pay for water. It's certainly being as close to inflation proof as anything you could think of and other fuels tend not to be. So using this approach on a water resource development project, this is as I say a first of a kind. It may be. I think a process, an approach to the economic analysis that we'll see much more of in the future in addressing water resource development projects. Next question for Mr. Callahan. You indicate tidal heights of 18 feet, 13 feet and 11 feet, what is the average difference in water levels in the high and low pools?

Mr. Callahan: I think I made a mistake if I said 11 feet. It should be the high tide and the spring tide, the high tide of the month is, averages about 27 feet, and the neap tide, the low tide of the month, of the month is about 13 feet for an average of about 18 feet. In our tidal

power project, I mentioned a little while ago that our pools and the ocean, we would generate power while the differential of the heights of the water were 5 feet and that is about our latest knowledge on our turbines that we would be using in the project or proposing for the project. If we have a high, if you have a single pool scheme similar to the 35 plan, the water levels could operate just like the normal tides do today; in other words, in the high pool, you could see tidal power, tidal flats. If you had a two-pool scheme, in the high pool, you'd probably wouldn't see low tidal flats. In the low pool, you probably would.

Col. Chandler: Next, I think I have the question here. Has the study of the Whitings River in Denningsville above the Pembroke Falls been made for aquaculture for bay scallops?

I don't know Dr. Barrett, why don't you give that a shot.

Dr. Barrett: I don't know if one has been made. We haven't made any but I do know that there's a fair amount of activity in mariculture going on in both Quoddy Bay and Cobscook Bay and to that fact even further south. So there very well could have been a study done but at this time, we're unaware of it. If there was one, I would say within six months we'll be aware of it.

Col. Chandler: Well, and if the writer is aware of one, we will, we could.

Dr. Barrett: Right.

Col. Chandler: be aware of it before we leave tonight?

Dr. Barrett: Yes

Col. Chandler: This is another way incidentally that you could help us.

If we answer a question that indicates ignorance on our part, bear with us and enlighten us. Don't stop there. We're looking for sources of information and extraordinarily so, we know awfully little about what is, what's called the base line here in Cobscook Bay. We made the reference to the Suffolk University project up here our U.S. Fish and Wildlife Service is undertaking some analyses in the New England Area that are going to be very helpful but, when you talk to people about the kinds of questions that we have to answer, the first thing we find out is we don't know what the current situation is. Indeed we've argued as to whether or not there is shellfish in Cobscook Bay. Some people say yes. Some people say no. And then how much is there and who depends upon it. This question I'll try to answer, will the project operate independent of Dickey-Lincoln proposed dam. In one sense yes in that the two projects are being treated totally independently. Stemming from the earlier decision which I related to you back in the sixties. You might ask the question well okay, so you could make the case for the project up in the upper St. Johns because it was economically feasible and it provided peaking power and somebody said you needed peaking power but you couldn't make a case for the tidal project and the kind of peaking power that it gave didn't time right. So you just let it go, now you're going to bring it back in, why don't you need to lash it up with Dickey-Lincoln? Well, the technology has changed. The two-pool technology permits you to generate firm power, for instance, and to supply peaking power needs, you can manage the timing problems much better. There are quite a few intringuing things that you can do. Even if you just go around them and you were to dam some of the imbayments, I think many of you who know Cobscook Bay

very well, know that high tide arrives at different times in different bays within Cobscook Bay. So if you were having four or five of these bays operating, you can play all kinds of games on the timing. The marketing study may indicate the need is for firm power up here in which case again it could be totally independent of Dickey-Lincoln. So in that sense, there's no indication at this point and time that the two projects need to be operated together. Now there's also another factor that's changed since 1965-66 when that decision was made and that is NEPOOL, the New England pool was created in the early seventies and through the New England pool in the central dispatch system of the 150 odd entities that, are marketing power in New England and the some 200 odd facilities that are generating power, you can see the whole network works together and you can bring any sort of facility on line when you need it to meet a particular kind of need if it's available.

Let's say you did not have the Dickey project and that storage capacity, what levels out the valleys that still persist in the tidal project? Well, it's something else that's in the NEPOOL right now or would be built into it that could level those out. So again, there's no need now with those integrated systems in New England, which did not exist in the middle sixties, there is no, you can get from that central pool the kind of thing you need to fill the valleys in the tidal project. Now, turning that all the way around, you can say yes they are not operatin independently then because if both were built, both would be in the NEPOOL and indeed, it could be that some power being generated at the tidal project, which was excess to the needs at the time that it was available might be the power that was being transmitted up to Dickey

which would be used for the pump storage feature in Dickey to move water from the Lincoln School back up beyond the Dickey Dam and by the same token, it could be that some of the peaking power coming out of the Dickey might be used to filling valleys from something but that would all be very indirectly through the whole manipulation of the New England pool system. I think that's really the key to this particular question. It's really the presence of the New England pool of electrical utilities as well as changing technology to two pool systems that really says that no there's no intrinsic interdependence of the two kinds of projects any longer. The next question for Dr. Barrett is on the maximum-minimum water temperatures now and the projection of temperature inside the enclosure and what would the ice conditions be or might be?

Dr. Barrett: We don't have definitive answers on that. So if you're asking what my opinion at this time might be, I would expect that the summer temperatures would be elevated or increased and that the winter temperatures would tend to be decreased but there would be a delay or a lag time in this winter decrease. You'd get stratification or layering of your water probably more significant at this time, with the project operation. Your fresh water would lay on the surface and create a layer and this would occur during the summer and winter . Of course, during the winter, that would be the time that the fresh water would freeze much more quickly than salt water but to the extent that this would occur we don't know yet. If we go far enough into the project studies and this sort of thing, you would more than likely turn to a physical model and actually test this out on a working model of a bay or the configuration that we'd want to use.

Col. Chandler: I think that gets back to another point, this question is getting into the area now of water quality. You're talking about temperature but also the question of salinity is going to come into this and these things are very hard to project without physical models and one of the things that the study will have to determine, right off, is whether or not a physical model of the area is going to have to be constructed in order to get to a recommendation. Physical models are very, very expensive, and that's one thing we want to move into very carefully. We would hope at this time perhaps to be able to get to a decision without having to go to a physical model but we simply don't know. It may be absolutely necessary and, of course, from physical modeling, you get a higher confidence too in the physical changes that are imposed as well as the water quality aspects. Next question I'll try to answer. Has the project been determined to be compatible with the Pittston Refinery Project? This question came up in Eastport and, to the degree that I discussed already in terms of physical lay-out and land and water use, I would have to say at this point in time, it would be compatible. Now we don't know the specifics of the tidal project that would be the recommended project. We do have a good idea of the configuration, of course, of the Pittston Refinery and we do have the statement in a letter from Pittston that they would modify their design if it did come into conflict with the tidal project. So from that standpoint, I would say that they are compatible. There was another question though that runs a little deeper than that and that has to do not so much with the physical land use competition in the area but some of the

other aspects. One person touched on the question of oil spills and I doubt that that's a serious problem. The question that was raised in Eastport was more along the lines of air quality and would there be problems in that the proposed Pittston Refinery might consume all of the allowable degradation of sulfa dioxide in the atmosphere and the question concerned itself largely with not so much the operation of the tidal project because that would be really pollution free but perhaps the construction phase. I shared that concern, not when I came to the meeting. I learned something at that meeting and I'm aware of the petitions that are circulating and I have now gone back and done my homework a little better and know what is said in the impact statement and that those sorts of assertions are made. So I've registered my concern that the air quality situation might pre-empt the project. I have received a communication, that will incidentally be included as my comment on the impact statement, that expresses this concern. However, I also received a communication from EPA indicating that construction projects are presently exempt from the requirement for the PDS type of air quality certification., so permit. So for the present, that's all well and good but that doesn't really answer the secondary question though; and that is if you have a tidal project and it has stimulated economic development in the region, is it true as the impact statement suggests that nobody else though would be permitted to introduce a new industry into the area which would affectively cancel out then much of the value of the project. I would have to say the answer to that is not quite as clear. The current regulations would, would have various threshholds so that the emmitor in the future that come along with this economic development would have to be a relatively

large pollutor to have to apply for such a permit and maybe that's not unreasonable to expect with the tidal power development. That, of course, would be sensitive to the size of the tidal power development. On the other hand, I would also hasten to add though that I know my regulations from my own agency change frequently from the regulatory area and I think the same could be expected in air quality. Those New Englanders who like swordfish remember the mercury game that we played and, you know, absolutely this was intolerable and people found out it really wasn't intolerable. Saccharin seems to have come back again and found out we're not rats. Rats will die from it but apparently we won't. So you know, we can expect regulations I think to change. So I simply add here that from the standpoint of the air, the impact of the air quality permit, our concern is still registered with the EPA that we see this having an impact on what might evolve out of a tidal project; and they have received that comment. The next question, will the property adjoining the project on the Canadian side of the border be affected in any way? Yes I suspect so, probably in several ways and the study area itself will include Canada; and Canada in indicating that they would not participate in the study as a joint venture hastened to add though that in establishing an observer for the study for us to maintain communications with, that they would support any undertakings that we wish to, or felt the need to undertake in the Canadian territory. So we will have to look at the impacts of, erosion, tides, currents and fisheries in Canadian territory as well as the U.S. territory in the immediate vicinity. Now we also have though I think at the working level a very good relationship with the Canadians just in passing. We're on a

I'll say a once-a-week basis of communicating with the people developing tidal power in Brunsuick, the Brunsuick Power Commission, and when the New England governors and Eastern Province premiers met in May of this year and we had a conference on energy alternatives, this is one of the issues that we made an explicit recommendation on that the governors and the premiers endorse a continuation if not an institutionalized exchange of information between the Corps of Engineers in its undertaking in New England and the New Brunsuick Power Commission and its undertaking in the Bay of Fundi, so that we would have a free flow of information on the physical, marketing, environmental impacts of these two projects and I think that will reinforce a good balance of the concerns for the Canadian side as well. I just ran out of questions and miraculously, it's nine o'clock sharp. Before I close it off, are there any other questions that you would like to submit at this time? Because we'd be glad to have them. Let me ask you this, I have four cards of people who wish to make comments. I have no more than those four and we could expect those four probably would consume 15 minutes. If it's your pleasure, we could forego the break at this time and simply move to those four comments and see where we stand at that time. Is that your pleasure to go ahead then here with the four comments or would you like a break? Would you prefer to continue? All right. We can and incidentally, those of you who need to leave, reasons to go home or to use the facilities, there are facilities just down the hall here to the left,

the door.

Incidentally, we don't have a stenographer tonight but we are taping this and we will be preparing a verbatum record from this and that verbatum record will remain open until the eleventh, the eleventh of August. So if you have additional questions that you would like to include in the record or if you have written comments that you want to send in, you're free to send those to me at my Waltham office up to the eleventh of August and they will be included in the record of this meeting. The, we normally follow a protocol which is sort of laborious which calls upon the elected officials at the Federal, then State, then Local level and then we go to appointed officials and I have looked around the room and I looked at the cards that I have and I, I see no one here appointed or elected above the local level and I'm going to simply ask if there are any elected officials at the local level who desire to be heard who have not submitted a card and if not are there any appointed officials at the local level who desire to be heard? And apparently there are not. So I'll move to the first card that I have and I'll take these in the sequence in which we received them and ask you when you come forward and, again for the purposes of the record, if you would, come to the microphone down here and state your name and who you representand who you represent and if you're representing yourself, simply say so so that our record will be able to reflect who, whose statement it is that we're hearing. The first one I have is Edward Hawkins, or did I just see him leave?

The second statement then is Donald Stockford and you're here?

Speaker: inaudible

Col. Chandler: All right Sir. The next card that I have is Preston Kinney and he has just left and the last card that I have is R. O. Perry?

Is he still here? Parry I believe, Mapletree Road in Lubec? All right. I know from the last two that I have had questions from them and that may have satisfied their needs. I'll ask if there's anyone else who'd like to be heard at this time?

Speaker: I would.

Col. Chandler: All right Sir. If you'll come forward, would you, would you go to the other microphone there Sir and if you would state your name for the record.

Speaker: Thank you Sir. You have, my name is Preston Kinney of Eastport. You have answered most of the questions with the exception of the, the high and low base and what the average height would be and, as I gather, it would be something between 5 and 8 feet and then, of course, you did touch on the, the salinity in the water in these basins but you were quite certain that aquaculture could be fostered here in, you know, in pretty good fashion with the salt content and the water changing, I'm wondering if this is true? I'm wondering if the amount of plankton and other forms of life that feed these animals or the fish of the water could get through the gates when you're only adding probably 20% more at each time you open your basins or open your gates? Already, you do have a very viable scallop producing area and I mentioned something about Whiting River area and the and the Smenisville River area. It is a very good spawning area for scallops. I do not know of a study going on at this time but I do know I have studied quite a bit about scallops and I am trying to put together a textbook on aquaculture and one of the prime areas on the coast as far as I am concerned is this one particular area and I'm wondering if 400 megawatts of current would actually

cover the cost of destroying such an area and there are other things. There are the clam flats and so forth. Now in your first comments you made, you made price of oil versus price of of fossil produced electricity. Of course, that also has to be balanced against renewable resources. This, is the part that I'm trying to get to and, in answering so many of your questions, I'am lost as to the order in which I was speaking in. I am very familiar with the Cobscook Bay area. I do know that there is flounder spawning grounds in the Cobscook Bay area and I guess the flounder is becoming one of the endangered species in a sense and, of course the temperature was answered to my satisfaction, the temperature of the water in the winter and summer weather. So I guess that's about all I have to say except there's one thing I'd like to leave with you. A lot of people in this room tonight remember when the Quoody dam started 35, 36. We had a resource here then that was actually as far as I'm concerned was a pretty good tourist attraction. Now in damming in the Carlow Island, Eastport to Pleasant POintends of it, you eliminated this tourist attraction that I'm thinking of and a lot of people remember the old sow. It was a large whirleypool off Dear Island Point and I've looked for it and I've been been paid oh two or three thousand dollars to find it. It isn't there any more but, as an eleven year-old boy in a ninteen-foot net boat, my cousin and I was in it and I could see down sixty feet into the water and sixty feet across. Fortunately I got the engine going. The centrifugal forceof the pool, of the whirl threw us out. The inside of the pool looked like a porcupine skin inside out. In those days, there was a lot of something and pulpwood and miscellaneous logs floating and

they were all down in there and, of course, when the whirleypool broke, they all come to the surface and the lighter ones jumped right out of the water. Now that's about all I have to add to it and there, this is some of the environmental changes that were never recovered from the original Quoddy dam. Thank you very much.

Col. Chandler: Thank you very much Mr. Kinney and your comments are very helpful and we will keep you in mind too as being a person who is very interested in these particular concerns in the Cobscook Bay area. Is there anyone else who desires to be heard? Yes Sir. If you would come forward and state your name.

This man's name is inaudible but it ends with adden. You answered a couple of my questions previously. I'd like to clear up a few prejudices which I have heard for years in this area concerning the project. One, when the project first begun years back, there was a lot of money wasted by the Army Corps of Engineers in Eastport, in Quoddy Village and someone's house and facilities. They felt that that was directly responsible for the depletion of the project. Secondly, they felt that a lot of politicians down south and especially those that have shares in small power companies held back in Congress legislation that might have projected the project. Another thing that bothers New Englanders here, is that the Government has bypassed us a lot. This area consists mostly of welfare people, retirees. There's no basic industry here to support the people and they would like a major project to come forth that would employ the people. Most of our young people are leaving, getting out because there's nothing here for them to do. The fishing industry's gone. You can't make it on clam digging. Lobster fishing is going down the drain fast due to the lack

of legislation that has protected it. The people here are tired of most of our dollars going abroad to the Middle East and they in turn come back here and invest in our companies. Sooar or later, they'll own us. The United States has slipped tremendously in the last ten years in the world popularity. I think New England needs something basic to give us a lift. We've felt neglected in the past few years. Thank you.

Col. Chandler: Thank you Mr. Sombody. Is there anyone else who desires to be heard at this time? Is there anyone else who desires to ask any questions at this time? Evidently not. I will remind you again that the record of this meeting will remain open until the eleventh of August. If you have questions or comments you desire to include in the record, please send them along to me. We will be making a copy of the transcript of this record available to you in the Town office and so in the future you will be able to inspect it when it becomes available. I'd like to thank Mr. Walston and the superintendent of your fine school here for arranging for us to be able to meet with you tonight in this very fine, comfortable facility. We've enjoyed being here. We appreciate your attendance tonight and the observations, the remarks, the questions that you've asked tonight will contribute to the quality of the undertaking which we're about to undertake and we will keep you posted of developments as we go along. These things don't move perhaps as rapidly as any of us would like to see them move but indeed progress will be being made and we will keep you apprised of what's going on. Thank you very much for your attendance tonight. The meeting is adjourned.

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(Heavily-edited version will be submitted as written contribution) —

RECORD

Statement for the Record at the Army Corps of Engineers' Public Hearings at Eastport, Maine, July 10, 1978

By Howard W. Carr of New Englanders for Tidalpower

The tidal power concept presented here today ACTUALLY reduces the true potential of tidal power capacity to alleviate the impending energy crisis and is therefore ludicrous.

Can any expert here explain in plain commonsense terms why the Quoddy tidal power concept suddenly regresses to the negligible capacity peak power installation which it started out as 50 years ago? 50 years ago the energy situation in the Northeast corridor was the exact reverse of what the energy crisis is all about today - that is to say, that in the 1920's and 1930's the Quoddy tidal project was terminated twice because there was really no justifiable market at hand for the power it would generate. Today, on the other hand, the northeast corridor can use every kilowatt of power the entire Fundy tidal power range can produce as a future hedge against the captive Arab oil trap we are now in - not to mention the finite nature of all fossil fuels.

No, gentlemen, this proposal involving the use of the old 1920's version of the U.S. unilateral Cobscook Bay project does not make sense - or perhaps I should say that it makes too much sense to those of us who have stood toe to toe against the Pittston Corporation, their friends in political circles and in the private power sector from the beginning. There have been too many of these coincidences which enhance Pittston's schemes.

(I note here the coincidence of Canada's recent reversal and public announcement of their disinterest in a joint Canadian-American tidal power installation in the Cobscook-Passamaquoddy area. -See attached newsclip).

The time has come for every citizen of Eastport, the general region and in all New England to demand of their Congressional delegation that the investigative branch of the Congress, the GAO, review the entire $13 to $15 million and 40 odd year history of the Quoddy project and - particularly from the viewpoint of the Federal taxpayer and electric power consumer of the Northeast corridor - the value for dollars spent.

I would also advise all informed and interested parties to rally to financing such litigation as would prevent the ripoff of this one last chance we have to join with Canada at some future date in harnessing the maximum electric power yield potential not only in the Passamaquoddy Cobscook Bay region, but in the entire Fundy range. Bear in mind, we speak here of a free energy source - the 20 to 50-foot tides of the unique Fundy range. This is a time in history when parts of our planet and even of this continent have no such God-given asset and therefore face the grim deadend consequence of the depletion of fossil fuels.

I implore you here to day - don't let this priceless infinite free energy source fall into the hands of the ruthless corporate manipulators. If we cannot proceed with Canada as planned to harness these eternal tides at this time, then we have a moral duty to preserve that option for future generations,--generations of people who will remember us for our wisdom and unselfishness, instead

of cursing us for our stupidity, as they slave to support the even more outlandish schemes of the corporate energy moguls. THE PRIVATE ENERGY FACTION will by then hold them by their jugulars in EVEN more brazen captive energy market schemes as the world supply of the finite fuels nears total depletion in the early 21st century, - this means saving Eastport, Moose Island, from the grasp of these ruthless self-seeking corporate and political manipulators.

Thank you.

H. W. Carr

H. W. Carr

BANGOR, MAINE, WEDNESDAY, JUNE 21, 1978 PG 1

Canada quits 'Quoddy project

By Gary Thomas
Special to the NEWS

WASHINGTON — The Canadian government has pulled out of the proposed Passamaquoddy Bay tidal power project, leaving the United States to go it alone on a project entirely within U.S. waters.

The Canadian government wrote to the U.S. Army Corps of Engineers that it was not interested in any joint venture on the project at this time. Canada added, however, that it would like to send an observer to any U.S. tidal project. The Canadians said they preferred to work on their own study for a tidal project on the powerful Bay of Funday.

The Canadian move puts the ball back squarely in the U.S. government's court. It had hoped to carry out the tidal study for a fure project in international waters in the Passamaquoddy Bay. But the Canadian refusal to participate has forced the Army Corps of ENGINEERS TO STUDY THE SECONDARY SITE IN Cobscook Bay.

"Sure, it changes things," said a Corps of Engineers spokesman. "All we can study is parts within the United States. We can't go in and study Canada."

The United States is trying to find a way to harness the powerful tides off the Maine and Canadian coasts for use as an energy source. Congress has approved a preliminary study by the corps and has appropriated money for that purpose.

KLUK)

COBSCOOK BAY TIDAL POWER PROJECT
U.S. CORPS OF ENGINEERS: NEW ENGLAND DIVISION
10.JULY.1978

STATEMENT BY:

PASSAMAQUODDY TRIBAL COUNCIL
PLEASANT POINT RESERVATION
PERRY, MAINE

The Passamaquoddy Tribe at the Pleasant Point Reservation in Perry, Maine has been actively involved in the development of tidal power since 1976. Our efforts have been directed at the construction of a small tidal power plant which would harness the considerable tidal forces of Half-Moon Cove - average tidal range of 18.1 ft. The power plant would serve several purposes:

- generate electricity from a renewable and environmentally safe energy resource for local, and regional, electricity demand.
- research and develop tidal power at an operating demonstration installation.
- establish an economic base from project-related industries; i.e. aquaculture development, tourism, research laboratories.
- develop tidal power, a non-depleable resource, as a substitute to conventional energy supplies.

Half-Moon Cove, adjacent to the reservation and Cobscook Bay, would serve as the tidal basin for the proposed tidal power plant. A dam constructed across the entrance would hold back tidal water flowing in both directions, generating electricity when released through the turbines. This project when completed and operational would mark the first-ever tidal plant, of this type, constructed in the United States and initiate the wide-scale development of tidal power.

Since 1919, when tidal power development for Passamaquoddy Bay and Cobscook Bay was first proposed, the Passamaquoddy Tribe has patiently awaited the development of this indigenous natural resource. But meaningful progress never materialized, instead periodic studies were conducted to assess the technical and economic feasibility of tidal power plants. Technical feasibility has invariably been affirmed and recognized, but economic feasibility has been critically questioned and inevitably formed the basis for the rejection of project construction. We have proposed the Half-Moon Cove tidal project as a logical phase of development which would demonstrate technical and scientific aspects before constructing a large tidal power plant. The inclusion of an extensive research and development program would also enhance economic feasibility for any future projects by decreasing the high capital costs associated with generating equipment and by resolving environmental, engineering, and operating uncertainties at an "on-line" facility.

The utilization of tidal power as a renewable resource is a subject which has periodically captivated the imagination of the energy community over the past few generations. Today, because of diminishing fossil fuel reserves and

the presence of ever-escalating prices of electricity, interest is once again renewed on power production from the ebb and flow of the tides in a manner similar to conventional hydroelectric generation.

We have requested funds from the U.S. Department of Energy to conduct an in-depth feasibility study of a small tidal power demonstration project at Half-Moon Cove. This would serve as a vital first-step in the development of tidal power and also enhance the prospects for future tidal projects presently being considered by the U.S. Corps of Engineers and the Department of Energy.

A joint effort between E.C. Jordan Engineering Company, Portland, Maine, Maritec, Inc., South Bristol, Maine, and the Passamaquoddy Tribe would investigate the following aspects associated with a demonstration project; engineering; environmental; socio-economic; research & development; tidal measurements; and related aquaculture development. The basic thrust of the demonstration project is aimed at the objectives listed below for two seperate classifications:

A. Scientific - Technical

- resolve environmental uncertainties; note, tidal power does not adversely affect the air and water quality. The major environmental concern is how the project will change the ecological balance through projected physical changes within the tidal basin.
- assess operational techniques and engineering designs
- develop and research prototype generating equipment and, thereby, reduce the high, initial capital cost associated with tidal plants
- investigate construction techniques, protective measures, and electrical network interfacing

B. Project Benefits

- increase employment opportunities in an economically depressed region; e.g., aquaculture, tourism, plant operation, and construction
- generate electricity for neighboring communities and provide a certain degree of regional energy self-sufficiency
- increase U.S. participation in tidal power development
- improve transportation system
- increase the probability for future tidal projects

We believe that the most efficient and expedient method to develop this considerable and valuable energy resource can be realized through the construction of a demonstration project and from the information and experience derivable from the plant's operation.

Plant capacity for the Half-Moon Cove projects ranges from 4 megawatts (MW) to 15 MW depending on operating mode (i.e., long-time duration versus maximum power production), research & development objectives, and power network compatability. As an illustrative example, consider the following facts related to the 5 MW installation in terms of prevailing 1976 cost estimates:

- total project cost; including interest during construction, contingency, etc. . .	$11,085,000
- annual energy production, kilowatt-hour	21,650,000
- average power cost, mills/kwh	49.6

- benefit-to-cost ration for power benefits at 22.4 mills/kwh in 1976 a. power only 0.408
  b. total benefits 1.333
- life cycle characteristics for 6% escalation rate for oil-fueled electricity
  * 16 years after operation until annual income exceeds annual cost
  * 27 years after operation until cumulative losses are recovered
- earliest on-line date 1984

Several points of interest regarding tidal power plants in general should be mentioned at this time:

- if a 300 MW tidal power plant had been constructed and on-line by 1965 in Passamaquoddy Bay, it would be producing cheaper power, today, than by conventional resources. The break-even point (i.e., when annual income first exceeds annual cost) would have occurred in 1974 as determined by actual electric utility industry statistics. Tidal power could be produced at 22.7 mills/kwh in 1974 versus the corresponding value of 26.85 mills/kwh which is the average revenue for public utilities in Maine for 1974.

- the 5 MW installation at Half-Moon Cove would have a lower average power cost than a 180 MW plant in nearby Cobscook Bay - 50 mills/kwh and 56.7 mills/kwh, respectively, 1976. The reason for this difference in favor of small plants is due to the relatively lower interest cost during construction and to the availability of existing transmission facilities.

- two small, or intermediately-sized, single pool tidal plants could be "paired" to produce dependable power by coordinating operation so as one functions from basin-to-sea, and the other from sea-to-basin. This mode of development could be applied to a series of suitably configurated basins along the upper Maine coast to produce an integrated energy system.

The committment of funds and effort to assist in the development of renewable energy sources is needed to overcome the financial constraints limiting project implementation and to ensure sufficient energy supplies for future demands By constructing a demonstration project allows immediate action and proper planning procedures before a wide-scale utilization is possible. Renewable resources are substitutes for depletable supplies and promises an infinite future energy sources.

We endorse and support the effort of the U.S. Corps of Engineers in thei investigations of the Cobscook Bay tidal power projects. Specific areas that should be studied deemed important to the our project include the following:

1. Compare the benefits of constructing a large tidal plant versus a series of small, interconnected projects in Cobscook Bay and along the upper Maine coast. This analysis should include consideration of the following factors:
   a) potential "boom-bust" effect versus controlled project implementation, the influx of construction workers for the large and paired-basin projects should be compared in terms of the area's ability to effectively absorb the population and to adequately expand the services

required.

b) power production potential, engineering and economic analysis of the anticipated annual output of a large plant versus a paired-basin system. Additional emphasis should be placed on the comparison between two-pool systems and paired-basin operation for dependable power production.

c) project impact, the following topics should also be considered when comparing the two different configurations;
- environmental impact
- adaptability for aquaculture development
- potential for economic growth
- compatability with existing lifestyle

2. When performing economic analyses of the various proposed projects in Cobscook Bay, there should be three types of seperate evaluations that are listed and described below;
   a) conventional benefit-to-cost analysis, to assess the static, or present-day, value of total capital cost versus actual tidal power values
   b) life cycle cost analysis, this method considers future predicted trends to calculate benefit-to-cost ratios for every year of operation
   c) others, one example is the use of inflation indexed bonds which makes it feasible to operate a tidal plant during the first years of operation when annual costs are greater than tidal power value, or income.

   By using these various methods, the emphasis is equally distributed to allow for criticism to be evenly dispersed. The acceptance of project implementation will then be ajudged on the basis of different criteria applicable to the analysis of projects using renewable resources.

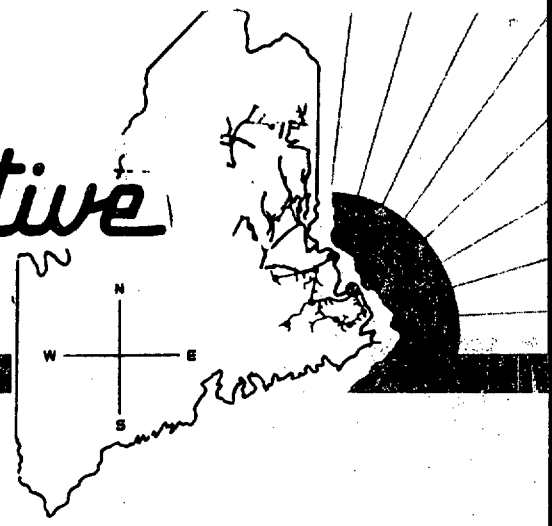
3. Request a realistic appraisal of how Pittston oil refinery would affect tidal power projects at, or near, Shackford Head. Since several configurations of the projects planned for study by the Corps will be located in that vicinity, it then becomes important to properly assess the two projects in terms of compatability. Questions that should be answered are as follows;
   a) Who should rightly bear the cost of locks needed for supertankers, and how the additional cost will affect the tidal projects economic feasibility?
   b) Would the Pittston refinery be operational during the construction phase of the tidal project?
   c) Within the impounded area, how will the refinery's discharge affect water quality and water temperature?

4. Determine the socio-cultural and socio-economic effect of the Cobscook Bay projects on the Passamaquoddy Tribe's lifestyle. And in general, accurately evaluate the project's impact on the socio-economic parameters controlling the region's characteristics. This would include archaelogical considerations, aboriginal rights, and assessment of new transportation densities on the reservation.

We believe that the most effective method of coordinating planning at the Half-Moon Cove project with the Corps' Cobscook projects is to work closely in the areas most pertinent to larger installations associated with research & development objectives at a demonstration plant. We welcome the opportunity to do so in the coming year.

Eastern Maine Electric Co-operative

INCORPORATED



REMARKS OF

ROBERT V. CLARK, GENERAL MANAGER

EASTERN MAINE ELECTRIC COOPERATIVE, INC.

PREPARED FOR PRESENTATION

AT EASTPORT, MAINE

JULY 10, 1978

T I D A L P O W E R S T U D Y

COBSCOOK BAY, MAINE

REMARKS OF

ROBERT V. CLARK, GENERAL MANAGER

EASTERN MAINE ELECTRIC COOPERATIVE, INC.

EASTPORT, MAINE.

JULY 10, 1978

WE ARE PLEASED TO BE ABLE TO COMMENT ON THE NEED FOR HYDRO-ELECTRIC FACILITIES GENERALLY AND MORE SPECIFICALLY ABOUT THE COBSCOOK BAY PROJECT NOW TO BE STUDIED.

IT HAS BEEN OUR OPINION THAT ALL AMERICAN ENERGY SOURCES THAT CAN REASONABLY BE DEVELOPED SHOULD BE DEVELOPED, EACH IN ITS TURN AS RELATED TO ENERGY AND POWER ECONOMICS, ENERGY AND POWER NEED, AVAILABLE FINANCING, MANPOWER, ETC.

IT IS INDEED UNFORTUNATE THAT CONGRESS, IN ITS WISDOM, DIDN'T ESTABLISH LONG AGO A POLICY THAT CONSIDERED THE REAL, LONG TERM VALUE OF FEDERAL HYDROELECTRIC PROJECTS TO THE CITIZENS OF THIS COUNTRY. NOW THAT YOU ARE STUDYING THE ALL-AMERICAN TIDAL POWER PROJECT IN COBSCOOK BAY AND YOU ARE TO BE CONSIDERING THE RELATIVE COST OF FUELS OVER THE LIFE TIME OF THE PROJECT,

PERHAPS MORE REALISTIC BENEFIT-TO-COST RATIOS CAN BE ESTABLISHED. THE INTERNATIONAL PASSAMAQUODDY PROJECT, WHEN STUDIED IN THE EARLY 60'S, DIDN'T HAVE THE ADVANTAGE OF A LIFE CYCLE FUEL COST ANALYSIS. INSTEAD, THE PROJECT WAS FOUND TO BE UNATTRACTIVE WHEN COMPARED TO A NEW OIL FIRED PLANT IN BOSTON BURNING OIL THAT COST APPROXIMATELY $1.50 PER BARREL (LESS THAN 4 CENTS PER GALLON). WITH OIL NOW COSTING NEARLY TEN TIMES AS MUCH AND FALLING WATER REMAINING ABOUT THE SAME, CLOSE TO ZERO, WHETHER RIVER OR TIDAL WATERS ARE INVOLVED, THE .86 BENEFIT TO COST RATIO WOULD BULGE TO A HIGHLY FAVORABLE FIGURE.

UNFORTUNATELY, WE DON'T HAVE THE SAME CONSTRUCTION COSTS NOW AS WE HAD IN THE EARLY 60'S, BUT THE PRINCIPLE IS THE SAME AT A HIGHER COST LEVEL. UNLIKE THE RISE AND FALL OF THE TIDES, CONSTRUCTION COSTS WILL ALWAYS CONTINUE TO INCREASE YEAR AFTER YEAR. THE EARLIER WE CAN ESTABLISH THE CONSTRUCTION COST LEVEL BY BUILDING ANY HYDRO FACILITIES THE GREATER THE BENEFITS IN THE YEARS AFTER THE CONSTRUCTION HAS BEEN ACCOMPLISHED.

WHERE LOCAL ENERGY SOURCES ARE TO BE CONSTRUCTED, UTILIZING

RENEWABLE LOCAL RESOURCES SUCH AS FALLING WATER, ALL AMERICA IS BENEFITED. IN FACT, UNLESS WE DO SOLVE OUR ENERGY PROBLEMS FAIRLY SOON, AMERICA MAY BECOME A DIFFERENT COUNTRY THAN WE HAVE KNOWN. UNLESS AMERICA CAN AGAIN BECOME ENERGY INDEPENDENT, WE WILL FIND, MORE AND MORE, THAT OUR COUNTRY WILL BE SERVING THE WISHES AND ASPIRATIONS OF FOREIGN GOVERNMENTS CONTROLLING THE ENERGY SOURCES WE REQUIRE. ALREADY WE SEE EVIDENCES OF THIS HAPPENING.

WE LOOK TO YOUR STUDIES TO SHOW THE VALUE OF LIFE CYCLE ECONOMICS IN DETERMINING THE VALUE OF HYDROELECTRIC PROJECTS. ALL PROJECTS DO NOT WITHSTAND THE RIGOROUS TEST OF A BENEFIT TO COST RATIO OF BETTER THAN ONE AT ANY GIVEN POINT IN TIME, ALTHOUGH IN THE LONG RUN, THEY MIGHT WELL BE ATTRACTIVE. PROJECTS, SUCH AS DICKEY-LINCOLN ON THE UPPER SAINT JOHN RIVER, WITH AN EXTREMELY FAVORABLE BENEFIT TO COST RATIO EVEN WITHOUT LIFE CYCLE, WOULD BE PROVEN TO BE EVEN OF GREATER VALUE WITH PROPER CONSIDERATION BEING GIVEN TO FOSSIL FUEL COST INCREASES IN THE FUTURE.

HOPEFULLY, YOUR STUDIES WILL NOT RESULT IN RECOMMENDATIONS

THAT WOULD PRECLUDE THE FUTURE DEVELOPMENT OF THE FULL INTERNATIONAL PASSAMAQUODDY HYDROELECTRIC PROJECT. ALTHOUGH THE TIME MAY NOT NOW BE RIGHT FOR CANADA TO JOIN WITH THE USA IN CONSTRUCTING THE FULL PROJECT, SUCH MAY NOT BE THE CASE IN THE FUTURE. THE AVAILABILITY OF A LARGER AND MORE ECONOMICAL DEVELOPMENT FURTHER UP FUNDY BAY WHERE TIDES ARE GREATER HAS AFFECTED CANADIAN DECISIONS ON QUODDY FOR THE PRESENT. WE HAVE HOPED THAT ANY ALL-AMERICAN PLAN TO BE DEVELOPED WOULD LATER BECOME AN INTEGRAL PART OF THE LARGER INTERNATIONAL DEVELOPMENT.

PERHAPS SOME OF THE "FLOW THROUGH" TAXES TO BE PAID DIRECTLY BACK TO THE GOVERNMENT BY THE VARIOUS CONTRACTORS AND INDIVIDUALS WORKING DIRECTLY ON THE JOB SHOULD BE CONSIDERED. ALTHOUGH THERE WOULD BE OTHER INDIRECT, BUT PERHAPS SIGNIFICANT, REPAYMENTS TO THE FEDERAL TREASURY THROUGH TAXES AS A RESULT OF THE ADDED BUSINESS IN STORES, EQUIPMENT FACTORIES, SUPPLY HOUSES, REAL ESTATE OFFICES, PROFESSIONAL SERVICES, TRADESMEN, ETC., SUCH MIGHT BE HARD TO ANALYZE, THOUGH REAL. AN ANALYSIS OF THE DIRECT TAX RETURN AS A RESULT OF THE INITIAL CONSTRUCTION CONTRACTS MIGHT, PERHAPS, BE INTERESTING. ALTHOUGH WE REALIZE THAT

ONE COULD REASON IN THIS SAME MANNER WITH ANY FEDERAL PROJECT, IT HAS A SPECIAL SIGNIFICANCE WHEN DEALING WITH RENEWABLE ENERGY RESOURCES THAT ARE THE MOST VALUABLE OF ALL ENERGY SOURCES THAT WILL BE REQUIRED TO STABILIZE THE FUTURE OF OUR COUNTRY.

TO SUMMARIZE, WE ARE PLEASED THAT YOU ARE MAKING THE STUDY AS IT WILL ADD TO OUR EXISTING TECHNOLOGY. THE STUDY WILL ALSO ADD TO OUR KNOWLEDGE ABOUT THE VALUE OF OTHER HYDRO SITES BY SHOWING TRUER VALUES THAN THOSE EXISTING METHODS NOW USED BY CONGRESS TO DETERMINE A PROJECT'S FEASIBILITY.

WE APPRECIATE THE OPPORTUNITY TO MAKE THESE GENERAL COMMENTS ABOUT THE COBSCOOK BAY PROJECT AND THE NEED IN THIS STUDY TO BRING OUT NEW INNOVATIVE WAYS OF SHOWING THE TRUE VALUE OF HYDROELECTRIC PROJECTS TO OUR COUNTRY. SUCH IS NEEDED BECAUSE PAST PRACTICES HAVE, IN OUR VIEW, SLOWED DOWN THE CONSTRUCTION OF MANY GOOD HYDROELECTRIC PROJECTS.

Official Record Copy

FINAL ENVIRONMENTAL IMPACT STATEMENT

PITTSTON OIL REFINERY AT EASTPORT, MAINE

I. Impacts on Passamaquoddy Tidal Power Proposals

The two projects are in direct conflict due to several factors that make the projects realistically incompatible. The major areas of concern include the following:

1. Effect on the Economic Feasibility of tidal project:
Since the cost of placing navigational locks in the dykes will be borne by the government, it then adds to the total cost of a Cobscook Bay installation located at or near Shackford Head. For example, assume that the total cost for a 200 MW tidal power plant is $500,000,000 has an initial benefit-to-cost ratio of 1.00. By constructing a lock for super-tankers at cost of $140,000,000, then decreases the benefit-to-cost ratio to 0.78. This in effect would wipe out the project's economic feasibility based on this criteria.

2. Assuming the refinery is constructed before approval of the tidal power plant, this would then render the refinery inoperable during the construction of the tidal project for 5-6 years. Once construction would start for tidal project it would then make it impossible for supertankers to navigate the channel until the lock is completed, as well as the other structures of the tidal plant. This situation points out the two project's incompatability once the refinery is operating, since it makes no sense to close the refinery for that length of time and would essentially negate any possible tidal plant construction near the refinery.

3. Assuming that the tidal power project and the refinery are both constructed {which does not seem possible, unless the tidal project is built first and Pittston assumes the cost of the locks}, the tidal water impounded behing the power plant would be susceptible to thermal pollution induced by the discharge from the refinery. This effect results from the decreased turbidity and flushing action encountered once a tidal plant is in place. Therefore, the effect of waste discharge is amplified and would have to be carefully analyzed before this type of operation would be permitted which would endanger the delicate ecological balance of Cobscook Bay.

4. Another factor related to item no. 3 is the petroleum by-products that will also be discharged in the tidal basin. The accumalative factor of this type of pollution would also have to be investigated to propertly assess any potentially dangerous environmental impacts.

5. Assuming that supertankers are navigating through locks constructed with the tidal project, it then becomes possible that the modification of power production schemes will cause a loss of electrical generation. This is due to the loss of water volume and hydraulic head during periods where tidal power production coincides with super-tanker schedules.

The tidal power projects referred to in this discussion are the ones presently being investigated by the U.S. Corps of Engineers. The Operation of the Tribe's project at Half-Moon Cove would not interfere with the refinery and vice versa. However, since the Half-Moon Cove project is being planned as a demonstration project, and as a forerunner to large tidal power projects, it then reduces the necessity of a demonstration projects. This thereby decrease the project's economic feasibility.

Also since the refinery and the tidal power project near Shackford head are incompatible, it then becomes a question of constructing and refinery in return for the loss of tidal power development on a large-scale. The energy production potential of tidal power is then loss in favor of an oil refinery with questionable value based on potential destruction of marine resources and a drastic change in the lifestyle of the region. The potentially dangerous SO_2 emission is also included within this equation.

It is my opinion that the resources embodied in the tides are more valuable than the dangers intrinsically involved in the construction of an oil refinery. In contrary to the Environmental Impact Statement the two projects are not compatible due to the following factors summarized below;

- cost of navigational locks
- alteration of tidal project's economic feasibility
- logistical incompatability of construction phase of tidal project with regard to supertanker passage
- potential dangers of aggravated thermal and water pollution withing the confines of the tidal basin
- loss of electrical generation capacity during navigational phases.

In other words, the renewable resources of tidal power would have to be eliminated in favor of an oil refinery that should be rejected on other grounds explained elsewhere.

SECTIONS PERTAINING TO PASSAMAQUODDY TIDAL POWER PROPOSALS

FINAL ENVIRONMENTAL IMPACT STATEMENT (VOLUME II)
PITTSTON OIL REFINERY AT EASTPORT, MAINE

1. ..., there is no conflict between the Pittston and tidal power projects sufficient to call the Pittston proposal into question (Page I-11)

2. In view of possible navigational needs, two alternate larger size locks were considered for the project, namely 830' x 120' x 42' deep and 1250' x 180' x 67' deep; their preliminary estimate total investment costs are $86,443,000 and $140,167,000, respectively. The lock size will be a matter for future determination, and based on costs versus navigational needs and benefits if and when the tidal project is authorized. The costs of the navigational locks would be charged against the tidal project and be borne by the Government. (Page III-162)

3. At this time the outstanding determinant is a national level decision as to whether the life-cycle costing method will be recognized as a basis for the economics of the project and the Survey Scope Study Report. (Page III-164)

4. The cold sea water will be brought in from Broad Cove through a screened inlet flume. It will flow through the system at 27,400 gpm, and will finally be returned into Deep Cove 20° F warmer. (Page IV-62)

5. However, this project (Passamaquoddy Tidal Power) remains a "potential" project which has not yet achieved the status of a proposed project. (Page V-17)

6. Based on these data, it can be concluded that the chronic spillage at Eastport will probably be between 20 and 86 barrels per year, in addition to the equivalent of 1-2 barrels per day discharged in wastewater. (Page VI-35)

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Comment by John R. Goodwin,
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U. S. Army Corps of Engineers
Public Meeting on
Cobscook Bay Tidal Power Study
Augusta, Me.

July 13,,1978

Thank you very much for this opportunity to discuss with you today the proposed tidal power project at Cobscook Bay in this state.

My name is John R. Goodwin of Bath, Me., and I am executive director of Maine Citizens for Dickey-Lincoln, a group of Maine citizens from all walks of life and from throughout the state who believe that that hydro-electric/flood control project is vital to meeting the energy needs of Maine and the rest of the region.

This meeting here today has, of course, been called to discuss the tidal project at Cobscook Bay and not Dickey-Lincoln, but we believe that the two projects are related now just as they were more than forty years ago when first conceived.

We would like to support the planned project at Cobscook Bay, for we believe that it, along with Dickey-Lincoln and various medi

and small-sized hydro-electric plants can and must play a large role in the future of this state and region.

Hydro-electric power is clean, renewable, and quite low cost. In a state and region which has little or no energy resources, water is something we do have in substantial abundance---not to be wasted, but to be used carefully in the best interests of all.

That water is a low-cost source of electric power is indicated in an advertisement the state's largest utility, Central Maine Power, ran in state newspapers recently. I would like to submit it for the record.

Claiming that its rates are well below the average for the top 100 electric utilities in the nation, CMP cites two basic reasons for this: One is what they describe as low-cost nuclear power; the other is even lower cost hydro power.

The reason hydro-electric power is so low cost in comparison with other sources is obvious: The water used to turn the turbines is free from the inflationary pressures which push up the cost of alternatives such as oil, coal and nuclear.

It is precisely this which appears to make the proposed Cobscook Bay project economically feasible even though by conventional measurements the cost-benefit ratio is less than one-half that of Dickey-Lincoln. The preliminary analysis of Cobscook done by the Corps of Engineers shows a cost-benefit ratio of between .31 and .45 to 1.0. The cost-benefit ratio of Dickey-Lincoln is 1.20 to 1.0.

If a dollar invested in Cobscook returns only between 31 and 45 cents, why, one might naturally ask, bother with it at all?

The answer is that over the long run the project no doubt will make sense. That is, over the life of the project---the life cycle, if you will,—the benefits will far outweigh the costs. The reason for this, as mentioned, is that the tidal water used to power the generating turbines is immune to inflationary pressures.

This loss in the short run and very substantial gain over the long run, is not all that strange a phenomenon. Countless businesses run in the red for a time after they begin and only gradually begin turning a profit and return on investment.

The difference between Dickey-Lincoln and the proposed Cobscook project is that at the St. John River Project there is no waiting for the break-even point down the road. It's economically viable today and will be even more so in the future, especially if the life-cycle method of analysis is applied. We understand the Corps is now engaged in such a study and that the results will be available later this summer.

We would hope that the state of Maine will be treated as a special marketing area for Cobscook Bay power just as it has been so designated in the case of Dickey-Lincoln.

Since there are environmental, social, and economic costs involved that are unique to the state, it seems only fair that Maine should get a larger proportionate share of the benefit than might otherwise be justifed.

Maine is scheduled to receive 44 per cent of all the power generated from Dickey-Lincoln. Some such allocation from Cobscook to th state would seem appropriate.

These sources of electric power are crucial to Maine's future. If the state's largest utility can credit hydro power, in part, for its supposed low rates, then it follows that hydro power is something we in Maine and elsewhere in New England should be developing to the extent possible.

Every electric power consumer in Maine should be supporting both Cobscook and Dickey-Lincoln, for they will all benefit from this low-cost source of energy.

Maine consumers are not dumb. They fully realize that there are special interests who want to push up the cost of electric power for their own peculiar reasons: For example, the oil dealers who are terrified of low-cost electric power; the no-growth forces who would put us all back into some sort of peasant culture; the sociological reactionaries who view broad-scale improvements in the standard of living as vulgar and cheap; the new class elitists who would take to themselves the task of defining what is "good" and what is "bad" for the rest of us.

But, as we said, Maine consumers are able to see through all that and observe for themselves that what Maine needs is more and cheaper power, not less power that's more expensive.

We're convinced that the studies the Corps of Engineers is now undertaking at Cobscook will show this unique project a worthwhile undertaking with benefits spreading throughout Maine and the rest of New England.

This idea of harnessing the tides to generate power has long been with us. So has Dickey-Lincoln. It's time both were brought to reality.

We have procrastinated so long, in fact, that the Canadians have withdrawn from the original idea of an international tidal hydro-electric project at Quoddy Bay.

One can hardly blame them. While Maine and New England have delayed in developing any large-scale hydro projects, Canada has moved ahead on a very large scale. In fact, the Canadians sell large amounts of power in this country today and are anxious to sell even more.

And why shouldn't they? It's a good way for them to work their own way into energy independence while others---that is, Americans---pay a large share of the bill.

Maine consumers are paying for Canadian power today and will be tomorrow. It's not low-cost hydro power, either (the Canadians wisely like to keep that for themselves), it's expensive power from oil-fired plants. Central Maine Power last year purchased 27 per cent of its power last year from sources outside its own generating system. Much of this came from the Canadians.

This dependence on outside sources for power---outside the state, outside the region, and outside the country---cannot be ended entirely, but it can surely be lessened by developing the natural resources we have. One of them water.

That is why---barring unforseen factors or developments that may emerge during the in-depth study now under way---we believe the Cobscook Bay project, along with Dickey-Lincoln, ought to be developed and brought on line as soon as possible.

STATEMENT

by

ROBERT TURNER

At The

PUBLIC MEETING IN AUGUSTA, MAINE, ON THE
TIDAL POWER STUDY, COBSCOOK BAY, MAINE, USA

Mr. Chairman, members of this hearing body, my name is Robert W. Turner and I live in South Bristol, Maine. I am the Executive Director of the Economic Resources Council of Maine, and I have been asked by our Board of Directors to speak on their behalf regarding the Tidal Power Study for Cobscook Bay.

The Economic Resources Council of Maine is a privately supported organization comprised of many of Maine's business and industry leaders as well as many private citizens from a wide variety of occupations, all of whom are committed to balanced economic growth for Maine. We have members from all areas of the State who are brought together by a common desire to have the positive aspects of appropriate economic growth communicated to the people of Maine.

On behalf of the Economic Resources Council of Maine I want to offer our complete support of this study. There are few projects in Maine which should be more aggressively examined than the possibility of using tidal power for the generation of electricity. In spite of the beliefs of the advocates of no growth, Maine needs electricity now and will need more in the future. Our participation in the New England power grid makes this a regional concern, and Maine must contribute its share to the region if we are to continue to use this

system. Once in place, this system would be a renewable, non-polluting source of power that could make a worthwhile contribution to our needs; and while it won't answer all our energy needs, we must have a diversified system of power generation, a system that has a place in it for tidal power.

We urge you to consider this project in light of the future costs of other power facilities. To make the financial analysis solely on the basis of today's costs would be extremely shortsighted and make the entire study one of dubious value.

Secondly, we urge you to consider the needs of the citizens of Washington County and the Eastport area. This area of high unemployment, more than any other in this State, has been subjected to the roller coaster of promised economic development followed by unfulfilled projects and the economic stagnation and unemployment that results.

The idea of tidal power in this area, as you know, is not new. Plans have been talked about without results for years. The proposed oil refinery project in Eastport continues to have roadblocks and obstacles thrown in its path. These are just two examples of the opportunities

the citizens of that area have been close to but unable to realize. The jobs resulting from this project would have a positive economic effect in Eastport and Washington County, a positive effect which must be given great importance.

It is our hope that this study will result in evidence that urges the project go ahead. Obviously, careful study is required, but we urge you to keep away from the many items, considered trivial by common standards, which often delay these studies. The people of Maine are known for their common sense. We hope that this common sense will be used in this study.

The Economic Resources Council of Maine welcomes the opportunity to help with this study in any way we can, and we urge you to proceed with your work as quickly as possible.

Thank you very much.

BEFORE THE U.S. ARMY CORPS OF ENGINEERS' PUBLIC MEETING
TO DISCUSS THE COBSCOOK BAY TIDAL POWER STUDY

JULY 13, 1978

I WELCOME THIS OPPORTUNITY TO EXPRESS MY SUPPORT FOR THE U.S. ARMY CORPS OF ENGINEERS' STUDY OF THE FEASIBILITY OF HARNESSING AND EMPLOYING ONE OF MAN'S MOST RENEWABLE ENERGY SUPPLIES -- THE OCEAN'S TIDES -- IN COBSCOOK BAY.

THE DREAM OF UTILIZING TIDAL POWER IS NOT A NEW ONE, ALTHOUGH THERE ARE PRESENTLY NO TIDAL POWER FACILITIES IN THE UNITED STATES. FRANCE AND THE SOVIET UNION ARE PRESENTLY OPERATING TIDAL POWER FACILITIES, AND BOTH CANADA AND ENGLAND HAVE SERIOUSLY CONSIDERED TIDAL POWER AS AN ALTERNATIVE SOURCE OF ENERGY.

A NUMBER OF STUDIES HAVE CONSIDERED THE FEASIBILITY OF TIDAL POWER IN THIS COUNTRY, AND EVEN THIS AREA OF MAINE, BUT EMPLOYING THE ENERGY OF THE TIDES HAS ALWAYS SEEMED ECONOMICALLY INFEASIBLE.

THERE IS EVIDENCE, HOWEVER, THAT WE MAY HAVE BEEN THINKING ABOUT THE ISSUE IN THE WRONG WAY. FIRST, THERE IS THE FRENCH EXPERIENCE. FRANCE CONSTRUCTED ITS PILOT PROJECT IN 1966; AND ALTHOUGH THE COST-BENEFIT RATIO WAS INITIALLY POOR, IT IS NOW FAVORABLE. THE CONSISTENCY OF THE PROJECT'S PERFORMANCE HAS FASCINATED SCIENTISTS. SECONDLY, THE STONE AND WEBSTER ENGINEERING COMPANY OF BOSTON, COMMISSIONED BY THE U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION, USED A "LIFE CYCLE COST ANALYSIS" AND RECENTLY CONCLUDED THAT A TIDAL POWER PLANT IN THE COBSCOOK BAY AREA OF MAINE IS "AN EXTREMELY ATTRACTIVE PROSPECT."

IN ADDITION, WE MAY HAVE BEEN ATTACHING TOO LOW A VALUE ON THE AVAILABLE BENEFITS TO BE DERIVED FROM THE USE OF TIDAL POWER. FOR ONE, THE VALUE OF REDUCING OUR DEPENDENCE ON HIGH-PRICED FOREIGN OIL IS DIFFICULT TO MEASURE, THOUGH IT IS CERTAINLY GREATER THAN EVER. AS WELL AS AN INCREASE IN HYDRO-ELECTRIC POWER AND A DECREASE IN OUR DEPENDENCE ON FOREIGN SOURCES OF ENERGY, BENEFITS OF A TIDAL POWER FACILITY IN COBSCOOK BAY WOULD INCLUDE A REDUCTION OF THE DISPARITY IN PRICES WHICH NEW ENGLAND STATES PAY FOR ENERGY AND THE CREATION OF JOBS THROUGH INVESTMENT IN AN AREA OF TRADITIONALLY HIGH UNEMPLOYMENT.

NEVER BEFORE IN OUR HISTORY HAS THE NEED FOR ALTERNATIVE SOURCES OF ENERGY BEEN SO URGENT. THE TIDES SEEM LIKE AN IDEAL SOURCE: THEY ARE PRODUCTIVE, NON-POLLUTING, AND RENEWABLE. A TIDAL POWER PLANT IN COBSCOOK BAY CERTAINLY DOES LOOK LIKE "AN EXTREMELY ATTRACTIVE PROSPECT."

THANK YOU.

DELIVERED BY SANDRA MORRELL, FIELD REPRESENTATIVE, FOR CONGRESSMAN EMERY.

Cobscook Bay Tidal Power Project
U.S. Corps of Engineers: New England Division
13. July. 1978

by, Normand Laberge
Dr. Normand Laberge, Scarborough, Maine

Nearly two years ago Stone & Webster Engineering Company conducted similar types of public hearings in connection with a tidal power study for the Energy Research & Development Administration. The positive results of their study, namely the use of life cycle cost analysis, enabled continued funding to be available, in this case, to the Corps of Engineers to further investigate tidal power. The inclusion of life cycle cost analysis was requested by Governor Longley. This emphasizes the importance of soliciting "public" comments in developing a comprehensive scope of work. The Corps should be commended in their effort at introducing "public" input during the early phase of their study.

I fervently hope that this present study is directed at the most immediate and effective way of developing this natural resource. In my comments I will point out several topics which should be seriously considered when addressing the methods by which tidal power should be evaluated. The underlying sentiment presented in my comments is predicated at constructing a demonstration project as the most logical first-phase of development. I have worked with the Passamaquoddy Tribe for two and one-half years on a demonstration tidal project which would lend itself ideally to the goals and objectives of utilizing, not periodically

studying, tidal power. I believe that we are now at a crossroads leading to project construction. A different approach should now be employed which offers the potential to make tidal power economically viable. That method, I claim, is the construction of a demonstration project as the forerunner to intermediate- and large-scale tidal installations

My specific comments are as follows for the general subjects underlined:

1. Regional energy supply

New England's present energy supply mix is greatly dependent on depletable resources. It then becomes important to expand the energy mix to include the use of renewable resources. Tidal power with the potential of having installed capacity from 300-500 MW is a most significant future contributor to this re-distribution of resources. Questions regarding national security environmental non-degradation, and the utilization of natural resources are all embodied within the solution available from tidal power development

2. Demonstration tidal project

The reasons for constructing a small project are quite numerous and historically precedent. They include the following:

- less of a capital investment
- valuable to investigate engineering designs
- determine environmental impact
- quantify operational parameters

- RESEARCH & DEVELOP RELATED ASPECTS OF TIDAL POWER; i.e., PROTECTIVE MEASURE
- ENABLE U.S. MANUFACTURERS TO TEST PROTOTYPE EQUIPMENT

BY IMPLEMENTING THESE ACTIVITIES WITH THE OPERATION OF SMALL TIDAL PROJECT IT IS POSSIBLE TO REDUCE THE COST OF FUTURE PROJECTS NOT ONLY BY THE DEVELOPMENT OF GENERATING EQUIPMENT, BUT ALSO BY REDUCING THE UNCERTAINTIES OF ENVIRONMENTAL IMPACT AND BY BEING ABLE TO PLAN FOR CONSTRUCTION ACTIVITIES BASED ON ACTUAL EXPERIENCES. THE ECONOMIC JUSTIFICATION IS CERTAINLY WARRANTED WHEN LIFECYCLE COSTING IS COMBINED WITH THE DEMONSTRATIVE VALUE OF SMALL TIDAL PROJECT. IF WE CONSERVATIVELY ASSUME THAT A DEMONSTRATION PROJECT COULD REDUCE TOTAL CAPITAL COST BY 1%, THIS WOULD THEN TRANSLATE INTO A $5,000,000 SAVINGS FOR A 200 MW TIDAL PLANT. THIS AMOUNT IS ABOUT HALF THE COST OF A 5MW POWER PLANT. I BELIEVE THAT ACTUAL SAVINGS WOULD BE BETWEEN 5-10% BECAUSE IT MUST BE REMEMBERED THAT TURBO-GENERATORS FOR TIDAL PROJECTS ARE APPROXIMATELY 2-3 TIMES GREATER THAN CONVENTIONAL HYDROELECTRIC PLANTS AND A MODERATE REDUCTION ON THIS COMPONENT GREATLY INFLUENCES THE COMPARISON WITH OTHER ENERGY RESOURCES

3. <u>OTHER BENEFITS OF DEMONSTRATION PROJECT</u>

A SMALL TIDAL PLANT WOULD BE GENERATING ELECTRICITY FOR REGIONAL DEMAND WHILE SATISFYING THE DEMONSTRATIVE PROPERTIES AND REQUIREMENTS. UNLIKE OTHER TYPES OF DEMONSTRATION PROJECTS, THIS POWER PLANT WOULD BE AN "ON-LINE" FACILITY PRODUCING VALUABLE ELECTRICITY, OFFERING EMPLOYMENT OPPORTUNITIES, ATTRACTING TOURISTS,

and useful as an alternative transportation route. A 5 MW plant could supply 2/3 of the region's electrical demand (total population of 3,600 for Eastport, Pembroke, Pleasant Point, and Perry) and still furnish 8,000,000 kilowatt-hour of "surplus" power for nearby markets. The 5 MW plant would cost approximately $11,000,000 in 1976 dollars with an average power cost of 49.6 mills/kwh

4. <u>Other modes of tidal power development</u>

Instead of considering a large tidal plant as the only alternative, I propose that:

a) the demonstration project be looked as the logical forerunner to a large plant

b) the demonstration project also be planned as the first-step in the construction of a series of small projects within an integrated energy network.

I will send to the Corps a copy of paper written by myself which explains the concept of paired-basin operation applicable to Cobscook Bay. Essentially, this involves an electrical link between two independent tidal basins which enables the production of dependable power from two single-pool systems. One basin would operate as a "high" pool and coordinated with "low" basin at the other tidal basin. Once the high capital cost for the initial tidal plant is reduced, then other projects will become increasingly cost-effective not only in Cobscook Bay, but also

along the upper Maine coast.

5. <u>Economics of tidal power</u>

The basis for economic evaluation of tidal power should be founded on both benefit-to-cost analysis and life cycle cost analysis. Use of other appropriate methods should also be promoted and investigated. In particular, I would like to see the use of an inflation indexed bond as a possible solution to operating deficiencies predicted during the first 10-15 years of tidal plant production. In any event, the development tidal power will necessitate federal assistance in overcoming the high initial cost and, thereby, ensure an adequate renewable supply for the future. I believe that a demonstration project is the most realistic and efficient way to accomplish these goals

Any information I have is available to the Corps of Engineers. Working with the Passamaquoddy Tribe I hope that we can be included with the Corps of Engineers' plan to work to incorporate the plans for the demonstration project with the overall plan of development of Cobscook Bay tidal power. I believe that the extension to include a series of small tidal plants is also an important development which should be given due consideration

<u>Author's Qualification</u>

B.C.E - Civil Engineering
M.S.E - Solid Mechanics
PhD - Material Science

Comment by John R. Goodwin,
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U. S. Army Corps of Engineers
Public Meeting on
Cobscook Bay Tidal Power Study
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Thank you very much for this opportunity to discuss with you today the proposed tidal power project at Cobscook Bay in this state.

My name is John R. Goodwin of Bath, Me., and I am executive director of Maine Citizens for Dickey-Lincoln, a group of Maine citizens from all walks of life and from throughout the state who believe that that hydro-electric/flood control project is vital to meeting the energy needs of Maine and the rest of the region.

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We would like to support the planned project at Cobscook Bay, for we believe that it, along with Dickey-Lincoln and various medium-

and small-sized hydro-electric plants can and must play a large role in the future of this state and region.

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The reason hydro-electric power is so low cost in comparison with other sources is obvious: The water used to turn the turbines is free from the inflationary pressures which push up the cost of alternatives such as oil, coal and nuclear.

It is precisely this which appears to make the proposed Cobscook Bay project economically feasible even though by conventional measurements the cost-benefit ratio is less than one-half that of Dickey-Lincoln. The preliminary analysis of Cobscook done by the Corps of Engineers shows a cost-benefit ratio of between .31 and .45 to 1.0. The cost-benefit ratio of Dickey-Lincoln is 1.20 to 1.0.

If a dollar invested in Cobscook returns only between 31 and 45 cents, why, one might naturally ask, bother with it at all?

The answer is that over the long run the project no doubt will make sense. That is, over the life of the project---the life cycle, if you will, the benefits will far outweigh the costs. The reason for this, as mentioned, is that the tidal water used to power the generating turbines is immune to inflationary pressures.

This loss in the short run and very substantial gain over the long run, is not all that strange a phenomenon. Countless businesses run in the red for a time after they begin and only gradually begin turning a profit and return on investment.

The difference between Dickey-Lincoln and the proposed Cobscook project is that at the St. John River Project there is no waiting for the break-even point down the road. It's economically viable today and will be even more so in the future, especially if the life-cycle method of analysis is applied. We understand the Corps is now engaged in such a study and that the results will be available later this summer.

We would hope that the state of Maine will be treated as a special marketing area for Cobscook Bay power just as it has been so designated in the case of Dickey-Lincoln.

Since there are environmental, social, and economic costs involved that are unique to the state, it seems only fair that Maine should get a larger proportionate share of the benefit than might otherwise be justifed.

Maine is scheduled to receive 44 per cent of all the power generated from Dickey-Lincoln. Some such allocation from Cobscook to the state would seem appropriate.

These sources of electric power are crucial to Maine's future. If the state's largest utility can credit hydro power, in part, for its supposed low rates, then it follows that hydro power is something we in Maine and elsewhere in New England should be developing to the extent possible.

Every electric power consumer in Maine should be supporting both Cobscook and Dickey-Lincoln, for they will all benefit from this low-cost source of energy.

Maine consumers are not dumb. They fully realize that there are special interests who want to push up the cost of electric power for their own peculiar reasons: For example, the oil dealers who are terrified of low-cost electric power; the no-growth forces who would put us all back into some sort of peasant culture; the sociological reactionaries who view broad-scale improvements in the standard of living as vulgar and cheap; the new class elitists who would take to themselves the task of defining what is "good" and what is "bad" for the rest of us.

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One can hardly blame them. While Maine and New England have delayed in developing any large-scale hydro projects, Canada has moved ahead on a very large scale. In fact, the Canadians sell large amounts of power in this country today and are anxious to sell even more.

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That is why---barring unforseen factors or developments that may emerge during the in-depth study now under way---we believe the Cobscook Bay project, along with Dickey-Lincoln, ought to be developed and brought on line as soon as possible.

John P. Chandler
Army Corps of Engineers
424 Trapelo Road
Waltham, MA 02159

July 28, 1978

Statement for the Record at the Army Corps of Engineers' Public Hearings at Eastport, Maine, July 10, 1978

By Howard W. Carr of New Englanders for Tidalpower

The tidal power concept currently being presented actually reduces the much needed true potential of tidal power capacity to alleviate the impending energy crisis. The plan is therefore ludicrous.

Can any Army Corps of Engineers (COE) expert explain in plain common sense terms why the Quoddy tidal power capacity suddenly regresses to the negligible quantity peak power installation which it started out at 50 years ago? 50 years ago the energy situation in the Northeast corridor was the exact reverse of what that region's energy crisis is all about today. In the 1920's and 1930's the Quoddy tidal project was terminated twice because there was really no justifiable market at hand for the power it would generate. Today, on the other hand, the northeast corridor can use every kilowatt of power the entire Fundy tidal power range can produce as a future hedge against the captive Arab oil trap we are now in - not to mention the finite nature of all fossil fuels.

This proposal involving the use of the old 1920's version of the U.S. unilateral Cobscook Bay tidal power project does not make sense - or perhaps I should say that it makes too much sense to those of us who have stood toe to toe against the Pittston Corporation in their steamroller determination to build an oil refinery on Moose Island and thus block the most logical

1M KW Joint Canadian American tidal power plan. To those of us who have faced this ruthless corporation and their friends in the political and private energy sector for over ten years, there have been too many of these strange coincidences in the entire case.

I note here the coincidence of Canada's very recent reversal of her stance and public announcement of a disinterest in any joint Canadian-American tidal power installation in the Cobscook-Passamaquoddy area. (See attached neswclip.) This is a strange turn of events with even stranger timing in that it will ultimately make it possible for Pittston to succeed in blocking the tidal power project in any form. Just the fact alone of the cutback amounting to less than half the electric power yield of the joint Canadian-American plan is a devastating blow to the project's chances for funding.

The time has come for every citizen of Eastport and the Northeast corridor to demand of their Congressional delegates that the investigative branch of the Congress, the GAO, review the entire $13 to $15 million and forty- year history of the Quoddy project. This GAO accounting is called for particularly from the viewpoint of the Federal taxpayer and electric power consumer of the Northeast corridor for value received for those millions of dollars already spent - and those currently being spent on further studies plus earlier millions spent representing land acquisition and construction already completed on the site. (two dams, Quoddy Village and supervisory personnel homes, two federal airport facilities with runways improved and extended as recently as 1959.)

Should the COE go forward with their Cobscook Bay-only plan

the building of a lock to accommodate Pittston's oil tankers would be even less cost-justified against the lesser KW yield - and Pittston wins still another underhanded victory.

I would also advise all informed and interested parties to rally to financing such litigation as would prevent the corporate-political ripoff of this one last chance we have to join with Canada at some future date in harnessing the meximum electric power yield potential not only in the Passamaquoddy, Cobscook Bay region, but in the entire Fundy range. Moose Island should be set aside exclusively for tidal power development. We speak here of a free energy source - a potential for upwards of 15M KW - the 20 to 50-foot tides of the unique Fundy range, and the elimination of the need for 15 1MKW nuclear plants.

We, of course should simultaneously encourage Canada to develop its larger share of the Fundy tidal range.

We face this vital choice at a time in history when most parts of our planet and even of this continent have no such God-given asset and therefore face the grim deadend consequence of the depletion of fossil fuels.

I implore all parties concerned: do not let this priceless infinite free energy resource fall in the hands of these ruthless corporate manipulators. If we cannot proceed with Canada as planned to harness these eternal tides at this time, then we have a moral duty to preserve that option for future generations. I refer to future generations of people who hopefully will remember us for our wisdom, foresight and unselfishness, instead of cursing us for our stupidity - as they literally slave to support some future even more arbitrary and outlandish scheme of the corporate energy moguls. Should we let this one

blatant energy ripoff scheme go unchecked, these same energy monopolists will ultimately hold New Englanders by their jugulars in more brazen captive energy market schemes as the world supply of the finite fuels nears total depletion in the early 21st Century. I urge all electric power consumers of the Northeast - save Eastport, save Moose Island, save our only truly viable tidal power site from the grasp of these ruthless self-seeking corporate and political schemers.

Thank you.

H. W. Carr

H. W. Carr
President - New Englanders for Tidalpower

G

Comment by Howard William Carr of Tidalpower Publications on the Final Draft EIS with Reference to the Air Impact Statement per Public Notice ME-41-78

I hereby acknowledge the receipt of the attached written comment on the Pittston Refinery application at Eastport, Maine submitted by Howard William Carr, in person, per public notice Number ME-41-78 for the final draft EIS with specific reference to the Air Quality Permit within the public thirty day comment period which ends July 19, 1978.

Date 7/18/78

Name Wallace E. Stark

Title Director IEEO EPA Region I

Comments by [illegible]
Final Draft EIS with Reference to the Air Impact Statement per Public Notice ME-41-78

Submitted by:

Howard William Carr
President, Tidalpower Publications
1179 Boylston St., Suite 14
Boston, MA 02215

Attention:

Mr. David Stonefield
Chief Stationary Source Section Air Branch
U.S. EPA, Region 1
JFK Building Rm. 2113
Boston, MA 02203

Re: Mr. John Silva
Federal Aviation Administration

With reference to permits already granted and those yet to be granted by Region 1, EPA to the Pittston Corporation of New York at Moose Island, (Eastport) Maine - and particularly the Air Quality Permit currently pending, I want to go on record as follows:

Inasmuch as the granting of an Air Quality Permit as well as the water quality permit and all other environmental impact facets involved must accept the infamous Pittston Corporation at its corporate word - I adamantly protest the granting of this Air Quality Permit or any other permit by Region 1 EPA to this arrogant reckless corporation.

The Pittston Corporation's word, and their general past conduct in their coal mine operations in West Virginia (125 people dead at Buffalo Creek), together with their underhanded methods in their attempts to procure an oil refinery site in Maine renders them conspiculously ruthless and irresponsible to all eyes which choose to see - including even the EPA's.

Therefore, since permits and promises with reference to Pittston's concern for the general ecology of the Moose Island-Campobello area are intangible factors and mere Pittston promises at this stage - I charge that the EPA is acting irresponsibly in granting the Pittston Corporation an Air Quality Permit at this time or a permit of any kind on the strength of an un-bonded Pittston Corporation verbal or written promise.

Pittston has posted no guarantee bonds to any person, corporation or governmental agency with reference to guaranteeing their living up to the conditions which they have thus far only verbally agreed to. They have posted no bonds with reference to their promises to the Maine BEP, the EPA, the FAA or to any citizen of Moose Island upon whom the worst aspects of the negative impacts of their oil refinery operation would be felt.

Pittston is in fact at this point strictly an "on-paper scam", in that low cost binding options, and secret political type promises of the delivery into their hands of federal airport lands are involved

in their proposed refinery site- not to mention one keystone parcel which was taken from a private owner literally at gunpoint.

In conclusion, the Pittston Corporation and its officers do not deserve the courtesy, respect and the special latitude being afforded them at this time by the region 1 EPA, the Army COE, the FAA, and the Maine BEP in that they have muscled, cajoled, clandestinely schemed and generally steamrollered their way like common Mafia thugs in their efforts to acquire this one-of-a-kind, priceless federal taxpayer's tidal electric power facility since the mid-1960's. It has been documented that Pittston operated covertly for years until they had enough options and political promises and assurances to safely announce their supposed intentions on the federal taxpayer's tidal power site and federal airport in a cautious press release in 1969.

B

Public Comment for the Record with Reference to the Federally Funded and Controlled Airport at Moose Island (Eastport), Maine Per the Region 1 EPA's Public Notice No. ME-41-78 and Their Cover Letter of June 19, 1978 to "All Interested Parties:"

Attention:

Mr. John Silva
FAA - ANE - 610
12 New England Executive Park
Burlington, MA 01803

Dear Mr. Silva:

I wish this letter combined with the attached document which has already been submitted to the Region 1 EPA as part of the public record to also serve as my public record comment with reference to your agency's (FAA) manner, terms, and the general circumstances of your agency's turning over of the federally funded airport facilities at Eastport, Maine to the irresponsible Pittston Corporation of New York. I am sure your agency knows of Pittston's plans to demolish the airport - supposedly to build a questionably located oil refinery - questionable, from the standpoint that this identical site is the self same and only viable site upon which the federal government could join with Canadian government to harness the hydroelectric potential of the Fundy tidal range. (See "Report to the International Joint Commission by the International Passamaquoddy Engineering Board - 1959 - an army COE document)

There are just a couple of further ironies I wish to point out here for the record. These "flukes" lie in the fact that both the federal airport facilities and the tidal power installation on Moose Island (the tidal power installation was actually under construction in 1936), represent together many, many millions of dollars of the federal taxpayer's money.

Further, this is a potentially first class paved airport (reconditioned in 1959), located in one of the most dangerous flight corridors in the country, given the general lack of emergency landing strips, the prevailing fog factor and fast weather change characteristi of the region. These are facts faced by pilots flying this route daily. In conclusion and in the same spirit in which I stated the case in the attached EPA public comment, I am utterly appalled at this entire giveaway of priceless federal taxpayer's facilities and shall continue to pursue the matter until I get satisfactory answers to the questions which I've raised here and have been raising for over ten years.

Howard William Carr

Howard William Carr
President, Tidalpower Publications
1179 Boylston St., Suite 14
Boston, MA 02215

Daryl James Christopher
Engineering Consultant
P.O.Box 72
Waldoboro, Maine 04572

U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

July 15, 1978

Dear Sir,

I would like to have the following comments included in your public record hearings for the Tidal Power Study Program, Cobscook Bay, USA 1978.

I would like to preface my observations and comments by saying that I feel the undertaking of a tidal power energy harnessing study, of an 'in - depth' nature, is timely, in the sense that we in the New England Region face a difficult economic period ahead as fossil fuel costs must inevitably rise placing an increased cost burden on all our people and industry. We must investigate all the alternatives for energy generation that are endemic to our region and develop plans to replace our fossil fueled power sources in a time frame compatible with the phasing - out of these fossil fuel sources as we bring our alternative sources on line. It is imperative that we expedite these investigations as soon as practicable. The longer we wait to develop these alternative devices or systems the more expensive the investigations and implementations will become as inflationary pressures must surely increase with time! A second fact, that of the decreasing availability and increasing costs of those fossil fuel energies that will be necessary to fashion or construct these new alternative energy extraction devices, should spur us on to rectify our rather precarious energy situation which exists at the present time. We are fortunate, indeed, to have the financial support and services of the Federal government and the U.S. Army Corps of Engineers, to bring their expertise and experience to bear on the solution to this important problem. It is my fervent hope and prayer that we may find timely and appropriate hardware implementations for these new energy sources,

while attempting to preserve our terrestrial and marine life ecology. We must not sacrifice 'our house' (our environment) to keep the 'fires' (production) burning! The acceptable and desirable solution, must of course be a compromise, but it is essential that we preserve our ecological integrity or we will perish as surely as other species have under unacceptable environmental pressures. Additionally, we have been blessed with a beautiful and unique region, touted and revered for its beauty, vacation promise and rugged climate. We attract many vacationers and they contribute substantially to our economic well being, for which we are thankful. We are blessed with a beautiful coast line, lovely harbors, and extensive fisheries which contribute greatly to our economic well being! We must protect these characteristics to the greatest extent possible.

It is unfortunate that the Canadian Government has opted to sit out the potential for a joint tidal study as this must surely limit the effective use that can be made of the energy potential that was formerly present in the original Passamaquoddy - Cobscook Bay tidal concept. The 1963 U.S. Army Corps of Engineers report forwarded to then President John Kennedy over the signature of Stewart Udall indicated an energy extraction possibility of 500 thousand kilowatts of peaking power utilizing Passamaquoddy Bay as 'high' pool and Cobscook Bay as 'low' pool, employing the two pool concept for its peak power generation. Now, that we are forced to 'go it alone' we must necessarily cut the potential energy generation by one-half at the very least. Since it is unlikely that we may effectively divide the Cobscook Bay tidal water surface area by exactly one-half, at least economically, we are forced to accept the resultant reduced energy extraction by the assymetry introduced. Again, I would like to point out that the power developed will be weighted heavily as of the peak power type.

As I understand the two pool technology, being tentatively proposed for the 'go it alone' Cobscook Bay Tidal Project, the high pool will be filled on the nearest high tide preceeding the expected <u>short period demand</u> of electrical energy. This introduction of the tidal periodicity function discontinuity means that the low pool water level will remain in the low position for a <u>minimum</u> of six hours and twelve minutes before water can begin refilling this pool. It also follows that portions of the low pool at or above

the mid-tide mark may not be 'wetted' again for about nineteen (19) hours, and that areas from the mid tide point to the high tide mark will vary from nineteen to nearly twenty-five hours! One can only imagine the consequences that such a time prolongation of exposure will have on the marine life of this low pool! I can only speculate that a tremendous biological migration must take place - to where I do not know, but I suspect that inevitably the life must move to an environment where tide periodicity can be restored to its life! In essence this probably will result in the loss of up to eight - nine square miles of intertidal zone breeding and nursery area in the low pool. The aquatic life dependent on the food chain generated in this intertidal zone must necessarily be reduced in consonance with the food supply reduction, thereby affecting the fishery production of this unique Maine coast. To what extent this disruption will affect the local fishery will remain unknown until the full impact is determined following construction and operation of this tidal project.

The prolonged exposure of the lowest tidal area of the low pool results in the exposure of benthic components to increased light exposure and higher water temperatures. Again, we can only estimate the impact of such a modification of this sensitive marine environment. Migration and relocation is likely.

In the 'high-pool' we can expect to find equally disruptive environmental forces of a somewhat different impact. The high - pool is filled to the level of peak high tide and the water entrapment maintained until the peak demand period, at which time the controlled dump from the high pool to low pool is made. The peak high pool water level can vary from normal to periods up to eight - ten hours. The benthic life in the high pool may be required to remain in deep submergence for a period up to almost twenty-five (25) hours before exposure to increased illumination levels and attendant warming. Again, one can not accurately predict the environmental impact in this high pool on the marine ecology and its resultant impact on the aquatic life system of this bay.

I tend to get a very queezy feeling in my body when I see man dabbling on such a massive scale! We have thus far managed to introduce much pollution and physical disruption upon the marine nursery environment here on the northeast coast, and it is of little

wonder to me that we are now experiencing reduced yields in all of our fisheries at this time. This may be a result, more of a reduced nursery environment than of overfishing, per se. Obviously, if we continue to interfere with these embryonic environments we will eventually topple the whole marine ecology on this section of the Atlantic coastline. What effect implementation of this two pool technology tidal project at Cobscook Bay may have on our fishery industry here in Maine will remain an unknown for many years. No amount of small scale experimental work can accurately predict the actual eventual impact. We affected a bald eagle crisis following the construction of a few houses and two dams located on Half Moon Cove in our preliminary attempts to harness the tides in the mid-thirties, and we never did affect a tidal water impoundment! If we should succeed, then what?

The terrestrial problems associated with the actual construction of the dams, navigational locks, power houses, emptying and filling gates, fishways, roads, and all the attendant activities necessary for such a two pool tidal project must necessarily have a significant impact on the surrounding area. Any project costing 250 - 600 million dollars must necessarily greatly modify the socio-economic conditions for its residents. At the very least, the impact will be earth shaking for the natives of that area!

If we must invade that environment, we should attempt to reduce the effects on the physical structure of the area and interfere with the aquatic and marine life forms on a planned minimal impact basis! There are ways, other than two pool technology, to extract useful power from Cobscook Bay.

I would like to suggest at this time that we should undertake a study to determine the feasibility of employing Hydrokinetics as a mechanism for energy extraction if we feel that we must invade that unique maritime area for energy extraction purposes. Now, it will be necessary to disconnect ourselves from the New England electric power grid, at least directly, since we will not be synchronized with the 5-6 PM peak power demand period. This should come as no 'great shock' anyway, as the Dickey dam project was 'shot down' primarily, I believe, because it too was a 'peak' power generator scheme! No public power company can afford the luxury of constructing peak power supply sources and I really don't think

it's fair to ask the taxpayers to support any Federally funded peak power sources either! Better that we should eliminate the peak power energy demand period by using appropriate conservation measures or employing load limiting techniques.

But there is a lot of energy that can be extracted from the Cobscook Bay tidal activity however. It can be done by employing hydro kinetics. This means that we capture the power available in moving water by simply placing an appropriately designed horizontal shaft turbine in the path of the moving water. If we design the unit to have front and rear blades on either side of the generator (electric) and further we provide reversible - pitch blades and make the pitch controllable we can optimize power extraction on both incoming and outgoing tide! It should be obvious that the quantity of energy extraction that is achievable will greatly exceed any pool water entrapment scheme contrived for the area in question. The topology of the Cobscook Bay area is almost perfectly suited as a physical structure to employ such a hydro kinetic implementation - and with a minimum impact in terms of terrestrial and biological impacts. Units may be placed at the following areas:

1. Leighton Pt - Youngs Pt
2. Birch Pt - Grove Pt
3. Shackford Head - Seward Neck
4. Entrance to Half Moon cove

This would utilize the high flow rates which characterize these constricted flow points.

Further, these units may be prefabricated at a shipyard or other assembly point and simply floated into place. Special anchoring structures may be floated into place during tide change and 'pinned' in place to receive the turbine units. Multiple units placed at the designated points will serve to restrict the flow by a predetermined amount according to the power level extraction desired within reasonable maximum limits. The effect is to reduce the peak to peak tide in the area on the land side of the turbines. But, we do not upset the tidal periodicity function and thereby preserve to the greatest extent possible, the 'status quo' of the present marine ecology.

If we find that we have violated the ecology of the area, the turbines can be removed as readily as they were placed there,

restoring the environmental integrity.

The electrical power can be used to generate energy clean hydrogen which may then be liquified and transported to the consumer. I believe the time has come to 'wean' ourselves off the electric power bottle! We need the security that energy form diversity can make available. Overdependence on the electric power lines can be fatal. Most all homes are inoperable and essentially unlivable when we experience the loss of electrical power for any extended period of time. I believe it is essential that we diversify our energy forms in these critical times. In particular, I would think the Federal government would be promoting energy diversification in form as an element of civil defense and national security. Besides, electric power generation systems today, require capitol cost investments of $1/00,000 per barrel of oil equivalent per day. In essence, this is the reason that most electric utilities have elected to spend their limited research funds to explore 'load management' approaches to the resolution of the peak/base load variation problem. It is a ridiculous reality that the utilities must construct and operate a capacity of 2.5 - 3 times peak loads to supply a unit base load!

We should attempt to reduce the use of electric stoves, electric dryers, electric home heating systems, electric hot water heaters and other extremely inefficient I^2R resistance heating devices! There is little doubt that we could significantly reduce our electrical power generating capacity requirements, restore conservation of energy (in the true sense of thermo dynamic efficiency) and preserve capital assets for other necessary functions. The rest of the world is awaiting our return to energy consciousness and a balanced international deficit.

The hydrokinetic units may similarly be employed in our extensive river systems here in New England for additional power generation. It is practical to consider their employment for the production of base hydroelectric power, as the rivers have relative constancy of flow. Existing paper company water entrapments that were formerly used for the pulpwood drives might be utilized to introduce constant river flowage and maximize hydropower energy generation. If a number of these turbines could be properly implanted in our river systems, it is conceivable that fossil fueled plants might

be used as peaking units instead of base supply generators, further enhancing our net energy/economic position. These are goals worth shooting for and present a new challenge to innovation and implementation.

To further minimize the impact of the construction phase on the people of the Cobscook Bay area, we might consider the possibility of housing workers aboard ships anchored in the bay area. This would obviate the necessity of impacting housing, supply, and other community functions that might be adversely affected by such a large undertaking in such a relatively undeveloped area.

Before embarking on a full scale Cobscook Bay tidal development, it would be useful and extremely prudent to test a 'pilot' model. We are fortunate that Half Moon Cove is available in that bay area and I think it would provide an invaluable data base for a full scale hydrokinetic development of Cobscook Bay, USA. Thank you.

Respectfully

Daryl James Christopher

Daryl James Christopher

Contribution) —

Statement for the Record at the Army Corps of Engineers' Public Hearings at Eastport, Maine, July 10, 1978

By Howard W. Carr of New Englanders for Tidalpower

The tidal power concept presented here today ACTUALLY reduces the true potential of tidal power capacity to alleviate the impending energy crisis and is therefore ludicrous.

Can any expert here explain in plain commonsense terms why the Quoddy tidal power concept suddenly regresses to the negligible capacity peak power installation which it started out as 50 years ago? 50 years ago the energy situation in the Northeast corridor was the exact reverse of what the energy crisis is all about today - that is to say, that in the 1920's and 1930's the Quoddy tidal project was terminated twice because there was really no justifiable market at hand for the power it would generate. Today, on the other hand, the northeast corridor can use every kilowatt of power the entire Fundy tidal power range can produce as a future hedge against the captive Arab oil trap we are now in - not to mention the finite nature of all fossil fuels.

No, gentlemen, this proposal involving the use of the old 1920's version of the U.S. unilateral Cobscook Bay project does not make sense - or perhaps I should say that it makes too much sense to those of us who have stood toe to toe against the Pittston Corporation, their friends in political circles and in the private power sector from the beginning. There have been too many of these coincidences which enhance Pittston's schemes.

(I note here the coincidence of Canada's recent reversal and public announcement of their disinterest in a joint Canadian-American tidal power installation in the Cobscook-Passamaquoddy area. -See attached newsclip).

The time has come for every citizen of Eastport, the general region and in all New England to demand of their Congressional delegation that the investigative branch of the Congress, the GAO, review the entire $13 to $15 million and 40 ODD year history of the Quoddy project and - particularly from the viewpoint of the Federal taxpayer and electric power consumer of the Northeast corridor - the value for dollars spent.

I would also advise all informed and interested parties to rally to financing such litigation as would prevent the ripoff of this one last chance we have to join with Canada at some future date in harnessing the maximum electric power yield potential not only in the Passamaquoddy Cobscook Bay region, but in the entire Fundy range. Bear in mind, we speak here of a free energy source - the 20 to 50-foot tides of the unique Fundy range. This is a time in history when parts of our planet and even of this continent have no such God-given asset and therefore face the grim deadend consequence of the depletion of fossil fuels.

I implore you here to day - don't let this priceless infinite free energy source fall into the hands of the ruthless corporate manipulators. If we cannot proceed with Canada as planned to harness these eternal tides at this time, then we have a moral duty to preserve that option for future generations,--generations of people who will remember us for our wisdom and unselfishness, instead

of cursing us for our stupidity, as they slave support the even more outlandish schemes of the corporate energy moguls. THE PRIVATE ENERGY FACTION will by then hold them by their jugulars in EVEN more brazen captive energy market schemes as the world supply of the finite fuels nears total depletion in the early 21st century, - this means saving Eastport, Moose Island, from the grasp of these ruthless self-seeking corporate and political manipulators.

Thank you.

H. W. Carr

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If we must invade that environment, we should attempt to reduce the effects on the physical structure of the area and interfere with the aquatic and marine life forms on a planned minimal impact basis! There are ways, other than two pool technology, to extract useful power from Cobscook Bay.

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The electrical power can be used to generate energy clean hydrogen which may then be liquified and transported to the consumer. I believe the time has come to 'wean' ourselves off the electric power bottle! We need the security that energy form diversity can make available. Overdependence on the electric power lines can be fatal. Most all homes are inoperable and essentially unlivable when we experience the loss of electrical power for any extended period of time. I believe it is essential that we diversify our energy forms in these critical times. In particular, I would think the Federal government would be promoting energy diversification in form as an element of civil defense and national security. Besides, electric power generation systems today, require capitol cost investments of $100,000 per barrel of oil equivalent per day. In essence, this is the reason that most electric utilities have elected to spend their limited research funds to explore 'load management' approaches to the resolution of the peak/base load variation problem. It is a ridiculous reality that the utilities must construct and operate a capacity of 2.5 - 3 times peak loads to supply a unit base load!

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Before embarking on a full scale Cobscook Bay tidal development it would be useful and extremely prudent to test a 'pilot' model. We are fortunate that Half Moon Cove is available in that bay area and I think it would provide an invaluable data base for a full scale hydrokinetic development of Cobscook Bay, USA. Thank you.

Respectfully

Daryl James Christopher

Daryl James Christopher

Comment by Dr, Peveril Meigs, Wayland. Small tide mills worth developing.

While we are waiting for the Cobscook Bay Tidal Power Project to be approved and developed, it would be timely to develop small tidal power projects now, to serve as a model for other small and large power developments. I have located over 300 places on the Atlantic Coast of the United States which had tide mills in the past, and at least a dozen of those could profitably operate electric power turbines now. In some caes, even the dams are ready. The Indian Project at Half-Moon cove sounds ideal.

R. Gibrat, Professor of Industrial Power, Ecole Nationale des Mines, Paris, whose insistence resulting in the building of the Rance Project, the biggest tidal tidal power project in the world today, was all for develpping small tidal projects in addition to large. By small, he meant turbines which operated on a mill pond of down to 10 hectares (about 25 acres) in size. He made these estimates in 1956, before the price of oil had quintupled. With a head of 12½ feet, I estimate that a pond of 25 acres could generate about 1,000,000 kwh per years, working 12 hours a day. With the globe turbine used in the Rance (and recently by Stone and Webster project in the West), that generates power on the incoming tide as well as the outgoing (about 1 to 3), the power would be increased.

Gibrat has his statment in: U.N. Dept. of Economic and Social Affair, New Sources of energy and economic development, N.Y., 1957, pp.62-75.

JM.

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COBSCOOK BAY TIDAL POWER PROJECT
U.S. CORPS OF ENGINEERS: NEW ENGLAND DIVISION
10.JULY.1978

STATEMENT BY:

PASSAMAQUODDY TRIBAL COUNCIL
PLEASANT POINT RESERVATION
PERRY, MAINE

The Passamaquoddy Tribe at the Pleasant Point Reservation in Perry, Maine has been actively involved in the development of tidal power since 1976. Our efforts have been directed at the construction of a small tidal power plant which would harness the considerable tidal forces of Half-Moon Cove - average tidal range of 18.1 ft. The power plant would serve several purposes:

- generate electricity from a renewable and environmentally safe energy resource for local, and regional, electricity demand.
- research and develop tidal power at an operating demonstration installation.
- establish an economic base from project-related industries; i.e. aquaculture development, tourism, research laboratories.
- develop tidal power, a non-depleable resource, as a substitute to conventional energy supplies.

Half-Moon Cove, adjacent to the reservation and Cobscook Bay, would serve as the tidal basin for the proposed tidal power plant. A dam constructed across the entrance would hold back tidal water flowing in both directions, generating electricity when released through the turbines. This project when completed and operational would mark the first-ever tidal plant, of this type, constructed in the United States and initiate the wide-scale development of tidal power.

Since 1919, when tidal power development for Passamaquoddy Bay and Cobscook Bay was first proposed, the Passamaquoddy Tribe has patiently awaited the development of this indigenous natural resource. But meaningful progress never materialized, instead periodic studies were conducted to assess the technical and economic feasibility of tidal power plants. Technical feasibility has invariably been affirmed and recognized, but economic feasibility has been critically questioned and inevitably formed the basis for the rejection of project construction. We have proposed the Half-Moon Cove tidal project as a logical phase of development which would demonstrate technical and scientific aspects before constructing a large tidal power plant. The inclusion of an extensive research and development program would also enhance economic feasibility for any future projects by decreasing the high capital costs associated with generating equipment and by resolving environmental, engineering, and operating uncertainties at an "on-line" facility.

The utilization of tidal power as a renewable resource is a subject which has periodically captivated the imagination of the energy community over the past few generations. Today, because of diminishing fossil fuel reserves and

the presence of ever-escalating prices of electricity, interest is once again renewed on power production from the ebb and flow of the tides in a manner similar to conventional hydroelectric generation.

We have requested funds from the U.S. Department of Energy to conduct an in-depth feasibility study of a small tidal power demonstration project at Half-Moon Cove. This would serve as a vital first-step in the development of tidal power and also enhance the prospects for future tidal projects presently being considered by the U.S. Corps of Engineers and the Department of Energy.

A joint effort between E.C. Jordan Engineering Company, Portland, Maine, Maritec, Inc., South Bristol, Maine, and the Passamaquoddy Tribe would investigate the following aspects associated with a demonstration project; engineering; environmental; socio-economic; research & development; tidal measurements; and related aquaculture development. The basic thrust of the demonstration project is aimed at the objectives listed below for two seperate classifications:

A. Scientific - Technical

- resolve environmental uncertainties; note, tidal power does not adversely affect the air and water quality. The major environmental concern is how the project will change the ecological balance through projected physical changes within the tidal basin.
- assess operational techniques and engineering designs
- develop and research prototype generating equipment and, thereby, reduce the high, initial capital cost associated with tidal plants
- investigate construction techniques, protective measures, and electrical network interfacing

B. Project Benefits

- increase employment opportunities in an economically depressed region; e.g., aquaculture, tourism, plant operation, and construction
- generate electricity for neighboring communities and provide a certain degree of regional energy self-sufficiency
- increase U.S. participation in tidal power development
- improve transportation system
- increase the probability for future tidal projects

We believe that the most efficient and expedient method to develop this considerable and valuable energy resource can be realized through the construction of a demonstration project and from the information and experience derivable from the plant's operation.

Plant capacity for the Half-Moon Cove projects ranges from 4 megawatts (MW) to 15 MW depending on operating mode (i.e., long-time duration versus maximum power production), research & development objectives, and power network compatability. As an illustrative example, consider the following facts related to the 5 MW installation in terms of prevailing 1976 cost estimates:

- total project cost; including interest during construction, contingency, etc. . .	$11,085,000.00
- annual energy production, kilowatt-hour	21,650,000
- average power cost, mills/kwh	49.6

- benefit-to-cost ration for power benefits at 22.4 mills/kwh in 1976
  a. power only 0.408
  b. total benefits 1.333
- life cycle characteristics for 6% escalation rate for oil-fueled electricity
  * 16 years after operation until annual income exceeds annual cost
  * 27 years after operation until cumulative losses are recovered
- earliest on-line date 1984

Several points of interest regarding tidal power plants in general should be mentioned at this time:

- if a 300 MW tidal power plant had been constructed and on-line by 1965 in Passamaquoddy Bay, it would be producing cheaper power, today, than by conventional resources. The break-even point (i.e., when annual income first exceeds annual cost) would have occurred in 1974 as determined by actual electric utility industry statistics. Tidal power could be produced at 22.7 mills/kwh in 1974 versus the corresponding value of 26.85 mills/kwh which is the average revenue for public utilities in Maine for 1974.

- the 5 MW installation at Half-Moon Cove would have a lower average power cost than a 180 MW plant in nearby Cobscook Bay 50 mills/kwh and 56.7 mills/kwh, respectively, 1976. The reason for this difference in favor of small plants is due to the relatively lower interest cost during construction and to the availability of existing transmission facilities.

- two small, or intermediately-sized, single pool tidal plants could be "paired" to produce dependable power by coordinating operation so as one functions from basin-to-sea, and the other from sea-to-basin. This mode of development could be applied to a series of suitably configurated basins along the upper Maine coast to produce an integrated energy system.

The committment of funds and effort to assist in the development of renewable energy sources is needed to overcome the financial constraints limiting project implementation and to ensure sufficient energy supplies for future deman By constructing a demonstration project allows immediate action and proper planning procedures before a wide-scale utilization is possible. Renewable resources are substitutes for depletable supplies and promises an infinite future energy sources.

We endorse and support the effort of the U.S. Corps of Engineers in th investigations of the Cobscook Bay tidal power projects. Specific areas that should be studied deemed important to the our project include the following:

1. Compare the benefits of constructing a large tidal plant versus a series of small, interconnected projects in Cobscook Bay and along the upper Main coast. This analysis should include consideration of the following factor
   a) potential "boom-bust" effect versus controlled project implementation, the influx of construction workers for the large and paired-basin projects should be compared in terms of the area's ability to effectively absorb the population and to adequately expand the services

required.

b) power production potential, engineering and economic analysis of the anticipated annual output of a large plant versus a paired-basin system. Additional emphasis should be placed on the comparison between two-pool systems and paired-basin operation for dependable power production.

c) project impact, the following topics should also be considered when comparing the two different configurations;
- environmental impact
- adaptability for aquaculture development
- potential for economic growth
- compatability with existing lifestyle

2. When performing economic analyses of the various proposed projects in Cobscook Bay, there should be three types of seperate evaluations that are listed and described below;
   a) conventional benefit-to-cost analysis, to assess the static, or present-day, value of total capital cost versus actual tidal power values
   b) life cycle cost analysis, this method considers future predicted trends to calculate benefit-to-cost ratios for every year of operation
   c) others, one example is the use of inflation indexed bonds which makes it feasible to operate a tidal plant during the first years of operation when annual costs are greater than tidal power value, or income.

   By using these various methods, the emphasis is equally distributed to allow for criticism to be evenly dispersed. The acceptance of project implementation will then be ajudged on the basis of different criteria applicable to the analysis of projects using renewable resources.

3. Request a realistic appraisal of how Pittston oil refinery would affect tidal power projects at, or near, Shackford Head. Since several configurations of the projects planned for study by the Corps will be located in that vicinity, it then becomes important to properly assess the two projects in terms of compatability. Questions that should be answered are as follows;
   a) Who should rightly bear the cost of locks needed for supertankers, and how the additional cost will affect the tidal projects economic feasibility?
   b) Would the Pittston refinery be operational during the construction phase of the tidal project?
   c) Within the impounded area, how will the refinery's discharge affect water quality and water temperature?

4. Determine the socio-cultural and socio-economic effect of the Cobscook Bay projects on the Passamaquoddy Tribe's lifestyle. And in general, accurately evaluate the project's impact on the socio-economic parameters controlling the region's characteristics. This would include archaelogical considerations, aboriginal rights, and assessment of new transportation densities on the reservation.

We believe that the most effective method of coordinating planning at the Half-Moon Cove project with the Corps' Cobscook projects is to work closely in the areas most pertinent to larger installations associated with research & development objectives at a demonstration plant. We welcome the opportunity to do so in the coming year.

Rt. 1, Box 133
Eastport, Maine 04631
July 24, 1978

Division Engineer
U.S. Army Corps of Engineers
ATTN: NEDPL-H
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This letter is in response to the meeting on tidal power held in Eastport on July 10, 1978.

It makes good sense for the Pittston Company to tell the Corps that it favors tidal power, but it makes poor sense for the Corps to believe it.

The Pittston Company will do everything in its power to build and operate an oil refinery in Eastport. It will even favor the idea that tidal power and a refinery are compatible on the same land and sharing the same waters. Pittston has picked the only place in the United States where tidal power is most feasible: of course Pittston could have a refinery elsewhere if it really favored the tidal power project.

On a one pool concept the chief dam would seem to be between Shackford Head and Cooper Ledges. This would separate the VLCC (large crude carrier) berths from the product tanker docks and would create crowding. Time would be spent entering and leaving locks built in the tidal project dam. This delay would cost Pittston money and Pittston would not favor this.

If there were both a tidal project and an oil refinery the management of the town of Eastport would be shared. The town of Eastport would not be one exclusively run by Pittston. The tax assessor should be a person that the Pittston Company depends upon. Pittston would not favor shared management.

How much land owned by the Pittston Company would be needed in the Corps tidal project? Pittston would no favor relinquishing any of its land.

Again, land owned by the Government for the tidal project would not be taxable. Such land would be excluded from the tax rolls. Pittston would not favor this.

With Pittston in the picture there would be restraints upon the Corps in the designing of the tidal structures and a delay in acquiring land necessary for it.

The Corps may expect Pittston to look unfavorably upon the tidal project once the refinery is built--the tidal project is of no benefit to Pittston.

Once the oil refinery is established the need for another industry to "help the economy of the region" is much reduced. Then it is to Pittston's interest to act unfavorably on a tidal project.

It should be recounted how Pittston has reacted to both Federal and the State of West Virginia regulations.

Some years ago, and certainly within the last ten years, a mine dump collapsed in Wales near a school house. As a result many children died.

Mr. Stewart Udall, then Secretary of the Department of the Interior, realized that perhaps similar unsafe dumps might be found in the United States. He therefore instructed scientists and engineers in his Department to visit and locate any unsafe areas and to get them rectified.

One of these was at Buffalo Creek in West Virginia where the Pittston Company mines coal. The Federal Government informed Pittston of the hazardous dump on their property.

Soon after Pittston was notified the State of West Virginia also sent men out to the Buffalo Creek area where Pittston operated. The unsafe nature of the Pittston workings was confirmed.

The rest is history. Pittston took no steps to shore up their dump or tailings, whatever one wishes to call it. The workings collapsed and 125 men, women, and children died. The account of this is given in my enclosure, "The Pittston mentality: Manslaughter on Buffalo Creek."

Pittston had been warned repeatedly about the unsafe condition of their operation. After the disaster Pittston blamed the whole tragedy on God--"An act of God."

In one year alone the Pittston Company had over 5,200 safety violation filed agains them.

There are numerous newspaper accounts, magazine articles, and books written about this company. It would do well for the Corps to ponder the machinations of this company.

It makes good sense forthe Pittston Company to tell the Corps that it favors tidal power, but it makes poor sense for the Corps to believe it.

Sincerely yours,

Robert S. Jones

Robert S. Jones

ENCL.