① 730
② 732

# EXPLORATION SERVICES CO., INC.

ALASKA OFFICE - POST OFFICE BOX 1611 - ANCHORAGE, ALASKA 99501 (907) 272-2419

August 4, 1975

Director (732)
Bureau of Land Management
Washington, D.C. 20240

Gentlemen:

RE: Proposed Lease Sale (39)
Oil and Gas on the Outer Continental Shelf, Gulf of Alaska

This letter is submitted for your consideration relative to proposed lease sale (39).

Exploration Services Co., Inc. has conducted extensive coring operations in the proposed lease sale area during the months of June, July and August of 1971 and again during the months of June and September of 1973. Our operations were conducted in a safe and efficient manner and at no time did the situation arise where there was any danger of creating an environmental hazard or was our crew or vessel at any time in danger as a result of the elements.

Our basic purpose in the Northeastern Gulf of Alaska was to acquire environmental, engineering and geological data for the petroleum industry as it relates to evaluation of the potential and possible hazards related to operating in the area. Through our efforts, the Industry gained a significant amount of information which should place them in a position of operating in a safe and efficient manner in the area.

During the 1971 operations 19 oil companies participated in the project and have this information available to them. During our 1973 operations in the Gulf of Alaska 11 oil companies participated and again have this information available to them.

Due to business commitments, we are unable to present this testimony at the hearings in Anchorage, Alaska, and are hopeful that this submittal will be considered as a part of your findings on the proposed lease sale.

Very truly yours,

B. C. Osborn
President

BCO/mlh

RECEIVED
AUG 7 1975
DIVISION OF MINERALS
ENVIRONMENTAL ASSESSMENT

R & M CONSULTANTS, INC.

ANCHORAGE
FAIRBANKS
JUNEAU

THREE IEES PROF. BLDG. • 6-1/2 MILE GLACIER HWY. • P. O. BOX 1786 • JUNEAU, ALASKA 99801 • TELEPHONE 907-789-0880 • TELEX 090-35419

ALASKA OCS OFFICE
AUG 27 1975

August 15, 1975

U.S. Department of Interior
Bureau of Land Management
Alaska Outer Continental Shelf Office
800 A Street
P.O. Box 1159
Anchorage, Alaska 99501

Gentlemen:

On August 13, 1975, continuence of public hearings were to be conducted at the ballroom of the Anchorage Westward Hotel. During the evening of August 13, 1975, our Chamber of Commerce, represented by Malcolm A. Menzies, was to give verbal testimony. His time schedule is shown on the attached agenda which was anticipated to begin at 6:45 PM. Mr. Menzies arrived at the Anchorage Westward Hotel at 6:30 PM after flying from Juneau to participate. Upon arriving at the Anchorage Westward Hotel we found that the hearing had been completed with no formal acknowledgement by your committee. We feel this was an unfair and unjustified act by your committee. We are submitting a draft of the informal statement that Mr. Menzies was to make at said hearing. We will also submit a more formal statement in writing to your office prior to the expiration date of August 29, 1975.

Sincerely,

Malcolm A. Menzies
Juneau Chamber of Commerce

MAM:emm

Attachment

R & M CONSULTANTS, INC.

ANCHORAGE
FAIRBANKS
JUNEAU

THREE TREES PROF. BLDG. • 6-1/2 MILE GLACIER HWY. • P. O. BOX 1786 • JUNEAU, ALASKA 99801 • TELEPHONE 907/789-7580 • TELEX 090-35419

ALASKA OCS OFFICE
ANCHORAGE, ALASKA
AUG 22 12 45 PM '75

August 12, 1975

U.S. Department of Interior
Bureau of Land Management
Outer Continental Shelf Office
800 A Street
P.O. Box 1159
Anchorage , Alaska 99510

Re: Prpoposed Lease Sale (#39)
Oil & Gas on the Alaska Outer Continental Shelf
Gulf of Alaska
Public Hearings - August 12th & 13th, 1975

Gentlemen:

As a member of the Board of Directors, Greater Juneau Chamber of Commerce, City & Borough of Juneau, Alaska, I wish to start our public testimony in a positive light. Our body totally favors, and is in support of,the OCS proposed leasing to be conducted during late Fall-early Winter, 1975. To amplify and expand the Juneau Chamber of Commerce's position, a formal written statement will be submitted prior to the closing date of such submittals of August 29, 1975. Hopefully, to amplify this formal written statement, and to render some meaningful constructive criticisms concerning the Northern Gulf of Alaska Environmental Impact Statement, this testimony is submitted. As Laymen within the Juneau Chamber of Commerce, we cannot fully render an in-depth, meaningful constructive crtique of the Environmental Impact Statement. On the surface the volumes of data submitted appear quite complete, well prepared and well documented with the possible exception that our coastal community and its possible relative, long term substantial impact on OCS has been omitted. Whether this omission is planned or ignored we cannot determine. We are laymen with respect to the oil industry and cannot comment on the many and various aspects of the technical and support data within the draft Environmental Impact Statement. As far as energy needs in the United States, and in particular Juneau, are concerned, we only have to examine the damage rendered to our schools by the fuel shortage two short winters past. The fuel shortage and our community's effort to conserve energy (in co-operation with our government's request) has placed grim reminders in our public school systems by damage done through this conservation attitude and lack of energy resources which affected the public buildings considerably. Therefore, as a community we support natural resources development, and in particular, Outer Continental Shelf development.

Although technical expertise cannot be given by ourselves, as previously stated, we can address that portion of the statement (Environmental Impact) entitled "Social & Economic Environment of the Northern Gulf of Alaska Coast." Within this portion of the statement Juneau was wrongfully omitted. Geographically, the citizens of our community are as close or closer than other communities which were reviewed and discussed within this portion of the Environmental Impact Statement. As all are aware, Juneau presently is losing, or is about to lose, its prime source of economic endeavor, and that is government.

We are a community seeking economice deversification in an aggressive manner. Whether we will have or will not have a meaningful role in OCS activities, we will not change our endeavors to seek economic diversification. We feel there will be a role for Juneau within substantial long-term on-shore OCS impact. Your ability to ignore a community which presently has proper and adequate planning and zoning, vast industrial area at our Municipal Airport, and also within our harbor (Gastineau Channel), ignore established transportation systems, adequate school facilities, a housing vacancy factor, cultural activities etc., that would absorb much on-shore long range impact that other communities may fear or possibly welcome, but cannot financially support is indeed questionable. Granted, many think only of Anchorage as an access for on-shore support yet our community has many, if not all, of the advantages of Anchorage, and also has them on what many describe as a more pleasing scale.

In a reverse situation the oil industry sponsered studies by the Gulf of Alaska Operators Committee. They considered Juneau and the possible OCS on-shore impact of our community in their study. The study I refer to is: "An Economic and Social Impact Study of Oil-Related Activities in the Gulf of Alaska". Why, gentlemen and ladies, can industry be considerate of a community that seeks economic diversification and has plans that can be implemented, and further welcomes new industry, when the Federal Government cannot? This question, gentlemen, must be answered and it must be answered within that portion of the Environmental Impact Statement related to the "Economic and Social Impact of Oil-Related Activities in the Gulf of Alaska..

The shortness of this tesimony should not be considered as our community's lack of interest in OCS activities. On the contrary, we demand that your draft Environmental Impact Statement be revised to include the availability of on-shore resources that can support valid OCS activities in the Gulf of Alaska by Juneau.

Sincerely,

Malcolm A. Menzies
Juneau Chamber of Commerce

MAM:emm

HEADQUARTERS

# ALASKA MINERS ASSOCIATION, INC.


PRESIDENT
Wm. L. Waugaman
270 Illinois Street
Fairbanks, Alaska 99701
Phone 456-5005

VICE-PRESIDENT
Charles Herbert
1435 Inlet Pl.
Anchorage, Alaska 99501

SECRETARY
Dr. Ernest N. Wolf
P.O. Box 80989
College, Alaska 99701
Phone 479-2156

TREASURER
Gene Yurkovich
P.O. Box 3018
Fairbanks, Alaska 99701


AUG 12 1 46 PM '75

August 7, 1975

Director (732) Bureau Land Mgt
Washington,
D.C. 20240

Dear Sir;

Attached is a statement by the Alaska Miners Association regarding off shore drilling in Alaska waters which we are submitting for the record.

Our Association is statewide and represents in excess of seven hundred members.

Sincerily,

William I Waugaman
President
Alaska Miners Assoc.

WIW/flh

My name is W. I. Waugaman. I am President of the Alaska Miners Association, which has more than 700 members. Until assuming my present position, I was General Manager of Usibelli Coal Mine. My active mining experience in Alaska goes back to 1939. I served as a State Senator in 1967-68.

My views are straight forward--the mineral resources of Alaska and the Alaska OCS should be developed. I support the proposed oil and gas lease sale in the Gulf of Alaska.

Your announcement of hearings stated that you wish to develop all views on five specific points.

On the first, the environmental impact of the lease sale, my view is that it would be minimal. The oil industry has an enviable record offshore. It is my derstanding that in the drilling of thousands of wells offshore, there have been few blowouts and that of these, there was only one incident where oil went ashore. That was in Santa Barbara, of course. To me, this is an excellent record.

The second point has to do with the environmental effects which cannot be avoided if the lease sale is held. The thing that occurs to me is that there would be platforms in the Gulf. This raises concerns about fishing and shipping--but these things have apparently been worked out in other areas where offshore platforms are found.

As to the third point, alternatives to the proposed action, frankly, I see none. I'm convinced the United States needs the oil and if the rest of the country gets hurt, Alaska is bound to be affected. Any longings I might have for the good old days certainly don't include the economic situation of the country in the 1930's. I'm for economic development--and I believe most Alaskans are.

Your fourth point has to do with trade-offs. Do we get the oil and gas out and take a chance on messing up other uses of the Gulf? At least that is how I

read your statement. My view is that we are not in an either/or situation. We can have both. Let's produce the oil and protect the environment.

The fifth point asks if any irreversible or irretrievable commitments of resources would be involved in the sale. Well, certainly, we would be committing to use up the oil and gas. But, we have no other option because other sources of energy are just not available. And sources such as the sun and the tides and others cannot be perfected for many years.

My support of the lease sale is, I believe, support for the country, this state, and the miners that I represent.

I believe that economic development in this state--which for the time being means oil and gas development--is essential to miners. And miners are important, because the production of hard rock base minerals is going to be the backbone of the state's economy somewhere down the road.

The hard rock minerals are here and the nation is going to need them. I will support any reasonable measure that contributes to the miner's capability to get our minerals to market.

Let me give an example of how something done by the oil industry may be of considerable value to miners. This is the building of roads. Placer mines along the route of the trans-Alaska pipeline may now prove to be economical ventures because miners will be able to get in and out by truck rather than by aircraft. Lack of transportation facilities is one of the major problems facing the mining industry in Alaska.

Aside from my interest in mining--although this also affects miners--I am appalled at the quadrupling in the price of foreign oil and the effect of that on the nation's economy. Our nation is so geared that a reduction in oil and gas supplies would hold those at the bottom down and throw some who have gained a better way of life back down to start all over again. To permit this is foolish.

Our country still has considerable oil and gas. I believe we should let the oil companies go out and find it. And I hope they find enough to permit the country to stay afloat if the Mideast countries decide to place another oil embargo on us.

In closing, let me state my own personal alarm at the trend in our state government. The present administration is, I believe, anti-development. The environmentalists on the Governor's staff will no doubt speak to you in terms of orderly, cautious development. The record suggests no development. If this trend continues, I believe all Alaskans will be hurt. I also believe that the State's resources can be developed with due regard for the environment. I believe the Federal government's resources off our shore line can be developed safely, also.

Again, I urge the timely sale of oil and gas leases in the Gulf of Alaska.

Pres.

KENAI PENINSULA CONSERVATION SOCIETY
P.O. BOX 563
SOLDOTNA
ALASKA 99669

4 August, 1975

Alaska OCS Office 279-4578
117 W. Fireweed Lane
Anchorage, Alaska

CONFIRMATION COPY - NIGHT LETTER

Kenai Peninsula Conservation Society requests testify, 8-12-75.

Failing appearance, Society protests this wire OCS leasing schedule because adequate knowledge of area unavailable. Operational information elsewhere not necessarily transferable Alaska Gulf.

Rushing leasing, poor developmental, economic, social, environmental policy.

Recent Gulf studies appear designed support pre-determined leasing decision regardless consequences.

James E. Fisher

JAMES E. FISHER
President

cc: Mike Gravel

P RT OF SEATTLE
P. O. BOX 1209 / SEATTLE, WASHINGTON 98111

Mr. Edward Hoffmann, Manager
Alaska OCS Office
P. O. Box 1159
Anchorage, Alaska 99510

Statement By Merle Adlum, President,. Port of Seattle Commission for the record of the Anchorage hearing, August 4, 1975 concerning the proposed Northern Gulf of Alaska Lease Sale:

Seattle has been serving Alaska since Alaska firmly established us as its southern seaport during the Alaska Gold Rush of the 1890's. Construction of the Alyeska Oil Pipeline has further emphasized Seattle as Alaska's primary "lower 48" seaport, as well as establishing Alaska as Seattle's most important trade partner. The expertise we can contribute to this hearing is to assure all concerned that transportation facilities needed to equip northern Gulf of Alaska oil operations, from the lower 48 states, will be adequate. Alaskan transportation is our business and we have been working hard and steady to develop shipping facilities which will be able to meet any contingencies of the expanding Alaska economy. Even a project of the magnitude of the Alaska pipeline has not strained our service capability to Alaska. In the past five years, no less than eight major maritime facilities, costing over 18 million dollars, have been purchased, renovated or expanded in the Seattle harbor to meet Alaska's fast growing maritime shipping needs. Furthermore, air cargo and air passenger facilities have been greatly expanded at Seattle-Tacoma International Airport, much of which is to accommodate increasing Alaskan business.

Marine transportation facilities in Seattle which serve Alaska include rail barge, container ship, container barge, ocean-going liner and contract barge, roll-on/roll-off (container ship) and ferries of the Alaska Marine Highway. These shipping operations serve diverse Alaskan shipping facilities ranging from modern accommodations such as those of the Port of Anchorage to relatively primitive accommodations at Prudhoe Bay on the North Slope coast of the Arctic Ocean.

We have reviewed the Environmental Impact Statement of the proposed Northern Gulf of Alaska oil and gas lease and find it complete for transportation aspects within the northern Gulf of Alaska. However, it does not specifically include the excellent and varied transportation services which are available to the area from harbor locations in Puget Sound. At the present time, southeast Alaska is primarily served by Puget Sound shippers. Prince William Sound and Anchorage's Cook Inlet is also well served by numerous types of

scheduled and unscheduled shipping services from Seattle. Northern Gulf of Alaska waters, being in between, can have added transportation service from Seattle as demand requires, and with relatively little need for additional investment in port facilities. Based upon our experience with the Alyeska Pipeline project and years of accommodating Alaska's shipping needs, the additional 6,280 workers projected for the 1985 hypothetical "high" of Valdez, Cordova, Seward and Yakutat (page 572), could be easily served with existing or anticipated transportation improvements from Seattle. Furthermore, the shipping needs of the "net" baseline population increase of 11,487 (page 592), for Anchorage and North Alaskan Gulf communities, can also be accommodated with little additional shipping facility capacity.

We would like to go on record as being in favor of approval of the proposed northern Gulf of Alaska oil and gas lease. We feel we are well prepared to adequately accommodate the anticipated additional external shipping needs of the area, when, and if, oil and gas offshore exploration and/or development occurs.

Sincerely,

Merle D. Adlum

Merle D. Adlum
President
Port of Seattle Commission

August 1, 1975

2/09

Box 2025
Anchorage, Alaska 99510
August 12th, 1975

Hearing Officer
Alaska Outer Continental Shelf Office
U.S. Department of the Interior
Bureau of Land Management
800 "A" Street
Anchorage, Alaska 99501

Sir:

The Alaska Chapter of the Sierra Club wishes to advise that we plan to file a written comment on your Draft Environmental Impact Statement on Proposed Oil and Gas Leasing in the Northern Gulf of Alaska before the September 1 deadline. We will not, however, be making an oral statement at the public hearings being held on that subject in Anchorage on August 12th and 13th.

Sincerely,

Gerald R. Brookman

Gerald R. Brookman
First Vice-Chairman (Acting Chairman)
Alaska Chapter, the Sierra Club

Box 2025
Anchorage, Alaska 99510
August 12th, 1975

Hearing Officer
Alaska Outer Continental Shelf Office
U.S. Department of the Interior
Bureau of Land Management
800 "A" Street
Anchorage, Alaska 99501

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Gerald R. Brookman

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First Vice-Chairman (Acting Chairman)
Alaska Chapter, the Sierra Club

Box 2025
Anchorage, Alaska 99510
August 12th, 1975

Hearing Officer
Alaska Outer Continental Shelf Office
U.S. Department of the Interior
Bureau of Land Management
800 "A" Street
Anchorage, Alaska 99501

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Sincerely,

Gerald R. Brookman

Gerald R. Brookman
First Vice-Chairman (Acting Chairman)
Alaska Chapter, the Sierra Club

# BRISTOL BAY NATIVE CORPORATION

P. O. BOX 237
ILLINGHAM, ALASKA 99576
PHONE (907) 842-3070

447 EAST FIFTH AVE.
ANCHORAGE, ALASKA 99501
PHONE (907) 277-9511

August 14, 1975

Mr. Edward J. Hoffmann, Manager
Alaska Outer Continental Shelf Office
U.S. Department of Interior, BLM
P.O. Box 1159
Anchorage, Alaska 99501

Dear Mr. Hoffmann:

We respectfully request that this letter be included as part of the record of the August 12 & 13, 1975 hearings regarding a possible oil and gas lease sale offshore in the Northern Gulf of Alaska.

Bristol Bay Native Corporation is familiar with the time and background leading up to the announcement of a sale, as well as the draft Environmental Impact Statement on the proposed sale. Although we naturally would like for Alaska to share in the revenue from the sale, we see no good reasons, political, environmental, or otherwise that should delay the proposed sale. We support the sale as announced, as well as additional sales in the Gulf of Alaska and Cook Inlet, in order to provide the necessary lead time for the proper research and planning prior to any future sales in the Bering Sea - Bristol Bay region.

Thank you for the opportunity to submit this letter as part of the record supporting a Gulf of Alaska OCS Sale as scheduled.

Yours Very Truly,

BRISTOL BAY NATIVE CORPORATION

Harold H. Samuelsen

Harold H. Samuelsen
President

kn

# ALASKA CONSERVATION SOCIETY

UPPER COOK INLET
CHAPTER
BOX 3395
ANCHORAGE, ALASKA
99501

STATEMENT OF THE UPPER COOK INLET CHAPTER
OF THE ALASKA CONSERVATION SOCIETY AT THE
HEARINGS ON THE DRAFT ENVIRONMENTAL IMPACT
STATEMENT ON THE OUTER CONTINENTAL SHELF
PROPOSED OIL AND GAS LEASING IN THE
NORTHERN GULF OF ALASKA - Aug. 13, 1975
Anchorage, Alaska

Gentlemen:

My name is Virginia dal Piaz. I am testifying for the Upper Cook Inlet Chapter, is the largest chapter of the statewide Alaska Conservation Society. We are dedicated to securing the wise use, protection, and preservation of the scenic, scientific, recreational, wildlife and wilderness values of Alaska. We offer this testimony with the full expectation that it will be listened to and weighed carefully along with the other statements taken at these proceedings.

We would like to go on record, as we have done previously, as being opposed to the proposed oil and gas leases in the Northern Gulf of Alaska at this time. The CEQ has listed this area as the last area that should be leased due to weather, oceanographic problems, and lack of sufficient data on drilling in such a subarctic environment. The draft EIS contains mostly a compilation of the known scientific data, which is not a great amount; for example population data on marine mammals, fish, etc. from too few counts. This study is a necessary beginning, but the impact on these animals and their habitat is poorly documented, and thus needs more evaluation.

In fact, on pg. 341 under III ENVIRONMENTAL EMPACTS OF PROPOSED ACTION it states:

"Much of the impact data on which this section was based, was generalized, incomplete, and not specific to the Gulf of Alaska".

With such a statement prefacing the impact section, what are we to conclude??? Obviously, much more research and data need to be collected specifically on the Northern Gulf of Alaska if a studied and intelligent decision is to be made. At the very least, this proposed lease sale should be delayed at a minimum of ½ to 2 years as Gov. Hammond suggested at the hearings in Yacatat last week, to allow time to rectify this deficiency. How can the Department make a decision with such insufficient information??? Or, has the decision already been made???

We wish to go on record as fully supporting the State Adm. position to delay the proposed sale to gather more information and allow the state at least some time to plan for impact. After all, we are presently staggering under the impact of the Trans-Alaska pipeline land construction! And now with the proposed OCS leases breathing down our necks, it seems as if the fedaral government and the oil companies are thinking of Alaska only as a "giant socket" for the nation to plug into regardless of the state's needs and wishes.

It is obvious throughout the whole statement that insufficent data exists specifically on the Northern Gulf of Alaska. For example, on pg. 116 it states:

"Almost no work exists on zooplankton of bays and esturaries of the Gulf of Alaska".

And then several pages later, it lists almost all species as feeding on plankton! As these organisms are one of the basic components of the marine food chain, we suggest that not looking into the effects of chronic oil spillage on zooplankton, indeed not even knowing what is there, is a significant omission.

As another very important example, on pg. 100, under the discussion of "primary production" the statement is made that"studies of primary production for the northern coastal region of the Gulf do not exist in the current literature" and goes on to say all estimates are based on data from the Northeast Pacifie and from general knowledge of production in coastal zones. We submit the pages following that statement of estimates and species of phytoplankton are meaningless. At best, they are educated guesses. And such guesses should not be acceptable to the American people, particularly as a basis for making a decision which could forever destroy renewable food resources for a onetime extraction of a nonrenewable resource.

There is also insufficient data on climatological conditions and physical oceanography. Such factors as wind,fog, and precipitation are very severe in the Gulf and very adverse conditions for humans to be working under. Currents, tidal changes, and wave action will have enormous effects on drilling platforms and subsea units. Does the technology really exist, or is the industry extrapolating from other, not truly comparable areas??? It is entirely possible that the physical conditions of the Gulf of Alaska may be so hazardous that the cost of extracting energy in the form of oil and gas from this area is far greater than the value received.

A very important point not addressed in the EIS is the lack of a cohesive national energy plan. Until there is such a plan delineating energy reserves as to location and amount, what is the purpose of rushing in and leasing large tracts under this "energy sulf-sufficiency" banner??? In the name of action and doing something visable? We think a more democratic position would be to enlist the help of Congress and the people in determining just what is the "national interest" where do we want to go for energy to run our economy and society?? Oil and gas? Solar? Geothermal?

Alternative C - WITHDRAW THE SALE gives a viable and presently available alternative: that is energy conservation. If people can still get cheap energy (petroleum products) the incentive to conserve or decrease use is not there. The only way usage will be decreased is if the source of energy is <u>not</u> there. Nowhere in the statement is there documented proof for the <u>need</u> for more oil, in fact, it states (pg. 753) that "energy conservation offers the only option for matching energy requirements to available supply. The goals of national self-sufficiency and conservation of natural resources are best achieved through energy conservation". In other words, we already have enough if conservation measures were initiated. In the face of the enormous waste in our system, why even think of leasing the OCS off the Gulf of Alaska before first getting the "house in order"?

According to our information, the only slightly comparable area in the world for offshore drilling is the North Sea. Yet the statement continually pulls from data and experience in the Gulf of Mexico. And both the North Sea and the Gulf of Mexico have land areas on three sides - the Gulf of Alaska faces the open ocean.

In the Baldwin"s book, <u>Onshore Planning for Offshore Oil</u>, (literature cited pg. 620) several important observations are made:

1. Pg. 163 - "Unlike large oil spills which may occur once offshore oil activity begins, onshore support development will certainly occur; furthermore when offshore fields are depleted, the social, economic, and

environmental changes will remain. Ecological and economic impacts are particularly profound when oil facilitites are attracted to previously undeveloped areas... these developments make local economy entirely dependent on oil and thus vulnerable to the boom-and-bust cycle of the offshore industry".

2. Pg. 168 - "Oil companies, contractors, pipe layers and other support activities seek to minimize cost and maximize profits. They are likely to choose sites for their operations because of their own needs, not those of communities themselves".

Has the oil industry solved problems in areas where it has come in, or has it just created them? We believe the benefits of economic expansion do not outweigh the detriments to the environment and social/cultural impact on Alaskan life.

We are in a period of profound transition and rethinking of our energy usage and extraction from the earth. If it is to be believed, we are in an energy crisis. The medical definition of crisis means the turning point in an illness - the illness here being our addiction to oil. A crisis means whether or not the patient will recover or die. We will undoubtedly go through withdrawal. Will this country be able to survive on much lower levels of energy consumption? Luckily, we still have plenty of warning to reverse this addition if we act soon. It would be wise to stop seeking new answers in old solutions to our energy problems. Does it make sense to destroy our environment which gives us life , to perpetuate our wasteful way of living?

Finally, in the words of the statement itself, this whole operation has a "relatively high aesthetic degradation potential". The impact of the project has nothing but adverse effects upon fish and wildlife, coastal land use, and the economics of Alaska - another boom-and-bust to further unstabilize our state economy. Our state's most valuable natural resources such as scenery, wildlife, etc. are renewable. Should these be sacrificed for a finite, nonrenewable resource? How many tourists will come to Alaska to see oil rigs and pipelines? As the statement says (pg. 570) "the reaction of a tourist to an oil slick is unknown..."

Alaska is more important as she is to this nation, both aestheically and culturally.

In conclusion, we have several questions for the Interior Dept. to answer on the proposed lease:

1. What in depth studies have been done concerning interaction between marine traffic from the OCS activity and the supertankers from the Trans-Alaska pipeline?

What regulations will the USCG set up? They have been asked to comment on the impact statement and apparently were not consulted during the statement preparation.

2. Why can't the leases be delayed for ½ to 2 years (pg. 746) to allow for completion of all environmental baseline data to meet the Department's own objectives? (Pg. 747)
3. How much consideration is being given the proposal that the government do drilling, etc. before leasing to the oil companies? The federal government could do its own detailed seismic studies and exploratory drilling prior to leasing rather than relying on private industry to discover after leasing how extensive these publically owned resources are. The OCS areas belong to all the people of the US and they should have access to this information.
4. What about the fact that the probability of waves being over 8 ft. is 50% in DJFM, 20% in AM, 25% in JJAS and 40% in OND (Pg. 745) that there is "presently no known method of containment or cleanup that is effective in turbulent seas where wave heights exceed 8 ft" (pg.668)????? What good are contingency plans then????
5. Why should we accept a continuous level of chronic "unavoidable" oil spills? By the statements own admission they don't know the long term effects of oil pollution on the seas or life in the seas. What effect will this have upon the food chain?
6. No national energy policy, elucidated by the people and Congress with public input exists and why are these leases being offered without such a plan??? How and who is saying this leasing is in the "national interest"? What is the national interest? There are no elected officials involved in making this decision! No natural checks and balances in this issue - one person the Sec. of Interior - will make this decision.
7. What is the availability of trained technical personnel for operating and building drilling rigs or subsea units for the Gulf of Alaska waters?
8. How is Interior planning on working with the State that currently has no coastal zone management act? Who will have jurisdiction for wastewater discharge, etc.?? EPA? USCG? The state?
9. What is the critical point at which oil cannot be absorbed or elimated by living organisms? Research on this very important point is incomplete. (see The Frail Ocean, Marks).
10. What is the environmental cost (irretrivable losses) compared to economic benefits? Where is the analysis of how much energy will be used to get out the oil and gas in the lease area? What will be the net gain in energy to our country????

Manager, Alaska Outer Continental Shelf Office
P.O. Box 1159
Anchorage, Alaska 99510

Betty Varney
Cape Yakataga, Alaska 99560
15 August, 1975

Dear Sir:

I would like to express my views on the development of the offshore resources in the Gulf of Alaska. First as a concerned citizen and resident of Cape Yakataga, Alaska and, secondly as a business woman whose income is principally derived from oil and oil related industries.

Our Gulf is beautiful, virgin and really too spleddid for me to put into words. I do not know this just from reading magazines, seeing pictures or watching television; Cape Yakataga is a part of me, I live it daily. My love for the beauty of nature is great enough to endure the many hardships of living in remote Alaska. Few environmentalists can say that! I will stay here as long as I am strong enough to take it and then I will quit like so many others. Why? Because no few individuals can settle these vast Alaskan regions by themselves. We must develop, grow and settle; it is unrealistic to think any other way. We can no longer just live off of the land by trapping or mining. We must develop our other natural resources to give us jobs and provide a living to those who want to live where they choose. One indust ry will open the door to others. If it is the oil industry in the Gulf, so be it. Yes, I am honest enough to say my income comes from the oil industry as does millions of other American The oil industry is the largest and the most powerful industry in these United States, who could be more capable of developing the Gulf of Alaska? We Americans must relie on our own country, our own technology to develop this much needed source of energy. We must start developing it right now while there is still time to do it carefully and properly.

When I first came to Cape Yakataga the very thought of an oil well within a thousand miles made me ill. Since then I've seen the oil companies in action here, I've talked with their geologists, I've talked with their crews, I've studied and read to educate myself on whats going on in the oil industry. I have seen the time and money spent by the oil companie to make sure that things go right. I have faith that they will not destroy my beautiful Cape Yakataga home.

Sincerely,

Betty Varney

written only

# ALASKA AERONAUTICAL INDUSTRIES, INC.

ALASKA'S COMMUTER AIRLINE

C FICATED ALL WEATHER
AIR TAXI & CHARTER SERVICE

GENERAL OFFICES
Airport Annex - Box 6067
Anchorage, Alaska 99502
Phone (907) - 277-6882

Good morning, Gentlemen. My name is Douglas Haynes of Alaska Aeronautical Industries, Inc. AAI is a small scheduled airline serving the Cook Inlet basin area. The oil industry is, perhaps, the major user of our service.

We do not serve the area from Seward to Yakutat, however, the coastal communities expected to receive the greatest amount of activity from future exploration and development in the northern Gulf of Alaska. I point out the connection because the AAI operation would be considerably smaller without the revenue from the oil industry and it is very unlikely that some of the points we serve would have scheduled service were it not for that revenue base.

Now the air taxi operators in Alaska are, for the most part, doing a fine job and I don't want to sound like I am criticizing them. But their operating costs are high and, consequently, travel in those parts of Alaska where there is no scheduled air carrier can be a problem and is certainly relatively expensive. So a lot of our customers are benefiting from the oil industry activity here, whether they realize it or not.

I am sure the same situation will be the case, if and when oil production and development comes in the Gulf Coast area. Cordova, Valdez and Yakutat have scheduled service now, of course. But increased competition and frequency of flights is almost inevitable.

Now I would also like to comment on the national aspect of this situation. I have recently been shown figures of the U. S. Bureau of Mines which project the U. S. will be using at least twince as much energy in 2000 as in 1965. That low estimate is based on a very conservative 2 per cent a year growth rate.

At four per cent the demand would be the energy equivalent of about 40 billion barrels of oil per year in 2000.*

While other energy sources will certainly meet a large share of that future demand, there will obviously be need for large amounts of oil and gas for fuel, lubricants and petrochemicals. With other countries showing a natural concern about preserving sufficient reserves to meet their long term requirements, the United States can't rely on those sources. Domestic reserves must be found.

That means starting exploration of Outer Continental Shelf areas, such as the Fulf of Alaska, as soon as possible. It must be kept in mind that intensive exploration under the waters of the Gulf of Mexico began some 25 years ago. That area appears to be just now peaking in oil and gas production.

Thank you, Mr. Chairman.

# # #

*BOM Data Source: An Energy Model for the United States, Distributed by National Technical Information Service

THE CITY WITH A FUTURE
THE VILLAGE WITH A PAST

KENAI CHAMBER OF COMMERCE

OFFICE IN THE BENCO BUILDING
PHONE 283-7989

P.O. BOX 497
KENAI, ALASKA 99611
OIL CAPITOL OF ALASKA

RESOLUTION OF

GREATER KENAI CHAMBER OF COMMERCE

WHEREAS the entire OCS leasing program is part of a national plan to increase oil and gas production and reduce reliance on foreign energy sources as soon as possible, and

WHEREAS consideration is being given by the Bureau of Land Management to proceed with leasing of OCS tracts in the Gulf of Alaska, and

WHEREAS the City of Kenai has had the unique experience of being a beneficiary of major onshore petroleum development in the State of Alaska, and

WHEREAS the impact of that development has been beneficial in improving property tax valuation in both petroleum and non-petroleum oriented properties, and

WHEREAS this increased valuation has permitted our City to grow and provide all the services we enjoy today, and

WHEREAS this growth has occurred without significant detriment to our environment, and

WHEREAS we have previously submitted testimony before the Council of Environmental Quality Hearings on "Outer Continental Shelf and Gulf of Alaska Exploration & Development" in Anchorage, Alaska, on September 27, 1973 (copy of that testimony attached hereto as part of this resolution), and

NOW, THEREFORE, be it resolved that the Board of Directors of the Greater Kenai Chamber of Commerce supports prompt leasing of the OCS tracts in the Gulf of Alaska by the Bureau of Land Management, and urges the Federal Government to do everything possible to expedite rapid exploration of and early production of any oil and gas that may be found on the offshore lands leased.

PASSED AND APPROVED THIS FIRST DAY OF AUGUST, 1975

G. E. Day, President
Greater Kenai Chamber of Commerce

KENAI CHAMBER OF COMMERCE

TESTIMONY OF

OSCAR L. THOMAS, DIRECTOR

BEFORE THE

COUNCIL OF ENVIRONMENTAL QUALITY

HEARINGS ON

OUTER CONTINENTAL SHELF AND GULF OF ALASKA EXPLORATION AND DEVELOPMENT

ANCHORAGE, ALASKA

SEPTEMBER 27, 1973

My name is Oscar L. Thomas. I am a Director and past President of the Kenai Chamber of Commerce. I am also Vice President and General Manager of Kenai Utility Service Corporation, a natural gas distribution company operating in Kenai Alaska. I appear today on behalf of the Kenai Chamber of Commerce and its President, Mr. Richard Stetler.

The Council has indicated a desire for information on specific topics in its consideration of the advisability of oil and gas exploration and development in the Gulf of Alaska. Of these, "Potential Effects of Onshore Development" is the issue to which we will speak today. We are, perhaps, uniquely qualified to testify on this matter. To date we are the only Alaskan community to have experienced the impact of major onshore petroleum development. The City of Kenai lies geographically in the midst of Alaskas' only currently productive reserves, exclusive of Pt. Barrow with its minimal amounts of natural gas production. To our immediate south lies the Kalifonski Gas Field supplying natural gas for domestic consumption to the Kenai Peninsula and the City of Anchorage, as well as far larger quantities of gas to two huge processing plants which convert the commodity for export. Contiguous to our easterly city limits we have the Beaver Creek Field which has recently become productive of oil, and where we understand continuing development is taking place. To our north and northeast we have the Swanson River Field, another onshore development that gave the industry its beginnings here in ~~1959.~~ 1957 Further north and northwest the fourteen Cook Inlet offshore platforms pump the production from several hundred wells to onshore sites for processing and shipment. These sites are located just a few miles from downtown Kenai. They include the Collier-Carbon and Chemical Plant, Phillips Petroleum Gas Liquification Plant, Standard Oil Refinery and Tesoro Refinery. We feel that the experience of our community in its relationship with the development outlined herein should establish our credentials to address ourselves to the subject at hand.

In sharing with the Council our interpretations of what has actually occurred on the Kenai Peninsula as a result of petrochemical activities, we will touch mainly on the socio-economic results and environmental impact of these activities.

The Kenai Peninsula Borough was formed in ~~1965,~~ 1964 about the same time that the oil and gas activities began to emerge as a major development. In comparing our economic picture at that time to our present outlook the difference is, broadly stated, as the difference between night and day. Through the courtesy of the Kenai Borough Assessor's office we have compiled the following statistics:

1. Total 1965 Real and Property Tax Valuation-$95,000,000.00. Of this amount, approximately $30,000,000.00 was directly related to oil and gas properties. These properties would include pipelines, refineries, processing plants, oil and gas fields, service company holdings and other petroleum-oriented properties. It is seen, then, that exclusive of the industry, the total Borough Tax valuation was $65,000,000.00

2. Total 1973 Real and Property Tax valuation-$575,000,000.00. Of this amount, approximately $405,000,000.00 is related to oil and gas properties as defined above. We have then, a 1350% increase in petroleum properties and a 290% increase in other properties for the eight year period.

3. In 1965 the Borough Tax Levy was at five mills. After eight years of spiraling inflation, eight years of constant expansion in the scope of Borough services to the people, our 1973 tax rate is - the same five mills. We wonder how other Alaskan communities have fared in this respect in this time period.

Along with this favorable tax position, which accrues to the benefit of all of us, there are other important considerations. In 1965 the City of Kenai was, quite frankly, a rather dreary little hamlet with a population of about 700. Among the social necessities that were either limited, sub-standard or non-existent were schools, fire and police protection, shopping facilities, churches, public works, hospital and other medical and dental facilities, housing, recreational facilities and year around employment opportunities. Here again, we see a dramatic change. Within the City of Kenai three new schools have been constructed; elementary, junior high and vocational training. Fully staffed and equipped fire and police departments are housed in a public safety building completed last year. A million dollar shopping mall, complete with super market, department store and a variety of consumer product and service shops, now sits in the center of Kenai alongside a five lane highway completed in 1972. The number of our churches has tripled. Water and sewer utilities have been and are continuing to be, installed throughout the city as well as a

natural gas distribution system. A sophisticated sewage treatment plant went into operation earlier this year, protecting Cook Inlet waters from the pollution of our domestic effluents. A well equipped medical center continues to expand as do dental facilities and related services. A wide variety of modern homes and apartments is now available in well kept subdivisions.. Municipal parks, a racetrack, rifle range and other recreational needs are being provided or planned for. In neighboring Soldotna, eleven miles distant from us, a fine new hospital has been built along with a new community college as well as a modern office complex housing the Borough administration offices and those of our school district. Lastly, a serious, qualified job seeker is much more apt to find full time employment then he would have been in the days when seasonal salmon fishing was the only industry sustaining the community.

Gentlemen, we submit that all of these things have come to us solely as a result of onshore development on the Kenai Peninsula. They have come to us in an orderly, well thought out progression of events that have posed no serious problems with respect to either the social or ecological environment. As social needs have been expanded, so has the industry given to the community the affluency to meet them. As our awareness of the increasing need to protect our ecology becomes more and more acute, so does the industry respond with planning, technological advancements and a genuine will to provide the all important development of our resources while maintaining a good balance with nature. Dating back to the previously mentioned Swanson River discovery in 1959 we are aware of no significant damage to our air, our land or our waters that are attributable to petroleum industries. Had there been, and surely there may someday be, such damage there is a fitting perspective to consider. Our world population continues to increase at an almost unbelievable pace. There are tremendous demands being placed on the development of our natural resources. If there is a price to pay for such development let us recognize it. Let us make every effort at our disposal to minimize it. Then, let us proceed to do what we all know must be done.

In a very selfish sense we on the Kenai, are very sensitive to a certain environment-related potentiality. As local residents, and most assuredly the Anchorage population must be included here, we see our natural gas reserves being snapped up by outside markets more rapidly than they are developed. Alternative energy sources are not palatable to us. Winter temperatures in the area often drop to minus forty degrees fahrenheit and thermal inversion layers in our air are common. The combustion products of coal and oil, when used as heating fuels, can combine with automotive exhaust emissions and be trapped under such circumstances, polluting our air to a degree of extreme hazard to human well being. Our neighbors in Fairbanks can well testify to this. The development of petroleum resources in the Gulf of Alaska would tend to relieve the pressures on our local gas reserves, insuring us a continuing supply of natural gas for our own relatively small but ever increasing needs.

In summary, we have tried to illustrate that the onshore development of petroleum resources on our peninsula has provided us with widely varied benefits which far outweigh any negative factors. We do not advocate, nor would we stand for, the rape of our ecology. Most of us live here by choice and consider this land as ours. We intend to protect it. We have seen the performance of the petroleum industry over a span of years and are satisfied with that performance. We consider ourselves fortunate to have the industry active in our midst. We see no reason why the experience in our area with onshore development cannot be duplicated anywhere in Alaska, or for that matter, in the world.

The Kenai Chamber of Commerce appreciates very much the opportunity to appear before this Council. We respectfully submit that the Council on Environmental Quality should recommend to the President of the United States that petroleum exploration in the Gulf of Alaska should proceed as soon as possible.

written only

STATEMENT OF R. DEAN ALLEN PREPARED FOR PUBLIC HEARING ON THE PROPOSED LEASE SALE (#39) OF OIL AND GAS ON THE OUTER CONTINENTAL SHELF - IN THE GULF OF ALASKA AUGUST 12, 1975, ANCHORAGE, ALASKA.

My name is R. Dean Allen. I have lived in Alaska for almost ten years. I am a former manager of petroleum engineering in Alaska for a major oil company. Since 1969, I have been an entrepeneur involved in supplying food & housekeeping and operations & maintenance services to the petroleum industry in Cook Inlet and at Prudhoe Bay. These service copmanies are frequently allied with Alaskan Native corporations created under the Land Claims Settlement Act. Our work force of almost 100 is predominantly Alaskan.

With a background such as mine it must come as no surprise that I favor OCS leasing in the Gulf of Alaska, and at the earliest date possible. My 23 years in the petroleum industry has in large part been centered around exploration and development projects. I am keenly aware of the time lag from lease sale to fully developed oil production. Exploration cycle time almost always exceeds five years and usually is closer to ten years. At a time when our Nation's developed oil supply is not meeting critical energy demands, it makes a great deal of sense to open up exploration to those vast unexplored areas beneath the sea.

I have followed ocean technological advancements since my first exposure to offshore development in the mid-fifties. The techniques and procedures for safe offshore exploration and production of petroleum are already largely developed. The vast majority of work done offshore has resulted in no disasters of any kind. The few accidents that have occured have resulted in little permanent damage to the enviroment. I have confidence the industry is ready for the Gulf of Alaska.

The positive impact of oil industry efforts in the Gulf of Alaska should follow a well traveled path of industry involvement in the communities with which they come in contact. Individuals directly employed by the industry receive incomes substantially above average in the State. A large share of the incomes is spent on goods and services within Alaskan communities creating secondary effects of increased employement and incomes in support industries. Taxes on increased personal incomes are revenues to the State. Onshore facilities are tax bases for tax-empowered entities - borough or city. These taxes are used in providing community health and social services and public facilities, often times where none may ever exist without the revenues from oil. The petroleum industry has consistently supported local charities, educational institutions and community hospitals. They provide leaders of proven capability who voluntaryily spend many hours and contribute many thousands of dollars every year to community projects.

As a supplier of labor and other services in Alaska I can make the following observations from experience. The opportunites for local employment on a long term basis occur mainly with production activity. The producing platforms require a permanent work force of mechanics, electricians, production operators, crane operators, welders, cooks and an assortment of unskilled helpers. These positions are usually given to qualified locally-based personnel on a preference basis. Training for some of the jobs is afforded by the contractor or by the oil company. Other jobs require skills common to serveral industries which may be locally available, but under-utilized by the communities. Commonly, work schedules are such as to provide ample time to participate in personal pursuits currently being enjoyed by the local work force. Most production employees on remote Alaskan oil operations work one week on and one week off.

For those employees not hired locally, the oil companies have provided long distance rotation from more populated areas, such as Anchorage and Fairbanks. Thus,

although, undoubtedly some permanent influx may be expected into coastal communities, this impact is not as great as might be expected. Prudhoe Bay, for example, has only a handful of "permanent" residents. The rest are rotated from communities as close as Barrow and as far away as Anchorage. Where facilities are needed to house and feed workers, temporary camps are erected which have their own sewers, water and utilities, thus limiting to some extent the impact of even the temporary surge of workers on the local community. Transportation and communication facilities initially are usually overtaxed when the industry activity concentrates in a locale, but these systems are quickly expanded leaving in the wake of activity a much improved condition for those remaining to enjoy the life style they choose.

It is my intention to offer our companies' capabilities in support of the petroleum industry's efforts in the Gulf of Alaska, and it is my plan to include the people of affected areas in the opportunity. This will consist of the offer of jobs to local residents and joint venture efforts with the Native village and regional corporations where feasible. We pledge to assist local communities in planning for and coping with the impacts of such oil activity in their area, if they wish our help.

written only

ANCHORAGE, ALASKA August 12, 1975

STATEMENT OF RAYMOND I. PETERSEN, PRESIDENT, WIEN AIR ALASKA, INC. BEFORE THE U. S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT, HEARING ON PROPOSED OIL AND GAS LEASING ON THE OUTER CONTINENTAL SHELF, NORTHERN GULF OF ALASKA.

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Although Wien can expect little direct benefit from Northeastern Gulf of Alaska oil activity, a socioeconomic study made by Mathematical Sciences Northwest, Inc. for the oil industry indicates a major development there would have the greatest population impact in Anchorage where Wien operates. The Anchorage area population would increase by several thousand, while coastal communities would receive only a few hundred new residents, the study concluded.

Every business in Alaska, including Wien, now doing business with the oil industry must plan future growth and capital investment on the assumption there will be a continuing and orderly program of exploration and development in Alaska by the industry. To unduly delay the Gulf of Alaska activity will disrupt this orderly expansion and could lead to over-investment which would probably be economically disastrous for some small companies.

The air transportation industry is a large oil consumer and many Alaskans are nearly totally dependent on air carriers for their needs. Should another international crisis lead to an acute fuel shortage in the future, Alaska might have trouble getting the fuel it needs if the rest of the nation felt that Alaskan oil reserves were being held by selfish interests.

The main arguments against the development in the gulf is that pollution will damage and perhaps destroy the fisheries, that the way of life in coastal communities will be destroyed, that shoreside facilities will be a cost burden to the State for which it will receive no benefits, and that a state coastal zone management law

is necessary to permit better state control of the activity. In my opinion there is no scientific evidence anywhere in the world, including Cook Inlet, to support the first. Anyone who has visited Alaska villages on a recurring basis should know that the "way of life" is undergoing constant evolution and the Native Claims Settlement is having a far greater impact than any single commercial activity could.

When I came to Alaska in 1934 there was an estimated 30,000 Eskimos, Indians and Aleuts in the territory. The balance of the total 60,000 population were Caucasian and other. Today I understand there are 75,000 natives and the population is increasing rapidly due to improved health services in recent years. The life style of these people today is a far cry from their igloo dwelling subsistence living style of their parents and grandparents. The old fish-burner powered transporation and seal oil lamp heating has been replaced by petroleum products. There is no turning back!

The Air Transport Association has recently released figures showing the scheduled airline industry incurs costs of $1.4 million per day for each cent that the price of fuel increases. In the case of my company, Wien Air Alaska, a one cent increase at present consumption costs the airline a quarter of a million dollars a year. Total increase in Wien's costs for the year 1975 over '74, will be close to $4 million.

The point I am trying to make is the necessity to find vast quantities of oil within andoffshore of the United States of America. Only with an adequate supply of petroleum can the market system really work. The oil companies are highly competitive and given

the opportunity through exploration can and will reduce the price of petroleum products, or at the very least hold it under inflationary conditions.

As for the third argument, any shoreside facilities are subject to state taxation and it will be the responsibility of the Department of Revenue to see that actual costs are recovered by that means. Finally, state officials, have stated that state laws now exist to achieve adequate control over any coastal activities. A coastal zone management law would simply streamline the administration and, theoretically, give the State some say-so over the activities of federal agencies. Emphasis should be put on the word "theoretical", however. Those same agencies would have to first approve any state CZM plan calling for this exercise of state authority.

I wish to conclude by urging oil exploration in all areas under the U. S. flag as expeditiously as possible, taking into proper account environmental necessities.

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letter only

**Tenneco Oil**
A Tenneco Company

Tenneco Building
P.O. Box 2511
Houston, Texas 77001
(713) 229-2131

August 12, 1975

Mr. Edward Hoffman, Manager
Alaska Outer Continental Shelf Office
Bureau of Land Management
P. O. Box 1159
Anchorage, AK 99501

Re: Public Hearing - Draft Environmental Impact Statement
Gulf of Alaska - Proposed OCS Lease Sale No. 39

Dear Mr. Hoffman:

Reference is made to the public hearing which you are holding in Anchorage August 12 and 13, concerning the environmental impact which a possible sale of oil and gas leases on the Outer Continental Shelf of the Northern Gulf of Alaska might have upon the adjoining land, the people of the great State of Alaska and this nation as a whole.

Tenneco Oil Company feels this sale and others that have been proposed in the frontier areas of the Outer Continental Shelf should be held. We know of no other domestic region within this industry's reach that offers the reserve potential to solve this nation's immediate and critical energy shortage. Given the opportunity by making leases available, with reasonable incentives and minimum restraints, the petroleum industry can and will, safely, explore for these potential reserves.

For me to offer further testimony in support of the foregoing statements, it would only be a redundancy to the testimony you will hear and witness today as will be presented by the Gulf of Alaska Operators Committee. Tenneco Oil Company is a participating member of this committee and fully endorses the testimony which they will present to your panel today.

In the interest of conserving the panel's time, we respectfully ask that our statements and endorsement of the Gulf of Alaska Operators Committee's testimony be entered into your record of these proceedings.

Yours very truly,

Jack Morris

Jack Morris
Land Manager-Frontier Projects
North America

JM:pb

writer only

POLAR AIRWAYS, INC.
2600 EAST FIFTH AVENUE
ANCHORAGE, ALASKA 99501
PHONE 279-5555

STATEMENT REGARDING OUTER CONTINENTAL SHELF LEASING

Thank you, Mr. Chairman.

I am Dr. Royce Morgan, President of Polar Airways, Inc., a Certificated Scheduled Air Carrier operating in this state. I endorse the Interior Department's plan for accelerated OCS leasing that would permit a sale in the Northeast Gulf of Alaska late this year.

I find several good reasons for proceeding. There are several in the Aviation business who have applied for operating rights at Yakutat who believe that revenue would come to their busi - nesses by serving the oil industry there.

The future of Polar Airways is predicated to a great extent on continued economic development by the oil industry. But so is the entire state of Alaska's future to a large extent. It is estimated that a majority of Alaska's revenue in the near future will be derived from the oil industry.

In the first chapter of the first book of the Bible, " God said, ' Be fruitful, and multiply, and replenish the earth, and subdue it' ". I believe orderly development of our natural resources is in line with God's plan for man and the earth. I would hope that development of the petroleum resources in the Gulf of Alaska is part of that orderly sequence of activity.

Thank you, Mr. Chairman.

Royce H. Morgan

Royce H. Morgan M.D.
President
POLAR AIRWAYS, INC.

S C Sandusky
Manager Anchorage Division
Production US & Canada

ALASKA OCS OFFICE
ANCHORAGE, ALASKA

Marathon Oil Company

P.O Box 2380
Anchorage, Alaska 99510
Telephone 907/274 1511

RECEIVED
AUG 25 1975
U.S. DEPT. OF INTERIOR
ENVIRONMENTAL ASSESSMENT

August 22, 1975

Director (732)
Bureau of Land Management
Washington, D.C. 20240

Dear Sir:

Proposed OCS Lease Sale #39, Gulf of Alaska

Marathon Oil Company wishes to add its support to the testimony presented by the petroleum industry through the Gulf of Alaska Operators Committee at the hearing held in Anchorage August 12 and 13 concerning the Draft Environmental Impact Statement for the referenced sale.

In addition, we believe the testimony of Mr. R. W. Bybee and others, with regard to delay of the sale, deserves special attention. Advocates of such delay state they need time for social-economic impact planning. We concur with Mr. Bybee's judgment that many of the essential ingredients of the final planning process are now imponderables (e.g., number of fields and their location, number and location of pipelines, nature and location of required auxiliary facilities, number of people needed in the operation, and the time schedule) and that hard data concerning these items will become available progressively during the long lead time between a sale and production. We believe that anticipatory planning can and should go forward so that when real data are available, implementation will be orderly, but that delay will serve no useful purpose.

There are also some who cite the need for baseline studies as reasons for delay. We do not believe that such studies will supply information that would affect the decision making process except, perhaps, to support a sale. For example, it is generally recognized that the Gulf is or borders a substantial fishery. Knowing the exact magnitude of that fishery in terms of fish counts and so forth would not materially add to hard data based on historical catches nor to the resulting need for enlightened regulations governing

operations. On the other hand, if the baseline studies found limited fishing or negligible habitat in or adjacent to the sale area, leasing should proceed and the delay would have been for nought. However, we do believe that data-gathering opportunities provided by the long lead time will assist in developing the necessary regulations and operational plans and techniques to protect the environmental conditions actually found to exist.

Accordingly, Marathon urges that the sale be held as scheduled.

Yours very truly,

S. C. Sandusky

Alaska State Legislature

SENATOR
ROBERT H. ZIEGLER, SR.
P. O. BOX 979
KETCHIKAN, ALASKA 99901

POUCH V
JUNEAU, ALASKA 99811

ALASKA OCS OFFICE
ANCHORAGE, ALASKA
SEP 3 11 35 AM '75

CHAIRMAN
JUDICIARY

MEMBER
COMMERCE
LEGISLATIVE COUNCIL

Senate

RECEIVED
AUG 25 1975
DIVISION OF MINERALS
ENVIRONMENTAL ASSESSMENT

August 21, 1975

Director (732)
Bureau of Land Management
Department of the Interior
Washington, D. C. 20240

Re: Proposed Lease Sale (#39)
Outer Continental Shelf/Gulf of Alaska

Dear Sir:

My name is Robert H. Ziegler, Sr. I am a partner in the law firm of Ziegler, Ziegler and Cloudy in Ketchikan, Alaska, past president of the Alaska Bar Association and an 11-year member of the Alaska State Senate, representing District A. I would like to submit the following to you in support of the captioned lease sale.

Beyond a doubt, the national energy situation is grave and will probably get worse before it gets better. Out national efforts to develop alternate energy sources should be redoutled. Even so, there will be a continuing need over a number of years to rely on fossil fuels to stay even, much less gain. Much of our fuel requirements must still be met by oil and gas which, as I understand it, will be found largely in the offshore areas. I therefore urge that the proposed oil and gas lease sale in the Gulf of Alaska be held.

From news accounts, I gather that in the hearings held August 12th and 13th ofthis year in Anchorage, the major point of disagreement was not whether or not the sale should be held, but, rather, when the sale would be held. My views on this matter are reflected by the lead editorial published in the Anchorage Daily Times on August 7, 1975, a copy of which is attached for the record.

Those who doubt the oil industry's ability to operate safely in the Gulf of Alaska are, I believe, a shrinking minority. However, from news accounts available to me, representatives of that minority appeared at your hearings. The view I hold on that matter is reflected well in another Anchorage Times editorial. This editorial, published on August 14th, is also attached for the record.

Another concern growing out of your hearings is the matter of lifestyles in Alaska. Rather than detail my thoughts on that subject, I will endorse the article by Max Brewer, printed in the Anchorage Times on August 3, 1975. A copy of that article is attached for the record.

I do have one reservation about the timing of the lease sale in the Gulf. As a Senator in Alaska, I am well aware of the state's need for revenues. Our annual budget is now in the $600 million range. Half of this will come from the oil industry. It is my firm conviction that most taxpayers in Alaska--including the oil industry--should not be burdened with additional taxation. Therefore, the financial assistance needed by the State of Alaska and its coastal communities to cope with the initial impact of oil and gas development in the Gulf of Alaska should be met by the Federal government. An equitable revenue sharing system should be enacted by Congress to provide such funds.

While revenue sharing is needed in Alaska, the national need for additional oil and gas supplies is greater and, therefore, I support the lease sale in the Gulf without qualification. At the same time, it cannot be emphasized too strongly that to proceed without a revenue sharing plan would be unfair to Alaskans.

I urge both revenue sharing and the lease sale--in that order.

Thank you for allowing me to make this statement for the record.

Very truly yours,

Robert H. Ziegler, Sr.

RHZ/pkz

enc.

EDITORIAL PAGE

Anchorage Daily Times

ROBERT B. ATWOOD
Editor and Publisher

WILLIAM J. TOBIN
Associate Editor
And General Manager

CLINTON T. ANDREWS JR.
Managing Editor

Page 6 Thursday, August 14, 1975

## Drilling In The Gulf

# PLENTY OF KNOW-HOW

**IMPRESSIVE** technical and scientific data supports the oil industry's argument that petroleum exploration and development can safely take place on the Outer Continental Shelf in the Gulf of Alaska.

Against this array of information, only fuzzy and vague allegations expressing a fear that the job cannot be done have been offered to counter federal plans to stage an offshore lease sale in December.

The different viewpoints were expressed here this week in testimony before an Interior Department panel soliciting comment on a draft environmental impact statement on OCS operations.

By any fair assessment, the pro-development forces were by far more informed, prepared and backgrounded than were those who spoke in favor of delaying the lease program.

**THE OIL** industry was represented at the hearing by a contingent of experts who have been busy for years with all sorts of studies relating to development off the Alaska coast. Working under a jointly sponsored project known as the Gulf of Alaska Operators Committee, the industry has assembled some of the best technical experts in the world to determine what the risks and potential might be.

Nothing in the findings, said Howard Slack of Atlantic Richfield, "would preclude operations" in the Gulf.

John H. Silcox of Standard Oil of California pointed out there has been "a mass of documented data," some of which has been grossly ignored by those who conjure up visions of environmental destruction.

Yet in the face of this testimony and the back-up data, state officials denied that proper biological and technical research has been done and said it would have to be done after the leasing.

Furthermore, the state contended that it was caught by surprise when a lease sale was announced -- as though hit by a bolt from the blue.

**THE FACT** is that it has been known for years that a Gulf of Alaska lease sale would be forthcoming.

That's why the industry formed the Gulf of Alaska Operators Committee some years ago, and that's why all of this biological and technical data is in hand — even if the state would like to pretend it doesn't exist.

It's true, unfortunately, that the state may not be prepared. But is not true to suggest that the industry has been deficient. It hasn't.

Instead, it has the technical know-how and ability to proceed.

If Outer Continental Shelf development is blocked the blame will be for political reasons, not technical ones. And to contend otherwise simply doesn't match up with the facts.

August 3, 1975, Anchorage Sunday Times

# Preservation of Lifestyles

By Max Brewer

RECENTLY there has been much discussion about the subjects of the quality of life and of the preservation of lifestyles in Alaska. A basic assumption appears to be that the preservation of the existing Alaskan lifestyle is desirable and that it should be maintained at all costs. Indirectly, the assumption seems to be that the existing quality of life, if not quite as desirable as it was 20 years ago, is good and that it is what most of the people want.

THE QUALITY of life is an illusive and ill-defined phrase generally meaning something different to each beholder. The discussions of the subject are carried out by restricted groups talking to like-minded individuals. There generally is little public involvement in the discussions other than reading about them in the news media.

Because they are complex, could be controversial, or might cloud the issue, the questions of whose quality of life and whose lifestyles might be affected are rarely discussed in detail.

IT IS ONLY human nature for those whose lifestyles already are confortable or enjoyable and whose jobs are secure, to want to preserve the status quo. It also is natural that they might fear change or to fear that any change would automatically be bad. Paradoxically, these fears do not fit with the pioneering [illegible] people exist throughout Alaska, although the strength of their situation can best be realized through observations made in a native community over a period of time.

IT IS discouraging to know of schools that have been constructed but for which there is no money for school books even two and three years later. It is disheartening to know of schools not having money for hot lunch programs, when these lunches are counted on to build up the youngsters physical condition during the winter months. It is even worse to know that many of the youngsters, even the little ones, hadn't had breakfast and were too hungry to study.

An uncomfortable feeling also is conjured up knowing that some schools have unheated bathrooms; some even have no bathrooms and youngsters use the willows. Sometimes that can be difficult when there are no willows as can be the case in western and northern Alaska.

In any event the experience is far more exhilarating, if not numbing, at 50 below with a sharp breeze, than the vacationer experiences during the summer when all he has to worry about is having a can of insect repellent to keep away the mosquitoes and biting flies.

A SHOCKING experience can be had when a doctor comes begging for penicillin

While water usage of over about 100 gallons per day, in the absence of industrial uses, usually indicates an inadequate or inefficient system, usage of under 50 gallons per day per person not only indicates an inadequate system but also a health hazard.

Disposal of untreated sewage to the waters of the state and more particularly the land surfaces of the state poses rare health hazards. It also causes deterioration of the environment, particularly where populations are concentrated and especially in areas where permafrost is a problem.

Such deterioration will continue and will grow until communities and the state not only have the money to construct the required facilities but, even more importantly, the money to operate the facilities once they are constructed. Unfortunately such funding is nowhere in sight, even after completion of the pipeline.

THE QUALITY of remote housing in much of Alaska is grossly inadequate for even reasonably healthful conditions to prevail. Unfortunately, the housing is usually designed for maximum consumption of very expensive energy. This occurs even though we know how to build, with no increase in cost, for much better energy conservation, while at the same time providing additional comfort.

It does not engender confidence to hear young natives complain about our construction of "instant slums" and "drafty and leaky cracker-boxes". It doesn't even give an impression that they have any confidence that people know what they are talking about when they talk about the quality of life.

It does, however, help explain some of their frustrations and their desire to

THE NEED FOR these compromises, or the consequences of no compromises, is not being discussed today. Perhaps we also need to discuss the quality of survival life. Perhaps we need to really discuss which lifestyles we wish to preserve, wherever possible, and which lifestyles that we want to change for the better as soon as possible.

Whatever we do, let us look at the whole picture of the quality of life and not kid ourselves. We might even consider holding our quality of life conferences at Bethel, in winter, and at Barrow, during the summer.

*Max Brewer, trained as a scientist, is former commissioner of environmental conservation. He is now living in Juneau and is a consultant on environmental and Arctic problems.*

EDITORIAL PAGE

Anchorage Daily Times

ROBERT B. ATWOOD
Editor and Publisher

WILLIAM J. TOBIN
Associate Editor
And General Manager

CLINTON T. ANDREWS JR.
Managing Editor



## OCS Hearings

# ONE-SIDED TESTIMONY

A CURIOUS double standard is demonstrated by officials of Alaska who tell a group of visiting congressmen that the state doesn't want offshore oil development now, and may file suit in an effort to block a Gulf of Alaska lease sale if the federal government proceeds with plans to put undersea acreage up for lease.

The biggest gun on hand to shoot down federal offshore planning, during the course of a hearing Tuesday at Yakutat, was Gov. Jay Hammond.

His opposition to leasing on the Outer Continental Shelf represented the official administration position. But it is safe to say that he did not speak for all Alaskans when he argued for at least a two-year delay in the lease offering now scheduled for in December.

Instead, he voiced an administrative philosophy which puts environmental considerations above all others and which reflects an attitude that growth is bad, no-growth is good.

THE GOVERNOR, of course, has a legitimate interest in seeing that environmental considerations

studies, preliminary seismic work and other assignments be carried out without some advance preparation?

THE MAYOR of Yakutat, Larry Powell, complained to the committee that his town isn't prepared for this sort of thing. It has no zoning ordinances, he said.

Surely he doesn't want the oil industry to be responsible for local ordinances. For several years it has been obvious that Yakutat would be a center of activities should federal leases be sold offshore. The town has had ample time to be looking into zoning and other matters that are the obligation of any community, with outside assistance available when it is needed.

It's no criticism of a town of 540 people to say that it lacks the governmental sophistication of a major metropolitan area or that it may lack the skills necessary to cope completely with demands that will arise in connection with sudden industrial growth.

But the state administration has such skills and it should lend a positive hand in a case such as this.

ALASKA
BANK OF COMMERCE

MAIN OFFICE: POUCH 7012, ANCHORAGE, ALASKA 99510 • FORMERLY MATANUSKA VALLEY BANK

August 25, 1975

Director 732
Bureau of Land Management
Washington, D.C. 20240

Subject: Proposed Lease Sale #39
Gulf of Alaska

My name is Albert Swalling, a 45-year resident of the State of Alaska. Address: 2601 Marston Drive, Anchorage, Alaska 99503. I welcome the opportunity to present my views on the proposed sale referenced above.

I hold no claim to fame or expertise as a gas or oil specialist. However, so that you may better evaluate my views, the following is a list of some of the exposure I have had in energy and environmental fields:

Chairman: "North Commission", a study group created by the Alaska Legislature to study, promote, and develop the human and physical resources of Northern Alaska, 1967-1971.

Member: Alaska International Rail & Highway Commission, 1958-1960.

Chairman: Environmental Committee, Alaska Chapter-Associated General Contractors of America, 1972.

Chairman: Environmental Committee, Associated General Contractors of America, Washington, D.C.

Chairman: Energy Crisis Committee, Alaska Chapter-Associated General Contractors of America, 1973.

Member: Fuel and Energy Committee, Associated General Contractors of America, Washington, D.C., 1973-1974.

Member: Fuel and Material Shortage Committee, Associated General Contractors of America, Washington, D.C., 1974-Present.

Member: Governor's Pipeline Commission, State of Alaska, 1970-1971.

Member: Board of Directors, Alaska Pipeline Company, 1963-1972.

Member: Board of Director, Anchorage Natural Gas Company, 1960-1972.

Member: Board of Directors, Alaska Interstate Company, 1968-1972.

President and Chairman: Suntrana Mining Company, Healy, Alaska (Coal), 1953-1966.

President: Swalling Construction Company (Heavy, Marine and Industrial Contractor), 1947-Present.

President: Alaska Bank of Commerce, 1967-1975.

Chairman: Alaska Bank of Commerce, 1967-Present.

Since the announcement of the proposed lease there has been a very active program by the state administration and environmental groups to postpone the sale on the basis that additional time is needed for proper planning so as to lessen the impact on the affected communities. I believe some of these people are sincere, but for the most it is a repeat performance of unending delay tactics.

The sale must be held in order that the search may begin. There is no assurance that either oil or gas in economic quanities will be discovered. The actual initial prospecting will have very little impact on the State as a whole or the particular communities involved.

In a national energy crisis, such as we are now experiencing, an inventory must be taken of our known reserves, and the only sure method of proving a reserve is to drill for it.

Many words have been spoken and printed to the effect that we need more time to plan and prepare for the activity in the gulf. Among the several items mentioned are housing, utilities, staging areas, schools, and motel and hotel accommodations. It is obvious to me that unless the field or fields are discovered we will have no need for these facilities. You show me the mortgage loan officer that would finance, say, 200 living units in Yakatat at this stage, and I'll point to the man heading for early retirement or the school board asking for funds for 20 class rooms on the strength of an unknown, maybe need.

Another item mentioned in opposition to the gulf sale is that when Alyeska comes on full stream there will be a surplus of product on the West Coast and will result in a depressed market, thereby seriously effecting the monetary return to both the federal and state from a royalty standpoint. At this point in time the State has no royalty claim to O.C.S., but it is argued that it could effect the market for Prudhoe and Cook Inlet production. My best information is that this problem has been anticipated and is well on the way of being solved.

My conclusion is that the sale should proceed, exploration should be expedited, the field or fields inventoried, and when this has been accomplished and the need established, the necessary facilities can be provided by both the private and the public sector within their areas of normal responsibility.

A. C. Swalling
Chairman of the Board

to support a positive decision by the Department of the Interior to conduct this sale.

OCS Importance

The impact of the Arab embargo led to the development of a widely held view that this nation must regain a reasonable level of energy self-sufficiency. We currently import 6 million barrels per day of crude oil and petroleum products and the figure is steadily rising. Our dependence on imports adversely affects the nation's security and economic stability. We are no longer assured an adequate supply of fuels for national defense and our foreign policy is undoubtedly weakened by the threat of an embargo that can cripple our industries and seriously affect our life style. Aside from the uncertainty of supply, costs of large volumes of imported oil will adversely affect the nation's balance of payments causing an intolerable drain on the economy.

In developing plans to improve the nation's energy self-sufficiency, all available alternatives must be investigated. It is a generally accepted premise that the nation cannot achieve this goal by relying solely on reducing our level of energy consumption through a no energy growth economy and energy conservation measures. A no-growth economy is not a viable alternative. We must find new reserves to replace the 3 billion barrels

of oil and 22 trillion cubic feet of natural gas consumed from our existing reserves each year just to keep the present situation from worsening. Furthermore, some increase in energy use is necessary to supply the needs of a growing population even if we do no more than maintain our current standard of living. Energy conservation is an extremely important step toward reaching the goal of energy self-sufficiency. There is much room for improvement in the use of energy and conservation should be a part of our national energy program. However, energy conservation by itself will not be enough.

Any effective plan for achieving a reasonable level of energy self-sufficiency must include development of all of the nation's energy resources. We are indeed fortunate that the present energy shortage is caused by an inadequate development of supplies rather than by depletion of our energy resources. This nation has an abundance of energy resources in a wide variety of forms and simply needs to take the steps necessary to enable these resources to be explored, developed and brought to market.

The nation's most significant energy resources are nuclear and fossil fuels. Nuclear energy has tremendous potential, but it has faced lengthy delays due to environmental objections. It cannot be a substantial factor in our nation's energy supplies for the next

10 to 15 years because of the long lead times in nuclear plant construction. Domestic coal and oil shale resources are extremely large and can be processed into oil and gas to meet the market demands now supplied by conventional sources. However, it does not appear that these resources will make a significant contribution to the nation's energy supplies for many years due to the economic and physical limitations of constructing mines and converting the production into gas and liquid forms. There are also similar limitations to mining coal, converting equipment to burn it in its natural form and cleaning the stack gas to meet air pollution standards. Clearly for at least the next 10 to 15 years there are no alternatives to conventional oil and gas for major new supplies of domestic energy.

In reviewing the alternatives with regard to development of the nation's conventional oil and gas resources, it is apparent that the historical onshore producing areas alone no longer have the potential to supply the nation's petroleum needs. Even the Gulf of Mexico has undoubtedly passed its peak for new discoveries. In our opinion, the nation's greatest potential for new discoveries of conventional oil and gas lies in the remaining Outer Continental Shelf areas of Alaska, California and the Atlantic Coast. To evaluate this potential and achieve the goal of improved energy self-sufficiency the nation

must make all of these offshore areas available for exploration and development through an accelerated leasing program.

Gulf of Alaska Resource Evaluation

In 1974 the Bureau of Land Management requested that the petroleum industry prepare rankings of the 17 Outer Continental Shelf areas of the United States by order or resource potential and environmental concerns. In addition to responding to this request Atlantic Richfield Company ranked these areas by leasing preference. This ranking reflected the combined considerations of resource potential, possible environmental impacts, and operating capabilities that might affect the timing for delivery to market of any reserves found. At that time we assigned the Gulf of Alaska the highest resource potential and the highest preference for leasing of all the OCS areas. We continue to hold that view.

Industry's interest in the Gulf of Alaska and assessment of its potential is based on numerous geological and geophysical studies conducted by individual companies and groups. In an effort to further evaluate the potential of the Gulf of Alaska, Atlantic Richfield together with three other companies recently obtained approval from the U. S. Geological Survey to drill a stratigraphic test in the area. This well has been spudded at a

location some 18 miles offshore in a spot intentionally selected where oil and gas are not expected to be found. Other companies have been invited to participate in this data acquisition program by sharing in the cost of the well. There are now 26 companies participating in the program.

The proprietary geological and geophysical data and interpretative studies developed in the presale exploration programs of the various companies interested in the Gulf of Alaska will be used in evaluating the prospective tracts. Independent evaluations prepared by the different companies combined with competitive bidding in the lease sale will ensure the Government a fair market value for these public resources. Some concern has been expressed publicly that the Government does not receive a fair share of the proceeds from reserves found in OCS areas. An often overlooked fact is that the Government under the present system receives not only the amount paid in bonuses but also 1/6 royalty and income taxes on the industry's profits. Our studies indicate that considering the risks involved in the exploratory ventures of the Outer Continental Shelf and the time value of money the Government receives about 80% of the gross profits from OCS production.

Physical Environment

Weather and sea conditions are a major factor in conducting offshore exploration, development and producing operations. Since the Gulf of Alaska is generally noted as being a very stormy area, the industry has sponsored numerous programs to assess its physical environment. These programs include on site measurements of present conditions and hindcast studies from records of past conditions in the Gulf of Alaska to develop extensive information on wave heights, tides, winds, currents and water temperature. It is necessary to study not only the normal conditions of the Gulf of Alaska, but also to determine conditions that exist during peak storm periods. These extreme or rare occurring storm conditions provide the design criteria for installations that must sustain the maximum forces encountered in a storm.

Studies of the Gulf of Alaska indicate that weather and sea conditions are no harsher than those encountered in other areas in which the industry has operated. In fact, the Gulf of Alaska is very much like portions of the North Sea, especially with respect to wind and wave conditions. Furthermore, extreme wind conditions in the Gulf of Alaska are no harsher than those in the Gulf of Mexico during a hurricane and the water currents and tides are not as severe as those in the Cook Inlet. The most important point from this comparison, however, is that the industry

has faced similar weather and sea conditions in other areas and has successfully dealt with the problems of operating in a similar environment.

Public concern has been expressed with regard to the effects of earthquakes on operations conducted in the Gulf of Alaska. An earthquake could cause faulting of the surface sediments and loss of soil stability resulting in damage to offshore facilities installed in the effected area. Geological hazards of this type caused by earthquake activity can be reduced considerably by utilizing geophysical techniques. Seismic data shows that the danger of a fault rupturing surface sediments in the Gulf of Alaska is extremely low. There has been no evidence discovered of fault displacements in recent sediments on a majority of the structures. Seafloor topography as well as the thickness and contortion history of the overburden have been studied by seismic mapping to determine the potential loss of overburden stability. Such studies in the Gulf of Alaska indicate that the possibility of mass wasting of unconsolidated sediments over most of the area is very remote. The knowledge gained from these studies and from later detailed surveys that will be conducted in selecting specific sites for exploratory drilling or construction of production platforms will enable the industry to minimize the risks of encountering unstable seafloor conditions.

Technological Assessment

Although industry has not previously operated in the Gulf of Alaska and the environment is known to be harsh, we are confident that present technology will enable operations to be conducted safely in this area. Two of the main conditions that make the Gulf of Alaska a harsh environment are the frequent storms and the threat of earthquakes. We have experience in other areas, notably the North Sea, where operations have been successfully conducted under similar storm conditions. The threat of earthquakes can be dealt with by selecting locations for drilling and construction of offshore facilities to avoid areas with unstable seafloor conditions and by applying existing structural design techniques evaluated both in offshore platforms and other types of structures to reduce the risk of failure to an acceptable level.

The experience gained in designing equipment for the North Sea together with the extensive data gathered on the physical environment of the Gulf of Alaska has prepared the industry exceptionally well for operations in this new area. In over a decade of activities in the North Sea during which almost a thousand wells have been drilled, drilling rigs and production facilities as well as support equipment, such as supply boats and helicopters, have been steadily improved and successfully tested in severe operating conditions. For example, the latest

generation of semisubmersible drilling rigs used in the North Sea have safely withstood waves of almost 100 feet. These wave heights are comparable to the extreme waves expected in the Gulf of Alaska.

The experience of oil industry and related support personnel in the North Sea provides a bank of trained manpower uniquely qualified for operations in the similar environment of the Gulf of Alaska. Experience in the North Sea has also led to the development of operating procedures in drilling and producing activities that provide increased safety and efficiency over earlier procedures. This knowledge of improved procedures can be transferred to the Gulf of Alaska. Industry has also learned that the best procedures for safe and efficient operations vary with the severity of weather and sea conditions. Advances in reliable weather forecasting now allows offshore operators to make needed changes in their activities before bad weather reaches the area.

With regard to the adequacy of present technology in protecting against the threat of earthquakes in the Gulf of Alaska, we have already discussed the techniques used in selecting sites for drilling and construction where seafloor stability is not expected to be affected. In locations where the foundations remain stable, the main threat of an earthquake to offshore structures is the force of the shock waves. Platforms installed in the

Cook Inlet and on the California Coast have been designed to withstand these shock forces. Earthquakes have occurred in both areas with no structural damage to the platforms. Although the shock intensity was not as severe as may be experienced in the future either in these areas or the Gulf of Alaska, the experience does provide some indication that platforms can be designed to withstand earthquakes. In addition, structural engineers are experienced in designing other types of structures to withstand earthquake forces and are able to evaluate their design techniques by studying the performance of structures that have been exposed to severe earthquakes. These experts advise that the present technology is adequate for the design of offshore platforms and facilities to withstand these forces with an acceptable level of reliability.

## Environmental Considerations

The Gulf of Alaska supports a sizable fishing industry and it is natural that the entry of a new industry into these waters would be viewed with some concern. However, the history of 25 years of operations in the Gulf of Mexico offers substantial evidence that the petroleum industry has the ability and desire to conduct its activities compatibly with fishing, shipping, and other offshore industries. Our relationship in the Gulf of Mexico has been excellent not only with other industries

but also with the adjacent states and onshore communities. Although petroleum related activities arising from the proposed northern Gulf of Alaska lease sale may accelerate the growth of several coastal towns any adverse socio-economic impacts on the majority of the people in the area should be offset by improved job opportunities and higher income. We firmly believe that petroleum operations can be conducted in the Gulf of Alaska with no significant long term environmental impact or adverse effects on other activities and adjacent areas.

Oceanographic studies, both physical and biological, have been or are now being conducted in the northern Gulf of Alaska. The most comprehensive is the one being done by NOAA in conjunction with the Bureau of Land Management. Atlantic Richfield Company, together with three other companies, has just completed an oceanographic survey at the drill site for the stratigraphic test well in the northern Gulf of Alaska. Although environmental studies in the Gulf of Alaska have accelerated in the past two to three years, oceanographic observations date back to 1778, the early 1920's, and continuously since the late 1940's.

The greatest environmental concern with regard to petroleum industry operations in offshore areas is undoubtedly the risk of an oil spill. The petroleum industry takes extensive protective measures in equipment

design, operating procedures, and training of personnel to prevent such an occurrence. The public is further assured of adequate industry measures to provide environmental protection and safety in offshore operations through the requirements of the U. S. Geological Survey's operating orders for OCS areas. Operating orders are now being developed specifically for the Gulf of Alaska based on knowledge gained by many years of industry operations in offshore areas under U. S. Geological Survey jurisdiction.

It is not possible to eliminate all risks of an oil spill regardless of how many safeguards are taken to prevent it. However, it is important that we keep this risk in its proper perspective. In the Gulf of Mexico and the California offshore the petroleum industry has drilled over 16,000 wells on the Outer Continental Shelf. While conducting these activities only four major spills have occurred and only one, the Santa Barbara Channel spill in 1969, caused appreciable short term environmental damage. To the best of our knowledge there is no evidence that even this spill had any permanent effect on the ecology. A National Academy of Sciences' study also helps to place offshore drilling and producing activities in the proper perspective with regard to the threat of pollution. Their study found that these offshore activities have historically caused less than 2% of the total oily discharges into the oceans.

Even though the risk of an oil spill from offshore exploration, development and production is relatively small protective measures are taken to contain and cleanup an accidental spill and minimize the threat of damage. The petroleum industry has established cooperative organizations, such as Clean Seas Inc. and Clean Gulf Associates, for containment and cleanup of spills in all offshore areas in which it operates. A similar organization, Gulf of Alaska Clean Up Cooperative, is now organized for the Gulf of Alaska and will provide oil spill clean up equipment and operating procedures before exploratory drilling and development begins. These cooperative organizations are adequately funded, equipped and manned by personnel trained to respond quickly and effectively in the event of a spill. In addition, the U. S. Coast Guard maintains a "strike team" that is alerted in the event of a spill in offshore waters. This team will take charge of containment and cleanup operations in any case where industry activities are not considered to be adequate.

## Conclusions

Atlantic Richfield Company personnel have reviewed the draft Environmental Impact Statement prepared with respect to the proposed northern Gulf of Alaska lease sale (No. 39). In our opinion, this statement is adequate for a positive decision by the Bureau of Land Management to proceed with the proposed sale. We are also confident of the petroleum

industry's capability and determination to operate safely in the Gulf of Alaska. Considering the alternatives available with regard to meeting the nation's future energy needs, we believe it is vitally important for decisions to be made by the Government which will allow maximum development of the petroleum resources of the Outer Continental Shelf as promptly as possible. We respectfully urge a decision to proceed with the northern Gulf of Alaska lease sale ( No. 39) as presently scheduled.

Comments with regard to the specific items in the draft Environmental Impact Statement are attached.

Sincerely yours,

J. P. Johnson

J. P. Johnson

JPJ/nn

Attachment

Getty

Getty Oil Company Post Office Box 1404, Houston, Texas 77001 · Telephone: (713) 228-9361

Mid-Continent Exploration and Production Division
H. E. Wendt, Offshore Manager

August 27, 1975

Director (732)
Bureau of Land Management
Washington, D. C. 20240

Dear Sir:

Re: Proposed Lease Sale No. 39
Outer Continental Shelf -
Gulf of Alaska

Please accept the attached statement as the views of Getty Oil Company on the proposed sale of oil and gas leases in the Gulf of Alaska, Sale No. 39.

Yours very truly,

H. E. WENDT

ERT/skf

Enclosure

DEPARTMENT OF THE INTERIOR

HEARING ON

ENVIRONMENTAL IMPACT STATEMENT
PROPOSED GULF OF ALASKA OCS LEASE SALE

AUGUST 12-13, 1975

WRITTEN COMMENTS OF

H. E. WENDT
ON BEHALF OF
GETTY OIL COMPANY

Getty Oil Company has reviewed and concurs in the presentation made by the Gulf of Alaska Operators Committee at the August 12-13, 1975, hearing held in Anchorage on the Environmental Impact Statement relative to the possibility of the Department of the Interior conducting an offshore lease sale in the Gulf of Alaska.

Getty Oil Company is confident that offshore drilling and production equipment and operating techniques have been developed to such mechanical excellence that exploration for and production of petroleum can be conducted in the Gulf of Alaska with minimum disturbance to indigenous ecological systems. Any damage that might occur would surely be temporary, and we believe that due consideration should be given to the fact that platforms, etc., will be of limited term - such as for forty years, as stated in the Environmental Impact Statement.

Of apparent concern to a number of those testifying at the hearing was the impact of offshore drilling and production operations on small communities on the Gulf of Alaska shore. Though some of the participants in the hearing suggested considerable delay to "study" the impact, may this company suggest that such considera tion be entertained after the initial exploratory drilling. Exploratory drilling is usually done with rather minimum disturbance to shore installations and the rig crews rarely live in the small coastal towns. Crew work patterns of seven days on seven off or ten on ten off usually allow sufficient time for travel to their homes in a larger city. It is our opinion that there will be little impact on coastal towns for the first two or three years after a lease sale, and when platforms are installed and development drilling commenced the impact of boat traffic and supply operations will be gradual and will be absorbed without undue hardship on the local population.

Getty Oil Company speaks from long experience in offshore operations. This company began producing oil from platforms in the Pacific Ocean off southern California before World War II and commenced an exploration program in the Gulf of Mexico in 1946. Our offshore operations now consist of more than 500 oil and gas wells, over 100 production platforms and numerous support facilities. We are satisfied that our operation participation has been, from the start, a safety conscious and minimum pollution occurrence endeavor.

GREATER SITKA
Chamber of Commerce, Inc.

~~0 73280~~
2 732

ALASKA'S HISTORICAL CAPITAL
TO KNOW ALASKA ONE MUST FIRST KNOW SITKA

ALASKA OCS OFFICE
SITKA
AUG 22 12 45 PM '75

Director (732)
Bureau of Land Management
Washington, D.C. 20240

Gentlemen:

The Greater Sitka Chamber of Commerce on August 14, 1975 passed the following resolution for your consideration:

WHEREAS, there is an urgent need for energy fuels at the present time; and,

WHEREAS, we strongly feel that American dependence on foreign imported oil, and the attendant whims of foreign politics, should be reduced to o the lowest possible levels with all practical haste: and,

WHEREAS, the outer continental shelf of the Gulf of Alaska is expected to be a potentially rich source of oil, which is so badly needed by industry: and,

WHEREAS, due to the extensive environmental research already done, we feel that additional time, effort and money spent in such pursuits would be counterproductive:

THEREFORE, be it resolved that the Greater Sitka Chamber of Commerce hereby urges your agency to expedite such plans and arrangements as are necessary to the immediate beginning of exploration and development of the Gulf of Alaska outer continental shelf.

This the 14th day of August, 1975.

Lloyd R. Rice

Lloyd R. Rice, President

RECEIVED
AUG 22 1975
DIVISION OF ENVIRONMENTAL ASSESSMENT

POST OFFICE BOX 638 • SITKA, ALASKA 99835

Manager, Alaska Outer Continental Shelf Office
P.O. Box 1159
Anchorage, Alaska 99510

Richard W. Varney
Cape Yakataga, Alaska 99560
30 July, 1975

Hearing Rec'd 8/1/75

Dear Sir:

As a concerned resident of Cape Yakataga, I feel my sentiments regarding the forthcoming oil and gas lease sale should be made a part of the public record.

I strongly feel that the offshore tracts should be leased as soon as possible to prevent a future critical domestic oil shortage. By letting the offshore leases by this fall the various companies will have ample time to discover, drill, and define much needed crud oil reserves in an orderly manner.

The local economy at Cape Yakataga will benefit tremendously when the offshore oil land begins to be developed. Between Cordova and Yakutat lies an approximate 250 mile strip of timbered beach with virtually no develppment. This area has historically been a living nightmare to pilots due to its isolated nature and unpredictable weather. The ly airstrip in the area is located at Cape Yakataga. The F.A.A. had, until recently, all but shut down their facilities at the runway. With the recent scientific studies taking place in the Gulf of Alaska (approximately 28 miles SSW of Cape Yakataga) already there have been improvements with the facilities at the airport. The F. A. A. in co-operation with the interested oil companies have and are in the precess of installing new navigational equipment and a lighting system. It is difficult to estimate the number of lives that could have been saved in the past if these safety devices had been installed then. Future lives will most assuredly be saved by the installation of this equipment. This is only the beginning, if the offshore lands are developed Cape Yakataga will enjoy an all weather, all instrument airport. The people ultimately benefitting will be the general public.

When the offshore leases are let, the oil companies will need communications. The present facilities at Cape Yakataga are incapable of handling the increased demand that l be placed on them after the leases are let. RCA Alaska Communications employs three ner (myself included) at the communications site. We and our families rely on added grow for continued existence at Cape Yakataga. Since the F.A.A. closed its doors four years

ago, Cape Yakataga has shrunk from a prosperous community of 30 to a hopeful 5. The offshore leases will definitely give the communications industry in Southeastern Alaska a shot in the arm.

With the possibility of offshore oil being developed producing an inexpensive source o power, I.E. mining, may be encouraged to develppe. (This area is rich in minerals). Cape Yakataga could concievably becomea very important city in Alaska. I for one feel that now is the time to start progressing towards that goal.

Simply stated, without tbe development of the offshore natural resources Cape Yakataga will atropy and die. On the other hand, with the letting of the leases one can look forward to a steady healthy ecomimic development of the area.

Richard W. Varney

Richard W. Varney

FIDC

DR. WILLIAM R. WOOD
EXECUTIVE VICE PRESIDENT

FAIRBANKS INDUSTRIAL DEVELOPMENT CORPORATION
Phone 907 452-5400 or 452-5752 619 Eleventh Avenue Fairbanks, Alaska 99701

ALASKA OCS OFFICE
ANCHORAGE, ALASKA
SEP 8 11 24 AM '75

August 28, 1975

Manager
Alaska Outer Continental Shelf Office
Bureau of Land Management
117 W. Fireweed Lane
Anchorage, Alaska

Dear Sir:

The attached written testimony concerning the "Proposed Lease Sale (#39) of Oil and Gas on the Outer Continental Shelf - in the Gulf of Alaska" is presented on behalf of the Fairbanks Industrial Development Corporation.

Sincerely yours,

Wm R. Wood

William R. Wood
Executive Vice President

WRW/kb
encl.

Written Testimony Concerning the "Proposed Lease Sale (#39) of Oil and Gas on the Outer Continental Shelf - In the Gulf of Alaska"

I am Dr. William R. Wood, President Emeritus of the University of Alaska, and currently Executive Vice President of the Fairbanks Industrial Development Corporation, a non-profit community service organization comprised of ninety-two professional and business member firms, representing major business, professional, industrial, and civic enterprises of Interior Alaska.

I am instructed by the Board of Directors of FIDC to urge the earliest feasible development of the potential oil and gas reserves on the Outer Continental Shelf in the Gulf of Alaska, and other Continental Shelf areas surrounding the State of Alaska, consistent with national needs and priorities in the development of essential energy supplies for the people of our nation and state.

It is understood by the FIDC Board that careful consideration by those directly responsible will be given to protecting the ocean environment, as well as the coastal environment involved, and that every effort will be made at the national level to protect the economic interests of the people of Alaska, particularly in those Continental areas immediately impacted by any resource development efforts undertaken, including among other matters exploration, production, and processing of all non-renewable resources found on the Outer Continental Shelf in waters surrounding the State of Alaska.

It is the position of the Board of FIDC that mere exploitation of the Outer Continental Shelf by the national government or private enterprise cannot be adequately justified apart from careful consideration of the issues raised here. A common-sense gradual approach to development in the common interest of the people of Alaska, as well as of the nation, is advocated, rather than any extremist view at either end of the spectrum of possibilities.

FIDC is confident that this point of view is shared not only by member firms of our non-profit community service organization, but by a strong majority of the residents of the Interior Alaska. We have come to this conclusion after studying a mass of detail that has been made available from a variety of sources during the past several months.

Move. Move now. Move now as a prudent person should who holds the interest of others at heart, as well as one's own future well-being.

Wm R. Wood

William R. Wood
Executive Vice President
Fairbanks Industrial Development
Corporation

August 28, 1975

FIDC

DR. WILLIAM R. WOOD
EXECUTIVE VICE PRESIDENT

ALASKA OCS OFFICE
ANCHORAGE, ALASKA
SEP 8 11 24 AM '75

FAIRBANKS INDUSTRIAL DEVELOPMENT CORPORATION
Phone 907 452-5400 or 452-5752 · 619 Eleventh Avenue Fairbanks, Alaska 99701

August 28, 1975

Manager
Alaska Outer Continental Shelf Office
Bureau of Land Management
117 W. Fireweed Lane
Anchorage, Alaska

Dear Sir:

The attached written testimony concerning the "Proposed Lease Sale (#39) of Oil and Gas on the Outer Continental Shelf - in the Gulf of Alaska" is presented on behalf of the Fairbanks Industrial Development Corporation.

Sincerely yours,

Wm R. Wood

William R. Wood
Executive Vice President

WRW/kb
encl.

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Wm R. Wood

William R. Wood
Executive Vice President
Fairbanks Industrial Development
Corporation

August 28, 1975

**Alaska Loggers Association, Inc.**

BOX 425
KETCHIKAN, ALASKA 99901
Phone 225-6114

July 31, 1975

Manager, Alaska OCS office
Box 1159
Anchorage, Alaska 99510

Dear Sir:

Enclosed are four copies of an Alaska Loggers Association Resolution number 75-1 supporting OCS development in the Gulf of Alaska.

Also included are copies of the ALA people map, which provides information about Alaska Loggers Association and locates the members thruout the State.

Please direct the material to the proper people.

Sincerely,

Donald A. Bell

Donald A. Bell
General Manager
ALASKA LOGGERS ASSOCIATION

DAB/mjs
Enc/
cc. James Campbell
R.L. Jernberg
Keith Arnold

ALASKA LOGGERS ASSOCIATION RESOLUTION 75-1

WHEREAS the Alaska Loggers Association, Inc., is a legally incorporated Alaska trade association with a membership of 91 regular members and 165 associate members, individuals and firms involved in Alaska's wood products industry, and

WHEREAS this industry ranks third in total employment in Alaska, and

WHEREAS the United States is now approximately 35 percent dependent on unreliable foreign sources for its oil and this dependence is still increasing, and

WHEREAS the wood products and petroleum production industries not only share the same producing areas harmoniously but also receive some mutual benefits through the resulting economic interaction, and

WHEREAS it is belief of the Directors of the Alaska Loggers Association, Inc., that a mutually cooperative development is desirable in the Gulf of Alaska region and that continued growth of both industries is in the best interests of the State and Nation; now, therefore, it is:

That Alaska Loggers Association, Inc., support prompt leasing of OCS petroleum exploration tracts in the Gulf of Alaska by the Department of Interior and urge local, state and federal government cooperation in fostering exploration

Approved this 25th day of July 1975.

James F. Campbell
President
Alaska Loggers Association Incorporated

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James F. Campbell
President
Alaska Loggers Association Incorporated

# Greater
# Juneau Chamber of Commerce

"SERVING ALASKA'S CAPITAL"

200 N. Franklin Street (907) 586-2201 Juneau, Alaska 99801


August 28, 1975

U. S. Department of Interior
Bureau of Land Management
Alaska Outer Continental Shelf Office
P. O. Box 1159
Anchorage, Alaska 99501

Gentlemen:

The Greater Juneau Chamber of Commerce has, since OCS became a household expression, been for the leasing and development of the oil and other resources of the Continental Shelf.

Juneau is more vibrant now than in the past and we do want to be evaluated with the other cities as a possible important cog in the development.

We are not "playing dead" and want the Alaska Outer Continental Shelf Office to know we are ready to help in whatever means you need.

Please keep us in mind.

The enclosed states our position and has been forwarded to the Bureau of Land Management in Washington, D. C. and to our Congressmen.

Sincerely,

R. A. "Dutch" Derr
Executive Vice President

Enclosure

RAD:ew

A RESOLUTION

WHEREAS, the Board of Directors of the Greater Juneau Chamber of Commerce is a representative of the business community for the residents of the City and Borough of Juneau, Alaska.

WHEREAS, the future ability of Juneau to meet its service responsibilities to its constituent member is to a large extent dependent on healthy regional, state and national economy to which increased domestic oil production is essential and,

WHEREAS, the residents of the City and Borough of Juneau, Alaska are currently dependent primarily on state and federal government, tourism and related services as a source of revenue and,

WHEREAS, these industries are totally dependent on petroleum for its energy and,

WHEREAS, there is no evidence to indicate that Outer Continental Shelf leasing within the Gulf of Alaska and oil development is incompatible with these industries, we must totally support the proposed fall/winter, Gulf of Alaska, Outer Continental Shelf leasing.

WHEREAS, oil development holds a promise of a boarder industrial base and economic diversification for the residents of the City and Borough of Juneau and,

WHEREAS, such economical growth can be expected to result in a more fruitful lifestyle for the residents of the City and Borough of Juneau, it is therefore resolved that the Board of Directors of the Greater Juneau Chamber of Commerce support prompt leasing of OSC tracts in the Gulf of Alaska by the Bureau of Land Management.

WHEREAS, it is also desired that within the Draft Environmental Impact Statement, Outer Continental Shelf proposed gas and leasing in the northern Gulf of Alaska be broadened within its "Social and Economic Impact of the Northern Gulf of Alaska Coast" to include the City and Borough of Juneau relative to short and long term on-shore impact.

WHEREAS, Juneau is the only major community within the coastal Alaskan waters within a 200 mile radius of said lease sale that is not included within the Draft Environmental Impact Statement,

WHEREAS, Juneau is the only community within 175 miles of the impact area that has proper planning and zoning laws present to facilitate anticipated on-shore impact,

WHEREAS, the Board of Directors of the Greater Juneau Chamber of Commerce demands that the final Environmental Impact Statement include the assessment of what Juneau's potential impact on such long term leasing is.

Passed and Approved on August 25, 1975.

Signed _____

R.A. "Dutch" Derr
Vice President
Greater Juneau Chamber of Commerce

Greater
Juneau Chamber of Commerce
"SERVING ALASKA'S CAPITAL"
200 N. Franklin Street (907) 586-2201 Juneau, Alaska 99801

ALASKA OCS OFFICE
ANCHORAGE, ALASKA
SEP 3 11 14 AM '75

August 27, 1975

Director (732)
Bureau of Land Management
Washington, D. C. 20240

Dear Sir:

The enclosed is a much discussed resolution from the Greater Juneau Chamber of Commerce.

We are unanimous in our support of the Outer Continental Shelf leasing and oil development.

We are also desirous of being included in the "Social and Economic Impact of the Northern Gulf of Alaska Coast."

It is important that the Bureau of Land Management realizes that Juneau is a very vibrant community and that the Capital Move has made the people more aware of opportunities that are available to us.

Please don't write us off - keep us informed. We are, and may continue to be, the Capital of Alaska.

Sincerely,

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Passed and Approved on August 25, 1975.

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Vice President
Greater Juneau Chamber of Commerce

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R.A. "Dutch" Derr
Vice President
Greater Juneau Chamber of Commerce

[illegible]

[illegible]

[illegible]
Anchorage, Alaska 99510
August 27, 1975

Bureau of Land Management
Alaska Outer Continental Shelf Office
Post Office Box 1159
Anchorage, Alaska 99510

Gentlemen:

The Alaska Chapter of the Sierra Club was unable to present oral testimony at the public hearings held here recently on proposed oil and gas leasing in the Northern Gulf of Alaska(Sale No. 39), as described in your Draft Environmental Impact Statement dated June 27, 1975. We are submitting this written statement in lieu of oral testimony, and request that it be made a part of the permanent hearing record.

We wish to state that we understand the importance of assuring an adequate supply of oil and gas, and other forms of energy for the United States in the years ahead. Sierra Club members are aware of the importance of energy resources to our country, and we realize the consequences of a shortfall of oil and gas to the American economy. We are as concerned as are other Americans, about the need for these resources; however, we believe that the natural environment, including the offshore areas, must be given adequate protection in the process of exploring for, and extracting oil and gas and other necessary resources.

We believe that the Draft E.I.S., while it no doubt represents a considerable amount of effort on the part of the Alaska O.C.S. staff, cannot be considered adequate in many respects because of the lack of sufficient baseline data. We believe that the studies presently under way should be completed, and their results completely analyzed, before any decision to hold an oil and gas lease sale in the Northern Gulf of Alaska is made. We estimate that a period of at least two years, and longer than this if necessary, will be required for this purpose. We believe, therefore, that any decision to hold a Northern Gulf of Alaska oil and gas lease sale before at least September of 1977 would be premature and unjustified, and we request that such a delay be made.

Regarding alternatives to the proposed sale, Section VIII of the Draft E.I.S., we believe that under Subsection B., "Delay Sale", all three considerations ("Until new equipment is available to provide increased environmental protection; pending completion of studies... and Pending completion of coastal zone and growth plans onshore) are valid, and are sufficiently important as to justify a delay in the sale until all three are satisfactory to the State of Alaska and to the Council on Environmental Quality.

We believe that the alternative of energy conservation could be adequate to cover any shortfall in energy supply until the three conservations mentioned in the previous paragraph have been satisfied. We realize that although this alternative must be included in the Draft E.I.S., the authority to mandate it is not the B.L.M.'s, but rather is that of the Congress and the Federal Energy Administration. We do wish to point out that a number of authoritative studies have recently pointed out the practicality and necessity of this alternative. For instance, the Council on Environmental Quality's proposal, "A NATIONAL SHORT CONSERVATION PROGRAM: THE HALF AND HALF PLAN", and the Ford Foundation's ENERGY POLICY STUDY both describe practical alternatives which should be given serious consideration.

The public hearings held here recently saw the oil industry and its supporters assure the B.L.M. that they have the capability to explore for and produce oil and gas in the Northern Gulf of Alaska with minimal risk to the environment. This is standard procedure; has anyone ever heard them admit that they might not be able to do so? We believe, however, that these people really can't be considered an unbiased, objective source of information, and we hope that you will take this into consideration when evaluating their testimony. We believe that the Council on Environmental Quality, which held hearings around the country, including Alaska, on "Project Independence", is a much more reliable and accurate source of information upon which to base a decision on outer continental shelf oil and gas leasing schedules. As you are no doubt aware, the C.E.Q., in April of last year, released its report on O.C.S. oil and gas leasing, and stated that such leasing in the waters off Alaska should be held last, after other areas have been leased. We certainly agree with the C.E.Q.'s recommendations, and urge that you give them the weight which they deserve.

We hope that this comment on the Draft E.I.S. is useful to your agency in drawing up its final Impact Statement. We appreciate the opportunity to submit our views, and want to thank you for receiving them.

I am, Sincerely,

Gerald R. Brookman
First Vice-Chairman, Alaska Chapter, Sierra Club
(Acting Chairman)

Mobil Oil Corporation

P.O. BOX 5444
DENVER, COLORADO 80217

H.J. FITZGEORGE
REGION VICE PRESIDENT

ALASKA OCS OFFICE
ALASKA
AUG 26 1975

August 22, 1975

Mr. Edward Hoffman
Manager, Alaska Outer
Continental Shelf Office
Bureau of Land Management
P. O. Box 1159
Anchorage, Alaska 99501

Re: DRAFT ENVIRONMENTAL IMPACT STATEMENT
PROPOSED LEASE SALE (OCS No. 39)
OUTER CONTINENTAL SHELF SALE
OFFSHORE NORTHERN GULF OF ALASKA

Dear Mr. Hoffman:

Attached for inclusion in the record is Mobil Oil Corporation's written statement commenting on the draft Environmental Impact Statement which was the subject of the hearing beginning on August 12, 1975. We would appreciate it if you would include this written statement as part of the record of such hearing.

Very truly yours,

H. J. Fitzgeorge

MOBIL OIL CORPORATION STATEMENT

SUBMITTED TO THE
U.S. DEPARTMENT OF THE INTERIOR

REGARDING THE
DRAFT ENVIRONMENTAL IMPACT STATEMENT
PROPOSED 1975 OCS OIL AND GAS LEASE SALE

NORTHERN GULF OF ALASKA
OCS SALE NO. 39

Mobil Oil Corporation has reviewed the Draft Environmental Statement relative to the proposal to offer acreage for oil and gas leasing on the Outer Continental Shelf in the Gulf of Alaska. It is a comprehensive study which provides a good basis for evaluation of the many issues which arise in connection with the proposed leasing.

Mobil would like to file some brief remarks focusing on that section of the Draft Environmental Statement which, in our view, is central to a decision as to whether the proposal should be implemented; namely, alternatives to this proposed action.

Fundamental to the evaluation of any alternative is an understanding of U.S. oil and gas consumption today and for the decade ahead.

Various supply and demand forecasts have been made in recent months. Mobil's forecast is this:

1. Even with vigorous conservation efforts, total U.S. energy consumption will grow with time as our population increases, as we continue to develop industrially, and as we strive to increase the standard of living for all Americans.

2. Oil and gas today supply more than three-fourths of our energy needs. Even with increasing use of alternative energy sources, Mobil projects that by 1985 oil and gas will still be providing about two-thirds of the energy consumed in this country, with the actual volume of "conventional" oil and gas required in 1985 exceeding current consumption by about 15%.

3. Along with this increased oil and gas consumption in 1985, there will be a substantial decrease in production from presently proved domestic oil and gas reserves. The 1974 production level of nearly 11 million barrels of oil and 60 billion cubic feet of gas per day from these reserves is projected to decline to about 5 million barrels of oil and 20 billion cubic feet of gas per day in 1985.

4. Converting gas to barrels of oil on the basis of energy content, this means that by 1985 the U.S. will be using about 32 million equivalent barrels [1] of "conventional" oil and gas per day, but we estimate the country will only be producing around 9 million equivalent barrels per day from presently proved reserves.

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[1] Barrels of oil plus gas converted to barrels of oil on the basis of energy content. (5600 cubic feet of gas = 1 Bbl. of oil)

The projected gap of 23 million equivalent barrels per day by 1985 can only be filled by increased imports and increased domestic production. It is clearly in the best interests of this nation to strive toward increasing domestic production. Because of the exploration maturity of most onshore geologic provinces, Mobil Oil Corporation believes that the vast and little explored Outer Continental Shelf offers the largest potential for significant new oil and gas discoveries.

It is against this background that alternatives to the proposed sale must be assessed.

The first alternative is to simply withdraw the proposed sale as well as others in frontier OCS areas. This action can only increase imports.

Mobil is in favor of conservation to cut out waste, but as stated earlier, and as the Draft Environmental Statement points out, conservation will not halt the growth of our use of energy.

Secondly, even when synthetic and alternate energy sources are fully considered, the fact remains that by 1985 the U.S. will still require about 15% more conventional oil and gas than is used today. It should also be fully realized that each alternate energy source has its own peculiar set of environmental impacts. Finally, vastly increased oil imports will not only decrease the security of our future supply, but will further aggravate our balance of payments problem with a resulting unfavorable impact on the nation's economy.

Withdrawing this sale, or other frontier OCS sales, does not constitute a viable alternative if we are to work toward increasing the domestic oil and gas production the United States so vitally needs.

The second alternative to the proposed OCS sale would be to delay it pending development of new environmental protection technology, further impact studies, new OCS operating orders, and completion of onshore land use plans. In Mobil's view, delay for these reasons is not appropriate.

The industry's technology for environmental protection has been continuously improving and operating regulations and procedures have become more stringent. Significantly, there is no evidence that any past spill has had a permanent adverse effect on the environment. Further, industry has participated in development of advanced spill clean-up technology, and has established cooperative clean-up organizations in the areas where it now operates.

Delay of the proposed sale in order to make additional environmental impact studies might be justifiable if knowledge of the Gulf of Alaska borderland environment were meager. Knowledge is in fact substantial and additional study would probably not change the fundamental understanding of this environment or the impact of oil and gas operations on it.

Delay for the purpose of developing a new set of OCS operating orders would ignore the comprehensive and tested OCS orders which already exist. Furthermore, the Secretary of the Interior now has the authority to revise these orders at any time so far as they pertain to prevention of waste, conservation of natural resources, or protection of correlative rights.

Finally, we believe a delay in the proposed sale to allow completion of onshore land use plans is not necessary. Mobil endorses the concept of coordinated planning of production facilities, pipelines, and onshore facilities as new offshore producing areas are discovered and developed. Industry, working with federal and state government agencies, has the ability to do this planning in the time span that normally exists between initial discovery and development.

Significant drilling must take place before reserves and producing rates can be estimated so that production and transportation facilities can be properly designed. Mobil believes the time requirements inherent in progressing from exploration to field development afford adequate opportunity for full analysis and approval of final field development plans and transportation systems.

These timing considerations are especially important as they relate to the impact of future OCS production on our energy supply. The urgency for an early beginning is evident when we consider the time involved from initiation of an offshore lease sale to actual production of oil and gas from a given lease. Variations in rig availability, water depth, wind and wave conditions, platform fabrication capacity, and remoteness of an area all bear on lead time. We estimate for new leases this lead time typically will be in the range of from four to seven or more years. Development of new offshore areas must begin at the earliest possible time if production from these areas is to make a significant contribution to our supplies in the next decade.

Another alternative to the proposed sale which we feel deserves comment is exploration of the OCS by government drilling prior to a sale. Mobil is opposed to this idea. We believe that the competitive forces present within the oil and gas industry have served and will continue to serve the public interest by inducing multiple conceptual approaches to exploration, divergent assessments of potential and risk, development of new technology, and high lease bonus prices which result in an economic necessity for expeditious development of new production. Certainly, the environmental impact of government exploration should not be less than that of industry exploration.

In summary, Mobil believes the United States must proceed with leasing in frontier OCS areas now if we are to strive toward establishing the secure future energy supply this country must have. Also, Mobil is confident that this can be done with full regard for establishing a proper balance between environmental protection and development of a much needed resource.

REPRESENTATIVE
M. F. "MIKE" BEIRNE
P. O. BOX 4-1539
ANCHORAGE, ALASKA 99509
PHONE (907) 272-1445
POUCH V STATE CAPITOL
JUNEAU, ALASKA 99801
PHONE BARANOF HOTEL
(907) 586-2660

# Alaska State Legislature

## House of Representatives

COMMITTEES
STATE AFFAIRS
LABOR AND MANAGEMENT

July 25,1975

The Bureau of Land Management
Alaska Outer Continental Shelf Office
800 "A" Street
Anchorage, Alaska 99501

Gentlemen:

I strongly support the exploration and development of our outer continental shelf areas. I expect to be present at, and to give testimony at the August 12- 13 hearings to be held in Anchorage.

There is no question that America must have immediate exploration and development of the outer continental shelf. Proper environmental safeguards are proper and necessary. These safeguards however should be reasonable in every respect so that we do not add to the cost of living. Certainly we consumers ultimately must pay any and all bills, and all costs related to these safeguards, as well as for the exploration, developing and marketing of our petroleum resources.

Sincerely yours,

M. F. Beirne

M.F. "Mike" Beirne
Alaska State House of
Representatives

mfb:bp

cc: Senator Ted Stevens
Senator Mike Gravel
Congressman Don Young

27

Interior

TBO

Dear President Ford,

I feel the Dept. of Interior has gone too far when it proposes to lease millions of acres of Alaskan sea to the oil companies. Who gave the Dept. or the oil companies the right to murder extraordinary numbers of marine organisms that wil ~~un~~ no doubt perish in unavoidable oil spills--unavoidable because of the conditions present in the Gulf of Alaska. How can the oil companies say that they can operate in a sea area that has ninety foot waves, 100 mile per hour winds, and earthquakes measuring 6.8 on the Richter scale?

It is evident from the facts that the Dept. of Interior and the oil companies realize that spills--massive spills,will occur, but they dont care as long as it brings in oil and money. You must be aware that that ~~s~~ is a very shallow view. Their value system is faulty if they think oil is more valuable than the environment We can learn to live with less oil,we must, but we can not survive without the ocean; it is the central key to life on Earth.

In view of the above, I urge you to halt the Dept. of Interior's plan to lease Alaskan seas to the oil companies before it is too late.

Sincerely,
Jennifer Malvin

Jennifer Malvin

Please write to
612 N. ARDEN DR.
BEVERLY HILLS, CALIF
90210

ALASKA OCS OFFICE
P. O. BOX 1159
ANCHORAGE, ALASKA 99510

BLM HEARING

ON

PROPOSED LEASING

NORTHERN GULF OF ALASKA

WRITTEN PRESENTATION

OF

GULF OF ALASKA OPERATORS COMMITTEE

T A B L E  O F  C O N T E N T S

VOLUME I

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2. GOAOC Comments on Draft EIS
3. Statements Delivered at August 12-13 Hearing
   - A. William M. Meyers
   - B. Dr. Howard A. Slack
   - C. John H. Silcox
   - D. Sherman H. Clark
   - E. Paul L. Horrer
   - F. John H. McKeever
   - G. H. J. Fitgeorge
   - H. Dr. John H. Wiggins
   - I. Leland E. Wilson
   - J. Dr. Kenneth A. Blenkarn
   - K. A. D. Mookhoek
   - L. Guenter M. Conradus
   - M. Joe W. Tyson
   - N. William F. Gusey
   - O. Dr. Clayton D. McAuliffe
   - P. Dr. Dale Straughan
   - Q. Edward W. Mertens

R. Dr. Albert H. Lasday

S. Jesse P. Johnson

VOLUME II

1. Silcox Exhibit I - Oil Industry Comments on the CEQ Report
2. Clark Exhibit I - Report: "The Need For Oil and Gas Resources from the Gulf of Alaska"
3. McKeever Exhibit I - Maps and Drawings
4. Blenkarn Exhibit I - Report: "Development and Production, Gulf of Alaska"
5. Mookhoek Exhibit I - Report: "Marine Transportation and Tanker Terminals - Gulf of Alaska"
6. Conradus Exhibit I - Report: "The Economic and Social Impact of Oil Related Activities in the Northern Gulf of Alaska," prepared by Mathematical Sciences, Northwest, Inc.

VOLUME III

1. Tyson Exhibit I - Pamphlet: "The GURC Offshore Ecology Investigation"

2. Gusey Exhibit I - Report: "Fish, Wildlife and Petroleum Production - The Gulf of Alaska"
3. Gusey Exhibit I, Appendix 1: "Birds of the Gulf of Alaska and Coastal Zone; and National Wildlife Refuges"
4. Gusey Exhibit I, Appendix 2: "Terrestrial Wildlife of the Gulf of Alaska Coastal Zone"
5. Gusey Exhibit I, Appendix 3: "Marine Mammals of the Northern Gulf of Alaska"
6. Gusey Exhibit I, Appendix 4: "Threatened Species - Gulf of Alaska"

VOLUME IV

1. Gusey Exhibit I, Appendix 5: "Fishery Resources of the Gulf of Alaska"

VOLUME V

1. Gusey Exhibit I, Appendix 6: "Fish, Wildlife and Petroleum Production: The Gulf of Mexico, Santa Barbara Channel, California, and Cook Inlet, Alaska

2. Gusey Exhibit I, Appendix 7: "United States and Regional Fishery Statistics, 1939-1974"
3. Gusey Exhibit I, Appendix 8: "Exploratory Fishing Drags for Demersal Fish and Shellfish, the Gulf of Alaska"
4. McAuliffe Exhibit I - Report: "Chevron Main Pass Block 41 Oil Spill: Chemical and Biological Investigations"
5. Johnson Exhibit I: Inventory of Oil Spill Cleanup Equipment of Several Cleanup Cooperatives
6. Johnson Exhibit II: Draft Agreement for Alaskan Gulf Cleanup Cooperative
7. Johnson Exhibit III: Brochure, Oil Spill Control School, Texas A & M University

DEPARTMENT OF THE INTERIOR

HEARING ON PROPOSED LEASING

IN THE

NORTHERN GULF OF ALASKA

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ANCHORAGE, ALASKA

AUGUST 12 - 13, 1975

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WRITTEN PRESENTATION

on behalf of the

GULF OF ALASKA OPERATORS COMMITTEE

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SUBMITTED BY:

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New Orleans, Louisiana 70112

Attorneys for the Gulf of Alaska
Operators Committee

# WRITTEN PRESENTATION

# OF THE

# GULF OF ALASKA OPERATORS COMMITTEE

## INTRODUCTION

As was noted in the testimony of Dr. Howard A. Slack, the Gulf of Alaska Operators Committee (hereinafter sometimes referred to as the GOAOC), is comprised of twenty-eight companies interested in mineral development in the Gulf of Alaska. This committee was organized in November, 1971 to develop an assessment of the impact of oil exploration and development on the environment of the Gulf of Alaska, and to prepare and coordinate the presentation of testimony at the BLM public hearing on proposed leasing in the Gulf of Alaska.

Appreciation is expressed to the Administrative Judge and Panel for the advance permission granted for a special presentation by the GOAOC. It was felt that the presentation in this form not only effected a savings of time by elimination of individual presentations from a great majority of the member companies of the GOAOC, but that it also permitted consideration of important technical issues in an orderly fashion.

PRESENTATION OF THE GULF OF ALASKA
OPERATORS COMMITTEE

Submitted herewith are the following:

(1) The opening statement of William M. Meyers, attorney for the GOAOC.

(2) The written statement of Dr. Howard A. Slack, Chairman of the GOAOC.

(3) The written statement of John H. Silcox, with exhibit.

(4) The written statement of Paul L. Horrer.

(5) The written statement of John H. McKeever, with exhibit.

(6) The written statement of H. J. Fitzgeorge.

(7) The written statement of Dr. J. H. Wiggins.

(8) The written statement of L. E. Wilson.

(9) The written statement of Dr. Kenneth A. Blenkarn, with exhibit.

(10) The written statement of A. D. Mookhoek.

(11) The written statement of Guenter M. Conradus, with exhibit.

(12) The written statement of Joe W. Tyson, with exhibit.

(13) The written statement of William F. Gusey, with exhibits.

(14) The written statement of Dr. Clayton D. McAuliffe, with exhibit.

(15) The written statement of Dr. Dale Straughan.

(16) The written statement of E. W. Mertens.

(17) The written statement of Dr. Albert H. Lasday.

(18) The written statement of Jesse P. Johnson, with exhibits.

## SUMMARY OF GOAOC PRESENTATION

In the hope that it may be of assistance in the preparation of the Final Environmental Statement, the following summary is given of the GOAOC presentation. In addition to this summary, the GOAOC has included in this presentation detailed written comments on the Draft EIS.

## INTRODUCTORY PANEL

Dr. Howard A. Slack
Vice President, Atlantic Richfield Company
and Chairman, Gulf of Alaska Operators Committee

### Role of the GOAOC: Environmental Studies Conducted by GOAOC

Dr. Slack is Vice President and Resident Manager of Atlantic Richfield Company in Alaska, and is currently serving as the Chairman of the GOAOC.

After reviewing the member companies and the various working sub-committees of the GOAOC, Dr. Slack summarized the studies and activities undertaken by the GOAOC and by certain member companies. Following this

summary, Dr. Slack observed that never has industry entered a new area so well informed, well equipped and well trained as it is now for the proposed exploration and development of the Gulf of Alaska.

John H. Silcox
Vice President and General Manager
Exploration Department, Western Operations, Inc.
Standard Oil Company of California

Commentary on the Report Prepared by the Council on Environmental Quality entitled "OCS Oil and Gas - An Environmental Assessment."

Mr. Silcox is Vice President and General Manager, Exploration, Standard Oil Company of California, Western Operations, Inc. His testimony focused on the report entitled "OCS Oil and Gas - Environmental Assessment" prepared by the President's Council on Environmental Quality. Mr. Silcox noted that this report has become to some the final authority on environmental issues associated with oil and gas operations in the Gulf of Alaska, and is erroneously regarded as a scientifically complete and objective appraisal. The major shortcomings in the CEQ Report identified by Mr. Silcox are summarized below:

(a) The Report gives little notice to the sweeping technical advances which the oil industry has achieved in offshore drilling during the past 25 years.

(b) The Report gives superficial treatment to complex technical subjects.

(c) The spill trajectory probability forecast set forth in the Report makes no allowance for the effects of evaporation, biodegradation, emulsification and dispersion of spilled oil.

(d) The Report overstates the effects which oil operations in the Gulf of Alaska will have onshore, both in Alaska and in the lower 48 states.

(e) The Report fails adequately to recognize that hydrocarbon emissions from refinery operations are strictly controlled by regulations.

(f) The Report contains a superficial discussion of natural phenomena and the technology which has been developed to minimize problems caused by natural phenomena.

(g) The Report leaves the reader with a false impression of the overall severity and potential for damage resulting from the tsunami.

(h) The Report gives insufficient recognition to the oil industry's experience in offshore drilling in the Gulf of Mexico.

Detailed comments on the CEQ Report are found in the volume entitled "Oil Industry Comments on the CEQ Report," which is attached hereto as Silcox Exhibit I.

PANEL A

Sherman H. Clark, Economist
President, Sherman H. Clark Associates

Need for Oil and Gas Resources of the Gulf of Alaska; Alternatives to Leasing in the Gulf of Alaska

Sherman H. Clark is the President of Sherman H. Clark Associates, a firm specializing in energy and resources economics.

Mr. Clark's oral testimony covered three basic points:

(1) Is there a basic need for the oil and gas resources of the Gulf of Alaska?

(2) What are the hazards of delaying development of this region?

(3) Is it desirable to forestall development until a national energy policy is prepared?

In his analysis of the need for the resources, he observed that domestic oil and gas production have both been declining for several years and that a downward trend is a near certainty to 1980. He stated that the conclusion is inescapable that federal OCS production will only offset or help to offset the production decline in old fields. Short of accelerating the exploration effort in all frontier areas, such as the Gulf of Alaska, there is no way that U. S. oil and gas production will exceed present levels. He also concluded that energy requirements would not be met by other energy sources, and that the nation will have to continue to rely on oil imports of increasing magnitude.

Such reliance, he notes, is not sound policy because of the lack of security of this supply, an already uncertain outlook as to the availability of the quantities required without full U. S. development, and the potential economic distortion if the reliance is too extreme.

On the topic of delaying OCS development in these areas, Mr. Clark observed that there is substantial net economic benefit to the development of OCS production. Any delay - even for a few years - cannot be made up later and will reduce those benefits in constant present dollars, as well as incurring a greater risk of inadequate energy supplies over a longer period of time.

Finally, Mr. Clark focused on the question of delaying development until a national energy policy has been adopted. He noted that however desirable such a policy may be, it can not alter the basic facts of energy supply and demand. He further noted that a complete national energy policy may never be developed, but that in any event it could not create onshore oil and gas resources that do not exist, bring on new resources held

back by legal or environmental hurdles, or make new technology and capital instantly available. He concluded that delaying development until a national energy policy is available will help to defeat the potential of any such policy because a domestic energy supply is needed now.

His comprehensive 66 page report covering these topics in greater detail is attached as Clark Exhibit 1.

## PANEL B

## PHYSICAL OCEANOGRAPHY AND OCEAN GEOLOGY

Paul Horrer
President, Intersea Research Corporation

### Climate, Winds, Waves, Tides, Storms, Tsunamis

Mr. Horrer is the President of Intersea Research Corporation, La Jolla, California. He has more than 19 years experience as a consultant oceanographer and has been involved in a number of oceanographic projects in the Gulf of Alaska.

Mr. Horrer's testimony concentrated on the physical marine environment of the Gulf of Alaska, particularly as this environment affects offshore petroleum operations.

He reviewed the oceanographic studies conducted by various groups, then presented salient results of those studies. Included was information concerning monthly variation of wind speeds, wind distributions, and recurrence intervals of winds. Seasonal variation of wave heights, recurrence interval of significant wave heights and maximum wave heights were also set forth in his testimony. He noted that while the Gulf of Alaska has earned a reputation as being a stormy area, it is not markedly different from other areas in which the offshore petroleum industry has successfully conducted operations. The indicated extreme winds of the Gulf of Alaska are substantially less than those associated with Gulf of Mexico tropical hurricanes and the persistence of storm winds in the Gulf of Alaska does not appear to suggest more severe conditions than are encountered in the Norwegian North Sea. In both of these areas the petroleum industry now operates successfully.

Turning to the important question of tsunamis, Mr. Horrer stated that in the CEQ Report the potential damage to underwater oil storage systems on the open coast due to tsunamis was assessed improperly. He then compared the tsunami to a storm wave, noting that drag and inertial

forces on a hypothetical storage vessel due to a tsunami will be much smaller than those due to the maximum storm wave for which the industry is confident it can safely design.

He concluded by expressing his belief that sufficient knowledge is already available concerning the physical oceanography of the Gulf of Alaska to permit operations to be conducted there with safety to the environment and to personnel.

John H. McKeever
Staff Geologist, Amoco Production Company

Seafloor sediments; seafloor characteristics, industry surveys of bottom conditions

John H. McKeever is a Staff Geologist and Exploration Representative in Alaska for Amoco Production Company. He has been employed in that capacity, resident in Alaska, for 9 years.

In his opening remarks, Mr. McKeever emphasized that the Gulf of Alaska seafloor is not free from problem

areas. He did, however, state his firm belief that industry has the information and the knowledge to identify these areas and that the industry's operations can be safely conducted.

Mr. McKeever described two methods of obtaining information concerning the seafloor, these being seafloor sampling and high resolution acoustic seismic surveys. Detailed descriptions of these methods are found in his presentation, along with examples of the data gained by these surveys.

Commencing on page 7 of his presentation, he described the Gulf of Alaska Continental Shelf, noting that offshore formations are less structurally disturbed than they are onshore, and that they were planed off by marine and glacial erosion during rather late geologic time. He notes that the Gulf of Alaska has undergone a long history of earth movements that have folded and tilted the underlying bed rock. However, there has not been any extensive folding or faulting offshore since the late Pleistocene era. This can be demonstrated because no deformation or only occasional incidents of

deformation of the glacial recent overburden layer can be seen. Since this recent overburden layer blankets most of the Shelf, its stability as a foundation layer is especially important.

H. J. Fitzgeorge
Vice President, Mobil Oil Corporation

Geology; oil and gas potential

H. J. Fitzgeorge, Vice President of the Western Exploration and Producing Region, North American Division, Mobil Oil Corporation, described the geology and the oil and gas potential of the Gulf of Alaska.

He noted that the prospective sedimentary rocks of the Gulf of Alaska are sands and shales of Tertiary and Pleistocene age, and are both marine and non-marine in depositional origin. Numerous structural features have been identified both onshore and offshore. Within the designated sale area there are large anticlinal structures mapped by the seismograph. Structures of the magnitude outlined can contain significant reserves.

Analysis of crude oils from the Katalla Oil Field and the various seeps indicate that the Gulf of Alaska has the potential for high quality, low sulphur crudes. Mr. Fitzgeorge stated that his company's most recent estimates in the Gulf of Alaska of the potential recoverable oil and gas are of similar magnitude as the USGS estimate set forth in the Draft EIS. He concluded by stating that in the Department of the Interior's survey of the oil industry the Gulf of Alaska ranked No. 1 in OCS priority for its probability of large potential.

Dr. John W. Wiggins
J. H. Wiggins Company

Seismicity; consideration of seismic hazards in the design of facilities.

Dr. Wiggins holds a Doctor of Philosophy degree in Civil Engineering with a specialty in Structural Dynamics. He is one of four persons selected to develop seismic risk maps for the United States National Bureau of Standards earthquake code study. His testimony deals with the probabilistic response of offshore platforms to seismic excitation in the Gulf of Alaska.

Dr. Wiggins noted that earthquake engineering is made up of three disciplines in the scientific community. The first deals with the seismic environment in which principally seismologists work. From the knowledge of the seismic environment, one can estimate ground shaking, structural response and the failure of various structural elements and components. The latter two disciplines are left to the structural engineer and the specialist in engineering mechanics.

In discussing the "proneness" of an area to earthquake activity, he set forth six methods of estimating future seismicity. Thereafter, Dr. Wiggins presented seismic risk maps showing hard rock velocities to be anticipated in the general sale area.

Turning to the structural analysis and response procedure, he explained how actual test site borings have been taken in the Gulf of Alaska and how typical offshore structures have been analyzed and modeled. Concluding, Dr. Wiggins stated that with appropriate consideration of each probabilistic term, enough knowledge and know-how is

available so that structures can be designed for the Gulf of Alaska within an acceptable level of risk.

## PANEL C

## TECHNOLOGY FOR OCS DEVELOPMENT

L. E. Wilson
Petroleum Engineer
Atlantic Richfield Company

### Exploratory Drilling Operations; the North Sea Experience

Mr. Wilson, a registered Petroleum Engineer in the State of Alaska, has worked with the Atlantic Richfield Company since 1950, primarily in drilling and production activities. For the past three years he has been associated with his company's operations in the North Sea.

He observed that the North Sea was quite different from other major operating areas where the offshore oil industry had previously worked. The Gulf of Mexico, although severe at times, did not generate the continual storm environment of the winters in the North Sea. Describing the environmental constraints present in that area,

he noted that as demand increased for year round exploration, as well as for exploration in the far North, more sophisticated equipment was built to cope with the sea conditions. He stated further that the developments which had occurred as a result of North Sea operations will be of significant benefit in the Gulf of Alaska. These developments include; better weather forecasting, utilizing computers and satellites, use of long range helicopters with large load capacities, and creation of specially designed supply ships capable of working in heavy seas. Mr. Wilson concluded by stating that the success of the North Sea operations reflects the ability of the oil industry to explore and develop in a hostile environment similar to that which will be encountered in the Gulf of Alaska.

Dr. Kenneth Blenkarn
Special Research Group Supervisor
Amoco Production Company

Development and production; pipelines; design of structures to withstand wave and seismic forces

Dr. Kenneth Blenkarn is a special research group supervisor for Amoco Production Company. His engineering

PhD degree emphasizes training and research in theoretical and applied mechanics.

Dr. Blenkarn's testimony described the equipment and methods employed in the production of offshore petroleum resources, as well as the special aspects of engineering for application in the Gulf of Alaska. He described the manner in which offshore platforms are constructed onshore, barged to location, and emplaced on the ocean floor. He then noted that after construction of the platform is completed, well drilling is initiated through specially driven structural well conductor pipes. Following a brief description of the environmental safety features to be found on a platform, he stated that generally the preferred and safest way to transport offshore production away from a platform is to transport it through a subsea pipeline to shore facilities. The pipeline construction operation was described.

Turning to specific consideration of the Gulf of Alaska, be observed that there is no question of industry's ability to design platforms to resist the conditions in the Gulf of Alaska. He stated that there may emerge special platform designs for Gulf of Alaska

operations, but that designs will not be dictated because wave conditions are more severe than encountered elsewhere.

On the question of design for earthquakes, Dr. Blenkarn concluded that on balance, there is little doubt but that industry can design offshore platforms with appropriate levels of earthquake resistance. He noted that extensive drilling and producing operations have been conducted in the seismically active area of Southern California. While a few wells there have suffered casing damage by fault movement, such damage has not occasioned release of well fluid to pose a pollution threat.

A. D. Mookhoek
Port Operations Manager
Exxon Company, U.S.A.

Transportation; terminals

Mr. Mookhoek is the Ocean Operations Manager for the Marine Department, Exxon Company, U.S.A. During his 27 years in the company, he has been associated with all aspects of marine transportation, including the technical, economic and operational aspects. He is also the Chairman of the Marine Services Sub-committee of Alyeska.

Mr. Mookhoek first focused on the vessels which might be used to transport Gulf of Alaska oil. He noted that for obvious reasons, no one can determine the size tanker to be used for this purpose, since this is a function of crude production and the location of the terminal. However, to place the issue in perspective, he presented a table indicating, for various ship sizes and different production levels, the number of port calls which would occur. He then observed that the traffic separation system presently under development for all ships travelling between Valdez and the West Coast will also aid ships carrying crude from the Gulf of Alaska.

Turning to the second subject, he noted that a marine terminal or terminals will be necessary to receive crude delivered from the wells, store the oil, and then load it into tankers for delivery to market destinations in the lower 48. He pointed out that a number of potential site locations exist in the Gulf of Alaska, including Yakutat Bay, Ice Bay, Kayak Island, Middleton Island and Montague Island. The advantages and disadvantages of each of these were discussed. Finally, he described the environmental safety features which would be incorporated into any terminal or system.

PANEL D

Guenter Conradus
Mathematical Sciences Northwest, Inc.

Report on study on
Socio-economic Impacts

Mr. Conradus is employed by Mathematical Sciences Northwest, Inc., of Bellevue, Washington, as a Senior Economist. In January of 1975, Math Sciences was requested by the Gulf of Alaska Operators Committee to undertake a study of the economic and social impacts which would be felt in Alaska as a whole and specifically in six coastal communities (Juneau, Yakutat, Cordova, Seward, Whittier and Kodiak) as a result of likely exploration, development and production activities on the OCS of the Gulf of Alaska. Mr. Conradus directed that study.

His testimony presented a very brief summary of the study itself, and further summarization will not be attempted here. Mr. Conradus' testimony is included in the written presentation and his full report, "An Economic and Social Impact Study of Oil Related Activities in the Gulf of Alaska," is attached as Conradus Exhibit I.

PANEL E

ENVIRONMENTAL EFFECTS

Joe Tyson
Senior Scientist
Gulf Universities Research Consortium

Report on Gulf Universities Research Consortium Offshore Ecology Investigation

Mr. Tyson is a Senior Scientist for the Gulf Universities Research Consortium (GURC), Houston, Texas. He reported on the results of the GURC Offshore Ecology Investigation (OEI), a study conducted to answer the question "What is the measurable impact of drilling for oil and later producing it on the estuarine and marine environment of the Louisiana Outer Continental Shelf?" While noting that there are significant differences between the environment of the Gulf of Alaska and that of the Gulf of Mexico, Mr. Tyson stated that the OEI must be given serious consideration whenever offshore leasing is proposed. This, he said, is because the OEI is by all odds the most thorough and comprehensive study of the environmental effects of offshore drilling and production ever undertaken.

The salient results of the study may be summarized as follows:

(1) The results question the universal necessity for conducting a "before the fact" baseline study to subsequently determine the environmental impact of this type of man's activity.

(2) Natural phenomena such as seasonality, floods, upwellings, and turbid layers have much greater impact on the ecosystem than do petroleum drilling and production operations.

(3) Concentrations of all compounds of OEI interest which are in any way related to drilling or production are sufficiently low to present no known persistent biological hazards.

(4) Every indication of good ecological health is present.

(5) The area has not undergone significant ecological change as a result of petroleum drilling and production since 1952.

A pamphlet setting forth and summarizing certain results of the study is attached as Tyson Exhibit I.

William F. Gusey
Shell Oil Company

Effects on Fish and
Wildlife Resources

Mr. Gusey is a Senior Staff Wildlife Specialist in the Environmental Affairs organization of Shell Oil Company, and appeared at the hearing as the Coordinator of the Environment and Biology Standing Committee of the GOAOC. He submitted for the record a detailed statement entitled "Fish, Wildlife and Petroleum Production - the Gulf of Alaska". Also submitted were Appendices 1 - 5, to that document, describing the fish and wildlife resources of the Gulf of Alaska; and Appendices 6 - 8, supplementary fish and wildlife data discussing existing petroleum industry experience and the resources in the Gulf of Mexico, Santa Barbara Channel, and in the Cook Inlet. Mr. Gusey's testimony, including his written presentation, briefly summarized the salient findings of these lenghty documents and further summarization will not be attempted. The documents are attached as Gusey Exhibits I - IV.

PANEL F

OIL AND THE MARINE ENVIRONMENT

Dr. Clayton McAuliffe
Chevron Oil Field Research Company

Movement and degradation of oil spills

Dr. McAuliffe is a Senior Research Associate with Chevron Oil Field Research Company, La Habra, California. For the past five years he has devoted his time almost exclusively to a study of petroleum in the marine environment. His testimony focused on what happened to crude oil during a major oil spill as revealed by studies during and following that spill. He related these events to the Northern Gulf of Alaska to predict what would happen to the oil if a major spill should occur in the Gulf of Alaska.

In reporting on the Main Pass Block 41 spill, Dr. McAuliffe noted that during a three week period in 1970, an estimated 65,000 barrels of crude oil were discharged from a platform 11 miles East of the Mississippi River Delta. As a safety precaution, 2,000 barrels of

chemical dispersants were sprayed on the platform and on the surrounding water surface. It is estimated that between 25-30 per cent of the oil evaporated during the first 24 hours, 10-20 per cent was recovered from the water surface, less than 1% dissolved, and less than 1% of the oil was identified in sediments within a 5 mile radius of the platform. The remaining oil emulsified and dispersed to undetectable levels, biodegraded, or photooxidized.

Spilled oil, identified in bottom sediments by gas chromotography, showed rapid weathering after one week to one month, and at the end of one year was reduced to a few per cent of the amount after the spill. There was no correlation of number of species, number of individuals or other biological parameters with the hydrocarbon content of the sediments for samples from within a 10 mile radius of the platform. This lack of correlation suggests lack of significant effect of oil on benthic organisms. A reprint of a paper summarizing the investigation is attached to Dr. McAuliffe's testimony.

After noting the difficulties inherent in extrapolating the results of a study from one region to another,

effects of oil pollution following the Santa Barbara spill.

Dr. Straughan stated that experience in the Santa Barbara area should provide some insight in the effects of oil spillage in the Gulf of Alaska. While the area is colder than in the Santa Barbara Channel, many of the same species range through and beyond both areas.

In commenting on the results of the Santa Barbara study, she observed that on balance, biological damage was much less than predicted immediately after the spill and, at the conclusion of the study, the area was recovering. In a subsequent ecological survey of rocky shores and sandy beaches in 1974, Dr. Straughan was unable to demonstrate disruption in the distribution and abundance of intertidal species due to the Santa Barbara oil spill. Her conclusions were that any disruptions had been of a temporary nature.

E. W. Mertens
Chevron Research Company

Effects of oil in the marine environment

Mr. Mertens is a chemist for the Chevron Research Company, and currently serves as Chairman of the American Petroleum Institute Committee on the Fate and Effects of Oil in the Marine Environment.

Mr. Mertens reported on the comprehensive research program initiated by the API on the fate and biological effects of oil spills. He noted that perhaps the most serious problem concerning the potential effects of oil on marine life is whether oil, once taken up by a marine organism, would be permanently retained by that organism, and, if so, whether the oil would become concentrated as it moves up the food chain. If this were true, in time the oil would reach some member of the food chain that is used by the human race as a part of its diet. Thus, it might constitute a threat to human health. Mr. Mertens' testimony showed that such concerns have no valid scientific basis, because extensive research shows that oil does not permanently enter the food chain.

Next, Mr. Mertens noted that it is widely believed by the public that whenever an oil spill of any reasonably large magnitude occurs, the aftermath is a major devastation of marine life. Moreover, the public is conditioned to believe that this devastation will persist for an extended period of time.

Citing the results of studies, he stated that for a spill to cause significant environmental damage, three conditions must exist simultaneously. These conditions are:

(1) The oil must be spilled into a confined body of water, such as a small bay.

(2) The oil should be refined oil, such as No. 2 fuel oil.

(3) Storms or heavy surf must cause the spilled oil to be churned into the bottom sediments.

In contrast, offshore platforms are almost without exception located in unconfined areas and in reasonably deep waters. Second, a platform produces crude oil, which is substantially

less toxic than most refined oils. Finally, in deep waters such as those in the proposed sale area, storms and heavy surf rarely, if ever, are able to churn oil into the sediments. Thus, the absence of all three factors minimizes the risk to the marine ecosystem.

Dr. A. H. Lasday
Texaco Inc.

Comments on Draft EIS

Dr. Lasday is a coordinator in Texaco's Environmental Protection Department. His responsibilities include advising on and coordinating the company's world wide activities in prevention and control of water pollution, including oil spills. Dr. Lasday's testimony contains detailed comments on the Draft Environmental Statement and will not be summarized at this point.

Jesse P. Johnson
Atlantic Richfield Company

Oil spill prevention,
containment and cleanup

Mr. Johnson, the Manager of Atlantic Richfield Company's South Alaska District, is responsible for company

operations in South Alaska, including any which may occur in the Gulf of Alaska. His testimony related to procedures for oil spill containment and cleanup in the Gulf of Alaska. He announced that, as a result of the efforts by the GOAOC, twenty-four companies have committed to join the newly formed Gulf of Alaska Clean-Up Cooperative. He stated that company participants in this new co-op met on August 8, 1975 and transacted business, including the appointment of several committees. These committees will plan for the equipment and procedures necessary to clean up oil spills in the Gulf of Alaska. He also reviewed work already accomplished by the GOAOC designed to provide special versions of skimming equipment for use in the Gulf of Alaska. Model testing of a suitable self-propelled skimming vessel has been contracted for by the GOAOC. The Cooperative will take over this program, and is expected to commit for engineering design and drawings, and then for construction of the ocean open skimming vessel. When built, this skimmer would be the largest such vessel in operation in OCS waters.

He closed by stating that all precautions will be taken to prevent oil spills. In the event a spill

does occur, contingency plans and a cooperative will be in effect to respond promptly and thoroughly.

## CONCLUSION

The testimony of the GOAOC at this hearing has demonstrated beyond question that the oil industry has sufficient knowledge to operate in the Gulf of Alaska without causing significant environmental harm. The GOAOC witnesses - each a recognized expert in his or her field - have convincingly refuted arguments that the Gulf of Alaska environment is too hostile for oil and gas development. To the exact contrary, this presentation has shown that never has industry been better prepared or equipped to commence operations in a frontier area than it is for the Gulf of Alaska.

William M. Meyers

J. B. St. John

Attorneys for GOAOC

GOAOC COMMENTS ON DRAFT EIS

Pages 7, 8, 9: Resource Supply and Production Assumptions

The Draft EIS estimates that 635,000 acres in the area proposed for leasing will be productive. Although the estimate of total reserves is thought to be accurate or even conservative, at least one member company of the GOAOC believes this estimate of productive acreage to be too large.

Pages 41-44:

The damage caused by the 1964 Alaska Earthquake is well documented in the Draft EIS. However, the GOAOC suggests that mention be made of the fact that Cook Inlet production and gathering facilities as well as drilling exploratory wells (all onshore) withstood this earthquake with minor damage and with no detrimental effect to the environment. The Beluga River Gas Field, the Kenai Gas Field, and the Swanson River Oil Field were all on production or under development at that time. Such a comment could be included on pages 41-44, or in the section of the EIS dealing with probability of oil spills due to natural phenomena (pages 363 et seq.)

states that magnitude is only one part of the two part problem of deriving intensity. On pages 7 through 10 of his testimony, he points out that, using all of the historic information available and treating each earthquake as a point source, hard rock velocity contours for an arbitrary return period of 100 years have been constructed for the Gulf of Alaska. A map setting forth these contours is attached to his presentation.

In connection with the discussion of probability of spills due to natural phenomena found on pages 361-366 of the EIS, it is suggested that comments of Dr. Kenneth Blenkarn (Testimony page 10) be considered. Here, Dr. Blenkarn notes that extensive drilling and producing operations have been conducted in seismically active areas of Southern California. While a few wells have suffered casing damage by fault movement, such damage has not occasioned release of well fluids to pose a pollution threat.

Page 51:

It should be noted that if onshore facilities, such as tank farms, are built high enough or if they are surrounded by dikes of sufficient height, they will not be damaged. Moreover, in connection with paragraph 3, it should be noted that some major earthquakes which have

ocurred in Southcentral Alaska did not produce a tsunami.

Page 71, First complete paragraph, last sentence:

Some direct current measurements (by current meters) were made in the Gulf of Alaska in 1974. These measurements are described on page 6 of the testimony of Paul L. Horrer.

Pages 341-343, 417-418: Effects of Drilling Muds on Marine Organisms

The testimony of Dr. Albert H. Lasday (pages 8-10) addresses some of the concerns set forth in the EIS, and cites a number of studies concerning the impact of drilling muds on organisms. Dr. Lasday concludes that rapid dilution by sea-water renders components of drilling muds non-toxic almost instantaneously.

Pages 342-5, 424: Effects of Produced Water Discharges

Pages 10-11 of the testimony of Dr. Albert H. Lasday contains some additional references on the question of effects of produced water discharges.

Page 345, First paragraph:

On page 345 of the EIS, the authors note that in the worst case, some 1,400 barrels of oil per year could be intro-

duced with discharged formation water. Additional perspective on this point might be gained by noting that some 40 to 45 million barrels of petroleum are introduced into the marine environment each year through many sources, and that offshore oil exploration and production contributes only slightly more than 1% of the total. ("Petroleum in the Marine Environment" - National Academy of Sciences, Washington, D.C., 1975).

Page 346, Last sentence:

The EIS notes that "an estimated 200 miles of pipeline will be buried, resulting in the resuspension of .6 to 1.6 million cubic yards of sediment." To obtain additional perspective, it might be noted that this amount of sediment is small in comparison to the discharge of sediment by rivers and resuspension of bottom sediments by wave action. An average of 200,000 tons of sediment per day enters the Cook Inlet, and the Mississippi River discharges an average of over 1 million tons of sediment per day. The sediment discharge from streams into the Northern Gulf of Alaska is likewise large.

Pages 356-357:

In its discussion of natural seeps in the Gulf of

Alaska, the BLM should consider the publications of R. D. Wilson, et al., of Esso Research, who have made estimates of seepage into the marine environment. These authors rank the Gulf of Alaska as having high seepage potential and capable of seepage rates as high as 4,500 barrels a day. (Wilson, R. D.; Monaghan, P.H.; Osanik, A.; Price, L.C.; and Rogers, M.A., 1973. "Estimate of Annual Input of Petroleum to the Marine Environment from Natural Seepage." Transactions of 23rd Annual Convention, Gulf Coast Association of Geological Societies.)

Page 392, Last sentence:

The EIS notes that "chronic oil pollution sources near major salmon spawning streams or within salmon migration paths could eliminate certain salmon runs." The authors may wish to note in the Final EIS that salmon continue to migrate through San Francisco Bay and up the Sacramento River despite the fact that 7 oil refineries are located on the Bay and that appreciable quantities of hydrocarbons are discharged into the Bay, principally from municipal sources. This amounts to approximately 30 tons per day. Moreover, petroleum generations exist, and oil spills have occurred in the Cook Inlet. Salmon continue to migrate there.

Pages 395-404: Chronic Exposure of Marine Life to Spilled Oil

While considerable speculation on this topic has appeared both in the technical and the popular literature, many comprehensive studies have been conducted or are in progress which show that such exposure is not harmful. Of particular interest is the work done by Gulf Universities Research Consortium, as well as the Battelle Northwest Laboratories study of Lake Maracaibo in Venezeula. Other literature references on this subject are to be found on pages 4-6 of the testimony of Dr. Albert H. Lasday.

Page 395, Third paragraph:

In preparing the Final EIS, the authors may wish to note that several studies show that organisms do not magnify hydrocarbons through the food web. (See authorities cited in the testimony of Edward W. Mertens, pages 1-6). Moreover, a number of investigators have shown depuration of hydrocarbons by many species of organisms. (See testimony of E. W. Mertens).

Pages 422-431: Effect of Spilled Oil on Phytoplankton

The Draft EIS discussed the effects of oil on

phytoplankton in several places, and principally on pages 422-431. It is argued that both acute and chronic effects of oil would be harmful to the phytoplankton population, that the phytoplankton are the ultimate basis of the marine food chain, and thus that any disruption or harmful effects on them would sequentially and adversely involve higher trophic levels.

In connection with the preparation of the Final EIS, the authors may wish to include some additional and new information regarding the effects of oil on phytoplankton. The conclusion of these studies is that insofar as phytoplankton are concerned, any adverse effects of crude oil is temporary and phytoplankton regenerate quickly after a spill. A listing of the principle studies addressing this question is found on page 3 of the testimony of Dr. Albert H. Lasday.

Pages 491-597: Impact on the Social and Economic Environment

In connection with the preparation of this section of the Final EIS, it is suggested that the BLM review the report "An Economic and Social Impact Study of Oil Related Activities in the Gulf of Alaska" prepared by Mathematical Sciences Northwest, Inc., under the direction of Mr. Guenter Conradus. The salient results of that study and a brief descripton of the methodology is found in the testimony of

Mr. Conradus.

Pages 740-745: Alternative of Delaying Sale Until New Equipment is Available to Provide Increased Environmental protection

It is suggested that the Final EIS take note of the developments announced by Jesse P. Johnson at the recent hearing. Mr. Johnson announced that, as a result of the efforts by the GOAOC, 24 companies have committed to join the newly formed Gulf of Alaska Cleanup Cooperative. He stated that company participants in this new Co-op met on August 8, 1975 and transacted business, including the appointment of several committees. These committees will plan for the equipment and procedures necessary to clean-up oil spills in the Gulf of Alaska. He also reviewed work already accomplished by the GOAOC designed to provide special versions of skimming equipment for use in the Gulf of Alaska. Model testing of a suitable self-propelled skimming vessel has been contracted for by the GOAOC. The cooperative will take over this program and is expected to commit for engineering design and drawings, and ultimately for construction of this vessel.

Pages 740-752:

In connection with the discussion of all alternatives

related to delaying the proposed sale, it is suggested that reference be made to the testimony of Sherman H. Clark. Mr. Clark states:

> "There are substantial net economic benefits to the development of OCS production. Any delay, even for a few years, can not be made up later and will reduce those benefits in constant present dollars as well as incurring greater risk of inadequate energy supplies over a longer period of time. There is a high degree of risk involved and the potential consequences are even lower economic growth and higher unemployment than has been incorporated in (the Clark) study. In evaluating the consequences, rather than isolating the analysis to one source such as the Gulf of Alaska, all challenged new sources should be combined together; the reduced domestic supply of 2 to 7 million barrels per day equivalent in 1985 and 5 to 12 million

barrels equivalent in 1990 entails high risks amounting to $100 - $300 billion (1975 dollars) per year reduced GNP rising to $250 - $600 billion per year by 1990; the related unemployment is in the millions of people at the extreme in excess of 20 million."

DEPARTMENT OF THE INTERIOR - BUREAU OF LAND MANAGEMENT

HEARING ON PROPOSED LEASING
NORTHERN GULF OF ALASKA

AUGUST 12-13, 1975 - ANCHORAGE, ALASKA

STATEMENT OF WILLIAM M. MEYERS

I AM WILLIAM M. MEYERS OF THE LAW FIRM OF LISKOW & LEWIS OF NEW ORLEANS, LOUISIANA. I AM APPEARING HERE TODAY AS ATTORNEY FOR THE GULF OF ALASKA OPERATORS COMMITTEE. AS WILL BE EXPLAINED LATER, THE GULF OF ALASKA OPERATORS COMMITTEE IS COMPRISED OF 28 MEMBER COMPANIES.

THE COMMITTEE HAS REQUESTED AND OBTAINED PERMISSION TO MAKE A MULTI-WITNESS PRESENTATION. THIS WAS DONE FOR TWO REASONS. FIRST, WE BELIEVE THAT A COORDINATED PRESENTATION OF THIS TYPE ON BEHALF OF THE OFFSHORE INDUSTRY WILL BETTER COVER THE PERTINENT ISSUES INVOLVED IN THIS HEARING THAN WOULD A SERIES OF SEPARATE STATEMENTS FROM THE MEMBER COMPANIES WHICH WOULD BE LARGELY REPETITIVE. SECOND, WE BELIEVE THAT CONSIDERABLE TIME WILL BE SAVED IN MAKING THIS INDUSTRY PRESENTATION SINCE A GREAT MAJORITY OF THE MEMBERS OF THE GULF OF

ALASKA OPERATORS COMMITTEE WILL NOW CONTENT THEMSELVES WITH FILING WRITTEN STATEMENTS.

OUR WITNESSES WILL COVER THE MANY IMPORTANT ISSUES RELATING TO THE EXPLORATION AND DEVELOPMENT OF THE PETROLEUM POTENTIAL OF THE GULF OF ALASKA. WE WILL DISCUSS THE NEED FOR THE OIL AND GAS RESOURCES OF THE GULF, THE PHYSICAL OCEANOGRAPHY, THE GEOLOGY, THE TECHNOLOGY, THE SOCIO-ECONOMIC IMPACTS, AND THE ENVIRONMENTAL EFFECTS. CERTAINLY, IN EVALUATING THIS TESTIMONY IT IS NECESSARY TO EXAMINE THE PARTICULAR BACKGROUND AND QUALIFICATIONS OF EACH WITNESS. WE SUBMIT THAT EACH OF OUR WITNESSES IS AN ESTABLISHED EXPERT IN HIS FIELD. EACH IS WELL-EQUIPPED BY EDUCATION, TRAINING AND EXPERIENCE TO ADDRESS THE SUBJECT WHICH HE HAS BEEN ASSIGNED IN A RESPONSIBLE AND OBJECTIVE MANNER.

OUR WITNESSES WILL BE PRESENTED IN SEVERAL PANELS. THE FIRST PANEL CONSISTS OF DR. HOWARD A. SLACK, VICE PRESIDENT, ATLANTIC RICHFIELD COMPANY AND CHAIRMAN OF THE GULF OF ALASKA OPERATORS COMMITTEE, AND MR. JOHN A. SILCOX, VICE PRESIDENT AND GENERAL MANAGER, EXPLORATION

DEPARTMENT, WESTERN OPERATIONS, INC., STANDARD OIL COMPANY OF CALIFORNIA.

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I NOW PRESENT DR. SLACK WHO WILL DISCUSS THE PURPOSES OF THE GULF OF ALASKA OPERATORS COMMITTEE AND THE VARIOUS ENVIRONMENTAL STUDIES WHICH HAVE BEEN CONDUCTED BY THE COMMITTEE AND CERTAIN OF ITS MEMBER COMPANIES.

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OUR NEXT WITNESS, MR JOHN SILCOX, WILL COMMENT ON THE REPORT RENDERED BY THE COUNCIL ON ENVIRONMENTAL QUALITY ENTITLED "OCS OIL AND GAS - AN ENVIRONMENTAL ASSESSMENT".

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MR. SHERMAN H. CLARK IS OUR NEXT WITNESS AND WILL DISCUSS "THE NEED FOR PETROLEUM SUPPLY FROM THE GULF OF ALASKA".

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THE NEXT PANEL WILL DEAL WITH THE PHYSICAL OCEANOGRAPHY AND OCEAN GEOLOGY OF THE GULF OF ALASKA. THE WITNESSES ARE:

1. MR. PAUL HORRER WHOSE SUBJECT IS THE PHYSICAL MARINE ENVIRONMENT OF THE GULF OF ALASKA.

2. MR. JOHN MCKEEVER WHO WILL DISCUSS SEAFLOOR SEDIMENTS AND CHARACTERISTICS, AND INDUSTRY SURVEYS OF BOTTOM CONDITIONS.

3. MR. H. J. FITZGEORGE WHO WILL TESTIFY AS TO THE OIL AND GAS POTENTIAL OF THE AREA UNDER CONSIDERATION.

4. DR. JOHN H. WIGGINS WHO WILL DISCUSS THE "PROBABILISTIC RESPONSE OF OFFSHORE PLATFORMS TO SEISMIC EXCITATIONS IN THE GULF OF ALASKA".

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THIS IS A CONTINUATION OF THE TESTIMONY ON BEHALF OF THE GULF OF ALASKA OPERATORS COMMITTEE.

OUR NEXT PANEL WILL COMMENT ON TECHNOLOGY FOR OCS DEVELOPMENT. THE WITNESSES ARE:

1. MR. L. E. WILSON WHO WILL SPEAK ON EXPLORATORY DRILLING OPERATIONS, WITH EMPHASIS ON THE NORTH SEA EXPERIENCE.

2. DR. KENNETH BLENKARN WHO WILL DISCUSS DEVELOPMENT AND PRODUCTION, PIPELINES, AND DESIGN OF STRUCTURES TO WITHSTAND WAVE AND SEISMIC FORCES.

3. MR. A. D. MOOKHOEK WHOSE SUBJECT IS TRANSPORTATION AND TERMINALS.

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THIS CONCLUDES THE PRESENTATION OF THE GULF OF ALASKA OPERATORS COMMITTEE SCHEDULED FOR TODAY.

WEDNESDAY, AUGUST 12, 1975

THIS IS A CONTINUATION OF THE PRESENTATION OF THE GULF OF ALASKA OPERATORS COMMITTEE.

OUR FIRST WITNESS TODAY WILL BE MR. GUENTER M. CONRADUS WHO WILL REPORT ON THE STUDY MADE ON THE ECONOMIC AND SOCIAL IMPACT OF OIL RELATED ACTIVITIES IN THE GULF OF ALASKA.

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THE NEXT PANEL OF WITNESSES WILL DISCUSS THE ENVIRONMENTAL EFFECTS OF OFFSHORE DEVELOPMENT.

1. MR. JOE TYSON WILL REPORT ON THE GULF UNIVERSITIES RESEARCH CONSORTIUM OFFSHORE ECOLOGY INVESTIGATION.

2. MR. WILLIAM F. GUSEY WILL COMMENT ON THE IMPACT OF THE PROPOSED OFFSHORE LEASING ON FISH AND WILDLIFE.

OUR LAST GROUP OF WITNESSES WILL DISCUSS OIL AND THE MARINE ENVIRONMENT.

1. DR. CLAYTON D. MCAULIFFE WILL DISCUSS THE FATE AND MOVEMENT OF OIL SPILLS.

2. DR. DALE STRAUGHAN WILL COMMENT ON THE ENVIRONMENTAL EFFECTS OF OIL SPILLS, PARTICULARLY RELATED TO THE SANTA BARBARA INCIDENT.

3. MR. E. W. MERTENS WILL REPORT ON THE RESEARCH PROGRAM CONDUCTED BY THE AMERICAN PETROLEUM INSTITUTE'S COMMITTEE ON THE FATE AND EFFECTS OF OIL IN THE MARINE ENVIRONMENT.

4. DR. A. H. LASDAY WILL DISCUSS CERTAIN AREAS OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT RELATING TO THE EFFECTS ON THE ENVIRONMENT OF CRUDE OIL AND OF OIL AND GAS DRILLING AND PRODUCTION RELATED FLUIDS.

5. MR. JESSE P. JOHNSON WILL DISCUSS OIL SPILL CONTINGENCY PLANNING.

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THIS CONCLUDES THE TESTIMONY ON BEHALF OF THE GULF OF ALASKA OPERATORS COMMITTEE.

STATEMENT OF

HOWARD A. SLACK
ATLANTIC RICHFIELD COMPANY

CHAIRMAN, GULF OF ALASKA OPERATORS' COMMITTEE

before the

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HEARING

on

PROPOSED OIL AND GAS LEASING

on the

OUTER CONTINENTAL SHELF

NORTHERN GULF OF ALASKA

ANCHORAGE, ALASKA

AUGUST 12-13, 1975

GULF OF ALASKA OPERATORS COMMITTEE

STATEMENT OF HOWARD A. SLACK, ATLANTIC RICHFIELD COMPANY

OFFSHORE SALE ENVIRONMENTAL HEARING

ANCHORAGE, ALASKA

AUGUST 12-13, 1975

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GOOD MORNING. MY NAME IS HOWARD A. SLACK. BY EDUCATION, I AM A PHD IN ENGINEERING PHYSICS. I AM A MEMBER OF THE SOCIETY OF EXPLORATION GEOPHYSICISTS, THE AMERICAN ASSOCIATION OF PETROLEUM GEOLOGISTS, AND A MEMBER OF THE BOARD OF DIRECTORS OF THE ALASKA STATE CHAMBER OF COMMERCE. I AM VICE PRESIDENT AND RESIDENT MANAGER FOR ATLANTIC RICHFIELD COMPANY IN ALASKA. MY AREA OF RESPONSIBILITY IS ALL MY COMPANY'S EXPLORATION AND PRODUCTION ACTIVITIES IN AND ADJACENT TO THE STATE OF ALASKA, INCLUDING THE OUTER CONTINENTAL SHELF. THE LATTER REPRESENTS APPROXIMATELY 383 MILLION ACRES OR ABOUT 66-2/3 % OF THE TOTAL UNITED STATES CONTINENTAL SHELF.

I AM APPEARING TODAY IN THE CAPACITY OF CHAIRMAN OF THE GULF OF ALASKA OPERATORS COMMITTEE, WHOSE MEMBERSHIP CONSISTS OF 28 COMPANIES. THESE COMPANIES ARE:

AMERICAN INDEPENDENT OIL CO., INC.
AMERICAN PETROFINA OIL COMPANY
AMOCO PRODUCTION COMPANY
ATLANTIC RICHFIELD COMPANY
ASHLAND OIL, INC.
BP ALASKA INC.
CHAMPLIN PETROLEUM COMPANY
CITIES SERVICE OIL COMPANY

CLINTON OIL COMPANY
CONTINENTAL OIL COMPANY
EXXON COMPANY, U.S.A.
GULF OIL COMPANY, U.S.
MARATHON OIL COMPANY
DEPCO, INC.
MOBIL OIL CORPORATION
MURPHY OIL CORPORATION
NATIONAL COOPERATIVE REFINERY
PANCANADIAN PETROLEUM COMPANY
PENNZOIL COMPANY
PHILLIPS PETROLEUM COMPANY
PLACID OIL COMPANY
SHELL OIL COMPANY
SKELLY OIL COMPANY
STANDARD OIL COMPANY OF CALIFORNIA
SUN OIL COMPANY
TENNECO OIL COMPANY
TEXACO, INC.
UNION OIL COMPANY OF CALIFORNIA

THE GULF OF ALASKA OPERATORS COMMITTEE WAS ORGANIZED IN NOVEMBER OF 1971 TO DEVELOP AN ASSESSMENT OF THE IMPACT OF OIL EXPLORATION AND DEVELOPMENT ON THE ENVIRONMENT OF THE GULF OF ALASKA AND TO PREPARE AND COORDINATE THE PRESENTATION OF TESTIMONY AT THE ENVIRONMENTAL HEARING FOR THAT AREA.

THE COMMITTEE ACCOMPLISHES ITS TASK THROUGH A NUMBER OF WORKING SUBCOMMITTEES. THESE SUBCOMMITTEES ARE:

ENERGY DEMAND
ENVIRONMENTAL AND BIOLOGY
GEOLOGY AND GEOPHYSICS
OIL SPILL PREVENTION
DRILLING AND PRODUCTION
MARINE TERMINALS AND TRANSPORTATION
ADMINISTRATION AND COMMUNICATIONS
PUBLIC, BUSINESS AND GOVERNMENT RELATIONS
SPECIAL PROJECTS

AND EACH IS EMPOWERED TO DEAL WITH THOSE PROBLEMS, RESEARCH AND STUDY RELATED TO ITS PARTICULAR INTERESTS. A SMALL EXECUTIVE COMMITTEE MEETS MORE FREQUENTLY THAN THE ENTIRE COMMITTEE TO COORDINATE THE EFFORTS OF THE GROUP. THE OFFICERS, THE EXECUTIVE COMMITTEE, AND THE SUBCOMMITTEE CHAIRMEN COMPRISE THE COORDINATING COMMITTEE.

THE OIL INDUSTRY HAS BEEN INTERESTED IN THE GULF OF ALASKA OCS FOR MANY YEARS, BECAUSE OF THE BELIEF THAT THIS AREA HOLDS PROSPECTS FOR MAJOR DISCOVERIES WHICH CAN SIGNIFICANTLY AID OUR COUNTRY'S GOAL OF REASONABLE ENERGY SELF-SUFFICIENCY. IN ANTICIPATION OF LEASING IN THIS REGION, THE INDUSTRY LONG AGO COMMENCED ONE OF THE MOST EXTENSIVE PROGRAMS OF ENVIRONMENTAL STUDY EVER ATTEMPTED. LET'S TAKE A LOOK AT SOME OF THE MORE SIGNIFICANT ACTIVITIES UNDERTAKEN BY THE GULF OF ALASKA OPERATORS COMMITTEE RELATIVE TO THE GULF OF ALASKA.

1. GROUP OCEANOGRAPHIC SURVEY: THIS SURVEY, UNDERTAKEN IN 1968, WAS ORGANIZED SOME TWO FULL YEARS PRIOR TO PASSAGE OF THE NATIONAL ENVIRONMENTAL POLICY ACT OF 1969. IT WAS DESIGNED TO ESTABLISH THE FULL RANGE OF PHYSICAL ENVIRONMENTAL CONDITIONS SO AS TO ASCERTAIN THEIR EFFECT ON PETROLEUM EXPLORATION, PRODUCTION, AND TRANSPORT. THIS RESPONSIBLE EFFORT RESULTED FROM THE STRONG DESIRE OF THE PARTICIPANTS TO DETERMINE WHETHER OPERATIONS COULD BE SAFELY AND ECONOMICALLY CONDUCTED IN THIS AREA. HISTORICAL DATA OF RECORD WAS COMPILED AND AN IN-OCEAN DATA BUOY WAS ACTIVATED TO GATHER WAVE DATA. THESE DATA HAVE CONVINCED US THAT CONDITIONS IN THE GULF OF ALASKA ARE NO WORSE THAN IN OTHER AREAS OF THE WORLD WHERE PETROLEUM OPERATIONS ARE CURRENTLY BEING SAFELY CONDUCTED. WITH THIS KNOWLEDGE, INDUSTRY HAS PROCEEDED WITH FURTHER ENVIRONMENTAL STUDIES AND WITH EXPLORATION COMMITMENTS PREPARATORY TO A SALE.

TO MY KNOWLEDGE, THE GULF OF ALASKA GROUP OCEANOGRAPHIC SURVEY IS UNIQUE. NOWHERE ELSE IN THE WORLD HAS THE INDUSTRY UNDERTAKEN SUCH AN EXTENSIVE EFFORT PRIOR TO MAJOR EXPLORATION AND PRODUCTION EXPENDITURES. THE DATA OBTAINED BY THE GROUP OCEANOGRAPHIC SURVEY IS PROPRIETARY TO THE PARTICIPANTS. HOWEVER, SINCE THE DATA PROVIDE THE MOST COMPREHENSIVE COMPILATION OF INFORMATION RELATIVE TO THE GULF OF ALASKA, THE PARTICIPANTS HAVE RELEASED TO THE GULF OF ALASKA OPERATORS COMMITTEE AND THEY, IN TURN, TO THE BLM AND THE COUNCIL ON ENVIRONMENTAL QUALITY, A CONDENSATION OF THE SURVEY REPORTS. THIS IS IN THE FORM OF FIVE SEPARATE DOCUMENTS. ADDITIONALLY, THE SURVEY GROUP HAS MADE CERTAIN APPROPRIATE PORTIONS OF THE INFORMATION AVAILABLE TO THE DRILLING CONTRACTING INDUSTRY FOR THEIR USE IN EQUIPMENT DESIGN.

2. REVIEW OF THE OCEANOGRAPHY AND RENEWABLE RESOURCES OF THE NORTHERN GULF OF ALASKA: THIS WORK WAS DONE BY THE INSTITUTE OF MARINE SCIENCES IN 1972, EDITED BY DONALD H. ROSENBERG AND WAS PARTIALLY FUNDED BY THE GULF OF ALASKA OPERATORS COMMITTEE. THIS STUDY WAS AVAILABLE TO THOSE WRITING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT.

3. FISH, WILDLIFE AND PETROLEUM PRODUCTION, THE GULF OF ALASKA: THIS COMPILATION OF EIGHT SEPARATE REPORTS BY THE ENVIRONMENTAL AND BIOLOGY SUBCOMMITTEE OF THE GULF OF ALASKA OPERATORS COMMITTEE COVERS BIRDS, TERRESTRIAL WILDLIFE, MARINE MAMMALS, THREATENED SPECIES AND THE FISHERY RESOURCES OF THE GULF OF ALASKA.

ADDITIONALLY, IT REVIEWS THE EFFECT OF OIL ON FISH AND WILDLIFE WITH SPECIAL CONSIDERATION TO RECENT DATA ON COLD WATER EFFECTS. IT CONCLUDES WITH A STUDY CONDUCTED BY SHELL OIL ON EXPLORATORY FISHING DRAGS FOR DEMERSAL FISH AND SHELLFISH.

4. THE OIL ACTIVITY RELATED SOCIAL AND ECONOMIC IMPACT ON THE GULF OF ALASKA COMMUNITIES: THIS STUDY WAS CONDUCTED BY THE MATHEMATICAL SCIENCES NORTHWEST, INC. IN SEATTLE UNDER THE DIRECTION OF GUENTER CONRADUS AND FINANCED BY THE GULF OF ALASKA OPERATORS. COMMITTEE.

5. OIL SPILL TRAJECTORY PROGRAM: INTERSEA RESEARCH CORPORATION IS PERFORMING CALCULATIONS OF TRAJECTORIES ON THE OCEAN'S SURFACE FROM SEVERAL LOCATIONS WHERE OIL AND GAS OPERATIONS MIGHT BE CONDUCTED. MR. CLAYTON MCAULIFFE OF CHEVRON OIL FIELD RESEARCH COMPANY, USING PREVIOUS RESULTS, HAS MADE ESTIMATES OF BIODEGRADATION, DISPERSION, AND EVAPORATION OF POSSIBLE ACCIDENTAL OIL RELEASES IN THE GULF OF ALASKA. BOTH PROJECTS WERE INTIATED AND SUPPORTED BY THE GULF OF ALASKA OPERATORS COMMITTEE.

6. SEISMIC RISK ANALYSIS: THIS STUDY WAS CONDUCTED BY THE J. H. WIGGINS COMPANY OF CALIFORNIA AND REPRESENTS A PROBABILISTIC ANALYSIS OF THE GULF OF ALASKA SEISMIC ENVIRONMENT. THE LIKLIHOOD OF EARTHQUAKES OF VARYING MAGNITUDES OCCURRING AT ANY SITE HAS BEEN ESTIMATED AND THE RESPONSE AND PERFORMANCE OF OFFSHORE STRUCTURES TO SEISMIC EVENTS EXAMINED. THIS WORK FORMS A BASIS FOR THE DEVELOPMENT OF SEISMIC DESIGN CRITERIA AND THE ASSESSMENT OF THE FEASIBILITY AND RELIABILITY OF OFFSHORE STRUCTURES.

7. OIL SPILL PREVENTION AND CONTINGENCY PLAN: THE GULF OF ALASKA OPERATORS COMMITTEE HAS AN OIL SPILL PREVENTION AND CONTINGENCY PLAN WHICH WILL BE IN EFFECT PRIOR TO THE FIRST EXPLORATORY DRILLING ON THE OUTER CONTINENTAL SHELF OIL IN THE GULF OF ALASKA.

IN ADDITION TO THESE PROGRAMS ALREADY MENTIONED, THERE ARE MANY OTHER STUDIES THAT HAVE BEEN ORGANIZED AND SUPPORTED BY SEVERAL OF THE COMMITTEE'S MEMBER COMPANIES. SOME OF THIS WORK IS ONGOING NOW AND SOME IS IN THE PLANNING STAGES. THESE PROGRAMS INCLUDE:

(1) A WAVE AND WEATHER FORECAST STUDY (1971-1972)
MANAGED BY EXXON AND CONDUCTED BY OCEANOGRAPHIC SERVICES.

(2) AN OFFSHORE SOIL BORING PROGRAM (1973)
MANAGED BY SHELL AND CONDUCTED BY EXPLORATION SERVICES, INC.

(3) A WAVE AND WIND MEASUREMENT PROGRAM (1974-1976)
BEING ADMINISTERED BY MARATHON AND CONDUCTED BY INTERSEA RESEARCH.

(4) A WAVE HINDCAST EVALUATION PROGRAM (1975-1976)
THAT IS USING THE MANY PHYSICAL MEASUREMENTS COLLECTED FROM THE WAVE AND WIND MEASUREMENT PROGRAM TO IMPROVE WAVE FORECASTING TECHNIQUES. THIS PROGRAM ALSO IS BEING ADMINISTERED BY MARATHON AND CONDUCTED BY INTERSEA RESEARCH.

(5) A SUPERSTRUCTURE ICING REVIEW (1975)
ADMINISTERED BY MARATHON.

(6) AN OCEAN CURRENT MEASUREMENT PROGRAM (1974-1975) CONDUCTED BY BOLT, BERANEK AND NEWMAN.

(7) A METEOROLOGICAL AND OCEANOGRAPHIC FORECASTING PROGRAM (1975-1976) THAT WILL BE ADMINISTERED BY MARATHON AND WILL USE MUCH OF THE PHYSICAL MEASUREMENT DATA COLLECTED IN THE GULF OF ALASKA.

MOST OF THIS DATA HAS BEEN MADE AVAILABLE TO THE BUREAU OF LAND MANAGEMENT FOR ITS USE IN PREPARING THE DRAFT ENVIRONMENTAL IMPACT STATEMENT. OTHER STATE AND FEDERAL AGENCIES HAVE RECEIVED THIS INFORMATION UPON REQUEST. AS MR. MEYERS HAS INDICATED, SUBSEQUENT TESTIMONY BY REPRESENTATIVES OF THE GULF OF ALASKA OPERATORS COMMITTEE WILL CONTAIN FURTHER DETAILS OF SOME OF THESE PROGRAMS.

FROM THE ACTIVITIES WHICH I HAVE DESCRIBED, WE MUST CONCLUDE THAT THE INDUSTRY HAS THOROUGHLY STUDIED THE GULF OF ALASKA ECOSYSTEM. NOTHING HAS BEEN FOUND THROUGH THESE STUDIES WHICH PRECLUDES THE OIL INDUSTRY FROM OPERATING IN THIS AREA WITH COMPLETE ENVIRONMENTAL SAFETY.

THE GULF OF ALASKA OPERATORS COMMITTEE SUBMITS TO YOU THAT NEVER HAS OUR INDUSTRY ENTERED A NEW AREA SO WELL INFORMED, WELL EQUIPPED AND WELL TRAINED AS WE ARE NOW FOR THE PROPOSED EXPLORATION AND DEVELOPMENT OF THE GULF OF ALASKA. WE ARE PREPARED TO GO FORWARD, AND WE HAVE HIGH HOPES THAT OUR EFFORTS WILL RESULT IN SIGNIFICANT DISCOVERIES OF PETROLEUM WHICH ARE SO BADLY NEEDED FOR THE ECONOMIC WELL-BEING AND SECURITY OF OUR COUNTRY.

8/8/75

Testimony of John H. Silcox

Vice President and General Manager - Exploration
Standard Oil Company of California,
Western Operations, Inc.

On Behalf of Gulf of Alaska Operators Committee

At the Department of Interior, Bureau of
Land Management Hearings
On the Draft Environmental Impact Statement
For Outer Continental Shelf Leasing
In the Northern Gulf of Alaska

Anchorage, Alaska - August 12, 1975

My name is John H. Silcox. I am a geologist and Vice President and General Manager of Exploration for Standard Oil Company of California, Western Operations, Incorporated.

My company has been an active oil operator in Alaska since the late 1950's and during my career, I have been pleased to live and work in Anchorage for several years. As a result, and because of my present responsibilities, I am thoroughly familiar with the history and ongoing development of petroleum exploration in Alaska and its offshore waters.

My testimony today is on behalf of the Gulf of Alaska Operators Committee, a 28-member group of oil and gas companies engaged in exploration and environmental studies of the Gulf of Alaska.

Later in this hearing, others will offer statements on virtually every aspect of exploration, development and environmental assessment of offshore areas. They will outline the extensive efforts the oil industry is taking to minimize or eliminate entirely <u>any</u> potentially adverse environmental impact as a result of offshore operations.

My own comments will be limited to a document entitled "OCS Oil and Gas---An Environmental Assessment." This is a report to the President by the Council on Environmental Quality dated April 18, 1974. At this time, I would like to enter into the hearing record a volume entitled "Oil Industry Comments on the CEQ Report."

This volume contains detailed references to various parts of the CEQ Report, far more extensive than I can possibly cover in my brief comments. I urge your careful consideration of these observations.

First, let me say the oil industry recognizes that the CEQ---because of its presidential mandate---had only a short time to prepare its report on what is an exceedingly complex and controversial subject. We also recognize that the Council did not have the benefit of a technical staff with the scientific expertise to produce a definitive study.

Despite this, the CEQ Report has become to some the final "authority" on environmental issues associated with oil and gas operations in the Gulf of Alaska. It is erroneously regarded as a scientifically complete and objective appraisal. And it is often cited as a reference,

especially by those seeking to delay leasing of the Outer Continental Shelf for oil and gas exploration. Unfortunately, it is neither complete nor objective.

Because of this, we believe it is imperative to offer this critique on the CEQ Report and some of its findings. And we appreciate this opportunity to present our views at this hearing.

Our comments are necessarily critical of the report, its lack of scope in certain instances and the false impressions it can convey to the uninformed reader who is not familiar with technical subjects. But we believe our comments are constructive suggestions for improvement. We hope they will be carefully considered in the sincere spirit in which they are offered.

We respectfully request and we trust that our comments and our documented presentation will receive fair and objective consideration in the final Environmental Impact Statement on the Gulf of Alaska.

The CEQ Report does contain a number of constructive recommendations which have been accepted and implemented--- a fact not widely known, especially among oil industry critics.

But those of us who have spent years in oil development and environmental assessment find we must strongly disagree with much of the CEQ Report.

The petroleum industry has spent more than $2 million on numerous scientific studies of the Gulf of Alaska. These studies represent the most comprehensive environmental assessment of the possible impact of oil and gas operations ever conducted in any non-producing area in the world.

This involved years of effort and the talents of some of the most knowledgeable experts ever assembled. The studies were conducted with great care and at great expense. Petroleum industry witnesses appeared and testified extensively at the hearings conducted by the Council.

Yet their testimony, the supporting documentation and the comments made by petroleum industry witnesses were given little consideration. In fact, this mass of material and expert comment was virtually ignored in the final report.

As a result, the CEQ Report falsely implies that oil and gas development in the Gulf of Alaska is an unreasonably high environmental risk operation. Yet if this factual data had been reflected properly in the final draft, we believe it would clearly demonstrate the shortcomings of the CEQ Report and offset this false impression.

One conclusion in the CEQ Report which greatly concerns the petroleum industry is the arbitrary "ranking" of the 17 OCS areas in terms of environmental "risk." The report purports to classify the Gulf of Alaska as a high environmental risk for oil and gas exploration.

Apparently, this "ranking" is based on three general concerns: Oceanographic conditions, seismic hazards and the Gulf of Alaska's geographic location---an area of major ecological interest.

In all development by man, whether of oil or any other commercial endeavor, there is some degree of environmental risk. Yet in evaluating this potential risk, great care must be made to clearly distinguish between real threats to the environment and subjective judgments that simply prohibit any proposed development.

If this had been done, we do not believe oil exploration in the Gulf of Alaska could reasonably be classified as an area of high environmental risk.

Even the term "risk" must be properly defined if it is to offer any meaningful assistance to an environmental assessment of the Gulf of Alaska. Nowhere was this done in the CEQ Report.

Everyone here "risked" the prospect of being hit by a falling meteorite on the way to this hearing. Yet the probability of being struck by a falling meteorite is so remote that this particular "risk" is almost non-existent.

By failing to make such measured distinctions, the CEQ Report leaves a clear impression that anything labeled as a "risk" must indeed be "risky" or even unacceptably "hazardous."

This is simply not true.

To rank the Gulf of Alaska on the high end of an environmental risk scale and the Eastern Georges Bank at the low end is an arbitrary judgment. It totally ignores the fact that for both areas, based on past oil industry experience, there is a very low probability of any major or permanent environmental damage from drilling and production activity.

Furthermore, to be useful, the concept of "risk" of environmental damage must be considered on a larger scale of risk evaluation---giving proper weight to all available options the U.S. has to develop the additional energy it must have. Everyone is well aware of the potential long-term energy crisis confronting the United States.

We import 40 per cent of the petroleum we use and the gap between domestic production and demand grows wider each year. It aggravates the balance of payments problem; it seriously impairs the nation's ability to recover from the worst recession since World War II. Increased dependency on foreign sources of petroleum is clearly not in the national interest. Because of this, it is the declared policy of the Federal government to encourage and hasten domestic oil exploration, particularly in the promising offshore areas.

Chronic long-term energy shortages could cause widespread unemployment and severe hardships that would create massive social and economic problems. Clearly, the "risk" of exploring for oil in the OCS is more than offset by the economic risk of not vigorously trying to become more self-sufficient in energy.

Viewed in this context, as part of the overall economic, ecological and social environment, any reasonable observer must conclude that oil and gas exploration offshore, including the Gulf of Alaska, is clearly acceptable and necessary.

Too often, excessive environmental restrictions have simply ignored economic needs. The delay in the Alaska pipeline project is an example. Yet, to the individual citizen, a job, a paycheck and energy to heat and light his home and fuel to run his car are critically important. They are part of his total environment, and must be considered, too.

Major Short-Comings of CEQ Report

Because of limited time, I will briefly outline the major shortcomings we find with the CEQ Report. But I will be happy to respond to any questions at the conclusion of this summary.

First, the CEQ Report gives little notice to the sweeping technical advances the oil industry has achieved in offshore drilling the past 25 years. It virtually ignores the research programs carried out in the Gulf of Alaska by the petroleum industry, the testimony we presented, and the several boxes of documentation entered into the record. The final report contains only one or two minor references to this research.

By way of contrast, the environmental community offered rhetoric rather than scientific fact, and yet their philosophy permeates the entire fabric of the CEQ Report.

The U.S. industry leads the world in petroleum technology. It has explored, found and developed almost all the Free World's oil reserves, including the latest major offshore area---the North Sea. Except for seismic activity, environmental conditions in the North Sea are slightly more severe than in the Gulf of Alaska.

Yet the oil industry has constructed offshore platforms, drilled, and placed sub-sea pipelines into operation. Today, the North Sea is producing oil and gas with no significant detrimental impact on the marine environment.

The result has been tremendously beneficial for the economic environment of neighboring nations. The United Kingdom expects to be self-sufficient in oil and gas in the early 1980s and Norway plans to become an oil exporter. Previously, both those nations had been almost totally dependent on foreign oil.

Secondly, a disturbing part of the CEQ Report is the superficial treatment it gives to complex technical subjects, with insufficient documentation. The report uses language which exaggerates and overstates potential environmental damage.

The use of such words as "devastate," "chaos," and "massive changes" in describing the potential impact of oil operations strongly suggests a bias against petroleum development and clearly demonstrates a lack of scientific objectivity in assessing environmental questions.

In many instances, the overall impression given by the report is a wholly unwarranted skepticism toward the oil industry and its sincere and positive efforts to act responsibly, to fully comply with all environmental safeguards.

Thirdly, great emphasis is placed on the spill trajectory probability forecasts conducted by the Massachusetts Institute of Technology. Yet the MIT calculations are misleading in several crucial respects.

They make no allowance for the established fact that oil spilled in the ocean evaporates, biodegrades, emulsifies and disperses---within relatively short periods of time---so any spill is diluted to a degree that harmful effects are eliminated or greatly minimized.

Nor do the MIT calculations allow for the fact that the industry makes every effort to contain and prevent spilled oil from coming ashore. Indeed, Federal regulations already require equipment and containment plans in all offshore producing areas.

Fourth, the CEQ Report grossly overstates the effect that oil operations in the Gulf of Alaska will have onshore, both here and in the Lower 48 states.

For example, the CEQ predicts that more refineries and petrochemical plants will be required on the West Coast because of OCS oil. This is untrue. The growth of refineries is caused by demand for refined products in a particular region, not by the presence or absence of oil production. The production of OCS oil will simply substitute domestic oil for part of the foreign crude now being processed by West Coast refineries.

The only significant onshore effects will be from those required to support offshore operations---including boat landings, heliports, staging areas, offices and possibly oil and gas treating facilities. Even this may not be required in all cases because it may be an advantage to store and ship some oil from offshore facilities.

Fifth, in another reference, the report mentions potential health hazards and makes mathematical forecasts of additional hydrocarbon emissions near U.S. refineries. But it does not document this finding.

If it had, the authors would have discovered that in areas they mentioned, hydrocarbon emissions from refinery operations are strictly controlled now---by rigid state, local and Federal regulations. Clearly, this type of undocumented and incomplete presentation to a non-technical audience imparts an exaggerated and erroneous impression of onshore effects of OCS oil development.

The CEQ Report could have been more useful and accurate if it had studied these subjects in more depth and if it had at least considered the testimony by the petroleum industry.

But there is one onshore impact mentioned by the CEQ with which we do agree: OCS oil production will provide substantially increased employment opportunities---in the Lower 48 and in Alaska.

Sixth, I must criticize the Council's superficial discussion of natural phenomena and the design technology that has been developed to minimize problems caused by natural phenomena.

Other witnesses will discuss these topics in detail, including oceanographic conditions, the effect of winds and waves, earthquakes and design practices. Here again, the CEQ has ignored the considerable factual data and information presented by the Gulf of Alaska Operators Committee. In several instances, ocean conditions presented by the oil industry differed from those cited by the CEQ. But the Council did not list its sources, nor the geographic location of the data it cites.

There are several misleading statements on the oil industry's technical ability. An example: An uninformed reader scanning the CEQ Report would get the clear impression that modern engineering is incapable of designing structures to withstand earthquakes. But such structures are being constructed in active seismic zones throughout the world.

Further, in discussing offshore operations, the report should have noted that the farther away you get from an earthquake fault or epicenter, the <u>less</u> potential there is for damage or even ground motion.

Much of the lease sale area in the Gulf of Alaska is located sufficiently distant from significant faults that the potential for severe ground motion is sharply reduced.

The report should have at least acknowledged that millions of people in the world live in active seismic regions---in Japan, California, Alaska, down the West Coast of South America and into the Middle East. To suggest that development of any kind should be prohibited in these areas because of seismic hazards is absurd. What is needed is to design structures to withstand and minimize potential damage. That is already being done in the U.S.

Seventh, the discussion of tsunamis in the Council's report also leaves a reader a false impression of their overall severity and potential for damage. The main threat from wave actions caused by seismic activity is to onshore installations---berthing facilities, docks and things of this sort. This is recognized.

But in the open sea---where much of the oil operations in the Gulf of Alaska would take place---the impact of most tsunamis would probably go unnoticed.

The Council's report makes only passing reference to the oil industry's technological accomplishments in Cook Inlet where since the early 1960's, when petroleum production activities commenced, there have been no serious structural failures or damaging oil spills.

Drilling platforms in Cook Inlet have withstood yearly batterings by 3 to 4 feet of ice moving at five knots or better, and tides whose range is among the highest in the world. These platforms have also experienced an earthquake measured at a magnitude of 6.5 on the Richter scale.

Eighth, as a final item of this critique, we believe the CEQ Report should have placed more importance on the oil industry's experience in offshore drilling in the Gulf of Mexico. The industry has drilled and produced offshore in the Gulf of Mexico for a quarter of a century. There has been extensive operations in all weather, even under storm conditions in an area noted for hurricanes. Yet the oil, fishing and other industries have operated harmoniously together over all that period of time.

There has been no evidence of lasting harm to the environment nor to marine life from offshore oil operations.

The Offshore Ecology Investigation conducted by Gulf Universities Research Consortium contains factual data on the ecological health of the Gulf of Mexico. Despite this documentation, this harmonious operation of the oil industry with fishing and other marine activities is not reflected in the CEQ Report.

In summary, we believe many parts of the CEQ Report give an imprecise picture of the Gulf of Alaska environmental assessment, a false picture of the industry's ability to design safe structures for the Gulf of Alaska, and an erroneous impression of the onshore impact of leasing OCS lands in the Gulf of Alaska.

The oil industry believes its input to the CEQ Report was not adequately considered or reflected.

With this presentation and the written documentation we have offered, the industry has tried to put the CEQ Report in its proper perspective.

We earnestly trust that the testimony being presented here today will be seriously considered and evaluated by those who prepare the final Environmental Impact Statement---and by those in the decision-making process regarding OCS leasing for the Gulf of Alaska.

Thank you. If anyone has any question----

* * *

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Menlo Park, California 94025

Statement of
Sherman H. Clark

Before the
U.S. DEPARTMENT OF THE INTERIOR
Bureau of Land Management

Hearing on
**PROPOSED OIL AND GAS LEASING ON THE OUTER CONTINENTAL SHELF**
**Northern Gulf of Alaska**

Anchorage, Alaska
August 12-13, 1975

THE NEED FOR PETROLEUM SUPPLY FROM THE GULF OF ALASKA

My presentation deals with three questions relating to the potential development of Gulf of Alaska oil and gas resources: is there a basic need for this supply, what are the hazards in delaying the development, and is it desirable to forestall development until a national energy policy is prepared?

## THE NEED

Let me begin with the need, which is primarily a national issue. There are five components to the analysis: (1) outlook for domestic oil and gas production from existing sources, (2) the requirements for all energy, (3) the availability of other sources of energy, (4) resulting demand for petroleum, and (5) the implications of relying on foreign oil supplies.

### 1. Existing Sources

Domestic oil and gas production have both been declining for several years, and combined 1975 production will be down about 10% from the peak output. A downward trend is a near certainty to 1980. Excluding Federal OCS and all Alaskan sources, there is virtually no hope that the slide in production can be arrested thereafter. With early access to every possible resource and adequate incentives, the highest output of oil and gas combined will be no higher in 1985-90 than today. The generally prevailing estimate calls for a reduction of about 15%, or about 25% below the early 1970s peak. These estimates are not exceptional; most of the published projections in the past year or so have been in the same range.

The conclusion is inescapable; Federal OCS production will offset or help to offset, the production decline in old fields; short of accelerating the exporation effort in all frontier areas such as the Gulf of Alaska, there is no way that U.S. oil and gas production will exceed the present level. We are accustomed to thinking that new

supplies imply an increase in total supply available, but this is not the case with U.S. oil and gas production.

2. Energy Requirements

The use of energy is related to the level and characteristics of economic activity. In the past 18 months, beginning with the Arab oil embargo, we have also learned that economic activity can be affected by energy availability.

Our economic projections have been influenced by the energy outlook as well as by the length and severity of the current recession, the degree of inflation in the recent past, the federal deficits and imbalance of payments, and the below normal business investment in this decade. In a deliberately conservative forecast, we estimate the growth rate in real GNP to be only 2.2% per year for 1973-80, but to increase to 3.8% per year in the 1980s. In comparison with the postwar trend through 1973, extrapolated to 1990, $4.6 trillion less GNP will be generated in 1974-90 under this forecast; that is equal to three year's total output at the current size of the economy and part of that loss is attributable to our energy problems.

The nation is using a certain amount of energy to support the present level of economic activity, just as it has in the past and will in the future. The past trend in total energy use per unit of GNP shows a decline at 1.2% per year from 1920 to 1954, but in the postwar period there has been virtually no change; that is, for every percentage increase in GNP, there has been an equal percentage increase in energy. There is no indication of any change in the relationship through the first quarter of 1975. However, we have assumed--again in a deliberately conservative manner--that commencing in 1976 the use of energy per unit of GNP will decline at 0.7% per year, equal to the average rate of change over 1920 to 1974. The decline in the ratio is assumed, in anticipation of price effects combined with the effect of conservation legislation. But there are a number of factors that will tend to offset any improvement in the energy-economic activity relationship:

- More energy is needed for energy intensive growth markets such as fertilizers and petrochemicals.

- More energy is needed for the steel industry, which will expand more rapidly than in the past 10 years.
- More energy is needed because stack gas devices and other means of improving the environment absorbs energy.
- More energy is needed because energy conversion such as coal gasification absorbs a large share of the energy input.
- More energy is needed to save energy, in producing insulation and other energy saving materials.
- More energy per unit of output will be required in energy production and mining in general because of lower grades of deposits in less accessible locations.
- In addition, remember that we are comparing the future with the past relationship in energy use and GNP. Consider the following comparisons:

  -- The power plant heat rate (or efficiency) will improve very little over the next decade, and far less rapidly than in the 1920-60 period. Higher efficiency of new plants tends to be offset by energy absorbed in scrubbers and other environmental equipment. Dieselization of the railroads increased efficiency by several orders of magnitude in the postwar period but that program is completed and future improvement will be limited.

  -- Electric power will continue to increase as a share of total energy. Electric power requires more energy input per unit of output than other energy and as stated, the efficiency is not expected to improve.

  -- The composition of economic activity will change very gradually; Services, generally considered to be non-energy intensive, will not increase as a share of GNP any more rapidly than in the past 20 years during which the energy-GNP relationship changed very little. Services will be adversely affected by the slower future increase in real disposable income and static to declining discretionary income. Moreover, Services in total is already the major component of GNP and by virtue of its large share, a rapid change in share is extremely difficult to achieve.

Combining the conservative economic forecast with an energy-GNP ratio trend that certainly appears conservative in the light of all the above factors, yields a growth rate for energy requirements of only 1.5% per year for 1973-80 and 3.1% per year for 1980-90. The low growth rate in energy use is heavily attributable to a low growth rate in economic activity. A concerted effort to achieve more rapid economic growth can be expected and may well prove to be successful; if so, energy requirements will be higher than forecast above, and this forecast should be viewed as realistic to low.

3. Availability of Other Energy

Nuclear power production is based largely upon scheduled additions through 1985 at least. The scheduled additions have been stretched out and reduced in the past year or two; if anything, the projected reliance on nuclear may be overstated because of further delays and possible cancellations. Nuclear power faces even stiffer resistance from environmentalist groups than does Federal OCS development. As a result, 10 to 13 years may be required from initiation of a nuclear project to initial operation.

Coal, despite its enormous resource base faces many constraints to rapid expansion of productive capacity. Output and use failed to increase in 1974 and there will probably be little increase in 1975. Scheduled additions to capacity amount to about 200 million tons through 1983 versus roughly 600 million tons currently, but as much as half the additions will only offset capacity that will close down because of exhaustion of the deposit or inability to meet Mine Safety Standards or environmental regulations. Additional expansion can be expected by 1983 as well as in 1984-90, but there are limitations to expansion that include environmental limits on sulfur content, delays caused by environmental hearings, problems associated with industrial conversion to coal, water availability for gasification plants, and potential limits to output in the western states that may be imposed by these states. The projected production by 1990, including coal for gasification and for exports, is in excess of 1.2 billion tons. This is not necessarily the upper limit, but it will be difficult to achieve a much greater level of output.

Geothermal capacity operating in 1980 is only that already scheduled, and will be extremely limited. While rather fantastic estimates of operating capacity in 1985 and 1990 have been made by reputable groups, this source of energy is also subject to constraints and extreme uncertainty:

- The level of R&D; the degree of success in such efforts and the timing.
- The success of exploratory activity.
- The location of new deposits in relation to the demand centers for this energy.
- The necessary incremental approach to expansion of capacity in any general location, caused by the unpredictable size of the resource available. In other words it is not practicable to install a large plant, for example, one with a 1,000 megawatt capacity. In Geyserville, a large geothermal resource, each new plant adds only 75 to 125 megawatts of capacity.

Solar energy is in an R&D stage that will last at least five years and probably 15 years or more. According to the FEA, there is at present no market for solar systems because they are not competitive; if they could be sold, manufacturers would provide the systems. For example, manufacture of high temperature solar energy collectors in 1974, at maximum Btu output, was equivalent to only 56 barrels per day of oil, largely financed by various research projects. As in any extensive R&D effort, the outcome and particularly the timing of any degree of success is extremely uncertain. The position taken in this study is that the market for solar systems will evolve gradually, will not commence before 1980, and will probably not be particularly significant until after 1990. To the extent that there is any use in the 1980s, the effect is anticipated in the lower rate of growth in conventional energy demand in the residential and commercial sectors.

### 4. U.S. Total Demand for Petroleum

After allowing for low economic growth, a steady improvement in the relationship between energy use and economic activity that is a substantial departure from postwar experience and questionable in magnitude,

and the practical availability of all other forms of energy that recognizes all the constraints on these sources, the overall demand for oil and gas combined for 1973-80 is only 0.3% per year, and 1.8% per year for 1980-90, and part of this is coal that has been gasified. But total gas availability from all sources is certain to continue to decline to 1980, and will most probably be lower through the 1980s than at present by 10% or more. The most optimistic assumptions as to deregulation and resource base would yield no higher availability than at the peak in 1973, while the low estimate adopted is not necessarily the lowest that may be realized. To offset the gas decline and meet overall growth in oil and gas requirements, oil demand will increase by several percent per year while domestic production declines.

Thus, the results of this conservative analysis show that, even with the fullest possible access to Federal OCS lands and all other promising hydrocarbon locations throughout the country together with adequate incentives, the nation will have to continue to rely on oil imports of increasing magnitude. Depending on the oil and gas resource base and the inevitable delays in achieving new production in Alaska, imports will increase from 6 million barrels per day currently to 9 to 12 million barrels per day in 1980 and 13 to 17 million barrels per day in 1990. At the present time, the prevailing opinion as to the oil and gas resource base favors the higher estimate of import levels in 1980-90 even though the high import estimates look unrealistic today.

5. Implications of Relying on Foreign Oil

U.S. oil imports from Canada reached a peak of 1.2 million barrels per day and have since declined, with the further Canadian government objective of gradually phasing out exports completely. The oil availability from the rest of the free world (excluding OPEC and related production in the Middle East) is distinctly limited; this portion of the free world is in such a substantial net deficit position on petroleum that the expected increase in local production can do no more than offset, or partially offset, the local increase in demand. Some countries within this category, should substantial oil production be achieved, may also

elect to join OPEC, which is assumed to provide the balance of the required supply; its availability is far from assured.

Based upon a free world energy balance that takes into account the net availability from the Soviet Bloc, the OPEC and related Middle East output is projected to increase from 31 million barrels per day in 1973 and 27 million barrels per day in 1975 to 32 million barrels per day in 1980 and 41 million barrels per day in 1990. This projected OPEC output assumes full availability of Federal OCS and all other U.S. oil and gas as well as nuclear power and other sources of energy. When economists declare that there will be a surplus of energy within the time period of this study, they assume that all of these sources will be available and that there will also be numerous discoveries of supergiant oil fields, but some of the same economists will then argue against the development of Federal OCS resources or other sources of energy. The discovery of supergiant fields, sufficient to alter the historical trend in the finding rate, is basically unpredictable. The past finding rate incorporates discoveries such as in the North Sea and the North Slope; if the future trend in the finding rate is to be substantially higher, such fields will have to be found with increasing frequency. Outside of OPEC, such a prospect is not supported by current evaluations of the resource base.

If new U.S. sources of energy are not made available and the U.S. economic growth projections of this study are not reduced, the need for OPEC production will be that much greater; instead of 41 million barrels per day in 1990, we could face a reliance on OPEC of 58 million barrels per day if OCS production and nuclear power are not permitted. Obviously, the less the U.S. energy production, the greater the world's reliance on OPEC. Extreme reliance on OPEC is not sound policy because of the lack of security of this supply, an already uncertain outlook as to the availability of the quantities required without full U.S. development, and potential economic distortions if the reliance is too extreme.

Of major significance with respect to excessive reliance on foreign oil, is the burden placed on the foreign exchange position of the United States. Sudden price increases by the OPEC in 1973 increased the adverse balance of payments of the United States. The weight of

economic opinion is that the sudden increase had much to do with the severe inflation of 1974. The measures taken to combat that inflation as well as the basic economic distortion induced in turn, have a great deal to do with our present economic recession and high unemployment rate. The more we are dependent on foreign oil the more we are exposed to similar and indeed more severe shocks of the same sort. Gentlemen, the need clearly exists.

DELAYING DEVELOPMENT

The second question to be considered is that of delaying development. When there is a demonstrated need for oil and gas from the Federal OCS now, when there is every indication that the resource exists, when the technology is available to develop the resource, and when industry is considering investing to find and produce the oil and gas, should development be delayed? It has been argued that oil and gas are too precious to use them for their Btu content, and that development of the Federal OCS resources should be delayed until their use can be restricted to such valued uses which are generally characterized as the production of materials (i.e., petrochemicals) as opposed to heat and other forms of energy. It has also been argued that a delay of a few years is necessary for planning purposes.

There are substantial net economic benefits to the development of OCS production. Any delay, even for a few years, cannot be made up later and will reduce those benefits in constant present dollars as well as incurring greater risk of inadequate energy supplies over a longer period of time. There is a high degree of risk involved and the potential consequences are even lower economic growth and higher unemployment than have been incorporated in this study. In evaluating the consequences, rather than isolating the analysis to one source such as the Gulf of Alaska, all challenged new sources should be combined together; the reduced domestic supply of 2 to 7 million barrels per day equivalent in 1985 and 5 to 12 million barrels per day equivalent in 1990 entails high risks amounting to $100-$300 billion (1975 dollars) per year of reduced GNP rising to $250-$600 billion per year by 1990; the related unemployment is in the millions of people, at the extreme in excess of 20 million.

As for the long term delay, the same arguments are applicable. In addition, the concept that oil is too precious to use for thermal value fails to consider the potential use of coal--our abundant energy resource--for the production of chemicals and other materials.

## WAITING FOR A NATIONAL ENERGY POLICY

The third question deals with delaying development until a national energy policy has been adopted. But desirable as a national energy policy may be, it cannot alter the basic facts of energy supply and demand described earlier. Energy and economic activity are so interrelated that an energy policy literally requires an economic plan, introducing many uncertainties and extreme controversy. A complete national energy policy may never be developed. In any event, no policy or portion thereof has any chance of acceptance if it is predicated on low economic growth, high unemployment, or no increase in real disposable income. No policy can create onshore oil and gas resources that do not exist, or bring on new resources held back by legal or environmental hurdles, or make new technology and capital instantly available.

The probable elements of a national energy policy have been anticipated in the earlier analysis--conservation legislation, rising real prices for energy, and encouragement in the development of all energy resources. But a policy cannot change the alternatives to Federal OCS development--either greater reliance on oil imports or a lower economic growth rate. Delaying development until a national energy policy is available will help to defeat the potential success of such a plan, because the domestic energy supply is needed now.

## CONCLUSION

Developing Federal OCS resources will result in substantial net economic benefits in itself. Additionally, this development will help to support the nation in expanding the economy and creating additional jobs for an already known increase in the labor force. The alternative is lower economic growth and greater unemployment--measured in millions.

These resources should be developed as quickly as possible, in order to arrest a continuous decline in U.S. oil and gas production and to achieve a reasonable regional balance in world oil supplies. There is no economic or energy policy justification for any delay.

STATEMENT OF

PAUL L. HORRER
INTERSEA RESEARCH CORPORATION

before the

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HEARING

on

PROPOSED OIL AND GAS LEASING

on the

OUTER CONTINENTAL SHELF

NORTHERN GULF OF ALASKA

ANCHORAGE, ALASKA
AUGUST 12-13, 1975

GULF OF ALASKA OPERATORS COMMITTEE

Statement of Paul L. Horrer, Intersea Research Corporation

OFFSHORE SALE ENVIRONMENTAL HEARING
Anchorage, Alaska

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My name is Paul Horrer. I am President of Intersea Research Corporation. My educational background includes a BS in Meteorology from Cal Tech and MS in Physical Oceanography from Scripps Institution of Oceanography. My work experience includes 8 years as research oceanographer at Scripps and 19 years as a consulting oceanographer. The latter includes projects in Alaska beginning with the Chevron marine terminal at Nikiski in 1959. My firm, Intersea Research, is presently conducting a two-year wave measurement program at five locations in the Gulf of Alaska. Intersea's predecessor company, Marine Advisers, Inc., carried out an extensive in-office study in 1968-70 to develop and summarize data on weather, waves and currents in the Gulf of Alaska as well as two years of wave measurements at Yakutat. Both projects were financed by groups of oil companies.

Slide 1 The purpose of my testimony is to discuss the physical marine environment of the Gulf of Alaska, particularly as this environment affects offshore petroleum operations; to describe the state of present scientific knowledge of this environment; and to indicate some future improvements to be expected in such knowledge.

Generally my testimony is in agreement with the Draft Environmental Impact Statement which presents a good description of the physical marine environment. Two exceptions involve (a) ocean currents, and (b) tsunamis. Some recent information, not included in the EIS, is available on currents. The other exception is that I disagree with the broad statements made in the EIS regarding potential damage to rigs and facilities due to tsunamis. Written comments on the EIS will be filed later.

Slide 2 Past and present measurements in the Gulf that are pertinent to this testimony include both public and industry-sponsored programs which date back to the end of the last century, beginning with weather observations from ships, as well as shore-based recording of tides and sea water temperature. Those initial programs and others are continuing, and now there are weather satellites and sophisticated wave and weather telemetering buoys.

The weather plays a governing role in dictating the nature of almost all offshore operations. The knowledge of average or frequently occurring weather conditions is an important factor in planning for efficient and safe offshore operations. Evaluations of extreme or rarely occurring conditions provide the basis for the design of structures or other facilities. And, finally, prediction of weather is an integral part of the conduct of prudent offshore operations.

Slide 3 Within the Gulf of Alaska area, wind measurement data are available at coastal stations, at Middleton Island, at two weather buoys (EB-03 and

EB-33), and from some ship reports. Such information gives a first estimate of wind conditions generally to be found within the Gulf of Alaska but does not necessarily describe all offshore locations. However, there are methods by which winds can be calculated from the synoptic weather charts

Slide 4 of historical data published by the Weather Bureau. In 1967, the petroleum industry organized and supported an environmental study of the Gulf of Alaska costing $1,200,000 and requiring thirty months of effort. The prime contractor for this effort was my consulting firm, Marine Advisers, Inc. The Marine Advisers' project included wind calculations from weather maps, technically known as wind hindcasts, for twenty locations in the Gulf of

Slide 5 Alaska. An example result of this study is summarized in this slide which portrays the monthly variation of wind conditions throughout the year at one location. For example, this indicates that during the month of January winds greater than 24 knots could be expected to occur 25 percent of the time.

Slide 6 More detail is available in information about the directions of winds, presented in this slide as a typical "wind rose" at an information site. For example, this diagram indicates that winds from the east-southeast, at speeds between 11 and 21 knots, occur approximately 10 percent of the time.

Slide 7 In addition, the examination of wind information permits evaluations of the extreme events to be expected. As in all evaluations of extreme events, one must view the information in a probabilistic manner. Annual extreme winds have different sorts of probability distributions than do typical winds. A series of observed annual maximum events is fitted to one of these theoretical distribution functions and the speed occurring once per century on the average can then be determined. This slide indicates that at a

typical offshore location in the Gulf of Alaska, one should expect wind gusts of 100 knots to occur on the average once every five years.

It is important to note that, in general, winds are not directly the most important parameter which influence offshore structures or operations. Instead, it is the waves generated by the winds which constitute the most important phenomenon. Winds determined from the historical synoptic weather maps may also be used to evaluate waves occurring during past history. Such historical wave evaluations, or wave hindcasts, were also a part of the industry-supported Gulf of Alaska project begun in 1967.

Slide 8 Wave calculations were verified against wave measurements, also made as a part of the project. This slide indicates the seasonal variation of normal waves at a typical station in the Gulf of Alaska. These results, for example, indicate during the month of January, sea states with significant waves higher than 12 feet should be expected to occur 25 percent of the time. Significant wave height is a technical term but one whose numerical value corresponds closely to the subjective visual impression

Slide 9 of wave height reported by a trained observer. Information on the occurrence of extreme wave events is depicted in the next slide. This indicates that a wave 95 feet high should occur, on the average, once every 100 years.

Refinement of these wave data will be accomplished, if needed, by means of the wave measurements and hindcast evaluation being performed

Slide 10 now by Intersea for a group of oil companies. "Waverider" buoys, which measure sea surface elevation fluctuations by means of a specialized

accelerometer, telemeter data to shore while also analyzing and recording results on a cassette tape within the buoy. Fifteen of these were installed in five clusters of three each, for redundancy, in August and

Slide 11 September 1974. Wave data is received and recorded ashore from the Waveriders at Sitkinak Island, Middleton Island and Yakutat. Wind and other weather data are recorded ashore at these three locations. It is planned to continue this program into 1976.

The Gulf of Alaska has earned a reputation as being a stormy area of the world. However, this area is not markedly different from other areas in which the offshore petroleum industry has successfully conducted operations. The indicated extreme winds of the Gulf of Alaska are substantially less than those associated with Gulf of Mexico tropical hurricanes, and the persistence of storm winds in the Gulf of Alaska does not appear to suggest more severe conditions than encountered in the Norwegian North Sea. In both of these mentioned areas, the petroleum industry now operates successfully. The industry also copes with stormy

Slide 12 sea conditions in other areas, as well. An evaluation of various areas of the world has been made on the basis of ship reports of wave heights. This survey comparison is presented on the next slide. It is to be recognized that ship reports of wave heights reflect certain biases on the part of observers on ships with different characteristics. Nevertheless, the trends are significant in indicating that the Gulf of Alaska is not more stormy than other areas in which offshore petroleum operations have been conducted. In terms of extremes, it is worthwhile to note that the drilling vessel SEDCO 135F experienced a wave reported to be 95 feet high in drilling off Vancouver

(Petroleum Engineer, March 1969) without evidence of threat to the structural integrity or safety of the unit. Moreover, the industry has designed platforms for very large waves, and these have been utilized in the North Sea.

One familiar with the sea will recognize, of course, that conditions of wind and waves are also accompanied by various types of ocean currents. On the continental shelf, away from constricted bays, currents are not generally, however, a major factor in offshore design or routine operations. They are, nevertheless, considered in structural design and must be accounted for in any oil spill containment and cleanup contingency plan. The previously-described industry-sponsored study determined both normal current and extreme

Slide 13 conditions of current to be expected in the Gulf of Alaska. Such information is included in this slide which depicts the occurrence of normal types of current. This, for example, indicates that current velocities which exceed

Slide 14 one knot should generally be anticipated 25 percent of the time. Estimated extreme current values are shown in the next slide, where surface currents are evaluated for a typical location to be as much as 4 knots. The values for current indicated in these slides do not differ from currents found in many other areas of the world such as the North Sea or the Grand Banks area, and they are not as severe as currents in Cook Inlet.

Slide 15 Direct measurements of currents with recording current meters were carried out in the Gulf of Alaska in 1974 by Bolt, Beranek & Newman, and Intersea at seven locations and by the National Ocean Survey at three locations. Analysis of these data will permit further refinement of the Marine Advisers' study of currents.

As with traditional maritime activity, the drilling of offshore oil wells, especially exploratory wells, must be carried out with one eye on the weather. This means that weather forecasts are important. One oil company organized a trial forecasting effort, with emphasis upon those weather conditions which might, for example, call for shut down of an exploratory drilling operation.

Over a trial period of three months, routine forecasts were made for an area off Yakutat by a marine forecasting consulting firm. Particular attention was devoted to the forecast of sea states. Concurrently with the forecasting, waves were measured in the forecast area using a Waverider. Comparison of forecast and measured conditions of seas provides a measure of forecast reliability. From such comparisons the following conclusions have been established.

1. Most important, there occurred no storm conditions which were not forecast.

2. There were only a few "false alarm" forecast storms, which failed to materialize.

While experienced judgment indicates that present Gulf of Alaska forecasting is adequate for offshore operations, improvements are desirable and to be expected. A group of oil companies is considering a new year-long forecasting program using a computer-based wave model to gain practice in this science before exploratory drilling is initiated. Special forecasting

generally improves rapidly with experience gained in actual operations. For the Gulf of Alaska, one may expect that this normal evolution of improvement will be augmented through expansion of the input data base by additional oceanographic buoys to be deployed by the National Oceanographic and Atmospheric Administration. One such buoy is now in operation off Kodiak, and another is off Yakutat, as shown in an earlier slide.

Slide 16 In addition to knowledge of winds, waves and currents, the offshore industry also requires estimates of the total water level rise and, especially, estimates of the probability that various design water level elevations will occur. Besides waves and the infrequent earthquake-produced tsunami, the components of raised sea surface elevations are astronomical tide and storm surge. Tides in the Gulf of Alaska are of the mixed type, containing both diurnal and semi-diurnal components. In the northeast part of the Gulf of Alaska, extreme tides range from -3 to +15 feet relative to the Mean Lower Low Water reference datum.

Storm surge is the increase in sea-surface elevation due to low barometric pressure and to wind tide. In the Marine Advisers' study, storm surge was calculated for the most severe storms of record. Depending on location and water depth, the 100-year storm may raise the water level by one to five or six feet. The 100-year combined astronomical and storm tide is on the order of 20 feet above mean lower low water or 15 feet above mean sea level. This is considerably less than in Cook Inlet.

Slide 17 Good documentation now exists on tsunami run-up elevation in harbors and bays, and thus shore facilities can be constructed at safe elevations. In the open Gulf, although the tsunami is higher at places than the tides, it is much lower than the maximum storm wave. For example, in the Good Friday 1964 earthquake, it has been calculated by numerical modeling that the water elevations about 50 miles west of the proposed lease area reached a maximum of 30 feet, five minutes after initial ground motion. In the open Gulf, the tsunami was not a bore nor was it steep like a wind wave, but rather the water level rose gradually to its maximum elevation.

Slide 18 In the CEQ report the potential damage to underwater oil storage systems on the open coast due to tsunamis was assessed improperly. In order to place it into proper perspective, it is useful to compare the tsunami with storm waves. Drag and inertial forces on a hypothetical storage vessel due to a tsunami will be much smaller than those due to the maximum storm wave for which the industry is confident it can safely design.

For example, a tsunami raising the water level 30 feet in 5 minutes at a location where the water depth is 200 feet would produce water horizontal acceleration and velocity maxima of 0.15 ft/sec$^2$ and 7 ft/sec. By comparison, the maxima for a storm wave 90 feet high with a 16 second period would be 8 ft/sec$^2$ and 20 ft/sec at the surface decreasing to 4 ft/sec$^2$ and 10 ft/sec at the bottom.

Buoyancy forces due to a tsunami will be comparable to those due to the design storm wave. Of course, buoyancy forces matter

only for an underwater storage tank which has large volume above the still water level. A storm wave 90 feet high with 16 seconds period in 200 feet water depth would raise the water level an average of 44 feet along a 300-foot wide structure; the hydrodynamic attenuation reduces this to 25 feet differential water pressure at the sea floor. That compares with 30 feet calculated water level rise due to the 1964 tsunami in the open Gulf.

The offshore petroleum industry generally expends substantial effort in understanding the physical marine environment where offshore operations are conducted. It is to be noted that much of the detailed information is obtained to meet expanding needs as development proceeds. Specific design information, required for design of producing facilities, is most effectively gathered in the course of early exploratory phases. From the foregoing, it is quite clear that the industry has already completed the required preliminary assessment of the physical marine environment of the Gulf of Alaska. Although more complete and detailed knowledge will be gained as offshore activity in the area increases, I am confident that sufficient knowledge is already available to permit operations to be conducted with safety to the environment and to personnel.

GULF OF ALASKA

MARINE PHYSICAL ENVIRONMENT

PRESENT KNOWLEDGE

FUTURE IMPROVEMENT

SLIDE 1

METEOROLOGICAL AND PHYSICAL OCEANOGRAPHIC MEASUREMENTS

BY SHIPS OF OPPORTUNITY
- WEATHER
- SHIP'S DRIFT

BY OCEANOGRAPHIC SHIPS
- SEA WATER DENSITY
- CURRENTS

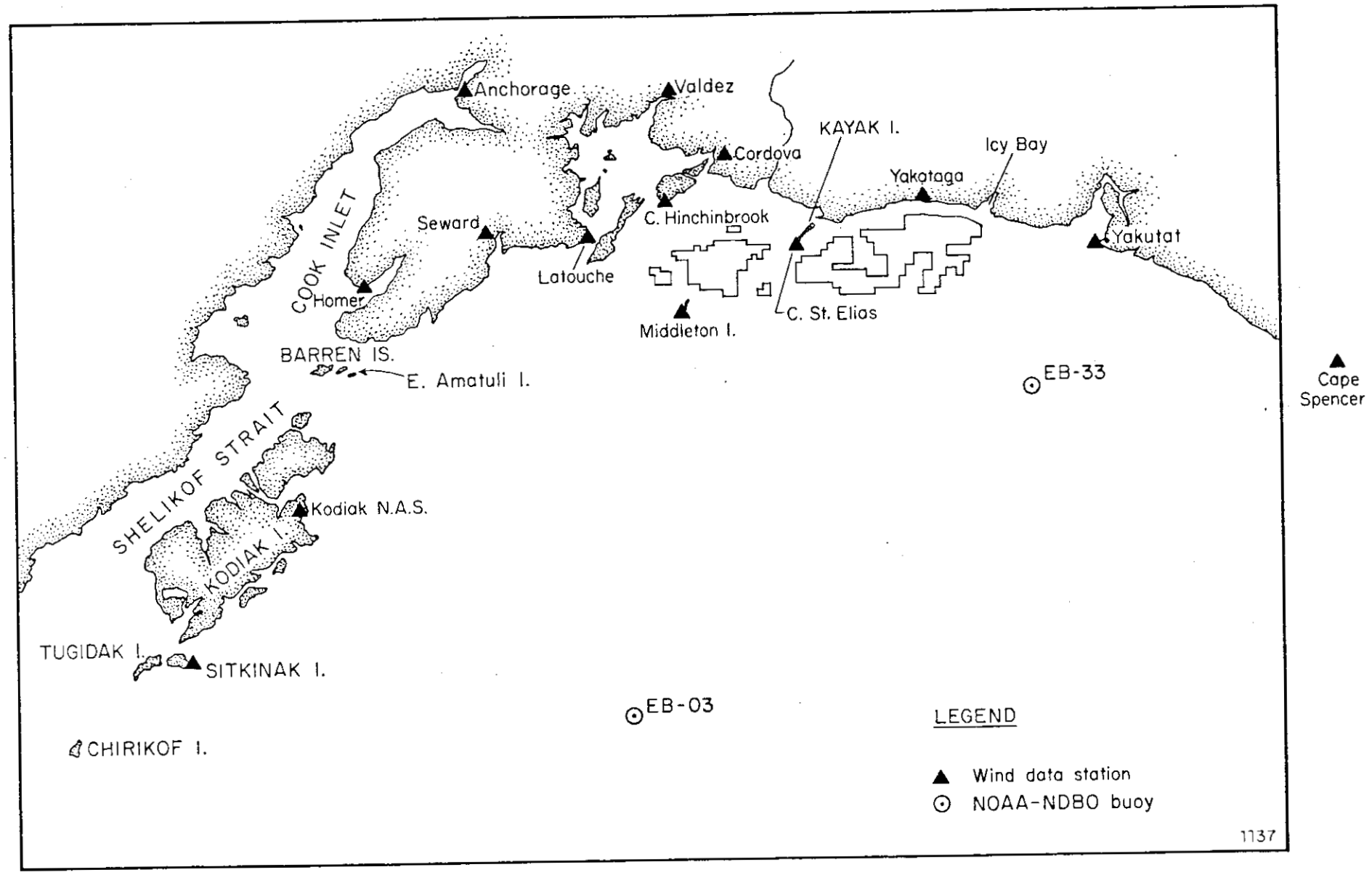
AT AIRSTRIPS, LIGHTHOUSES AND HARBORS
- WEATHER
- TIDE
- SEA TEMPERATURE

BY INSTRUMENT BUOY SYSTEMS
- WIND, AIR AND WATER TEMPERATURES, BAROMETER
- WAVES
- CURRENTS

BY UNDERWATER SENSOR CABLED TO SHORE RECORDER
- WAVES
- TSUNAMIS

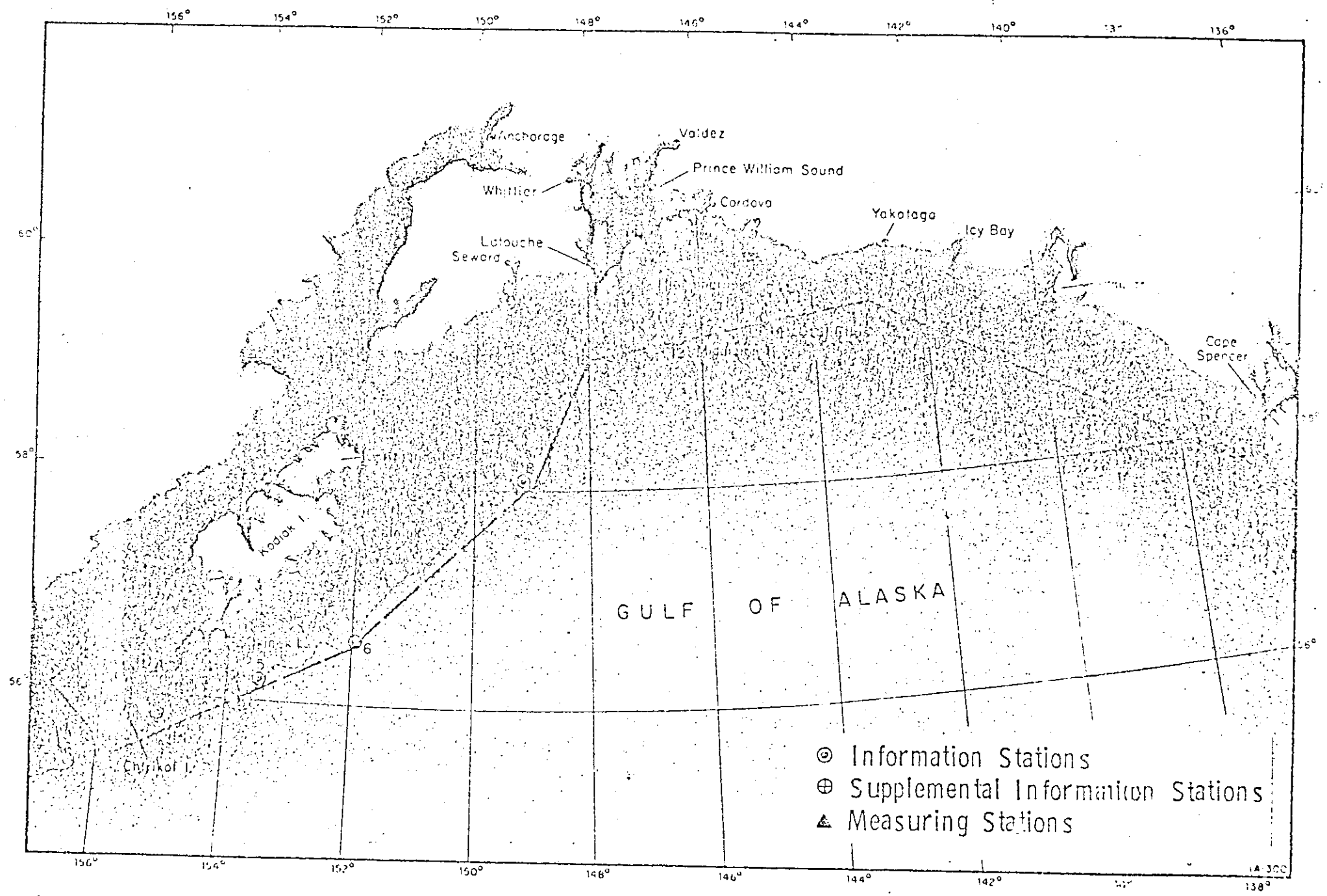
BY SATELLITES
- CLOUD COVER
- SEA TEMPERATURE

# WIND DATA STATIONS

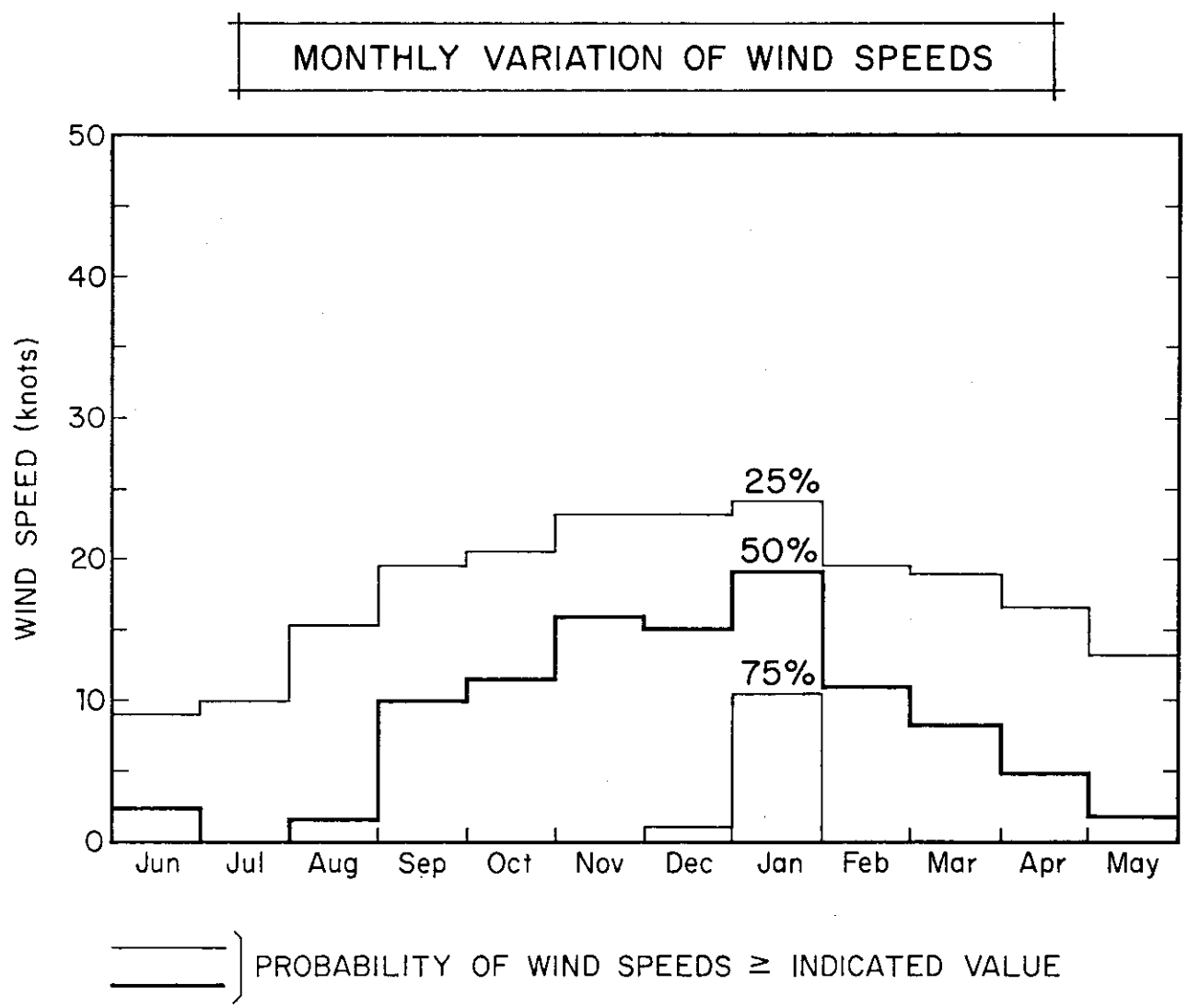



SLIDE 3

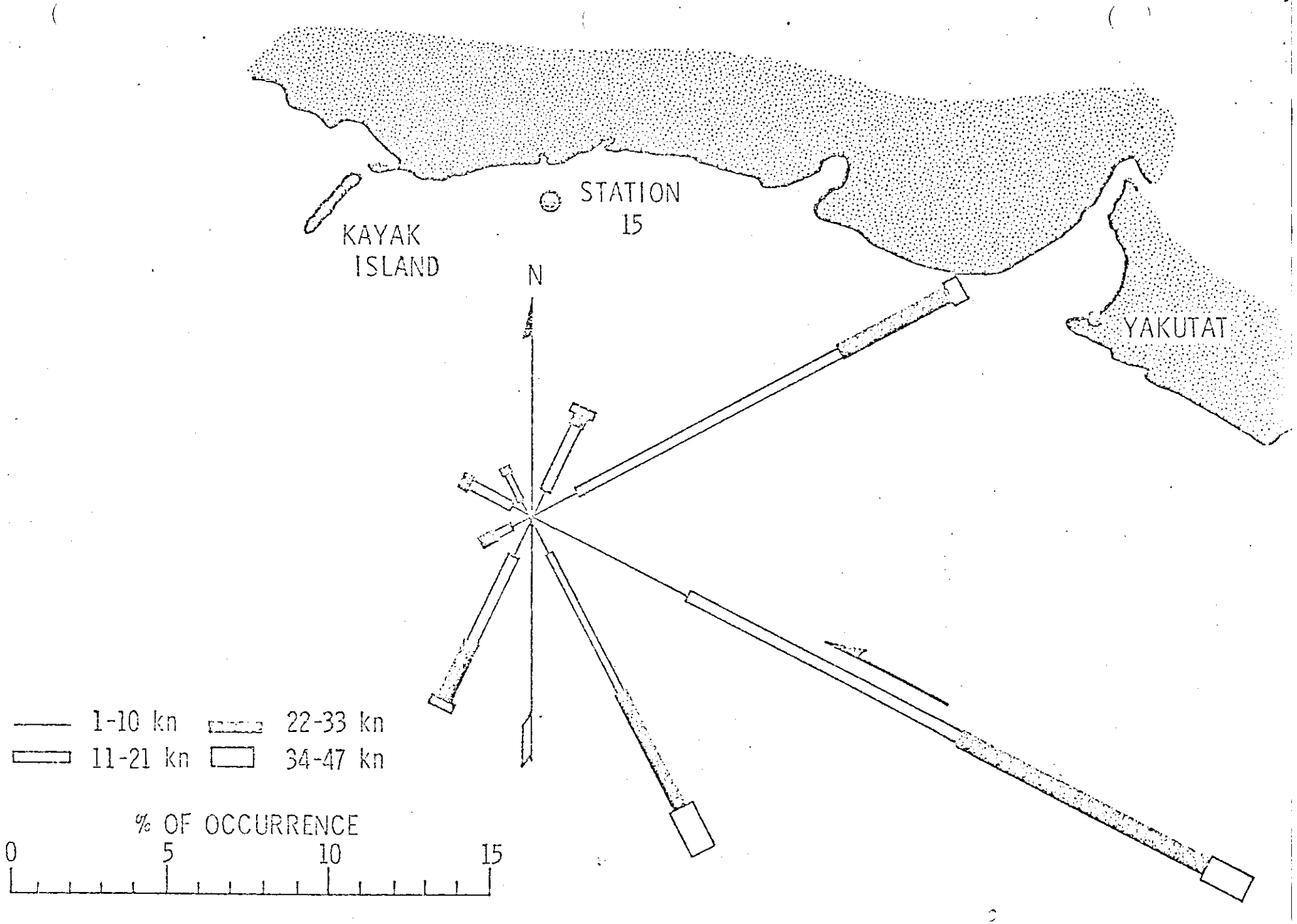
# LOCATION MAP FOR STUDY AREA AND VICINITY




SLIDE 4


MONTHLY VARIATION OF WIND SPEEDS
WIND SPEED (knots)
50
40
30
20
10
0
25%
50%
75%
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
PROBABILITY OF WIND SPEEDS ≥ INDICATED VALUE

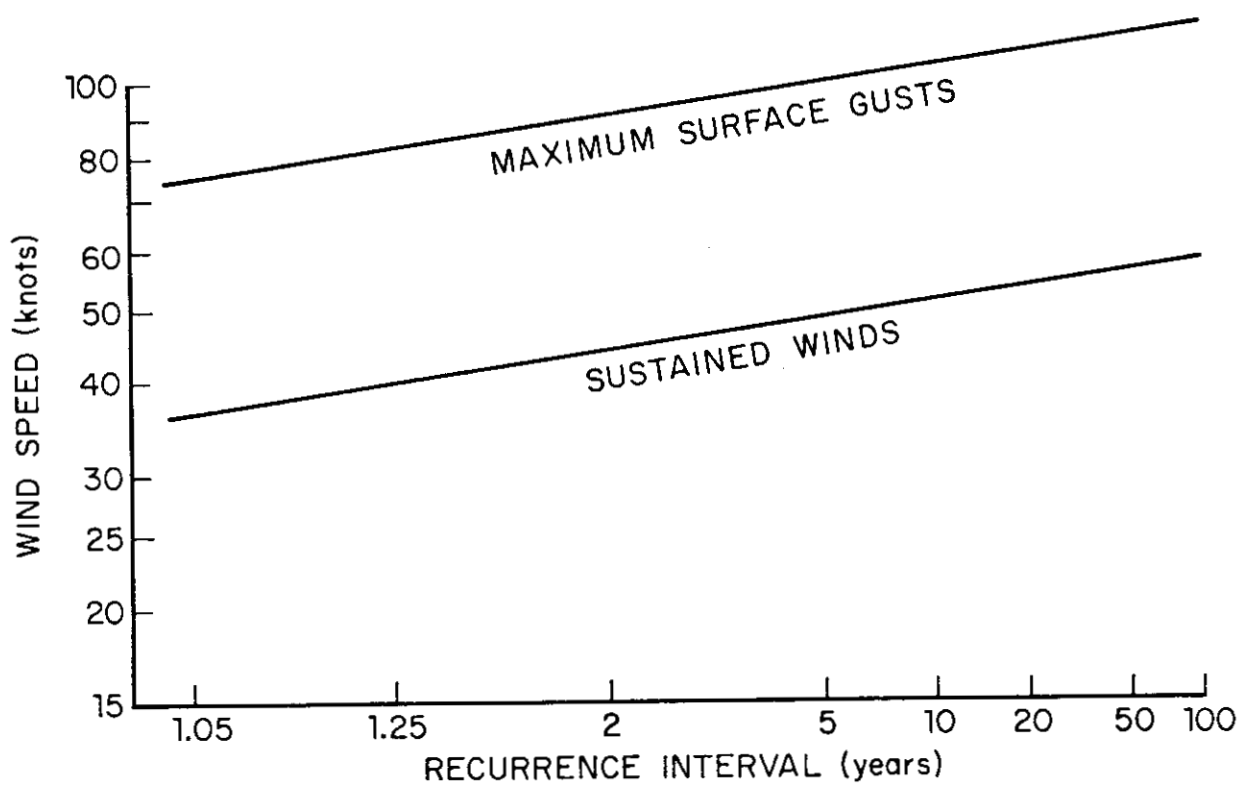
SLIDE 5



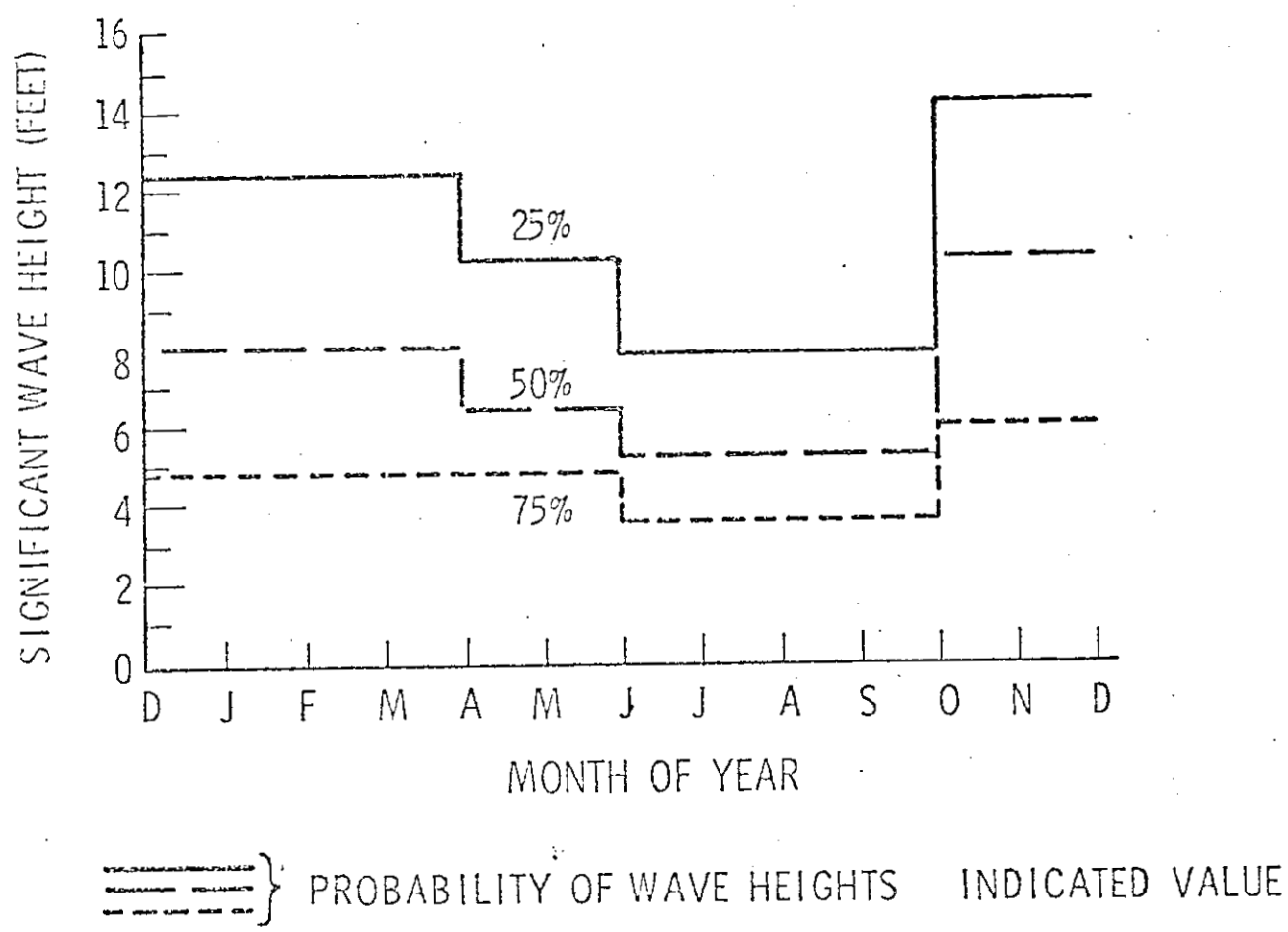

WIND DISTRIBUTION AT STATION 15 IN WINTER

SLIDE 6

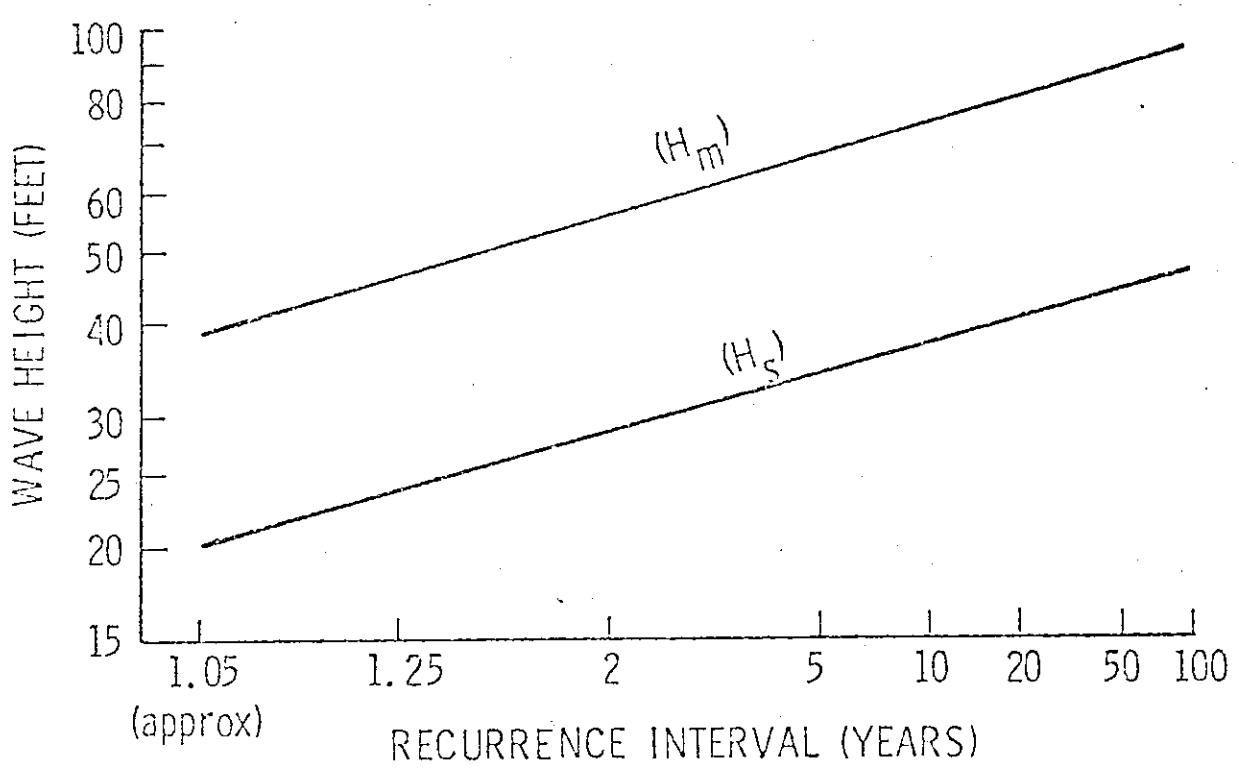
# RECURRENCE INTERVAL OF WINDS



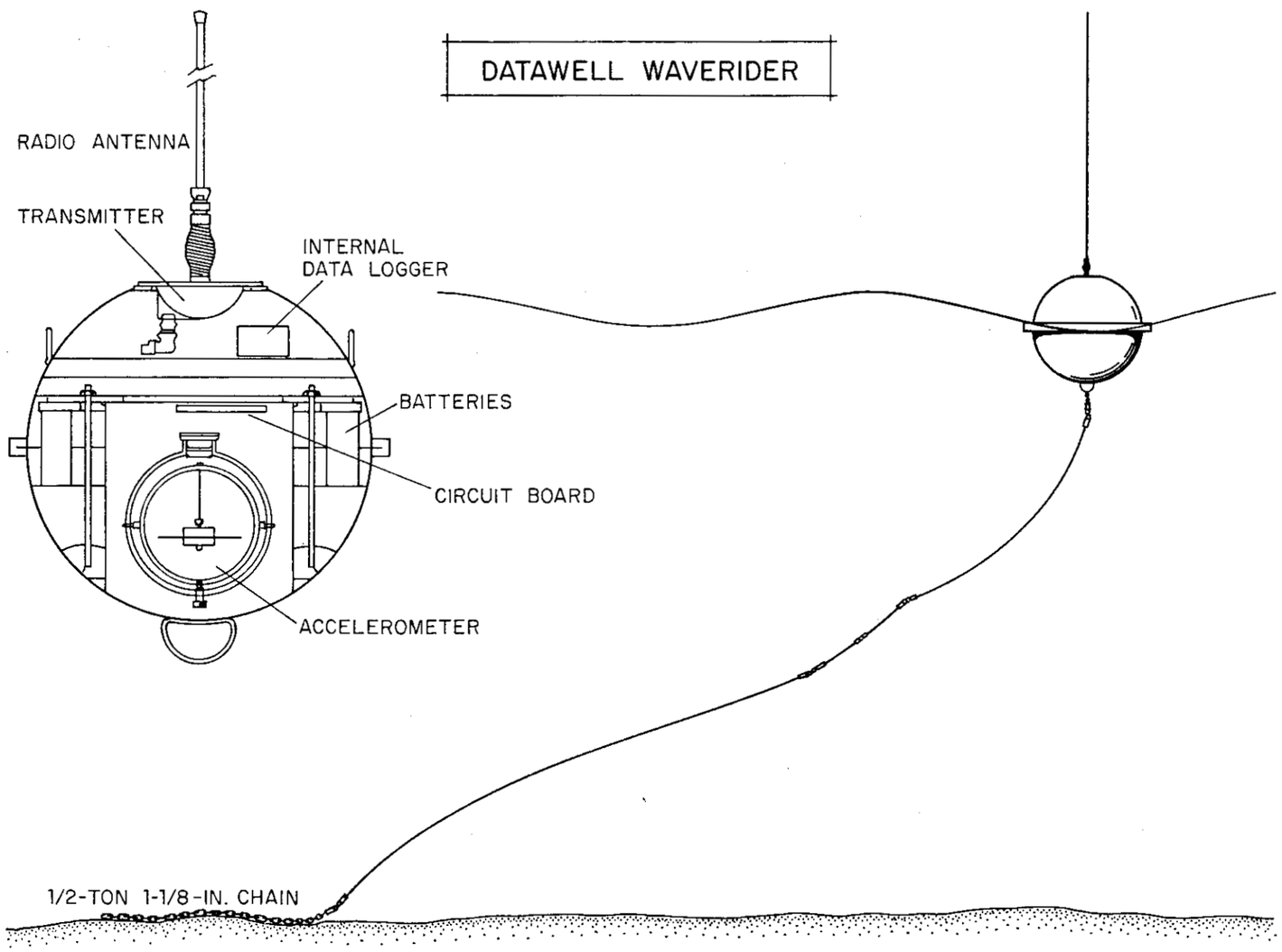
## SEASONAL VARIATION OF WAVE HEIGHTS



RECURRENCE INTERVAL OF SIGNIFICANT WAVE HEIGHT ($H_s$) AND MAXIMUM WAVE HEIGHT ($H_m$)

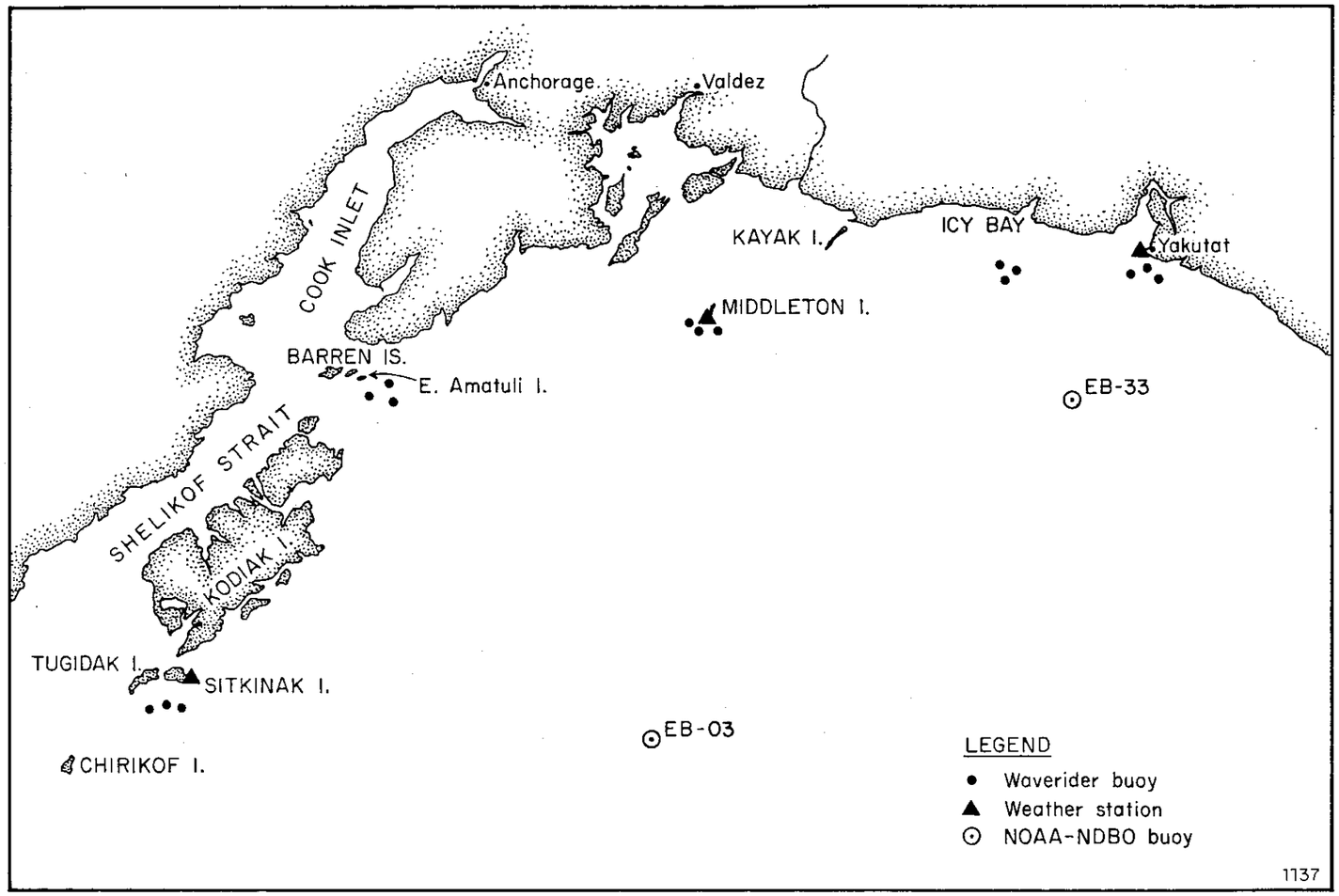



SLIDE

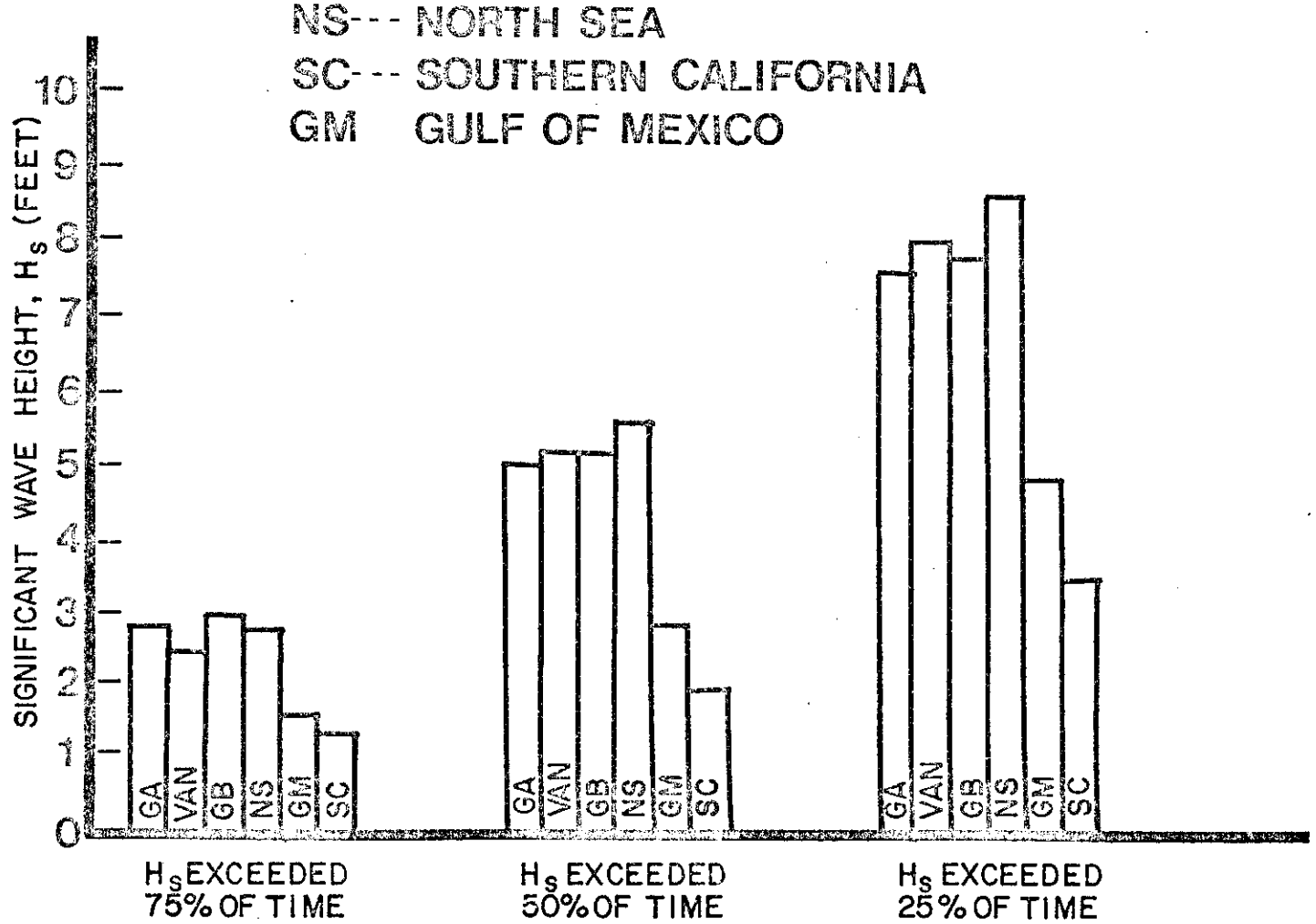

DATAWELL WAVERIDER
RADIO ANTENNA
TRANSMITTER
INTERNAL
DATA LOGGER
BATTERIES
CIRCUIT BOARD
ACCELEROMETER
1/2-TON 1-1/8-IN. CHAIN

SLIDE 10

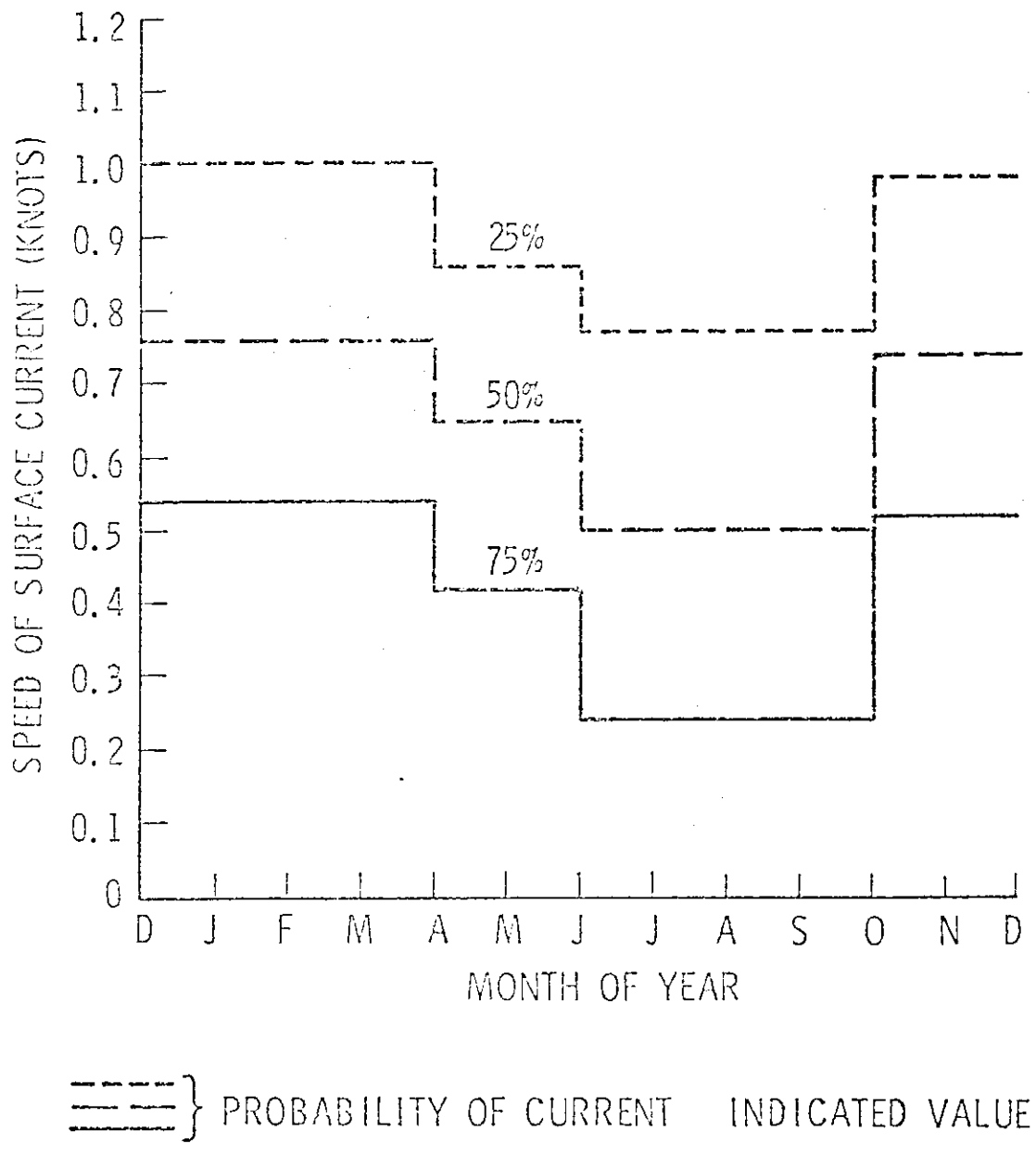
# GULF OF ALASKA
# WAVE AND WIND MEASUREMENT PROGRAM



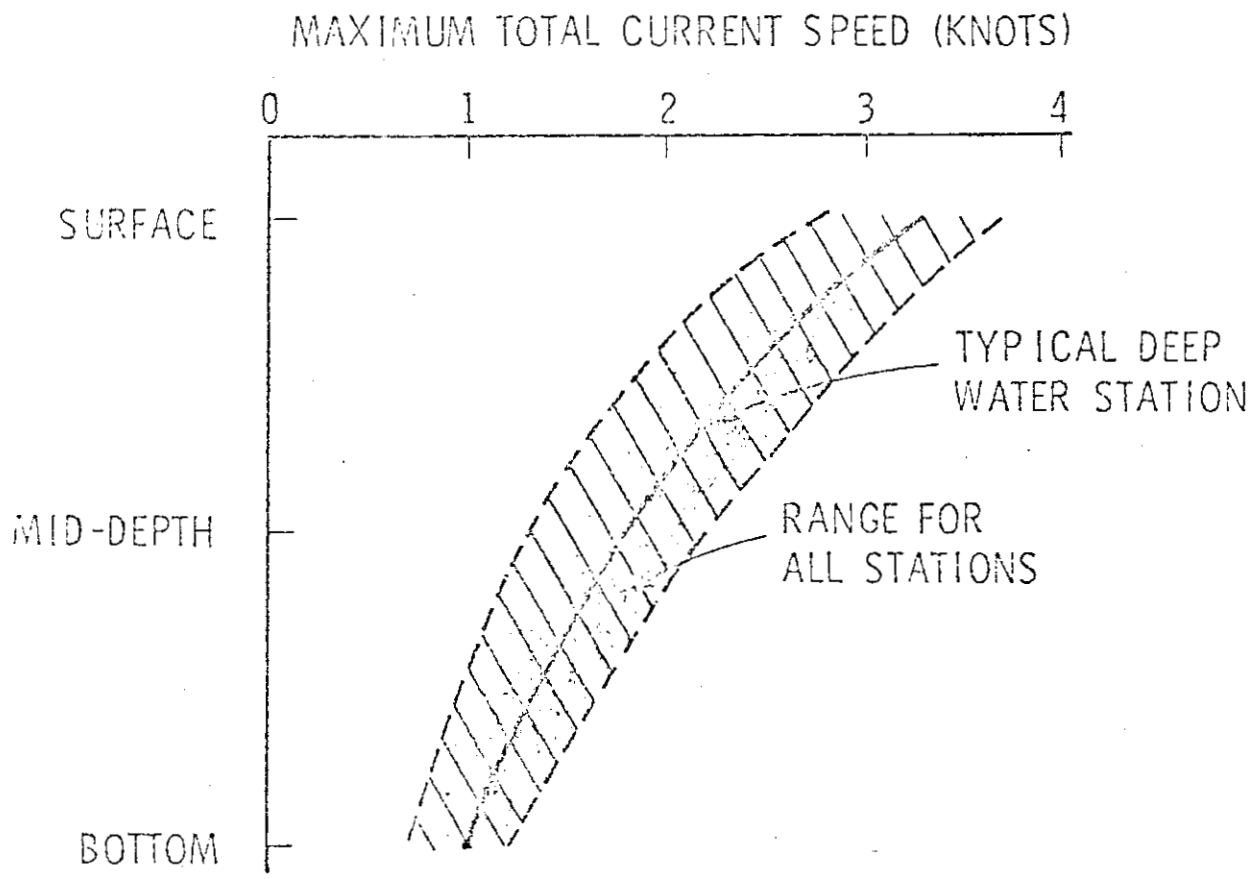
# COMPARISON OF WAVE HEIGHTS IN VARIOUS OPERATING LOCATIONS



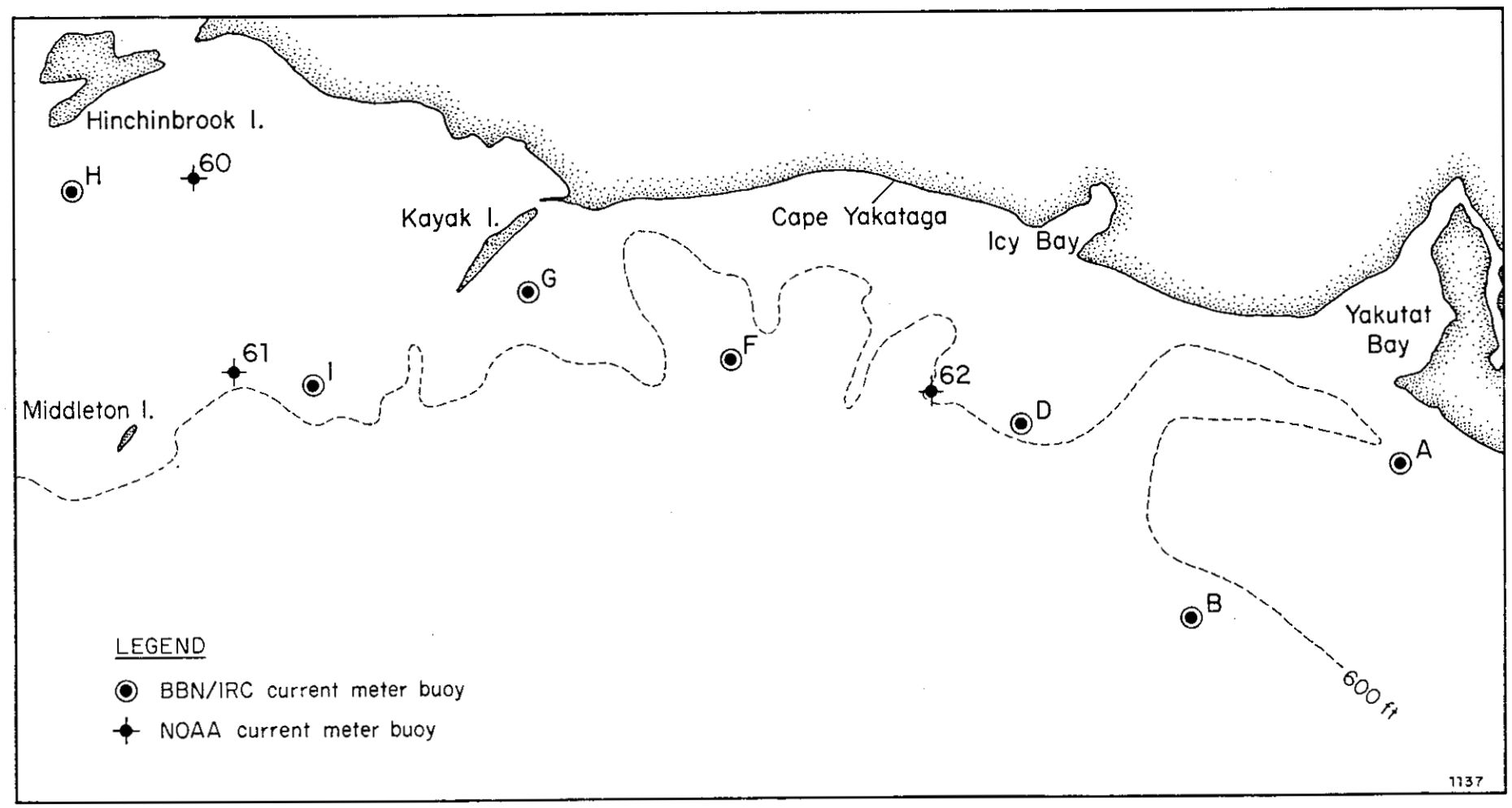
SEASONAL VARIATION OF SURFACE CURRENT SPEEDS



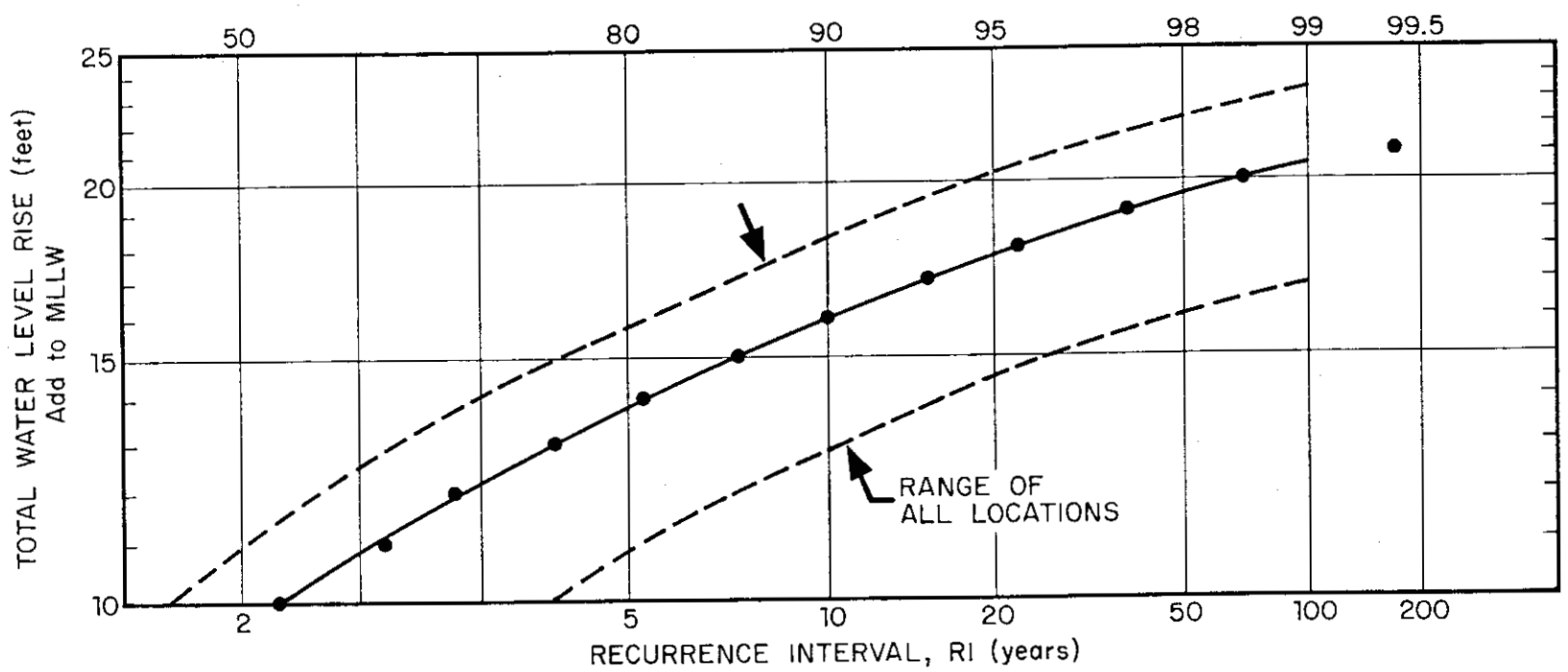
## MAXIMUM TOTAL CURRENT SPEED



GULF OF ALASKA
CURRENT METER MEASUREMENTS

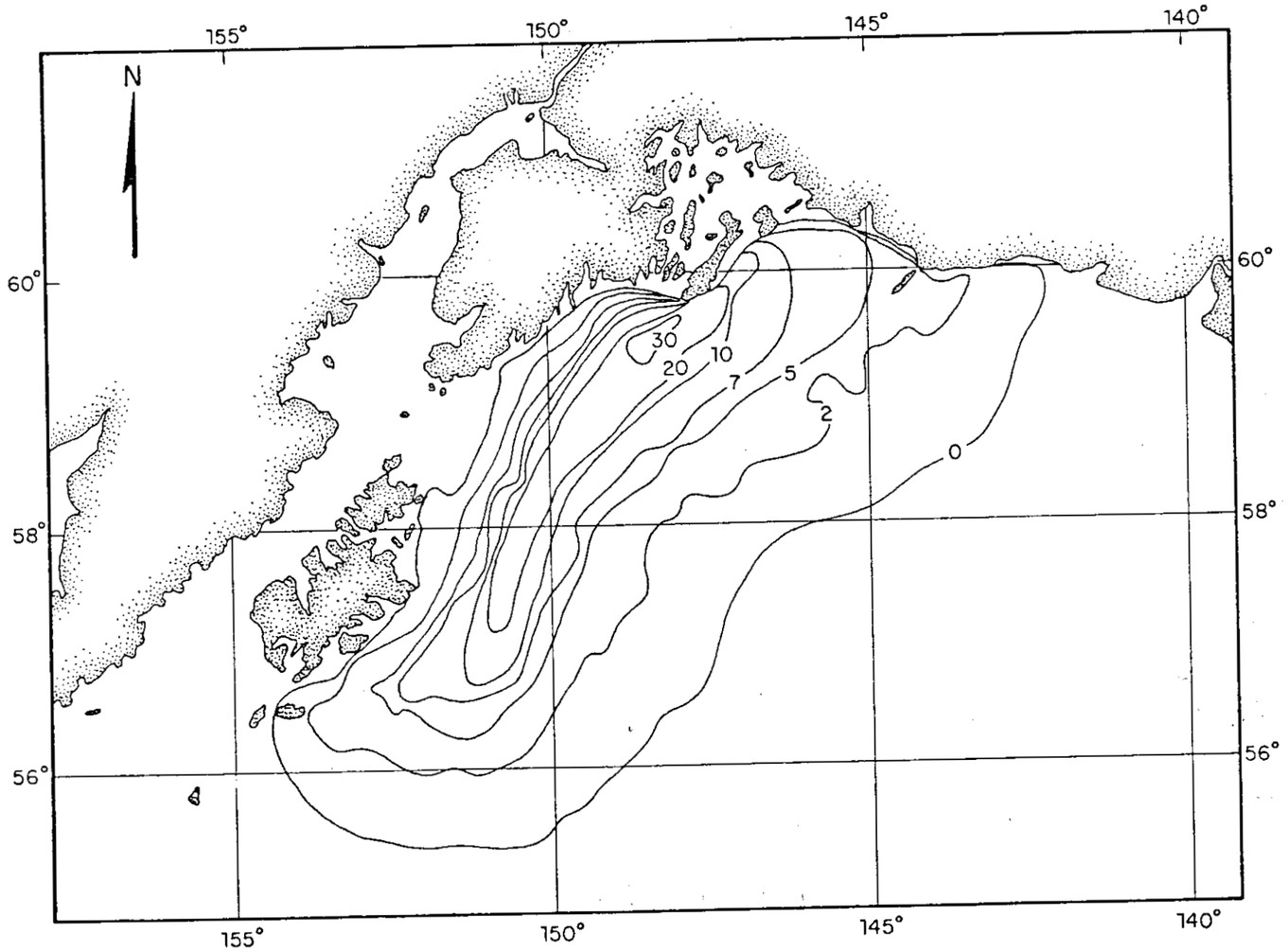


COMBINED WATER LEVEL ELEVATION
DUE TO ASTRONOMICAL & STORM TIDE

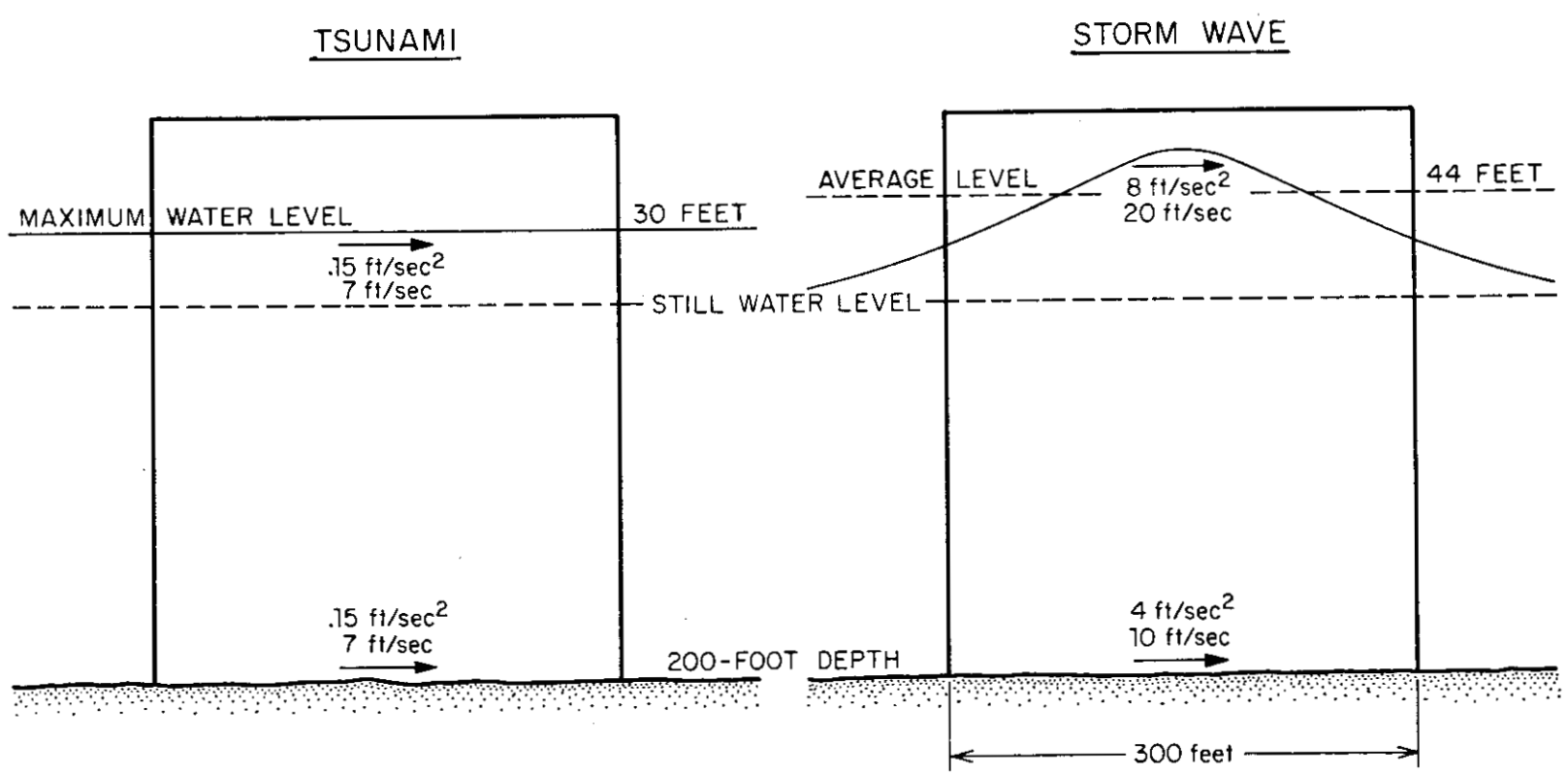



SLIDE 16
1137

COMPUTED MAXIMUM 1964
TSUNAMI ELEVATION (feet)



## COMPARISON OF TSUNAMI AND STORM WAVE



STATEMENT OF

JOHN H. MCKEEVER
AMOCO PRODUCTION COMPANY

BEFORE THE

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HEARING ON

PROPOSED OIL AND GAS LEASING
ON THE
OUTER CONTINENTAL SHELF
NORTHERN GULF OF ALASKA

ANCHORAGE, ALASKA
AUGUST 12-13, 1975

GULF OF ALASKA
SEA FLOOR

GOOD MORNING. MY NAME IS JOHN MCKEEVER. I AM A STAFF GEOLOGIST AND EXPLORATION REPRESENTATIVE IN ALASKA FOR AMOCO PRODUCTION COMPANY AND HAVE BEEN EMPLOYED IN THAT CAPACITY, RESIDENT IN ALASKA, FOR NINE YEARS. DURING THAT TIME I HAVE BEEN CONCERNED, ON BEHALF OF MY COMPANY, WITH FIELD WORK, WITH GEOPHYSICAL WORK, AND WITH BOTTOM SAMPLING IN THE GULF OF ALASKA. I HAVE REVIEWED THE DRAFT ENVIRONMENTAL STATEMENT. IN PREPARING THE FINAL ENVIRONMENTAL STATEMENT, I BELIEVE YOU SHOULD BE AWARE THAT THE OIL AND GAS INDUSTRY, AND OTHERS, HAVE ACQUIRED A VERY GREAT DEAL OF INFORMATION ABOUT THE SEA FLOOR IN THE GULF OF ALASKA, AND THAT CONSIDERABLE TECHNOLOGY TO INTERPRET THIS INFORMATION WITH RESPECT TO ENVIRONMENTAL CONCERNS EXISTS.

WE DO NOT SUGGEST THAT THE GULF OF ALASKA SEA FLOOR IS FREE FROM PROBLEM AREAS. WE DO, HOWEVER, FIRMLY BELIEVE THAT INDUSTRY HAS THE INFORMATION AND THE KNOWLEDGE TO IDENTIFY THESE AREAS AND THAT OUR OPERATIONS CAN BE CONDUCTED WITH COMPLETE ENVIRONMENTAL SAFETY.

IN GEOLOGY, AS IN HISTORY, ONE OF THE MOST BASIC PRINCIPLES IS THAT THE PAST IS A KEY TO PREDICTING THE FUTURE. FORTUNATELY, THERE IS A RECORD OF IMPORTANT PAST EVENTS IN THE GULF OF ALASKA TO AID US IN JUDGING THE SAFETY OF FUTURE OPERATIONS. THIS RECORD IS ENSCRIBED IN THE GEOLOGY OF THE GULF OF ALASKA. IT IS WRITTEN IN THE ROCKS EXPOSED ALONG THE SHORE, AND MORE GERMANE TO OUR PRESENT CONCERNS, IT IS WRITTEN IN THE SEDIMENTS UNDERLYING THE WATERS OF THE GULF OF ALASKA.

IN THE NEXT FEW MINUTES I WILL SHOW YOU HOW WE READ THE HISTORY WRITTEN IN THE ROCKS OF THE SEA FLOOR AND HOW WE CAN THEN ANSWER QUESTIONS ABOUT THE GULF OF ALASKA'S SEA FLOOR STABILITY IN RELATION TO LARGE EARTHQUAKES, STORM WAVES, TIDAL AND STORM CURRENTS, AND NATURAL OIL AND GAS SEEPS. BEFORE GETTING INTO THE TECHNICAL DETAILS OF HOW WE READ THE HISTORY OF THE ROCKS, LET'S REVIEW FOR A MOMENT WHAT WE ALREADY KNOW ABOUT THE GULF OF ALASKA. WE KNOW THERE ARE OIL AND GAS SEEPS IN THE AREA. WE KNOW THAT THE GULF IS SUBJECT TO LARGE WAVES AND SEVERE STORMS, AND THAT THESE HAVE OCCURRED FOR MANY YEARS. WE ALSO KNOW THAT WITHIN RECORDED HISTORY THE AREA HAS BEEN SUBJECT TO VERY LARGE EARTHQUAKES, AND THAT THESE ALSO TOOK PLACE IN PREHISTORIC TIMES. WE ALSO KNOW THAT SINCE ROCKS OF THE SEA FLOOR WERE

PRESENT DURING SUCH PAST EVENTS AND FAILED ONLY IN LOCAL AREAS, IT IS VERY UNLIKELY THAT WIDESPREAD FAILURE WILL OCCUR IN THE FUTURE.

NOW THEN, LET'S PROCEED TO INTERPRET GEOLOGIC HISTORY AND IF POSSIBLE TO PREDICT THE FUTURE. WE BEGIN BY GATHERING INFORMATION ABOUT THE SEA FLOOR, AND THIS IS OBTAINED IN A VARIETY OF WAYS, RANGING FROM DIRECT OBSERVATION BY PEOPLE IN SUBMERSIBLE VESSELS TO DETAILED MAPPING BY GEOPHYSICAL SURVEYS.

THE TWO METHODS MOST FREQUENTLY USED BY THE PETROLEUM INDUSTRY HAVE BEEN SEA FLOOR SAMPLING AND HIGH RESOLUTION ACOUSTIC SEISMIC SURVEYS. IN SEA FLOOR SAMPLING, AN ACTUAL PIECE OF ROCK OR OTHER MATERIAL FROM ON OR BENEATH THE SEA FLOOR IS RECOVERED BY DREDGING OR CORING. DEVICES SUCH AS CLAMSHELL OR BUCKET DREDGES, DART OR PISTON CORERS, OR ROTARY CORE DRILLS ARE USED TO OBTAIN ACTUAL SAMPLES OF THE MATERIAL ON OR BELOW THE SEA FLOOR.

HIGH RESOLUTION ACOUSTIC SEISMIC SURVEYS ARE USUALLY SPOKEN OF AS ACOUSTIC SURVEYS. ALL ACOUSTIC SURVEY SYSTEMS HAVE AN UNDERWATER ENERGY SOURCE BROADCASTING SOUND WAVES INTO THE WATER. THE SOUND IS SENT OUT IN SHORT PULSES AT PRECISELY

TIMED INTERVALS. WHEN THE SOUND PULSES STRIKE A SURFACE SUCH AS THE SEA FLOOR OR BEDS BENEATH IT, THEY ARE REFLECTED BACK, IN PART, AND ARE DETECTED BY SENSITIVE RECEIVERS, AND THE TOTAL TRAVEL TIME IS RECORDED. THE DISTANCE BETWEEN THE SOUND SOURCE AND THE REFLECTING SURFACE CAN THEN BE CALCULATED FROM THE KNOWN VELOCITY OF SOUND THROUGH THE TRANSMITTING MEDIUM.

THE RANGE OF USEFUL FREQUENCIES FOR ACOUSTIC SYSTEMS IS FROM ABOUT 40 UP TO 300,000 HERTZ. THE HIGHER FREQUENCY, SHORTER WAVE LENGTH SYSTEMS HAVE HIGHER RESOLUTION AND ACCURACY, BUT SHALLOW PENETRATION, WHILE THE LOWER FREQUENCY, LONG WAVE LENGTH SYSTEMS HAVE GREATER CAPABILITY IN DEEP PENETRATION. THE ENERGY SOURCE AND RECEIVERS OF ANY SYSTEM CAN BE TUNED TO RECORD SPECIFIC FREQUENCIES THAT PROVIDE THE BEST INFORMATION OR THE INFORMATION MOST DESIRED ABOUT A PARTICULAR AREA. SUCH SYSTEMS ARE CALLED TUNED TRANSDUCER SYSTEMS. UNDER GOOD CONDITIONS, THE HIGH FREQUENCY SYSTEMS CAN DEFINE FEATURES WITH LESS THAN A FOOT OF RELIEF ON THE SEA FLOOR AND THEY CAN ALSO DETECT SCHOOLS OF FISH AND BUBBLE COLUMNS IN THE WATER. THE LOWER FREQUENCY SYSTEMS CAN PENETRATE PERHAPS AS MUCH AS 3000′ INTO THE SEA FLOOR AND DEFINE BEDS WITH A RANGE OF ACCURACY OF 2′ TO 30′.

A NUMBER OF ACOUSTIC SYSTEMS ON DIFFERENT FREQUENCIES CAN BE MOUNTED ON ONE SURVEYING VESSEL AND WHEN THIS IS DONE THE RESULTING SURVEY IS CALLED A MULTI-SENSOR SURVEY. WHILE ACOUSTIC SURVEY DATA IS BEING RECORDED ON SHIPBOARD, THE EXACT POSITION OF THE SHIP IS ALSO BEING RECORDED CONTINUOUSLY BY NAVIGATIONAL SYSTEMS OF THE SHORAN OR LORAN TYPE. THUS, THE EXACT LOCATION WHERE EACH PIECE OF DATA WAS COLLECTED IS KNOWN AND CONSEQUENTLY, MAPS OF THE DATA CAN BE PREPARED.

EXAMPLES OF THIS DATA ARE SHOWN HERE. FIGURE 5 IS A DEPTH RECORDER PROFILE. NAVIGATIONAL STATIONS ALONG THE PROFILE ARE NUMBERED ACROSS THE TOP OF THE RECORD AND MARKED BY VERTICAL LINES. THE DEPTH SCALE ON THIS RECORD IS IN FATHOMS, AND YOU WILL NOTE THAT THE RECORD SHOWS A SCARP WITH ABOUT EIGHT FATHOMS OF RELIEF ON THE LEFT, AND BUBBLE CLUSTERS IN THE WATER COLUMN ON THE RIGHT.

A TUNED TRANSDUCER RECORD IS SHOWN IN THE LOWER PART OF FIGURE 5. THIS RECORD WAS RUN SIMULTANEOUSLY WITH THE DEPTH RECORDER RECORD ABOVE AND IT SHOWS THE SAME SCARP, THE SAME BUBBLE CLUSTERS; HOWEVER, THE HORIZONTAL SCALE IS EXPANDED.

AN ELECTROMECHANICAL RECORD IS SHOWN IN THE UPPER LEFT OF FIGURE 6. HERE WE SEE TWO LAYERS OF SEDIMENTARY ROCK,

COLORED GREEN AND YELLOW, AND WE SEE THE DETAILS OF THEIR CONTACT WITH A SERIES OF OLDER BEDS BENEATH THEM. PENETRATION HERE IS ABOUT 500' BENEATH THE SEA FLOOR. A SPARKER RECORD IS SHOWN IN THE LOWER PART OF FIGURE 6 AND IT SHOWS A SIMILAR SUCCESSION OF BEDS ALONG A DIFFERENT SURVEY LINE.

A SIDE SCAN SONAR RECORD IS SHOWN IN FIGURE 7. IN THIS SYSTEM THE SOUND IS BEAMED DOWN AND OUT ON EITHER SIDE OF THE SHIP'S TRACK AND THE RECORD FORMS A PICTURE MUCH LIKE AN AERIAL PHOTOGRAPH OF THE SEA FLOOR SURFACE.

THE ACTUAL BOTTOM SAMPLES CAN BE EXAMINED BY SPECIALISTS IN GEOLOGY AND ENGINEERING TO DETERMINE HOW OLD THE BEDS MAY BE, THE KIND OF ENVIRONMENT IN WHICH THEY WERE DEPOSITED, WHETHER THEY MAY PROVIDE SUITABLE SOURCES, OR SUITABLE RESERVOIRS, FOR OIL AND GAS, AND HOW STRONG THEY MAY BE FOR ENGINEERING PURPOSES.

WHEN THESE PROPERTIES ARE DETERMINED, THEY CAN BE CORRELATED WITH THE LAYERS OF SEDIMENTARY ROCK DETERMINED BY THE ACOUSTIC SURVEYS, AND MAPS CAN BE MADE SHOWING THE SEA FLOOR TOPOGRAPHY, THE TREND OF SEA FLOOR GEOLOGIC FEATURES, THE DISTRIBUTION OF DIFFERENT KINDS OF SEA FLOOR SEDIMENTS, AND THE GEOLOGIC STRUCTURE OF THE OLDER BEDS BENEATH THE SEA FLOOR.

THESE RESULTS CAN BE USED TO DETERMINE THE PRESENT SEA FLOOR ENVIRONMENT AS WELL AS ITS RECENT HISTORY, AND CAN ALSO BE USED TO PLAN FURTHER EXPLORATION ACTIVITY. ONE OF ITS PRINCIPAL USES FROM THE ENVIRONMENTAL STANDPOINT, IS THAT IT ENABLES THE PETROLEUM INDUSTRY TO LOCATE THE AREAS WHERE HAZARDS MAY BE INVOLVED AND TO AVOID THEM OR TO PLAN AROUND THEM.

A NUMBER OF SEA FLOOR SURVEYS HAVE BEEN CARRIED OUT IN THE GULF OF ALASKA BY INDUSTRY GROUPS, BY PRIVATE GROUPS, AND BY INDIVIDUAL COMPANIES. THE SURVEYS HAVE BEEN CONCENTRATED IN THE GENERAL AREA BETWEEN MIDDLETON ISLAND AND ICY BAY. BY THE END OF SUMMER 1975, IT IS ESTIMATED THAT THE INDUSTRY WILL HAVE ACCUMULATED ABOUT 6000 LINE MILES OF ACOUSTIC SURVEYS, OVER 5000 DART CORE SAMPLES, AND POSSIBLY 25,000' OF DRILL SAMPLES, AT A TOTAL COST OF MORE THAN $15 MILLION. MOST OF THIS EXPENDITURE MAY BE CREDITED TO THE PETROLEUM INDUSTRY AS AN INVESTMENT IN ENVIRONMENTAL UNDERSTANDING OF THE REGION.

BENEATH THE CONTINENTAL SHELF LIE ROCKS SIMILAR TO THOSE FOUND ONSHORE BORDERING THE GULF OF ALASKA. HOWEVER, OFF-SHORE THE FORMATIONS ARE LESS STRUCTURALLY DISTURBED THAN

THEY ARE ONSHORE, AND THEY WERE PLANED OFF BY MARINE AND GLACIAL EROSION DURING RATHER LATE GEOLOGIC TIME.

DURING THE PLEISTOCENE ICE AGES THE SEA LEVEL WAS LOWERED AND MUCH OF THE GULF OF ALASKA'S CONTINENTAL SHELF WAS ABOVE THE SURFACE OF THE SEA. IT WAS THEN COVERED BY GREAT ICE SHEETS ORIGINATING IN THE MOUNTAINS BEHIND THE PRESENT COAST LINE. THE ICE APPEARS TO HAVE CUT SEVERAL MAJOR CHANNELS ACROSS THE GULF OF ALASKA CONTINENTAL SHELF FROM MONTAGUE ISLAND CHANNEL TO ALSEK CHANNEL, AND GLACIATION APPEARS TO BE THE PRIMARY DETERMINANT OF THE BATHYMETRY OF THE GULF OF ALASKA CONTINENTAL SHELF.

THE UPPER RECORD ON FIGURE 8 IS AN ELECTROMECHANICAL RECORD, AND SHOWS THE SEQUENCE OF BEDROCK FORMATION AND GLACIAL AND RECENT OVERBURDEN THAT ARE TYPICAL OF MUCH OF THE NORTHERN GULF OF ALASKA. THE BOTTOM PART OF THE RECORD SHOWS BEDROCK SLOPING UPWARD TOWARDS THE SEA FLOOR, AND TRUNCATED BY A GLACIAL UNCONFORMITY. THIS EROSIONAL SURFACE SLOPES AT A LOW ANGLE AND IS FAIRLY SMOOTH AND REGULAR WITH PERHAPS 100' OF RELIEF.

DIRECTLY OVERLYING THE BEDROCK ALONG THIS UNCONFORMITY IS A LAYER OF OVERBURDEN ABOUT 40' TO 100' THICK. ITS SURFACE

HAS A LOW UNIFORM AVERAGE DIP SEAWARD WITH ERRATIC LOCAL RELIEF OF 10'. THIS LAYER SHOWS NO STRATIFICATION AND IT IS FEATURELESS EXCEPT FOR A NUMBER OF SMALL DIFFRACTION PATTERNS. CORE SAMPLES FROM THIS LAYER SHOW THAT IT IS OF LATE PLEISTOCENE TO RECENT AGE AND WAS DEPOSITED BY GLACIERS IN A MARINE ENVIRONMENT. IT IS CALLED THE GLACIAL OVERBURDEN LAYER AND IS OVERLAIN BY ANOTHER LAYER OF OVERBURDEN WHICH HERE THICKENS UNIFORMLY FROM ABOUT 20' TO 230' IN A SEAWARD DIRECTION. AT THIS LOCALITY THE UPPER SURFACE OF THIS LAYER FORMS THE SEA FLOOR WHICH IS EXTREMELY SMOOTH WITH A GENTLE SEAWARD SLOPE. THE SMALL CYCLIC VARIATIONS IN ITS THICKNESS ARE CAUSED BY WAVES OR SWELLS AT THE SURFACE OF THE SEA. SAMPLES OF THIS LAYER SHOW THAT IT IS A MARINE DEPOSIT OF RECENT AGE, COMPOSED ALMOST ENTIRELY OF SILTY CLAY WITH SCATTERED PEBBLES AND COBBLES EMBEDDED WITHIN IT, AND IT IS CALLED A RECENT OR NORMAL MARINE OVERBURDEN.

WHERE RECENT OVERBURDEN IS ABSENT, THE SEA FLOOR LOSES ITS SMOOTH ACOUSTIC CHARACTER AND TAKES ON A CHARACTER REFLECTING ITS COMPOSITION. WHEN GLACIAL OVERBURDEN FORMS THE SEA FLOOR, ITS TOPOGRAPHY IS TYPICALLY HUMMOCKY, AND SIDE SCAN SONAR SURVEYS MAY SHOW A COBBLY SURFACE OR EVEN MAY OUTLINE LARGE BOULDERS. WHERE BEDROCK FORMATIONS FORM THE SEA FLOOR THEY ARE USUALLY TOPOGRAPHICAL HIGHS, AND SHOW A ROUGH SURFACE, OFTEN WITH RIDGES THAT FOLLOW AND TRACE THE MORE RESISTANT BEDS.

THE LOWER ELECTROMECHANICAL RECORD IN FIGURE 8 SHOWS RECENT OVERBURDEN PARTLY COVERING A SEA FLOOR TOPOGRAPHIC HIGH, BUT ABSENT ACROSS THE ROUGH, ERODED APEX OF THE HIGH. THE ROUGH TOPOGRAPHY OF THIS FEATURE, AND THE ABSENCE OF DETECTABLE GLACIAL OVERBURDEN, MAY INDICATE THAT IT WAS NEVER GLACIATED AND IS IN FACT A BED ROCK OUTCROP.

THE GULF OF ALASKA HAS UNDERGONE A LONG HISTORY OF EARTH MOVEMENTS THAT HAVE FOLDED AND TILTED THE UNDERLYING BEDROCK. THE RECORD OF THESE EARTH MOVEMENTS IS EVIDENT FROM THE ACOUSTIC SURVEYS SHOWING FORMATION BEDROCK BENEATH THE OCEAN FLOOR. HOWEVER, THERE HAS NOT BEEN ANY EXTENSIVE FOLDING OR FAULTING OFFSHORE SINCE THE LATE PLEISTOCENE. WE CAN DEMONSTRATE THIS BECAUSE WE SEE NO DEFORMATION, OR AT LEAST, ONLY OCCASIONAL INSTANCES OF DEFORMATION OF THE GLACIAL OVERBURDEN LAYER AND THE RECENT OVERBURDEN LAYER.

THE RECENT OVERBURDEN LAYER FORMS THE SEA FLOOR, OVER ABOUT 75% OF THE SHELF AREA, AND THE GLACIAL OVERBURDEN COVERS ABOUT 10%, WHILE 15% OF THE SEA FLOOR IS COMPOSED OF BEDROCK ITSELF.

SINCE THE RECENT OVERBURDEN LAYER BLANKETS MOST OF THE SHELF, ITS STABILITY AS A FOUNDATION LAYER IS ESPECIALLY

IMPORTANT. THE FLAT PARALLEL REFLECTORS WITHIN THIS UNIT ARE BEDDING PLANES FORMED AS THE UNIT WAS DEPOSITED. BREAKS IN THESE BEDDING PLANES WOULD INDICATE TECTONIC DISTURBANCE. SUCH A BREAK IS VISIBLE IN THE BEDDING OF THE RECENT OVERBURDEN ON THE RIGHT SIDE OF FIGURE 8B, SHOWING THAT THE SEDIMENTS HAVE SHIFTED SLIGHTLY SINCE THEY WERE DEPOSITED AND THEREFORE MIGHT NOT PROVIDE A FIRM FOUNDATION IN THE FUTURE. ACOUSTIC SURVEYS HAVE FOUND SUCH AREAS OF INSTABILITY AT ONLY A FEW ISOLATED LOCALITIES. IN THE REST OF THE REGION THE BEDDING IN THE RECENT LAYER IS PARALLEL AND UNBROKEN. THIS SHOWS THAT THESE SEDIMENTS HAVE BEEN UNDISTURBED OVER A PERIOD OF MANY THOUSAND YEARS SINCE THEY WERE DEPOSITED, AND THAT THEY WILL PROVIDE A STABLE FOUNDATION FOR ANY FUTURE CONSTRUCTION.

ACOUSTIC SURVEYS HAVE SHOWN THE DISTRIBUTION, THICKNESS AND TOPOGRAPHY OF THE VARIOUS KIND OF BEDS THAT FORM THE SEA FLOOR IN THE NORTHERN GULF OF ALASKA, AND THEY SHOW RECENT STRUCTURAL MOVEMENTS. AS MENTIONED EARLIER, THERE ARE ONLY A FEW LOCATIONS WHERE THERE HAVE BEEN RECENT MOVEMENTS WITHIN THE PROPOSED SALE AREA.

THERE ARE BATHYMETRIC TRENDS WHERE THE BOTTOM SLOPE MAY BE STEEP ENOUGH TO BE UNSTABLE AND SUBJECT TO SLUMPING. THESE

TRENDS OF SLUMPING HAVE BEEN LOCATED AND MAPPED BY ACOUSTIC SURVEYS AND SEEM GENERALLY TO BE ALONG THE OUTER EDGE OF THE CONTINENTAL SHELF IN THE AREA OF DEEP WATER. FIGURE 9A, ON THE SPARKER RECORD AT THE TOP, IS A PROFILE ACROSS THE BOUNDARY BETWEEN THE CONTINENTAL SHELF AND THE SLOPE. IT SHOWS A ZONE OF SMALL FRACTURES NEAR THE EDGE OF THE SHELF AND A ZONE OF PROBABLE SLUMPING DOWN THE SLOPE. SUCH UNSTABLE AREAS WILL BE AVOIDED DURING OFFSHORE EXPLORATION OPERATIONS.

ACOUSTIC SURVEYS CAN ALSO BE UTILIZED TO LOCATE BUBBLE COLUMNS IN THE WATER AND ACOUSTIC VOIDS IN THE BEDS BENEATH THE SEA FLOOR. FIGURE 5 SHOWS AN EXAMPLE OF BUBBLES IN THE WATER COLUMN. THE LOWER ELECTROMECHANICAL RECORD ON FIGURE 9B SHOWS A CLUSTER OF ACOUSTIC DISCONTINUITIES. IN OTHER REGIONS IT HAS BEEN FOUND THAT SUCH ACOUSTIC DISCONTINUITIES AND BUBBLE COLUMNS ARE OFTEN EVIDENCE FOR HYDROCARBON GAS SEEPS. THUS, TO REDUCE THE POSSIBILITY OF BLOWOUTS, OPERATORS WOULD AVOID DRILLING OR TAKE ADEQUATE PRECAUTIONS IN LOCATIONS WHERE SEEPS HAVE BEEN MAPPED OR ARE SUSPECTED.

THE SEA FLOOR SURVEYS UNDERTAKEN COLLECTIVELY AND INDIVIDUALLY BY COMPANIES IN THE PETROLEUM INDUSTRY PROVIDE THE KNOWLEDGE NEEDED TO CARRY OUT ENVIRONMENTALLY SAFE PETROLEUM

EXPLORATION AND DEVELOPMENT ACTIVITIES. THE SURVEYS THAT HAVE BEEN MADE SHOW THE CHARACTERISTICS OF THE SEA FLOOR IN THE REGION AND THEY HAVE LOCATED THE TRENDS WHERE PROBLEMS MAY EXIST. THE TOTAL INDUSTRY EFFORT THAT HAS GONE INTO SEA FLOOR SAMPLING AND ACOUSTIC SURVEYING WILL GO FAR TO MAINTAIN ENVIRONMENTAL INTEGRITY IN EXPLORATION FOR PETROLEUM IN THE GULF OF ALASKA.

THANK YOU.

THE OIL AND GAS POTENTIAL OF THE GULF OF ALASKA

STATEMENT BY
H. J. FITZGEORGE, MOBIL OIL CORPORATION

PREPARED FOR
GULF OF ALASKA OPERATORS COMMITTEE

GULF OF ALASKA ENVIRONMENTAL IMPACT HEARING
ANCHORAGE, ALASKA
AUGUST 12-13, 1975

My name is Harold Fitzgeorge. I am Vice-President of the Western Exploration and Producing Region, North American Division of Mobil Oil Corporation. In this position I am responsible for all exploration and producing operations for the State of Alaska and contiguous waters, and the northern two-thirds of the United States, including the West Coast and offshore areas.

Prior to this assignment, my experience included assignments as President of Mobil Oil Company de Venezuela, Exploration Manager for Mobil International, and Vice-President and Exploration Manager of Mobil Oil Canada, Ltd. In total, I have 27 years of experience in oil and gas exploration and development since I began working as a geologist in Oklahoma City.

Mobil Oil Corporation is an active member of the Gulf of Alaska Operators Committee, and I am pleased to speak here today. It provides me an opportunity as a geologist to discuss the oil and gas potential of a region that could become one of the most important oil and gas provinces of the U.S. I will elaborate on this, but wish to caution you that in spite of my scientifically based optimism, there are no certainties in oil and gas exploration.

The Gulf of Alaska Sedimentary Basin lies between Kodiak Island on the west and the coastline just west of Juneau, Alaska. It is almost 900 miles long and varies from 40 to 100 miles wide. The total area of the basin is about 40,000 square miles, of which 85%, or about 34,000 square miles, lies beneath the waters of the Gulf of Alaska. This area compares in size with the Louisiana and Texas combined offshore areas.

Oil explorationists look for several criteria when evaluating the oil potential of a basin. Two important factors are source and reservoir rocks. An oil basin must have sedimentary rocks capable of generating oil, and sufficiently thick porous rocks to contain the oil. Oil is generated from organic rich sediments by heat when these sediments are buried to depth, and it is commonly trapped in porous sand reservoir rocks in the earth. Large anticlinal structures contain much of the known world oil accumulations.

The presence of source beds and hydrocarbons in the Gulf of Alaska is well documented:

- A total of 108 oil and 15 gas seeps have been reported onshore by the U.S. Geological Survey. All are west of Yakutat Bay, with clusters of 86 of them in the Katalla area and 29 in the Yakataga area. Several offshore seep areas have also been noted.

- Shallow oil was discovered in 1902 on the north shore of the Gulf of Alaska at Katalla. Cumulative production of nearly 154,000 barrels from the Pt. Hey sandstone and fractured Poul Creek shales resulted from this and subsequent drilling between 1902 and 1933. The oils were described as high gravity, paraffin base and very low in sulfur content.

- A total of 71 wells have been drilled in the province, including one near Middleton Island, 70 miles offshore. Although no commercial discoveries by today's standards have been made, numerous shows of oil and gas have been recorded and the existence of a thick sedimentary sequence has been clearly established.

- Geological and geophysical studies indicate that the Gulf of Alaska Sedimentary Basin contains rock thicknesses in the order of 20,000 feet of Tertiary and Pleistocene rocks, of which the younger 10,000 to 15,000 feet are highly prospective for oil and gas. Estimates of the volume of these younger rocks range from 50,000 to 75,000 cubic miles.

The many onshore indications of hydrocarbons in the basin logically led to a search for petroleum offshore. In 1964 Mobil conducted their first seismic survey in the Gulf of Alaska, and in 1966 joined 24 companies in the first group survey in the Gulf of Alaska. Since then, numerous group and proprietary surveys have been conducted, and my company alone, as an example, has participated in 19 proprietary and 11 group surveys. In addition, we have obtained gravity, aeromagnetic, shallow seismic and sidescan sonar surveys plus bottom sampling and core hole data. We estimate that industry in both group and proprietary surveys has collected over 60,000 miles of seismic data, 8,000 line miles of gravity data, 14,000 line miles of aeromagnetic and 6,000 miles of shallow resolution seismic data. They have drilled 89 core holes and obtained extensive dart core coverage. Our company alone has obtained in excess of 4,500 dart cores. I estimate these surveys represent a pre-sale investment on the part of private competitive industry in the amount of $26 million dollars.

Now let us take a closer look at the geology and oil and gas potential of the Gulf of Alaska. It is important for everyone, and in particular local, state and federal government officials, who influence and directly affect offshore exploration and producing operations, to understand the potential of the Gulf of Alaska in light of our worsening domestic oil and gas shortages.

The prospective Sedimentary rocks of the Gulf of Alaska are sands and shales of Teritary and Pleistocene age and are both marine and non-marine in depositional origin. These sediments are exposed along the northern edge of the basin and have been further described in the subsurface by wells drilled along the shore and seaward by core holes, bottom sampling, geophysics and one deep test near Middleton Island.

Rocks of Cretaceous age are highly intruded, contorted and metamorphosed and are not regarded as objectives for oil and gas exploration.

The Tertiary rocks of the basin are of two distinct sequences: the lower unit is of Paleocene and Eocene age. They are usually hard, dense and highly deformed, and as such offer limited potential.

These rocks are overlain by a sequence of middle and upper Tertiary and recent sediments thought to be in the range of 15,000 to 20,000 feet thick. Beds of Oligocene, Miocene, Pliocene and Pleistocene age exhibit adequate reservoir characteristics, and the organic shales and silts of early Miocene age are thought to be potential source beds, as shown by the many oil and gas seeps from these rocks in the central part of the Gulf of Alaska.
It is interesting to note that rocks of the same age are the major producing horizons in California and the Gulf of Mexico.

Numerous structural features have been indentified both onshore and offshore. Within the designated sale area there are large anticlinal structures mapped by the seismograph. Structures of the magnitude outlined can contain significant reserves which are critically needed for the continued economic well being of Alaska and the lower forty-eight.

Analysis of crude oils from the Katalla Oil Field and various seeps indicate that the Gulf of Alaska has the potential for high quality, low sulfur crudes. The Katalla area crudes measure 41-45$^{o}$ API gravity, with negligible sulfur and high gasoline yields. Analysis of seep crudes show sulfur contents of .8% by weight or lower. This type of crude is a highly desirable source for our product needs in light of air quality control requirements for low sulfur products.

Published figures vary widely on the oil and gas potential of the Gulf of Alaska. Likewise, the areas covered and the methods used by various analyses differ. The Alaska State Department of Natural Resources, Division of Geological and Geophysical Survey, using a volumetric method, estimated in 1974 for the Gulf of Alaska offshore a speculative recoverable resource of 5.4 billion barrels of oil and 39.4 trillion cubic feet of gas, to water depths of 1,500 meters. The United States Geological Survey has recently published a survey for Southern Alaska offshore which gives the lowest limit at 95% probability to be 1 billion barrels of oil, and the highest limit to be 6 billion barrels with a 5% chance: gas reserves are estimated at 2 to 17 trillion cubic feet at the same probabilities. These USGS reserves are for 200 meters or less of water depth and include the Cook Inlet and Kodiak Island Province, which are not included in the aforementioned State of Alaska survey. The Draft Environmental Impact Statement contains the USGS estimate of oil and gas potential for that portion of the Gulf of Alaska contained in the proposed sale area. The lower limit, at 95% probability, is 100 million barrels of oil and 300 billion cubic feet of gas. The high side of that estimate, with a 5% probability, is for 2.8 billion barrels of oil and 9 trillion cubic feet of gas.

Mobil's most recent estimates in the Gulf of Alaska of the potential recoverable oil and gas are of similar magnitude. However, there is no way of knowing what might ultimately be found until the drill bit actually penetrates the reservoirs we think might be present. The potential of the area can only be determined by a succession of exploratory wells seeking out every stratigraphic trend, every structural trend and every combination of both until the final oil potential of the region is known.

There are those who will argue that estimates of the hydrocarbon potential for the entire U.S. offshore are too high and those who argue the other side. Mobil's as well as many other responsible published opinions is that the United States' undiscovered resources will be large in the offshore with the Gulf of Alaska being one of the significant undrilled frontier areas. We think the offshore offers the best opportunity to find large accumulations of oil that will allow us a viable alternative to increased dependence on foreign imports; however, there have been no offshore Federal sales since 1968, except the Gulf of Mexico. In the first quarter of 1975 oil imports represented 38% of total petroleum supply. Our nation should not continue its heavy and increasing dependence on foreign energy sources. Our offshore areas must be explored now. America needs to breathe new life into its domestic oil and gas exploration. In a Department of interior survey of the oil industry, the Gulf of Alaska

was ranked number one in OCS sale priority for its probability of large potential. The oil industry by its already large investment in the Gulf of Alaska has shown it is prepared to carry out an exploration and producing program in an environmentally safe manner that will contribute to a greater and safer domestic energy supply.

Thank you for your attention, and if I can answer any questions you may have I will be pleased to do so.

# PROBABILISTIC RESPONSE OF OFFSHORE PLATFORMS TO SEISMIC EXCITATION IN THE GULF OF ALASKA

Oral Testimony

by

John H. Wiggins, Ph.D.
Professional Engineer
Professional Geophysicist

Presented at the
Environmental Hearing:
Gulf of Alaska
Offshore Sale

SLIDE 1

My name is John Wiggins. I hold a Master of Science Degree in Geophysics, with a speciality in Seismology and the Doctor of Philosophy Degree in Civil Engineering, with a speciality in Structural Dynamics. I am a Registered Civil Engineer and Geophysicist in the State of California, and am one of four persons selected to develop seismic risk maps for the United States, National Bureau of Standards' earthquake code study. My firm has been intimately involved with developing the seismic risk maps for the State of Alaska over the last two and one half years.

My purpose here is to discuss the probabilistic response of offshore platforms to seismic excitation in the Gulf of Alaska.

SLIDE 2

Earthquake engineering is made up of three disciplines in the scientific community. The first deals with the seismic enviornment in which principally seismologists work. From the knowledge of the seismic environment, one can estimate ground shaking, structural response and the failure of various structural elements and components. The latter two disciplines are left to the structural engineer and specialists in engineering mechanics.

All of these disciplines and the knowledge inherent within them, have varying degrees of uncertainty. By combining all of the disciplines and the uncertainties, one can estimate the seismic risk of a particular structural design located at a particular geographical position.

SLIDE 3

This slide illustrates the specific steps that must be treated in an earthquake engineering analysis. Specifically, I shall first discuss the "proneness" of an area to earthquake activities. By combining the seismicity inputs with the soil-structure models, modes of vibration and estimates of damage can be computed in probabilistic terms.

SLIDE 4

Until recently, earthquake design codes, as well as almost all codes and standards, have been developed with the "hope" that absolute safety would result. We now realize that some risk is involved with every standard or code used in design practice. Earthquake codes currently being developed for the National Bureau of Standards by more than 70 national experts is being developed with a clear expectation of risk (chance of loss) in mind. It is within this risk acceptance rationale that I shall direct my testimony.

SLIDE 5

Let us first examine the factors that influence ground motions.

SLIDE 6

The mechanism of earthquake action in the Gulf of Alaska is now generally agreed to be caused by a layer of roving plates which are moving relative to one another. The Pacific Plate is being forced northwesterly in relation to the American Plate. The area of interest is located in the vicinity of the junction of the Pacific and American Plates.

SLIDE 7

On page 53 of the EIS, it is stated that there are two methods for estimating future seismicity. One of these can only be used for relative comparisons. There are actually six basic methods which have been developed in order to make estimates about future seismic motions. Method 1 is deterministic in its approach. Maximum credible earthquakes are postulated to occur on known fault lines which intersect the earth's surface. Usually an earthquake magnitude and distance from source to site is postulated by an expert.

SLIDE 8

This slide indicates the zone of the postulated maximum credible earthquake magnitude of 8.5 developed by the U.S. Geological Survey. It ranges from the dotted line to the 3,000 meter contour depth line. The major problem in determining potential future motions is specifying the location of the earthquake within this broad zone. Should it be located at the center of the zone, directly underneath the site, or at some other distance?

SLIDE 9

In order to overcome some of these objections, Method 2 assumes that a good estimate of future seismicity may be derived from examining historic seismic conditions that are not modified by judgment. Various scientists have contended, however, that historic data are too limited to derive accurate probabilistic values of seismicity.

SLIDE 10

Method 3 assumes that the "negative" of seismic history can be expected to occur in the future. Thus, where seismic "gaps" appear in the data , one can expect a large earthquake in the near future. Such a "gap" has been postulated to occur within the zone anticipated for the general sale area.

SLIDE 11

This figure indicates all earthquakes greater than magnitude 7 that have occurred since 1938. The 38 years of data alleges to indicate that there is a seismic feature missing in the area of the sale. However, if one considers a longer history, and includes the three earthquakes that occurred in the "gap" in 1899 and 1900, one can compute the amount of energy released along the eastern, western and "gap" areas. More than twice the energy per year has been released in the "gap" area per mile as compared to that for the eastern and western areas combined. On page 55 of the EIS, further evidence elaborating on the usefulness of the "gap" theory in forecasting future seismic motions is developed.

SLIDE 12

Method 4 attempts to combine the knowledge of fault locations and historic data in a manner such that all past earthquakes are judgmentally placed in "source zones." The resulting seismicity is therefore influenced heavily by human judgment. This method has the same drawbacks as Methods 1 and 2 in that criteria depend on the involved individual's judgment and the completeness of the data.

SLIDE 13

Method 5 makes the assumption that our knowledge about past seismic history is highly uncertain. Earthquakes are postulated to occur anywhere within a very large region. The major drawback to this "shoulder-shrugging" process is that major tectonic features are known and should be considered in some logical way.

SLIDE 14

Method 6 has only recently been postulated. Some earth scientists think that there is a link between the huge earthquakes which periodically erupt all around the rim of the Pacific Ocean basin. A huge tremor that shakes Japan, the scientists suspect, may trigger another large earthquake months later in Peru, Mexico or Alaska.

This view has been cautiously expressed and has not been able to meet the test or repeatability using 75 years of fairly accurate information.

SLIDE 15

I have chosen to use Method 2 for the best, first estimate of the seismicity in the Gulf. I believe that Method 2 is superior for the following reasons:

1. We have used yet another approach for mapping called the Bayesian method. It combines Methods 1 with 2 in a rigorous mathematical procedure. To date, we have constructed Bayesian maps only for California. However, those maps reveal that where data are of good quality and in sufficient number,

there is little difference between a Bayesian map and Method 2.

2. Historical data allow us to use the probabilistic method and present a logical engineering framework for decision making.

3. The rationale follows that set forth by the Structural Engineers Association of California in their earthquake design policy.

4. It has been shown in all case law involving flood plain zoning, another natural hazard, that the severity of the regulation must match the severity of the historic risk.

SLIDE 16

Before talking about earthquake history, let us examine something that is more familiar; namely, automobile accidents. This slide describes the number of yearly accidents that might be expected. The number of vehicles involved in an accident may be described as the magnitude of the accident. Note that the data do not fall on top of one another, because they involve different data bases. Also, the data diverge for 8 and 9 vehicles. The reliability of the information in the large magnitude is lower than that in the low magnitude range. Nevertheless, as more yearly data are plotted, they will converge on the line, even at high mangitude.

SLIDE 17

The same phenomenon is experienced in earthquake history. This slide plots the magnitude of events that have occurred in and about the City of Anchorage, using two data bases. The first is that which has been taken by NOAA since 1963. It is an accurate information base; however, the reporting period (10.5 years) is short compared to the historic Alaska data base of 74 years. The historic data base, however, is incomplete for magnitudes lower than 6.5.

The 10.5 year data base coincides quite closely with the regression curve plotted in the lower magnitude ranges. More information is available in the smaller magnitude range than that for large magnitudes. This finding reflects the automobile accident example.

However, if the historic is combined with the 10.5 year data base, the circles plot closer to the regression curve than do the triangles, indicating that the line is a good estimate of seismicity.

SLIDE 18

The ground motion that might be experienced by a structure is influenced by the distance as well as the size of the earthquake. It is suggested that the EIS make note of this fact. On pages 362, 364, 365 and 366, it is mentioned that structures are designed to resist earthquakes of a specified Richter magnitude. But magnitude is only one part of the two-part problem of deriving intensity. Unlike water waves, which occur over large regions, earthquake motions dissipate from source to site. Thus, the second part of deducing

intensity is to know the attenuation properties of the geographical region in question. What are the ground motions at the epicenter and how do they dissipate with distance?

Curves used in our study to develop seismic risk maps are constructed primarily from California earthquake data. The question might arise as to whether California information can be used to discuss Alaska conditions, both near the epicenter and at some distance from the epicenter. This slide shows the difference in attenuation properties in the eastern and in the western or California region of the United States. In 1811, an earthquake slightly smaller than the famous 1906 San Francisco earthquake occurred in southern Missouri. The area of potential damage is considerably larger than that of the 1906 quake. Similarly, the 1971 San Fernando earthquake affected a much smaller area than did the 1886 Charleston, South Carolina earthquake which had a similar magnitude.

SLIDE 19

This slide plots the region in which people can notice an earthquake. I have also plotted the areas felt by six typical Alaska earthquakes. In all but one instance, the data fall well below the California line indicating that California attenutation equations are conservative in an analysis of Alaska. Page 44 of the EIS confirms our estimates of the attenuation properties for the Gulf of Alaska region.

SLIDE 20

Is the same observation correct in the near-field? It has been postulated that because Alaska earthquakes occur on

"low angle" faults, this may not be the case. As you can see, the Pacific Plate being pushed under the American Plate has a very gentle slope.

The following rationale leads me to the conclusion that the use of California data in the near-field is also an adequate approximation of Alaskan conditions:

1. Alaska earthquakes have deeper foci than do California quakes. The average depth of the 1964 shocks was 26.5 kilometers. California earthquakes have an average depth of about 16 kilometers.

2. As the slide depicts, it is questionable whether or not the sale area is underlain by the low angle fault type.

SLIDE 21

3. Referring back to an earlier figure, the western Alaska aftershock zones appear to be wider than the eastern aftershock zones. When the energies are balanced, however, the length to width ratio of the zones are nearly similar.

The largest recent earthquake in California (the 1952 Arvin earthquake of magnitude 7.7) had a similar aftershock length to width ratio. This indicates that the aftershock zone width is not necessarily proof that low angle faulting contributes to large zones of high intensity vibrations.

SLIDE 22

Using all of the historic information available and treating each earthquake as a point source, hard rock velocity contours for an arbitrary return period, 100 years, have been constructed for the Gulf of Alaska. In the general area of the sale, the contours range from a low of about 3 inches per second at the southeast edge to a high of about 7 inches per second at the northwest edge of the area.

SLIDE 23

Using the fault line correction technique, in a sense combining Method 1 and Method 2, we have constructed a more realistic map. Particle velocity ranges from 4 inches per second to 8 inches per second within the general vicinity of the sale. Considering the differences in techniques for constructing maps, these differences are small and lend confidence to the analysis.

SLIDE 24

Recognizing that maps can be produced for different return periods, the question arises as to what return period or, put another way, what probability of occurrence during the structure lifetime is acceptable for design? In order to answer this question, we can examine the de facto risk associated with the current and proposed United States codes.

Present California codes have associated with them a de facto 22% chance that the level of design will be equaled or exceeded during the 50-year lifetime expectancy of a building. The U.S.G.S. is now using the 10% chance of exceedance

in their map values for a 50-year building life. These percentages of exceedance may be compared with water wave exceedance estimates appearing on page 36 of the EIS. These estimates are 26% for the 100-year and 14% for the 200-year storms.

SLIDE 25

Recognizing these de facto as well as stipulated criteria, four candidate levels of shaking, reflected by the response spectra shown, have been used to analyze various offshore platform designs in various kinds of soils. Level 3 corresponds to the strongest record recorded on soil in California, and Level 4 corresponds to 1.5 times that level. Using the relative methods of determining seismic recurrence frequencies referred to on page 53 of the EIS, 0.5 inches/yr. vertical uplift has been evidenced on the average over the last 4500 years. Assuming a dip angle of $10^{\circ}$, the horizontal movement has been about 2.3 inches/yr. which corresponds to the California San Andreas Fault rate of movement. The base, particle velocity spectra are shown in this slide.

SLIDE 26

Herein are shown the various risks associated with the inputs used in analysis. The probability of occurrence of each level at the strongest and the weakest seismic locations are noted. Levels 3 and 4, for the most part, equal or are below current and proposed probabilistic levels.

SLIDE 27

We may now proceed to the structural analysis and response procedure. Seismograms, typical of that shown in the lower left-hand corner of this slide, were used to excite structures.

SLIDE 28

Actual test site soil borings were taken in the Gulf of Alaska. Three typical sites are shown: Soils I, II and III might be termed as soft, stiff, and semi-stiff, respectively. These soil configurations were modeled for computer treatment.

SLIDE 29

We have analyzed and modeled typical offshore structures, one of which is shown. The vibration modes have been coupled with soil as demonstrated by the lower figure on the right.

SLIDE 30

Let us proceed now to the development of an understanding of the damage that might occur from the various levels of vibration.

SLIDE 31

Three platform configurations were considered: template, outrigger and tower. These are jargon descriptions of various designs that may be considered for the Gulf of Alaska region. Five modes of failure were considered: failure of the deck structure, the template, the piles in compression and tension, and failure of the conductor pipe in which oil pipes are contained.

SLIDE 32

The performance of the tower structure in 600 feet of water can be demonstrated. Assuming the sofest soil, the normalized deck displacement relative to rock is shown for the levels of input and various types of analyses performed.

I want to make two points in this slide: First, the worst level of shaking was provided by level 3, when soil interaction is considered, because of tuning between the soil column and the structure. Tuning between the soil and the structure is therefore a very important consideration to investigate in the design of any structure located at a particular site.

Second, it can also be seen that the two different methods of analysis; namely, DYNALIST II and SAP IV, (which is used to design California hospitals and other structures) present only slightly different results.

In summary, all three possible preliminary designs are expected to survive earthquake actions of level 3 and 4 without collapse, but with some damage. This result indicates that structures can be designed using the current seismic knowledge as input.

SLIDE 33

In order to gain a perspective on how severe level 3 and level 4 earthquakes are, let us compare them with existing codes. Level 4 is higher than all of the codes, includin the California Hospital Code. Likewise, level 3 is higher than all but the 1976 Uniform Building Code which assumes the worst soil and the most importan structure.

Herein I am plotting the UBC code levels stipulated for the design of "other structures." In that code, forces are doubled for "other structures" as compared with buildings because of the usual lack of redundancy built into bridge piers and the like. But offshore drilling platforms that are highly interlaced with bracing, are very redundant types of structures and could be categorized as "buildings" when the intent of the doubling factor is recognized. Thus, for platforms of the template variety, level 3 and level 4 would be inputs well above all of the codes shown.

SLIDE 34

In summary, it must be recognized that the earthquake engineering problem of design is probabilistic in nature, as pointed out in the EIS. There are many factors that affect safety and the environmental risk. How big is the earthquake? Where will it be located? What is the chance that response will be equaled or exceeded? How does response affect the probability of damage? How will damage affect loss consierations?

With the appropriate consideration of each probabilistic term, enough knowledge and know-how is available so that structures can be designed for the GOA within an acceptable level of risk.

Thank you,

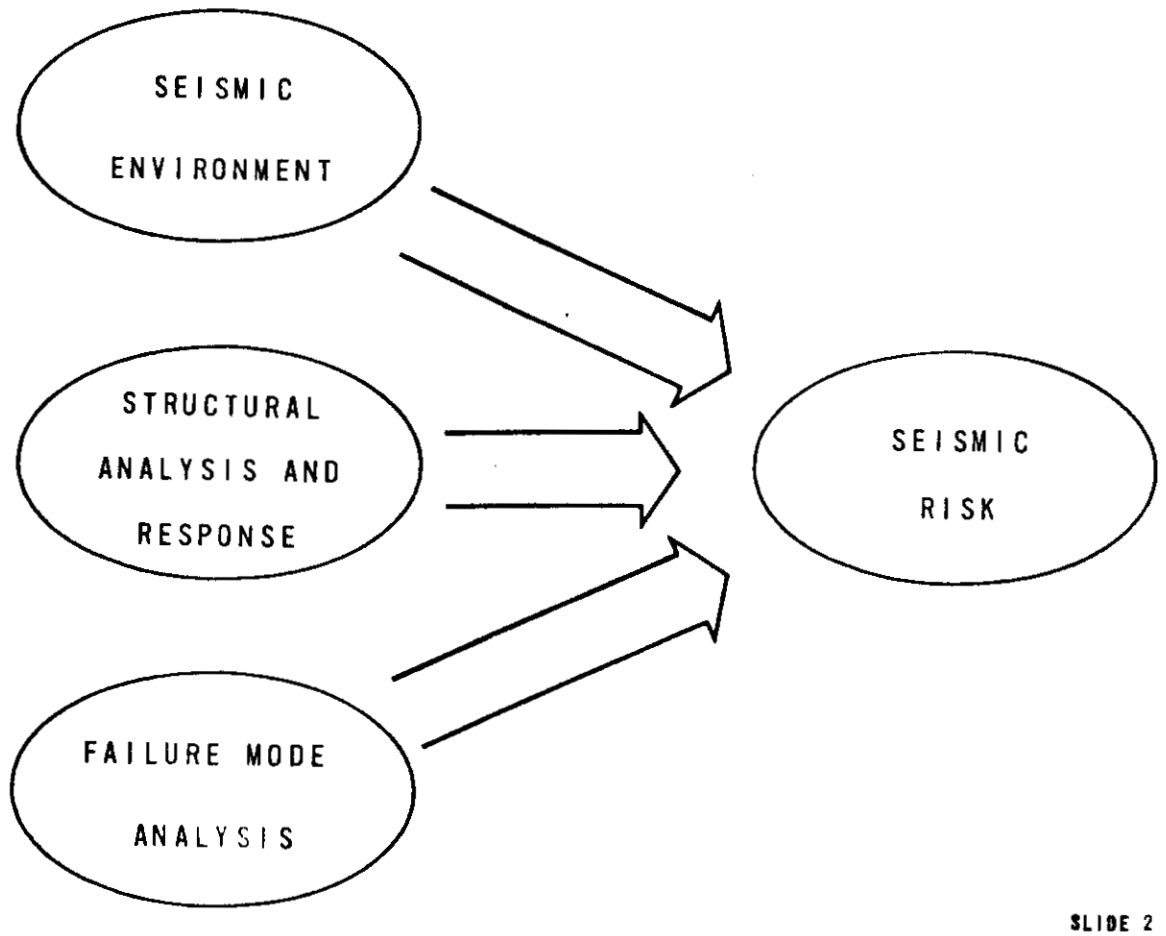
J. H. Wiggins

J. H. WIGGINS COMPANY

# PROBABILISTIC RESPONSE OF OFFSHORE PLATFORMS TO SEISMIC EXCITATION

SLIDE 1

## EARTHQUAKE ENGINEERING

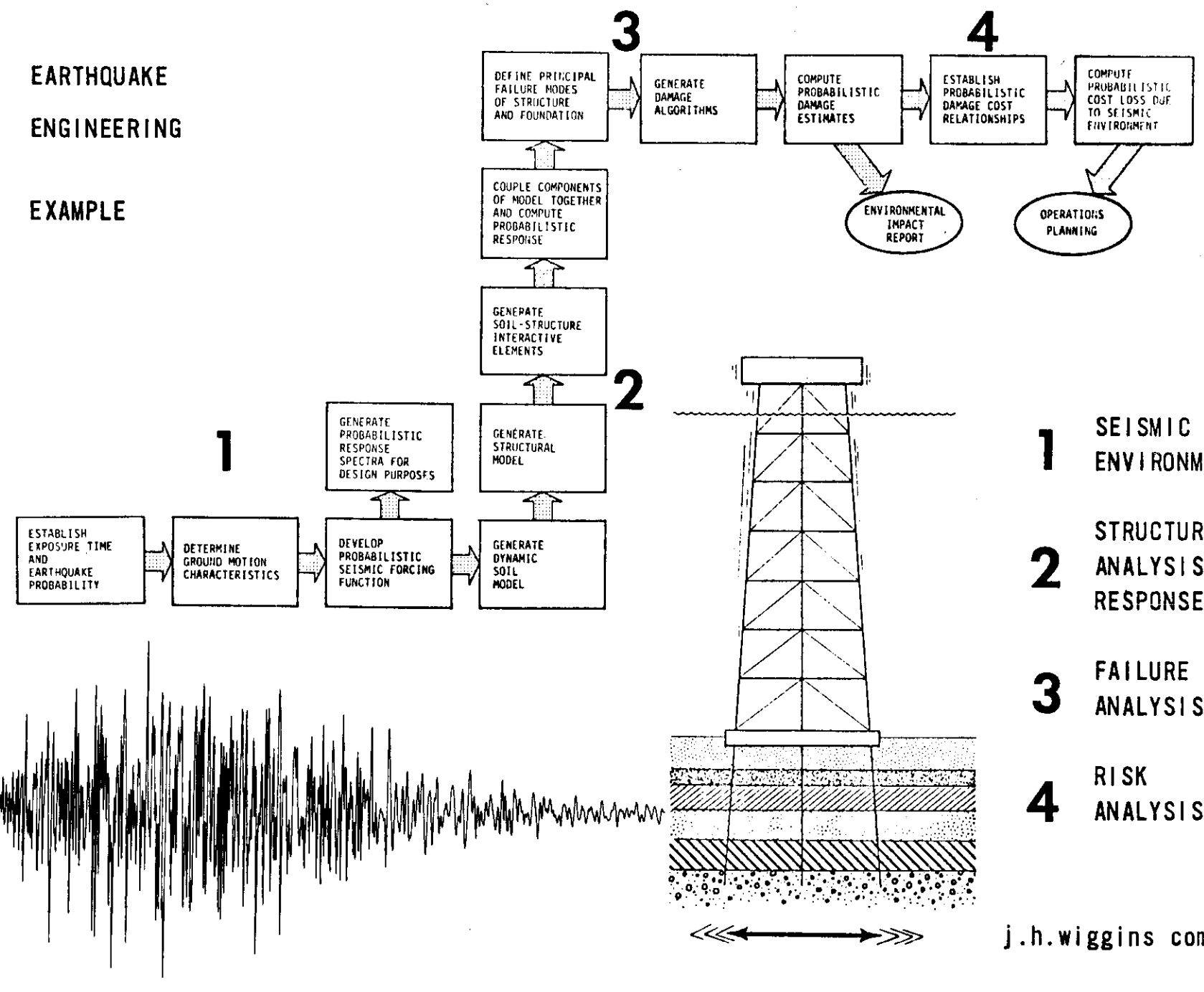



SLIDE 2

EARTHQUAKE

ENGINEERING

EXAMPLE




**1** SEISMIC ENVIRONMENT

**2** STRUCTURAL ANALYSIS AND RESPONSE

**3** FAILURE MODE ANALYSIS

**4** RISK ANALYSIS

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SLIDE 3

## EARTHQUAKE DESIGN RATIONALE

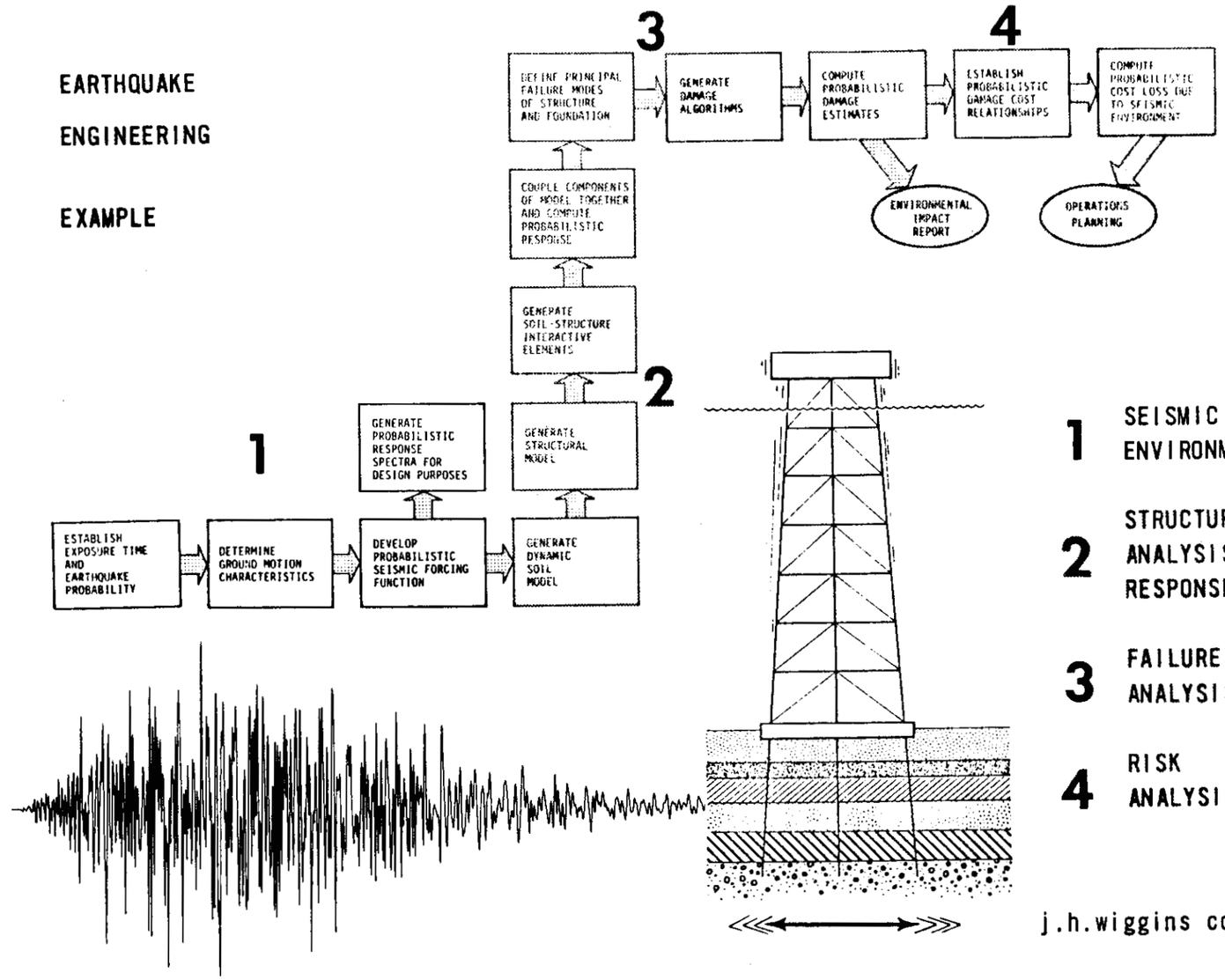
CURRENT EARTHQUAKE DESIGN
CODES ARE BEING DEVELOPED
WITH THE CLEAR EXPECTATION
OF RISK . . . (CHANCE OF LOSS)

SLIDE 4

EARTHQUAKE

ENGINEERING

EXAMPLE




1 SEISMIC ENVIRONMENT

2 STRUCTURAL ANALYSIS AND RESPONSE

3 FAILURE MODE ANALYSIS

4 RISK ANALYSIS

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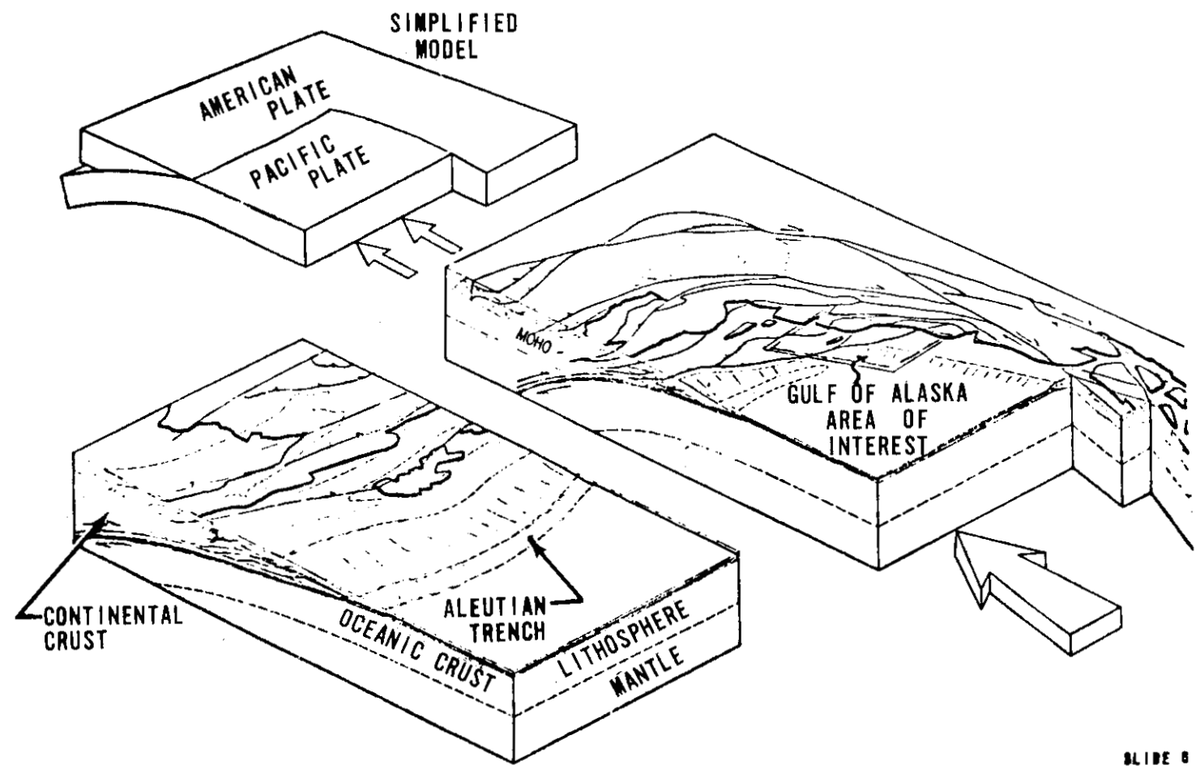
SLIDE 5

## GULF OF ALASKA PLATE MOTION

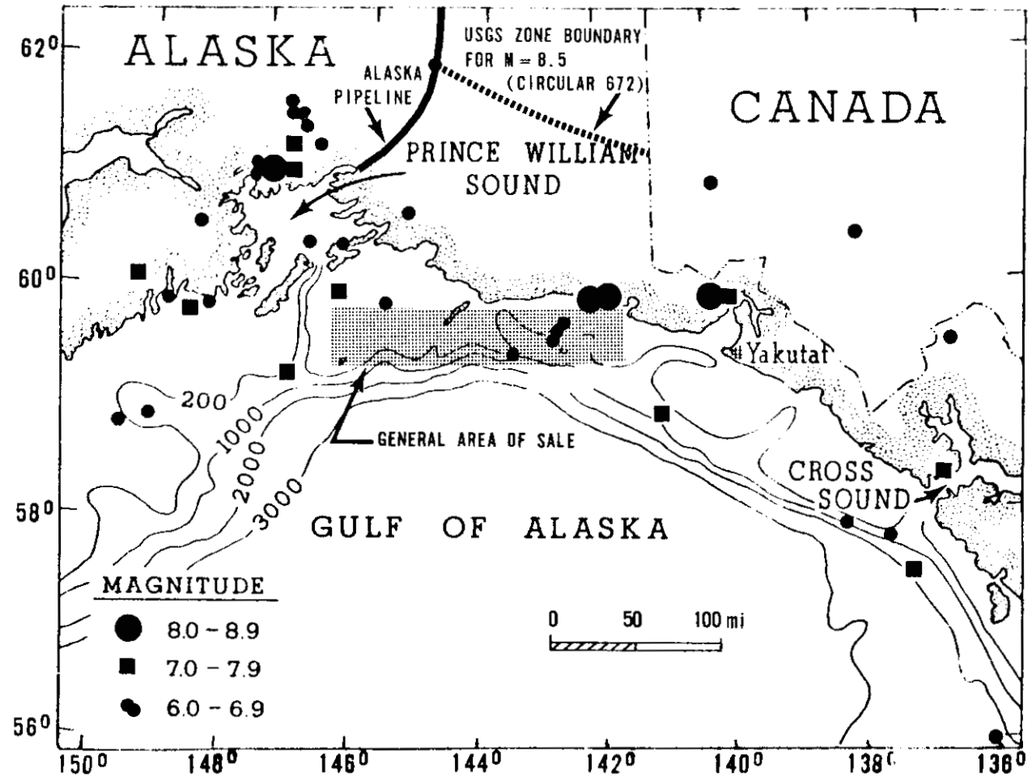



SLIDE 6

## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC - EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE

## GULF OF ALASKA—EPICENTERS OF HISTORIC EARTHQUAKES




1. Submarine contours in meters.
2. After Page.

SLIDE 8

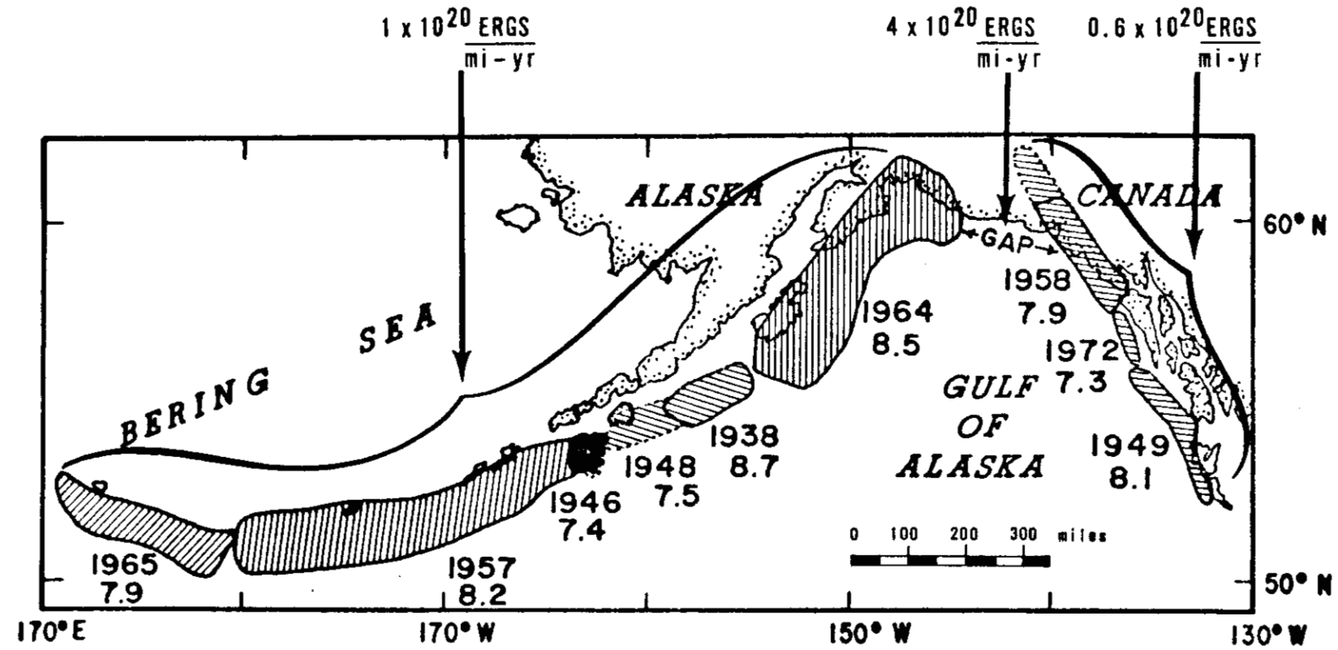
## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC - EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE
2. PROBABILISTIC - HISTORY IS LIKELY TO REPEAT ITSELF

## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC – EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE
2. PROBABILISTIC – HISTORY IS LIKELY TO REPEAT ITSELF
3. PROBABILISTIC – THE 'NEGATIVE' OF HISTORY IS LIKELY TO OCCUR

AFTERSHOCK ZONES OF EARTHQUAKES OF MAGNITUDE
7.3 OR GREATER SINCE 1938




1. Dashed where extent of zone is uncertain.
2. Dates and magnitudes given.
3. After Page.

SLIDE 11

## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC – EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE
2. PROBABILISTIC – HISTORY IS LIKELY TO REPEAT ITSELF
3. PROBABILISTIC – THE 'NEGATIVE' OF HISTORY IS LIKELY TO OCCUR
4. DETERMINISTIC:PROBABILISTIC – HISTORY REPEATS ITSELF ON KNOWN FAULTS

SLIDE 12

## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC – EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE
2. PROBABILISTIC – HISTORY IS LIKELY TO REPEAT ITSELF
3. PROBABILISTIC – THE 'NEGATIVE' OF HISTORY IS LIKELY TO OCCUR
4. DETERMINISTIC:PROBABILISTIC – HISTORY REPEATS ITSELF ON KNOWN FAULTS
5. PROBABILISTIC:UNCERTAIN – HISTORY WILL REPEAT ITSELF AT A UNIFORM RATE OVER A BROAD AREA

## METHODS FOR CONSIDERING SEISMICITY

1. DETERMINISTIC - EXPERT JUDGMENT ABOUT MAGNITUDE AND DISTANCE
2. PROBABILISTIC - HISTORY IS LIKELY TO REPEAT ITSELF
3. PROBABILISTIC - THE 'NEGATIVE' OF HISTORY IS LIKELY TO OCCUR
4. DETERMINISTIC : PROBABILISTIC -
   HISTORY REPEATS ITSELF ON KNOWN FAULTS
5. PROBABILISTIC : UNCERTAIN -
   HISTORY WILL REPEAT ITSELF AT A
   UNIFORM RATE OVER A BROAD AREA
6. PSUEDO DETERMINISTIC -
   LARGE PRIOR EARTHQUAKES FORETELL
   FUTURE SHOCKS

SLIDE 14

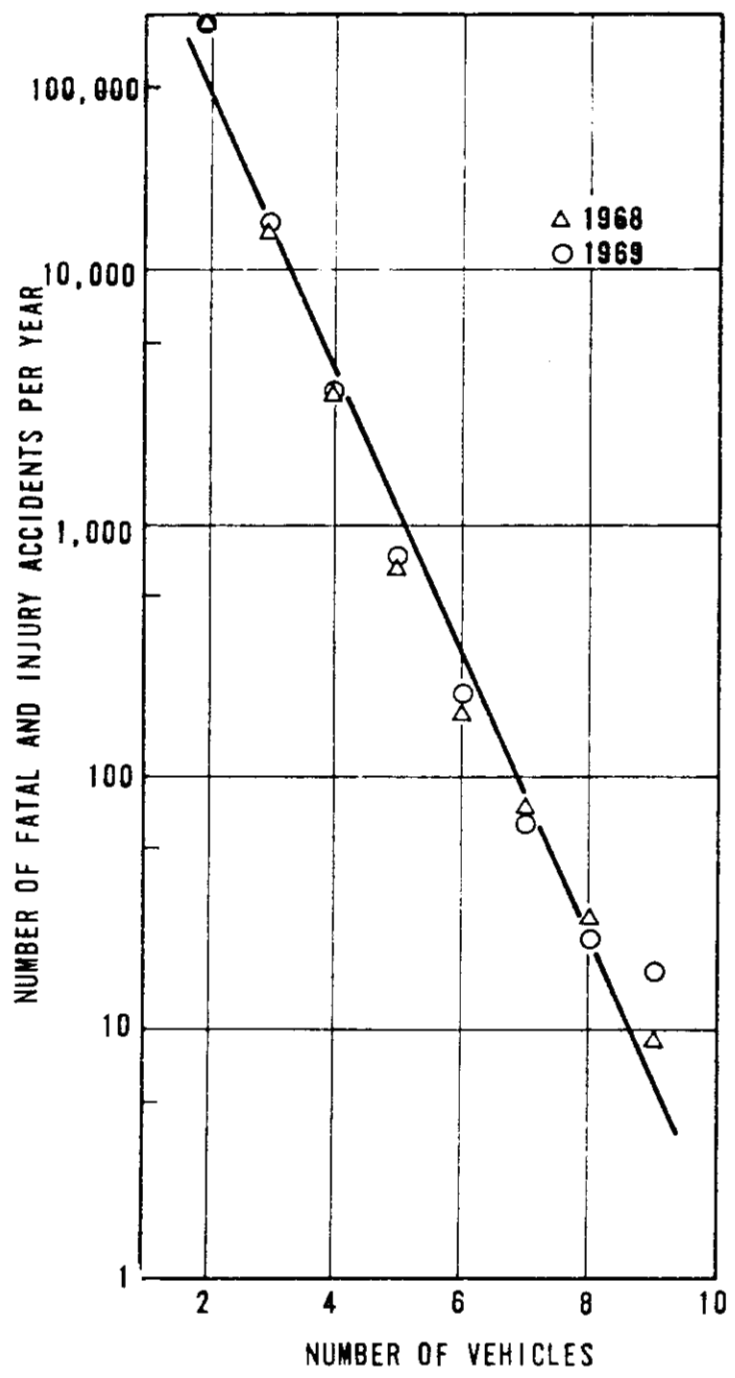
## OUR METHOD OF REPRESENTING SEISMICITY

USE METHOD 2 - HISTORY IS LIKELY TO REPEAT ITSELF USING FAULT LINE CORRECTIONS IN METHOD 1

REASONS

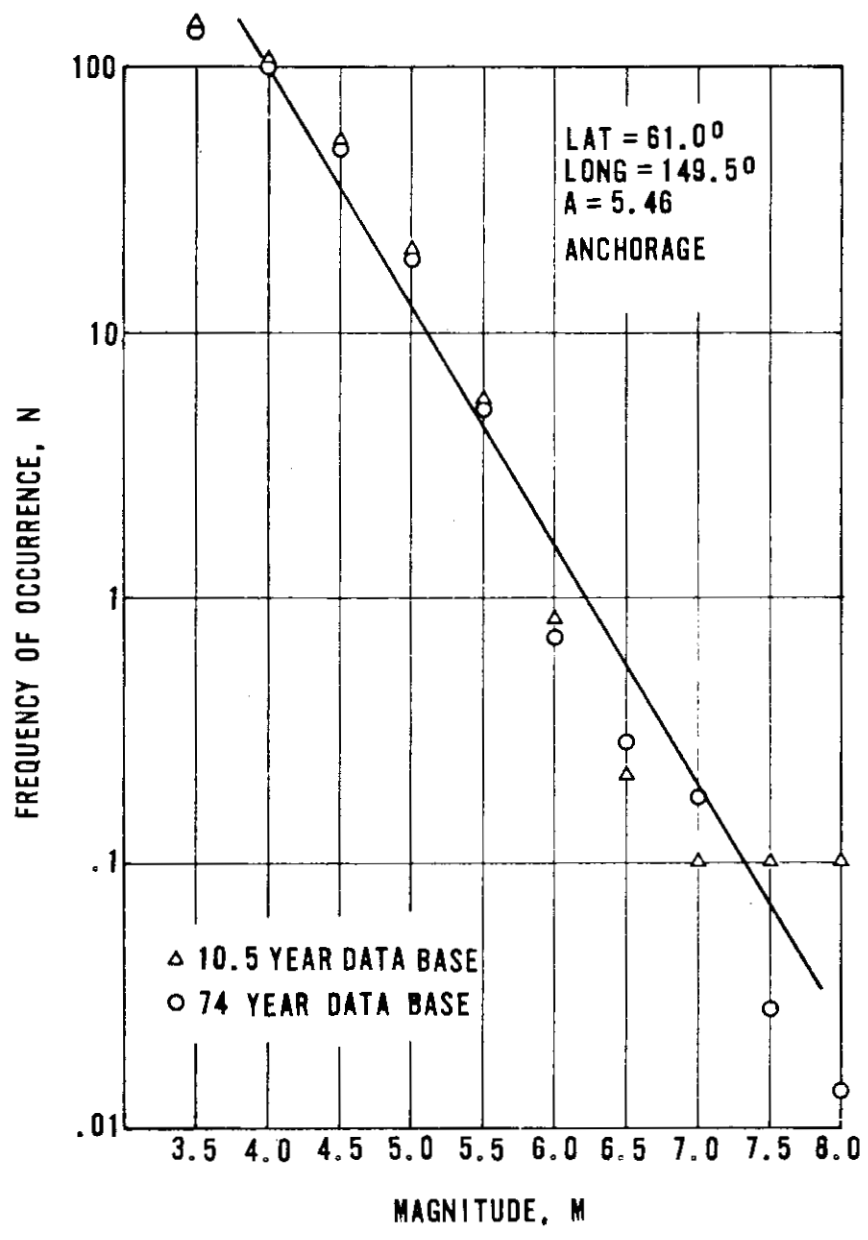
1. BAYESIAN MAPS OF CALIFORNIA
2. PROBABILISTIC ENGINEERING FRAMEWORK
3. FOLLOWS RATIONALE OF STRUCTURAL ENGINEERS ASSOCIATION OF CALIFORNIA
4. SATISFIES CASE LAW REQUIRING THAT 'THE SEVERITY OF THE REGULATION SHALL MATCH THE SEVERITY OF THE RISK.'

FATAL AND INJURY ACCIDENTS BY NUMBER OF VEHICLES (CALIF.)



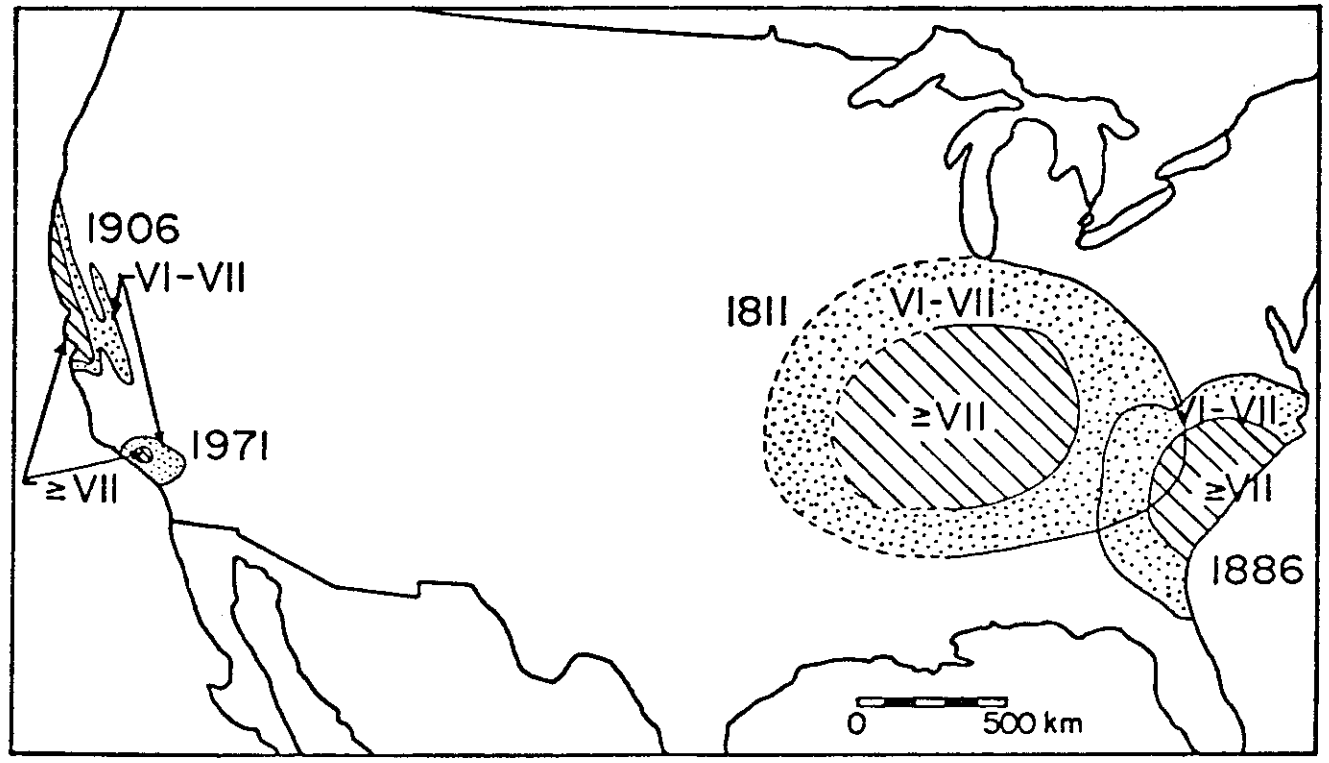

SLIDE 16

EARTHQUAKE FREQUENCY DISTRIBUTION FOR ANCHORAGE




SLIDE 17

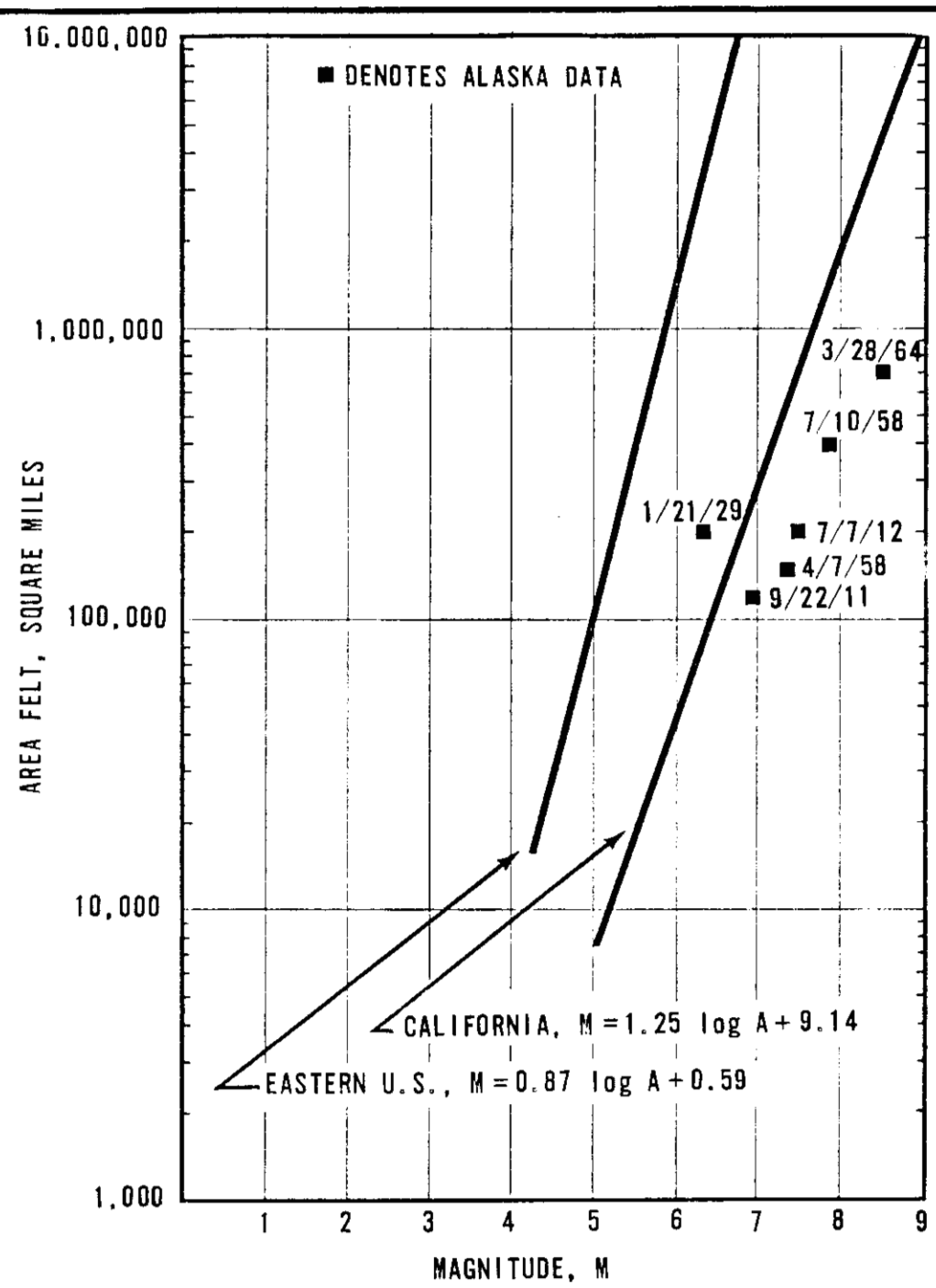
## COMPARISON OF DAMAGE AREAS




1. The 1906 and 1811 earthquakes were about equal in magnitude, as were the 1971 and 1886 earthquakes.
2. After Nuttli.

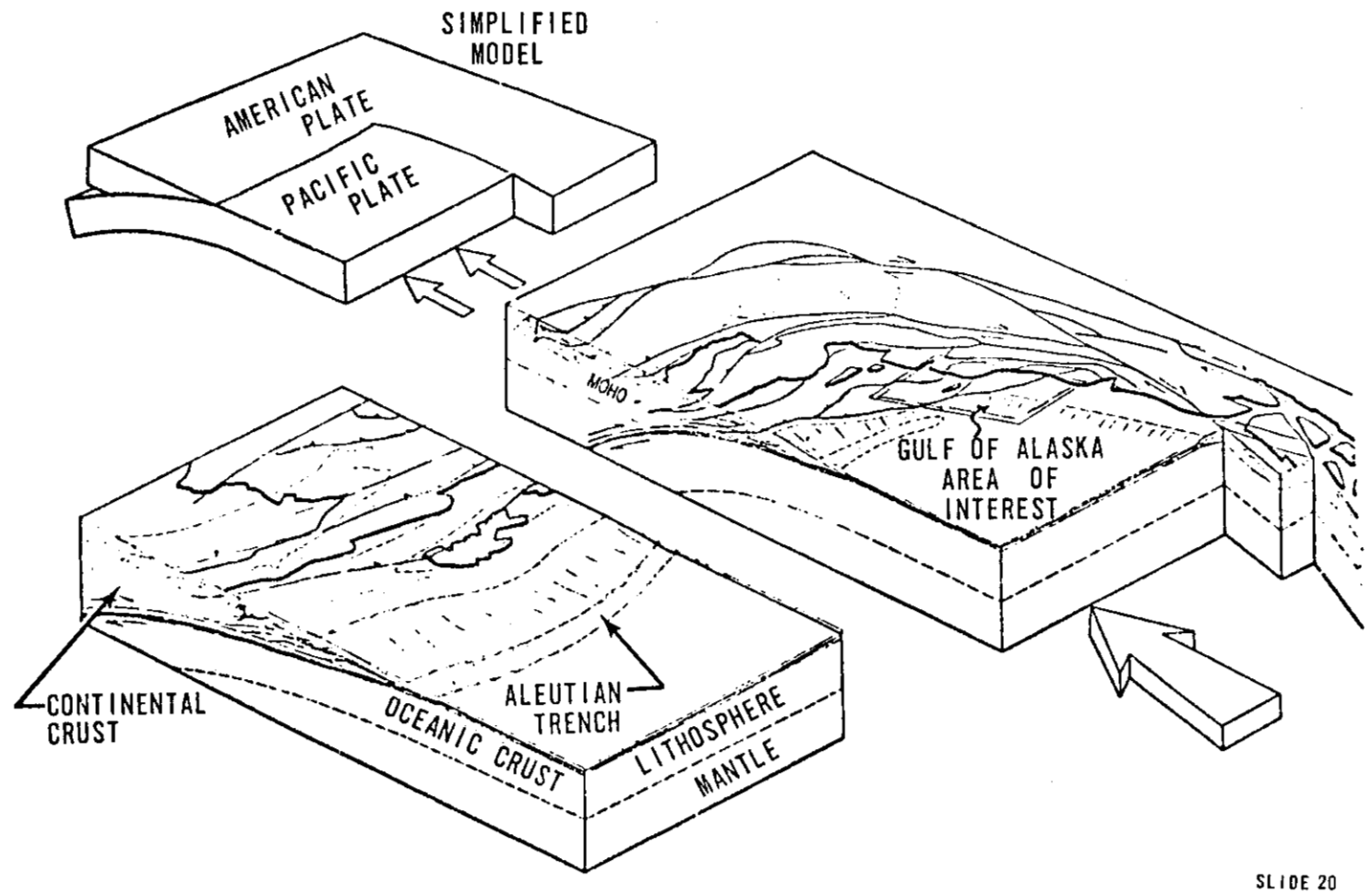
SLIDE 18

FELT AREA OF ALASKA EARTHQUAKES IS LESS THAN THAT OF CALIFORNIA OR THE EASTERN PART OF THE UNITED STATES



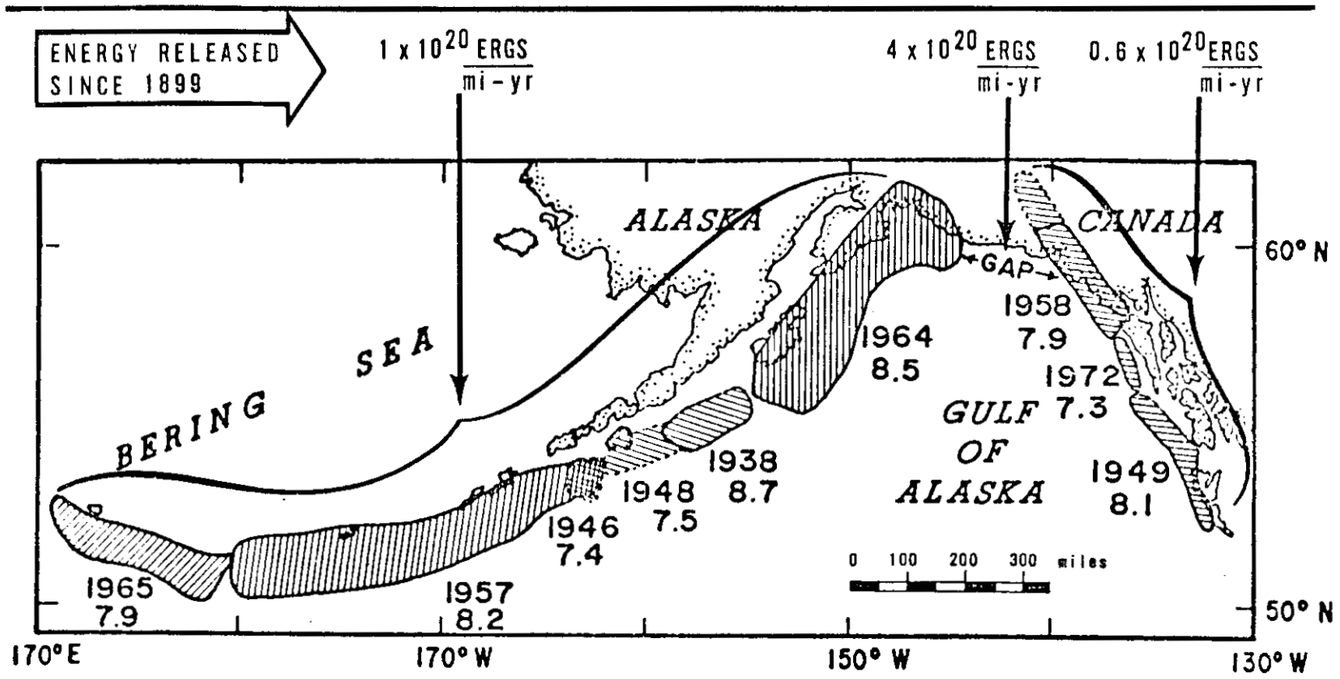

THE TWO CURVES WERE CONSTRUCTED FROM EQUATIONS IN NBS, BSS #61, ASSUMING A 'FELT' MMI OF III.

# GULF OF ALASKA PLATE MOTION




SLIDE 20

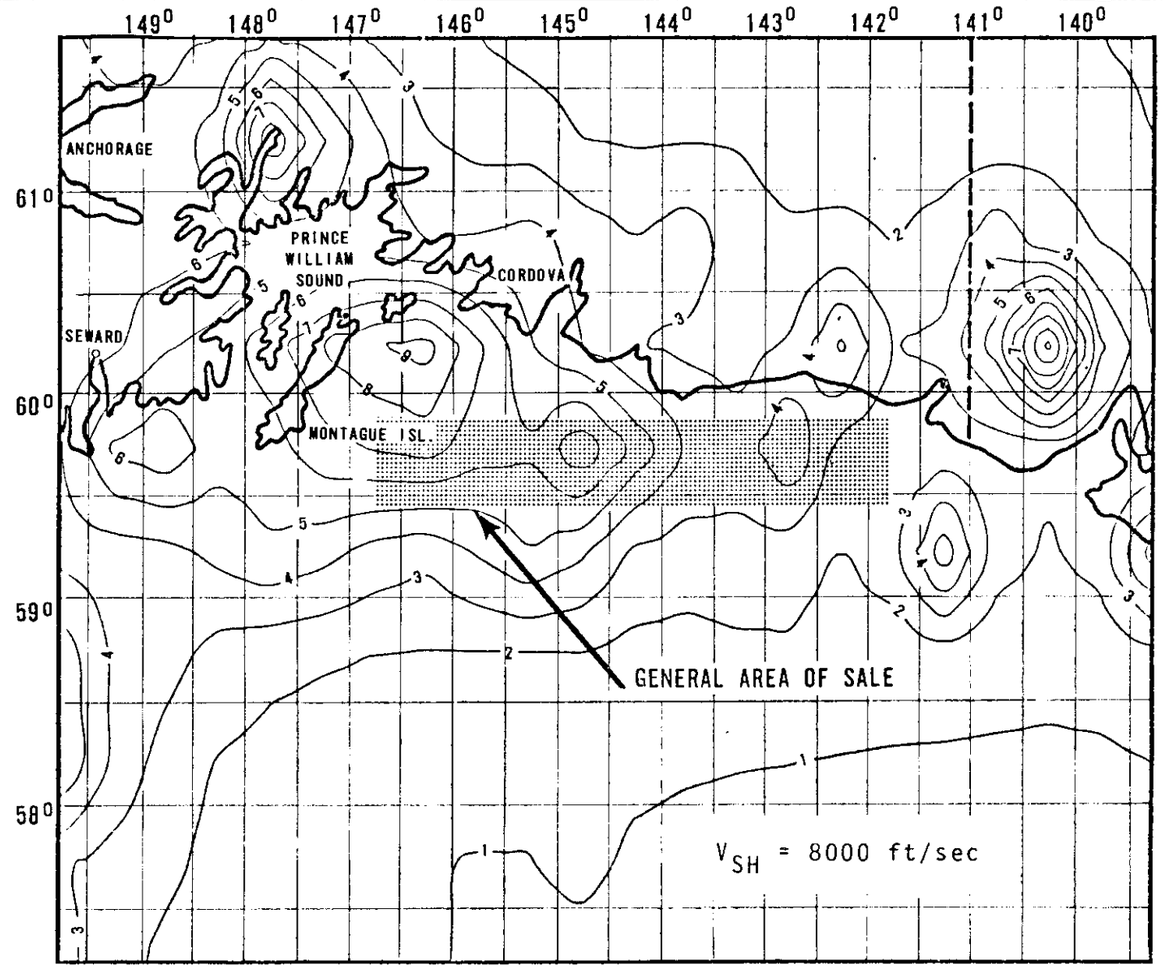
AFTERSHOCK ZONES OF EARTHQUAKES OF MAGNITUDE
7.3 OR GREATER SINCE 1938




1. Dashed where extent of zone is uncertain.
2. Dates and magnitudes given.
3. After Page.

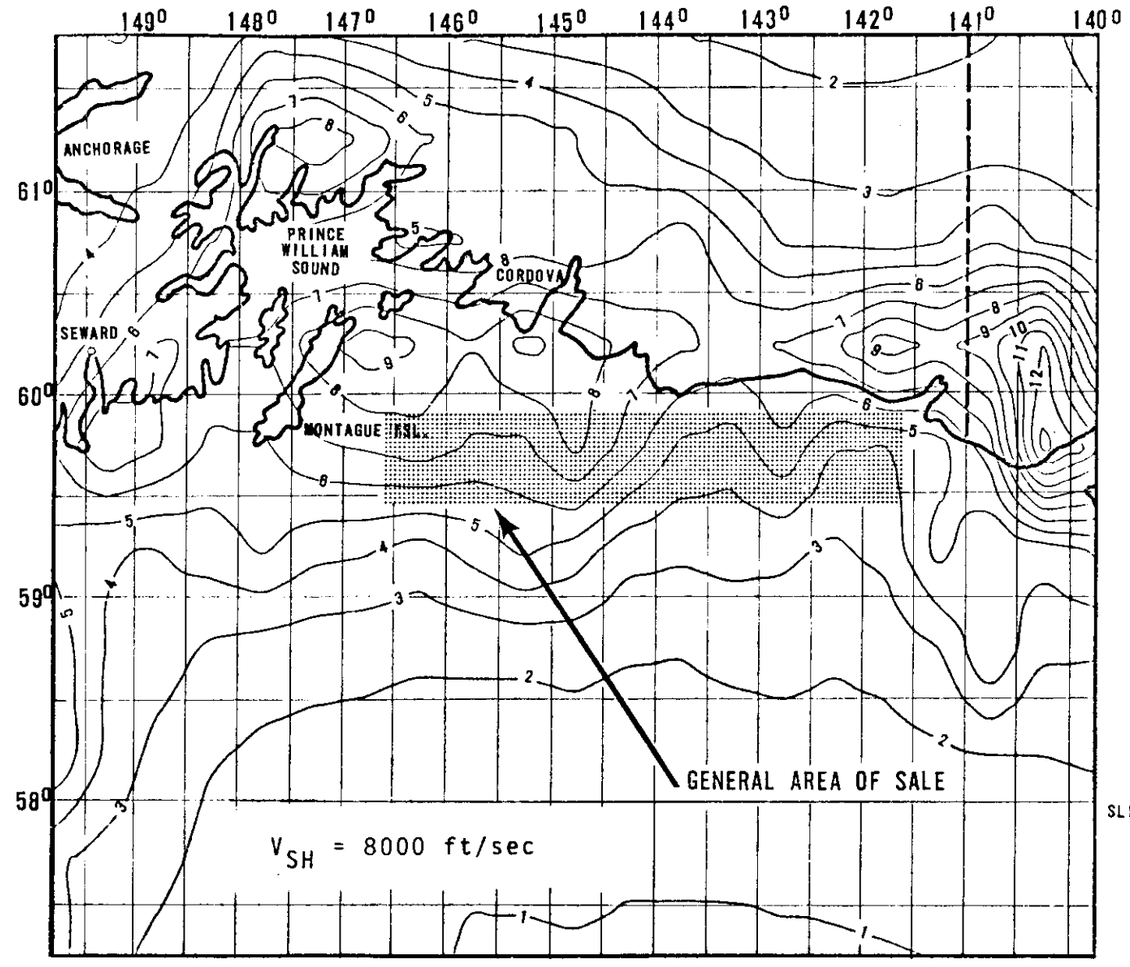
SLIDE 21

HARDROCK VELOCITY (IN/SEC), GULF OF ALASKA, RETURN PERIOD = 100 YEARS
(NO FAULT LINE ENERGY DISTRIBUTION)




SLIDE 22

HARDROCK VELOCITY (IN/SEC), GULF OF ALASKA, RETURN PERIOD = 100 YEARS
(WITH FAULT LINE ENERGY DISTRIBUTION)

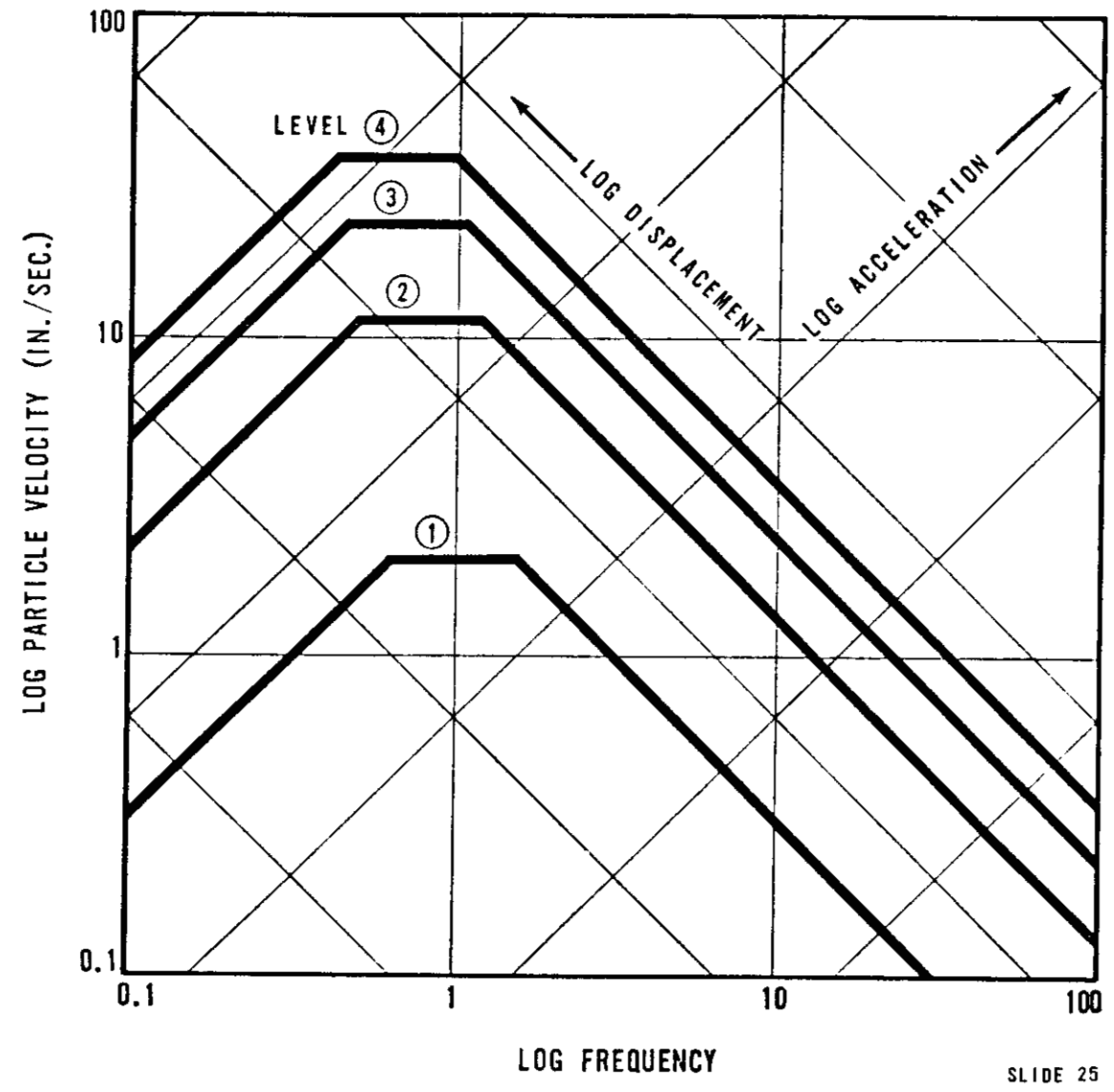



SLIDE 23

## ANALYSIS CRITERIA

| | BUILDING LIFE | PROBABILITY OF EQUALING OR EXCEEDING |
|---|---|---|
| UNIFORM BUILDING CODE | 50 YRS | 22% |
| USGS RISK MAPS | 50 YRS | 10% |

## HARDROCK PARTICLE VELOCITY SPECTRA ($V_{SH}$ = 3800 FT/SEC)




SLIDE 25

## EARTHQUAKE PROBABILITIES FOR SEISMIC ENVIRONMENTS IN GOA

FOR MONTAGUE ISLAND AREA

| LEVEL NUMBER: | $P_0$(%): |
|---|---|
| 1 | 99.9 |
| 2 | 31.9 |
| 3 | 12.8 |
| 4 | 5.6 |

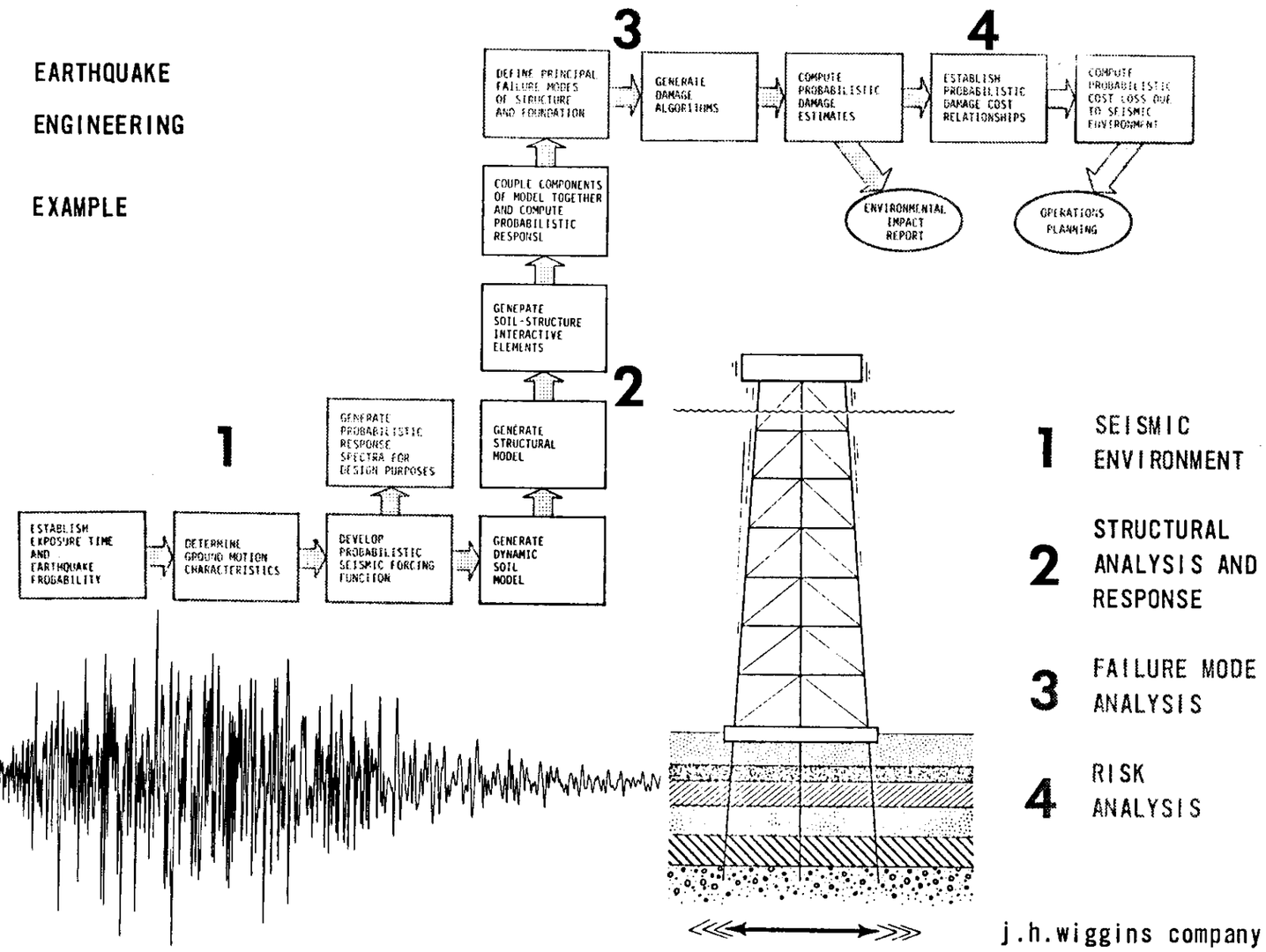
FOR YAKUTAT AREA

| LEVEL NUMBER: | $P_0$(%): |
|---|---|
| 1 | 97.2 |
| 2 | 18.4 |
| 3 | 6.0 |
| 4 | 3.1 |

EARTHQUAKE

ENGINEERING

EXAMPLE




1 SEISMIC ENVIRONMENT

2 STRUCTURAL ANALYSIS AND RESPONSE

3 FAILURE MODE ANALYSIS

4 RISK ANALYSIS

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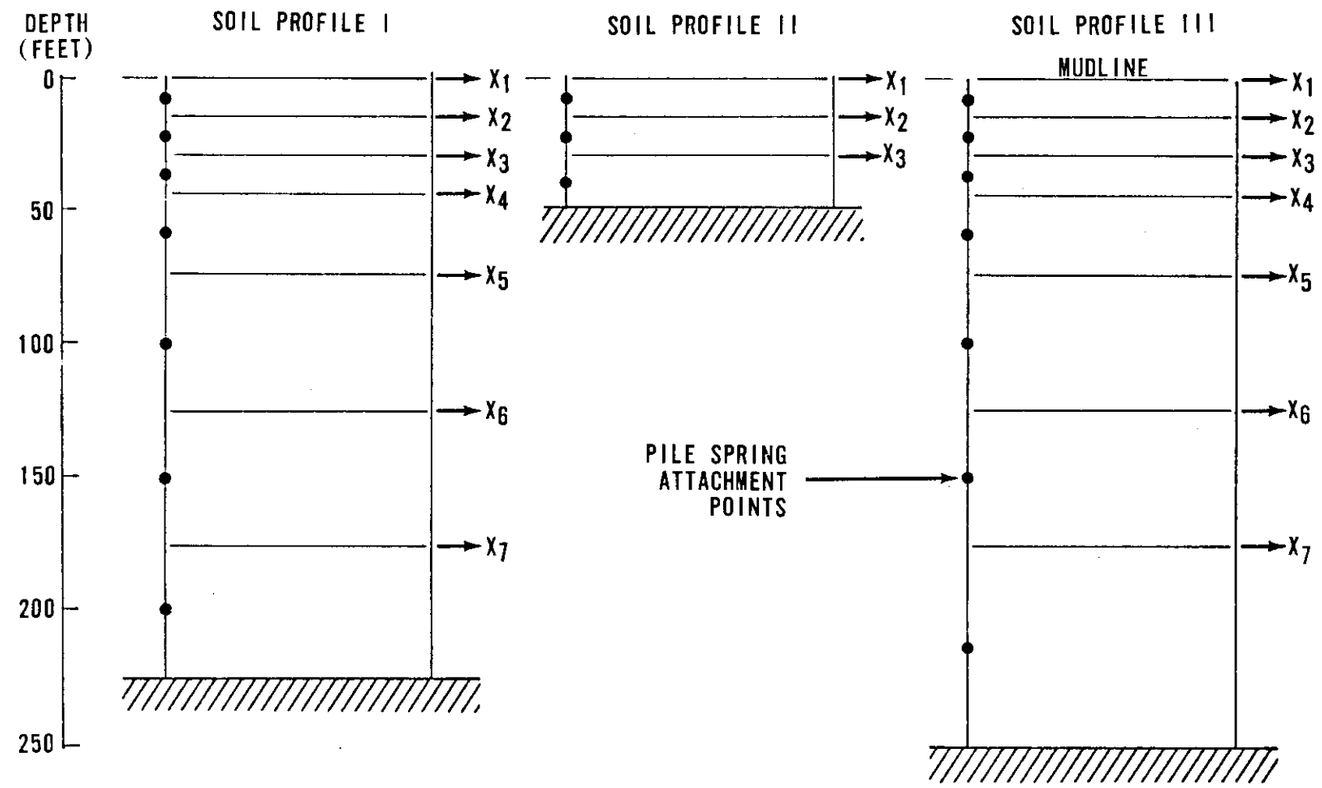
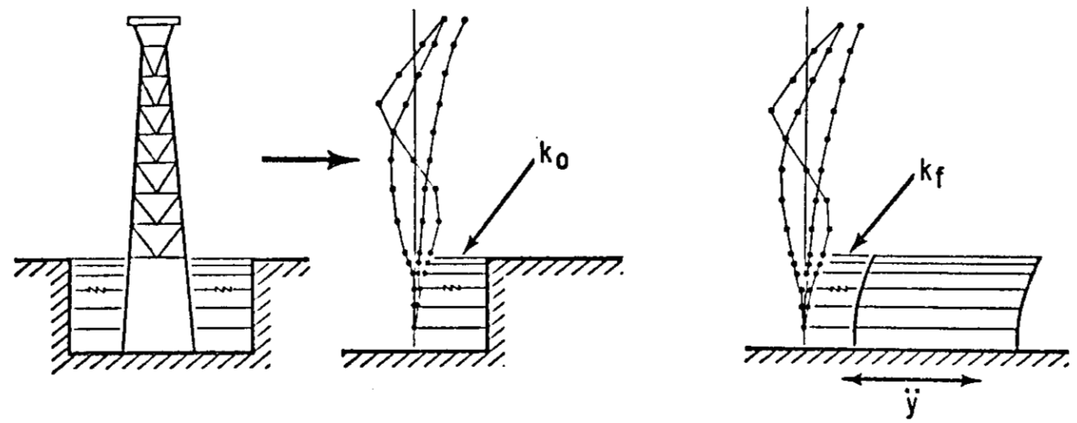
## FINITE ELEMENT MODELS FOR THREE SOIL PROFILES




SLIDE 28

| MODAL REPRESENTATION OF A COMPLEX STRUCTURE | COUPLED RESPONSE OF SOIL STRUCTURE SYSTEM |
| --- | --- |

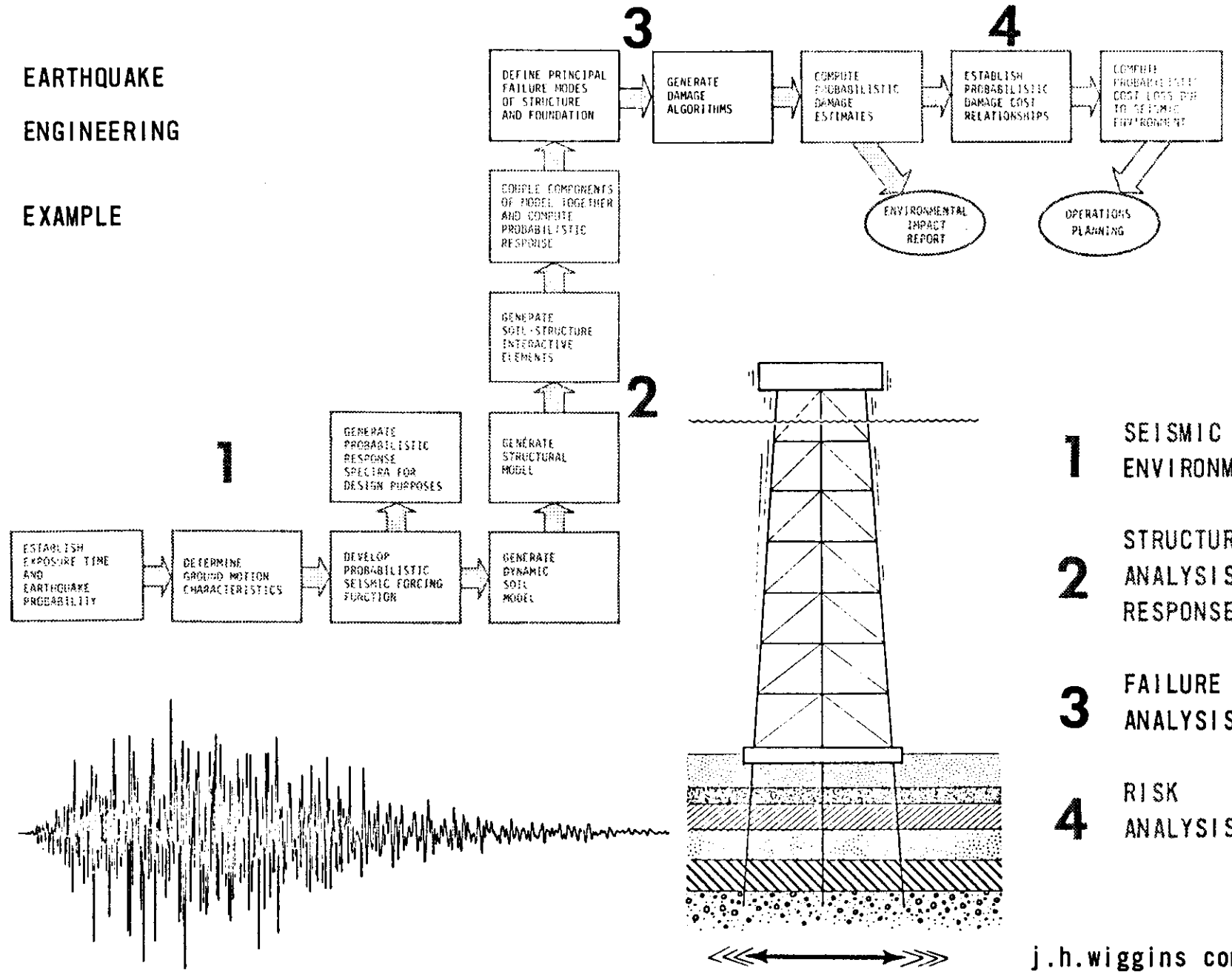



SLIDE 29

EARTHQUAKE

ENGINEERING

EXAMPLE




**1** SEISMIC ENVIRONMENT

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**3** FAILURE MODE ANALYSIS

**4** RISK ANALYSIS

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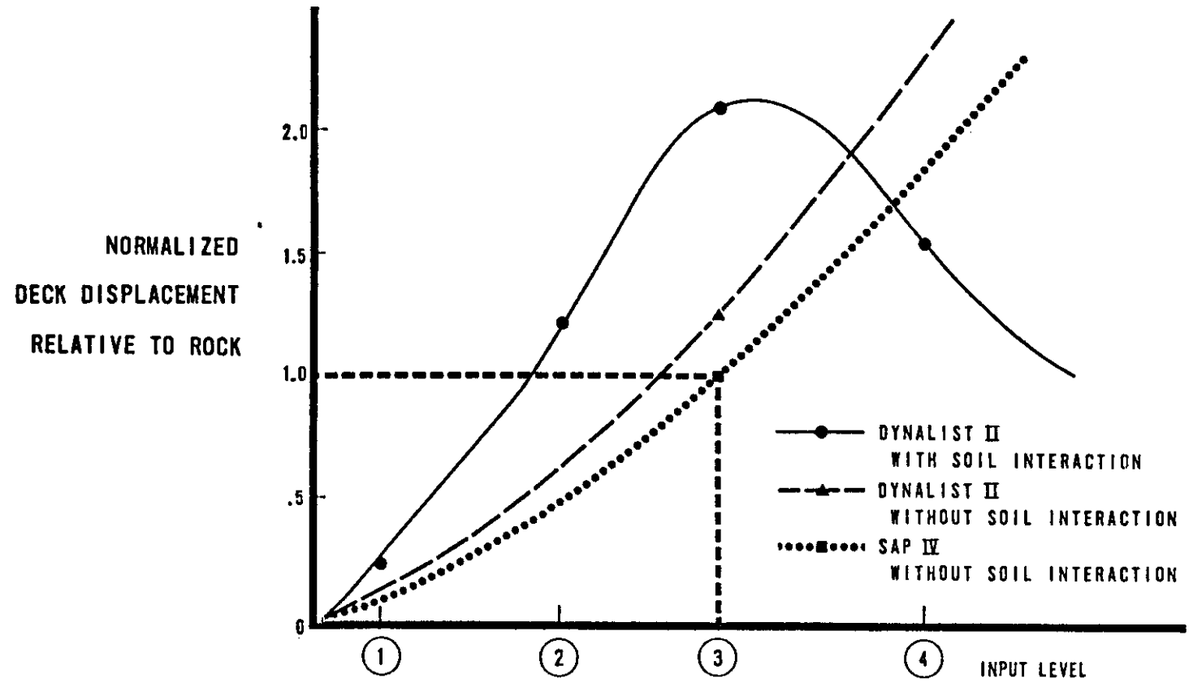
SLIDE 30

## FAILURE MODES CONSIDERED

1. DECK STRUCTURE
2. TEMPLATE
3. PILES IN COMPRESSION
4. PILES IN TENSION
5. CONDUCTOR PIPE

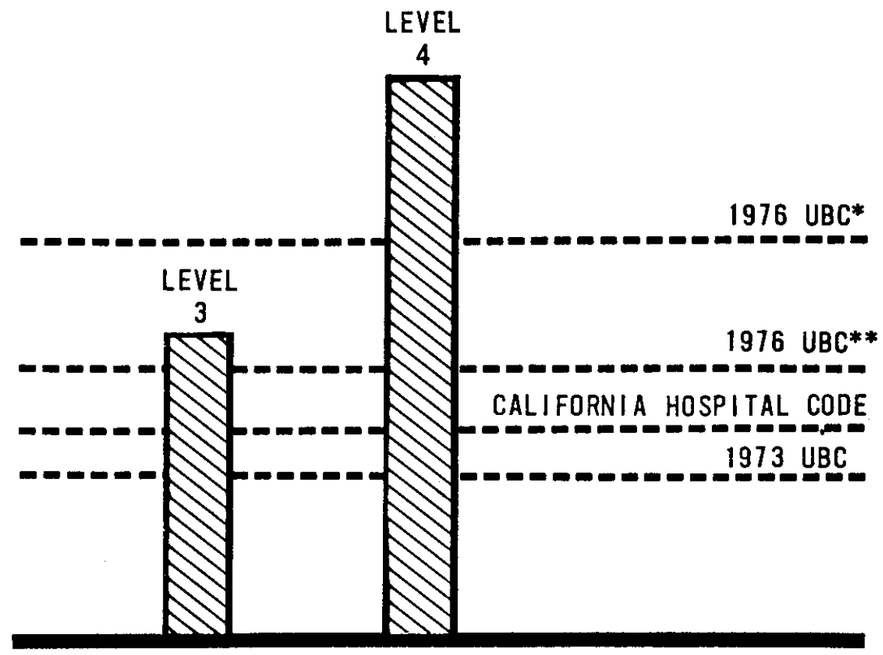
## COMPARISON OF RESPONSE METHODS




| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| (%)PROBABILITY OF OCCURRENCE (WORST PART OF GOA) | 99.9 | 32 | 12 | 5 |
| (%)PROBABILITY OF OCCURRENCE (BEST PART OF GOA) | 97 | 18 | 6 | 3 |

SLIDE 32

## COMPARISON OF LEVELS OF ANALYSIS PERFORMED ON PRELIMINARY GOA STRUCTURES WITH EXISTING U.S. CODES




* Worst Soil, Most Important Structure.
** Best Soil, Most Important Structure.

SLIDE 33

## SEISMIC RISK - PROBABILITY OF OCCURRENCE

- PROBABILITY OF EARTHQUAKE = $P_E$
- PROBABILITY OF LOCATION = $P_L$
- PROBABILITY OF RESPONSE = $P_E \times P_L \times P_R$
- PROBABILITY OF DAMAGE = $P_E \times P_L \times P_R \times P_D$
- PROBABILITY OF LOSS ($) = $\underbrace{P_E \times P_L \times P_R \times P_D \times P_\$}_{\text{CONDITIONAL PROBABILITIES}}$

S T A T E M E N T

OF

LELAND E. WILSON

BEFORE

THE U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT HEARING

ON THE

PROPOSED OUTER CONTINENTAL SHELF
OIL AND GAS LEASE SALE

GULF OF ALASKA

_____, 1975

ANCHORAGE, ALASKA

Mr. Chairman, my name is Leland E. Wilson. I am a 1950 graduate of Tulsa University in Petroleum Engineering. Since 1950 I have worked with Atlantic Richfield Company, primarily in drilling and production activities. I am a registered Petroleum Engineer in the State of Alaska and have authored several technical papers on drilling and production. My experience includes eight years in the offshore areas of the Gulf of Mexico, four years in the Cook Inlet area and three years on the North Slope. For the past three years I have been associated with my company's operations in the North Sea. While the North Sea is not the Gulf of Alaska, there are many physical similarities between these two areas and certain of the operating conditions found in the North Sea will be present in the Gulf. For that reason, the experience of the industry in the North Sea is relevant to this hearing.

In my opinion the North Sea effort has clearly demonstrated industry's proven capability to explore and develop in a severe environment. However, it should be borne in mind that we will be entering the Gulf of Alaska very substantially better prepared, equipped and supported than we were when operations commenced in the North Sea. We will have more and better data on basic environmental conditions and structural design for the Gulf. This results from our industry programs relating to meteorology, oceanography, current data, weather forecasting,

wave hindcast evaluation, superstructure icing and, most importantly, on our evaluation of the significance of this data. We will be entering the Gulf of Alaska with capable, trained personnel and will be able to draw from a well developed and experienced oil industry related infrastructure of capable contractors.

(1) Index Map of the North Sea Area.

It was in 1964 that the governments of the various countries surrounding the North Sea began awarding exploration licenses. Early drilling was confined to the southern portion of the North Sea in water depths of less than two hundred feet. Large gas fields, including Leman Field, one of the largest offshore gas fields in the world with reserves of about ten trillion cubic feet of gas, were quickly discovered. Gradually drilling operations moved northward, and the first major oil field Ekofisk, was discovered in Norwegian waters in 1969. Other new oil fields were discovered at Forties, Josephine, Auk, and Brent, and new gas fields were found at Heimdal and Frigg. The northernmost drilling site of $62^{o}$ North latitude in the North Sea compares with a latitude of about $60^{o}$ North for the northern Gulf of Alaska.

(2) Slide of Fields

A total of 975 wells have been drilled in the North Sea since the beginning of leasing in 1964. Of these 975 wells, 725 have been exploratory holes. Of these exploratory wells, 520 were dry holes, 120 discovered gas and 85 discovered oil. Seventeen commercial gas fields and twenty-four commercial oil fields have been discovered.

The North Sea was quite different from other major operating areas where the industry had previously worked. The Gulf of Mexico, although certainly severe at times, did not generate the continual storm environment of the winters in the North Sea. There we have not only sea states of 65 to 85 ft. maximum waves, but we had added the conditions of extremely cold water, heavy swells from the mid-Atlantic and rapid development of storm conditions both from the North and West. Fog conditions were frequent and radio/communications/navigation systems were not as well developed in the North Sea as in the Gulf of Mexico. It is not unusual to have extended periods of downtime due to this wide spectrum of offshore problems, for example: one drill ship which we contracted for was essentially idle from November 15th to February 15th with almost no progress. The semi-submersibles which are better equipped to maintain operations under storm conditions have also been shutdown for weeks at a time due to one or more of the variety of conditions which can cause downtime. The Gulf of Mexico seldom shuts down rigs for such long periods although individual hurricane storms can be just as severe for short periods.

To search for and produce oil under adverse conditions new equipment had to be designed and built. One of the major tasks was to develop drilling and production platforms capable of withstanding the harsh sea and weather conditions. The early drilling in shallow water depths in the southern North Sea was accomplished from existing jack-up rigs. As drilling moved North into more severe weather

conditions and greater water depths, semi-submersible rigs such as are shown on these viewgraphs were used:

(3) SEDCO 135

(4) BLUE WATER III

(5) TRANSWORLD 61

These rigs were utilized in water depths up to six hundred feet and, in summer months, as far north as the Shetland Islands (refer to Viewgraph 1). Generally, these rigs returned to more southern drilling sites in winter months to allow for more efficient operations. However, as demand increased for year-round exploration, as well as for exploration in the far north (up to $62^{o}$ North Latitude), more sophisticated, heavy,semi-submersibles were built to cope with the sea and weather conditions:

(6) WAAGE II

(7) PENTAGONE DESIGN

(8) SEDCO 700

(9) AKER H-3

(10) PENROD 71

These rigs, some displacing upwards of 30,000 tons, can work safely in gale force winds and high sea states. They are capable of survival in one hundred foot seas and are able to continue efficient operations in twenty to twenty-five foot seas in water depths of over one thousand feet. Most are self propelled, use all-chain anchor systems, and have

crews of seventy to ninety men. Many of these rigs have sustained maximum wave heights of seventy feet and mean wind velocities of over sixty-five miles per hour. In the event of severe storms, a rig of this type can disconnect from the sea floor and ride out the storm, primarily because of its design which offers much less resistance to waves than does a ship shape. Most of this new generation of semi-submersibles are ocean going craft that can, and have, crossed the Atlantic under their own power or with only an accompanying tug.

(11) Illustration of Transparent Design

As of July 1, 1975 there are thirty-five semi-submersible rigs working in the North Sea from about Latitude 56$^{o}$ North to 62$^{o}$ North. It might be noted that all rigs and hull designs are carefully checked by qualified marine surveyors such as Det Norske Veritas, Lloyds, and the American Bureau of Shipping.

In addition to advanced drilling platforms, development of associated equipment has aided in operations in the North Sea and contributed to the fine safety record of these new rigs. For example, major advancements have been made in the design of Blowout Preventers and subsea equipment. Operators regularly use 10,000 psi working pressure equipment although little high pressure has been encountered. The newer equipment allows releasing from the sea floor safely, reconnecting and completely circulating the well prior to opening BOP's. Fail-safe valves, shear rams, redundancy on all safety systems and frequent tests have greatly improved the reliability of all this equipment.

Another major development greatly aiding operations in the North Sea has been better weather forecasting utilizing computers and satellites. These forecasts give us more lead time to prepare for storms and allow a prediction of their duration. Many operators use the London Weather Centre and independent contracting firms to give them twice a day forecasts or even more frequent if storm conditions are worsening. For example, our own Company uses a procedure whereby if weather forecasts are for twenty-five foot seas and/or forty-five mile per hour winds we discontinue drilling new hole, but may continue with other operations which are considered safe such as: logging or running casing. If wave heights are forecast to be greater than thirty-five feet we suspend all operations at the drill floor, pull and lay down sufficient drill pipe to allow the drill string to be hung off on the lower pipe rams with the bit inside the casing. If wave heights are expected to exceed forty-five feet or there is a vertical motion of the drill floor equal to or greater than fifteen feet we pull and lay down the riser pipe with the drill pipe still in the hole at the base of the last string of casing. In this position we are able to ride out the remainder of the storm or if we were moved off location by an anchor slippage it would not be too difficult or expensive to get back on to location again. It is very rare for the personnel to be removed from the rig since the vessel is seaworthy and designed to withstand up to one hundred foot waves.

In order to offset the long distances from operating bases it was necessary to greatly improve support transportation. Long range helicopters with large load capacities have significantly helped to alleviate the distance problem. These helicopters can quickly deliver

emergency supplies and technical assistance when needed. Specially designed supply ships with 1,000 ton cargo capacity are now common. In addition to moving large amounts of supplies in one trip, these ships can serve as anchor handling vessels, supply vessels, towing vessels and safety vessels.

(12) Viewgraph of Supply Boat

Increased storage areas on rigs also help to resolve the supply problem. The larger rigs can store up to 2,000 tons or more of variable loads of muds, cement, water and fuel, as well as items for human consumption. This increased storage capacity helps to prevent in-hole problems as enough materials can be kept on board to cope with emergencies until more supplies can be obtained.

Rigs in the North Sea are manned by much more than a driller and a few roughnecks. Highly trained technical personnel in numerous fields stay on board. On a typical rig in the North Sea will be found superintendents, both for contractor and company, geologists, drilling engineers, electricians, mechanics, sub-sea engineers, mud engineers, cementers, welders, weather observers, a complete marine crew, and a team of expert divers.

There is no doubt that those operating in the Gulf of Alaska will benefit greatly from industry's experience in the North Sea, including the mistakes that were made. For example, certain rig deficiencies noted in the early stages of the North Sea activity have resulted in significant

improvements in structural design, instrumentation, and inspection techniques which will provide much more reliable Units for the Gulf of Alaska than were available for the initial operations in the North Sea. Several rigs which were of inadequate design have failed to perform properly and one jack-up rig and one semi-submersible has been lost in storms. Inadequately designed rigs are now relegated to the Mediterranean and other milder areas. In addition one gas well went out of control and a relief well had to be drilled to control it, however no environmental damage was done during this blow out. Many of the lessons we have learned in drilling in the North Sea will be of benefit to the Gulf of Alaska operation, such as proper marine riser tension, use of motion compensators, proper storm draft, and improved anchor handling techniques.

The success of the North Sea operation reflects the proven ability of the oil industry to explore and develop in a hostile environment similar to that which will be encountered in the Gulf of Alaska. I believe it is reasonable to expect an even better personnel and equipment safety record in the Gulf of Alaska as a result of improvements initiated in the North Sea. Wells are now routinely being drilled East of the Shetland Islands at distances of 200-250 miles from the Aberdeen shore base which require 2½-3 hours helicopter flying time and 24-30 hours boat time each way. Sea temperatures are very similar to that of the Gulf of Alaska at between eight and nine degrees centigrade during the winter months. From what I have seen of the storm data of the Gulf of Alaska it appears that the same frequency of storms and similar sea states can be expected during the winter months.

It is a credit to the governments of the countries surrounding the North Sea and the industry that despite all of this activity no major oil spills or serious environmental damage has occurred. This outstanding record has been achieved even though the area was entered and initially explored with a lack of experience in operating in such an environment and without some of the more sophisticated technology and logistical support which will be available in the Gulf of Alaska.

In conclusion, let me point out that the North Sea is estimated to contain 30 billion barrels of oil reserves and 85 trillion cubic feet of gas reserves. Production should peak at about 2.8MM barrels per day of oil and 10 billion cubic feet per day of gas by 1980, thus making Norway and the United Kingdom self-sufficient. Hopefully, operations in the Gulf of Alaska will help move our country in the same direction. Based on my experience, I see no reason why the industry cannot operate safely and efficiently in the Gulf of Alaska.

STATEMENT OF

KENNETH A. BLENKARN, Ph.D.
AMOCO PRODUCTION COMPANY

before the

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HEARING

on

PROPOSED OIL AND GAS LEASING

on the

OUTER CONTINENTAL SHELF

NORTHERN GULF OF ALASKA

ANCHORAGE, ALASKA
AUGUST 12-13, 1975

OFFSHORE DEVELOPMENT AND PRODCTION

Statement of Kenneth A. Blenkarn, Ph.D., Amoco Production Company

OFFSHORE SALE ENVIRONMENTAL HEARING

Anchorage, Alaska

Good morning, ladies and gentlemen. My name is Kenneth Blenkarn. I am a Special Research Group Supervisor for Amoco Production Company, and I direct the development and application of offshore and arctic technology for Amoco and its corporate affiliates. My engineering Ph.D. degree emphasizes training and research in theoretical and applied mechanics. For more than 20 years I have been developing basic technology related to petroleum production, particularly environmental force criteria for offshore structures. I have been responsible for the design of many offshore platforms, including many of the early permanent structures installed in Cook Inlet.

Slide 1

My first purpose is to describe for you the equipment and methods employed in the production of offshore petroleum resources. I then wish to address the special aspects of engineering for applications in the Gulf of Alaska.

Only after exploratory drilling has discovered petroleum deposits, and various testing and confirmation has established adequate reserves, does

actual development of production begin. The key feature of most offshore production is the construction of fixed platforms or towers. These platforms, founded on the sea bottom, support working decks clear of wave action and from which well drilling and production activities are conducted. Most offshore platforms are comprised of three basic elements: jacket, piling, and deck.

Slide 2
Slide 3
Slide 4

The trussed or braced jacket is fabricated at a shore location. It is then barged or floated to the offshore site where it is tipped or otherwise maneuvered into position resting on the ocean floor.

Slide 5

Piling are then guided and driven through members of the jacket to fix the structure firmly into the foundation soils. This work is generally performed by special offshore construction derrick barges.

Slide 6

Once piling installation is complete, deck sections, together with operating equipment, are hoisted up and placed atop the structure by the derrick barge.

Effective design of offshore platforms requires careful evaluation of the environmental forces to be anticipated during the structure lifetime. This is especially true of forces caused by storm waves. Over the years, the offshore industry has devoted significant effort to the scientific investigation of ocean waves, their occurrence probabilities,

and the forces resulting from waves. Such efforts have contributed to the success of the industry in building reliable offshore platforms.

After construction of a platform is completed, well drilling is initiated generally through specially driven structural well conductor

Slide 7

pipes. Several wells are directionally drilled from a single platform to reach an array of locations at the productive horizons. Production from the completed wells is directed into separation and other treating equipment to prepare it for entry into the transportation system.

All of the equipment and tanks on a platform are fitted with automatic safety devices which shut in the producing wells and stop flow through the system in the event of any equipment malfunction. Shut-off valves on the platform deck are supplemented by safety shut-in devices down inside well casings, below the ocean bottom. These are controlled to be activated by abnormalities in the production equipment or in the platform structure itself. The likelihood of oil discharge, even in the improbable event of platform structural failure, is significantly re-

Slide 8

duced by use of downhole safety valves. These valves have undergone rapid improvement in recent years and will be able to provide a high degree of reliability.

Generally, the preferred and safest way to transport offshore production away from a platform is to pump it through a subsea pipeline to shore

facilities. The construction of subsea pipelines employs special pipe-lay barges. As successive lengths of pipe are joined on the barge, additional lengths of pipeline are lowered onto the ocean bottom.

Slide 9

Depending upon the water depth, the pipeline is either guided to the ocean bottom by a structural stinger or suspended under controlled tension to preclude bending damage to the pipe. Subsea pipelines are weighted to rest on bottom without movement under changing current or wave conditions. In areas where the pipe is likely to be subject to excessive environmental forces, or to mechanical damage by anchors and fishing gear, the pipe is buried beneath the sea floor. The pipe bury operation is accomplished with unique dredging equipment which cuts a trench into which the pipe is deposited and subsequently to be covered.

Pipelines are coated to protect against corrosion, and construction joints are carefully inspected to avoid mechanical or metallurgical defects. Nevertheless, like platform production equipment, subsea pipelines can be equipped with automatic sensing devices which shut down the throughput stream. These devices serve to minimize the discharge of oil in the case of any leak which might occur in spite of quality control measures in construction.

While pipelining to shore has long been the predominant disposition of offshore production, alternates are being developed. Offshore storage

Slide 10

and offshore tanker loading have become increasingly common. The latest

developments are engineered to permit continuation of operations even under stormy sea conditions.

Additional detail regarding various potential development systems for the Gulf of Alaska is to be found in a supplemental document which I submit for the record.

The basic methods for production from offshore locations are well established and proven. The question at issue in these hearings is whether such technology is suitable for application in the Gulf of Alaska. More specifically, the concern is with our ability to adapt this proven technology adequately to account for the particular physical environment of the area. I intend to show that such an adaptation can be made. I will discuss the two important implications of the environment of the Gulf of Alaska. The physical oceanographic conditions and earthquakes.

The Gulf of Alaska is recognized as a stormy region, and one must address the influence of weather and waves upon the safety of offshore facilities. At the heart of the matter is the effect of storm waves on the structural integrity of offshore platforms or other structures.

Testimony by Mr. Horrer describes studies of the physical oceanography of the Gulf of Alaska and our knowledge of expected conditions in this

region. For the present concern, the main result is a comparison of

Slide 11 extreme Gulf of Alaska wave conditions with those determined for the North Sea. This comparison is shown on slide 11. There is no real definable difference in the severity of extremes in the two areas. This is important because a number of offshore platforms have been designed to withstand North Sea extremes. Several of these have already been installed. There is no question of our ability to design platforms to resist Gulf of Alaska extreme waves.

Slide 12 Some of the recently designed North Sea platforms represent a marked departure from traditional modes of offshore platform construction. Specific attention is drawn to the concrete, gravity-foundation platforms. It is, however, to be recognized that this particular development is a reflection of (a) construction schedules and economics, (b) foundation soil conditions, and (c) premium placed on storage capacity. The choice of a concrete gravity platform as opposed to a more conventional steel structure is not a consequence of the particular design wave requirements. There may emerge special platform designs for Gulf of Alaska operations, but such designs will not be dictated because wave conditions are more severe than encountered elsewhere.

The generally stormy weather of the North Sea has led to the construc-

Slide 13 tion of larger, more seaworthy construction ships and barges, for example, very large derrick ships and semi-submersible pipelay vessels. These

advances have been motivated by the need to improve the effective working time of construction equipment. It is to be expected that much of this construction experience will carry over directly to application in the Gulf of Alaska.

The Gulf of Alaska region is, of course, recognized as being prone to earthquake activity. Hence, as in the case of design against waves, the industry must build structures to resist anticipated earthquakes with a high degree of reliability. This is required for reasons of both economics and personnel safety. Nevertheless, we must balance risks against the costs to society of reducing such risks. It is not in the best
Slide 14 interests of society to squander capital, material, and human resources in needless overdesign of offshore structures. In seeking the proper balance of design, the industry looks to the professional community, as well as its own scientists and engineers.

The technology of earthquake design has been developing for many years. As Dr. Wiggins explains, it combines inferrences of seismically induced base rock and ground motions together with analyses of resulting structure and foundation behavior. I think that it is important to emphasize that this is not just a matter of interpreting seismic measurements by mathematical manipulations. Methods and practices of earthquake design have been adjusted and calibrated from observations of actual structures

in earthquakes; some fail, while others experience earthquake shaking without damage.

The focus of earthquake design is to provide a structure adequate to withstand statistically projected seismic conditions anticipated at the construction site. Dr. Wiggins testimony outlines the basis for this technology. Of course, there is no such thing as a structure which can be guaranteed against failure, regardless of cataclysmic events which nature might someday bring to pass. This is not to say that such imponderables are to be simply ignored. Serious conjecture about such events can provide useful input to the overall design process. These ideas may, for example, suggest design refinements which give a structure the potential to sustain extensive damage without collapse, but which do not subvert the basic design indicated by established earthquake engineering practice. Once again, it is to be noted that in the unlikely event of structure damage or even collapse, the likelihood of pollution by uncontrolled well flow will be further reduced by the functioning of downhole safety shut-off valves.

On balance, there is little doubt but that we can design offshore platforms with appropriate levels of earthquake resistance. It is important
Slide 15 to observe that offshore structures, unlike most conventional buildings, are predominantly designed against lateral loads. And there is an extensive experience in such designs. The wave loading on a platform may well be of the same magnitude as design earthquake forces. Moreover,

in-service experience shows that offshore platforms display a substantial margin between design forces and those actually required to cause collapse.

Ocean bottom soils are particularly important in considering design against possible consequences of earthquakes. Local soil conditions affect the intensity of local seismic loading and the foundation integrity for structures. The soil of the ocean bottom also determines the susceptibility of pipelines to seafloor slides triggered by earthquakes. The industry has already initiated investigations of the Gulf of Alaska sea bottom through use of soil borings and soil seismic surveys. Testimony by Mr. McKeever describes such activity in some detail, and places it within an overall geologic perspective. Extensive and detailed investigations will take place during exploratory drilling and in preparation for development of permanent facilities. The purpose will be to identify suitable sites for offshore structures and proper routing for pipelines, all to reduce earthquake damage hazards. Surveys with soil sampling and seismic methods also serve to avoid the placing of installations where there is likelihood of disruption by surface faulting or soil movement.

Slide 16

One might perhaps be concerned over direct disruption of oil wells by fault movement during earthquakes. However, there is a body of experience to indicate that this is not a significant problem. Extensive

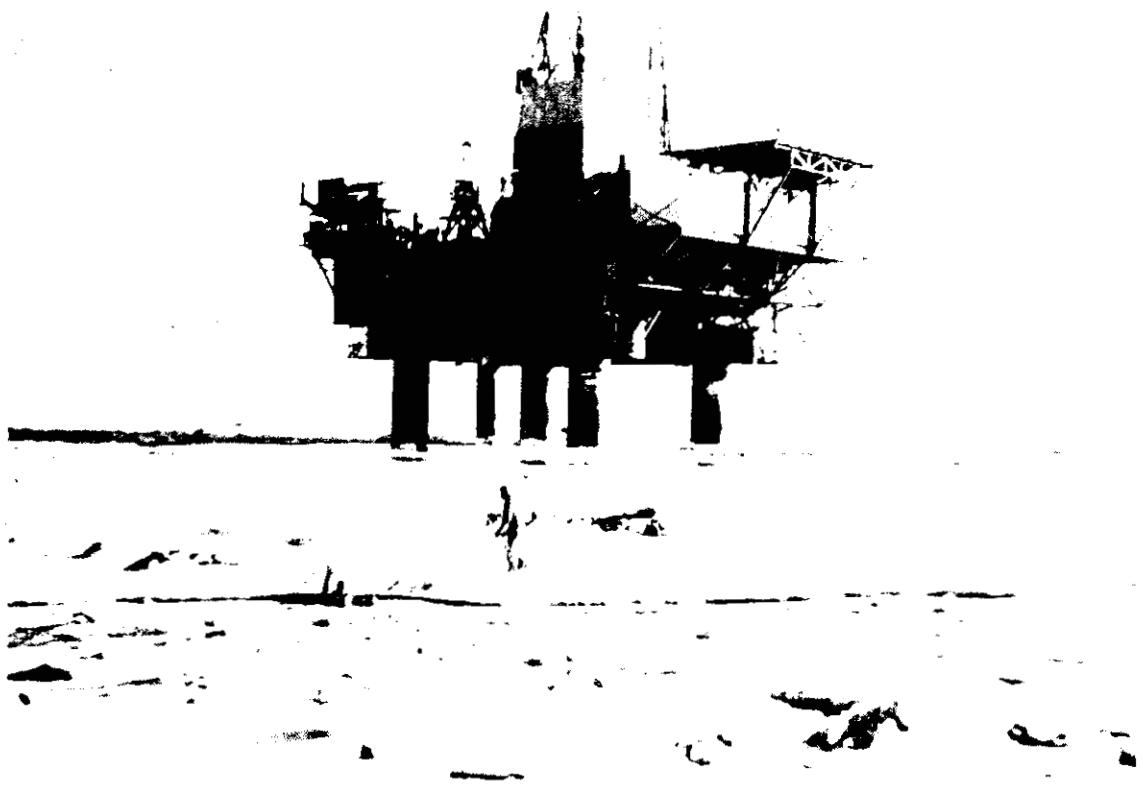
drilling and producing operations have been conducted in the seismically active area of Southern California. While a few wells have suffered casing damaged by fault movement, such damage has not occasioned release of well fluids to pose a pollution threat.

Consideration of the foregoing leads me to the following conclusions regarding technology for offshore production in the Gulf of Alaska:

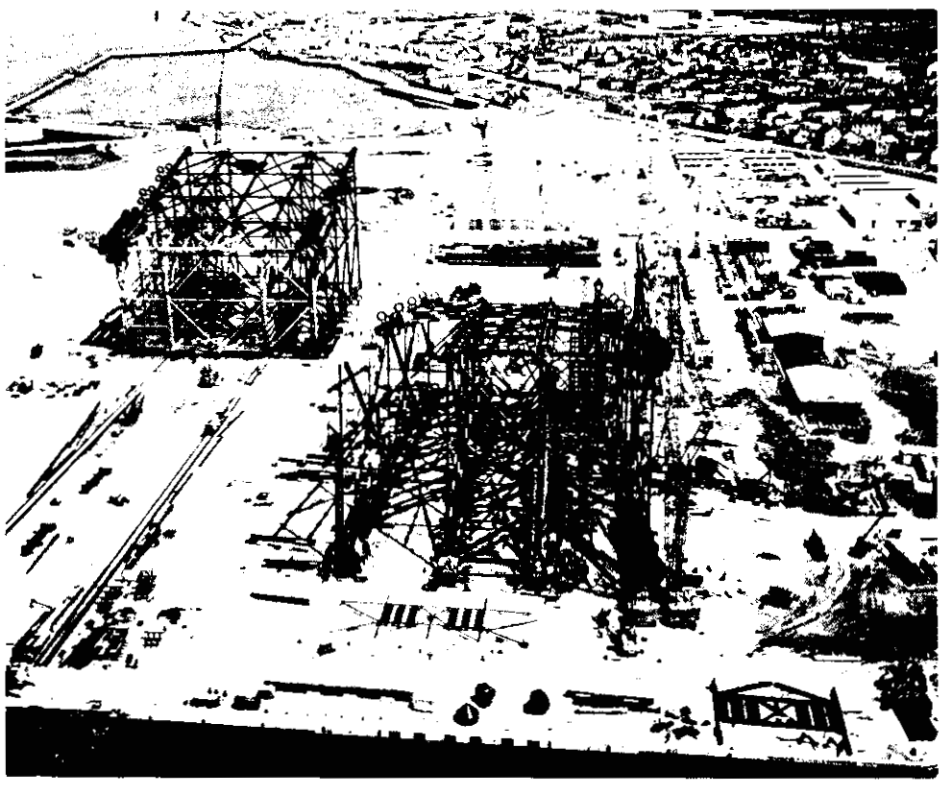
1. Most of the established production technology previously described here is directly applicable to operation in the Gulf of Alaska.

2. Wave conditions in the area against which facilities must be designed are not any more severe than already overcome by the industry.

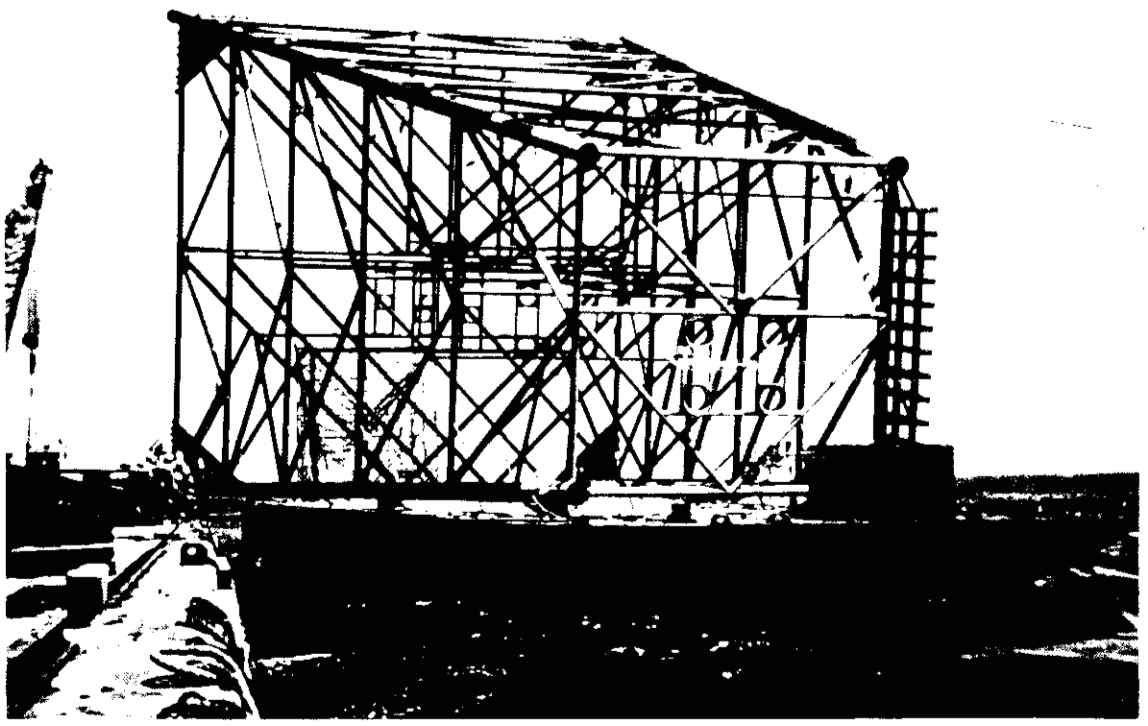
3. Available earthquake technology provides means for construction of platforms and other facilities with adequate structural reliability.



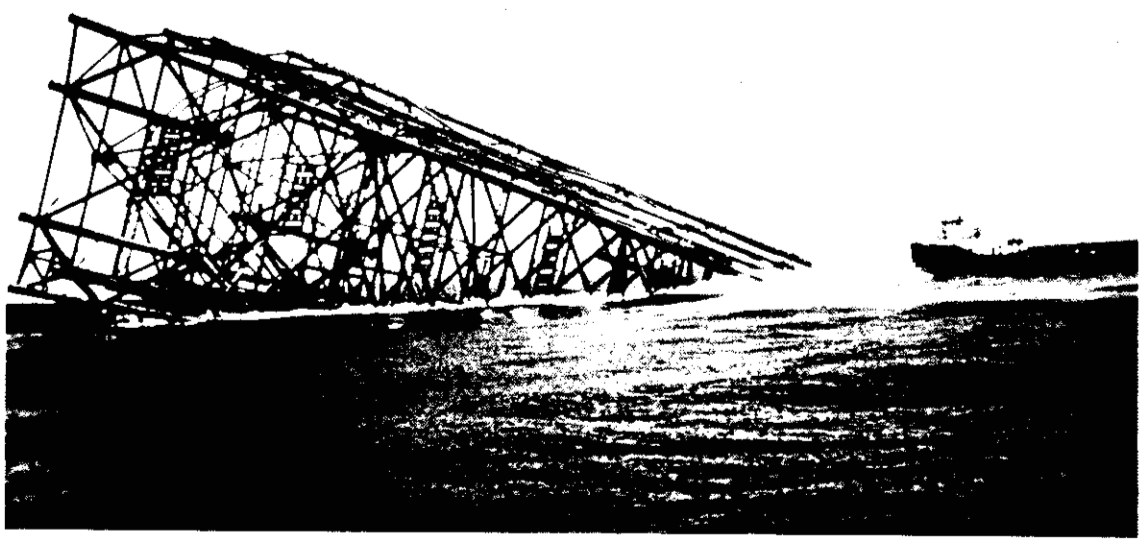
SLIDE 1 COOK INLET PLATFORM



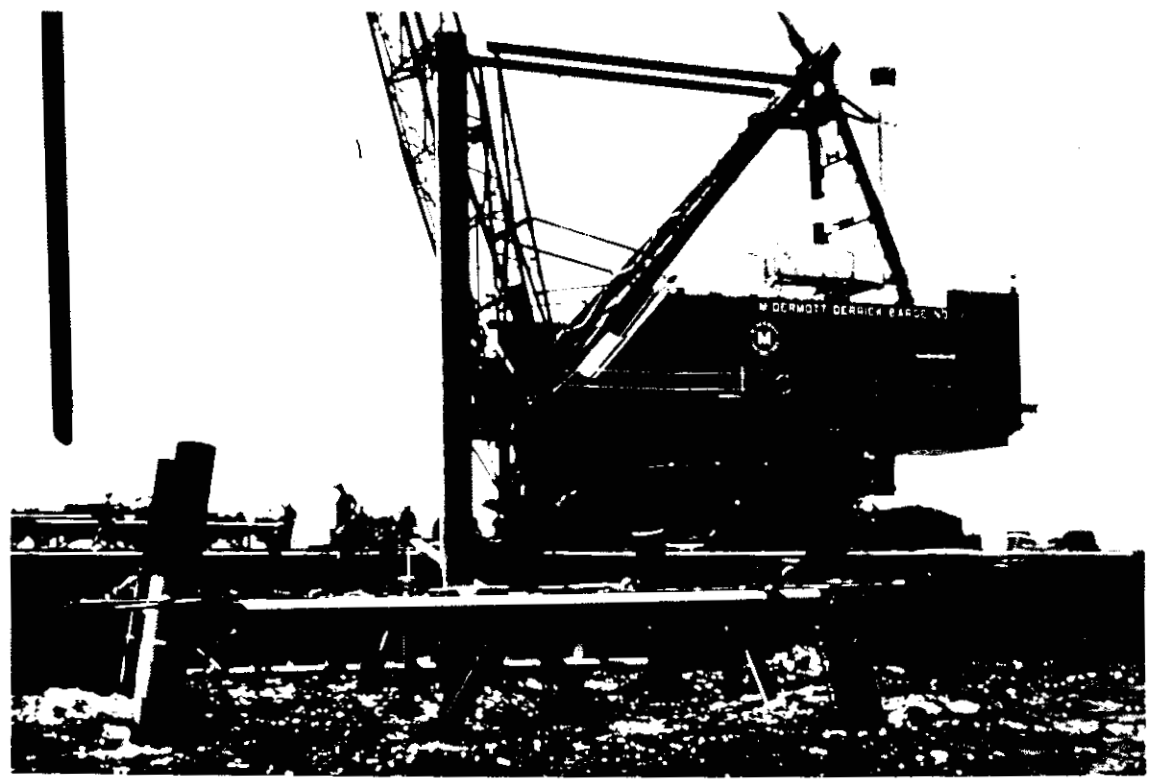
SLIDE 2 PLATFORM JACKET IN FABRICATION



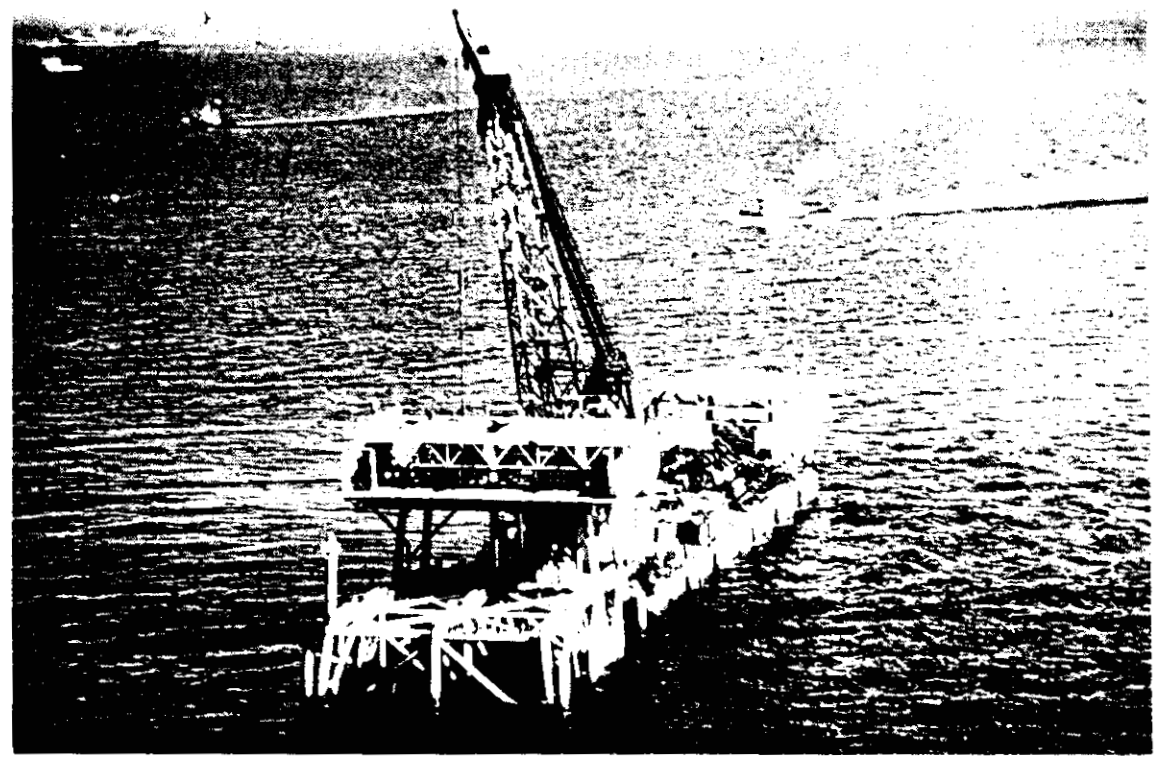
SLIDE 3  JACKET BEING TRANSPORTED



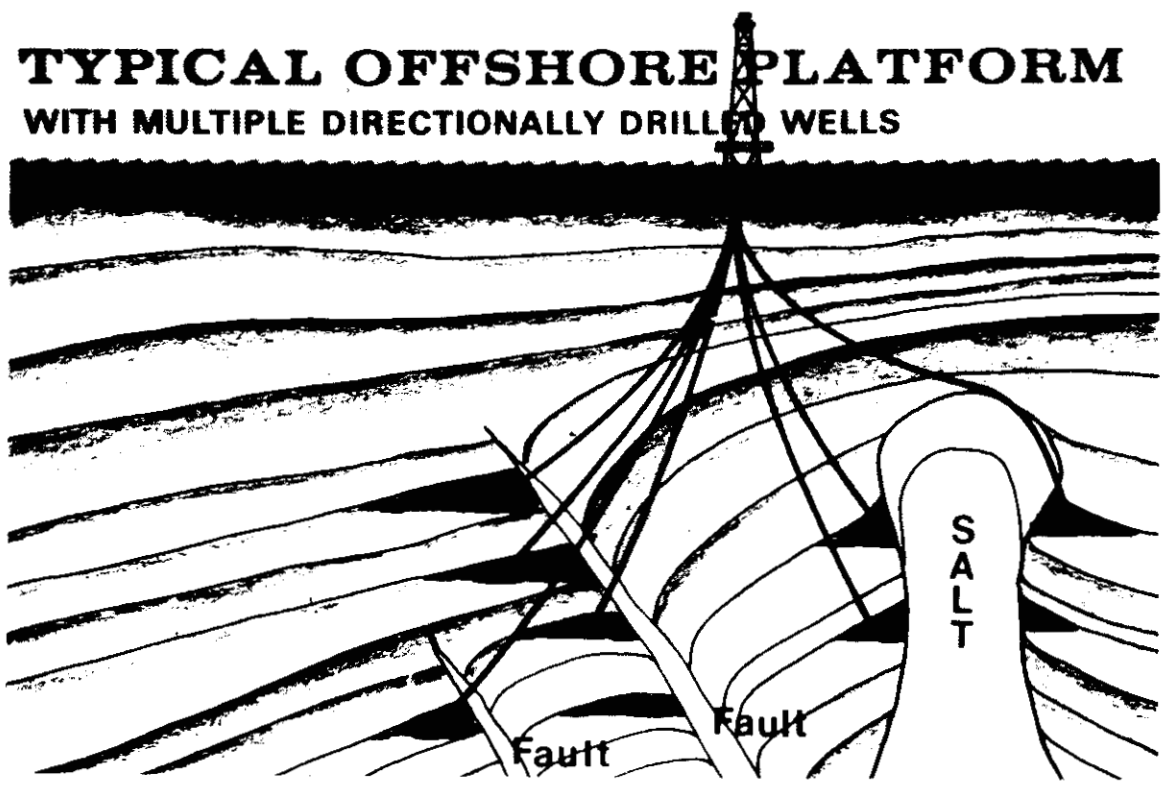
SLIDE 4  JACKET BEING LAUNCHED



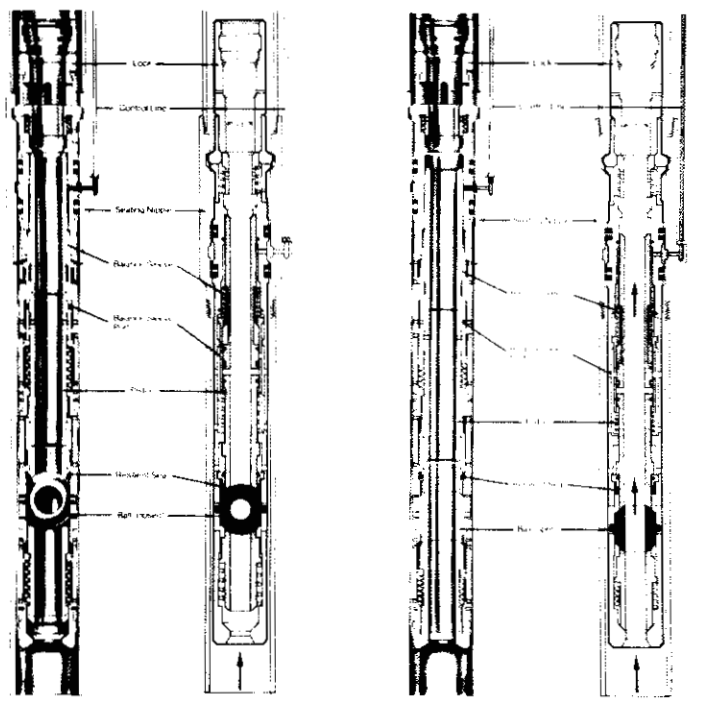
SLIDE 5  PILE DRIVING



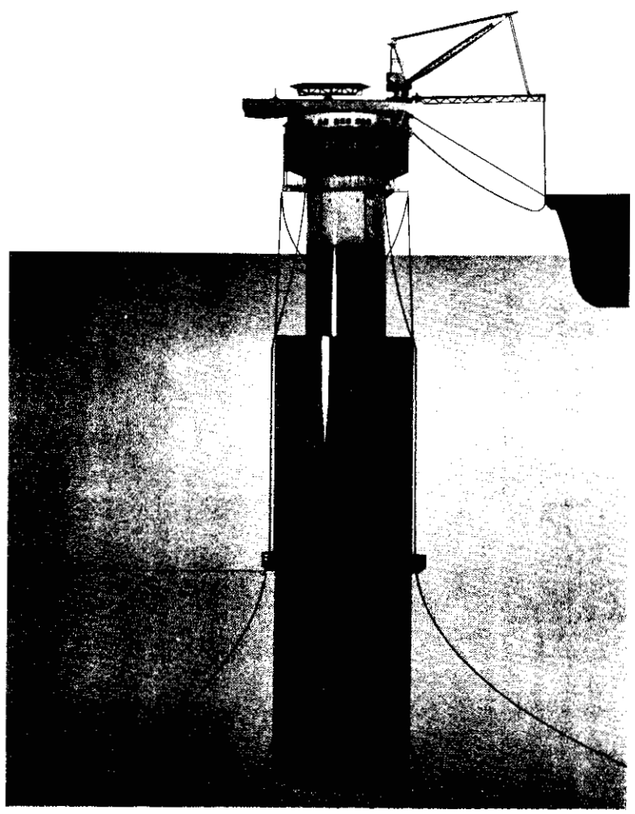
SLIDE 6  DECK LIFT



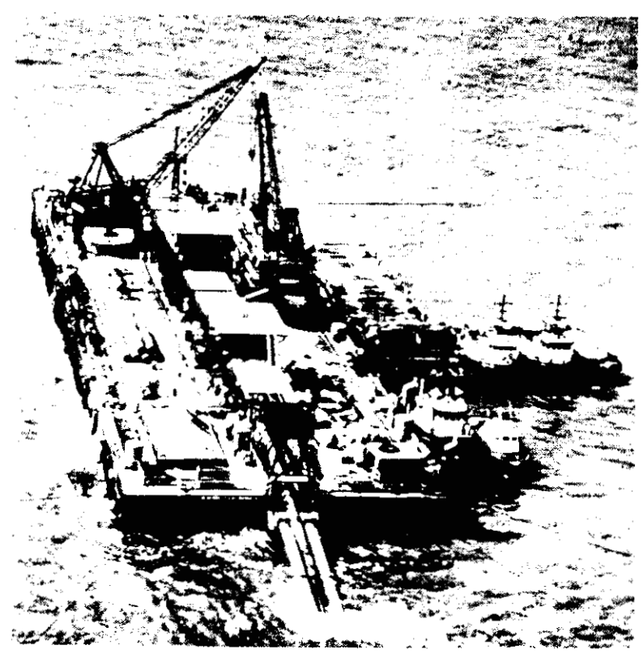

SLIDE 7 SCHEMATIC OF DIRECTIONAL DRILLING



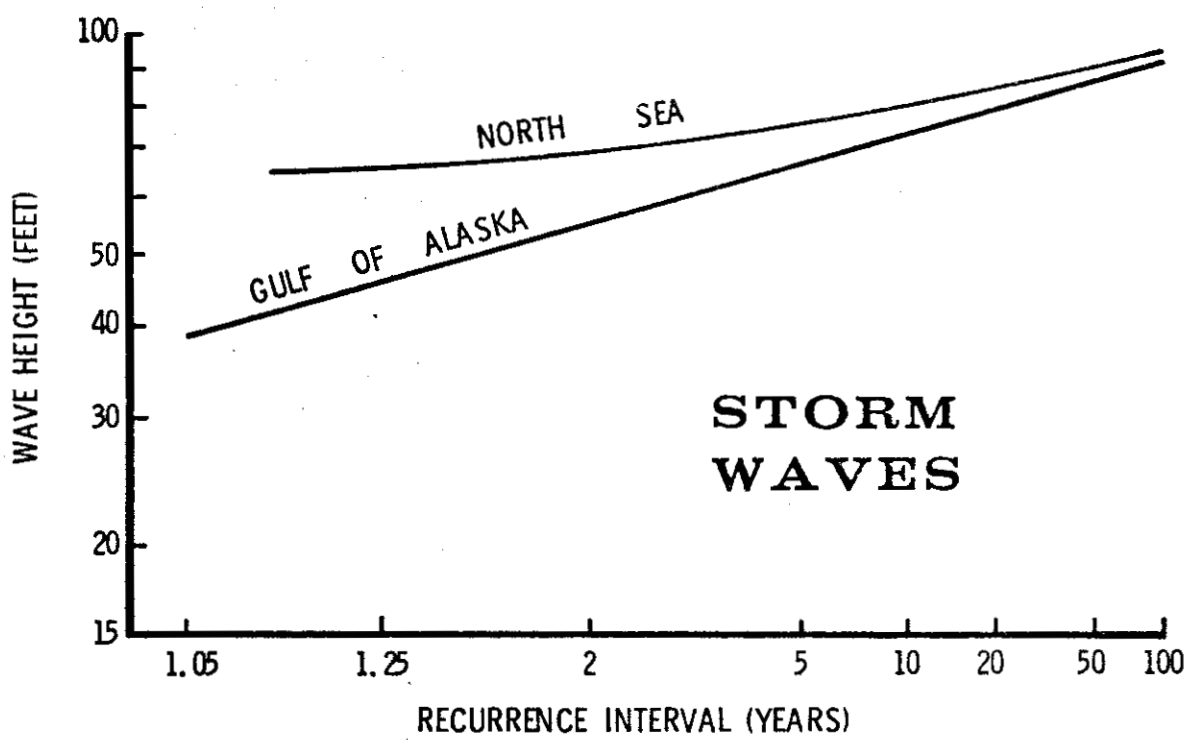
SLIDE 8 DOWN-HOLE SAFETY VALVE



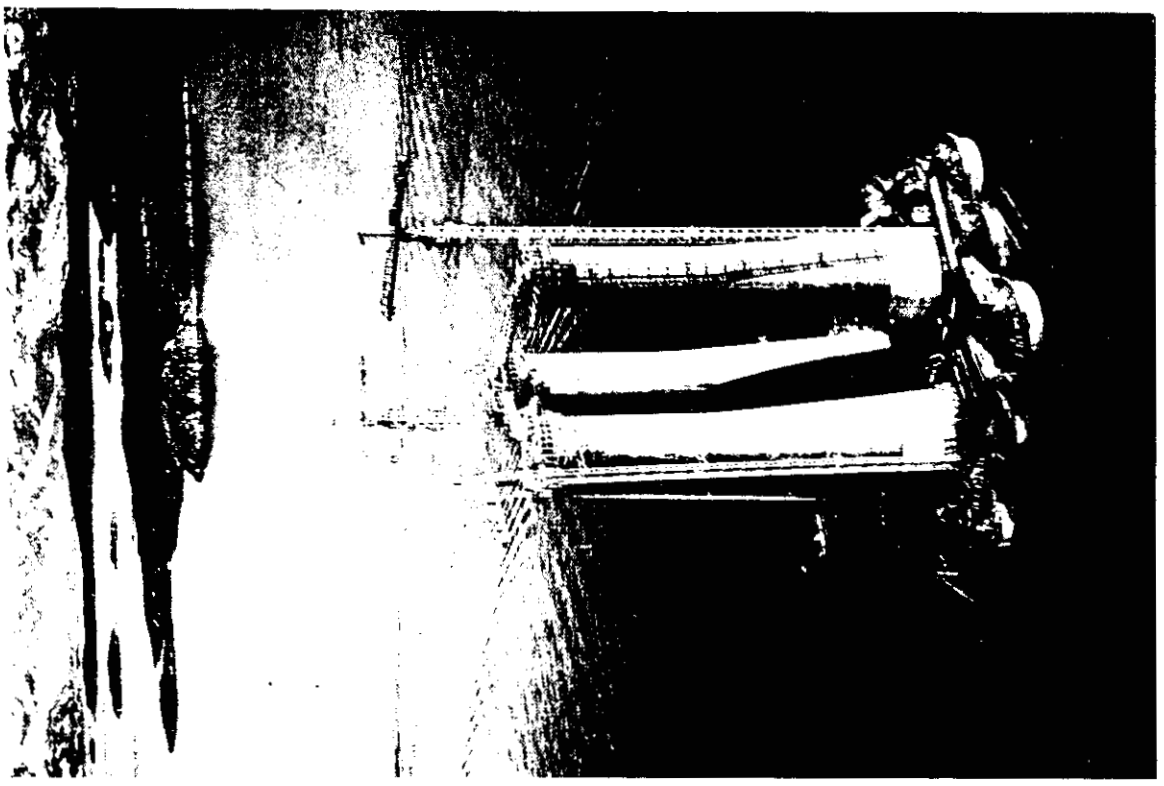
SLIDE 10 OFFSHORE STORAGE AND TANKER LOADING



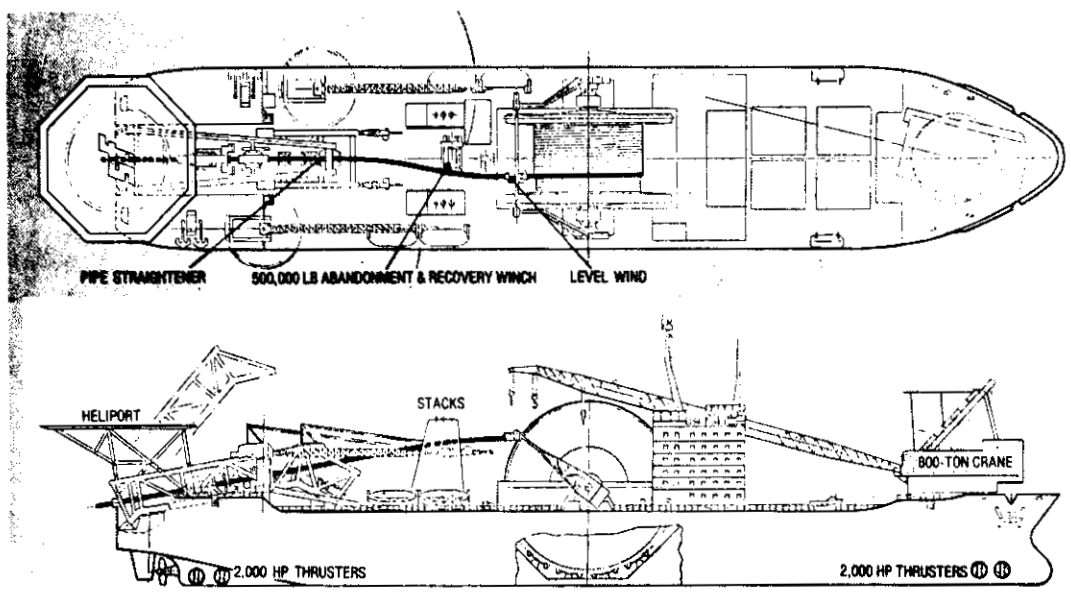
SLIDE 9 PIPELAY BARGE




SLIDE 11 GULF OF ALASKA AND NORTH SEA STORM WAVES

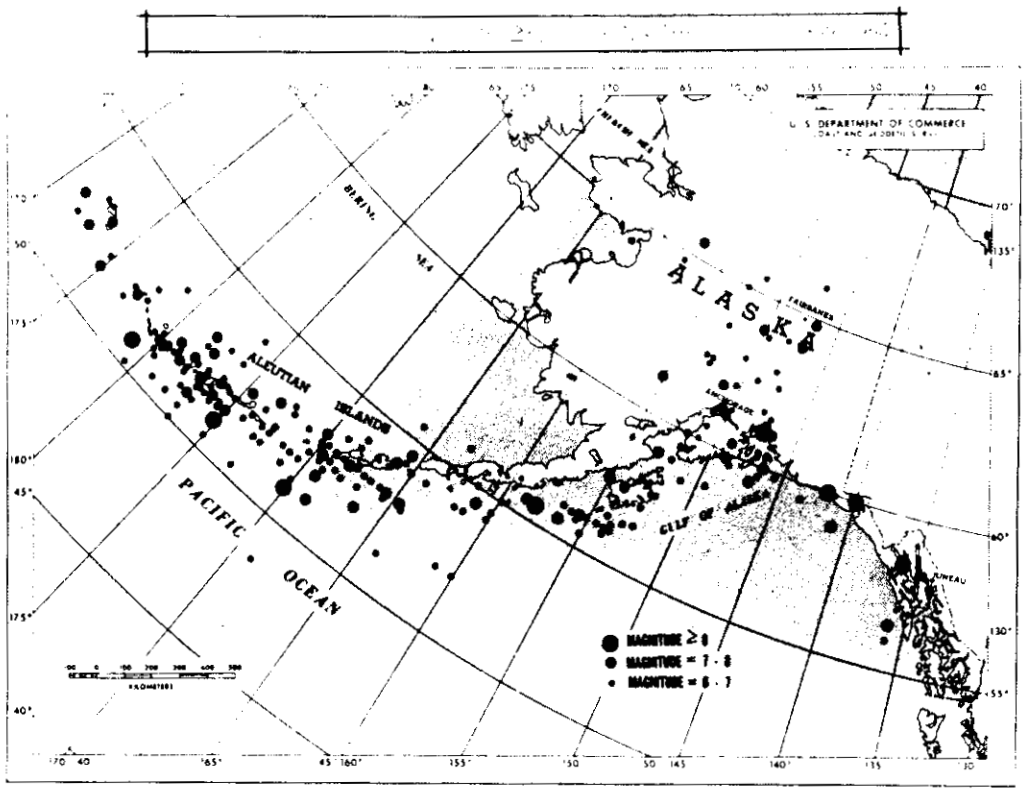


SLIDE 12 CONCRETE, GRAVITY PLATFORM

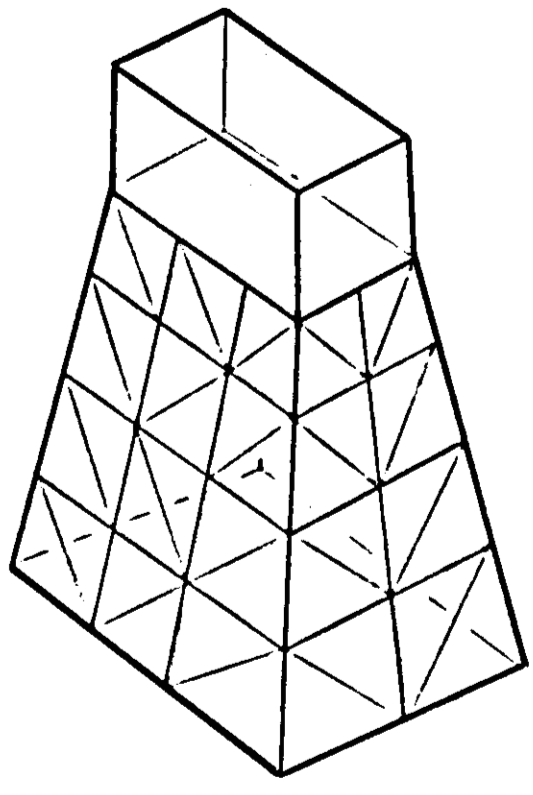



**SCHEMATIC OF THE PIPE LAY SHIP** A level wind feeds wraps of pipe on and off the reel. As it is wound around the reel, the pipe acquires an ovality of 1.5%, but after it is straightened, an ovality springback reduces this to about 0.1%. Shown here the pipe is entering the water at a shallow angle. The truss can be elevated to increase this angle to 55%.

SLIDE 13 NORTH SEA CONSTRUCTION VESSEL




SLIDE 14 GULF OF ALASKA EARTHQUAKE LOCATIONS



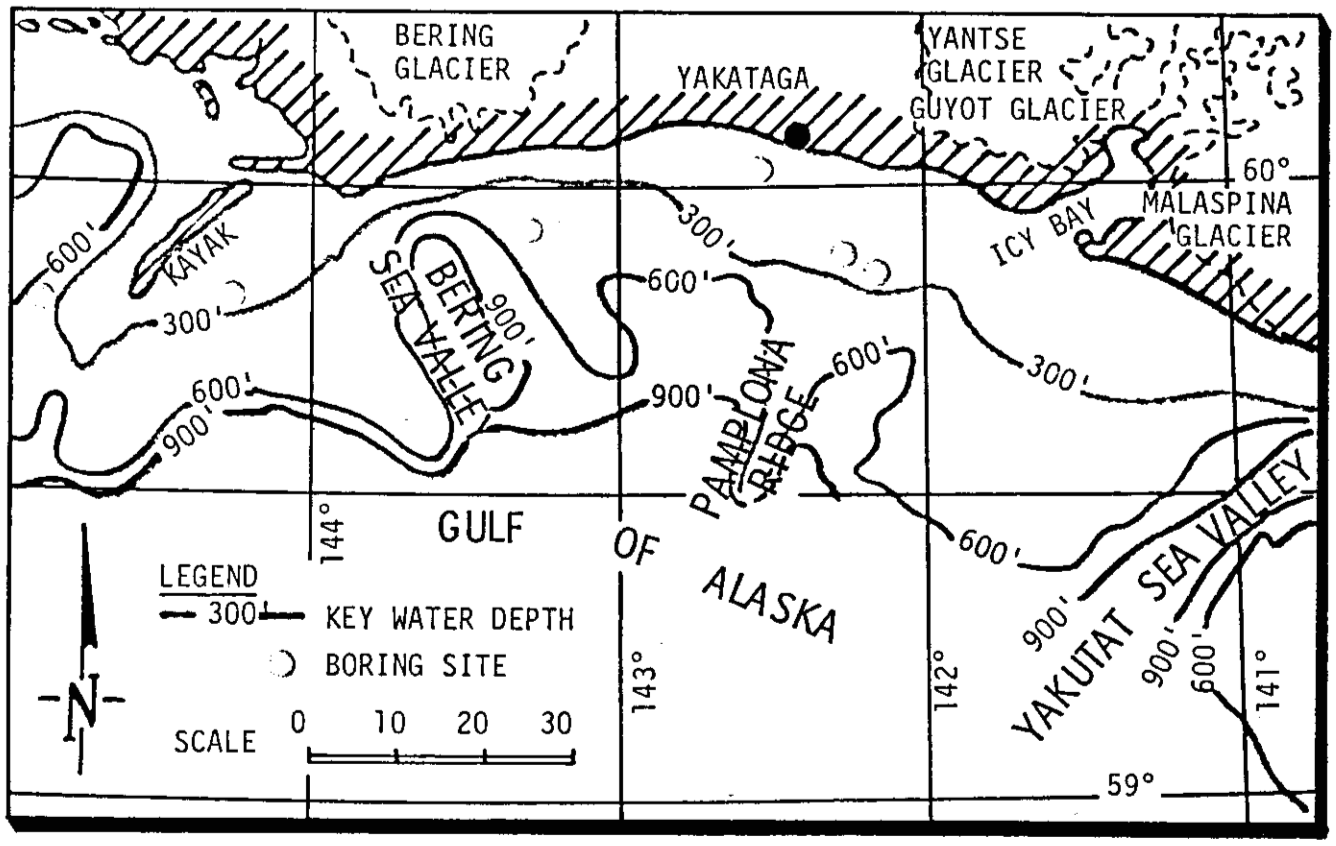
# WAVE vs. EARTHQUAKE LOADING

EXAMPLE PLATFORM

IN 300 FOOT WATER DEPTH

| FOUNDATION SHEAR | FOUNDATION OVERTURNING |
|---|---|
| 6,000 TONS | 1,200,000 TON-FEET |
| 7,300 TONS | 1,800,000 TON-FEET |

SLIDE 15 COMPARISON OF WAVE AND EARTHQUAKE LOADING




SLIDE 16 SOIL BORING LOCATIONS

PROFESSIONAL SUMMARY

KENNETH A. BLENKARN

Present Position:

Special Research Group Supervisor
Marine and Arctic Operations
Tulsa Research Center
Amoco Production Company

Degrees:

1951 B.A., Rice University
1952 B.S. Mechanical Engineering, Rice University
1954 M.S. Mechanical Engineering, Rice University
1960 PhD Mechanical Engineering, Rice University

Professional Societies:

American Institute of Mining, Metallurgical and Petroleum Engineers

Publications (9):

Petroleum technology, theoretical mechanics, structures

Principal Field of Research:

Oil well drilling, offshore structures, drilling vessels, marine environmental design conditions

Years of Industrial Experience: 20

STATEMENT OF

A. D. MOOKHOEK
EXXON COMPANY, U.S.A.

before the

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

HEARING

on

PROPOSED OIL AND GAS LEASING

on the

OUTER CONTINENTAL SHELF

NORTHERN GULF OF ALASKA

ANCHORAGE, ALASKA
AUGUST 12-13, 1975

PRESENTATION FOR ENVIRONMENTAL HEARING
GULF OF ALASKA OFFSHORE SALE
A. D. Mookhoek

My name is Bram Mookhoek. I am the Ocean Operations Manager for the Marine Department, Exxon Company, U.S.A., and during my 27 years in the company have been associated with all areas of marine transportation including the technical, economic and operational aspects. I might mention at this time that I am also chairman of the Marine Services Subcommittee of Alyeska, which is a group representing the Owner companies in marine matters. In this capacity, I work closely with the U. S. Coast Guard on routing of tankers to and from Valdez, navigation aids, anchorage areas in Prince William Sound, vessel traffic system, etc. Some or all of these aspects will also apply to the Gulf of Alaska marine operations.

In my discussion today, I will cover two subjects: (1) marine transportation, and (2) terminals.

In the marine transportation area, we will first look at the ships. For obvious reasons, we are, at this time, in no position to determine the size tanker to be used since this is a function of the crude production and the location of the terminal. However, to place this in better perspective, we have prepared this slide which shows, for various ship sizes and at different production levels, the number of port calls which would occur. This tabulation shows that a 45,000-ton tanker with a draft of 39 feet and a carrying capacity of 325,000 barrels of crude at a production level of 120,000 barrels per day will be arriving at the terminal about once every 3 days, while a 120,000-ton vessel having a draft of 52 feet and carrying about 860,000 barrels will arrive once every 7 days. Of course, if the production is greater than 120,000 barrels per day, port calls will increase correspondingly, as indicated by the number to the right of the third column.

It should be pointed out that the ship sizes shown here are arbitrarily selected and do not imply the actual size to be used. However, I believe it can generally be accepted that vessel size increases as production levels become higher.

Some of the sizes shown here are for existing vessels in the U. S. fleet, while others are new construction. Assuming that crude will be shipped to the U. S. West Coast, only vessels built in the U. S. and manned by U. S. crews will be permitted, because the Jones Act prohibits use of foreign flag vessels in U. S. domestic trades. U. S. ships are built to standards established by the American Bureau of Shipping and maintained under the rigid inspection and maintenance requirements of the ABS and the U. S. Coast Guard. The vessels are equipped with reliable and advanced communication and navigation equipment.

On this next slide, we are indicating some of the typical design and operating data. The sea speed of all these vessels is about the same and varies between 16 and 17 knots.

One of the items in this slide shows the quantity of segregated and dirty ballast capacity. Under normal weather conditions, northbound vessels carry about 30 to 35 percent of the ship's deadweight tonnage in ballast, while in heavy weather this may amount to 40 to 50 percent. As you know, segregated ballast is carried in tanks which are dedicated to clean seawater ballast and are not connected to the cargo tanks. Accordingly, this ballast water is not in contact with oil and can be discharged to the sea. The dirty

ballast is carried in tanks previously containing crude and is contaminated with oil. Therefore, this ballast will be transferred to a shore receiving facility where oil and water will be separated. How this is done will be briefly covered later in this presentation in the environmental impact statement.

On this next slide we show some of the special design and equipment features. Most of these items relate to safety, communication and pollution prevention and are designed to prevent accidents.

In this respect, you may be aware that a traffic separation system is presently under development by the U. S. Coast Guard for all ships traveling between Valdez and the West Coast. This new system will establish separate routes for north and southbound vessels and is designed to minimize crossing situations, thus reducing the chances of collision. It is likely that vessels scheduled to load at a Gulf of Alaska terminal will be required to use these same routes for part of the voyage. In addition, a vessel traffic system similar to Prince William Sound will probably be developed for the approaches to the terminal.

You may also be aware that the Coast Guard is installing a Loran "C" system which will cover the area from Southern California to Alaska. This navigation system, which, according to the U. S. Coast Guard, is accurate to 1/4th of a mile at the edge of the station's operating envelope and improves to 50 feet accuracy closer to the station, is scheduled to be in service prior to the start-up of the Trans Alaska pipeline and provides accurate vessel position fixing and, combined with the radars and bridge-to-bridge communications, will augment the ship's navigation system to insure the possibility

of collisions and groundings are reduced to as low a level as possible. Vessels to and from the Gulf of Alaska will use this system also.

Turning now to the second subject, a marine terminal or terminals will be necessary to receive crude oil delivered from the wells, store the oil and then load into tankers for delivery to market destinations in the lower 48. These terminals may serve a single company or, in most cases, may be operated as multiple use facilities. A typical terminal installation located ashore is shown in this slide. Terminal storage requirements depend directly upon thruput volumes and tanker sizes and schedules. Storage facilities must be adequate to allow continuous operation of the offshore pipelines, thus minimal storage requirements are usually several times the daily thruput volumes. To place this in better perspective, for a production level of 120,000 barrels per day, a terminal site of about 40 acres with about 1 million barrels of tankage would be required. Because of these large storage requirements, for operational reasons it is generally more advantageous to locate the tanker loading facilities adjacent to or near the shore. However, offshore loading berths cannot be discounted at this time for the Gulf of Alaska until fields are discovered and the feasibility of suitable onshore terminals has been developed.

There are a number of site locations in the Gulf of Alaska, as indicated on this slide, which would be suitable for tanker terminals. In view of the present uncertainty as to where oil will be discovered, no detailed analysis has been prepared for these locations. In the selection of a location, we take into account length of submarine pipelines, water depth, protection from the weather by terrain features, suitable land to build a tank farm, etc. Some of the more favorable sites for terminals near the proposed lease area are:

Yakutat Bay - This location with water depths of 180 feet can accommodate the largest tankers and is currently used for infrequent tanker deliveries and has a dock facility. However, this facility is very limited in size and not suitable for crude tankers anticipated. Several protected waterfront sites exist within the bay which are suitable for a marine terminal. Water depth is adequate near shore to accommodate fixed loading docks while terrain is sufficiently high to protect the shore facilities from high tides and waves.

Icy Bay - The bay with a water depth of up to 60 feet provides shelter from the east and has several potential terminal sites with deep water near the shore. The bar at the entrance to the bay has about 40 feet of water, with the bottom consisting of sand and gravel. Dredging to a depth of about 50 feet suitable for 80,000-ton tankers for a distance of about two miles could be considered. The contiguous land areas are flat with sufficient high ground to accommodate an onshore terminal.

Kayak Island - This area is exposed to the Gulf of Alaska on the east but affords some protection for large vessels on the west side. Deep water areas, 180 to 300 feet 4 miles offshore, have no limitations for large tankers, while the approaches are not restricted by depth or land masses. Due to the exposed location, sea berths would probably be more practical than fixed berths. There is ample relatively flat land for installing tanks and other terminal facilities.

Middleton Island - The west side provides protection from easterly winds and seas, but due to the depth of water, about 80 feet, tankers would have to moor approximately one and one-half miles offshore. Adequate high ground is available on the island for storage tanks and related terminal facilities.

Montague Island - This area has several protected areas with deep water, about 600 feet, to the coast which would be suitable. Onshore land is available for terminal facilities.

The crude oil terminals will be planned and operated in accordance with advanced technology to ensure a safe, pollution free performance with the principal features to be developed to suit the specific sites. Design considerations and operational provisions will be made for rapid response to emergencies such as extreme weather, warning of a tsumani or other contingencies. Of course, the actual location and design of any terminals will require compatible solutions to land use, wildlife habitat and seismic considerations.

Crude oil will be received from the submarine pipelines in all welded steel tankage which will be designed to meet the local conditions, i.e. high snowfall and anticipated seismic forces. Tanks will be provided with automatic gauging equipment with manual back-up, together with high level alarms to guard against overfilling. A containment dike with a capacity of 110% of the total tankage including adequate allowance for surface water impounded within the dike area will be installed. A fire detection and extinguishing system will be incorporated in the design.

Turning now to the dock facilities, a sufficient number of docks will be provided to accommodate the required number and size of tankers. These docks will be equipped with a fendering system and designed to withstand seismic and wave forces as well as docking impact forces. The dock

structure to be used will vary with the prevailing slope and soil conditions of the seabed. For flat or gently sloping seabed conditions, the dock will be constructed from steel jacket or reinforced concrete structures which will be anchored to the sea bottom.

In the case of a steeply sloping sea bottom, a floating dock might be constructed which will have the ability to move in a vertical direction to accommodate tidal movement or wave action. Lateral or longitudinal movement will be restrained by means of rigid struts hinged at the dock and anchor points ashore.

Mooring dolphins for each type of berth will be constructed of steel jacket structures anchored to bedrock or firm soil. Each mooring dolphin will be equipped with quick release mooring hooks for securing the mooring lines from the tankers.

Qualified pilots will be used for all tankers entering or leaving the terminal while tugs and mooring launches will be available to assist in mooring the vessels. In addition to berthing and unberthing tankers, these tugs will be fitted with fire fighting systems capable of delivering foam or water onto the deck of the largest tankers when in light condition.

Loading of the tankers will be by gravity flow if tanks are installed at a sufficient elevation, which is dependent on the topography of the onshore site. In the event elevation is insufficient, loading pumps will be used.

Steel loading arms will be provided on each dock to connect to the ship's piping. These will be operated from a control center on the dock. Shut-off valves will be provided on the docks and onshore in each loading line

to permit either local or remote operation from the control center. This valve arrangement will allow emergency shutdown to be initiated at various points. To prevent excessive surge pressures in emergency conditions, relief valves will be included in the design. These emergency features will prevent internal pressure buildup by more than 10% at any point in the piping system.

To maintain the high water quality standards and scenic beauty of the area, strict operating procedures to guard against the possibility of accidental oil spills and the adoption of design criteria to minimize the risk of oil spills resulting from equipment failure or due to earthquakes will be developed. In addition, a sewage treatment facility and incineration of combustible waste will be provided.

A ballast treatment plant to handle all oil contaminated ballast water and wash water used to clean cargo tanks will be installed. Although advancing technology may result in further improvements, the type of system will probably consist of a three-step process of gravity separation followed by chemical flocculation and dissolved air flotation. The treated water will conform to the applicable water quality standards. In this system, oil contaminated water is pumped into steel storage tanks where, after settling, floating oil is skimmed off and pumped to the oil treating section. After the gravity separation, chemicals will be added to the ballast which will then enter the chemical flocculation and air flotation chambers. The ballast is retained for a specified time in the flocculation chamber where it is subjected to continuous gentle agitation for floc development. This floc has a strong affinity for oil, and the remaining oil in the ballast is captured by the floc particles.

From the flocculation chamber, the ballast flows to the mixing zone, where air is introduced and air bubbles attach themselves to the floc and the mixture flows to the flotation zone. In the flotation zone, the air suspended material rises to the surface where skimming equipment removes the floating matter. The clarified ballast is tested continually for oil content and leaves the treating facility into an outfall line through a diffuser discharging into the port at a point well below sea level.

Oil skimmed in the gravity separation step and that recovered in the flocculation/air flotation process is pumped to the terminal crude storage tanks for loading aboard tankers.

The foregoing description of dock facilities mainly applies to onshore type installations. However, offshore sea berths cannot be discounted until oil fields are discovered and the feasibility of suitable onshore terminals has been developed. Ballast handling facilities for offshore loading berths will be designed to perform a similar function as for the onshore berth. Either the dirty ballast will be pumped ashore for treatment or retained aboard the vessel for subsequent discharge at a shore treatment plant.

These offshore berths could be of several types, including fixed type docks, island type docks, single point moorings or conventional multipoint moorings. In general, the seabed anchoring characteristics, water depth and sea conditions will dictate the most economical and practical type structure.

Offshore loading facilities are relatively common, but until recently they were all located in protected water. However, with improved technology, offshore loading terminals in exposed locations are relatively common, i.e. Kharg Island in the Persian Gulf, Dubai Terminal 60 miles offshore in the Arabian Gulf, Mobil's Nigerian Terminal, Phillips' Ekofisk Terminal in the North Sea, etc. In addition, single point mooring installations are in the advanced engineering stage for offshore locations in the Gulf of Mexico off Louisiana and Texas.

The Louisiana facility will be located about 18 miles off Bayou Lafourche, while the Texas installation will be 30 miles off Freeport. Both facilities will be in a water depth of about 100 feet. Although the difficulties may be accentuated in the Gulf of Alaska, these installations which include tanker safety zones and traffic regulations demonstrate the feasibility of constructing and operating offshore terminals in exposed locations safely and with minimum hazard to the environment.

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