



U. S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

HEARING ON PROPOSED LEASING IN THE GULF OF ALASKA

Ladies and Gentlemen:

I am Joe W. Tyson, Senior Scientist for the Gulf Universities Research Consortium (GURC), now Houston, Texas. I am appearing today on behalf of GURC at the request of the Gulf of Alaska Operators Committee.

As some of you may know, GURC is a research oriented organization which counts in its membership 20 universities with interests in the Gulf of Mexico.

During 1972-1974, GURC, at the request of a number of SLIDE #1 companies, initiated its Offshore Ecology Investigation to answer the deceptively simple question; "what is the measureable impact of drilling for oil, and later producing it on the estuarine and marine environment of the Louisiana outer continental shelf, the nation's greatest offshore oil producing region?" After an intensive study costing more than 1½ million dollars, the conclusion reached by GURC is that the drilling and subsequent production of petroleum products off of Louisiana has had no major lasting adverse affects on the marine environment and may even have been beneficial to some life forms.

In appearing here today, I fully realize that the Gulf

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STATEMENT OF

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STANDING COMMITTEE
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 Clayton D. McAuliffe,
Chevron Oil Field Research Company

OFFSHORE SALE ENVIRONMENTAL HEARING

Anchorage, Alaska

I am Clayton McAuliffe, Senior Research Associate, with Chevron Oil Field Research Company, La Habra, California. I received my doctorate in Soil Science with minors in Physical Chemistry and Plant Physiology from Cornell University, and was a professor at Cornell University and North Carolina State University for 8 years before joining Chevron Oil Field Research Company 19 years ago.

I am a member of the American Chemical Society, The Soil Science Society of America, the American Society of Agronomy, a member and Fellow of the American Association for the Advancement of Science, the Society of Petroleum Engineers and several honorary societies. I have published over 40 papers covering a variety of subjects in scientific journals and I have a number of U. S. and foreign patents.

For over five years I have devoted my time almost exclusively to a study of petroleum in the marine environment. I assisted in the planning and coordinated the extensive chemical and biological studies conducted during and following the 1970 Chevron oil spill in the Gulf of Mexico. I performed a similar function following the collision of the tankers in San Francisco Bay in 1971. I served on the Steering Committee of the National Academy of

Sciences Panel on Inputs, Fates, and Effects of Petroleum in the Marine Environment which resulted in the recent NAS publication "Petroleum in the Marine Environment". For the past four years I have been associated with the American Petroleum Institute's Committee on Fate and Effects of Oil in the Environment. I have also served on various other environmental and science advisory committees.

INTRODUCTON

Today I will review what happened to crude oil during a major oil spill as revealed by studies during and following the Chevron Gulf Coast spill and relate these results to the northern Gulf of Alaska to predict what would happen to the oil in the unlikely event that a major spill should occur. Before undertaking this I'd like to review some general observations concerning offshore crude oil spills.

As shown in Slide 1, the probability of a major oil spill is low. There have been only three major spills from offshore production platforms in the drilling of approximately 19,000 wells in the U.S. offshore.

Based upon the amount of oil discharged during these three major spills, it is predicted that if a major spill occurs in the Gulf of Alaska, it probably will range from 20,000 to 100,000 barrels.

Based upon past experience, a major oil discharge from an offshore platform may last for several weeks and possibly for a month or two.

During the period of oil discharge, it is obvious that the highest concentrations of oil will always be at the point of discharge.

To date the amount of oil discharged to the marine environment from offshore spills has been less than 2% that of the total petroleum input (National Academy of Sciences, 1975). As offshore production increases, the amount of oil discharged may increase, but probably will remain a small fraction compared with total input to the oceans. It may even become less because of improved drilling practices, and the employment of fail-safe valves in the oil wells.

As will be discussed in other testimony, the only documented adverse effects from major crude oil spills have been to some species of intertidal organisms when oil stranded on the shore (Straughan, 1971), and to sea birds if they were present. Therefore, efforts should be made to reduce the stranding of oil to an absolute minimum. I will later in my testimony make comments concerning a method for minimizing possible impacts of oil.

Some publications which have treated the issue of movement of oil spills have not given adequate recognition to the numerous changes which oil undergoes when discharged to the marine environment. Indeed, some studies on the subject have as a major assumption, the proposition that once oil is spilled, it will continue to drift around the ocean essentially unchanged for 50 or even 100 days. This assumption is clearly a false one, and it leads to unrealistic oil spill trajectories and hypothesized adverse impacts of the oil.

I wish to devote the major portion of my testimony to the numerous changes oil undergoes before discussing possible oil spills and oil spill trajectories in the proposed lease areas of the northern Gulf of Alaska.

Although laboratory studies, visual observation of small oil spills at sea, and oil spill models provide some information, the extrapolation of the results of these studies to a major spill situation is largely speculation. I believe that the best prediction of what might happen in the event of a major spill in the Gulf of Alaska is to extrapolate observed results from a major crude oil spill (McAuliffe et al, 1975) with proper modifications for the different environment in the northern Gulf of Alaska.

When oil is discharged to the marine environment, it undergoes a number of rapid physical changes including spreading, dispersion, evaporation, solution, sedimentation, and emulsification. Beginning immediately, but proceeding at slower rates, are other crude oil alterations including biodegradation, photo-oxidation, and incorporation by marine organisms other than bacteria.

Of the three major offshore platform spills, chemical and biological studies were conducted only for the Santa Barbara and Chevron Gulf of Mexico spills. The Chevron study was one of the most comprehensive and diagnostic investigations ever made of an offshore crude oil spill. We believe that reference to this investigation and to the summary paper published in the Proceedings of the 1975 Conference on Prevention and Control of Oil Pollution held in San Francisco in March would be useful to the BLM in connection with the preparation of the final environmental impact statement.

MAIN PASS BLOCK 41 OIL SPILL

Chevron production platform C, Main Pass Block 41 Oil Field, located 11 miles east of the Mississippi River Delta in 40 ft of water, caught fire February 10, 1970. On March 10 the fire was successfully extinguished and oil was discharged until March 31 when the last wells were brought under control. During this three-week period, an estimated 35,000 to 65,000 bbls of crude oil was discharged. Assuming the higher value, the initial rate of discharge was approximately 6,000 B/D, decreasing to 1,500 B/D during the final week. As a safety precaution during the fire and oil spill, 2,006 bbls of chemical dispersants were mixed in water and sprayed on the platform and surrounding water surface. The addition of chemical dispersants (surfactants) breaks the oil into small droplets which do not stick to each other, but mix into water. An everyday example of an emulsion is cream. It is an emulsion of butterfat in water and it disperses when added to coffee.

Slide 2 shows the Mississippi River Delta region and the location of the Main Pass Block 41 C Platform. Shown on the slide is a composite of the surface oil slick during the three-week period of oil discharge. On most days the slick was about six to nine miles in length and 1.0 to 1.5 miles wide. On two days, with relatively calm weather, the surface slick was observed 40 miles to the south and on another day it extended a similar distance to the east.

Appreciable amounts of oil were emulsified by the dispersants. This emulsified plume extended no more than 1.0 to 1.5 miles from the platform which would be within the small circle drawn around the platform on the map.

During the last five days of the spill, water samples were collected in the immediate vicinity of the platform and outward at distances up to 30 miles. Water samples were collected from near-surface, mid-depth, and near-bottom. On three days, water samples were collected in the emulsified oil plume in areas which visually had the highest concentrations of oil-in-water emulsion in the near-surface waters.

Following the spill a large number of bottom sediment samples were collected for hydrocarbon and benthic organism analysis throughout the study area extending north as far as northern Chandeleur Sound and south around the Mississippi River Delta.

For a year following the spill, a large number of trawls collected fish, shrimp, and crabs. The trawls were made principally between the platform and the delta in order to intercept shrimp that would have migrated through the oil spill area.

Water, sediment, benthic, and trawl samples were appropriately analyzed and the next slides show what happened to the oil. Based upon the crude oil composition and verified by gas chromatographic analysis of oil samples collected from the water surface (Slide 3), between 25 and 30% of the oil evaporated into the atmosphere during the first 24 hours. Between 10 and 20% of the oil was

skimmed from the water surface even though the recovery devices were far less efficient than those which are available now, more than 5 years later.

Hydrocarbons dissolved in the water column were found only in the platform vicinity in the emulsified oil plume. All other waters contained dissolved hydrocarbons in concentrations of less than one part per billion (ppb). The dissolved hydrocarbons were low-molecular weight (less than 10 carbon atoms in the molecule) with about one-half the dissolved constituents being low-molecular weight aromatic hydrocarbons--benzene, toluene, xylenes, and trimethylbenzenes. These low-molecular weight aromatic hydrocarbons are considered to be toxic to biological life. Note, (Slide 3) that the dissolved hydrocarbon concentrations at the platform ranged from .02 to 0.2 ppm decreasing to 0.002 ppm (2 ppb) at approximately one mile. On one day, dissolved hydrocarbons were observed in mid-depth and near-bottom waters near the platform in the 2 to 5 ppb range. From the dimensions of the emulsified oil plume, the dissolved hydrocarbon concentrations in the water, the rate of oil discharge, and water current, it was possible to calculate the amount of oil that dissolved in water. The amount dissolved averaged 0.15% during the first two hours. Because the emulsion droplets were small, the rate of solution would have been rapid initially and then decreased with time. Therefore, it is estimated that less than 1% of the oil dissolved the first day.

Slide 4 summarizes what happened to portions of the oil. The concentrations of oil in the emulsion plume ranged from 2 to 60 ppm at the platform and decreased to 1 ppm at one mile. The oil was not found in mid-depth (20 ft) samples under the emulsion plume, showing that emulsified oil was only in the near-surface waters. Again, knowing the dimensions of the emulsion plume, concentrations, and flow rates, it was possible to calculate that from 10 to 50% of the oil was emulsified.

Analysis of numerous sediment samples by gas chromatography documented that crude oil settled to the bottom only within a five-mile radius of the platform. The concentrations for the C₁₂-C₃₃ hydrocarbon fraction measured by gas chromatography and for total oil are shown ranging from 125 to 625 mg/l for the highest values with mean values of 31 and 151 mg/l of sediment.

To obtain an adequate amount of sediment for oil analysis, the top 1.5 inch interval of 2.0 inch diameter cores was extracted. The next lower 1.5 inch core interval analyzed did not contain Main Pass Block 41 crude oil, thereby showing that the sedimented oil was found only in upper 1.5 inches of sediment.

The remaining oil, not accounted for, is thought to have dispersed throughout the water column and possibly sedimented. It was diluted to such low concentrations as to be immeasurable.

In addition to these weathering processes, biodegradation was occurring.

Slide 5 compares the gas chromatogram for oil collected from the water's surface about 0.5 mile from the platform with chromatograms of oil in sediment samples located near the platform. The top

chromatogram of the partially weathered oil (loss of hydrocarbons below normal C_{13}) has marked normal alkane peaks sticking up like fingers and numbered from 13 through 35. Hydrocarbon oxidizing bacteria, found in all marine waters, apparently started to biodegrade the oil immediately as shown in the bottom 2 chromatograms. The normal alkane peaks are much reduced in the oil extracted from a sediment sample collected 2 miles south of the platform one week after the spill, and they are essentially gone from the oil in the sediment sample taken one month after the spill 3 miles south of the platform. The small normal alkane peaks visible in the bottom chromatogram in the C_{27} - C_{35} region are of biogenic origin.

Additional evidence of weathering is shown in Slide 6. Oil from Main Pass Block 41 identified by gas chromatography was measured at three locations after the spill and ranged from 50 to 125 ppm. Samples collected at these same locations (within 10 to 15 ft by accurate Raydist navigation) 11 months later had oil contents from 3 to 6 mg/l (ppm). These concentrations are approximately equal to background values for sediments from this part of the Mississippi Delta.

Although my testimony is principally to document what happened to the oil discharged during the Chevron spill, I do wish to make a few comments about the observed effects of the oil discharge on marine life.

We have just shown that the concentrations of dissolved hydrocarbons and oil emulsified in the water column were relatively low and diluted very rapidly. With a current of 0.5 knot, the

concentrations became less than 1 ppb at the end of a two-hour period one mile from the platform. Thus, even planktonic organisms moving with the water containing emulsified oil were subjected to low hydrocarbon concentrations for a very short period of time - short compared with bioassay tests which are normally conducted for 4 days. Bioassay data cited by the draft EIS and in Marine Bioassays Workshop Proceedings, 1974, show that much higher concentrations of oil and dispersed oil are required to cause half-kill of test organisms, including eggs, larvae, and juvenile stages.

Bioassay tests using six different species of organisms were conducted with Main Pass Block 41 crude oil and the two dispersants used during the oil discharge period. The concentrations of oil and emulsified oil required to cause one half-kill were much higher than the concentrations measured in the sea water at the time of the spill, and the exposure time was 4 days. These data would predict no measurable effect from the oil and emulsified oil on marine life. This conclusion was confirmed because no dead or distressed organisms were observed during the spill. Divers were under the platform on several occasions and observed fish, shrimp, and other marine life with no evidence of distress.

Planktonic organisms were exposed to low concentrations of oil for a short period of time and mobile organisms can leave the area, but benthic organisms living on and in the bottom sediments are sedentary. They were subjected to possible effects from the oil for the entire discharge period. Over 550 species of benthic organisms were identified in 233 benthic samples throughout the

study area. Within seasonal variations, bottom sediment type, and possibly other environmental parameters, it was not possible to measure an effect of the spilled oil on these benthic organisms. There was no correlation of number of species or number of individuals or other biological parameters with the hydrocarbon contents of sediment samples within a 10-mile radius of the platform. It is within this area that an effect, if one were to occur, would be expected from sedimented oil. This lack of correlation strongly suggests a lack of significant effect of oil on the benthic organisms.

The extensive trawl samples showed no alteration in the annual life cycle of commercially important shrimp. Blue crabs were observed throughout the study area, and the number of species of fish collected in the trawl samples in the study area were comparable to a previous survey conducted by the Louisiana Estuarine Inventory conducted along the entire coast of Louisiana.

I have attached a reprint of the paper summarizing the Chevron Chemical and Biological investigations to my testimony.

EXTRAPOLATION OF CHEVRON GULF SPILL RESULTS TO NORTHERN GULF OF ALASKA

Statements have been made that it is not possible to extrapolate the results of a study from one area to another. To a certain extent this is true, but good estimates can be made from such an extrapolation. Such an evaluation is much better than merely stating that we don't know what to expect in a new exploration area such as the northern Gulf of Alaska.

Life of a Surface Slick

During the Main Pass Block 41 spill, oil on the water's surface which left the platform in one direction on a given day, followed by a change in the wind which carried the oil in a different direction the next day, revealed that first day's slick could not be found on the second day. Details of individual slicks are given by Murray et al, 1970, and Murray, 1975. The fact that the slick extended on most days a maximum of six to nine miles from the platform with a 0.5 knot current indicates a maximum life of oil on the surface of 12 to 18 hours.

The discharge of this same crude oil to the waters of the northern Gulf of Alaska would probably show a somewhat longer life, but not to an appreciable extent. The University of Alaska study (Kinney et al, 1969) in the Cook Inlet indicated the half-life of a crude oil spill was less than one day with complete disappearance after four to five days. A similar observation was made, even in the winter time, for the spill that occurred at the Drift River terminal. The oil moved throughout portions of the Cook Inlet quickly, but was not observed to persist.

The Main Pass Block 41 crude oil was 34° API gravity. Cook Inlet crude oils have API gravities ranging from 35° to 45° and crude oils from the Katella oil field measure 41-45° API. If similar oils are discovered in the northern Gulf of Alaska, the rates of weathering and dispersion should be at least as rapid as

observed in the Cook Inlet. Because of higher winds and waves, the weathering and dispersion may be more rapid.

Evaporation

The rate of oil evaporation would be somewhat slower in the northern Gulf of Alaska as compared with warmer waters due to the lower vapor pressure of the hydrocarbons. If the temperature was 10°C lower, the rate of evaporation would be approximately one-half. The average water temperature during the Chevron spill was 15°C. The northern Gulf of Alaska water temperatures range from 4 to 14°C while nearshore waters range from 9 to 12°C. The maximum water temperature difference comparing the Chevron spill with the coldest northern Gulf of Alaska water would be about 10°C and sometimes less. Therefore, the maximum decrease in evaporation rate would be approximately one-half that observed for the Gulf of Mexico spill. However, the higher average wind velocities would increase the rate of evaporation in the Gulf of Alaska as compared with the Gulf of Mexico. The rate of evaporation increases linearly with wind speed. Higher winds would partially compensate for lower water temperatures and if wind velocity was twice that in the Gulf of Mexico, wind would completely compensate for water temperatures 10°C lower.

Dissolved Hydrocarbons

The rate of solution of hydrocarbons from a similar oil into the Alaskan Gulf water column would be somewhat slower than in the Gulf of Mexico because a similar oil would have a lower

viscosity due to lower water temperatures. The transfer of the hydrocarbons to water would be at a lower rate. In both the Gulf Coast and the Gulf of Alaska, hydrocarbons that do dissolve will either biodegrade or evaporate back into the atmosphere. Low molecular weight aromatic hydrocarbons have the highest hydrocarbon solubilities in water, but are still relatively insoluble. Because there is no reservoir of these hydrocarbons in the atmosphere, they evaporate from the water column into the atmosphere (McAuliffe, 1974). The rate of evaporation of soluble hydrocarbons from oil greatly exceeds the rate of their solution into water (McAuliffe et al, 1975; Harrison et al, 1975).

Biodegradation

Biodegradation rates in cold waters are slower than in warmer waters. However, we believe that the rate of biodegradation set forth in the draft Environmental Impact Statement is understated, because it is based upon the reduction in rate which occurs in chemical reactions (i.e., rate reduced one-half for each 10°C lowering of temperature). In preparing the final EIS, the BLM may wish to consider the following material. Slide 7 shows studies which have been conducted using Prudhoe Bay crude oil in Prudhoe Bay waters. Atlas (1973) found that in three days the percentage degradation at 5°C was 21% whereas at 25°C it was 39%. Atlas tested a 20°C temperature difference, but the rate of biodegradation at 5°C was less than one-half the rate at 25°C. In five weeks, 60% of the oil was lost and when Atlas added

nitrogen and phosphorous as nutrients to the water, 80% of the oil biodegraded in five weeks. ZoBell (1973) using Prudhoe Bay crude oil found 61% biodegradation in ten weeks even with the water at -1.1°C (below freezing).

The information just discussed suggests that the half-life of a crude oil spill in the Gulf of Alaska would be of the order of one day and with complete loss of oil from the surface by five days. Thus, any appreciable stranding of oil would not occur in a period exceeding three days, and the slick life might be less.

The draft Environmental Statement discusses oil spill trajectories in the northern Gulf of Alaska and recognizes in its initial statement dispersion, weathering, and biodegradation processes. However, it then discusses proposed trajectories and continues to give probabilities of stranding for long periods of time, up to 88 days for average times and no limit for maximum times. Slide 8 shows the approximate location of the Sites 3 and 4 estimated from figures in the CEQ report and the draft EIS. Site 3 is about 20 miles from shore. Site 4 is 60 miles from Montague Island and a similar distance from the Copper River Delta. At the bottom of the figure are listed the minimum and average times in days for oil to strand from these sites as calculated in the CEQ report. Only in the winter and fall at Site 3 is there an indication of oil stranding after a minimum three day period; the average times are very much longer.

Based upon the weathering and dispersion of the oil which we have previously discussed, there is little likelihood of significant quantities of oil from even a major spill stranding on the coastline

from these representative sites in the two major proposed lease areas.

Also shown on Slide 8 is a possible location for a "worst case" situation postulated in the draft EIS - a 100,000 bbl spill over 61 days 4 miles from shore with the oil driven continually ashore by wind. Until oil in commercial quantities has been discovered, possible spill locations and oil spill trajectories are only conjecture.

The use of meteorological and oceanographic data is helpful in predicting oil spill trajectories. The Gulf of Alaska Operator's Committee is calculating spill trajectories from a number of sites throughout the lease area based upon past meteorological information. The Operator's Committee also is currently obtaining additional meteorological and oceanographic information from which spill trajectory calculations can be made. These data will be incorporated into oil spill contingency plans.

There are certain areas which are more subject to impact than others. For example, oil discharged within three or four miles of shore is likely to strand. Water currents (geostrophic) are consistently to the west, and winds are predominately from the east and southeast. The probability of oil coming ashore east of a possible spill location is very remote. In the eastern portion of the lease area a spill close to shore or to Kayak Island would likely strand.

The western lease area, however, is sufficiently far from shore that it is unlikely appreciable quantities of oil would strand. If oil did strand, it would probably do so on Montague Island or on Middleton Island.

RISK ANALYSIS

The draft EIS undertakes a "Proximity Evaluation and Summary Risk Analysis" which recognizes the dispersion and weathering of spilled oil, but does not compensate for them. The analysis uses the shortest distance to shore or environmentally sensitive areas from each lease tract, and the movement of oil at a constant speed of 0.4 mile per hour. The analysis also does not consider current and wind directions or velocities. The evaluation concludes that 100 blocks have a high potential risk for three types of impacts, 168 for two impacts, 56 for one impact, and that only six blocks would not have an environmental impact. These six tracts are located closest to the Copper River Delta.

In preparing the final EIS, the BLM should consider the weathering and dispersion of oil that we have discussed in this statement and referenced in the scientific literature, and to use spill trajectories suggested by meteorological and oceanographic data to obtain a more meaningful analysis of possible adverse environmental impacts from a possible oil spill from each lease tract. The BLM might also consider the use of dispersants to minimize possible adverse effects in their risk analysis.

ADVANTAGES OF USING DISPERSANTS

Major crude oil spills have had documented adverse environmental effects only if oil stranded in the intertidal zone, or to birds if they were present at the time of the spill. Thus, methods of

minimizing oil adherence to feathers or preventing the stranding of oil ashore would be beneficial. Emulsification of the oil is such a method. I have already discussed the use of dispersants during the Chevron Gulf Coast spill and the demonstrated lack of adverse effects on the marine environment.

The use of oil dispersants received adverse publicity at the time of the Torrey Canyon spill. However, the dispersants and their formulation in toxic solvents as well as improper use in the intertidal zone, resulted in the adverse environmental effects; the intertidal zones have subsequently recovered. This adverse publicity resulted in the U.S. Environmental Protection Agency banning the use of dispersants in this country other than for safety reasons. Other countries and scientists in other countries recognized the advantageous use of surfactants, and dispersants are used to disperse oil (Marine Pollution Bulletin, 1975; Canevari, 1969, 1971, 1973, 1975; McAuliffe et al, 1975).

Slide 9 documents some of the advantages of using dispersants. First and foremost is the rapid dilution which occurs with emulsification. The dispersed oil mixes downward in near surface water and removes oil from the water's surface. The bulk of the oil is removed from most of the wind's influence and the oil does not travel as far as a surface slick (Chevron spill, 1 mile vs 6-9 miles average distances). The life of the surface oil slick would be reduced and significant amounts of oil are not likely to reach shore or move to biologically sensitive areas after one day.

Emulsification greatly lessens the tendency of oil to stick to itself and to solid surfaces. It, therefore, would lessen bird kill, although not eliminate it because not all oil can be emulsified and some remains on the surface. It would reduce the tendency of oil to adhere to solid particles (silt) in the water and therefore lessen the amount of oil that would sediment (Canevari, 1971; McAuliffe, 1973). It would particularly lessen the sedimentation of oil if the situation existed where surface oil met turbid water from the mouth of a river for example. Without emulsification, the oil might sink and be concentrated in the sediments at the zone where the oil met the turbid water.

If emulsified oil should strand in the intertidal zone, it would have very much less tendency to adhere to sand, rocks, or other solid surfaces. Emulsified oil would be in low concentrations and eliminate smothering of marine life in the intertidal zone which may occur with non-dispersed crude oil which has lost light components at sea. The emulsion would have a tendency to wash back out with receding tide and subsequent tides.

Emulsification would accelerate biodegradation by presenting a larger surface area to volume of oil. It likewise would accelerate physical weathering such as evaporation and solution with those soluble constituents dissolved in the water column subsequently either biodegrading or evaporating into the atmosphere.

Emulsification might also increase oil oxidation by exposing more of the oil's surface to the sun relative to the volume of oil even through the oil is removed from the immediate water surface. Emulsified oil stays principally in near-surface waters as documented during the Chevron oil spill.

SUMMARY

In summary, we believe that the probability of a major oil spill in the proposed lease area is very low, and that the odds may be more favorable than past experience, because of improved drilling practices and fail-safe well control valves.

We have documented what happened to oil discharged during the Chevron Gulf of Mexico spill, and showed that there was no measureable effect on marine life.

We believe that results from the Gulf Coast spill can be used to predict what would happen to oil from a possible spill in the northern Gulf of Alaska.

We believe that dispersing spilled oil has many advantages.

We believe that considering changes that occur when oil is discharged to the water surface, the use of meteorological and oceanographic data is a general way to predict spill trajectories, and the use of dispersants, will greatly reduce the number of tracts from which a spill is predicted to have observed environmental impacts as summarized in the draft EIS.

It is our belief that exploration, production, and transportation of crude oil, if found, can be conducted in the northern Gulf of Alaska without significant adverse environmental impacts.

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SLIDE 1

SOME GENERAL OBSERVATIONS CONCERNING OFFSHORE CRUDE OIL SPILLS

- THE PROBABILITY OF A MAJOR OIL SPILL IS LOW—ONLY 3 MAJOR SPILLS IN U.S. OFFSHORE WATERS.
- THE AMOUNT OF OIL LIKELY TO BE SPILLED — 20,000 TO 100,000 BARRELS.
- LENGTH OF SPILL — SEVERAL WEEKS TO SEVERAL MONTHS.
- HIGHEST CONCENTRATION OF CRUDE OIL WILL BE AT POINT OF SPILL.
- AMOUNT OF OIL FROM MAJOR OFFSHORE PLATFORM SPILLS HAS BEEN LESS THAN 2% OF TOTAL PETROLEUM INPUT.
- STUDIES OF MAJOR CRUDE OIL SPILLS HAVE DOCUMENTED ADVERSE EFFECTS ONLY ON SOME SPECIES OF INTERTIDAL ORGANISMS, AND TO BIRDS.
- OIL DISCHARGED TO THE MARINE ENVIRONMENT UNDERGOES A NUMBER OF PHYSICAL, CHEMICAL, AND BIOLOGICAL CHANGES.

SLIDE 3

FATE OF DISCHARGED OIL

EVAPORATED 25-30% DURING FIRST 24 HOURS

RECOVERED 10-20% SKIMMED FROM WATER SURFACE

DISSOLVED IN WATER 0.15% IN 2 HOURS, ESTIMATED LESS THAN
1% IN 24 HOURS.

HIGHEST CONCENTRATION AT PLATFORM RANGED FROM 0.02 TO 0.2
ppm, DECREASING TO 0.002 ppm AT APPROXIMATELY 1 MILE.

SLIDE 4

FATE OF DISCHARGED OIL

EMULSIFIED IN WATER (OIL-IN-WATER EMULSION) 10-50%

HIGHEST CONCENTRATION OBSERVED ON 3 DAYS AT PLATFORM
RANGED FROM 2 TO 60 ppm DECREASING TO 1 ppm AT 1 MILE.

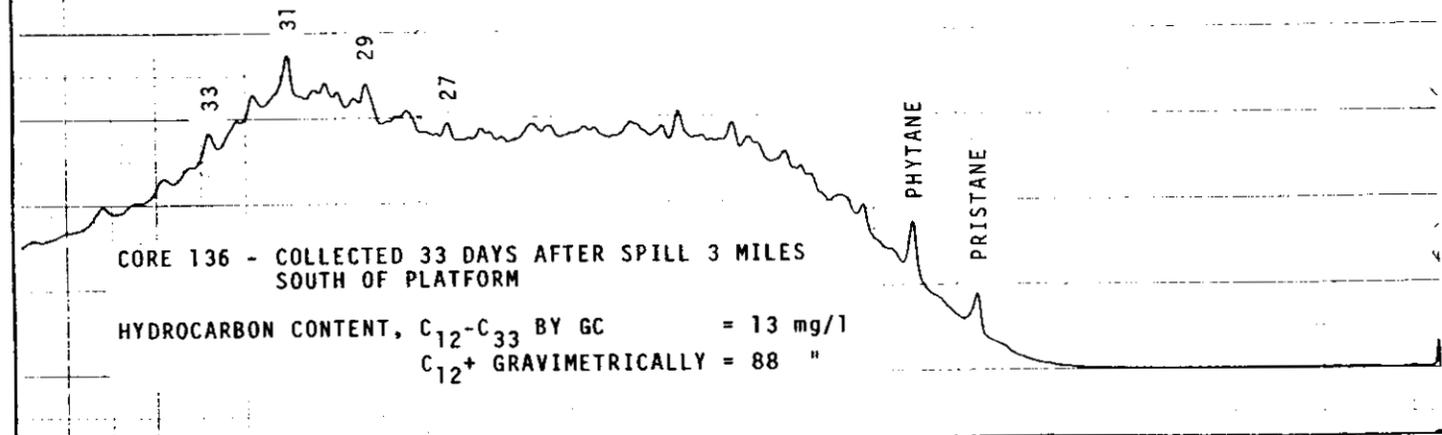
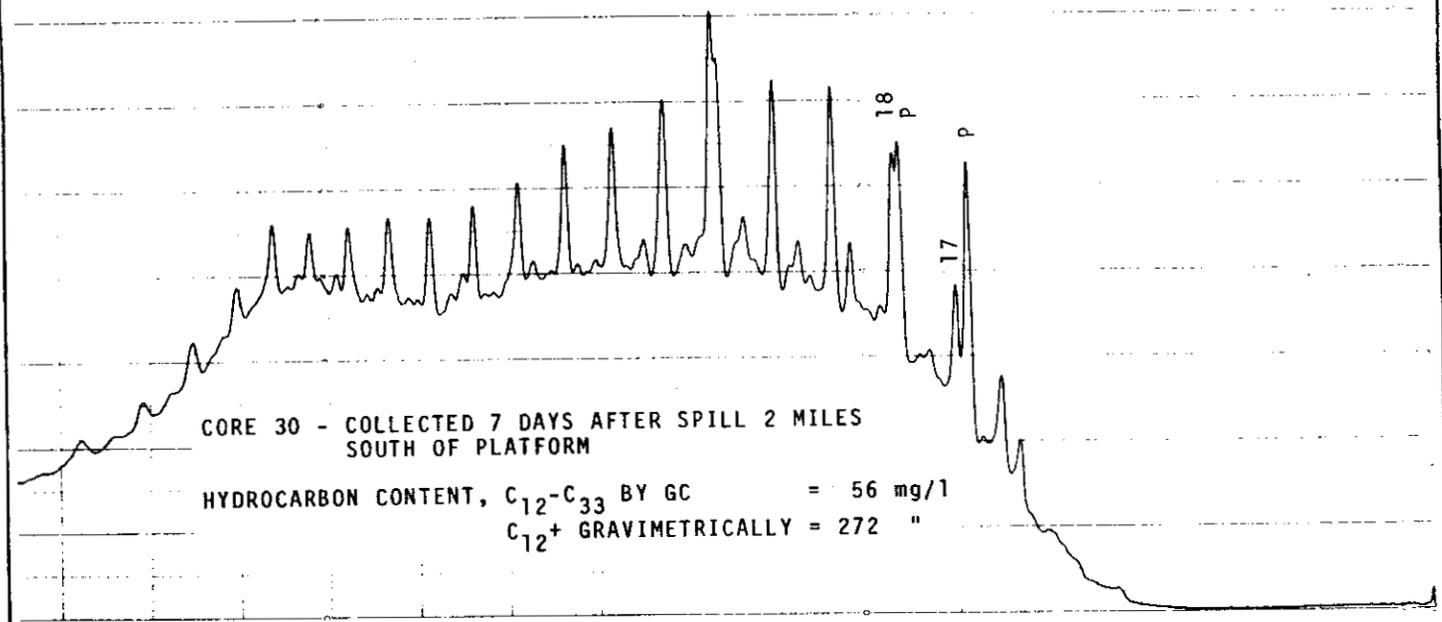
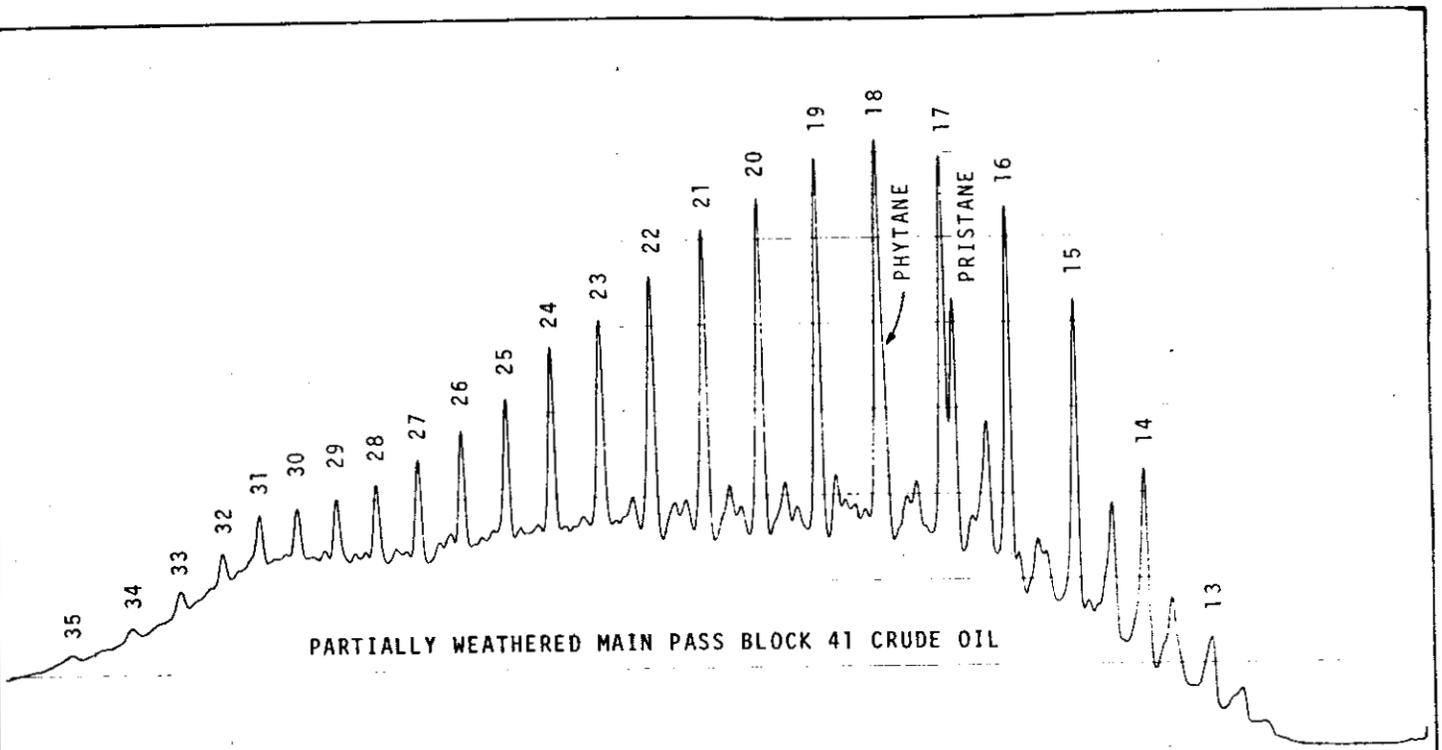
SEDIMENTED LESS THAN 1% WAS FOUND IN BOTTOM SEDIMENTS WITHIN
A 5 MILE RADIUS OF THE PLATFORM.

CONCENTRATIONS:

C₁₂-C₃₃ FRACTION - HIGHEST, 125 mg/l; MEAN 31 mg/l

C₁₂ PLUS FRACTION - HIGHEST, 624 mg/l; MEAN 151 mg/l

DISCHARGED OIL IN SEDIMENTS WAS RESTRICTED TO UPPER 1.5 INCHES



SLIDE 6

ADDITIONAL EVIDENCE OF WEATHERING

C₁₂-C₃₃ HYDROCARBON FRACTION IN SEDIMENTS (CONCENTRATIONS IN mg/l)

AFTER SPILL

125
63
51

11 MONTHS LATER

2.5
6
4

APPROXIMATELY
BACKGROUND VALUES

SLIDE 7

CRUDE OIL BIOGRADATION

CRUDE OIL BIODEGRADATION RATES ARE APPRECIABLE AT ARCTIC TEMPERATURES, BUT NOT AS RAPID AS IN WARM WATERS.

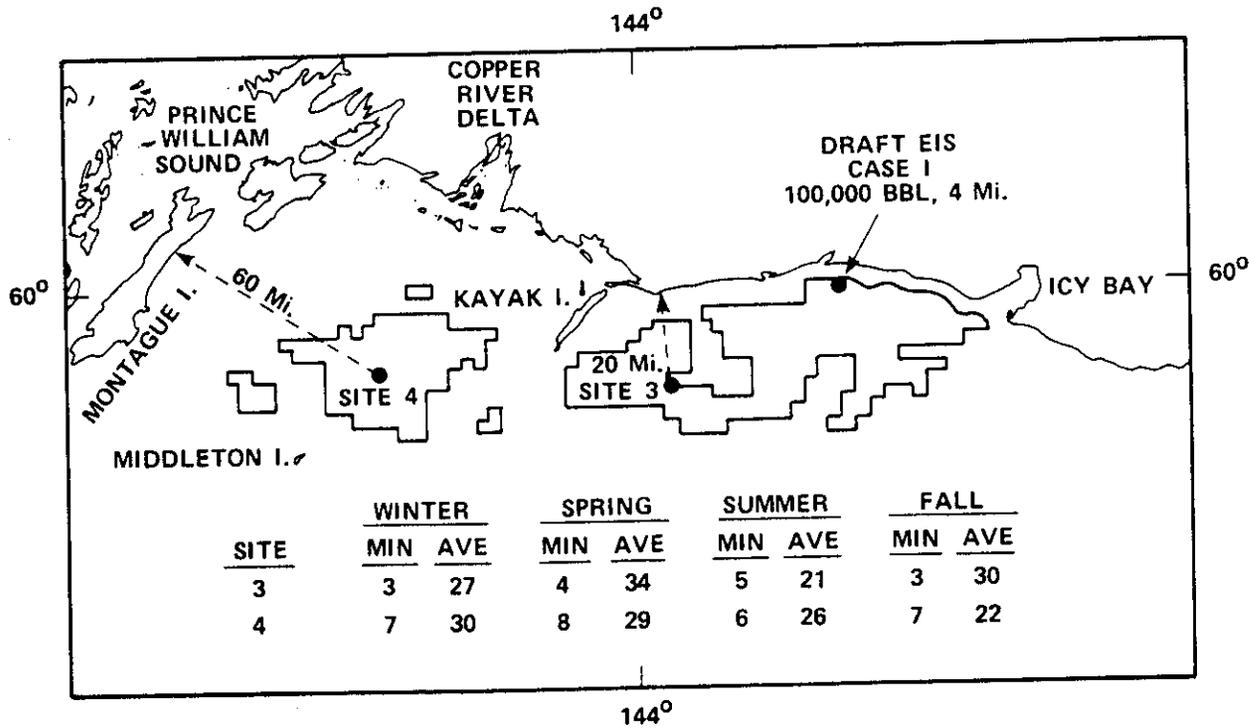
ATLAS FOUND THE FOLLOWING BIODEGRADATION RATES IN 3 DAYS FOR PRUDHOE BAY CRUDE OIL IN PRUDHOE BAY WATER.

5°C	21%
25°C	39%

IN 5 WEEKS 60% OF THE OIL WAS LOST. WITH NITROGEN AND PHOSPHORUS ADDED TO THE WATER, 80%.

ZOBELL FOUND 61% BIODEGRADATION IN 10 WEEKS AT -1.1°C .

SLIDE 8



SLIDE 9

ADVANTAGES OF USING DISPERSANTS (SURFACTANTS)

- RAPID DILUTION
- GREATLY REDUCES TENDENCY OF OIL TO "STICK" TO SOLID SURFACES
 - REDUCE BIRD KILL
 - REDUCE SEDIMENTATION
 - REDUCE AMOUNT OF OIL IN INTERTIDAL ZONE
- ACCELERATE BIODEGRADATION
- ACCELERATE PHOTO-OXIDATION
- ACCELERATE PHYSICAL WEATHERING
 - EVAPORATION
 - SOLUTION AND SUBSEQUENT EVAPORATION

BIOGRAPHICAL SKETCH

Clayton McAuliffe was born August 18, 1918, in Chappell, Nebraska. He received an A.B. degree in chemistry with high distinction from Nebraska Wesleyan University in 1941. He was a Frascch Foundation Fellow at the University of Minnesota where he obtained his M.S. degree in 1942. He was a Research Fellow at Cornell University, 1942-43 and 1946-48, and obtained his Ph.D. degree in soil science in 1948.

He was a Laboratory Assistant in inorganic chemistry 1939-40 and organic chemistry 1940-41 at Nebraska Wesleyan University. He was on the Manhattan Project as a Research Chemist with the Division of War Research, Columbia University, 1943-44, and with Union Carbide at Columbia and Oak Ridge, Tennessee, 1944-46. He was a consultant with the U. S. Department of Agriculture 1947-48, Research Associate at Cornell University 1948-50, and Research Associate Professor at North Carolina State University 1950-56. Since 1956 he has been with Chevron Oil Field Research Company, La Habra, California, where he is Senior Research Associate.

He has published 40+ papers in scientific journals on subjects such as petroleum in the marine environment, improving fluid flow through porous media to improve oil recovery, solubility of hydrocarbons in water, geochemistry in petroleum exploration, soil chemistry, radioisotopes and stable isotopes in soil-plant investigations, and stable isotopes in surface area measurements. He holds 20+ United States and foreign patents.

He is a member of the American Chemical Society, Society of Petroleum Engineers of AIME, American Society of Agronomy, Soil Science Society of America, and the American Association for the Advancement of Science. He is a member of Phi Kappa Phi, Sigma Xi, and Alpha Gamma Rho.

He is a Fellow of the American Association for the Advancement of Science and was Visiting Scientist Lecturer for the Soil Science Society of America, 1964-1967.



U. S. DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

HEARING ON PROPOSED LEASING IN THE GULF OF ALASKA

Ladies and Gentlemen:

I am Joe W. Tyson, Senior Scientist for the Gulf Universities Research Consortium (GURC), now Houston, Texas. I am appearing today on behalf of GURC at the request of the Gulf of Alaska Operators Committee.

As some of you may know, GURC is a research oriented organization which counts in its membership 20 universities with interests in the Gulf of Mexico.

During 1972-1974, GURC, at the request of a number of SLIDE # companies, initiated its Offshore Ecology Investigation to answer the deceptively simple 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, the nation's greatest offshore oil producing region?" After an intensive study costing more than 1½ million dollars, the conclusion reached by GURC is that the drilling and subsequent production of petroleum products off of Louisiana has had no major lasting adverse affects on the marine environment and may even have been beneficial to some life forms.

In appearing here today, I fully realize that the Gulf

of Mexico is not the Gulf of Alaska, and that there are significant differences between the two areas. Nonetheless, we believe that the results of our studies must be given serious consideration whenever offshore leasing is proposed. This is because the GURC offshore oil investigation is by all odds the most thorough and comprehensive study of the environmental effects of offshore drilling and production yet undertaken.

Based upon the data analyses thus far, several general conclusions can be reached from this comprehensive Offshore Ecology Investigation:

1. It questions 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 upon the ecosystem than do petroleum drilling and production activities.
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. The region of the sampling sites is

a highly productive one, from the biological standpoint, more so than other regions thus far studied in the eastern and open Gulf of Mexico.

5. Timbalier Bay has not undergone significant ecological change as a result of petroleum drilling and production since just prior to 1952 when other more limited data was generated.

The accuracy of the conclusions reached on any such scientific study are, of course, dependent upon the validity of the procedures and the accuracy of various tests and measurements. Therefore, the procedures and equipment used in this study will be discussed in some detail in this presentation along with the most important of the factual data and results.

The biological, chemical and physical experiments to be performed were designated and sites were selected in Timbalier Bay, Louisiana, and in the offshore area to depths SLIDE #6 of about one hundred feet of water (shaded in red). Sampling stations adjacent to drilling or production platforms and control sample stations in areas where there has never been oil drilling or production are within the same region, thus making possible valid comparative studies. All sampling SLIDE #7 stations are located far enough from the Mississippi River mouth to uniformly minimize, but not eliminate, its impact.

A low elevation aerial oblique view of the region shows

the natural relationships between the Continental Shelf, SLIDE #8
the narrow beach, and the inner bay.

Platforms, both for drilling and production; are quite
dense in this region between Timbalier Island and Casse-tete SLIDE #
Island.

This platform just west of Philo Brice Island in Tim-
balier Bay was one of the intensive sampling sites with sam- SLIDE #
ple stations being located in a radial pattern outward from
the platform.

The density of platforms and wells offshore is some-
what less, than in the bay, although recent figures indi- SLIDE #1
cate there are some 2,650 platforms in the northern Gulf
of Mexico. Because of the intensity of petroleum presence
and production, there has been and is oil in this environ-
ment -- whether as a result of natural seeps, spills, or
whether as a result of overboard discharge of brine contain-
ing a few parts per million of petroleum hydrocarbons or
from other sources as city wastes, seagoing ships, sports
boats, and the plants and animals living in the environment.

A working platform makes many contributions to the en- SLIDE #1
vironment in addition to its physical presence. You will note
that among the potential contributions from the platform are
nutrient (food) materials from treated sewage, garbage, brine
containing small amounts of petroleum hydrocarbons, trace
elements from corrosion protection devices, and other kinds of

compounds as well as a habitat for plants and animals. The sampling program was designed to determine which of those are present and, if present, their locations and concentrations.

GURC scientists visited the platform and control stations as indicated by this sample station map. Timbalier Bay had 224 stations, enough to allow any existing gradients to be established. There were 115 stations offshore and along transects or lines drawn from the platform and control sites to shore-based stations. All field equipment was regularly calibrated against available appropriate standards (both external and internal) to allow comparative correlations to be made from one field trip to the next. There were four seasonal 8-to-10-day trips each year for the two years by the group plus many other shorter trips by individual scientists. All of the sampling stations were occupied on each seasonal trip, as well as at other times by either the 23 scientists or some of the more than 30 graduate students involved in the program -- many of whom were diving scientists.

The largest number and volumes of samples collected were water samples taken at the surface, at mid-depths and very near bottom to determine oceanographic information such as salinity, temperature and nutrient and trace element chemistry. Fractions were analyzed for total carbon and organic carbon. For these kinds of analyses, relatively

small volumes of water are required; allowing utilization of the Sampling Bottle shown.

Large volume samples were required for the determination of the specific classes of hydrocarbons in the water mass. Therefore, this large volume sampler was used so enough water would be acquired to permit the detection and characterization of hydrocarbons. SLIDE #1

Plankton nets were used in order that the mainly microscopic floating plant and animal life could be caught and studied. From samples captured by the Plankton nets the scientists were able to determine, as a function of carefully measured volume, the nature of the living things floating in the water, their diversity, their effective weight by species, and their hydrocarbon types and amounts. SLIDE #1

The bottom grab sampler takes approximately 1/3 of a cubic yard of sediment each time it is lowered. These sediment samples were required for sediment analysis and to catch the bottom dwelling plants and animals (benthos). Some bottom grab samples as well as short sediment cores were collected by divers. SLIDE #2

Evidences of drill cuttings and muds were sought at every sampling station and were found by divers only once and in very small quantities near a platform leg. These cuttings could not be associated with an adverse impact. SLIDE #2

It was mentioned earlier that water samples were taken SLIDE #2

to allow for the determination of dissolved mineral nutrients. Nutrients enter the living processes in plants and animals and are, therefore, often early affected by materials introduced into the environment. The extent of dissolved mineral nutrients then is an indicator of environmental impact. Here, onboard scientists at the sampling station are splitting the water samples for chemical analysis.

Crude oil will float temporarily at the surface, forming a filmy sheen. To determine the quantities and fate of these petroleum hydrocarbons, it was necessary to sample the thin floating film. Project scientists developed this sampler that would allow them to take a reproducible standard sample and relate the results of chemical analyses to the volume and area that had been sampled.

The sampler was lifted aboard the research vessel where the adsorbed oil and other materials were carefully washed into previously cleaned containers. Scrupulous care was taken to insure that no contaminants (such as lubricating oils) get into the sample during the transfer process.

In university laboratories, the biological samples were positively identified, counted and weighed so that comparisons were possible from place to place on a seasonal basis.

Some of the laboratory activities required highly sophisticated and massive equipment such as these views of hydrocarbon chemistry laboratories and gas chromatograph and

mass spectrometer equipment linked to computers. Such a link makes comparisons possible between samples collected during the project and calibrated standards and permits identification of separate compounds present. Furthermore, selected animals and some uppermost sediment samples were analyzed to determine their hydrocarbon content.

That active oil drilling and production operations do SLIDE # sometimes result in release of hydrocarbons is demonstrated by this infrared image showing drilling platforms and a temporary hydrocarbon sheen resulting from their activities. In the center of the view, a one molecule-thick layer of crude oil shows as a lighter blue area stretching between the two rigs. The reddish areas that you see below are marsh grasses onshore nearby as they appear on infrared film.

The occurrence of other fresh crude oil on the surface SLIDE # of the water gave the scientists an opportunity to conduct field studies on its behavior and fate in the marine environment, so this small floating patch was observed for several days.

After twenty-four hours, the appearance of the same oil had changed. Evaporation of some less complex hydrocarbons SLIDE # and microbial and chemical degradation of the oil was relatively advanced. It will be noted that the oil has begun to emulsify and clump.

In order to follow the process and rate of breakdown of the oil under more controlled conditions, experiments were SLIDE #

conducted in the laboratory. Flasks were inoculated with both locally produced oil and bacteria found in the area. Here on the left, you will note that initially the oil is floating on the surface of the seawater with very few globules and very little clumping. On the right, 24 hours later, bacterial and chemical action has substantially degraded the crude oil; clumping is very far advanced; and much of the material has been converted by bacteria into foodstuffs and byproducts.

In order to better identify and count these bacteria, SLIDE #1 seawater was placed on suitable materials in shallow plastic dishes using standard microbiological techniques. Here, particularly under the number 14, you see several small, white, glistening colonies of individual kinds of hydrocarbon-degrading bacteria isolated from the study area, and, in the same numbers, from other control areas in the Gulf of Mexico.

These experiments indicate that physical and bacterial processes rapidly degrade oil films with the result that there are extremely low amounts of hydrocarbons (average: 5 parts per billion) found in the water.

There was a definite lack of concentration or build-up of any specific hydrocarbon molecule. Similar results were shown by mass spectrometer analysis of the oil on the surface of the water and samples taken deeper in the water.

The major components of the Gulf of Mexico ecosystem SLIDE #1 are the phytoplankton, the mainly microscopic floating plants.

These are the primary producers of the sea that convert carbon dioxide, minerals, and water to starches and sugars, protoplasm and other chemical compounds by photosynthesis. They are eaten by the next level in the food web, the zooplankton which include numerous types of mainly microscopic animals. The nekton are those free-swimming animals found in the environment such as fish and squid. The benthos are the bottom dwellers, some attached and some capable of burrowing in the sediments.

Several aspects of the food cycle and ecosystem were studied in the Offshore Ecology Investigation. Some of the aspects studied were the total mass and diversity of living material present and the distributions of living plants and animals. The results of these investigations showed that there are no differences solely attributable to geographical location except for populations living on platform legs. In other words, except for increase in the populations of certain life forms, the presence of man and petroleum production has had no major effect on the total mass and diversity of living material. Because all life forms are sensitive to their environment, the seasonal changes in both temperature and chemical nature were studied in detail. By the end of the study, the project biologists were able to show that these seasonal variations were far more significant than any other variations, including proximity to oil producing areas.

One sensitive measure of the gross productivity of the SLIDE #3 phytoplankton community is the presence and amount of chlorophyll, the green substance of plants which allows conversion of simple compounds into complex food materials. It can be seen on the slide that there were significant seasonal changes in chlorophyll content reflecting the total populations of floating microscopic plants.

Associated with changes in this floating plant community were seasonal changes in the floating animal community, the zooplankton. It can be seen that these seasonal changes follow the seasonal change in chlorophyll. SLIDE #3

The bottom dwelling community is of great import in SLIDE #3 the ecosystem. It is this community that receives the "rain" of food that sinks down from above. Many of the benthos are filter feeders that therefore take surrounding water through their bodies and remove particulate matter and phytoplankton from the water as food. Others obtain nutrients from sediment passed through the digestive tract. It will be noted that the seasonal changes in this community greatly exceeded the differences between a site of man's activity and a control site where there was no such activity.

Because the reef effect of platforms is so important, SLIDE #4 the study of the living things found on their legs deserves further attention. Every solid surface is colonized and becomes a reef. Platform legs here supported about 6½ pounds

of living things per square yard of surface area, more than any natural "surface" in the study area.

As one begins at the surface of the water and goes downward to the bottom of a platform leg, the simplest of plants, the algae, which are also near the bottom of the food web, grow only in shallower depths where light can penetrate. The net effect of the growth on platform legs is to increase the available food supply for animals higher in the food web because these plant materials are grazed by smaller fish, snails and other animals which are fed upon, in turn, by the species sought by man.

SLIDE #4

To investigate growth rates, the platform leg on the left, had been scraped to the bare metal some 45 days before the photograph was made. It is easily seen that recolonization is rapid. On the right, the large white patch is a colonial animal form called Bryzoa.

SLIDE #4

Here, both barnacles and hydroids (other animal forms) are seen growing together. As colonization develops with time, there is both an increase in and a complexity of living things as well as an increasing competition for the available space. The hydroids are overgrowing the barnacles.

SLIDE #4

From the fish catch, shrimp catch, and oyster harvest data shown plotted here with oil production through the years in this region of Louisiana, it can be seen that these catches of commercial importance have not decreased as oil production

SLIDE #4

has increased; they have indeed increased. This is not to say that increase in catch is the result of industrial activity; however, it is certain that catches have not suffered while oil drilling and production have increased greatly during the same years.

"In conclusion, ladies and gentlemen, let me state that SLIDE #4 I appreciate the opportunity to appear before you today to report on the results of our Offshore Ecology Investigation. Based on this study and other less inclusive with which I am familiar, it appears that there are no significant long-term adverse effects resulting from offshore petroleum operation. In light of this evidence, and considering the critical need for the energy resources of the Gulf of Alaska, all factors appear to argue in favor of the holding of the proposed sale.

Joe W. Tyson
SENIOR SCIENTIST
GULF UNIVERSITIES RESEARCH CONSORTIUM

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STATEMENT OF

GUENTER M. CONRADUS
MATHEMATICAL SCIENCES NORTHWEST, INC.

CONSULTANT, 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

My name is Guenter M. Conradus. I am employed by Mathematical Sciences Northwest of Bellevue, Washington as a Senior Economist.

In January of 1975, Mathematical Sciences Northwest, Inc. 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 the result of likely exploration, development and production activities on the outer continental shelf in the Gulf of Alaska. I directed that study.

I had earlier directed a number of economic and social impact studies of, for example, the construction and operation of new or expanded oil terminal facilities in the Puget Sound waters of Washington (for the Oceanographic Institute of Washington) and the construction and operation of four nuclear power plants in the State of Washington (for the Washington Thermal Power Plant Site Evaluation Council).

Prior to returning to the private sector in 1972, I taught undergraduate and graduate economics at Occidental College and San Jose State University. I also taught at the University of California, Los Angeles and the University of Southern California, on a part-time basis.

Over the past twelve years, I have consulted for a number of public agencies and private corporations in matters relating to the economics of growth and change and resource taxation.

The study for the Gulf of Alaska Operators Committee was completed in May of 1975, and in the months of June and July members of the Gulf of Alaska Operators Committee and I briefed officials of the Alaska state government,

the Mayors and members of the Cities Councils of the cities of Yakutat and Cordova, the President and members of the Yak-tat Kwaan Native Corporation in Yakutat, the President of the Eyak Native Corporation, representatives of the Cordova fishermen's union, Alaska state legislators and their staff, and members of the news media.

Copies of the study have been made available to a large number of interested public and private bodies, among them the Alaska state government, state legislators, the Outer Continental Shelf Office of the Bureau of Land Management, the Federal Energy Administration, the Mayors of the six most likely impact communities, environmental groups, and representatives of the news media.

A summary of our study has been prepared by me and will be submitted for the record.

After the study was completed, I spent more than three weeks in England, Scotland, the Shetland Islands, and in Norway. I there talked with government officials, local and regional planners, academicians, fishermen and representatives of some of the oil companies which operate in the North Sea.

This is obviously not the place nor the time to comment at length on both my findings and the impressions I gathered.

The one overwhelming impression I brought back is that the local authorities, both at the city and county levels, with the active cooperation of the oil companies and their contractors, have been able to effectively plan for the onshore development related to support bases, platform construction sites, terminals, gas separation plants, pipelines, and tank farms, thereby minimizing any adverse social and economic effects.

The Economic and Social Impact Study of Oil Related Activities in the Gulf of Alaska was undertaken by Mathematical Sciences Northwest, Inc. (MSNW) at the request of the Gulf of Alaska Operators Committee (GOAOC).

The study addresses the likely economic and social impacts of oil and/or gas exploration, development, and production activities following the first sale of leases on the outer continental shelf (OCS) in the Gulf of Alaska. The impact areas are the "Gulf of Alaska" and "Other Alaska". Within the "Gulf of Alaska" area which includes Anchorage, six coastal communities have been identified as potential primary impact sites, serving as onshore support bases for offshore activities or as transshipping points for the expected future hydrocarbon output of the yet to be discovered fields. The coastal communities are: Juneau, Yakutat, Cordova, Whittier, Seward and Kodiak. (See attached map). The study period is 1976 to 1985.

Since no one knows with any precision what the quantities of proven and recoverable reserves of oil and gas in the lease area are, and since the rate(s) of recovery are also unknown, certain assumptions had to be made. For the base case, the most important assumptions are:

- Exploration activities commence in 1976, leading to the discovery of the first field in 1977.
- A total of five fields will be discovered.
- Each field will ultimately support three production platforms, for a total of fifteen.
- The peak average daily production from all fields will sum to 550,000 barrels/day.

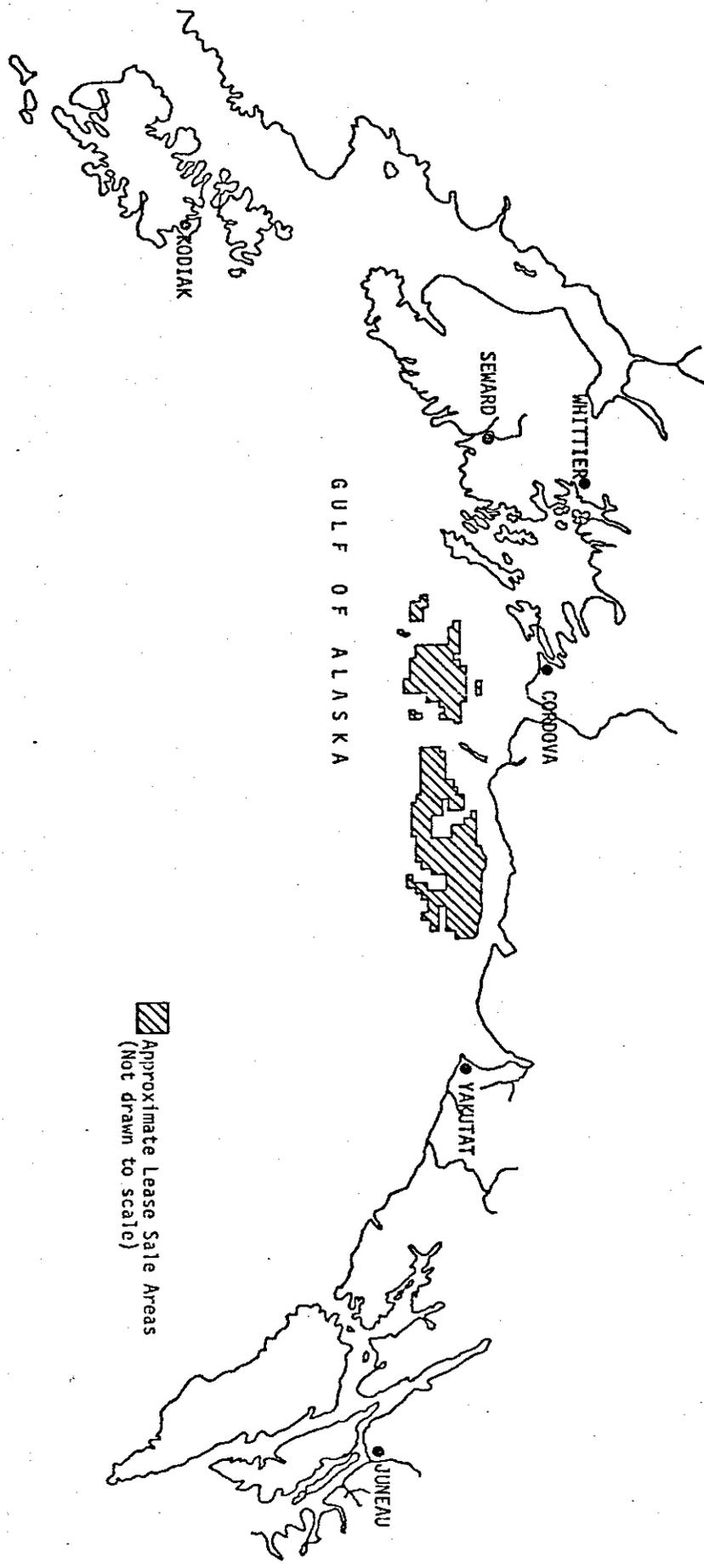


FIGURE I-1: IMPACT COMMUNITIES IN THE GULF OF ALASKA AND APPROXIMATE FIRST LEASE SALE AREAS


 Approximate Lease Sale Areas
 (Not drawn to scale)

- Two pipelines will be constructed to transport the crude to two onshore transshipping terminals.
- Two permanent onshore bases will support the offshore activities during the exploration, development and production phases.

The economic impacts of the oil and gas related activities all emanate from the additional employment generated. Based on data supplied by the GOAOC, the direct employment was estimated to be 291 persons in 1976, the first year of activities, build up to a peak of 1,486 persons in 1980, and gradually decline to 886 persons in 1985.

The incremental onshore indirect and induced employment in such sectors as construction, wholesale and retail trade, finance, insurance, and real estate, and state and local government, for example, was also calculated. In fact, three calculations were made, using an employment multiplier of 2.0, 1.86, and 1.46 respectively. Given a multiplier of 1.86 (thought to be applicable to the geographic areas under consideration), the indirect and induced employment generated by the primary hydrocarbon activities will number 541 persons in 1976, 2,764 in 1980, and stabilize at 1,648 in 1985. Thus, the total employment generated and attributable to the new OCS activities in 1976, 1980, and 1985 sums to 832, 4,250, and 2,534 persons respectively.

While many of the workers who will be employed in the primary activities such as exploration and development drilling and the offshore construction of platforms are likely to be brought to Alaska from other parts of the United States, significant additional employment opportunities in the secondary

sectors will be created for Alaskan residents. Persons presently employed in the construction of the Alyeska pipeline, for example, will be able to transfer their skills to the construction of support bases and transshipping terminals as work on the pipeline winds down. Fishermen can operate supply boats in addition to or instead of their usual occupation (if the Alaskan Limited Entry Program prevents their continuing as fishermen). The induced onshore activities will not only offer additional employment opportunities but are also likely to offer jobs at different and higher skill levels.

In addition to using an economic base model to estimate the future employment (and population) effects, an input-output (I/O) model was constructed. The implementation of the I/O model on a computer permitted the calculating of the direct and indirect employment, income (wage), and output effects of a number of alternative oil development schemes, which differed from the basic assumption of a peak production of 550,000 barrels/day from five offshore fields. The nine basic alternatives which were considered ranged from unsuccessful exploration ending in 1980 without any further activities in the lease sale area, to the discovery of ten fields producing 1.5 million barrels/day and the construction and operation of 10 pipelines to shore and three onshore facilities. Using the I/O model also made it possible to make assumptions about the ability of the Alaskan economy to expand in real terms (15, 30, and 100 percent per year respectively), and to calculate the resulting employment, income, and output effects. Thus, in all, 28 separate oil development and real growth combinations were considered and their economic impacts calculated.

Assuming that from five offshore fields the peak production reaches 600,000 barrels/day, for example, the total (direct and indirect) additional

wage earned in the impact areas amounts to \$9.6 million in 1976, peaking at \$44.3 million in 1981, and stabilizes at \$29.5 million in 1985. If the wage and salary incomes earned in the rest of Alaska are added (\$5.0, \$14.8, and \$16.7 million in 1976, 1981, and 1985 respectively) the total direct and indirect incremental wage and salary payments to persons working in Alaska due to the oil and gas activities would amount to \$14.6 million in 1976, \$59.1 million in 1981, and would stabilize at \$46.2 million in 1985.

The state's production of goods and services will, of course, also increase. Abstracting from the direct values of the oil related facilities and the oil itself, which are enormous, the value of the output of goods and services induced by the primary activities also increases significantly. It is estimated to be \$22.9 million in 1976, \$79.8 million in 1981, and \$87.1 million in 1985.

The additional personal and corporate incomes earned, the value of the additional output of goods and services, and new plants and facilities will provide new state and local tax bases. Several factors made it impossible to estimate the tax revenues accruing to state and local governments. It was not clear what the effective rate of taxation of incomes earned by a temporary workforce would be. The definition of taxable corporate income earned from offshore activities and the effective rate of taxation applied to it were also unknown, as was the value of the onshore plant and equipment subject to state and local property taxation.

The additional economic activity induced by the hydrocarbon development and production not only creates additional employment but also causes the temporary and permanent populations of the impact communities and the rest of

Alaska to grow. A larger population requires an absolutely larger quantity of goods and services. Some of these will be supplied by the private sector. Others, however, require public investment. It is not only important to determine what the absolute quantities of goods and services (public and private) demanded will be, but the points in time when they must be available must also be known, in order to assure that the quantities and qualities of services available to the present population in the impact areas are not diminished by a sudden surge in the demand for them by an immigrant population.

Using the base case of peak petroleum production of 550,000 barrels/day once more, the maximum total population changes in Alaska (assuming all new jobs are filled by immigrants), are 1,396 persons in 1976, peaking at 7,232 in 1980, and leveling off at 4,426 in 1985. This additional population will be distributed throughout Alaska however. The permanent OCS induced population increases in one or more coastal impact communities (most likely Yakutat and Cordova, because of their proximities to the lease areas), are estimated to be 59 persons in 1976, 700 in 1980, finally reaching 1,302 in 1985.

The assumptions underlying the estimates of the permanent population increases in the coastal communities are:

- 15 percent of the Alaskan component of the workforce employed during the exploration and development phases will live in the coastal communities.
- 30 percent of the workforce employed during the production phase will live in the coastal communities.

- The employment multiplier is 1.86.
- The dependency ratio is 2.04.

Additional public services must be supplied to this population. Some public services will also have to be supplied to at least a percentage of the new temporary population which will reside in the impact areas during the exploration and development and construction phases. In addition, public services will have to be available to those new immigrants who are drawn to the areas by the expectation of obtaining employment.

A major issue is housing. Assuming that 0.81 housing units are required per member of the permanent labor force (the 1970 Alaskan state-wide average), 23 additional housing units must be available in 1976, a total of 277 units in 1980, and 516 units in 1985. Since none of the coastal communities do at present have any appreciable number of vacancies, these housing units must be newly constructed, or that segment of the workforce which was assumed to take up permanent residence in the coastal communities will have to be transported to the sites from other Alaskan or lower 48 cities.

Other issues addressed are:

The permanent school population in the impact areas will also grow, from 8 students in 1976, 91 in 1980, to 160 in 1985. Depending upon the communities in which this school population finally settles, some, or possibly a significant amount of additional investment will have to be made in fixed facilities.

Because the communities have virtually no excess capacities, investments in a number of other public sectors will also be required. Additional water and sewage treatment as well as solid waste disposal facilities must be provided.

Since none of the communities are presently equipped to handle major medical problems of the existing population, medical facilities and staff must be added.

In order to assure the public safety, more peace officers and fire-fighters will be required and more equipment and facilities are likely to be demanded.

Additional social capital and professional manpower attracted to the impact sites are likely to benefit both the present resident as well as the newly attracted population.

In all of these public employment categories, wage rates may have to be increased above current levels if the public sector is to compete effectively in labor markets stimulated by the OCS induced activities.

The quantity and range of indoor recreational opportunities must be enlarged.

Finally, given the significant projected increases in the population of the likely coastal impact communities relative to their present sites, and assuming reliance on the automobile, the surface transportation, e.g. roads, parking lots, etc. must be expanded.

It is unlikely that the coastal impact communities, individually or collectively, have the fiscal resources to make the necessary public investments (well in advance of the time their output is actually demanded) to assure that no bottlenecks develop.

After the lease sale has taken place and the impact communities requiring additional public and private investment have been identified, federal, state, and private investment funds must become available. The

magnitudes of the necessary social and private investment programs are a function of the level of exploration activities and ultimately depends upon the discoveries made and the rate of production of oil and/or gas. Equally, if not more important than the availability of financial resources for public and private investment, will be the existence of local and state planning processes which allocate the investment resources. At present, neither the likely impact communities nor the state or federal agencies (in Alaska) appear to have any or adequate staff to effectively deal with the OCS related issues. Therefore, state and local planning agencies should be established to permit the rational planning of offshore and onshore developments and in advance of making the necessary public and private investments.

The OCS induced activities will bring about economic and social changes in Alaska. These changes will be more noticeable in the smaller coastal communities than, for example, in Anchorage or Juneau. Because some major activities, such as the construction of platforms, will not take place in Alaska (in the foreseeable future), the aggregate impacts in Alaska will be relatively smaller when compared with impacts observed in North Sea coastal communities of the United Kingdom or Norway.

Nevertheless, some individuals or firms may incur economic and social costs. It is likely, for example, that competition for labor among employers will push up wage rates, increasing the cost of production of public and private goods and services. Those individuals who, at present, have adequate incomes in the form of money and tranquility which affords them a certain "Lifestyle" may consider the reduction of the latter as both an economic

and a social cost, even if their money incomes increase. On the other hand, the likely economic benefits, both for Alaska and the U.S. as a whole, are significant. The expected value of the hydrocarbon output is enormous. The national importance of its physical availability is obvious. The macro-economic benefits for Alaska will take the form of increased long-run employment opportunities, increased wage and salary incomes, and an increased tax base. At the micro level, an increase in the size of local markets may increase both the quantity and quality of public and private goods available to all segments of the population.

47
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STATEMENT OF
WILLIAM F. GUSEY
COORDINATOR, ENVIRONMENT AND BIOLOGY
STANDING COMMITTEE
GULF OF ALASKA OPERATORS COMMITTEE
BEFORE THE HEARING OF
THE U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ON
ENVIRONMENTAL IMPACT OF PROPOSED OIL AND GAS
LEASING-OUTER CONTINENTAL SHELF, GULF OF ALASKA
(OCS SALE NO. 39)
AUGUST 12-13, 1975
AT ANCHORAGE, ALASKA

Gentlemen:

My name is William F. Gusey. I am the Senior Staff Wildlife Specialist in the Environmental Affairs organization, Shell Oil Company, but am appearing here today as the Coordinator, Environment and Biology Standing Committee, Gulf of Alaska Operators Committee. A copy of my curriculum vitae is attached to my statement.

Within the Gulf of Alaska region, fish and wildlife resources are essential to the overall recreational program of the state and contribute substantially to the economy of the state. Time does not permit an adequate discussion of these resources at this point. However, we are submitting a detailed statement entitled, "Fish, Wildlife and Petroleum Production - The Gulf of Alaska," dated August, 1975. We ask that this statement and the following appendices be made a part of the record of this hearing.

Appendices 1 to 5, a 524 page document (2 volumes) describing the fish and wildlife resources of the Gulf of Alaska.

Appendices 6 to 8, a 227 page document of supplementary fish and wildlife data, which discusses existing petroleum industry experience and the resources of the Gulf of Mexico, Santa Barbara Channel and Cook Inlet; the National fishery situation from 1939 to 1974, as applicable to fishery trends where the petroleum industry currently is and is not operating; and Gulf of Alaska demersal fish and shellfish distribution and abundance data for the period 1950 to 1971.

On behalf of the Environment and Biology Committee of the Gulf of Alaska Operators Committee I want to express our appreciation for the generous responses we received to our many requests for data from many individuals in the Alaska Department of Fish and Game; National Marine Fisheries Service;

surfaces provided by oil platforms. Encrusting organisms also thrive on these surfaces.⁽¹⁾

Thus, the reef effect of offshore platforms, like other artificial reefs, is an ecological asset. The abundant fish around such structures is well known in the Santa Barbara Channel and in the Gulf of Mexico. These platforms serve as artificial reefs where major fish populations are concentrated. In the Gulf of Mexico this feature of platforms has been instrumental in the development of a substantial sport fishery off the Louisiana coast.⁽²⁾ Whether or not this will be a measurable value in the Gulf of Alaska will be determined only on the basis of sport fishing demand.

In the Gulf of Alaska, we believe that mid- and upper-water pelagic fish will orient to platforms, some strongly, with numbers dictated by seasons and available food. Studies by the National Marine Fisheries Service (Klima 1970),⁽³⁾ revealed that certain Gulf of Mexico open water species such as sardines, menhaden, and jacks were attracted in great numbers to small structures positioned about 50 feet below the surface. In excess of 10,000 fish were attracted in one day and upwards to 100,000 after only seven days.

Diver observations in the Gulf of Mexico indicate that commercial quantities estimated at up to 25 metric tons of fish were attracted to an artificial structure on one occasion, and, on six others, at least 5 metric tons were attracted during a 20-day study.⁽³⁾ It is questionable that this will occur with strongly migratory fish such as salmon.

3. The effect of offshore platforms in reducing the fishable sea floor is yet to be examined, but in terms of fishery harvests, is probably statistically insignificant.

by the Bureau of Land Management for this Gulf of Alaska lease-sale. In addition, seal populations exist near several coastal locations which may be considered as potential crude oil terminal sites. These include populations at Yakutat Bay, Icy Bay, southern end of Kayak Island, and the northern end of Montague Island.⁽⁶⁾

Abandonment of harbor seal pups by their mothers is a common occurrence, particularly if they are disturbed by hunting or other activities of man, including aircraft and boat traffic. The seriousness of this reaction as a function of seal populations in the immediate vicinity of terminal sites cannot be fully evaluated at this time. Seals will vacate any shoreline area which is greatly modified by construction and followed by intense industrial activity. Measures to mitigate these effects will have to be determined on a site-by-site basis. On the other hand, seals may continue to occupy previously utilized beaches or rocks some distance removed but in the general area of a shore facility, i.e., one mile.

Steller Sea Lions

Significant sea lion concentrations have been identified at seven points along the perimeter of the area offered for an OCS lease sale.⁽⁵⁾ Five of these concentrations are in the vicinity of sites which could be used as crude oil terminal sites. These include populations at Sitkagi Bluffs at Yakutat Bay, Kayak Island, Seal Rocks and Porpoise Rocks off Montague Island, and at Fountain Rock off Middleton Island.⁽⁶⁾

The existence of substantial sea lion populations along the California coast where there is extensive boat traffic supports our opinion that, in general, boat traffic will have little adverse effect on sea lions in the Gulf of Alaska. On the other hand, helicopter or other aircraft

that a high degree of curiosity will exist, following some initial avoidance of areas of human activity or machinery noise. We expect that these animals will find the water column beneath platforms excellent fishing grounds.

Influences on Birds

Twelve areas with major concentrations occur on the mainland or on offshore islands adjacent to the broad area offered for this OCS lease-sale. (5,8) In general, seabird populations will remain largely uninfluenced by offshore structures and operations. Canadian studies indicate minimal disturbance of several species of birds by helicopters; however, aircraft activity can be programmed to avoid nesting and colonial roosting in day-to-day traffic. It is not anticipated that boat activity accompanying OCS activities will pose any stress on seabird colonies.

Any production, storage or processing facilities constructed onshore should involve consideration of bird breeding and roosting and foraging sites in order to reduce the disturbance of such areas to a minimum. In some instances the conflicts may be obvious, such as a construction site in the immediate vicinity of a large breeding colony or eel grass bed, or less obvious, such as the filling of intertidal mud flats which may serve as a foraging areas for shorebirds.

Those species which tend to be most vulnerable to human disturbances are the colonial nesting species which nest in exposed sites. Adults frightened off nests leave their young vulnerable to exposure and predation. Knowledge of the sensitivity of these birds to such factors will lead to operational plans designed to limit or avoid any adverse effects on their populations.

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Organizations and Positions:

Bureau of Sport Fisheries & Wildlife, U.S. Department of the Interior,
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Pesticides Regulation Division, U.S. Department of Agriculture, 1964-1966.

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Shell Chemical Company, Agricultural Chemicals Division, 1968-1969.

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Vice-Chairman, Program Review Sub-Committee,
Federal Committee on Pest Control, 1966-1967

Technical Advisory Group, Committee on Water Quality Criteria,
Federal Water Pollution Control Administration (now Federal Water
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Homer, Alaska, May 18, 1974.

STATEMENT OF
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AMERICAN PETROLEUM INSTITUTE COMMITTEE ON
FATE AND EFFECTS OF OIL IN THE ENVIRONMENT
BEFORE
THE U.S. DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT HEARING
ON
ENVIRONMENTAL IMPACT OF PROPOSED OIL AND GAS
LEASING--OUTERCONTINENTAL SHELF, GULF OF ALASKA
(OCS SALE NO. 39)
AUGUST 12-13, 1975
ANCHORAGE, ALASKA

MR. CHAIRMAN:

My name is Edward Mertens. I am employed as a chemist by Chevron Research Company, a research subsidiary of the Standard Oil Company of California. During my career, which extends back to the close of World War II, I have held a number of scientific and research management assignments concerned with research work on the heavier fractions of crude oil and the many products derived from these fractions. I hold over 20 U.S. and foreign patents and have written a number of technical articles based on this work. These heavier fractions, incidentally, tend to persist longer after a typical oil spill.

Ten years ago my work began to involve the environmental and health aspects of these products. For the past six years, I have devoted full time to work on environmental problems. As the primary duty of my current assignment, I am Chairman of the American Petroleum Institute's Committee on the Fate and Effects of Oil in the Environment.

API initiated a comprehensive research program on the fate and biological effects of oil spills five years ago. The total cost of this program to the industry is well over a million dollars each year. I expect that this level of support will continue for at least the next several years.

Our program has already yielded a wealth of information. More than 40 papers either have been written or are in preparation by those investigators we have sponsored at

various universities and research organizations. Ultimately, this information will be an important contribution to the large body of literature pertaining to the fate and effects of oil in the marine environment.

Perhaps the most serious problem concerning the potential effects of oil on marine life was 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 part of its diet. Thus, it might constitute a threat to human health. This hypothesis has been advanced by literally scores of authors in their reports, reviews, environmental impact statements, research proposals, and similar writings that are concerned with the effects of oil on marine life. However, as my testimony today will show, these concerns have no valid scientific basis because extensive research shows that oil does not permanently enter the food chain.

This hypothesis is based largely on a study conducted by Blumer following a spill of No. 2 fuel oil in Buzzard's Bay, Massachusetts, in 1969¹ and his subsequent conclusions.²

Blumer analyzed oysters exposed to this spill and found they had taken up oil fractions. He kept three of the exposed oysters--only three--in flowing seawater in his laboratory. One oyster was analyzed for its oil content after 72 days;

the other two after 180 days. Concerning this work he states, "Oysters that were removed from the polluted area and that were maintained in clean water for as long as six months retained the oil without change in composition or quantity. Thus, once contaminated, shellfish cannot cleanse themselves of oil pollution."¹

My previous testimonies given at hearings sponsored by the Department of the Interior in Corpus Christi, Texas, last September³ and in Beverly Hills, California, last February⁴ cited nearly a dozen references⁵⁻¹⁵ that refute Blumer's conclusion. Every reference reports that once an exposure to oil has passed, the amount of oil in the organism had either returned to, or closely approximates, the original background level. Release occurs rapidly at first, but in a few instances, as much as 6-8 weeks may be required before the last traces may no longer be detectable.^{16,17} Further, this conclusion, namely, that oil is released quickly and either nearly or completely quantitatively, is corroborated by additional publications that have appeared in recent months.¹⁷⁻²³

Even Blumer's data do not bear out his conclusion cited above. If one compares closely the concentration of oil he found in the oyster tissues after being held in the laboratory for six months¹ with the concentration of oil in the tissue found at the beginning of the depuration experiment,^{24,25} the average content of oil per 100 grams of tissue are 3.8

and 6.9 milligrams, respectively. Even by his data, he shows a release of almost 50%, rather than none as he states in his conclusion. He claims that the oil quantities in the tissues before and after the experiment are in good agreement, especially if allowance is made for the apparent dilution of oil by growth of the oysters during the course of the experiment. His data show that the average gain in weight per animal was barely 5%. If the decline was attributed solely to dilution by growth, the average content of oil per 100 grams of tissue should have declined from 6.9 milligrams to 6.6 milligrams rather than 3.8 milligrams.

Thus, I am not aware of any reference in the literature--not even Blumer's work--that support his contention that oysters or any other marine organism retain whatever oil they have accumulated without change in composition or quantity once their exposure to oil has been terminated. On the contrary, every reference concerning uptake and depuration research that I have seen shows that marine organisms depurate once an oil spill episode or a simulated spill has passed. Indeed, this conclusion is shared by the Energy Policy Project of the Ford Foundation,²⁶ the National Academy of Sciences,²⁷ and the Marine Technology Society.²⁸

These results which I have just summarized strongly refute the previously mentioned hypothesis which has been adopted widely by the critics of our industry. Since marine organisms subjected to an oil spill do not retain oil permanently,

we feel that it is highly unlikely that such contamination becomes concentrated by transfer from one trophic level to the next through the food chain. Thus, the possibility of transfer of harmful oil fractions by this mechanism so that they become a threat to human health becomes extremely remote or, more likely, nonexistent.

These latter conclusions are supported by research conducted both in the laboratory and in the field.

The question of magnification of hydrocarbon concentrations occurring from transfer up the food chain was investigated by Cox⁷ and J. W. Anderson.⁸ Neither investigator found any evidence of magnification. Their observations agree with those of Straughan, who found no evidence of biomagnification in her recently completed two-year study of the marine community exposed to the natural oil seeps near Santa Barbara.²⁹ Burns and Teal found no relation between the hydrocarbon content of an organism and its position in the food chain in their study of the Sargasso Sea community.³⁰ Thus, neither laboratory work nor field studies support the contention of the industry's critics that the concentration of oil increases as it progresses through the food chain.

Exposure at sublethal concentrations of oil has shown no effect on growth rate of marine organisms. This conclusion was reached by R. D. Anderson⁶ and Cox⁷ in their research on oysters and shrimp, respectively. Their conclusions agree

with those obtained by Mackin and Hopkins,³¹ who found no difference in the growth rate between oysters growing in an area subjected to oil contamination and that of control oysters in an uncontaminated area. Nor did Straughan, in her work supported by API, find that the natural oil seeps near Santa Barbara affected the growth rate of marine organisms living in the area.²⁹ More recently, these results are confirmed by Battelle-Northwest studies at Lake Maracaibo, Venezuela. There they exposed *lisa*, a fish native to that area, for 11 weeks to Tia Juana Medium crude oil.³² No effect on growth rate was observed. Since growth rate integrates many life processes and physiological factors, we are encouraged by those results. Part of our research program is directed toward studying more extensively the potential effects of exposure of marine life to sublethal concentrations.

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. Further, the public is conditioned to believe that this devastation will persist for an extended period of time. Most of my remaining comments today will provide information that will show these beliefs are inaccurate insofar as all but the most severe spills are concerned.

A comprehensive survey of more than a hundred major spills that occurred throughout the world over a 12-year period (1960-1971) was made by Ottway.³³ An analysis of the data

from this survey revealed that birds represented the type of marine life most often significantly affected. In less than 25% of the spills were more than 50 birds involved. For other forms of marine life where damage could be described as extensive, the incidence was even less.³⁴ These levels are probably low because some of the spills may not have been adequately reported. Nevertheless, only a small number of spills, most notably the West Falmouth and the Tampico Maru spills, resulted in significant damage lasting a year or more. The latter spill, incidentally, occurred near Baja California in Mexico in 1957. Comparable damage resulted from the Torrey Canyon spill, but it is generally acknowledged that this damage resulted primarily from the use of improperly formulated dispersants applied in an improper manner rather than from the effect of the oil itself. All three of these spills occurred near shore.

On the other hand, spills from offshore platforms have been relatively rare. Of the 19,000 wells drilled in our continental waters over the past 25 years, only the Santa Barbara spill reached the beach in a quantity that required extensive cleanup. Its effect on marine life was slight and temporary.³⁵ Only two other significant platform spills have occurred.^{36,37} Coincidentally, both of these were in the Gulf of Mexico in 1970. One of these was studied extensively to assess its environmental impact. Its damage

to marine life was inconsequential.³⁶ By all standards, this record of the offshore industry is impressive.

The factors that are responsible for the wide variations in the environmental effects of oils spills are identified by McAuliffe.³⁸

He observes that three conditions are especially critical; and for a spill to have significant environmental damage, all 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. Thus, the volume of oil spilled is large with respect to the body of water being impacted.
2. The oil should be a 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.

Indeed, all three conditions did exist in the case of the two spills, the West Falmouth and the Tampico Maru spills, in which significant damage attributed to the oil itself persisted beyond a year or two. In each case, the oil spill involved a No. 2 fuel oil, which was confined in a small area of shallow water for several days. Storms and/or heavy surf caused the oil to be churned into the bottom sediment.

In contrast, offshore platforms are almost without exception located in unconfined areas and in reasonably deep waters. Thus, the first condition outlined by McAuliffe can rarely be met. Secondly, a platform produces crude oil, which is substantially less toxic than most refined oils. Thirdly, in such deep waters, 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.

Moreover, it must be remembered that since platforms are usually located well offshore, substantial changes in the character of the spilled crude oil will occur before it reaches the nearshore zone, which is the most biologically vulnerable area. Once oil is spilled, there is time for the lighter oil fractions to evaporate. Within a matter of hours, components of crude oil as heavy as gasoline have escaped into the atmosphere.^{39,49} These fractions are generally acknowledged as the most toxic fractions. This conclusion is confirmed by work conducted by Battelle-Northwest at Lake Maracaibo, Venezuela. They demonstrated that after only two hours' weathering, the toxicity of the oil to shrimp had dropped substantially.³² This drop correlated closely with an attendant drop in concentration of light aromatics in the water column.

There is time also for many of the components of the crude oil to be dispersed or, for some components, to be dissolved

in the water column. Subsequent dilution rapidly reduces their concentration to far below toxic levels. Further, their presence in the water column is often short-lived because many components partition readily from the water into the atmosphere.⁴¹ And, finally, if a spill should threaten a nearshore zone or shoreline, there is time for cleanup equipment to be placed in operation.

The public has also expressed concern about chronic pollution of the oceans by oil that may occur from increased offshore drilling. They envision that the amount of oil entering the oceans will be substantial and that, consequently, the quantity and diversity of marine life will gradually diminish to a small fraction of the current level. My remaining comments today will point out that the day-to-day operation of additional offshore platforms will impose, at most, a very small incremental burden of oil to the oceans of our world.

Estimates of the quantities of oil that enter the oceans annually from various sources have been developed by the National Academy of Sciences.²⁷ Of the estimated six million metric tons that reach the oceans throughout the world each year, nearly 80% comes from river and urban runoff, municipal and industrial waste discharges, and marine transportation. About 10% comes from natural seeps and another 10% from atmospheric fallout. The contribution from offshore production is 1.3%.

Thus, the contribution of oil to marine waters from offshore production relative to the overall amount can be considered minimal if not negligible. With respect to the amount that comes from natural oil seeps, offshore production contributes only one-eighth as much. Significantly, even if we doubled the number of wells in our outercontinental waters, their total contribution to marine waters would be still a small fraction and would be only one-fourth of the amount that comes from natural oil seeps. This comparison is especially significant for the purposes of this hearing in view of the many natural seeps that are known to exist along the Gulf of Alaska shoreline.⁴² Undoubtedly, many other seeps exist in the deeper waters of the Gulf that have not been observed.

In summary, we are convinced that oil poses far less of a threat to marine life than has been popularly believed.

There is no evidence that oil is passed through the food chain and thereby becomes concentrated so that eventually it becomes a health hazard to man. Major oil spills from offshore platforms have been a rare occurrence to date.

Those who oppose offshore drilling frequently express the fear that if a major spill should occur, it will have a devastating effect on marine life. This fear is unfounded, for out of more than 19,000 wells drilled in offshore waters so far, there has never been a spill where such devastating effects have taken place. Indeed, in only one spill has any

measurable damage occurred; and its extent was inconsequential. And, finally, even if we doubled the number of offshore wells, the added input of oil from such operations would add little more than 1% to the oil that now enters the marine waters annually.

Our Committee is convinced that by taking proper precautions that employ technology presently available, the added risk is extremely small. This conclusion is confirmed by the excellent record of the offshore industry since its beginning more than 25 years ago.

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STATEMENT OF

DR. DALE STRAUGHAN

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

STATEMENT FOR ENVIRONMENTAL HEARING FOR THE
PROPOSED GULF OF ALASKA LEASE SALE
DALE STRAUGHAN

W MY NAME IS DALE STRAUGHAN AND I AM PRESENTLY A RESEARCH SCIENTIST AT THE ALLAN HANCOCK FOUNDATION, UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.

I RECEIVED MY PH.D. IN ZOOLOGY AT THE UNIVERSITY OF QUEENSLAND IN 1966. SINCE THAT TIME, I HAVE WORKED AT THE JAMES COOKE UNIVERSITY OF NORTH QUEENSLAND, HAWAII INSTITUTE OF MARINE BIOLOGY, AND COSTA RICA BEFORE BECOMING A VISITING ASSISTANT PROFESSOR IN BIOLOGICAL SCIENCES AND A RESEARCH ASSOCIATE OF THE ALLAN HANCOCK FOUNDATION OF THE UNIVERSITY OF SOUTHERN CALIFORNIA IN 1969,

Call ~~BETWEEN FEBRUARY 1969 AND FEBRUARY 1971, I WAS THE PROJECT DIRECTOR OF THE ALLAN HANCOCK FOUNDATION STUDY TO DETERMINE THE BIOLOGICAL AND OCEANOGRAPHICAL EFFECTS OF OIL POLLUTION FOLLOWING THE SANTA BARBARA OIL SPILL IN JANUARY 1969. SINCE THAT TIME, I HAVE STUDIED THE EFFECTS OF OIL ON MARINE BIOTA UNDER BOTH FEDERAL (SEA GRANT COLLEGE, ENVIRONMENTAL PROTECTION AGENCY AND NOAA) AND INDUSTRIAL (APT, WOGA) AUSPICES. THIS HAS INCLUDED STUDIES OF VARIATION IN TOLERANCE OF FIELD POPULATIONS TO OIL POLLUTION, EFFECTS OF OIL AND DETERGENTS ON SURVIVAL OF SPECIES AND RECOLONIZATION OF INTERTIDAL SUBSTRATES, THE THERMAL EFFECTS OF BLACK CRUDE OILS IN THE UPPER INTERTIDAL ZONE, LONG TERM AND SUBLETHAL EFFECTS OF EXPOSURE TO OIL.~~

I HAVE ALSO TRAVELLED WIDELY TO OBSERVE THE EFFECTS OF OIL SPILLS--'~~TORREY CANYON~~' IN CORNWALL, '~~FLORIDA~~' IN MASSACHUSETTS, '~~TAMANO~~' IN MAINE, '~~METULA~~' IN THE STRAITS OF MAGELLAN--AS WELL AS CALIFORNIA AND THE GULF OF MEXICO.

OK I AM A MEMBER OF THE NATIONAL ASSEMBLY OF ENGINEERING COMMITTEE ON SAFETY OF OUTER CONTINENTAL SHELF PETROLEUM OPERATIONS. THIS COMMITTEE WAS ESTABLISHED TO REVIEW THE U. S. GEOLOGICAL SURVEY PROGRAMS ON THE OUTER CONTINENTAL SHELF. I AM ALSO A MEMBER OF THE NATIONAL OFFSHORE OPERATORS ADVISORY COMMITTEE TO THE COAST GUARD. I HAVE ALSO SERVED AS AN OBSERVER FOR THE ENGINEERING COMMITTEE ON OCEANIC RESOURCES AT THE RECENT MEETING OF ICG FOR GIPME IN PARIS. I AM ALSO ASSISTING IN THE PREPARATION OF A PAPER FOR THE U. N. *Working* GROUP OF EXPERTS ON SCIENTIFIC ASPECTS ON MARINE *oil* POLLUTION. *pollution*

I HAVE BEEN ASKED TO COMMENT TODAY BY THE GULF OF ALASKA OPERATORS COMMITTEE.

SOME HAVE EXPRESSED FEARS THAT THE PROPOSED DEVELOPMENT OF THE PETROLEUM RESOURCES OF THE GULF OF ALASKA WILL RESULT IN ENVIRONMENTAL DISRUPTION. ONE PARTICULAR CONCERN IS THE POSSIBILITY OF A LARGE OIL SPILL SUCH AS THE ONE WHICH OCCURRED IN THE SANTA BARBARA CHANNEL IN 1969 AND A SECOND IS THE FEAR OF "CHRONIC POLLUTION."

CERTAINLY EVERY REASONABLE SAFEGUARD MUST BE EMPLOYED TO PREVENT THE *occurrence* OCCURRENCE OF SUCH SPILLS AND ELIMINATION OF POSSIBLE CHRONIC POLLUTION SOURCES. HOWEVER, THERE CAN BE NO ABSOLUTE GUARANTEE THAT THERE WILL BE NO SPILLAGE OF OIL. THEREFORE, ONE MUST ADDRESS THESE PROBLEMS.

EXPERIENCE IN THE SANTA BARBARA AREA SHOULD PROVIDE SOME INSIGHT INTO THE EFFECTS OF OIL SPILLAGE IN THE GULF OF ALASKA. WHILE THE AREA IS COLDER THAN THE SANTA BARBARA CHANNEL, MANY OF THE SAME SPECIES RANGE THROUGH AND BEYOND BOTH AREAS. HENCE, DATA IS AVAILABLE ON THE SURVIVAL OF MANY OF THE SPECIES FOUND IN THE GULF OF ALASKA ON EXPOSURE TO BOTH LARGE DOSAGES OF OIL IN AN ACUTE POLLUTION SITUATION AND TO A CHRONIC EXPOSURE SITUATION.

FIRST OF ALL, I WOULD LIKE TO COMMENT ON THE RESULTS OF OUR WORK IN THE SANTA BARBARA CHANNEL DURING THE PERIOD AFTER THE 1969 SANTA BARBARA OIL SPILL. OUR INITIAL FINDINGS SHOWED A SIGNIFICANT MORTALITY IN BIRD POPULATIONS AND IN THE UPPER INTERTIDAL BARNACLE, CHTHAMALUS FISSUS. THERE WAS ALSO SOME DIE-OFF IN THE SURF GRASS, PHYLLOSPADIX AND THE ALGAE, HESPEROPHYCUS HARVEYANUS. NO REPORTS DEMONSTRATED DAMAGE TO POPULATIONS OF MARINE VERTEBRATES, FISH, SEALS, OR WHALES. FISH CATCH DATA AND A TRAWLING SURVEY BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME AS WELL AS ~~FISH SPOTTING~~ DATA FROM THE BUREAU OF COMMERCIAL FISHERIES DID NOT INDICATE ANY DECREASE IN FISH POPULATIONS DUE TO THE OIL SPILL. A SURVEY OF GREY WHALE STRANDINGS DURING THE LAST DECADE DID NOT SUGGEST THAT FIVE (5) STRANDINGS IN THE MONTH AFTER THE OIL SPILL WAS INORDINATELY HIGH. THROUGH A PROGRAM OF TAGGING OF OILED (75% OF BODY COVERED BY OIL) AND UNOILED ELEPHANT SEALS, OVER A 13 MONTH PERIOD, B. LEBEOUF FOUND NO EVIDENCE OF INCREASED MORTALITY AMONG OILED OVER THE UNOILED ANIMALS. THERE WAS ALSO NO PROOF OF AN INORDINATELY HIGH MORTALITY OF SEA LION PUPS AT SAN MIGUEL DUE TO OIL POLLUTION.

IN FEBRUARY, 1971, THE ALLAN HANCOCK FOUNDATION ISSUED A TWO-VOLUME REPORT ON THIS RESEARCH. I WISH TO POINT OUT THAT WE TRIED TO INCLUDE ALL BIOLOGICAL STUDIES BY OTHER GROUPS AND AGENCIES FOLLOWING THE SPILL IN THIS REPORT. THIS INCLUDED EXTENSIVE SURVEYS BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME, BUREAU OF COMMERCIAL FISHERIES, DR. M. NEUSHAL AT THE UNIVERSITY OF CALIFORNIA AT SANTA BARBARA, AND DR. WHEELER NORTH FROM THE CALIFORNIA INSTITUTE OF TECHNOLOGY AMONG OTHERS. THE REPORTS OF THESE SURVEYS SUBSTANTIATED THE FINDINGS BY THE ALLAN HANCOCK FOUNDATION STUDY. THAT IS, THAT THE BIOLOGICAL DAMAGE WAS MUCH LESS THAN PREDICTED IMMEDIATELY AFTER THE SPILL AND THE AREA WAS RECOVERING.

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RECOVERY OF THE AREA STARTED WITHIN SEVEN (7) WEEKS OF THE OIL SPILL. THE BARNACLE, BALANUS GLANDULA, HAD SETTLED ON DRY OIL BY THAT TIME. BETWEEN SIX AND SEVEN MONTHS AFTER THE SPILL, THE CALIFORNIA DEPARTMENT OF FISH AND GAME REPORTED "NEAR NORMAL QUANTITIES" OF HESPEROPHYCUS WHILE PHYLLOSPADIX WAS GROWING AGAIN IN DAMAGED AREAS OF THE CHANNEL (A.H.F. REPORT 1:495). CHTHAMALUS FISSUS WAS RECORDED SETTLING ON OILED SUBSTRATES 10 MONTHS AFTER THE SPILL. IN MORE RECENT EXPERIMENTS THIS SPECIES SETTLED ON SUBSTRATES LESS THAN 10 WEEKS AFTER THEY WERE SOAKED IN OIL. THESE EXPERIMENTS ALSO SHOWED THAT RECOLONIZATION RATES DEPEND ON THE SEASON OF THE YEAR. HENCE, RECOLONIZATION BY THIS SPECIES NEED NOT BE DELAYED AS LONG AS 10 MONTHS. THIS WORK IS REPORTED IN THE PROCEEDINGS OF THE CONFERENCE ON PREVENTION AND CONTROL OF OIL SPILLS SPONSORED BY API, EPA, AND THE COAST GUARD IN JUNE, 1971.

ALTHOUGH COMPARABLE DATA TO THAT OBTAINED BY THE CALIFORNIA DEPARTMENT OF FISH AND GAME IN 1969, IS NOT AVAILABLE ON BIRD POPULATIONS FOR LATER YEARS, THE AUDUBON CHRISTMAS CENSUS FOR THE FOLLOWING YEARS (1969-1973) DID NOT REVEAL A LOSS OF BIRDS CORRELATED WITH THE OIL SPILL. THE DIFFICULTY WITH THESE DATA IS THAT THE LEVEL OF EFFORT IS PROBABLY STILL TOO LOW TO REGISTER CHANGES IN THE SANTA BARBARA AREA BECAUSE THE RESULTS ARE RELATED TO THE NUMBER OF OBSERVERS.

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IN SUBSEQUENT ECOLOGICAL SURVEYS OF ROCKY SHORES AND SANDY BEACHES IN 1974, WE WERE UNABLE TO DEMONSTRATE DISRUPTION IN THE DISTRIBUTION AND ABUNDANCE OF INTERTIDAL SPECIES DUE TO THE SANTA BARBARA OIL SPILL. OUR CONCLUSIONS WERE THAT ANY DISRUPTION HAD BEEN OF A TEMPORARY NATURE.

AT THIS POINT, I WOULD LIKE TO TAKE EXCEPTION TO FIGURE 45 IN THE EIS WHICH HAS BEEN QUOTED DIRECTLY FROM THE CEQ REPORT. IN THIS FIGURE, CEQ EXTRAPOLATED FROM MY DATA, THAT IT TOOK 3 YEARS FOR OIL FROM THE SANTA BARBARA SPILL TO BE LOST FROM THE SANDY BEACHES. GOD KNOWS HOW THEY CAME TO THAT CONCLUSION! I CAN ONLY SPECULATE THAT THE CEQ WRITERS BELIEVED THAT BECAUSE I SURVEYED THE SANDY BEACHES 2 AND 3 YEARS AFTER THE OIL SPILL, THAT I HAD EVIDENCE THAT OIL FROM THE SANTA BARBARA OIL SPILL WAS STILL ON THOSE SANDY BEACHES. I HAVE NO EVIDENCE THAT OIL FROM THE SANTA BARBARA OIL SPILL WAS STILL ON A SANDY BEACH TWO OR THREE YEARS AFTER THE OIL SPILL. IN FACT, ALL OIL THAT WAS COLLECTED AND THAT COULD BE TRACED TO AN IDENTIFIABLE SOURCE, WAS DESIGNATED SEEP OIL.

from sandy beaches

ONE OF THE PROBLEMS OF ASCERTAINING POSSIBLE EFFECTS OF OIL POLLUTION IN A NEW AREA IS THAT OF PREDICTION WHEN SO MANY OF THE VARIABLES ARE UNKNOWN. HERE ONE CAN ASSUME THAT OIL OFFSHORE FROM THE GULF OF ALASKA WOULD POSSIBLY BE SIMILAR TO THAT OBTAINED FROM NATURAL OIL SEEPAGE ALONG THE COAST. THE MAJOR PUBLICIZED SPILLAGES OF OIL IN COLD WATERS TO DATE, HAVE BEEN OF ARABIAN CRUDE OILS (E.G., "TORREY CANYON" AND "METULA"). THESE HAVE FORMED LARGE QUANTITIES OF CHOCOLATE MOUSSE--SOMETHING THAT HAS NOT BEEN OBSERVED IN THE SPILLAGE OF OILS ALONG THE WEST COAST OF NORTH AMERICA. THROUGH THE LARGE INCREASE IN VOLUME (CHOCOLATE MOUSSE MAY BE 1 OIL: 4 WATER), OIL IN THIS FORM MAY PHYSICALLY KILL MORE ANIMALS WITHOUT ANY REAL CHANGE IN CHEMICAL TOXICITY.

SAMPLES OF OIL FROM A FIELD NEAR THE ~~GULF OF ALASKA~~ WERE ANALYZED BY DR. TOM MEYERS. ~~HE REPORTED THAT THIS WAS A FULL RANGE CRUDE CONTAINING VOLATILES AND THAT IT WAS REMARKABLY SIMILAR TO SAMPLES FROM PLATFORM A-21 IN THE SANTA BARBARA CHANNEL. THIS WAS BASED ON GAS CHROMATOGRAPHY IN THE C₁₀ TO C₃₅ RANGE.~~

Littorina

TWO SERIES OF EXPERIMENTS HAVE BEEN CONDUCTED USING INTERTIDAL SNAILS (LITTORINA SCUTULATA) FROM SEWARD, ALASKA, SOUTHERN CANADA, AND SOUTHERN CALIFORNIA, AND SEVERAL TYPES OF PETROLEUM INCLUDING CRUDE OIL FROM THE GULF OF ALASKA AND SANTA BARBARA CRUDE OIL, TO DETERMINE POSSIBLE TOLERANCE DIFFERENCES IN FIELD POPULATIONS. LITTORINA SCUTULATA FROM ALASKA SURVIVED AS WELL, AND AT TIMES BETTER, THAN THOSE FROM THE SANTA BARBARA CHANNEL.

MORTALITIES FROM CRUDE OIL WERE LIMITED TO ANIMALS EXPOSED TO 29°C AND APPEAR TO BE A TEMPERATURE RATHER THAN AN OIL EFFECT. SUBLETHAL EFFECTS, INCLUDING ABILITY OF THE SNAILS TO REMAIN ATTACHED TO THE SUBSTRATE WERE ALSO CONSIDERED. IF THE SPECIES IS NOT ATTACHED TO THE SUBSTRATE, IT WILL BE WASHED AWAY AND ESSENTIALLY LOST FROM THE POPULATION. ATTACHMENT RATES OF ANIMALS FROM ALASKA ARE NOT SIGNIFICANTLY DIFFERENT FROM THOSE OF ANIMALS FROM THE SANTA BARBARA CHANNEL.

THE AVAILABLE DATA SUGGEST THAT THE EXPERIENCE IN THE SANTA BARBARA CHANNEL IS MORE RELEVANT TO THE GULF OF ALASKA. THAT IS, THE ENVIRONMENT WILL BE ABLE TO TOLERATE ISOLATED LARGE SPILLAGES OF OIL. HOWEVER, THE WORD ISOLATED MUST BE EMPHASIZED.

LET ME NOW ADDRESS THE SUBJECT OF "CHRONIC" POLLUTION BY PROVIDING SOME INFORMATION FROM A REPORT IN THE LAST DRAFT STAGE. THIS DEALS WITH WORK CONDUCTED OVER A TWO-YEAR PERIOD TO STUDY THE SUBLETHAL EFFECTS OF CHRONIC EXPOSURE TO OIL FROM NATURAL SEEPAGE AND INCLUDED BOTH INTERTIDAL AND SHALLOW SUBTIDAL SPECIES. IT WAS NOT DESIGNED AS A COMMUNITY STUDY, BUT AS A STUDY TO RELATE INDIVIDUAL SPECIES TO OIL. IT ALSO INCLUDED AN EXTENSIVE PROGRAM OF CHEMICAL ANALYSIS OF TISSUES AND SEDIMENTS.

SEVERAL MAJOR POINTS THAT EMERGED WERE THAT MARINE SPECIES CAN AND DO LIVE IN AREAS CHRONICALLY EXPOSED TO OIL. THIS INCLUDES BENTHIC SEDIMENTS. MOST OF THESE SPECIES HAVE PELAGIC LARVAL FORMS. THEREFORE, THIS CAN NOT BE REGARDED AS THE RESULTS OF NATURAL SELECTION OVER MANY GENERATIONS. THERE MAY INDEED BE AN INCREASE IN TOLERANCE TO OIL OF INDIVIDUALS THROUGH CHRONIC EXPOSURE AS WELL AS SELECTION OF THOSE MOST TOLERANT TO OIL FROM EACH GENERATION.

Report to ... 1/6

IN GENERAL, THE HIGHEST CONCENTRATION OF PETROLEUM HYDROCARBONS IN TISSUES WERE FOUND IN MYTILUS CALIFORNIANUS. EXAMINATION OF THE GONADS INDICATED THAT THE SPECIES WAS INDEED BREEDING AT COAL OIL POINT AND THAT OOCYTES AND EGGS APPEARED NORMAL IN THE OVARY. LIKEWISE, A STUDY OF THE EARLY STAGES OF LARVAL DEVELOPMENT IN SEA URCHINS, STRONGLYCENTROTUS SHOWED NO DETRIMENTAL EFFECTS EVEN THOUGH THE TISSUES OF THE PARENT ANIMALS CONTAINED PETROLEUM HYDROCARBONS.

THE AREA WAS ALSO NOT POPULATED WITH MALFORMED ORGANISMS. THIS INCLUDED A SURVEY OF ENCRUSTING BRYOZOANS FROM THE KELP CANOPY. CONTRARY TO THE OBSERVATIONS OF POWELL, ET AL (1970), NO HYPERPLASIA OF BRYOZOAN OVICELLS WAS RECORDED. COULD THE EFFECTS OBSERVED BY POWELL BE DUE TO SOME OTHER FACTOR OPERATING IN THEIR STUDY SUCH AS CREOSOTE--A COAL-TAR DERIVATIVE--WHICH HAS A HIGHER CANCER PRODUCING POTENTIAL THAN CRUDE OIL?

EXTERNAL PRESENCE OF BLACK OIL, HOWEVER, WAS ASSOCIATED WITH A REDUCTION OF THE BROODING RATE IN THE STALKED BARNACLE, POLLICIPES POLYMERUS. THIS APPEARED TO BE A TEMPERATURE EFFECT WITH THE OIL INCREASING THE ANIMAL'S BODY TEMPERATURE. HOWEVER, IN ALASKA WHERE THE SPECIES IS NEARER TO THE COLDER END OF THE RANGE, SUCH AN INCREASE IN TEMPERATURE MAY NOT BE SUFFICIENT TO REDUCE THE BROODING RATE.

OTHERS HAVE SURVEYED PRODUCTION AREAS (GURC, CALIFORNIA FISH AND GAME) AND LARGE PORTS (MILFORD HAVEN). THEIR DATA SHOW THAT THE INDUSTRY HAS INDEED BEEN ABLE TO OPERATE WITHOUT LARGE SCALE ENVIRONMENTAL DISRUPTION. ALL THESE OPERATIONS, HOWEVER, DO REQUIRE STRICT CONTROL BY INDUSTRIAL OPERATIONS TO MINIMIZE CONTAMINATION OF THE ENVIRONMENT. THE NEED FOR THIS CONTINUED CONTROL AND QUICK RESPONSE TO AN INCIDENT TO MAINTAIN CLEAN PORTS IS CONTINUALLY EMPHASIZED BY CAPTAIN DUDLEY, THE HARBOR MASTER AT MILFORD HAVEN.

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STATEMENT OF
DR. ALBERT H. LASDAY
VICE-CHAIRMAN, AMERICAN PETROLEUM INSTITUTE
COMMITTEE ON FATE AND EFFECTS
OF OIL IN THE ENVIRONMENT
BEFORE THE HEARING OF
THE U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
ON
ENVIRONMENTAL IMPACT OF PROPOSED OIL AND GAS
LEASING-OUTER CONTINENTAL SHELF, GULF OF ALASKA
(OCS SALE NO. 39)
AUGUST 12, 13, 1975
AT ANCHORAGE, ALASKA

I am Dr. Albert H. Lasday, a Coordinator in Texaco Inc.'s Environmental Protection Department. One of my responsibilities is to advise on and to coordinate the Company's world-wide activities in prevention and control of water pollution, including oil spills.

I also serve as Vice Chairman of the American Petroleum Institute's Committee on Fate and Effects of Oil in the Environment. One of the Committee's sub-units is its Task Force on Physical Transport of Oil, of which I serve as Chairman. This latter group is concerned primarily with sponsoring and supervising, on behalf of the API, research which seeks to describe quantitatively the fate of spilled oil.

For the past seven and one-half years I have been occupied exclusively with water pollution problems. For the initial three and one-half years of that period I was Supervisor of Research at a Texaco laboratory where my section worked on various studies of waste water treatment and oil spill recovery and cleanup. Moreover, I have served as Texaco's Environmental Protection Coordinator at three significant oil spills in which my Company was involved (none of them off-shore), so that I am knowledgeable of the environmental aspects of events attendant on the accidental and unexpected release of large amounts of oil.

Detailed written comments on the "Draft Environmental Impact Statement for the Proposed OCS Oil and Gas Lease Sale-Northern Gulf of Alaska" will be submitted by the Gulf of Alaska Operators Committee. However, I shall comment today on several salient points contained in that document, regarding some of the effects on the environment of crude oil, of oil and gas drilling, and of production-related fluids, including drilling muds, drill cuttings, and produced brine.

WEATHERING AND DISSIPATION OF SPILLED CRUDE

Regarding the crude oil category, it is important, insofar as effects on marine biota are concerned, to distinguish between fresh and weathered oil, as the fresh crude contains components which are present in lesser amounts or even absent after weathering. Regardless of its source, a fresh crude entering a particular place in the marine environment will be transported somewhere else by winds, waves, and currents. During the time of transport, the characteristics and toxicity of the fresh crude are greatly modified by the weathering processes of evaporation, dissolution, photo-oxidation, emulsification, and biodegradation. Further, the operative transport mechanisms remove various components of the oil into other reservoirs such as the atmosphere, the water column, and the sediments.

Thus, any possible toxicity effect of crude oil entering the marine environment is rapidly decreased and effects on marine life much reduced after only a few hours time. This greatly reduced toxicity occurs soon at the original site, say of a spill, and consequently is even further reduced at any distant site to which the crude may be transported, due to the action of weathering and dissipative factors. Dr. Clayton D. McAuliffe discusses this subject of the fate of a spilled oil extensively and in detail in his presentation.

EFFECTS OF SPILLED OIL ON PHYTOPLANKTON

The "Draft Environmental Impact Statement" discusses 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. It is my purpose to make available some additional and new information regarding the effects of oil on phytoplankton, and to base some differing conclusions thereon.

Work funded by the American Petroleum Institute (API) and conducted by Ray and Mills at Texas A & M University showed that phytoplankton exposed to the water-soluble fractions of several test oils evidenced reduced primary productivity.¹ However, they noted that once the exposure to oil was terminated, the phytoplankton resumed a normal growth rate within a few days. They conclude that once a spill episode has passed, only a few cells need survive to repopulate a given area rapidly. Recruitment from nearby unaffected areas also would act to restore a normal phytoplankton population quickly. For these reasons, they report that phytoplankton have a great "rebound" potential.

In still other work funded by API, Strand and co-workers at Battelle-Northwest Research Laboratories report that at concentrations of oil less than 1 ppm, oil stimulated the growth of phytoplankton.² Other investigators have reported similar observations in Alaska³, France⁴, Canada⁵, and elsewhere.^{6,7} Evidently at these low concentrations, oil serves as a nutrient.

Finally, The Gulf Universities Research Consortium (GURC) conducted an extensive environmental study⁸ in the Gulf of Mexico utilizing control areas away from oil production, and study areas

with concentrated production activities. In his report to GURC²⁴, Dr. S. Z. El Sayed states, "There is no evidence to suggest that production or drilling activities have had any deleterious effect on phytoplankton communities in the off-shore waters" Thus, it is concluded that, insofar as phytoplankton are concerned, any adverse effect of crude oil is temporary and that the phytoplankton regenerate quickly after a spill.

CHRONIC EXPOSURE OF MARINE LIFE TO SPILLED OIL

Another subject which is discussed in the "Draft Environmental Impact Statement" is that of the effects of long term, chronic exposure to crude oil. See, for example, the section expressing some of the more prevalent concerns, pages 395-404. Considerable speculation has also appeared both in the technical and in the popular literature on this subject. However, many comprehensive studies have been conducted or are in progress which show that such exposure is not harmful. The most extensive work has been done by the Gulf Universities Research Consortium.⁸ The testimony of Mr. J. W. Tyson at this hearing reports that there have been no measurable adverse effects on marine life as a result of the off-shore oil operations in the Gulf of Mexico over the past 25 years or more.

A similar conclusion was reached by Battelle-Northwest Research Laboratories as a result of their three year study of Lake Maracaibo in Venezuela⁹, which has been impacted by off-shore operations for several decades. Further evidence is provided by studies conducted by Dr. Dale Straughan on the effects of the natural oil seeps off Coal Oil Point, Santa Barbara, upon the marine

community. She finds that the chronic exposure to oil from the natural seeps does not affect the health of the local marine animals in any way. Neither their growth rates nor their reproductivity are affected. Moreover, she finds no evidence of abnormal growths.¹⁰

Continuing in the same vein are the results being reported by the Bermuda Biological Station for Research from their study for the API on the effects on marine life of weathered oil washing ashore on some of the Bermuda beaches. So far, after more than a year's study, the researchers find no effects of oil on subtidal and intertidal marine life, nor are any effects observed upon the life that is inhabiting the splash zone.¹¹

As a final study of chronic exposure of the marine environment to crude oil, I wish to report on the work being done in the Santa Barbara channel under the direction of Dr. John D. Isaacs of the Scripps Institution of Oceanography. This project, also sponsored by the API, is developing a census of various types of marine life under and adjacent to platforms Hilda and Hazel in the Santa Barbara channel. This census will be compared with a similar one conducted immediately after these platforms were constructed in 1959 and 1960. At the time of construction, very little marine life inhabited the area. Soon after construction, the fish population had grown to about 6,000 under each platform. The structures had become encrusted with sessile organisms, such as mussels and barnacles, but no marine life was present in or on the sterile drill cuttings deposited at the base of the platforms.¹²

Today the fish populations are estimated at more than 20,000 under each platform. The structures are heavily encrusted by sessile organisms. Also, the drill cutting piles have become a teeming community of benthic life.¹³

These studies provide graphic evidence that there are little, if any, adverse effects upon marine life from chronic exposure to crude oil. On the contrary, they provide good evidence that such off-shore platform structures provide an environment that increases the total biomass for their local area.

Except in confined bodies of water where, for example, sediments can become heavily contaminated, oil has a negligible effect upon marine life. Undoubtedly the major factors responsible for this condition are the very low solubility of oil in water and the rapid dilution which occurs. Most toxic levels of oil involve concentrations measured in the many parts per million range, up to hundreds of parts per million, whereas the concentration of oil in the natural environment lies in the parts per billion range. For example, scientists of the Bedford Institute in Nova Scotia have found hydrocarbon levels in the range of only 1 to 6 parts per billion in waters off the Canadian East Coast.^{14,15} Tanker routes in the Atlantic Ocean contain only 2 to 20 parts per billion of hydrocarbon.¹⁶ The hydrocarbon content of the water column affected by the natural seeps near Coal Oil Point at Santa Barbara is, at most, 16 parts per billion.¹⁷ In the studies of the 1970 platform spill in the Gulf of Mexico, the concentrations of hydrocarbon were only 200 parts per billion at the platform and had dwindled to only 1 part per billion a mile away.¹⁸ It is small wonder, therefore, that such low levels of exposure, especially in areas of open moving water, do not significantly affect marine life to any measurable degree.

LABORATORY BIOASSAY VS. REALISTIC CONDITIONS

Laboratory bioassay has been a primary investigative method from which have been derived the results and conclusions which are discussed in the "Draft Environmental Impact Statement," in the sections on the effects of oil on phytoplankton, and the long-term chronic exposure effects of oil. Because of the importance of the conclusions which have been based largely on laboratory bioassay testing, it is necessary to question the validity of that test procedure. Important observations concerning this were made at the API-sponsored Fate of Oil Symposium, May 29-30, 1974, in Washington, D.C. The several contractors conducting research for API on fate and effects of oil reviewed publicly the results they have obtained. A copy of the program is attached.

Significantly, each of the contractors emphasized that results from laboratory bioassay testing cannot be used as a direct measure of the toxic effects that may be expected in a "real world" circumstance. This is especially difficult with oil because it is for the most part insoluble in water. Therefore, a uniform distribution throughout the water is virtually never realized. In the case of oil, evaporation occurs; and, consequently, the lighter fractions are quickly removed. Moreover, in the "real world," dilution also occurs rapidly. In bioassay work, on the other hand, the concentration of a contaminant is held constant throughout the duration of the test, usually 96 hours. This is an unrealistically long time in the case of most spills in marine waters where the exposure time for a given local area is brief, often only a matter of hours, because the spilled oil is being moved by winds, waves, and currents.

Furthermore, the loss of fin fish is seldom observed in an oil spill in the marine environment even though a significant susceptibility is measured by laboratory bioassay work. This anomaly exists because in bioassay work the test fish is confined to a given volume of water, whereas, in marine waters, the fish can escape after evidently sensing the oil. This lack of correlation between bioassay work and field results is generally recognized. For example, the Marine Technology Society in April of this year conducted a workshop to assess this problem and to recommend needed research. Also, this deficiency was emphasized as a problem in a workshop sponsored last year by the Institute of Petroleum in England.¹⁹

As a result of the experiences of and conclusions reached by its contract research organizations, as well as by the observations of others, the API is placing maximum emphasis on field studies in its continuing sponsorship of research concerning the effects of oil. It is therefore recommended that any revisions to the "Draft Environmental Impact Statement" place increased emphasis on the results of field studies, and very cautiously evaluate the conclusions based on laboratory bioassay experiments.

EFFECTS OF DRILLING MUDS ON MARINE ORGANISMS

Drilling muds are identified in the "Draft Environmental Impact Statement" (pages 341-343, 417-418) as having possibly undesirable effects due to toxicity of some components and to turbidity. Let's now address ourselves to some additional information regarding drilling muds.

Drilling muds are complex mixtures of many different components. The toxicity of these components varies widely when tested individually. However, the most toxic components are used only sparingly in the formulation of the drilling muds. The low concentrations of such components in the muds are reflected in the high concentrations of mud in the receiving waters that are needed to produce a toxic effect.

This conclusion is illustrated by the work reported by Logan, Sprague, and Hicks of the University of Guelph in Ontario, Canada²⁰ and summarized by Falk and Lawrence.²¹ Logan and coworkers determined by laboratory methods the LC50 (the lethal concentration of drilling mud in water needed to kill half of their test organisms) after an exposure of 96 hours. Their test organisms were lake chub and rainbow trout. The LC50's for a 96-hour exposure period ranged from 0.83% to 12.0%. Thus, since such high concentrations of drilling mud in water are required in order to demonstrate toxic effects, only moderate dilution, depending on the drilling mud being used, would be needed to render the mud non-toxic even for a 96-hour exposure period. The currents that normally exist around a platform would achieve this degree of dilution within a few feet of the point of discharge and within an elapsed time of only a few minutes. Thus, the effect of discharging drilling muds upon the health of a marine ecosystem can be considered negligible.²² But one must bear in mind the limitations of laboratory bioassays, as discussed above.

The "Draft Environmental Impact Statement" expresses specific concern about the ferrochrome lignosulfonates and barite

used in the formulation of drilling muds. Logan et al²⁰ report the toxicity level of ferrochrome lignosulfonate to be about 1500 ppm, or about 0.15%. Since it is used sparingly in the formulation of drilling muds, its concentration in the water after discharge of the mud is very low and therefore non-toxic.

Further, the "Draft Environmental Impact Statement" states that an unknown factor is the toxicity to benthic organisms from barium compounds in drilling muds. While these compounds are a major component in drilling muds, Logan et al²⁰ report their toxicity to be extremely low, essentially zero. As observed above, the rapid dilution by seawater at the point of discharge of the mud renders components non-toxic almost instantaneously. F. T. Weiss²³ observed in his testimony before the Bureau of Land Management hearing in Los Angeles last May that these same barium compounds are the principal ingredients in the "barium enema" or "barium diet" used for X-ray examinations. While they may be unpleasant, they can hardly be considered as toxic materials!

EFFECTS OF PRODUCED WATER DISCHARGES

The discharge from producing platforms of formation waters is discussed in the "Draft Environmental Impact Statement" (for example, pages 342-5, 424) and it is concluded that the impact will not likely be significant, based on dilution of produced waters in the ocean water column, and the patchiness of phytoplankton production in the northern sector of the Gulf of Alaska. In support of that conclusion, it should be noted that an important component of discharged water from a producing platform is oil -- in the 10 to 50 parts per million range -- and as discussed above, chronic exposure of phytoplankton and other marine organisms to low levels

of crude oil is not harmful. In addition to minor amounts of entrained oil, some additional characteristics of produced water noted in the "Draft Environmental Impact Statement" are high salinity, and presence of various metals and non-metals.

Regarding salinity, the GURC study⁸ previously mentioned reported salinity measurements at 180 sampling locations in the northern Gulf of Mexico. The observed levels were reported to be within normal ranges according to season of the year. Of course, dilution is the method of detoxification. Dr. J. F. Mackin²⁵ said, "This dilution in large water bodies and comparatively deep water is almost instantaneous, and dilutions of 1,000 parts of sea water to one of brine can be effected in even comparatively shallow water in distances of from 8 to 50 feet. In off-shore waters in the Gulf or elsewhere, there is no brine problem for that reason."

Various metals and non-metals present in produced water are listed in Table 45a, page 344 of the "Draft Environmental Impact Statement." In addition, trace amounts of other metals have been listed.²⁶ While all of the trace elements discovered in brines are present in sea water, some of the former could be discharged at higher concentrations. As previously discussed with respect to salinity, dilution would very rapidly, and in a very short distance, render harmless any brine discharge containing even an otherwise toxic concentration of a heavy metal.

SUMMARY AND CONCLUSIONS

In summary, the following conclusions have been stated in my testimony:

1. Any adverse effect of crude oil on phytoplankton is temporary as they regenerate and repopulate quickly after a spill.
2. Chronic exposure of marine life to low levels of petroleum hydrocarbons from crude oil entering the environment does not significantly affect the biota.
3. Laboratory bioassay testing does not simulate the "real world" in any reasonable fashion and, therefore, the results of such studies must be interpreted and applied with extreme caution. "Real world" field studies are a much preferred investigatory route for determining the effects of oil on marine flora and fauna.
4. Drilling muds may contain some additives which are toxic if concentrated; however, in actual practice, rapid dilution in the water column, should they be discharged, renders them negligibly harmful to marine life.
5. At time of discharge, ocean bottom areas covered with drill cuttings will be sterile, but a thriving benthic population will develop.
6. The discharge of formation waters into the ocean from producing platforms does not present any hazard to sea life forms in the water column near the platforms, due to the rapid dilution which occurs.

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PRELIMINARY PROGRAM AND INVITATION

SYMPOSIUM ON

FATE AND BIOLOGICAL EFFECTS
OF OIL SPILLED IN THE MARINE ENVIRONMENT

Sheraton-Park Hotel, Washington, D.C.

May 29-30, 1974



Sponsored by

The American Petroleum Institute

PROGRAM TOPICS AND SPEAKERS

Physical Transport of Spilled Oil

Dr. R. L. Kolpack
University of Southern California

SYMPOSIUM ON

FATE AND BIOLOGICAL EFFECTS

OF OIL SPILLED IN THE MARINE ENVIRONMENT

Chemical Analysis for Oil in Water,
Sediments, and Tissues

Dr. J. S. Warner
Battelle Memorial Institute
Columbus (Ohio) Laboratories

In 1971, after a careful evaluation of published documents on the fate of oil spills and their ecological/biological effects, the American Petroleum Institute determined that there was a dearth of scientific knowledge on this subject. It was found that the literature was frequently speculative, and contained little experimental evidence. Furthermore, many far-reaching questions of importance to the petroleum industry could not be answered for lack of factual information.

API then launched a comprehensive research program to get these answers. This program has grown during the past three years, and has begun to provide much scientific data on the fate and effects of oil.

To provide a forum for the presentation and discussion of these data by the scientists who are conducting the research, API has scheduled this symposium. It is the hope of API's Task Force on Fate of Oil that this symposium will promote objective evaluation of these projects and the information developed by them. The net result should be of benefit to the scientists involved, to API, and to all who share an interest in the area.

Biodegradation of Oil

Dr. Rita R. Colwell
University of Maryland

Dr. Leon Petrakis
Gulf Research & Development Co.

Effects of Oil on Phytoplankton

Dr. J. R. Vanderhorst
Battelle Memorial Institute
Pacific Northwest Laboratories

Dr. S. M. Ray
Texas A. & M. University

Toxicity of Oil to Marine Fauna
(Flow-Through Bioassay Technique)

Dr. B. E. Vaughan
Battelle Memorial Institute
Pacific Northwest Laboratories

Toxicity of Oil to Marine Fauna
(Static Bioassay Techniques)

Dr. J. W. Anderson
Texas A. & M. University

Avian Physiology Research

Dr. W. N. Holmes, Jr.
University of California at
Santa Barbara

Field Studies, Bermuda

Dr. C. D. Gebelein
Bermuda Biological Station for
Research

Field Studies, Santa Barbara

Dr. Dale Straughan
Allan Hancock Foundation
University of California

Field Studies, Buzzards Bay

Dr. A. D. Michael
Marine Biological Laboratory
Woods Hole, Massachusetts

Analytical Method for
Polynuclear Aromatics

Dr. R. A. Brown
Esso Research & Engineering Co.
Linden, New Jersey

* * * * *

Direct requests for additional
Symposium information to:

Dr. J. R. Gould
Conference Coordinator
Fate and Effects Symposium
Suite 700
1629 K Street, N. W.
Washington, D. C. 20006
(202) 296-3018

GENERAL SYMPOSIUM INFORMATION

Registration: Attendance at this symposium is by invitation only. All invitees who wish to attend must register in advance. Please complete the enclosed registration card and return by April 10, 1974, with your check (made payable to American Petroleum Institute) to:

Fate and Effects Symposium
Suite 700
1629 K Street, N. W.
Washington, D. C. 20006

ask the hotel operator (202-265-2000) for the Fate and Effects Symposium Message Center. Please check the Message Board periodically.

Badges: Badges are required for admittance to all meetings. Please wear your badge at all times so you will not be delayed at the entrance to a meeting.

NOTES

Your badge and meeting materials will be held for you at the Symposium Registration Desk (Cotillion Room Foyer, Sheraton-Park Hotel) which will be open as follows:
Tuesday, May 28, 6:00 p.m.-8:00 p.m. and
Wednesday, May 29, 8:00 a.m. - noon.

Only those who have registered in advance will be able to attend the symposium sessions.

Luncheon: A luncheon is scheduled for Wednesday, May 29, and is included in your registration fee.

Hotel Reservations: A block of rooms at the Sheraton-Park Hotel has been set aside for participants. To ensure confirmed reservations from this block, your request must be RECEIVED BY THE HOTEL no later than May 8, 1974. The hotel reservation card (enclosed) must be mailed as soon as possible to: Sheraton-Park Hotel, Washington, D. C. 20008. An advance deposit or written guarantee of payment is necessary to hold your room if arrival is scheduled after 6:00 p.m. Available accommodations are: Single Rooms \$25.00; Double (Twin) Rooms \$33.00.

Message Center: A Message Center will be in operation May 29 from 8:00 a.m. to 5:00 p.m. and May 30 from 8:00 a.m. to 1:00 p.m. Please suggest that callers who wish to reach you during these hours

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STATEMENT OF

JESSE P. JOHNSON
MANAGER, SOUTH ALASKA DISTRICT

ATLANTIC RICHFIELD 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

STATEMENT OF JESSE P. JOHNSON, ATLANTIC RICHFIELD COMPANY

OFFSHORE SALE ENVIRONMENTAL HEARING

ANCHORAGE, ALASKA

MY NAME IS JESSE JOHNSON, THE MANAGER OF ATLANTIC RICHFIELD COMPANY'S SOUTH ALASKA DISTRICT. I AM RESPONSIBLE FOR COMPANY OPERATIONS IN SOUTH ALASKA WHICH INCLUDE OUR OPERATIONS IN COOK INLET AND FUTURE COMPANY OPERATIONS IN THE GULF OF ALASKA. I REPRESENT MY COMPANY ON THE GULF OF ALASKA OPERATORS COMMITTEE.

OTHER TESTIMONY EMPHASIZES THAT MEASURES WILL BE TAKEN TO PREVENT OIL SPILLS. THESE MEASURES INCLUDE TRAINING TO REDUCE THE NUMBER OF HUMAN ERRORS, THE INSTALLATION OF SAFETY EQUIPMENT AND POLLUTION PREVENTION EQUIPMENT, AND IMPLEMENTING OPERATION AND INSPECTION PROCEDURES TO ENSURE PROPER FUNCTIONING OF THIS EQUIPMENT. ALTHOUGH WE ARE CONFIDENT THAT SUCH MEASURES WILL PREVENT OIL SPILLS, WE WILL TAKE ADDITIONAL PRECAUTIONS TO PREPARE FOR SUCH AN UNLIKELY EVENT BY PROVIDING PHYSICAL CONTAINMENT (OR SECONDARY CONTAINMENT) WHERE APPLICABLE. THESE MEASURES WOULD BE TAILORED TO THE PARTICULAR FACILITY AFTER A CAREFUL ASSESSMENT OF THE POSSIBILITY OF A DISCHARGE OF OIL.

IF A SPILL OCCURS, OUR IMMEDIATE OBJECTIVE WILL BE TO MINIMIZE ANY RESULTING DAMAGE. EQUIPMENT AND TECHNIQUES FOR DOING THIS HAVE BEEN DEVELOPED AND ARE THE SUBJECT OF MUCH CURRENT RESEARCH, BOTH THE INDUSTRY

AND THE GOVERNMENT HAVE FUNDED, AND ARE CONTINUING TO FUND, PROJECTS TO DEVELOP NEW AND IMPROVED SKIMMING DEVICES, CONTAINMENT BOOMS, AND DISPERSANTS. THE MOST THOROUGH AND CURRENT SINGLE REVIEW AND ASSESSMENT OF THE TECHNOLOGY RESULTING FROM SUCH RESEARCH CAN BE FOUND IN THE PUBLICATIONS OF THE CONFERENCE ON PREVENTION AND CONTROL OF OIL POLLUTION. THE MOST RECENT OF THESE CONFERENCES WAS HELD IN SAN FRANCISCO IN MARCH OF THIS YEAR. THESE CONFERENCES ARE JOINTLY SPONSORED BY THE ENVIRONMENTAL PROTECTION AGENCY, THE UNITED STATES COAST GUARD, AND THE AMERICAN PETROLEUM INSTITUTE.

IN ADDITION TO SUCH TECHNOLOGICAL ADVANCES, THE INDUSTRY IS WORKING IN ANOTHER AREA THAT I CONSIDER EQUALLY IMPORTANT, WHICH IS THE ABILITY TO APPLY TECHNOLOGY RAPIDLY AND EFFECTIVELY. THROUGH THE AUSPICES OF THE AMERICAN PETROLEUM INSTITUTE, AN OIL SPILL SUBCOMMITTEE IS BUILDING EXPERTISE WITHIN THE INDUSTRY. THE API CONTRACTED WITH TEXAS A & M UNIVERSITY TO DEVELOP AN OIL SPILL CONTROL SCHOOL. THE PURPOSE OF THE SCHOOL IS TO TRAIN INDUSTRY PERSONNEL IN SPILL PREVENTION, CONTROL, AND CLEAN-UP TECHNIQUES. A BROCHURE DESCRIBING THE TEXAS A & M SCHOOL IS BEING SUPPLIED WITH THIS STATEMENT FOR THE PERMANENT RECORD. THE SCHOOL BEGAN THIS YEAR, AND A MINIMUM OF 20 SESSIONS WILL BE OFFERED EACH YEAR. THE SCHOOL IS CONDUCTED INDEPENDENTLY OF THE API.

MUCH OF THE PROGRESS IN THE APPLICATION OF CLEAN-UP TECHNIQUES IS DUE TO THE FORMATION OF OIL SPILL COOPERATIVES. COOPERATIVES ENABLE THEIR

MEMBERS TO POOL THEIR RESOURCES, SUCH AS EQUIPMENT, MACHINERY, SUPPLIES AND PERSONNEL. THE COOPERATIVE ITSELF CAN OWN SPECIALIZED EQUIPMENT NOT OWNED BY INDIVIDUAL MEMBERS. SOME OF THESE ORGANIZATIONS PROVIDE THEIR OWN SCHOOLS FOR TRAINING AND DRILLS.

COOPERATIVES HAVE RANGED FROM AN EXCHANGE OF TELEPHONE NUMBERS AND PROMISES OF AID TO TODAY'S MORE SOPHISTICATED COOPERATIVES WHICH ARE COVERED BY WRITTEN AGREEMENTS. A 1972 SURVEY CONDUCTED BY THE AMERICAN PETROLEUM INSTITUTE REVEALED THAT THERE WERE 100 SUCH COOPERATIVES THEN IN EXISTENCE, SUCH AS IN THE LOS ANGELES AREA, HUMBOLT BAY, SAN FRANCISCO BAY, COLUMBIA RIVER AREA IN OREGON, PUGET SOUND AND COOK INLET, ALASKA. ABOUT HALF OF THESE GROUPS WERE COMPOSED OF PETROLEUM COMPANIES ONLY. HOWEVER, MEMBERSHIP IS NOT LIMITED TO PETROLEUM COMPANIES AND OTHERS IN NEED OF COOPERATIVE SERVICES CAN JOIN.

IN ALASKA, TERMINAL OPERATORS, OFFSHORE CRUDE OIL DRILLERS AND PRODUCERS, AND AN ONSHORE CRUDE OIL DRILLER AND PRODUCER, JOINED TOGETHER TO FORM THE COOK INLET OIL SPILL COOPERATIVE. THE EXPERIENCES OF THAT COOPERATIVE WILL BE INVALUABLE TO THE GULF OF ALASKA CLEAN-UP COOPERATIVE.

THE MOST IMPORTANT REASON FOR THE ORGANIZING OF AN OIL SPILL COOPERATIVE IS TO DEVELOP AN INTEGRATED RESPONSE PLAN UTILIZING THE LARGEST POSSIBLE POOL OF EXPERTISE, EQUIPMENT, AND MANPOWER. BY SO DOING, THE TOTAL INDUSTRY EXPERTISE IN A GIVEN AREA IS USED IN PROMOTING READINESS AND

EFFECTIVENESS IN OIL SPILL PREVENTION AND CLEAN-UP. THE EQUIPMENT IS AVAILABLE IN THREE GENERAL WAYS. FIRST, A COOPERATIVE MAINTAINS AN INVENTORY OF THE EQUIPMENT AND MATERIALS OWNED BY INDIVIDUAL MEMBERS. SECOND, A SIMILAR INVENTORY IS MAINTAINED LISTING EQUIPMENT AND MATERIALS AVAILABLE FROM OTHER SOURCES SUCH AS SUPPLIERS AND RENTAL FIRMS. THIRD, SPECIALIZED EQUIPMENT NOT NORMALLY OWNED BY INDIVIDUAL MEMBERS IS PURCHASED BY THE COOPERATIVE. THE EQUIPMENT OWNED BY THE COOPERATIVE CAN BE MADE AVAILABLE TO NON-MEMBERS. THIS PROVISION CAN BE INCLUDED IN THE AGREEMENT. ALSO, ALL EQUIPMENT OWNED BY THE COOPERATIVE IS AVAILABLE TO THE UNITED STATES COAST GUARD. THE COAST GUARD TAKES CHARGE OF CLEANING UP SPILLS OF UNDETERMINED ORIGIN.

EFFORTS BY THE GULF OF ALASKA OPERATORS COMMITTEE HAVE RESULTED IN 24 COMPANIES COMMITTING TO THE GULF OF ALASKA CLEAN-UP COOPERATIVE. THE REPRESENTATIVES OF THESE COMPANIES MET ON AUGUST 8 AND TRANSACTED BUSINESS NECESSARY TO FORMALLY ORGANIZE AND APPOINT WORK COMMITTEES NECESSARY TO FULFILL THE RESPONSIBILITY OF PROVIDING EQUIPMENT, OPERATING PROCEDURES, AND TRAINING NECESSARY TO CLEAN UP AN OIL SPILL IN THE GULF OF ALASKA. A FIVE-MAN EXECUTIVE COMMITTEE, INCLUDING MYSELF AS CHAIRMAN OF THE CO-OP, WAS ELECTED. A LEGAL SUBCOMMITTEE WAS APPOINTED TO RECEIVE COMMENTS AND MAKE NECESSARY CHANGES IN THE DRAFT AGREEMENT WHICH IS BEING FILED WITH THIS STATEMENT. AN ENGINEERING COMMITTEE WAS APPOINTED TO REVIEW CLEAN-UP EQUIPMENT AND PROVIDE A RECOMMENDATION FOR OBTAINING SAME FOR

THE COOPERATIVE, INVENTORIES CARRIED BY SEVERAL EXISTING COOPERATIVES ARE BEING FILED WITH THIS STATEMENT AS EXAMPLES OF EQUIPMENT TO BE CONSIDERED. THE NEED FOR SPECIAL OR LARGER VERSIONS OF SKIMMING EQUIPMENT NOW BEING USED HAS BEEN REVIEWED BY THE GULF OF ALASKA OPERATORS COMMITTEE AND THE CO-OP ENGINEERING SUBCOMMITTEE WILL TAKE OVER THE RESPONSIBILITY OF OBSERVING THE TEST TANK MODEL STUDIES BY MARCO POLLUTION CONTROL. THIS WILL BE DONE TO DETERMINE A SUITABLE SELF-PROPELLED SKIMMING VESSEL FOR USE IN THE GULF OF ALASKA. THE MODEL TESTING OF TWO-HULL CONCEPTS WILL BE COMPLETED THE END OF THIS MONTH (AUGUST) AND A REPORT WITH RECOMMENDATIONS WILL BE COMPLETED THE END OF SEPTEMBER. THE GULF OF ALASKA CLEAN-UP COOPERATIVE IS EXPECTED TO COMMIT FOR ENGINEERING DESIGN AND DRAWINGS AND THEN FOR THE CONSTRUCTION OF THE OPEN OCEAN SKIMMING VESSEL. WHEN BUILT, THIS SKIMMER, TO OUR KNOWLEDGE, WOULD BE THE LARGEST SUCH VESSEL IN OPERATION IN OCS WATERS.

THE OPEN OCEAN SKIMMING VESSEL IS THE TYPE OF SPECIALIZED EQUIPMENT OWNED OR CONTRACTED FOR BY A COOPERATIVE. IN ADDITION, THE COOPERATIVE WILL PROVIDE FOR CONTAINMENT BOOMS, SORBENT MATERIALS, SURFACE TENSION MODIFIERS TO RETARD THE NATURAL TENDENCY OF OIL TO SPREAD RAPIDLY ON THE WATER SURFACE, AND THE EQUIPMENT TO DEPLOY AND USE THESE MATERIALS. THE COOPERATIVE, OR THE COMPANIES OPERATING SHORE-SIDE SUPPLY BASES, WILL PROVIDE OIL SPILL CONTAINMENT AND CLEAN-UP EQUIPMENT FOR SPILLS WHICH MAY OCCUR AT THESE BASES. AT THE PRESENT TIME, SHORE-SIDE SUPPLY BASES ARE PLANNED AT YAKUTAT AND CORDOVA.

I WILL NOW SHOW SOME SLIDES DEPICTING SOME OF THIS EQUIPMENT. PHOTOGRAPHS DEPICTING THIS EQUIPMENT ARE BEING SUPPLIED FOR THE PERMANENT RECORD. (SEE ATTACHMENT "A" FOR DESCRIPTIONS.)

IN SUMMARY, PRECAUTIONS WILL BE TAKEN TO PREVENT OIL SPILLS AND, IN THE UNLIKELY EVENT A SPILL DOES OCCUR, CONTINGENCY PLANS AND A COOPERATIVE WILL BE IN EFFECT TO RESPOND PROMPTLY AND THOROUGHLY. INITIALLY THE PLANS AND EQUIPMENT WILL BE THOSE NECESSARY DURING EXPLORATORY DRILLING OPERATIONS. EXPANSION OF THE CO-OP WILL OCCUR, IF AND WHEN COMMERCIAL PRODUCTION IS ESTABLISHED, TO INCLUDE PRODUCTION PLATFORMS, OFFSHORE AND/OR ONSHORE CRUDE OIL SHIPPING TERMINALS, PIPELINES, SHORE-SIDE SUPPLY BASES, AND ALL SUCH ACTIVITIES DEVELOPED TO PRODUCE CRUDE OIL AND GAS IN THE GULF OF ALASKA.

ATTACHMENT "A"

SLIDE NUMBER

DESCRIPTION

1. Open Ocean Skimmer. Conceptual outboard profile of Marco Class VI Catamaran ship to be model tested for the GOAOC.

Length O. A.:	108' -0"
Beam O. A.:	40' -0"
Displacement:	300 Long Tons
Sweep Width	
Free:	28'
With Water Spray Boom:	60'
Oil Slops Capacity:	1000 Barrels
Horsepower:	1500 to 2200
Range:	3250 Miles @ 13 Knots
	2300 Miles @ 14 Knots
Crew Accommodations:	7 (5 required)

2. Open Ocean Skimmer. Conceptual outboard board profile of Marco Class IV reversible ship. Combination monohull-Catamaran Marco design to be model tested for the GOAOC.

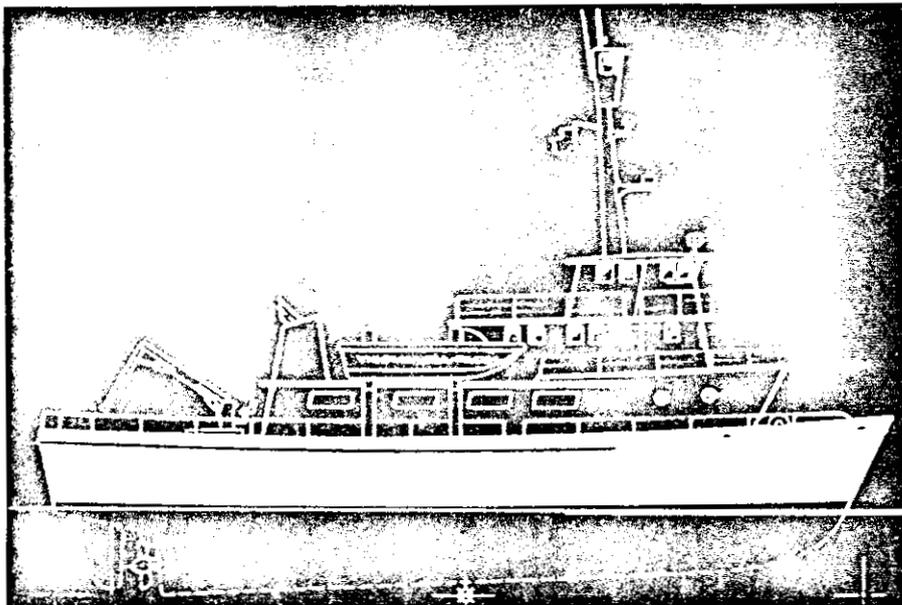
Length:	106' -0"
Beam O. A.:	30' -0"
Displacement:	275 Long Tons
Sweep Width	
Free:	20'
With Water Spray Boom:	50'
Oil Slops Capacity:	1000 Barrels
Horsepower:	850
Range:	4000 Miles @ 12 Knots
Crew Accommodations:	7 (5 required)

3. Catamaran Harbor and Bay Skimmer. Profile of Marco Class III skimmer in use in San Francisco Bay Area by Clean Bay, Inc. Experience gained with this skimmer will be used in the design of the skimmers in Slides 1 and 2.

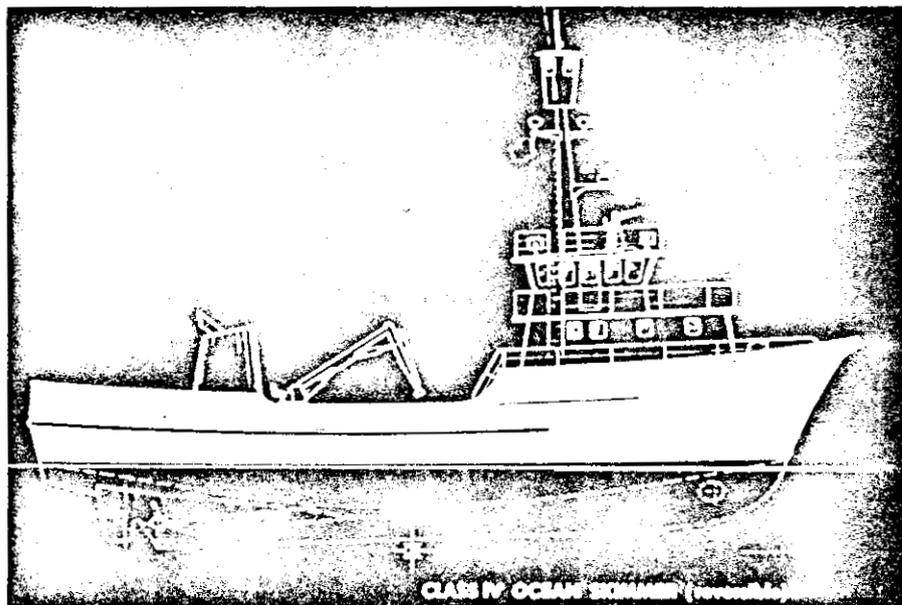
4. Catamaran Harbor and Bay Skimmer. Bow view of Marco Class III skimmer in use by Clean Bay, Inc. in the San Francisco Bay Area by Clean Bay, Inc. showing water spray booms. The water spray booms increase the sweep width from 16' (free) to 45'.

5. Vikoma Sea Pack Containment Boom. Fast response containment boom. The containment boom and inflation equipment are contained in a 23 foot boat hull. Boom lengths up to 1600 feet. Transportable by air or highway and can be towed on the water at speeds up to 4 knots. Boom is deployed from boat hull at the spill site.

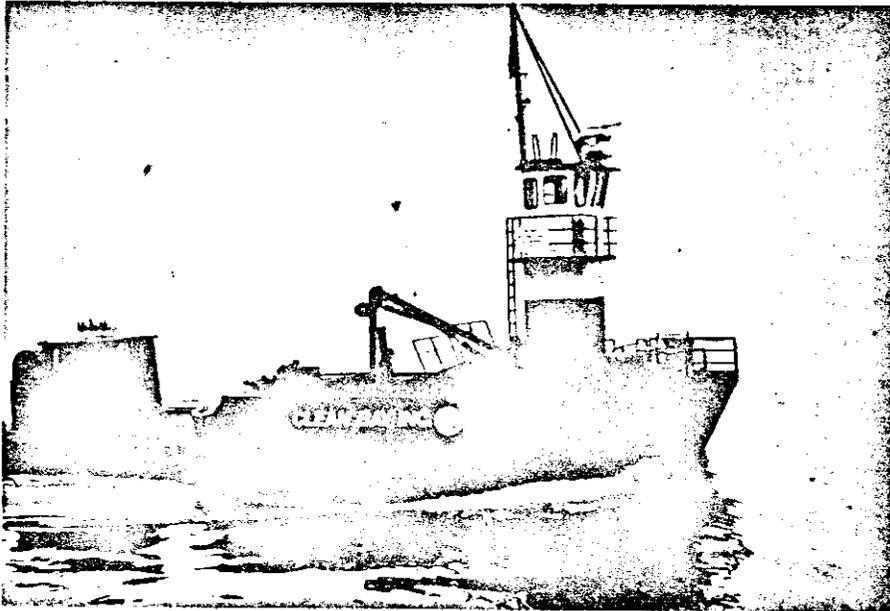
<u>SLIDE NUMBER</u>	<u>DESCRIPTION</u>
6.	<u>Vikoma Sea Pack Containment Boom.</u> Boom deployed.
7.	<u>Vikoma Sea Pack Containment Boom.</u> Boom deployed.
8.	<u>Containment Boom in Storage Trailer.</u> Fabric reinforced plastic skirt boom with plastic foam floats. Trailer stows 1000 feet of boom, floating type oil skimmers and pump. Air and highway transportable.
9.	<u>Containment Boom Deployed.</u> Boom in Slide 8. deployed.
10.	<u>Floating Skimmers.</u> Skimmers of the type stowed in trailer in Slide 8. Skimmers are effective in shallow water to 3" depth for use along shore lines. Floats keep hose on the water.
11.	<u>Containment Boom in Storage Boxes.</u> Fabric reinforced plastic boom with plastic foam floats. Open ocean boom. Each box contains 100 feet of boom.
12.	<u>Containment Boom Deployed.</u> Boom in previous slide deployed.
13.	<u>Sorbent Boom.</u> Preferentially absorbs oil and repels water. Absorbs crude oils, fuel oils, and lubricating oils.
14.	<u>Sorbent Boom Deployed.</u>
15.	<u>Sorbent Sheets.</u> Preferentially absorb oil and repel water. Absorb crude oil, fuel oils, and lubricating oils.



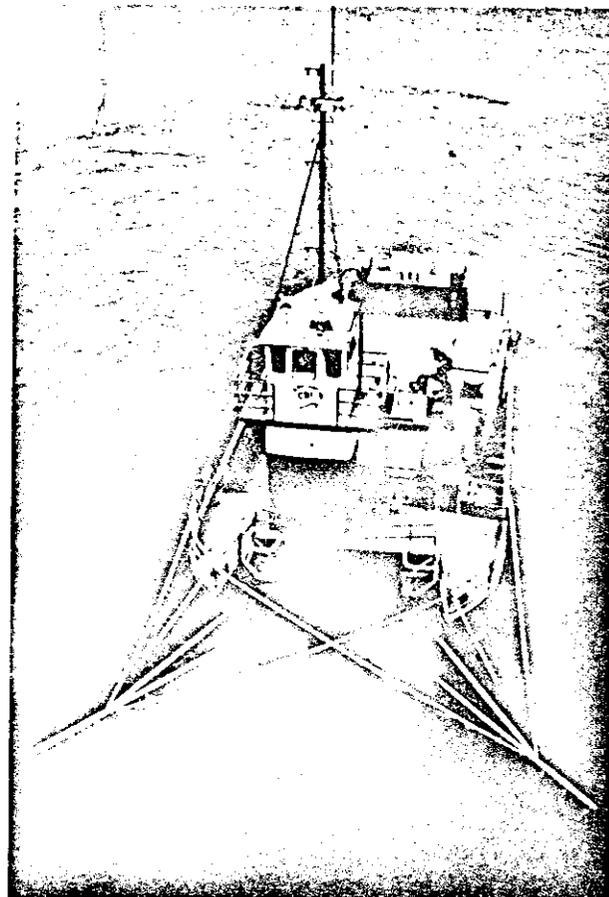
SLIDE - PHOTO 1.
OPEN OCEAN SKIMMER



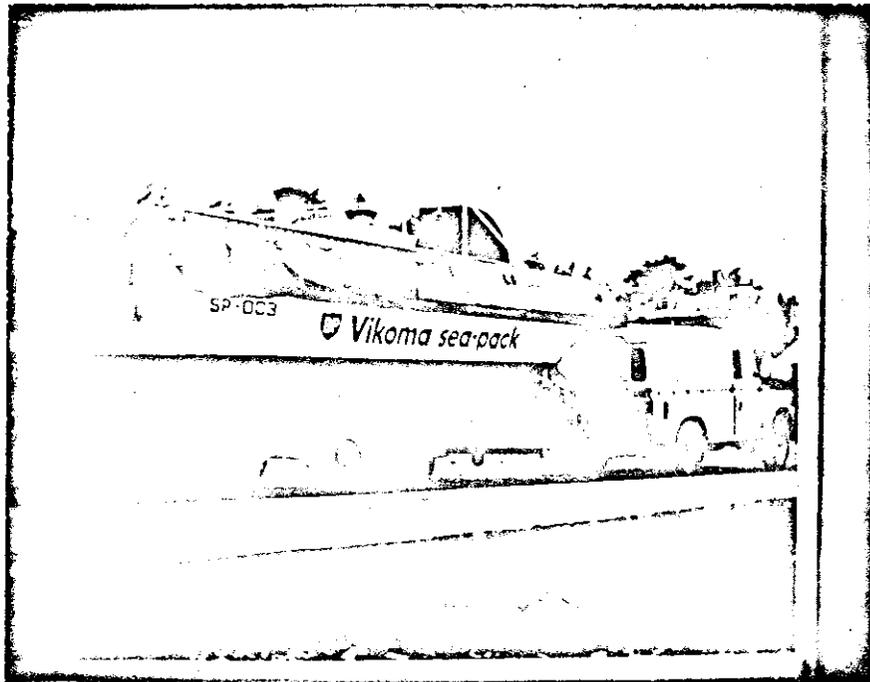
SLIDE - PHOTO 2.
OPEN OCEAN SKIMMER



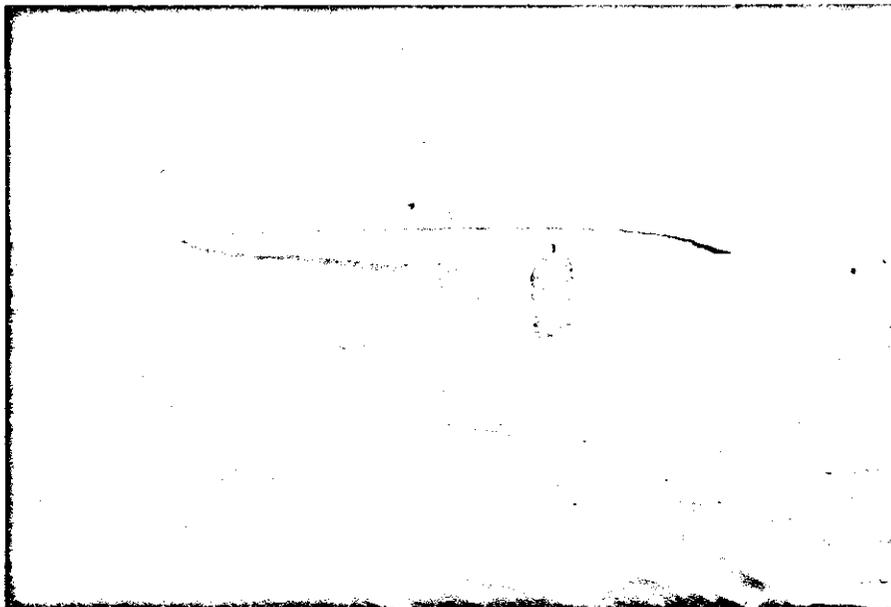
SLIDE - PHOTO 3.
CATAMARAN HARBOR AND BAY SKIMMER



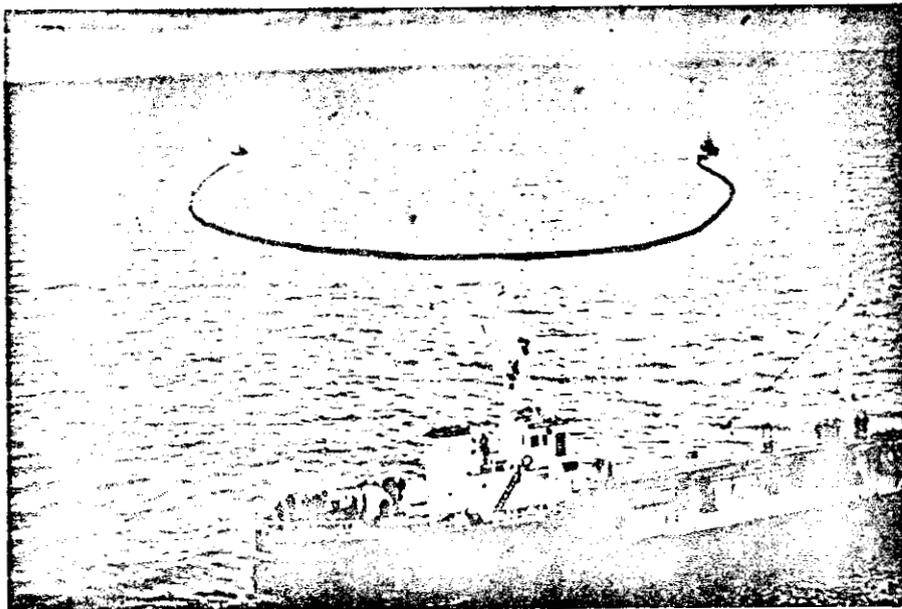
SLIDE - PHOTO 4.
CATAMARAN HARBOR
AND BAY SKIMMER



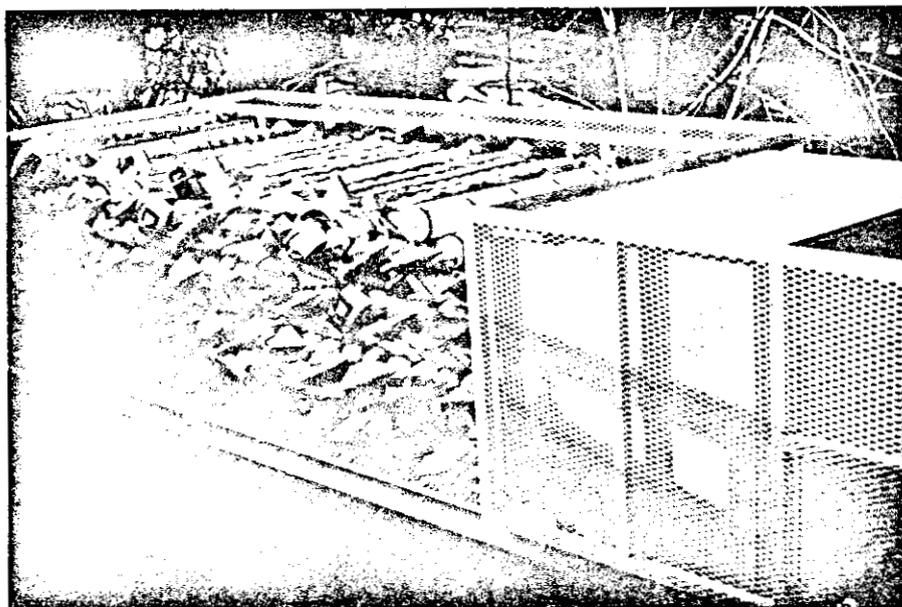
SLIDE - PHOTO 5.
VIKOMA SEA PACK CONTAINMENT BOOM



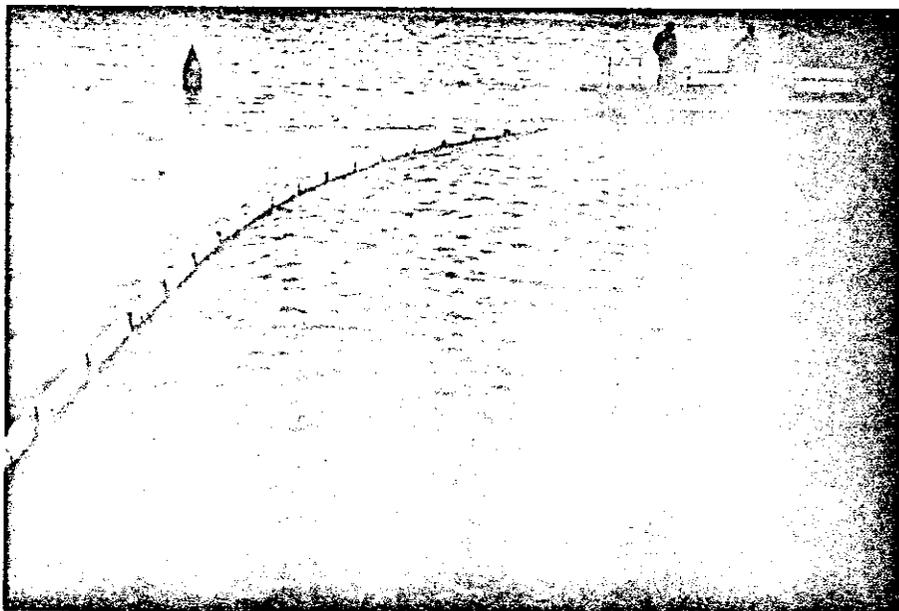
SLIDE - PHOTO 6.
VIKOMA SEA PACK CONTAINMENT BOOM



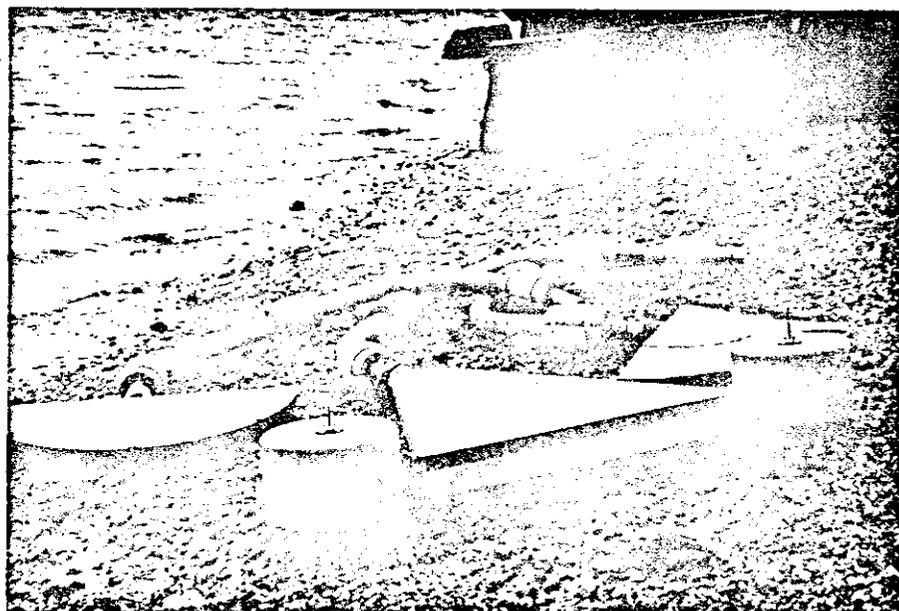
SLIDE - PHOTO 7.
VIKOMA SEA PACK CONTAINMENT BOOM



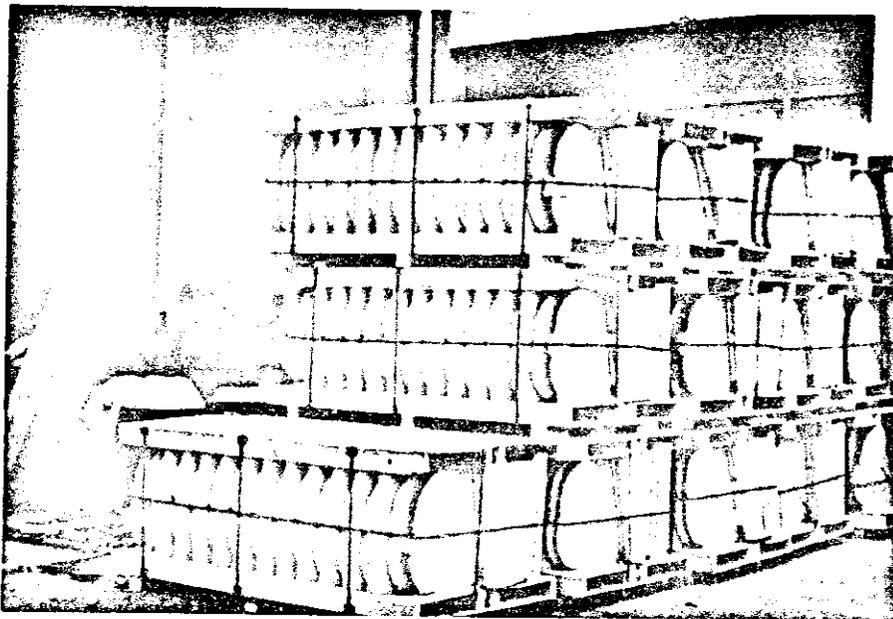
SLIDE - PHOTO 8.
CONTAINMENT BOOM IN STORAGE TRAILER



SLIDE - PHOTO 9.
CONTAINMENT BOOM DEPLOYED



SLIDE - PHOTO 10.
FLOATING SKIMMERS



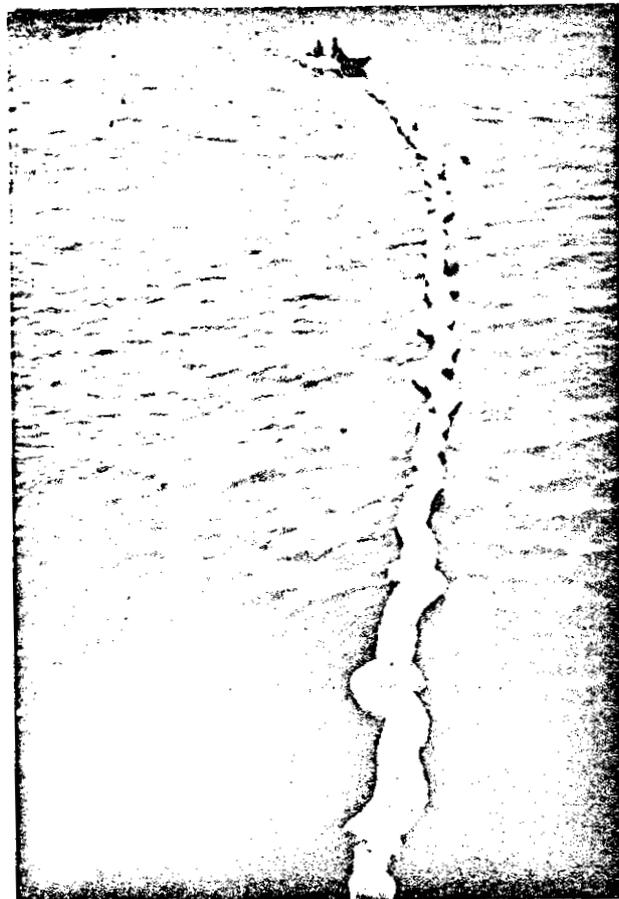
SLIDE - PHOTO 11.
CONTAINMENT BOOM IN STORAGE BOXES



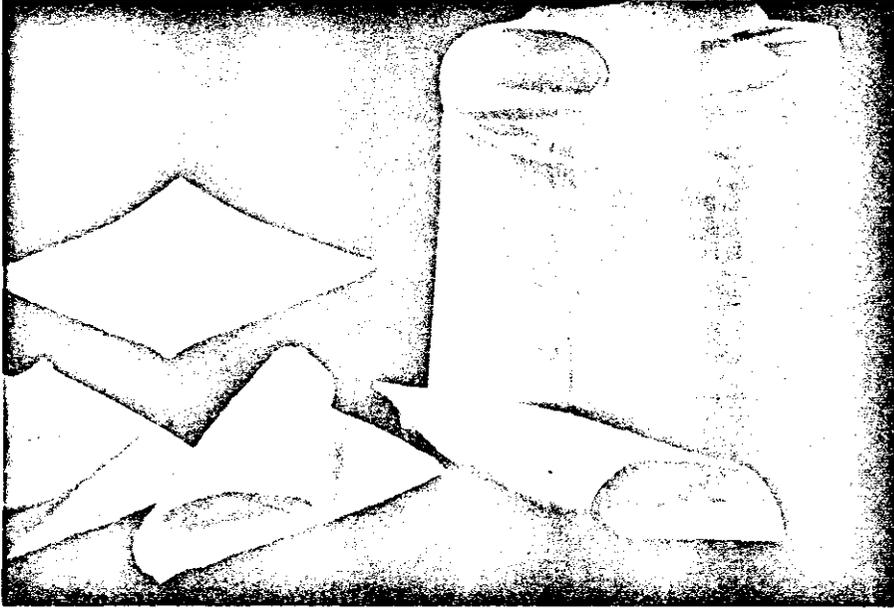
SLIDE - PHOTO 12.
CONTAINMENT BOOM DEPLOYED



SLIDE - PHOTO 13.
SORBENT BOOM



SLIDE - PHOTO 14.
SORBENT BOOM DEPLOYED



SLIDE - PHOTO 15.
SORBENT SHEETS

ATTACHMENT "B"

Inventory of Equipment

Clean Gulf Associates

A. Fast Response Open Sea and Bay Skimmer System

This is a portable system designed for boat mounting. It consists in part of a floating oil boom, skimmer, outrigger, pump and storage tanks. The system is designed to provide equipment capable of fast response to emergency spill situations.

- I. A. For use as immediate response system for offshore spills in accordance with 12-hour response provisions contained in lease agreements for certain offshore tracts recently acquired by member companies.
- B. Locations
 - 1. One complete system located at Venice.
 - 2. One complete system located at Intracoastal City.
- C. For use on boats of 65 feet or larger in the utility or work boat class. (See page 2 for details.)
- D. Maximum recovery capability with both tanks is 360 barrels fluid.
- E. For general use in seas up to 3-4 feet and water depths greater than 6-8 feet; specific use will depend on individual spill situations.

II. Equipment consists of six packages

- A. Primary skid (23' x 7 1/2') containing:
 - One 180 barrel tank (Coast Guard approved)
 - One Lister SR 2 Diesel Engine
 - One Gorman-Rupp 4 x 4, 500 GPM pump
 - One outrigger for oil boom
 - One stern davit for launch and recovery of skimmer
- B. Auxiliary skid (23' x 5 1/2') containing:
 - One 180 barrel tank (Coast Guard approved)
- C. One Don Wilson skimmer (triangular 9' x 9' x 10')
- D. One lot of Bennett oil boom sections - consisting of three 5 foot sections, nine 10 foot sections and one 15 foot section.
- E. One lot of 4" hose lines - One 40' length; one 20' length; two 10' lengths.
- F. One tool box complete with miscellaneous tools, shackles and other items essential for launch, recovery and maintenance.

B. HIGH VOLUME OPEN SEA SKIMMER SYSTEM

Central to this system is a barge specially modified to carry, deploy, and retrieve all components of a boom and skimmer system (except tugs) as shown in DWG No. CGA Hoss-1. The barge is constructed with a skimmer ramp and boom stingers on the aft-end. Launching and retrieval of these components are facilitated by a ballast system on the aft-end of the barge. Launching and retrieving of the skimmer and boom occur with the barge in the ballasted mode. The barge is de-ballasted for skimming.

The barge is towed to the worksite. The lead end of the barge is reversed, and two other tugs attach to the lead ends of boom to assist in deployment. With the booms and skimmer deployed, and booms spread, as in DWG No. CGA Hoss-1, the system is towed through the oil to be picked up into the mouth of the skimmer. Oil entering the skimmer is picked up and pumped to the separation and storage tanks located on the barge.

1. Use and Design Criteria

- a. Equipment - Intergrated system consisting of Bennett Offshore Booms, Union Oil Type Skimmer and 52' x 160' x 12' barge. See DWG Nos. CGA Hoss-1 & 2.
- b. Personnel - 14 to 16 including a superintendent, leadman and mechanic when deploying or retrieving boom and skimmer.
- c. Auxillary Equipment - 1 - 1200 hp tug to transport barge and (supplied by Operator) control on location.
2 - 600 hp tugs to drag boom while skimming.
- d. Design Criteria
 - (1) 36" draft approximately 12' water depth required while ballasted
 - (2) Approximately 4 knots maximum towing speed with all components on barge
 - (3) 5 foot maximum sea for skimming operations
 - (4) Approximately 1 knot current relative to barge movement for skimming operations
 - (5) U. S. Coast Guard Certified Vessel Class - unmanned barge
 - (6) Fuel supply - 3 days on barge. 4 - 250 gallon diesel fuels are located on the barge above the boomracks (Refer to DWG No. CGA Hoss-2)

(7) Personnel quarters - none

e. Location - Halliburton dock at Grand Isle, Louisiana

2. Equipment List (see DWG No. CGA Hoss 2 & 3)

- a. Air compressor - 1 Ingersoll Rand-600 ft. ³/min @115 psi.
Prime mover-GM, V-6, 210 HP @1700 rpm, diesel engine; battery started.
- b. Separation and storage tanks - 4 - 500 bbls., primary tanks with 380 bbls. behind Weir on each tank (shown in black on DWG No. CGA Hoss- 2).
- c. Generator - 2 - 25 KW w/Lister air cooled, HR-3 diesels rated at 37.5 HP at 1800 rpm.
- d. Lighting system (see DWG No. CGA Hoss-3)

Barge service lights - 1000 watt, mercury vapor lights are pole-mounted on each side of the barge. 400 watt, mercury vapor lights are located on each side of the barge under the superstructure near the skimmer. Smaller cage protected lights are abundantly distributed along all walkways, boom racks, work areas and sheds.

Navigational Lights

Running lights are located on each side of the barge bow.

Working lights are pole mounted above the storage tanks on the barge bow. The three lights (uppermost-red, middle-clear, bottom-red) are the international markings for a dredge. Use the bottom red light only if offloading oil at night. A red flag hoisted to the bottom light indicates offloading oil during daylight hours.

Anchor and stern lights (both clear lens) are located on the stern above the superstructure, over the skimmer.

e. Winch system (see DWG Nos. CGA Hoss-2 & 3)

Air powered - position 1 winches are used to assist in raising and lowering the stinger and stabilizing the skimmer during launch and retrieval. Position 3 winches are used in retrieving the boom. Position 4 winches are used to help deploy, connect and disconnect the boom and skimmer during launch and retrieval. Position 5 winches (DWG No. 3) are used to raise and lower the stinger.

Position 6 winch is used to control the skimmer suction and return hoses during launch and retrieval.

Position 7 winch is used to launch and retrieve the skimmer.

Position 8 winches are used to control boom launch and retrieval.

Hand winches -

Position 2 winches (DWG No. 2) located on the front end of the skimmer are used for connecting and disconnecting the boom to the skimmer during launch and retrieval. Although not shown in the drawings, hand winches are located near the piping headers, at each side of the aft end of the skimmer ramp, at the forward end of the skimmer and in the middle of each stinger to assist in boom launch and retrieval.

f. Pumps (see DWG No. CGA Hoss-2)

2 - 2000 gpm centrifugal (pumps P-A and P-B; 40-60' head) 8" x 8" powered by GM 271 diesel engines rated 65 HP at 2000 rpm; hydraulic started. Hand pump hydraulic system to 2500-3000 psi before starting the engines.

g. Piping system (see DWG Nos. CGA Hoss-4, 5, & 6)

Ballast (DWG No. 4) - Take suction through sea chest valve to 38.4' x 52' x 12' hull tank compartment inlets designated as A, B, C, and D.

Manifold (DWG No. 5) - Pump lines from the skimmer to the storage and separation tanks are 8". The overflow line carrying separated water from the tanks back to the skimmer is 10".

Transfer (DWG No. 6) - Transfer lines from primary to secondary separation tanks are 6".

h. Booms - 2 - 500' sections Bennett Offshore Boom (see DWG No. CGA Hoss-6-A)

i. Skimmer - Union Oil Type (see DWG No. CGA Hoss-7)

j. Communications system - 5 fm radio handsets and 2 megaphones

3. Operational Procedure

a. Deployment (total time approximately 6 hours)

(1) Position barge; use lead tugs to assist.

(2) Ballasting Barge - Approximately 1½ hours @ max. pump speed. Check ballast manifold; make sure proper valves are opened or closed. Don't leave seacock open. Ballast until the sea just meets the forward end of the barge.

NOTE: All engine oil is series 3-30 wt.
Air compressor oil is DEXRON hydraulic transmission oil.
All air motors on winches use SAE 20 oil with a viscosity of 250/350 SUS at 1000°F., a carbon residual of 0.3% and a neutralization No. 0.1.

C. Shallow Water Skimmer System, Grand Isle Unit

GENERAL DESCRIPTION

This unit is a self-contained shallow-water skimmer. The vessel is 24' long by 11'-4" wide by 9'-10" high and is propelled by two 125 hp Johnson outboard engines. It weighs 9000 lbs. and can be transported on a Lowboy truck. The unit is basically a floating API separator and the basic skimming mechanism is that employed in the High Volume Open Sea Skimmer System. Four 10 bbl. storage tanks are built into the hull. The vessel draws 8" of water with the hull tanks empty and 20" with all four filled. Two pumps are manifolded so that one can be used for skimming, the other for offloading, jetting oil from beneath docks, etc. Metal outrigger booms allow the vessel to sweep an area up to 20' wide. Connection points are provided for attaching commercial booms if a wider sweep is desired. The metal booms fold in to form a bow for travel. Maximum travel speed is five miles per hour. The maximum skimming speed is from one to two miles per hour.

In order to increase the oil handling capacity of the system and provide a means of transferring the oil from the skimmer to shore without shutting down the skimming operation, two 50 bbl. floating separation and storage units are available for use with the skimmer. The floating units can be moved to and from the location by conventional shallow water boats or a lugger. These units are 18' long by 11' wide by 3' high. The units weigh 8000 lbs. each and both can be transported on a flat bed truck.

DESIGN CAPABILITIES

1. Self-propelled by two 125 hp outboard engines.
2. For mobile skimming in calm shallow water bays and inland protected waters. Can maneuver to chase spills in shallow waters.
3. When deployed with conventional shallow water booms this unit can remain stationary to pick up spills moving under the influence of tides or winds.
4. Can be used in water depths as shallow as 12" for short periods. Vessel draws 8" of water empty and 20" when all four 10 bbl. storage tanks are full.
5. Effective skimming is limited to use in wave heights of one foot or less. It is not suited for use in open Gulf waters or very choppy inland waters.

TRUCK TRANSPORTABLE

1. Dimensions, 24' long by 11'-4" wide, 9'-10" high, weight is 9000 lbs.

D. Auxiliary Shallow Water Skimmers and Boom

Several individual pieces of equipment are provided for skimming oil which is contained by inshore boom, isolated in dead end canals, at dockside or other areas accessible from boat, barge or on foot. Two Parker Oil Hawgs will be kept at Grand Isle. Two Swiss Olea III type skimmers will be maintained at Venice. Intracoastal City will have one skimmer of each type. Drawings CGA Aux. 1 and 2 show the application of these units.

Parker Oil Hawg Skimmer
200 GPM Diesel Driven, Skid Mounted, Centrifugal Pump

Design Capabilities

1. Works well with any grade of oil ranging from Distillates through Cold Bunker C.
2. Is fully controllable from ashore, or from a boat or barge.
3. Eliminates the hazards of a power source on the skimmer.
4. Is easily cleared of trash.
5. Has inherent stability.
6. Will skim oil at the full capacity of the pump where the oil depth will allow.
7. Can be operated by unskilled personnel.
8. Limited to calm, shallow water, inland canals, docks, rivers, etc.

Not to be used until the oil layer is reduced to one-half inch or less.

Location

1. Grand Isle, La. - Two oil Hawg skimmers
2. Intracoastal City - One oil Hawg skimmer
3. Can be hauled by truck or boat.

Personnel Required

1. Two-man crew is required.
2. No training necessary.

Note: Only one pump is available at each Base. The units are designed to be run by an air compressor or hydraulic pump. No air compressor is supplied. Each unit can be driven by rental air compressors supplying from 20 to 80 SCFM at 100 psi.

D. Auxiliary Shallow Water Skimmers and Boom (continued)

Swiss Olea III Skimmers
200 GPM Diesel Driven, Skid Mounted, Centrifugal Pump

Design Capabilities

1. Works with any grade of oil.
2. Is fully controllable from ashore, or from a boat or barge.
3. Stable floating.
4. Can be operated by unskilled personnel.
5. Limited to calm, shallow water, inland canals, docks, rivers, etc.

Location

1. Venice, La. - Two Swiss skimmers.
2. Intracoastal City - One Swiss skimmer.
3. Can be hauled by truck or boat.

Personnel Required

1. Two-man crew is required.
2. No training necessary.

Note: Only one pump available at each location.

D. Auxiliary Shallow Water Skimmers and Boom (continued)

Inshore Boom

Available both at Grand Isle and at Venice are 1,000 feet of 36 inch Bennett Inshore boom. This is on pallets mounted for helicopter transport. An anchor system is included.

1. This boom can be deployed in relatively calm waters to control oil movement into undesirable areas.
2. It can be used in conjunction with the auxiliary skimmers listed prior.
3. Can be transported on pallets of approximately 500 feet each by helicopters of Bell 204 size or larger. Weight of each skid is approximately 2,500 pounds. It may also be transported by truck or barge.

PHI helicopter personnel are familiar with the loads and can advise on its movement by helicopter.

4. It will usually be deployed by a crew boat, by pulling off a pallet positioned on the beach, or from a barge by anchoring boom and pulling barge out from under it.
5. This boom is similar though not as large as that employed in the HVOSS system. (Figure CGA Aux. 3)
6. Personnel requirement to deploy is four roustabouts and a pusher.

E. Helicopter Spray System - HUSS Unit

GENERAL DESCRIPTION

The HUSS (Helicopter Underslung Spray System) unit is a helicopter supported spray unit such as those used for crop spraying. The unit is used to spray surface collecting agents or dispersants. The unit is a self-contained tank and pump unit with the spray nozzles mounted below the tank. The tank has an 84 gallon capacity. The spray is controlled from a control box that is mounted on the cyclic stick of the helicopter. The detailed brochure titled SHELL OIL HERDER which is included herein shows the HUSS equipment mounted under a helicopter in the application section. This brochure also contains information for using this surface active agent in containing oil spills, while recovery procedures are in effect. Handling and application recommendations are also included. It is emphasized here that the using member company is required to obtain authority from the Federal On-Scene Coordinator and the appropriate regulatory agencies, federal, state and local, before any chemicals can be used.

DESIGN CAPABILITIES

1. Used to spray collecting agent, Oil Herder*, or dispersant.
2. Tank has 84 gallon capacity.
3. Application of chemicals
 - a. Apply Oil Herder in a fine stream at a rate of 2 gallons per mile of slick perimeter.
 - b. Apply dispersant in a spray, 84 gallons of dispersant will cover 1,000,000 sq. ft.
4. Recommended flying speeds
 - a. Flying to and from slick - 50 MPH
 - b. Spraying speed - 30-40 MPH
5. One hour is required to get unit ready.
 - a. Mount control box in 47G or 206 helicopter.
 - b. Fill unit with collecting agent or dispersant, get pump ready, mount the unit, etc.

LOCATION

1. Grand Isle, La. - one complete unit
2. Venice, La. - one complete unit

HELICOPTER UNDERSLUNG SPRAY SYSTEM (HUSS)
LIST OF SPARE PARTS INCLUDED WITH UNIT

<u>No.</u>	<u>Description</u>	<u>Manufacturer's Name & Part No.</u>
1	Motorized Gate Valve With Teflon Seals	Whittaker 18-30V 103437
2	Spark Plugs	Champion GJ-6
1 Set	Points	Wico X 14270C
1	Condenser	Wico X 16329
1	Pump Seal	Homelite 62694
1	2 Pc. Trailer Connection	Echlin TC6206-7 or Substitute
80	Tee Jet Tips No. 8002	Spraying Systems Tee-Jet
80	Tee Jet Tips No. 8006	Spraying Systems Tee-Jet
10	Diaphragms For Nozzles	Spraying Systems Fairprene
6	Nozzles, c/w Caps & 50 Mesh Screens	Spraying Systems #8360
16	Aluminum Blanks For Nozzles	Spraying Systems
2	1/4" Drain Cocks	Paulin Co. or Substitute
1	Pressure Switch	Stewart-Warner (Hobbs) M-4009-15
1	1/4" Pipe Plug	-
10 Ft.	2 - 5 Ft. Lengths - Nylon Starter Cord	-

EQUIPMENT

Water Fowl Rehabilitation

1. Scare Away Propane Guns

A. The following equipment is available to deter waterfowl:

48 automatic propane bird scare-away guns complete with regulators and tank (in carrying case) (12 guns per case)

B. The automatic propane guns are designed to scare waterfowl away from an oil spill. Their range is about 1/3 mile. This spacing or closer should be used for initial operations. Experience may dictate a closer spacing if birds are observed in the area.

C. The automatic propane guns are located as follows:

24 propane guns are located at Grand Isle

24 propane guns are located at Venice

The scare-away guns can be mobilized by filling the propane tanks, installing a flint and transporting to the spill location. Each propane tank holds 5 gallons of propane. Carrying cases have been built for 12 propane tanks and 12 guns. The barrels have been removed for ease of transportation.

D. In operation the guns are spaced about 1/3 mile apart in the contaminated area. They operate completely automatic. The tank of propane will last for 2 to 4 weeks depending on the frequency of the shots. Initially a 3 to 5 minute shot frequency should be used.

E. The scare-away guns are lightweight, portable and may be deployed by trucks, boats or helicopter. Twelve complete guns have been packaged to be deployed at one time by helicopter. This is the quickest and easiest way to deploy the propane guns. The only routine servicing required is replacing the flint, corrosion protection and filling the propane tank.

The flint in the ignitor requires replacement about once each week. At this frequency the unit should be protected from corrosion by spraying with a silicone lubricant like WD-40. This weekly maintenance can be performed by two men plus transportation.

F. Operation of the propane guns will not require training of personnel. Each member company should appoint one supervisor to observe operation of the scare-away gun. This would include filling the propane tank, replacing the flint, adjusting the firing frequency and placing the gun in operation.

2. Fast Response Waterfowl Rehabilitation Station

A. The following equipment and materials are available to rehabilitate waterfowl should they become oil soaked.

1. Portable Fast Response Waterfowl Rehabilitation Station.
(An inventory of rescue and rehabilitation materials is tabulated by Table WF-1)

B. The portable waterfowl rehabilitation station is designed for fast response to rehabilitate contaminated waterfowl. The portable station provides the facilities to transport birds to the most convenient bird-care center shown on the map Figure WF-2. The station can be moved by trailer or boat and includes the necessary materials to clean and rehabilitate birds. State and Federal approval must be obtained to collect and rehabilitate waterfowl. The following should be contacted.

Federal Bureau of Sport Fisheries and Wildlife

Fred Williams or Jack Frost - (404) 526-5100 - Atlanta, Ga.
and David Hall (504) 527-2611, Ext. 6139 or 527-6139 - New Orleans, La.

Louisiana Wildlife and Fisheries Commission

Dr. J. Burton Angelle (504) 527-5126 - New Orleans, La.

C. The fast response rehabilitation station is located at Grand Isle.

D. Detailed instructions on collecting, transporting, cleaning, and rehabilitation of water fowl are included in API booklet "Operations Rescue" (WF-3). A comprehensive list of equipment, supplies, and personnel requirements for a large scale rehabilitation center is included in the paper "Implementation of Operations Rescue" by Bill Ayers and Phil Stanton (WF-4).

E. The fast response rehabilitation station will require the following operating personnel depending on the number of birds involved:

- 1 to 2 Trained Supervisors
- 2 to 8 Bird Cleaners and Attendants

If a large number of waterfowl are contaminated it will be necessary to immediately implement "Operations Rescue" (WF-5)

INVENTORY

RESCUE AND REHABILITATION MATERIALS

1 First Aid Kit
12 Clear Goggles
Box Rubber Bands
Box Cotton Swabs
2 Tubes A & D Dintment
2 Folding Tables
50# Rags
1 Card File Holder w/cards
1 Wheelbarrow
1# Boric Acid Powder
1 Roll Visqueen Plastic Sheeting
12 Aprons
1 Tool Chest
1 Socket Set (WSB-14)
1 Wrench Set (7)
2 Steel Tapes
12 Chick Feeders
6 Hose Nozzles (Garden)
4 Scrub Brushes
6 25' ϕ 5/8" Garden Hose
1 Post Hole Digger
1 Bird Banding Set of Assorted Pliers and Bands (Numbered)
2 Drums Polycomplex A-11
1 S & R Shovel
2 8# Sledge Hammers
1 Roll Bailing Wire
24 Pair Rubber Gloves
2 5 Gallon Water Coolers
2 BR22 Flash Lights w/Batteries
12 Cans Misquito Spray
24 Bars Soap
12 Bottles Hand Lotion
5 Packages Freezer Bags
2 20 Gallon Garbage Cans
2 Garden Rakes
6 #3 Galvanized Tubs
1 Jumbo Galvanized Water Trough
12 Handled Fish Nets
6 8 Quart Buckets
1 lb #8 Galvanized Nails
1 lb #12 Galvanized Nails
1 lb #16 Galvanized Nails
1 Roll, 600', 1/4" Polypropylene Rope
1 Hand Saw

Table WF-1

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Inventory
Rescue and Rehabilitation Materials
Page 2

1 16 oz. Hammer
1 24" Wrecking Bar
2 Pair 410 Snips
2 Pair 210 Pliers
2 Aluminum Scoops
1 Pitch Fork
1 IBI Shovel
2 Roll 2" x 5' Fence Wire (Poultry), 300'
50 Fence Posts
2 Wall Thermometers
6 30" Mirror Nets
12 Timbers, 4" x 6" x 8'
1 Case Single Fold Paper Towels
4 Rolls, 2" Duct Tape
2 Ø 48 Quart Ice Chests
12 Bottles Murine eye wash
12 Ø 1 Quart Mason Jars
3 Deck Brushes w/Handles
3 25' Water Resistant Extension Cards

Table WF-1

3-25-74

G. Miscellaneous Material Inventory

The following list of material will be maintained at location indicated.

<u>Quantity</u>	<u>Nomenclature</u>	<u>Location</u>
200 pads	Polyurethane Foam	Venice Grand Isle
2 drums	Oil Herder	Venice (z) Grand Isle

(z) For use with Helicopter Underslung Spray System

H. Portable Foam Generation Equipment

These five skid, helicopter transportable packages for generating polyurethane foam will be maintained at Grand Isle, Venice and Intracoastal City. The equipment is available as of August 13, 1973.

Basic equipment is on skids as follows:

1. Mixing equipment.
2. Chemical barrels - foam constituents.
3. Compressor - to provide air for process.
4. Wringer - to squeeze used foam for reuse.
5. Incinerator - to burn foam after use (Grand Isle only).

An expanded section on operating instructions will be supplied at a later date.

ATTACHMENT "C"

Inventory of Equipment

Clean Seas, Inc.

2700 - RESOURCES

This section lists a great majority of the items of containment and cleanup equipment, materials, and services plus support equipment and services, that might be needed in coping with a major oil spill. Most of the member companies have also stockpiled various types of oil spill cleanup equipment that would be made available.

The following sub-sections contain:

2701 - Inventory of Clean Seas Owned Equipment

2702 - Absorbents - Collecting Agents

2703 - Aircraft - Helicopters - Fixed Wings

2704 - Booms

2705 - Chemicals - Dispersants

2706 - Contractors - Manpower - Beach Cleanup

2707 - Disposal Sites - Oil & Oil Soaked Trash

2708 - Divers - Underwater Welding

2709 - Heavy Equipment - Trucks, Cranes, Bulldozers, Graders

2710 - Marine Equipment - Boats, Barges, Tugs

2711 - Skimmers

2712 - Trailer Rentals

2713 - Special Services and Supplies

2701 CLEAN SEAS - INVENTORY OF OWNED EQUIPMENT

MATERIAL AND/OR EQUIPMENT	STORAGE AREA	QUANTITIES	REMARKS	CONTACTS
<u>701.01 Mark II Skimmer System</u>				
1. Mark II Skimmer	CSI Yard - Carpinteria	2	All grades of oil can be recovered at rates up to 200 gallons per minute in light to moderate sea state	(805)963-3488 (805)684-4719
2. 80 Barrel Vacuum Tank	" " "	1		
3. Suction Hoses - 3"	" " "	150'		
<u>701.02 CSI Skimmer System</u>				
1. Skimmer 45'x 17'x 6'	Anchored - S.B. Harbor	1	The system is capable of recovering all grades of oil from light to bunker fuel at rates up to 2000 gallons per minute. It will operate successfully in moderate sea states, 20-K winds and towing speeds up to 1 1/2 K.	See above
2. 30" Kepner Sea Curtain Boom	On Skimmer	480'		
3. 100 Bbl. Tanks	CSI Yard - Carpinteria	2		
4. Oil and Water Pumps	" " "	3		
<u>701.03 Sea Dragon System</u>				
1. Sea Dragon Skimmer 45'x 26'x 8'	Anchored - S.B. Harbor	1	Heavy duty, moderate volume skimmer(45' long and with a 26' beam). The system will recover all grades of oil and large amounts of solid materials. It is operable in a moderate sea state and winds up to 25 K.	See above
<u>701.04 Bottom Tension Boom</u>				
1. 4'x 13' floats, 8'curtain	CSI Yard - Carpinteria	1000'	Use as containment boom in heavy seas. Curtain in 250' lengths on spools. B-T line in 500' lengths on spools. Booms can be used in 500' lengths or multiples of 500'.	See above
<u>701.05 Floating Weir Skimmers</u>				
	CSI Yard - Carpinteria	3	6' diameter floating weirs with air driven Acme-type pumps. Use in conjunction with B-T Boom or may be used independently. Will not handle debris. Handles most oils.	See above

2701 CLEAN SEAS - INVENTORY OF OWNED EQUIPMENT

MATERIAL AND/OR EQUIPMENT	STORAGE AREA	QUANTITIES	REMARKS	CONTACTS
<u>2701.06 Medusa Skimmer</u>	CSI Yard - Carpinteria	1	10' diameter, gasoline engine drive. Handles light oil in calm waters only. No debris	(805)963-3488 (805)684-4719
<u>2701.07 Vikoma Seapack Assembly</u>	CSI Yard - Carpinteria	1	Immediate response containment boom. The 23' hull containing 1600' of inflatable seaboom can be towed to the oil slick at high speed. The boom can be fully operational within 12 minutes of arrival onsite.	See above
<u>2701.08 Kepner Sea Curtain</u>	CSI Yard - Carpinteria	480'		See above
1. 480' (240' per unit)	" "	2000'		
2. 2000' 8"x12" (400' per unit)	" "	2000'		
3. 2000' 16"x12" (200' per unit)	" "	2000'		
<u>2701.09 Barge - Tide Mar VII</u>	Anchored offshore Santa Barbara	1	160'x39'x13' Tank Barge, 7800 bbl. capacity in 10 tanks. Has 6 diesel driven pumps and 2 diesel driven 50 KW generators.	See above
<u>2701.10 Absorbent-Collecting Agent</u>	CSI Yard - Carpinteria	142-351b.bags	Good sorbent for all grades of oil.	See above
1. Strickite NOT Licensed	CSI Yard - Carpinteria	8-5 gal.cans	Good sorbent for all grades of oil.	See above
2. Shell Oil Herder Licensed				
<u>2701.11 Boat (work)</u>	Santa Barbara Harbor Marina #1, Slip #19	1	19' Larson Fiber Glass with 125HP Johnson motor. Not safe in adverse weather.	See above

2701 CLEAN SEAS - INVENTORY OF OWNED EQUIPMENT

MATERIAL AND/OR EQUIPMENT	STORAGE AREA	QUANTITIES	REMARKS	CONTACTS
<u>2701.12 Chemicals</u>				
1. Gold Crew (Dispersant)	CSI Yard - Carpinteria	4-55gal drum	Good cleaning agent and disper-sant. <u>Not</u> licensed.	(805)963-3488 (805)684-4719
<u>2701.13 Compressor</u>	CSI Yard - Carpinteria	1	Gardner-Denver 600 cfm rotary diesel engine driven.	See above
<u>2701.14 Radio System</u>				
1. Repeater-Motorola	Santa Ynez Peak	1	49.04/48.62 - 45 watts	-----
2. Santa Barbara base	St. Barbara office	1	49.04/48.62 43 "	-----
3. Carpinteria base	CSI Yard - Carpinteria	1	49.04/48.62 - 50 "	-----
4. Portable base	" " "	1	49.04/48.62 - 48 "	-----
5. Portable - Handie Talkie	" " "	13	49.04/48.62 - 5 "	-----
6. Mobile	1971 Ford	1	49.04/48.62 & 48.66/49.42 - 50 "	-----
<u>2701.15 Wilden M-15 Pump</u>	CSI Yard - Carpinteria	2	For use on the MK-II Skimmers and miscellaneous pump requirements.	
<u>2701.16 Flat storage tanks</u> 100 bbl.	CSI Yard - Carpinteria	4	Used with MK-II Skimmers or other systems.	

2700-4

Revised 9-74
Replaces 5-74

ATTACHMENT "D"

Inventory of Equipment

Clean Bay, Inc.

1. MOBILE HEADQUARTERS TRAILER

8' x 25' Office Trailer w/tandem axle

Callout Procedure

Gulf Oil Company-California will provide a driver and vehicle to deliver the trailer at any time to a location as directed by Clean Bay Inc. or a member company. Union Oil Company will provide a vehicle and driver for backup service.

Calls should be placed in the order shown below. Union Oil Co. should not be called unless Gulf is unable to furnish a driver. All Gulf members should be exhausted first.

Calling Procedure

1. Shift Foreman (415) 758-4840
Gulf Oil Company-Calif. Ext. 268

Shift Foreman will notify a driver to deliver the CBI trailer to the requested site.

2. Bulk Shift Foreman (415) 799-2478
Union Oil Company 799-4411

Shift Foreman will notify a driver to pick up the CBI trailer at Gulf and deliver it to the requested site.

A list of the equipment in the trailer follows:

Mobile Headquarters TrailerEquipment List

<u>Quantity</u>	<u>I t e m</u>
1	Intech Marine Base Station on Marine Channels 10,16, 18A & 22A
1	Motorola UHF Mobile Radio
1	Intech Scan Receiver on Marine Channels 10, 16, 18A, 22A & WXI
3 sets	Headphones, Superex and Motorola
10	1-Watt Motorola Handi-Talkies (Paksets)
2	4-Watt Motorola Handi-Talkies (Paksets)
1	Motorola Multi-Unit Portable Charger
1	Onan Trickle Charger
1	Onan Gasoline Generator
1	Sony Cassette Tape Recorder
1	Craftsman Multi-Band Receiver
2	Motorola Megaphones
2	McGill Trouble Lights
1	50' Extension Cord, McGill & Hubble
1	100' ITT Extension Cord
3	"Scare-Away" Noise Units/Propane Supply
Numerous	Hardhats
1	J-W Combustible Gas Indicator
18	Pint Sample Bottles
12	Hand Lanterns
Numerous	Hand Tools

Rev. 11/74
Replaces 4/73

Mobile Headquarters TrailerEquipment List (continued)

<u>Quantity</u>	<u>I _ _ r _ e _ m</u>
2 sets	U.S.G.S. Maps of CBI Area of Coverage
2 sets	Nautical Charts of CBI Area
Numerous	Road Maps
Numerous	Tide and Current
1	Petroleum Pipeline Map
6	Map Overlays, 36" x 48" Clear Plastic
Numerous	Telephone Books
1 pr.	Binoculars
1	Dymo 2300 Tapewriter Kit
1	Polaroid 430 Camera
Numerous	Stationary Supplies
12	Raincoats
1	Blanket
2 sets	Emergency Road Reflectors
27	Emergency Road Flares (15-min.)
4	Fire Extinguishers
1	First Aid Kit

2. M/V RECOVERER

202', 9,000 bbl. petroleum cargo tanker capable of acting as:

- Command ship
- Primary control for cleanup, skimming, or lightering operations
- Central receiving vessel for off-loading skimmers
- Central receiving vessel during lightering
- Communications center
- Central location for crew changes
- Supply ship
- Central repair and maintenance facility
- First aid center
- Storage, transport and/or deployment of:
 - Skimmers
 - Booms
 - Dispersants
 - Sorbents
- Vacuum pumping capacity. Two pumps at least 1200 BPH each

(See Tank Plan (801-5) and Operation Plan (801-6 - 801-9))

Callout Procedure

In order to call out the M/V Recoverer, calls should be made to one of the following in the order shown:

R. W. Norton, CBI	(415) 685-2800 (24-hr.)
R. E. Nichols, HT&B	(415) 398-1150 (office) 376-1998 (home)
Harbor Tug & Barge Co. Pier 41 - Dispatcher	(415) 982-1600 (24-hr.)

3. OIL CONTAINMENT BOOMA - Kepner Sea Curtain Boom

2000' - 16" Float x 12" Curtain, 3/8" Chain weight in curtain

This boom is stored in two (2) 1000' sections complete with towing bridles; each 1000-ft. section in a 35' semi-trailer van at Royal Trucking Co. (address & phone below).

Each trailer has five sections, 200' each, of Kepner boom bolted together making a 1000' boom. The boom is packed for easy deployment. One end of the boom with towing bridle attached is at the rear door and ready to be pulled out by boat. A second towing bridle is located near rear door. The trailing end of the boom is free so the two booms can be bolted together for a 2000' boom or install the towing bridle for a 1000' boom.

NOTE: The boom trailers are not licensed. When boom is ordered out, a Trip Permit is required. A Trip Permit is obtained from the Department of Motor Vehicles for \$5.00 per vehicle per trip. Royal Trucking Co. has a permit for each vehicle and they should be reminded to fill it out and handle according to instructions before moving each trailer-van.

Royal Trucking (415) 934-0190 or
1420 Royal Industrial Way 689-6441
Concord, CA 94520

Roy Querio (Home) (415) 939-6057

B - Submarine Engineering Associates

1600' - 36PFX Sea Boom, 12" Freeboard x 24"
Draft with mooring plates, anchors
and USN-SEALOC Adapters

This boom is stored in four (4), 25' x 8' x
4'5" containers in the CBI Warehouse, Royal
Trucking yard, Concord, and can be obtained
through CBI or Royal.

C - Pacific Pollution Control

500' - 24C Aquafence Boom, 12" Freeboard x
24" Draft

This boom is stored in five (5) fiberglass
containers, 30" x 46" x 90" in the CBI
Warehouse, Royal Trucking yard, Concord,
and can be obtained through CBI or Royal.

D - Sayles Boom

2 - 100' sections, 36" Sayles Boom with
towing attachments, stored on the
M/V SPILL SPOILER to be used as diversion
booms for the skimmer. Boom not to be
removed from the vessel.

E - Vikoma Seapack & Seaboom

1600' - Ocean Boom, 27" Float x 17" Water Tube,
stored in 23' boat on a trailer. Can
be towed on road to launching site or
boat can be towed on water at high speed.

VIKOMA stored at Merritt (415) 982-1600
Ship Repair Yard, Oakland (415) 893-7020

In order to call out the VIKOMA, calls
should be made to one of the following in
the order shown:

R. W. Norton, CBI	(415) 685-2800	(24 hr.)
R. E. Nichols, HT&B	(415) 398-1150	(office)
		376-1998 (home)
Harbor Tug & Barge Co.	(415) 982-1600	(24 hr.)
Pier 41-Dispatcher		

4. PUMPING EQUIPMENTA - Tanker Lightering Equipment

1 - 40 HP air-cooled diesel engine prime mover mounted in a fiberglass container.

2 - 8" submersible turbine pumps, capacity of each pump is 1000 GPM through 1000' of 6" and 8" discharge hose.

1600' of 8" floating discharge hose

800' of 6" " " "

Accessory equipment for handling pump and driver.

Tanker lightering equipment is stored on board the M/V RECOVERER at Merritt Ship Repair Yard, Oakland, and is handled through the Harbor Tug and Barge Company.

Pier 41 - Dispatcher (415) 982-1600 (24 hr.)
Merritt Shipyard (415) 893-7020

B - Diaphragm Pumps

2 - Wilden M15B Spark Free, Diaphragm Pumps, 3" Kamlok inlet and outlet, compressed air driven, 150 GPM @ 100# air pressure.

These pumps with related air hose and fittings stored in CBI Warehouse at Royal Trucking Yard. Obtain through CBI.

(415) 685-2800 (24 hr.)

C - Oil Herder Helicopter Spray Pumping Unit

1 - Simplex Pumping Unit. Consists of a fiberglass bucket, 150 gal. capacity, 3 HP Briggs & Stratton gas engine and small gear pump, set at 1 GPM flow rate. Designed as helicopter undersling unit.

This pumping unit, plus 2 drums of Shell Oil Herder is temporarily stored at the CBI Warehouse in Concord (until contract is made with helicopter company). Obtain through CBI.

(415) 685-2800 (24 hr.)

5. SKIMMING EQUIPMENTA - Marco Class III Oil Recovery System

- 1 - M/V SPILL SPOILER - A 57' x 24' jet propelled bay skimmer with 2-3' wide Martin-Marietta filterbelts and 90 bbls. onboard storage capacity. Capable of recovering all grades of oil and debris at oil recovery rates up to 1,000 GPM, in 3' to 4' waves.

Moored at Pier 41, San Francisco

Manned and operated by:

The Harbor Tug and Barge Company
24-hr. Dispatcher (415) 982-1600

B - Floating Weir Skimmers

- 2 - Exxon Floating Weir Skimmers for use in recovering fairly thick oil concentrated within a boom.

Each skimmer equipped with an air driven pump, 200' of Acme 4" discharge hose with hose floats and 150' of 1" Dayco air hose.

This equipment was designed to work in conjugation with a barge. An air compressor is required, min. size of 300 CFM, to handle both units. A davit or crane is necessary to deploy these units.

Skimmers are stored at CBI Warehouse at Royal Trucking and are available through CBI (24-hr.).

6. SORBENTS, TOOLS, ETC.A - 35' Semi-Trailer Van - Sorbent Trailer

This van is stored at Royal Trucking Co. who furnish a tractor and driver to deliver the van as instructed by CBI on a 24-hr. basis.

NOTE: The Sorbent Trailer is not licensed. When sorbents are ordered, a Trip Permit is required following the same procedure as when calling out the boom trailers. (See 3-A, Page 801-10.)

Royal Trucking
1420 Royal Industrial Way
Concord, CA 94520

(415) 934-0190 or
689-6441

Roy Querio (Home) - (415) 939-6057

Inventory of Equipment & Supplies in
Sorbent Trailer

(See following pages 801-15/16)

Sorbent Trailer Inventory

<u>Quantity</u>	<u>I t e m</u>
5	Ball Peen Hammers, 1½# Channel lock or equal
6	10" Diamoloy crescent wrenches, or equal
2	30" MCC Bolt Cutters
36	½" Shackles w/screw pin, galv.
36	¾" Shackles w/screw pin, galv.
24	5/8" x 1½" long machine bolts w/hex nuts
2	30" or larger tool box to store Items 1-7; Kennedy or equal
600 ft.	½" Manila rope (1 coil)
600 ft.	¾" Manila rope (1 coil)
600 ft.	1" Manila rope (1 coil)
200 ft.	½" wire rope, 6 x 19, black
2	Morse model 85A drum carrier
2 sets	#52 Merrill drum lifter clamps
10	6' steel stakes
2	2 lb. rolls baling wire
2 pr.	Kline side-cut pliers
10 pr.	Heavy gloves; rubber lined gauntlet-type, work gloves, large size
12	Long-handle square point shovels
3	" " round point shovels
1	Sledge hammers - #8, long handle
1	Single bit axe
2	Ansul A-5, 5 lb. fire extinguisher, w/Foray dry chemical, or equal

Sorbent Trailer Inventory (cont.)

<u>Quantity</u>	<u>I t e m</u>
1	Standard Medical First-Aid kit
2	4-5 tine, long-handle pitchforks
17	Hoes
8	Long-handle sickles
14	Short-handle sickles
6	Garden type rakes
1	Chain Saw
1	8-point regular carpenter's saw
1	24" Pruning saw
2	30 gal. trash cans, galv. metal
2	Stanley razor blade knives
6	2-cell regular flashlights
10 rolls	3M Type, 100 rolls, 36" wide, 12 oz/yd ² , 3/8" thick
10 bales	3M Type 151 pads, 18" x 18" x 3/16"
8 rolls	Conwed Sorbent Blankets, 35" x 200' roll
12 ctns.	" " Pads, 17" x 17" x 1/4"
4 rolls	" " Rug, 40" x 300' roll
8 ctns.	" " Heavy duty boom, 10" x 8'

7. PORTABLE RADIO REPEATER TRAILER

This radio repeater trailer can be used in conjunction with the radio packsets in remote areas to improve communications. It contains a primary and secondary radio repeater and has two batteries which make the repeater independent for 48 hours. If available, 110 VAC should be connected to the self-contained battery charger.

Radio repeater trailer is stored at Royal Trucking. Obtain through CBI. The CBI car is equipped with towing attachment for towing trailer to desired location.

8. WORK BOAT

1 - 16' Boston Whaler w/40 HP Johnson outboard

This boat is primarily a ship-to-shore boat for the M/V RECOVERER but is available for oil spill work if the Recoverer is not in use.

To increase the flexibility of the boat, it is stored on a trailer in CBI warehouse at Royal Trucking and will be towed to the M/V Recoverer when needed or to other oil spill work.

A 1-7/8" ball is required for towing. An electrical plug with identified leads is with the trailer.

Towing and operating instructions on boat.
(See also following Pages 801-18/19)

Both the CBI company car and R. E. Nichols' company car are fitted with towing gear to tow this boat and trailer to desired location.

9. WAREHOUSE INVENTORY

In addition to equipment and supplies listed, there are other items stored in the CBI Warehouse located at: Royal Trucking
 1420 Royal Industrial Way
 Concord, CA

Following is an inventory list of items available through Clean Bay Inc.:

<u>Quantity</u>	<u>I t e m</u>
1 roll	Plastic 20' x 100' x .006"
6 rolls	Conwed Rug, 40" x 300'
7 "	" Blanket, 35" x 200'
10 ctns.	" Pads, 17½" x 17½" x 1/4"
9 "	" Boom 10" x 8'
10 ea.	Empty Boom crates
1	Radio repeater trailer (Item No. 7)
1	Boston Whaler & trailer (Item No. 8)
5	Floation boxes for lightering equipment (Equipment on M/V Recoverer)
2 boxes	Repair equipment for Kepner boom (Item No. 3-A)
2	Exxon skimmers w/air & discharge hoses (Item 5-B)
1	Skimmer (Skim, Inc.)
6	Boom towing cables
1 set	Fork lift extensions
2	15-men life rafts (inspection needed before use)
2 ctns.	Foam absorbent pads

Warehouse Inventory (cont.)

<u>Quantity</u>	<u>I t e m</u>
2	Wheelbarrows
2	Bbls Oil Herder (Partially full)
1	" Diesel oil (Partially full)
1	Pallet containing boxes of manual inserts
11	Pallets of 3" vacuum hose
2	" " 1½" " "
7	" containing bags of sawdust
12	Pitchforks
6	Square-corner shovels
4	Round-corner shovels

10. EQUIPMENT UNDER LEASE TO CBI

Contractor: Marine Service, Inc. (707) 745-2949 (24-hr.)
305 First Street J. L. Garske
Benicia, CA 94510

Equipment located at Marine Service, Benicia:

2 Mark II Oil Skimmers
1 56' LCM Boat, "Sponge"

Equipment located at Shell Oil, Martinez:

1 Mark II Oil Skimmer

Equipment located at C&H Sugar Co. Wharf, Crockett:

2 Mark II Oil Skimmers
1 56' LCM Boat, "Squeegee"

ATTACHMENT "E"

Draft

Agreement for Alaskan Gulf Clean-Up Cooperative

AGREEMENT

FOR

ALASKAN GULF CLEAN-UP COOPERATIVE

THIS AGREEMENT shall be effective when made and entered into, by and between ten (10) or more parties which execute the original of this Agreement or a counterpart hereof or other instrument agreeing to become a party hereto, being hereinafter sometimes referred to collectively as "Participants."

W I T N E S S E T H

WHEREAS each of the parties hereto has an interest, both financial and civic, in the prompt and efficient removal of oil spills occurring on or in the public and private properties, beaches, harbors, and offshore islands and waters within the Area of Interest; and

WHEREAS, the parties desire to provide resources for and to develop, maintain, and improve the procedure among the parties for mutual assistance and cooperation in the control of oil spill emergencies occurring within the Area of Interest; and

WHEREAS, the parties desire to commit themselves to an efficient and effective clean-up organization, and in so doing, agree to investigate and acquire appropriate equipment and materials, and to develop training programs for personnel who will be involved in the clean-up of oil spills; and

WHEREAS, due to the magnitude of the anticipated risks and costs related to the acquisition or lease of materials and equipment, the parties deem it necessary to join together under the terms of this Agreement for the purpose of sharing said costs and risks and minimizing the individual expenses and investments related thereto;

NOW, THEREFORE, in consideration of the premises and of the mutual covenants and agreements of the parties hereto, hereinafter set forth, the parties do hereby mutually covenant and agree as follows:

ARTICLE I

AREA OF INTEREST

The primary operations of the parties shall be confined to the geographical area described as:

the public and private properties, including but not limited to beaches, harbors, inland waterways, and offshore islands and water along the coast of the State of Alaska, between and including Cape Fairweather on the east and Cape Clear on the west,

which area shall hereinafter be referred to as the "Area of Interest;" provided, however, that nothing herein shall preclude the parties from contracting or cooperating with persons or organizations in other geographical areas for the purposes set forth in the recitals above.

ARTICLE II

PARTICIPANTS

A. Qualifications. Persons, partnerships, companies, corporations or other entities which contemplate operating refineries, terminals, pipelines or other facilities for handling, storing, transporting, or manufacturing petroleum or liquid hydrocarbons or which drill for or produce petroleum or liquid hydrocarbons or which contemplate conducting operations related thereto within the Area of Interest and which pay the initial advance as well as any costs related to subsequent joinder and which pay costs and expenses incurred in operations hereunder in accordance with the Participation Formula described in Article VI shall be qualified for Participation herein.

B. Voting Rights. The number of votes of the Participants may be unequal, and shall be determined by the Participation Formula described in Article VI.

C. Admission of New Participants. New Participants shall be admitted upon a showing to the Representatives that such potential Participants are qualified for membership hereunder. Such new participation shall be effective upon receipt by the Executive Committee of the initial advance required by the Participation Formula described in Article VI and in the case of a partnership or corporation the filing of the written designation of representation by such Participant as required by Article III.

D. Voluntary Withdrawal or Expulsion

1. Voluntary Withdrawal from Participation. Article VI to the contrary notwithstanding any Participant may withdraw from participation by filing written notice thereof with the Executive Committee; and such withdrawal shall become effective immediately upon filing of said notice. Such Participant shall fully pay all costs and expenses due and payable from it pursuant to the terms of this Agreement and fully provide for all contingent obligations to the remaining Participants on the effective date of withdrawal. This shall include, but not be limited to, prepayment by the Participant of its proportionate share of all outstanding long term lease obligations entered into by the Participants. The withdrawal by a Participant under the provisions hereof shall not relieve such Participant of his proportionate share of any liability incurred by, or rights or claims existing against the Participants at the effective date of withdrawal. Such withdrawing Participant shall be given credit for the current value of his ownership interest as defined in Article VI.F in co-owned capital equipment, materials, and cash or other liquid assets. Said current value shall be determined on the basis of the original cost depreciated at a rate of twenty percent (20%) per annum. If Participant's credit exceeds his obligations hereunder, he shall be refunded the difference in cash upon withdrawal.

2. Expulsion from Participation. Any Participant may be expelled for failure to pay part or all of any costs and expenses properly attributable to such Participant or for failure to reimburse part or all of any expenses duly incurred

hereunder within 45 days of incurring of such obligation. Such expulsion may be imposed only by a vote of at least 75% of the remaining Participants' Representatives. Any Participant so expelled shall be given credit for the current value of his ownership interest as defined in Article VI.F in co-owned capital equipment, materials, and cash or other liquid assets. Said current value shall be determined on the basis of the original cost depreciated at a rate of twenty percent (20%) per annum. If Participants' credit exceeds his obligations hereunder, he shall be refunded the difference in cash upon withdrawal. Said Participant shall become immediately obligated for prepayment to the remaining Participants its proportionate share of all outstanding long term obligations entered into by the Participants. No expulsion shall relieve such expelled Participant from any obligation to the remaining Participants before its expulsion and shall not preclude the remaining Participants from taking any other action to effect the collection of costs and expenses properly due and owing.

E. Adjustment of Voting and Participation Upon Voluntary Withdrawal or Expulsion. The votes of the Participants and future participation as determined by Article VI shall be adjusted as of the effective date of withdrawal or expulsion of a Participant or the admission of a new Participant.

ARTICLE III

DELEGATION OF AUTHORITY

Every Participant shall file with the Executive Committee a duly authorized and executed instrument designating a Representative, and one or more alternates, who shall for all purposes hereof have full power and authority to represent such Participant in all matters relating to this Agreement and upon whom any other communications with respect to this Agreement may be given, delivered or served. The power and authority of such Representative shall continue until the Participant represented by him shall designate another Representative and shall notify the Executive Committee in writing of the name and address of such new Representative, or until the participation of the Participant is withdrawn or expelled in accordance with Article II.

ARTICLE IV

MEETINGS OF REPRESENTATIVES

A. The business and affairs of the Cooperative shall be managed by the Representatives except where specifically provided herein for a power to be exercised by another person or other persons.

B. Without limiting the general grant of power set out in Article IV.A, the Representatives may, from time to time and at any time, delegate authority hereunder to the Executive Committee, a Manager or such other person or persons as the Representatives may deem appropriate. Said delegation may be withdrawn or rescinded at any time; provided, however, that no action previously taken by such delegate shall be affected by the withdrawal or rescission. Notwithstanding any provision herein to the contrary the Representatives shall approve by vote as provided herein (and shall not delegate authority to approve) an annual budget of expenditures and any necessary supplemental budgets or authorizations for expenditures of sums exceeding the amount budgeted for each category, if any, set out in the annual budget.

C. Annual Meeting. The annual meeting of Representatives shall be held on the third Tuesday of September each year at 9:00 a.m. at the offices of the Manager, if any, or at such other time or place as the Representatives may from time to time designate.

D. Special Meetings. Special meetings of the Representatives may be called by the Chairman, the Vice Chairman, the Manager, or by any three (3) Representatives. Not less than five (5) days' written notice to all Representatives for special meetings is required. The notice shall state the purpose of the meeting.

E. Emergency Meetings. Emergency meetings of the Representatives may be called by the Chairman, the Vice Chairman, the Manager, or by any three (3) Representatives for purposes of resolving policy or financial problems in connection with any oil spill or spills by giving not less than twenty-four (24) hours' telegraphic or personal written notice.

F. Action by Consent. Any action which may be taken at a meeting of the Representatives may be taken without a meeting if approved by a writing signed by 75% of the weighted vote. Said writing shall be mailed to the Executive Committee within thirty (30) days of the date of the first signature to be effective. The Secretary-Treasurer shall promptly notify the Representatives of the action taken and shall file the writing in the Minutes of the organization.

G. Quorum. At least five (5) Representatives representing ownership of sixty-five percent (65%) of the total number of the votes must be present before business may be transacted, but a lesser number may adjourn the meeting from time to time until a quorum is obtained. Representatives present at a duly called or held meeting at which a quorum is present may continue to do business until adjournment notwithstanding the withdrawal of members leaving less than a quorum.

H. Vote. Unless otherwise specified, wherever in this Agreement any action is to be taken upon vote of the Representatives, approval or passage is to be by a majority of the votes present or a majority of the votes necessary for a quorum, whichever is greater. The number of Representatives present at a meeting shall be considered only for the purpose of determining whether there is a quorum.

The number of votes for each Representative shall be based upon the percentage participation as described in Article VI. The number of votes may change from time to time if and as the percentage participation changes.

ARTICLE V

EXECUTIVE COMMITTEE

A. Composition. The Executive Committee shall be composed of five (5) persons including the Chairman, the Vice Chairman, the Secretary-Treasurer and two additional members. The Manager, if any, shall attend meetings of the Executive Committee but shall not have the right to vote.

B. Election. The members of the Executive Committee shall be elected by a majority vote of the Representatives at their annual meeting. Vacancies occurring before the next annual meeting may be filled by the Representatives at a special meeting called for that purpose in accordance with the provisions of Article IV.D.

C. General Powers and Authority. The members of the Executive Committee shall have such powers and duties, individually or collectively, as expressly stated herein or as may be provided from time to time by resolution or other directive of the Representatives.

D. Meetings. The Executive Committee may act in any meeting called at any time by the Chairman or any other member of the Executive Committee. Committee action may also be taken without a convened meeting by vote or agreement, by telephone, wire or letter.

E. Voting. Each voting member of the Executive Committee shall have one vote. Action by the Committee shall require three (3) affirmative votes. If three (3) such votes cannot be obtained, the matter may be considered and acted upon by the Representatives.

F. Administrative Duties

1. Chairman and Vice Chairman. The Chairman, or in his absence, the Vice Chairman:

(a) shall preside at all meetings of the Representatives and the Executive Committee;

(b) shall sign all contracts, and other instruments in writing when authorized by the Representatives by special or general grant of authority;

(c) shall discharge all other duties that may be required of him by the Agreement or delegated to him by the Representatives.

2. Secretary-Treasurer. The Secretary-Treasurer:

(a) shall keep a record of the proceedings of all meetings (1) of the Representatives and (2) of the Executive Committee;

(b) shall countersign all documents whenever required;

(c) shall keep a record of the votes each Participant is entitled to;

(d) shall keep a current record containing the name and address of each Participant and its Representatives;

(e) shall serve all notices required by law or by this Agreement;

(f) shall keep accounts of all receipts and disbursements and deposit all moneys or other valuable effects in the name and to the credit of the Cooperative in such depository bank or banks as may be designated by the Representatives;

(g) shall present at the regular meeting of the Representatives, or whenever required by them, accounts of all his transactions as Secretary-Treasurer and the financial condition of this joint undertaking, and discharge such additional duties as the Representatives may from time to time prescribe.

3. Manager. The Executive Committee may, within the power and authority it has hereunder, assign such duties and delegate such authority to the Manager, if any, as the Executive Committee deems necessary and appropriate. The Manager, if any, shall administer the joint activities of the Participants hereto subject to the direction of the Executive Committee.

G. Compensation. Except for the Manager, if any, no member of the Executive Committee shall be entitled to compensation. The compensation of the Manager, if any, shall be set by the Representatives.

H. Removal. The Chairman, Vice Chairman, Manager, if any, or Secretary-Treasurer may be removed at the pleasure of the Representatives, in accordance with Article IV.F., G. and H.

ARTICLE VI

OWNERSHIP OF ASSETS

FINANCES AND PARTICIPATION FORMULA

A. Advances and Budget. The Executive Committee shall, each year, prior to the annual meeting of Representatives, prepare and submit to the Representatives a budget for advances for operations for the following calendar year. Approval of the budget for the advances shall be by vote of the Representatives.

The budget for advances shall state an amount of money to be used for each of the following categories:

1. Day-to-day operations including but not limited to salaries, office expenses, and equipment and material lease and maintenance costs;

2. Investment in capital equipment and materials to be used in connection with clean-up activities.

Each Participant executing this Agreement on or before August 1, 1975 shall be deemed an original Participant and shall pay an initial advance of \$25,000. Subsequent advances shall be determined in accordance with the balance of this Article VI.

Any party executing this Agreement after August 1, 1975, but prior to the first lease sale in the Area of Interest shall pay as a portion of its initial advance \$25,000 plus its proportionate share, determined in accordance with B(1) below, of the current value of the original cost of all capital equipment and materials co-owned by the Participants. In addition, such party shall pay an additional sum equal to its proportionate share, determined in accordance with Paragraph B(1) hereunder, of the current value of all liquid assets co-owned by the Participants.

Within thirty (30) days following the award of leases at the first lease sale in the Area of Interest each original Participant to this Agreement who was not awarded a lease in said sale may withdraw from this Agreement and shall have refunded all advances and additional moneys paid by them to the cooperative less an amount equal to its share of the expenses incurred by the Cooperative hereunder during the period in which it was a Participant. A Participant who is admitted to the Cooperative after the effective date of this Agreement but prior to said lease sale who is not awarded a lease may also withdraw from this Agreement and shall have refunded all moneys paid by him to the cooperative, less \$25,000, and less an amount equal to its share of the expenses incurred by the Cooperative hereunder during the period in which it was a Participant. The remaining Participants shall have their proportionate interests redetermined and allocated in accordance with Paragraph B(2) below.

Any party executing this Agreement subsequent to the first lease sale in the Area of Interest and the award of leases therein shall pay as a portion of its initial advance \$25,000 plus one hundred fifty percent (150%) of its proportionate share of the actual cost of the capital equipment, and materials, and the current value of all liquid assets co-owned by the Participants. Such party shall also pay one hundred fifty percent (150%) of its proportionate share of the cumulative expense incurred by the Participants to the date of execution of this Agreement. Upon termination of this Agreement or withdrawal from same by such party the amount refundable shall be only that party's proportionate share of its current ownership interest, in accordance with Paragraph B below.

The preceding requirements for payment of a proportionate share of the initial advance and of the current value of all liquid assets will not be required when such entering party has purchased or otherwise acquired some portion of the assets or operating function of a Participant to this Agreement and by doing so assumes that Participant's interest. Those moneys paid in for an ownership in co-owned equipment and materials shall be refunded to the Participants in good standing in accordance with their ownership interest therein as set out in Paragraph B below.

B. Payments by Participants. Each of the Participants under this Agreement shall make payments as required to fund the budget in accordance with the following Participation Formulas:

1. Prior to Redetermination After First Lease Sale all expenditures shall be shared by each Participant on an equal basis.
2. Within ninety days (90) following the awarding of leases from the First Lease Sale the proportionate share of each Participant hereto shall be redetermined and reallocated on the basis of fifteen percent (15%) per capita and eighty-five percent (85%) acreage awarded in the first sale in the Area of Interest. Following any subsequent sale in the Area of Interest the proportionate share of each Participant shall be redetermined and reallocated on the basis of the Participation Formula then in effect.

The per capita share shall be divided equally among Participants. The acreage share shall be a Participant's fraction of leased acreage to the total leased acreage of all Participants.

Parties of Joint Interest may become Participants jointly or singly but in no instance can acreage be proportioned more than once.

3. Following the first calendar year in which twelve (12) rig months of drilling have occurred the proportionate share of each Participant hereto shall be redetermined and reallocated on the basis of ten percent (10%) per capita, ten percent (10%) acreage and eighty percent (80%) exposure risk. For the purposes of this Agreement, rig month is defined as each and every month a drilling rig or vessel is on location and working, including breakdown and maintenance time. A drill rig or vessel is considered on location at such time as the last anchor or leg is set in place at any proposed drilling site.

The basis for the per capita and acreage allocations shall be as described in subparagraph 3 above. The basis for the exposure risk shall be:

<u>Activity</u>	<u>Units</u>	<u>Weighting Factor</u>
Offshore Production and Pipelines	Barrels of HC Produced	1.0
Marine Transport (Crude & Products)	Barrels of HC Transferred	1.0
Onshore Pipelines	Barrels of HC Transferred	0.5
Exploration and Drilling	Rig Months	. 100,000 Development

All rates in B(3) above shall be tabulated from the preceding calendar year's operation.

For purposes of voting, each Participant shall be entitled to the same number of votes as its percentage interest rounded to the nearest 0.1% as determined by the applicable Participation Formulas.

Annually, prior to approval of the budget as described in Article VI.A, the Representatives shall determine the participation of each Participant according to the applicable Participation Formula. The initial yearly payment of each Participant will then be determined by relating the participation of each Participant to the budget.

C. Additional Requirements. Additional moneys may from time to time be added to and specified for any or all of the categories of advances referred to in Article VI.A by charge against the Participants in accordance with the applicable Participation Formula, but only on an affirmative vote of the Representatives in accordance with Article IV.F., G and H; provided, however, that any Participant who has given notice of withdrawal in accordance with Article II.D.1 shall not be required to advance additional money after date of such notice.

D. Payment of Advances. Payment of advances required to meet the cash call for the annual budget and any additional advances provided in this Article VI shall be made within thirty (30) days after call by the Secretary-Treasurer. Such call shall be for aggregate amounts not to exceed the amount determined by the Secretary-Treasurer to be sufficient to meet cash requirements for the ensuing thirty (30) days.

E. Authority to Expend Advances. The Executive Committee is authorized to expend the moneys received, subject to the condition that no moneys designated for use in any of the specified categories described in Article VI.A. may be used for the purposes described in any of the other categories specified in Article VI.A without an affirmative vote of the Representatives in accordance with Article IV.F., G and H. All expenditures within each of the specified categories shall be in accordance with the budget approved by the Representatives or in accordance with any instruction received from the Representatives.

F. Co-Ownership of Jointly Acquired Property. All capital equipment and materials or other real and personal property, tangible or intangible, acquired jointly by the Participants hereunder shall be co-owned as tenants-in-common. Each Participant's ownership interest therein shall be based upon and shall be equal to its participation under the applicable Participation Formula. Each Participant's ownership interest will accordingly be adjusted annually with the annual adjustments of the applicable Participation Formula. Such ownership interests may also be adjusted during the year with the addition of a new Participant or withdrawal or expulsion of an existing Participant.

G. Withdrawal Over Budget or Certain Expenditures. Any Participant voting against approval of the budget or against approval to make additional unbudgeted payments for acquisition or lease of capital equipment or materials or for the cost of cleaning up unidentified oil spills may withdraw, provided that such Participant exercises such right of withdrawal using the procedure described in Article II.D.1, within five (5) days after result of the vote is available to the Participant. Such resigning Participants shall be freed from any liability to the remaining Participants resulting from the aforesaid budget or additional unbudgeted payments, but shall, however, be subject to all other obligations imposed by Article II.D.1.

ARTICLE VII

CLEAN-UP POLICY

A. Oil Spills in the Area of Interest. Within the monetary limitations established from time to time and in accordance with the provisions of Article VI, it is the policy of the Participants to release co-owned and/or co-leased oil spill clean-up equipment and materials for use within the Area of Interest as follows:

1. Notice of Spill. In the event of an actual or threatened spill of liquid hydrocarbons by any Participant originating within the Area of Interest, and if such Participant desires to utilize the co-owned or co-leased equipment and materials, then such Participant shall promptly notify the Executive Committee Chairman, or if not available, any member of the Executive Committee. Such notification shall include the location and known nature and size of the spill, the required equipment and materials. Such notification may be oral, but shall be confirmed in writing as soon as practical.

2. Use by Participant. Upon receipt of the above notice, the Chairman or any member of the Executive Committee shall, without further approval of the Participants or their Representatives, release the requested equipment and material to the affected Participant. The affected Participant shall have the use of such equipment and material as may be required in containing and cleaning up such spill. During the time such equipment and material are thus committed, complete control thereof shall be in the affected Participant.

During such time the other Participants and Executive Committee shall not have any responsibility therefor, regardless of negligence. If such spill originates within the Area of Interest or, if such spill originates within such area but the containment and clean-up requires use of the equipment and material outside of the Area of Interest, the affected Participant may continue to use the equipment and material as required. The affected Participant shall return the equipment and material to as good a condition as when called into service subject to reasonable wear and tear, or at the discretion of the Executive Committee, shall pay to the Executive Committee an amount of money equal to the cost which would have been incurred in complying with such requirement. The other Participants and Executive Committee shall in no way be liable or responsible for the payment of any costs and expenses incurred by said Participant and the Participant affected by such spill shall indemnify said other Participants and the Executive Committee against all liability for such costs and expenses.

3. Multiple Use by Participants. If two or more spills affecting different Participants occur at the same time or require use of the same equipment and material in the containment or clean-up thereof and if all such spills occur in the Area of Interest, the Executive Committee shall decide in absence of agreement among the affected Participants which equipment hereunder shall be used for each spill. If, however, one such spill occurs in the Area of Interest and the other spill occurs outside the Area of Interest, the Participant affected

by the spill in the Area of Interest shall have the prior right to use such equipment and material as required, but may agree to the release of such equipment and material for use in connection with the other spill.

4. Use by Non-Participants. In the event of a request by any party who is not a Participant for the use of any equipment and material subject hereunder to contain and clean up a spill or threatened spill of liquid hydrocarbons, the Executive Committee may allow such use and determine the condition thereof, including the extent and location of such use. During the time such equipment and material are thus committed, complete control thereof and full responsibility therefor shall be in the Non-Participant subject to Article VII.A.5. During such time the Participants and Executive Committee shall not have any responsibility therefor, regardless of negligence. To compensate Participants for the cost and expenses incurred in providing and maintaining a continuing stockpile of equipment and material with expected early obsolescence and replacement and for the continuing expenses of maintaining standby services, the rate charged by the Executive Committee to a Non-Participant for the use of such equipment and material shall be an equitable rate established by the Executive Committee (subject to periodic review and change where justified), taking into consideration the continuing costs, amortization, cost of money and other pertinent factors. The Non-Participant shall be obligated to return the equipment and material to as good a condition as when called into service, or, at the discretion of the Executive Committee, shall pay to the Executive Committee an amount equal to the cost which would have been incurred in complying with such requirement. The Participants and Executive Committee shall in no way be liable or responsible for payment of any costs and expenses incurred by said Non-Participant, the Non-Participant affected by such spill shall indemnify said Participants against all liability for such costs and expenses.

5. Multiple Use by Participant and Non-Participant. In the event of concurring spills of liquid hydrocarbons by Participants and Non-Participants or unknown parties, the Participant affected shall have the prior right to use such equipment and material as are required, but may agree to the release of such equipment and material for use in connection with other spills.

6. Unidentified Spills. The Chairman or any member of the Executive Committee may, without approval of the Participants, release equipment and material for use in the clean-up of oil spills from unidentified sources within the Area of Interest only at the request and under the direction of the governmental agency having jurisdiction over the spill. Such usage shall comply with Article VII.A.4, 5 and 8 and Article XI.

7. Oil Spills Originating Outside of the Area of Interest. The Executive Committee may release equipment and material for use in the clean-up of oil spills originating outside of the Area of Interest. Such usage shall comply with Article VII.A.4, 5 and 8 and Article XI.

8. Charges for Use of Equipment and Material. Any charges provided for under this agreement to Participants or Non-Participants, other provisions hereof notwithstanding, shall be based on costs incurred, it being the intent of the Participants hereunder to provide such equipment and material on a non-profit basis.

ARTICLE VIII

INDEMNITY

A. Indemnity for Use. In the event of damage to, loss of, or consumption of any equipment and material subject hereunder, while committed to use by any Participant or Non-Participant in connection with any spill of liquid hydrocarbons by such Participant or Non-Participant, the affected Participant or Non-Participant shall be solely responsible and liable to the Participants for repairing or replacing such equipment and material or reimbursing the Participants for the costs thereof, and the affected Participant or Non-Participant shall indemnify all other Participants, subsequent Participants and the Executive Committee against all liability on account of such damage, loss or consumption.

B. Indemnity Agreements. Each Participant shall hold harmless and indemnify each other Participant or subsequent Participant, the Executive Committee, and the agents, servants and employees of the foregoing, against and for all liability, and costs incurred, including, but not limited to, attorneys' fees, expenses, claims, fines and damages which the affected parties suffer or sustain or become liable for by reason of any accidents, damages or injuries, either to the persons or property of the foregoing parties or to the person and/or property of any third party, including, but not limited to, federal and state governments and agencies thereof, in any matter arising out of or connected with the furnishing of equipment and materials hereunder to the indemnifying party. A like indemnity shall be obtained from a Non-Participant before such party can use the above-noted equipment and material as provided for in Article VII. The foregoing indemnity and hold harmless provisions by a Participant or Non-Participant shall be applicable whether or not the accident, damages, or injuries indemnified against were caused or contributed to in whole or in part by the negligence of the Participants, subsequent Participants, the Executive Committee or the members or subsequent members thereof, and the agents, servants, and employees of the foregoing. The party furnishing this indemnity further agrees that the parties to whom this indemnification and hold harmless provision extends shall have the right, but not the obligation, to tender the defense to the indemnifying party of any and all law suits arising out of or in any way connected with matters which are the subject of this indemnity and hold harmless provision, but that failure to tender any such law suit for defense shall in no way or wise release or relieve party furnishing this indemnity of his obligations hereunder. The party furnishing this indemnity also covenants and agrees that the indemnity and hold harmless provision granted to all the parties hereunder or subsequent parties hereunder shall not be limited, restricted or in any way affected by the amount of insurance by the party furnishing this indemnity.

ARTICLE IX

IMPLEMENTATION

To implement the purposes of this Agreement, and promptly after the effective date hereof, the Executive Committee shall appoint Committee(s) to evaluate the oil spill response capabilities required to contain and clean up potential oil spills which might occur within the Area of Interest. In evaluating the above the Committee(s) shall consider but not be limited to the following:

(1) entering into contracts and/or leases for the purchase or lease of appropriate oil spill capital equipment and materials; and

(2) entering into service contracts under which the contractor may (a) maintain such equipment and materials at specified locations; (b) furnish experienced operating personnel and provide training concerning use of such equipment and materials; (c) conduct sea trials of such equipment and material; and (d) furnish such other services as may be mutually agreed upon between the contractor and the Executive Committee; and

(3) providing for functions listed in IX(2) above by other means, such as response teams.

Immediately upon this Agreement becoming effective a Committee shall be appointed to develop and publish an Oil Spill Contingency Plan.

ARTICLE X

INDEPENDENT CLEAN-UP OPERATIONS

Nothing in this Agreement shall require or be construed as requiring any Participant to use co-owned or jointly leased materials and equipment or the services of the other Participants in connection with oil spill clean-up activities. Each Participant may, if it so desires, purchase or contract for its own clean-up equipment and materials, or engage any other person to assist it with the clean-up of oil spills, or may, as provided for in this Agreement, use co-owned or jointly leased clean-up equipment and materials and the services of the other Participants jointly with some other person or persons.

ARTICLE XI

INSURANCE

The Executive Committee shall secure and maintain in full force and effect, Alaska Workmen's Compensation Insurance and Employer's Liability Insurance, including coverage under the Longshoremen and Harbor Workers' Act and Outer Continental Shelf Act, and other insurance as required by the Participants. The Executive Committee shall also require any and all independent contractors performing work or services in connection with operations hereunder to provide adequate insurance coverage as required by Participants. In addition, the Executive Committee shall secure and maintain in full force and effect such other insurance as the Representatives may from time to time direct. The cost of all such insurance secured by the Executive Committee shall be deemed a normal cost of performing operations and shall be chargeable to the Participants in accordance with the Participation Formula. All insurance shall include the Alaskan Gulf Clean-Up Cooperative and the names of each Participant as a named insured. Such insurance shall contain a waiver of subrogation clause in favor of each of the Participants and Alaskan Gulf Clean-Up Cooperative.

ARTICLE XII

RELATIONSHIP OF THE PARTICIPANTS

It is expressly agreed that Participants hereto are engaged in a joint venture and that the relationship of the Participants is that of independent contractors and not as members of a partnership or association and that the duties, obligations and liabilities of the Participants are several and not joint or collective, and that nothing contained herein shall be construed to create or impose a partnership duty, obligation, or liability on any of the Participants. Participants shall share in accordance with the applicable Participation Formula as set forth in Article VI herein, all losses, claims, damages, judgments (and costs and expenses in connection therewith) or liabilities arising out of this Agreement.

No language in this Agreement shall in any way constitute a waiver of subrogation rights by the Participants for willful misconduct or gross negligence of the other Participants, subsequent Participants, the Executive Committee or the members or subsequent members thereof and the agents, servants and members of the foregoing.

Each Participant hereby elects to be excluded from the application of SUBCHAPTER K OF CHAPTER 1 of SUBTITLE A of the Internal Revenue Code of 1954, or such portion or portions thereof as may be permitted or authorized by the Secretary of the Treasury of the United States or his delegate insofar as such subchapter, or any portion or portions thereof, may be applicable to the Participants. If any present tax laws of any state contain provisions similar to those contained in the SUBCHAPTER of the Internal Revenue Code of 1954 above referred to under which a similar election is permitted, each Participant hereby elects to be excluded from the application of such laws. If requested by Operator, each Participant agrees to execute and join in such instruments as are necessary to make such elections effective.

ARTICLE XIII

MISCELLANEOUS

A. Contracts. The Representatives may authorize the Executive Committee or the Manager, if any, to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Participants and such authority may be general or confined to specific instances.

B. Checks, Drafts, or Orders for Payment. All checks, drafts, or orders for the payment of money, notes or other evidences of indebtedness issued in the name of the Participants shall be signed by such Executive Committee members or in such manner as shall from time to time be determined by resolution of the Representatives. In the absence of such determination by the Representatives, such instruments shall be signed by the Secretary-Treasurer and countersigned by the Chairman, Vice Chairman or Manager.

C. Deposits. All funds shall be deposited from time to time to the credit of the Participants in such banks, trust companies or other depositories as the Representatives may select.

D. Gifts. The Executive Committee may accept on behalf of the Participants any grant, contribution, gift, bequest, or devise for the general purposes or for any special purpose of this Agreement.

E. Books and Records. The Secretary-Treasurer shall keep correct and complete books and records of accounts and shall also keep minutes of the proceedings of the Representatives and the Executive Committee and shall keep at the office of the Manager a record giving the names and addresses of the Participants, Representatives and Executive Committee. All books and records for purposes of this Agreement may be inspected by any Representatives for any proper purpose at any reasonable time.

ARTICLE XIV

AMENDMENTS

This Agreement may be amended only by majority vote of the Representatives. Such amendment may be made at any annual meeting or special meeting of Representatives at which time a quorum is present, provided that notice shall have been given that the amendment will be considered. This Agreement may also be amended in accordance with the procedure set forth in Article IV.F. Notwithstanding any other provision of this Agreement, the affirmative vote or written consent of seventy-five percent (75%) of the Representatives entitled to vote shall be necessary to amend Article II.D or Article VI.G, or this sentence. Notwithstanding any other provision of this Agreement, the affirmative vote or written consent of seventy-five percent (75%) of the total number of votes shall be necessary to amend Article VI of this Agreement or this sentence.

ARTICLE XV

TERMINATION OF AGREEMENT

A. Election by Participants. Participants may elect to terminate this Agreement by the vote of the Representatives representing seventy-five percent (75%) or more of the voting power at a meeting of the Representatives specially called for this purpose or by written consent of all Representatives without a meeting.

B. Disposition of Equipment. Upon the termination of this Agreement, the Participants shall have the first right to purchase, on a bid basis and at its onshore storage site in Alaska, the equipment purchased with funds of the Cooperative. In the event none of the Participants hereto desires to purchase said equipment, the Executive Committee or the Manager, on behalf of the Participants, shall have the right to sell same to third parties. In the event the equipment cannot be sold as above provided, it will be disposed of for its salvage value, if any. Costs for removing unsaleable equipment shall be borne equally by the Participants. Any monies received by the Executive Committee or the Manager through sale or other disposition of the equipment shall be distributed to the Participants in accordance with the applicable Participation Formula in Article VI.

ARTICLE XVI

SEPARABILITY

If any provision of this Agreement is found to be illegal under the laws of the United States or the State of Alaska or any subdivision thereof, the remainder of the Agreement shall not be affected.

ARTICLE XVII

EXECUTION

This Agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as an original instrument and as if all of the parties to the aggregate counterparts had signed the same instrument. Any signature page of this Agreement may be detached by any party from any counterpart hereof without impairing the legal effect of any signatures thereon, and may be attached to another counterpart of this Agreement identical in form hereto but having attached to it one or more additional signature pages.

IN WITNESS WHEREOF, each party hereto has caused this Agreement to be executed by its duly authorized officer or attorney in fact as of the date first above written.

ATTACHMENT "F"

Oil Spill Control School

Texas A&M University System

COURSE OBJECTIVES

The purpose of this course is to provide the participants with the information and training necessary for handling an oil spill within the capabilities of available manpower and equipment. To achieve this goal, the Oil Spill Control Course will provide participants with hands-on experience and classroom instruction so that they may work within the framework of the law while maximizing their effectiveness under all spill conditions, and minimizing expense and liability to their companies. It is the School's aim that the participants will be able to:

1. recognize potential spill situations;
2. modify existing contingency plans to make them more current and practicable;
3. establish a supervisory team to execute their contingency plan;
4. organize, train, and direct a response team;
5. recommend and direct the use of proper oil spill equipment, such as skimmers, booms, sorbents, and other tools required to mount an effective spill cleanup;
6. preplan arrangements for additional support equipment and supplies not readily available;
7. establish plans for an effective communications system during a spill, which include radio, telephone, and public address systems;
8. meet legal requirements for properly reporting oil spills;
9. handle effectively the public relations aspects and be aware of the legal implications at a spill scene.

FOR FURTHER INFORMATION, CONTACT:

Oil Spill Control School
Texas Engineering Extension Service
Texas A&M University System
College Station, Texas 77843
(713) 845-2122 or 845-7621



OIL

SPILL

CONTROL

SCHOOL



conducted by the
TEXAS ENGINEERING EXTENSION SERVICE

of the
TEXAS A&M UNIVERSITY SYSTEM

(48)

KENAI PENINSULA BOROUGH

Box 850 Phone 262-4441
SOLDOTNA, ALASKA 99669

STAN THOMPSON
MAYOR

August 13, 1975

STATEMENTS OF STAN THOMPSON, KENAI BOROUGH MAYOR AT BLM-OCS HEARINGS

Gentlemen:

I appreciate the opportunity to speak--I hope in some way my views may be helpful.

Before I speak as Boro Mayor of the Kenai Boro I have been asked by the Chamber of Commerce of the City of Kenai to read into the record a resolution they had prepared and passed--so with your permission--this is the Resolution by the Kenai Chamber of Commerce concerning the Outer Continental Shelf.

Now, with your permission, I would like to speak as a 27 year resident of the Kenai area, as a commercial and sport fisherman, as former U.S. Commissioner 8 years, and as a Kenai ex-businessman, but particularly as Boro Mayor of the Kenai Boro.

The Kenai Boro has Alaska's only major producing gas and oil fields. It has, also, the industrial complex of refineries, fertilizer plants, and liquefaction plants that are associated with the oil/gas industry. The Kenai Boro has both offshore and onshore facilities and pipelines--In other words,

the Boro has had the complete impact that can be expected with O.C.S. development.

Historically, Kenai was a small fishing village--in 1948 when I first came to Kenai there were about 350 people that lived there--most of native -Russian heritage. The entire and only real occupation was fishing or working in a cannery--there were 1 or 2 bars and 1 general store and that was it.

During the next 10 years Kenai grew--mostly due to the opening of lands to homesteading to the construction of Wildwood Air Force Base at Kenai, and a connecting road to Anchorage. The village went to about 500 or more people.

Then in approximately 1958 came the oil impact and activity--and the town grew to meet the challenge. Slightly after the oil discovery the Kenai Boro (1964) was formed--taking in all of the Kenai Peninsula and the Inlet and the area across the Inlet. The City of Kenai--and the Kenai Boro met the challenges of this impact and of the change of economic conditions without any impact funds--without any increased State or Federal aids and without crying for either. Instead they bonded to build the needed facilities--the Boro bonded for over 12-million, for example, for school construction--They built the necessary schools, etc., and are still paying for them. But the point is--they can afford to pay for them due to the increased assessed values brought on by the oil industry.

For example, the Kenai Borough's assessed value in 1965, exclusive of

oil, was \$65,000,000. Today-1975-the total borough assessed value is \$700,000,000--an increase of \$635,000,000. Of this \$700,000,000 the value exclusive of oil properties is \$255,233,222.

Based on our experience, impact gifts to cities, boroughs, and least of all to the state does not seem to be necessary. The value of the impact outweighs the cost.

Now there are immediate problems in small cities and boroughs in meeting the impact--sewers, schools, etc. I would recommend an availability of low interest federal loans without the usual federal controls to be made available to the impacted area for their use, if necessary.

In possible cases where the assessed values wouldn't increase to handle the required increased costs the loans could be forgiven.

In any case--any impact funds should go directly to the impacted area and not siphoned off to the state treasury for the state's disposal to the areas that may have the most political clout.

Now in this same connection, I have heard of the tremendous need for planning for this influx of oil activity. The Kenai area's impact was, I believe, orderly and if today, with out 20-20 hindsight--we were to plan for the Kenai oil and gas impact I don't know very much we would or could do to improve on the way that economics dictated, and the way

the plants, pipelines, wells, etc. turned out. There is only a limited amount of possible advantages planning has that can be done in advance.

Kenai Borough has 3 major industries besides oil and gas--#1-fishing.#2 lumbering and #3 Tourists.

Now the fishing industry (of which I have been active in for 20 years and still am) has not really been affected pro or con by the oil industry. The fishing has had a few minor gains and a few minor losses, but they easily balance out and if in any direction--the oil industry has aided the fishing.

#2 Lumbering--has gained to some extent due to better markets and roads. However, there has been a Bore Beetle infestation in many of our spruce trees which was seemingly at least aggravated by the activities of seismic crews.

Tourism has increased beyond our capacity to handle it at present--and I can find no reason to believe it has in any way been hurt by the oil activity.

Now--it is true that the way of life--or life style, if you would--has been changed. Some feel it's poorer and some better. It is now at a faster pace with more emphasis on salary and goods. However, now there are jobs--good jobs and careers available--and our children are returning to the Kenai from college and high school instead of having to leave to find work as before.

The Boro has been able to build new schools or build additions to most others and maintain our 41 school buildings in A#1 shape-- 2 with new swimming pools and 1 more pool under construction and 2 more planned-- we have one of the most expensive school systems in the nation per capita student and we have done this with the lowest mill rates in the state--5 mills at present. This has been made possible through the assessed values of the oil properties--(it must also be remembered we get no income from the oil or gas production).

I would also like to note that there have been no significant air pollution or major oil spills, and few oil spills (if there were any) that have done any significant damage in all the years of platforms and oil pipelines in the area and also that the Swanson River oil field has located in it one of our most enjoyed wilderness recreation areas--the Swanson Canoe Trails Systems and they seem to be very compatible.

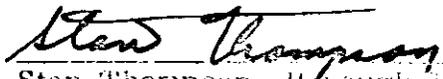
Most of us came here to Kenai to enjoy Alaska and the outdoor environment. We have found that we can enjoy the benefits of the oil industry and retain the enjoyment of wilderness Alaska. They are not incompatible at all.

In conclusion, I feel the Kenai Borough has definitely gained by the coming

of the oil industry--In fact the 2 biggest and most important things that have happened to improve the Kenai area as a place to live has been the opening of the land for homesteading (unfortunately long since stopped) and the entry of the oil industry.

From the viewpoint of orderly transition, I would recommend the federal government look seriously at the possibility of immediate development of lower Cook Inlet. This followed by the Gulf of Alaska, etc. The advantage being that basically all of the services and attitudes necessary are already in place in the Kenai Borough--particularly the Kenai, North Kenai area, and I could see no major disruption or problems from immediate OCS drilling in this area.

I would be pleased to answer any questions that your Committee would care to ask.



Stan Thompson, Borough Mayor

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FRIENDS OF THE EARTH

DAVID BROWER, *President*

BOX 1796, FAIRBANKS, ALASKA 99707

(907) ~~HEXZXX~~ 479-3684

JIM KOWALSKY, *Alaska Representative*

STATEMENT OF PETER SCHOLES, FRIENDS OF THE EARTH, REGARDING THE
SIC DEIS FOR THE PROPOSED OUTER CONTINENTAL SHELF OIL LEASES IN
THE NORTHERN GULF OF ALASKA, ANCHORAGE, ALASKA, AUGUST 13, 1975.

I am Peter Scholes, a resident of Anchorage and a member of
Friends of the Earth. Jim Kowalsky, Friends of the Earth's Alaska
Representative, was unable to be here today, so I am speaking in
his behalf. Friends of the Earth is an international organization
with many members in Alaska, and it is dedicated to the preservation,
restoration, and rational use of the earth.

I appreciate the opportunity to testify here today, and I
compliment the Bureau of Land Management on what I believe to be quite
a good draft environmental impact state -- certainly a better effort
than the programmatic impact statement released last winter.

Friends of the Earth's basic position is that the decision on
whether or not to lease as presently proposed should be delayed for
at least two years. There are many reasons, I believe, for delaying
the decision to lease, and I will elaborate on two of them here.

First, there are a number of planning and legislative
developments which are closely related to the sale of OCS leases.
The most obvious being the work of Representative Murphy's Select
Ad hoc Committee on the Outer Continental Shelf. This committee is
considering legislation dealing with revenues, impact funds, etc.,
and they deserve to be allowed to complete their work in advance of
a decision being made about leasing. Other examples include the

Committed to the preservation, restoration, and rational use of the ecosphere

State of Alaska's efforts with the Coastal Zone Management Act which will include planning for onshore impacts. Another example is the settlement of the "d-2" provisions of the Alaska Native Claims Settlement Act. In this regard, one of the "d-2" bills now before Congress would create a Wrangells National Park including the Copper River delta, Kayak Island, Icy Bay, and some areas on beyond Yakutat. I believe it is desirable that all of these issues be settled in advance of any decisions about OCS leasing.

The description of the biological environment in the DEIS is divided among producers and consumers, ^{coastal and marine} coastal and marine environments, etc., and from this one doesn't get a feeling for the way in which all of of the components of the Gulf of Alaska ecosystem are closely and inextricably interrelated. I am not a biologist, but I don't think that one has to be a biologist to understand what John Muir meant in his oft repeated quote about one thing in the universe being tied to every other thing in the universe.

One example is that of shorebirds and their use of the intertidal zones of the Copper River delta (Copper River flats). According to Islieb and Kessel (1973, see reference in DEIS) in the month of May more than 20 million birds migrate through the area and utilize the 200+ miles of the Copper River flats. Many of these are shorebirds, and, in fact, according to Islieb and Kessel, a great percentage of the entire Alaska populations of western sandpipers, knots, dunlins, dowitchers, and least sandpipers utilize this ^{little} area in May.

I understand that one of the ecological roles they may play is that of a recycler of nutrients in that they fertilize the flats

with their wastes, thus providing food for the growth of plankton which in turn is utilized by other creatures higher on the food chain (fish, some invertebrates, whales, etc.). This role as a nutrient recycler is also important for seabirds.

What is ^{the} significance of the flats for shorebirds? We know that they feed intensively there and that from the delta the shorebirds fly to their breeding grounds at various points in Alaska. We also know that the condition of shorebirds as they arrive on the breeding grounds is critical for successful nesting.

So what happens if a large oil spill covers a portion of the Copper River flats during the peak of the May migration? How will this affect the condition of the birds on the breeding grounds? What happens to other components of the Gulf ecosystem if the flats are contaminated and no longer utilized by 20 million birds? Will it affect the fishing industry?

The answers to these questions are not known although some of the OCS research getting underway this year will help answer some of these questions. Projects getting underway in 1975 for the Gulf include: the food habits of migrant shorebirds, gull reproduction on a barrier island, surveys of wintering seabirds, and hydrocarbon signatures in the pre-OCS development environment. Because of the interrelatedness that John Muir speaks of, these individual projects have a significance far beyond just the gulls on a barrier island, for example.

These research projects I just mentioned will likely not be complete for at least two more years. One can't simply dump several million dollars in the laps of some scientists and then a few months

later pick up the results. If this money is not to be wasted, then the decision to lease should be delayed for at least two years. I should add that on the basis of some of this research, you ^{should} be able to make decisions to lease or not to lease certain areas and predict the consequences -- to some extent -- for birds, fish, people, etc.

I would like to conclude by summarizing several specific recommendations.

- 1) The decision on whether or not to lease any or specific tracts should be delayed at least two years from the time the sale is now scheduled to take place.
- 2) The DEIS assigns each lease block a "proximity value" for oil spills and structures based on its distance from significant resource factors. I think this type of analysis could be expanded to include factors in addition to those utilized. A policy decision should be made that blocks that are assigned "relatively high hazard potential" should not be offered for sale given the present data base and circumstances.
- 3) Our current national energy policy seems to be little more than find all the petroleum we can and use it up as fast as possible. I believe the energy conservation measures as discussed in the DEIS (p.753), coupled with the development of non-petroleum energy alternatives, is the only long term course for the Nation to take.

Thank you for listening to these views. I hope these thoughts, along with all the others you have heard, will be thoroughly considered before the Interior Department makes any far-reaching decisions about OCS leasing.

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TESTIMONY BEFORE THE HEARING PANEL, U.S. DEPARTMENT OF THE INTERIOR

ANCHORAGE, ALASKA

August 13, 1975

I am Robert Richards, Vice President and Economist of the National Bank of Alaska.

In 1961 I received my Bachelor of Arts degree in economics from the University of Washington. In 1964 I received a Masters of business Administration, specializing in business economics, from the Graduate School of Business, Stanford University. While at Stanford University I studied under Professor Theodore Kreps, a nationally renowned expert in the field of business-government relations. While teaching at the University of Washington I took postgraduate work and completed the Doctoral examinations in the field of "Business, Government, and Society," examining many of the same issues with which the Department of the Interior is concerned.

From June, 1964, to September, 1971, I served as an economist in private industry, then I taught economics at Whitman College and at the University of Washington, and, finally I served as a consulting economist in private practice. In September, 1971, I joined the National Bank of Alaska as economist and have held that position to this date.

I am an economist interested in a balanced pursuit of our nation's economic objectives so as to be not only compatible with but indeed conducive to the achievements of our nation's social and ecological objectives, and I am a Westerner and an Alaskan with a great love for the outdoors. Therefore I can unequivocally assert that I am in accord with the full range of objectives of the Department of the Interior. .

When analyzing the Draft Environmental Statement, at least two major defects are observed:

- (1.) It fails to consider the effect on the structure of Alaska's economy of expanded petroleum development in this state;
- (2.) When examining the environmental impact of the proposed oil and gas exploration, development, and production in the Gulf of Alaska, its scope is far too narrow.

First, let us take a look at the structural elements of the economic impact.

Heretofore, Alaska's major basic industries have been fishing, construction, forest products, and tourism. These industries are highly labor intensive, highly seasonal, and highly subject to cyclical fluctuations. It is because the private sector of Alaska's economy has been based on these highly volatile, relatively low-wage industries that Alaska's economy has been subject to

wide swings, and certain areas have faced chronic poverty.

Now, however, we have the opportunity to break out of these low-wage bindings and cyclical disruptions which have plagued Alaska's economic history.

As you know better than I, the petroleum industry is extremely capital intensive. The pipeline, when in operation, will represent a capital investment of over \$20 million per employee. This is compared to a pulp mill -- the most capital intensive sector of the forest products industry -- of approximately \$800,000 per employee and a fishing vessel of less than \$100,000 per employee.

It is this difference in capital intensity and mainly this difference that explains why a roughneck on a drilling rig earns two to three times as much as a chokersetter in a logging operation in the woods.

Further, because of this extreme capital intensity and the relatively few workers associated with the petroleum industry, public revenue from this industry tends to increase to a greater degree than the need for additional public services. Indeed, an excellent additional illustration of the social benefits of the petroleum industry is the Kenai Peninsula Borough where borough government expenditures per capita are three times the level of those here in Anchorage and nearly 50% greater than the level in the Fairbanks North Star Borough.

Indeed, because the petroleum industry -- a highly capital-

be the vanguard of Alaska's future economic growth, it is my firm conviction that this economic growth will (1) create a more stable private sector and (2) not only be compatible with, but will be conducive to the achievement of the full array of our non-economic objectives: social, cultural, aesthetic, recreational, etc.

Now turning to the second defect of the Draft Environmental Statement; its narrow scope.

When endeavoring to measure the environmental and economic impact of proposed oil and gas production in the Gulf of Alaska, analyzing this project in the context of only Alaska would leave out the greatest part of the impact: the impact on the United States in general. The Department of Interior's task, of course, requires you to focus on the full range of national, social and economic benefits and social and economic costs, and the objective that we all share is to insure that the former exceed the latter.

I think it can be asserted that extraction of oil and gas from the Gulf of Alaska is not only compatible with achieving our nation's environmental objectives, but indeed is conducive to achieving our nation's environmental objectives. A number of factors lead to this conclusion.

1. If we constrain the use of coal and nuclear power because of environmental harm resulting from the development of these two resources, then this implies an increase demand

pressure on alternative energy sources such as oil and gas.

2. It is estimated that emission standards for automobiles imposed by the Environmental Protection Agency will increase demand for gasoline by approximately twelve per cent over the next three years.

3. Analysis of the oil seeps in the Gulf of Alaska indicates that the Gulf holds crude oil with a very low sulfur content. If this "sweet" crude in the Gulf of Alaska is not extracted, then a correspondingly greater amount of foreign crude oil must be imported. Because most of the growth in foreign supply is expected to be predominantly "sour" crude (this is, high sulfur crude) additional refineries capable of processing "sour" crude will have to be constructed in the United States, and our country will experience a greater degree of pollution resulting from refining the "sour" crude.

4. Somewhat ironically, at the very time that the Friends of the Earth, the Environmental Defense Fund, and the Wilderness Society were holding up construction of the trans-Alaska oil pipeline, I was in Los Angeles listening to environmentalists bemoaning the fact that more natural gas was not available to enable Los Angeles County to fully implement a program of fuelling county vehicles with natural gas so as to reduce air pollution.

Frankly, in my opinion, in the past there has been a tendency to analyze these projects in too narrow a sense. Ironically, rejecting certain projects on the basis of focusing on the specific environmental costs of the individual project could very well lead to not minimizing the total environmental costs to the nation as a whole. We economists refer to this as sub-optimization. It results from taking too narrow a viewpoint in our analyses of specific projects. Indeed, we are meeting ourselves full circle on this issue, and I would like to re-emphasize that, if we do not develop the oil and gas in the Gulf of Alaska because environmental costs are viewed as too great we must at least acknowledge that we are at the same time increasing environmental costs elsewhere in our country.

To summarize my testimony: I have endeavored to point out to the Hearing Panel that the Draft Environmental Statement (1.) fails to adequately consider the important positive effect on the structure of Alaska's economy from expansion of the petroleum industry in our state and (2.) does not sufficiently indentify or attempt to measure the environmental cost to the rest of the nation of not allowing oil and gas development in the Gulf of Alaska.

Thank you very much. I appreciate your taking time and considering my testimony.



Robert R. Richards

Vice President and Economist

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CHUGACH NATIVES, INC.
TESTIMONY ON OCS LEASE SALE
ANCHORAGE 8-13-75

MY NAME IS RICHARD JANSON, EXECUTIVE DIRECTOR FOR CHUGACH NATIVES, INC.

WE REQUEST A DELAY IN THE LEASE SALE IN THE GULF OF ALASKA; WE FEEL THAT THE STUDY ON THE IMPACT ON SHORE IS NOT ADEQUATE.

CONTINUED AND MORE EXTENSIVE STUDIES OF THE OCEAN CURRENTS IN THE PROPOSED LEASE AREA SHOULD BE DONE SO THAT ON SHORE DRIFT CAN BE DETERMINED THEREBY FIXING THE AREA THAT COULD CAUSE THE MOST DAMAGE ON SHORE, AND WE PROPOSE THESE AREAS NOT BE PUT UP FOR SALE.

THE STUDY ASSUMES THAT THE PLATFORMS WILL BE BUILT OUT OF STEEL AND OUTSIDE OF ALASKA. THIS THEN WOULD HAVE LITTLE IMPACT ON ALASKA BUT THE NORTH SEA DETERMINED THAT CEMENT PLATFORMS WERE THE BEST. THEY MUST BE BUILT CLOSE TO THE LOCATION AND TAKES MANY ACRES OF FLATLAND AND LOTS OF AGGREGATE. IF THIS BECOMES THE CASE IN ALASKA, THIS WOULD HAVE A BIG IMPACT ON SHORE. THE STUDY SHOULD CONTEMPLATE THIS POSSIBILITY AND ADDRESS IT AS SUCH.

WE FEEL THAT THIS DEVELOPMENT WILL HAVE A DEFINITE IMPACT ON OUR LANDS, OUR CITIES AND VILLAGES THAT ARE ADJACENT TO THE PROPOSED DEVELOPMENT. WE NEED TIME TO PREPARE FOR THIS IMPACT.

WE FEEL THAT THESE ARE JUST A FEW OF THE REASONS FOR DELAY, THEREFORE, IT IS OUR FEELING THAT A DELAY IS NECESSARY.

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Testimony of: Frank A. Tupper

Representing: Kachemak Bay Defense Fund

Submitted to: U.S. Dept. of Interior

O.C.S. Public Hearing on Northern Gulf of Alaska

Date: August 13, 1975

Anchorage, Alaska

Judge Mesch, and distinguished members of the Hearing Panel;

The tragic events leading to the leasing and sale of Alaskan land for oil & gas exploration in Kachemak Bay have a direct correlation to the proposed leasing of the Interior Department for the Gulf of Alaska.

Kachemak Bay is like no other body of water in the world. It is a gross understatement to claim that it is unique. Kachemak Bay is not typical in any sense of the word.

Unfortunately, the problem that the Bay faces is sadly typical. It is a Bay in crisis, brought about by crisis, with the net result of long term crisis.

Kachemak Bay lies at the southerly end of the Kenai Peninsula, adjacent to Cook Inlet, stretching 23 miles in length, and 3 miles in width. It is pure. It is clear. It is abundant in marine life. It is a tourist mecca. It is steeped in historical and archeological values. It is beautiful, and it is home. But most important - IT IS THREATENED.

In Dec. 1973, Kachemak Bay for all its worth and wealth, was sold out for a mere \$25 million at an oil lease sale, conducted by the State of Alaska, upon the request of the major oil industries.

The sale and the events that have followed, distinguished members of the Hearing Panel, are but a microcosm of O.C.S. and should be an impressionable lesson of historic significance for you to recognize and to avoid. Representation, protection, participation, candor conservation, and wisdom are the hallmarks of a truly democratic government and society. They do not always spell progress on the tally boards of Wall Street. Nor should they if necessary. But your assignment must be one of exercising logic, clear judgments and rational thought process, not a blind allegiance to some damn fool slogan of "operation independence" initiated by our gluttony of consumptive ^{spoiled} indigestion ^{causing} the malady of "energy crisis".

Kachemak Bay, not unlike the Gulf of Alaska, is abundant with renewable & non-renewable resources; hazzardous weather conditions, and geologically dangerous strata.

The residents of Homer and Seldovia, upon learning of the oil leases chose a course that would lead to a remedy. We requested that our state move cautiously and protect the area, the economy, the lifestyle and the resources. Our politicians had mired in the prospects of "black gold" far too long. The former Governor, the Commissioner of Natural Resources and

unquestioning staff, were so arrogant as not to even post notice of the sale in our area, nor was there even an economic and environmental finding conducted to see if the sale was in the best interest, and the final insult hurled from the lofty peaks of Juneau and Anchorage was the denial of a requested public hearing on the land to be leased prior to the sale.

Democracy and representation had been perverted and the peoples land would be leased without their knowledge or consent.

This issue is presently lying on the doorstep of the Alaskan Supreme Court, whose ultimate wisdom and justice we seek. The public sector was unable to obtain the protection of their land and existing resources without the recourse of having to initiate litigation. The public was unable to get a badly needed moratorium on drilling for the purpose of conducting necessary scientific studies of the Bay and the communities to be affected without the need of going to court. The public was unable to protect and espouse their Constitutional rights without entering into litigation. Why must these studies be conducted "post facto" and in an expeditious manner?

We were advised by our political leaders and educators to take an active part in the political and administrative process of government. We did. Four hearings were held, but to what avail? When the die is cast, be it in Juneau, Washington, or Houston, the public has little chance of having any meaningful impact on the planning process, save for accepting the fate, selling out and moving on, or plant your feet on the facts and moral convictions, and fight. In Homer, we have chosen the latter, and we will prevail no matter what the odds. However, it does seem a shame that in our historically evolved society, that this is the needed course of action that seems to be the most effective.

The action taken by the State was wrong, dead wrong, and it will eventually be corrected for Kachemak Bay and its' rich crab and shrimp sanctuaries must be protected from the high and proven risks that oil exploration and development will spawn.

Other Alaskan communities, faced with similar destructive environmental, social, cultural and economic impacts, can and must do the same to protect their rights, their values, and their interests.

In other areas of our State, the threat posed by O.C.S. development, merits the

communities do not sink into the abyss of the industries lust and bullish destructive tactics.

Time and again small towns and villages who quietly lie in the Alaskan fallow fields of abundant resources or choice land for industrial development, await with a sense of impending doom, the sentence to be handed down, or forced down, in the burzaucratic fashion that we have witnessed and tolerated for far too long. The situation must be reversed.

When government fails to be responsive and responsible to the needs, protection and dissemination of information to such communities and their people, moral discipline gives way to myopic vision; citizens have no other recourse and alternative than to vigorously oppose such unjust actions.

Such acts of arrogance and the betrayal of citizens rights and public trust were performed on Kachemak Bay. Some of those persons who were charged, through the electoral and appointive process of protecting the rights and land of the people, and who in turn, acquiesced in their line of duty, are here before you testifying today. Such a mockery. Such a farce.

I would take this opportunity today to call upon those Alaskan Coastal communities, who are being adversely affected by any unplanned, covert rush to develop, exploit and sacrifice the land and community of man and nature, to join forces and collective talents in forming an Alaskan Alliance of Coastal communities to protect the land they love and respect, and have come to view as a community, not a commodity. O.C.S. is but one of the challenges that stand on the threshold, there will be others for decades to come. But collectively, we can insure that orderly, wise and rational development through planning stemming from the people on down, rather than the other way around, will be a goal that will serve the best interests of us all.

Many Alaskans have come to develop a deeply ingrained distrust and distain for governmental agencies, bureaus and their respective lip service through the existing exercise of public hearings. *which is fact a farcical charade* For the simple reason that no one really listens, and no one really has security based on devotion to the principle of rational thinking, to act on behalf of the people.

A legacy of lies, half truths and selfish motivations on behalf of a few at the expense of many, have with great reason, caused many Alaskans to fear the combined powers of *and based on a N.B.*

John P. ...
large extractive industries, compromising small town business men, mayors and elected officials and lawyers who are emersed in the mire of the frontier exploitive ethic.

Prior to Statehood, the Federal government was charged with protecting wilderness and our bountiful natural resources. Since we have joined the Union, we have also joined the inane rush to ruination and a loss of the serenity, sparse population and scenic wonderment we use to believe was the "last frontier".

The Dept of Agriculture has, through a lax permit granting and basically unregulated conservation controls, allowed Southeastern and now Southcentral, *now gone* to be cleared to the waters edge of timber.

More recently, the Dept. of Interior has sanctioned an oil pipeline bisecting and usurping all that IS Alaska, impacting both man and nature at every conceivable level, with a promise of more to come, namely REG-S.

We, (Alaska, her people, resources and beauty) stand in the maw of Washington, expected to be rapidly devoured by the omniverous jaws of a *what next?* carcinogenic society, whose government underwrites the sanctions and justifications for such "crimes" against our beloved state.

Profit seeking industries do not invest themselves in seeking a halt to such consumption. Esthetics, lifestyle, serenity, and remoteness are something to be conquered. They will be smothered by the blanket of *the* profit priorities.

The Federal government and large coporate industries, spend millions of dollars trying to build and buy the publics' trust under the hearded banners of patriotism, operation independence, free enterprise and the common good, Slogans such as; "progress is our most important product"; "we're working to keep your trust"; and "we want you to know", are but salves to the innocent and insults to the informed.

We have built and created the box-like trap to which we now refer to as "the energy crisis". Not unlike the dreaded disease of cancer, we are the consuming cells devouring energy supplying resources in a maniacal frenzy, with no real efforts to conserve. It would appear that our appetite can not be satiated.

In Alaska, our cities, small towns, uninhabited areas, scenic splendor and lifestyle of a simplistic yet rugged and sometimes spartan design, are now being called upon to

ould we be obligated to be another sacrificial lamb on the altar of the Interior Dept. expedited O.C.S. lease schedule?

We can fully realize that every technological advantage has a comparable cost, that can be reflected by a given dependency. Yet we ignore the debt we owe to the land for the costly effects of what little we really gain.

Perhaps in a futile attempt to appeal to your postponing the lease sale in the Gulf and then Cook Inlet, I would strongly condemn the fact that in the more than 1300 page E.I.S. you devote but a meager 30 pages to onshore impact, land use, socio-economic effects, and no mention of construction, and service bases on shore that will be of significant impact. Also, I failed to see any reference to the cumulative effects on the environment of the Gulf and their long range implications.

Not unlike Kachemak Bay, you are trying to play "catch-up ball" with rushed scientific baseline studies on a vast area where so little is known and time is the only factor. But that is not in the best interest of "Operation Independence" now is it?

Perhaps it is long overdue, but I remain optimistic that it will be forthcoming when the government and the oil industry develop resources and meet the plans and desires of the citizens on their local level and not expect in the existing arrogant and perverted fashion of having the public rise to the wishes of the industry and government.

It is high time for Alaska to tap its human resources, and develop an inventory of petroleum resources, where they lie, and what causal effects there might be in exploring and developing these resources upon the land and the people, and then telling the industry on what conditions and where they may commence operations.

In closing, perhaps it is a most profound observation when one reflects that the battle to save Kachemak Bay comes at a time when we as a nation pay homage to the spirit of revolution against an oppressive government that took away our human rights in 1776. What started in Boston's harbor, is alive and well in Kachemak's Bay.

Thank you for your time, and allowing me the opportunity to testify.

Frank A. Tupper

(55)

STATEMENT OF DUANE R. BARTELS
AREA LANDMAN, EXPLORATION-OFFSHORE AREA
CONTINENTAL OIL COMPANY
HOUSTON, TEXAS

AT THE 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 12-13, 1975

MY NAME IS DUANE R. BARTELS. I AM AREA LANDMAN FOR THE EXPLORATION-OFFSHORE DEPARTMENT OF CONTINENTAL OIL COMPANY, HOUSTON, TEXAS. I SUPERVISE THE ACQUISITION AND ADMINISTRATION OF OIL AND GAS LEASES ACQUIRED IN ALL OF THE FRONTIER AREAS OF THE O.C.S. OF THE UNITED STATES AND ON ALL LANDS IN THE STATE OF ALASKA. FROM 1968 THRU JULY 1973 I HAD THE PLEASURE AND ENJOYMENT OF LIVING IN ANCHORAGE WHILE WORKING FOR CONTINENTAL OIL COMPANY. DURING THAT TIME I BECAME FAMILIAR WITH THE MANY CULTURES AND THE RICH ENVIRONMENT OF THIS GREAT STATE. BEING AWARE OF THE INDUSTRY'S INTEREST AND ABILITY TO PROTECT THE ENVIRONMENT, I AM CONVINCED THE O.C.S. OF THE NORTHERN GULF OF ALASKA SHOULD BE DEVELOPED IF INDUSTRY FINDS COMMERCIAL QUANTITIES OF OIL AND GAS. CONTINENTAL OIL COMPANY IS A MEMBER OF THE GULF OF ALASKA OPERATOR'S COMMITTEE AND THE ALASKA OIL AND GAS ASSOCIATION AND WHOLLY SUBSCRIBES AND SUPPORTS THE TESTIMONY PRESENTED BY ^{THE G.O.A.O. COMMITTEE} ~~THOSE TWO ORGANIZATIONS~~. IN ADDITION I HAVE THE FOLLOWING COMMENTS IN BEHALF OF CONTINENTAL OIL COMPANY, ALL IN SUPPORT OF HOLDING THE LEASE SALE IN THE AREA COVERED BY YOUR DRAFT ENVIRONMENTAL IMPACT STATEMENT.

FIRST, YOU AND YOUR STAFF ARE TO BE COMMENDED FOR THE COMPREHENSIVE PREPARATION OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT COVERING THE PROPOSED OIL AND GAS LEASING IN THE NORTHERN GULF OF ALASKA. IT APPEARS THAT FEW "STONES" WERE LEFT UNTURNED WITH RESPECT TO YOUR ACCUMULATION OF DATA. FOR EXAMPLE, THE STATEMENT RECOGNIZES THE POSSIBILITY OF AN OIL

SPILL. WE IN THE INDUSTRY ALSO RECOGNIZE THIS POSSIBILITY ALTHOUGH WE BELIEVE IT TO BE HIGHLY UNLIKELY.

IN ANY EVENT YOU MAY BE ASSURED THAT THE INDUSTRY WILL TAKE WHATEVER STEPS THE LATEST TECHNOLOGY HAS DEVELOPED TO PREVENT SUCH A SPILL; BUT, SHOULD A SPILL OCCUR, THE INDUSTRY WILL USE THE LATEST TECHNIQUES AND EQUIPMENT AVAILABLE TO MINIMIZE ANY ADVERSE IMPACT.

A CONSIDERABLE PORTION OF YOUR DRAFT IS VERY POSITIVE AS TO THE ADVERSE IMPACT SHOULD AN OIL SPILL TAKE PLACE. WE BELIEVE THAT THE FINAL ENVIRONMENTAL IMPACT STATEMENT SHOULD GIVE GREATER EMPHASIS TO THE REDUCTION OF SUCH IMPACT BY WIND AND WAVE ACTION, PARTICULARLY IN THE GULF OF ALASKA, AND BY THE USE OF OIL SPILL AND CONTAINMENT EQUIPMENT BY THE INDUSTRY.

WE ALL NEED TO STRIVE FOR CLEAR AND COMPLETE STATEMENTS TO PREVENT THE PUBLIC FROM BECOMING MISLED, CONFUSED AND THEREFORE RELUCTANT TO COMMIT TO A POSITIVE PROGRAM FOR THE DEVELOPMENT OF AN ADEQUATE ENERGY SUPPLY.

IT IS UNFORTUNATE THAT THE WORD "IMPACT" IS USUALLY IDENTIFIED WITH NEGATIVE EFFECTS. LITTLE IS SAID ABOUT THE POSITIVE SIDE OF AN IMPACT, PARTICULARLY THAT WHICH TAKES PLACE EVERYDAY, UNNOTICED, AND THEREFORE IS REALLY NOT FULLY APPRECIATED UNTIL IT IS DISRUPTED OR NO LONGER AVAILABLE. WITH THIS THOUGHT IN MIND, IT SHOULD BE RECOGNIZED THAT A CONSIDERABLE PORTION OF THE ESSENTIAL DAILY NEEDS OF THE PEOPLE LIVING IN ALASKA DEPENDS UPON

GOODS AND SERVICES BEING PRODUCED IN AND SUPPLIED FROM THE "LOWER 48". ACCORDINGLY, ANY ENHANCEMENT THAT MAY BE OBTAINED IN OUR NATION'S ENERGY SUPPLY, THRU DEVELOPMENT OF WHATEVER COMMERCIAL DEPOSITS OF OIL AND GAS THAT MAY BE FOUND ON THE OUTER CONTINENTAL SHELF OF ALASKA OR FROM ANY OTHER FRONTIER AREAS OF THE UNITED STATES, WILL CERTAINLY PROVIDE A POSITIVE IMPACT TO THE OVERALL ECONOMY OF THE STATE OF ALASKA AND THE NATION.

THUS THERE IS MORE TO THE IMPACT FROM THE ANTICIPATED DEVELOPMENT THAN STATE VS. NATIONAL OR NATIONAL VS. STATE AND; THEREFORE, CONSIDERATION SHOULD BE GIVEN TO THE TOTAL IMPACT-- NOT JUST TO ADVERSE EFFECTS TO ALASKA OR JUST TO THE PROPITIOUS EFFECTS TO THE "LOWER 48". WE ARE ALL IN IT TOGETHER--SO GOES ENERGY--SO GOES THE STATE AND SO GOES OUR NATION.

AS HAS BEEN SAID TIME AND TIME AGAIN, ONLY EXPLORATORY DRILLING WILL ANSWER THE QUESTION AS TO WHETHER OR NOT THERE IS OIL AND GAS IN THE AREA. SHOULD OIL AND GAS BE FOUND, THEN ONLY ADDITIONAL DEVELOPMENT DRILLING WILL PROVIDE A BASIS FROM WHICH TO PROJECT WHETHER OR NOT THERE ARE ADEQUATE RESERVES TO JUSTIFY ESTABLISHMENT OF PRODUCING FACILITIES. ONLY AFTER PRODUCTION FACILITIES ARE INSTALLED, FOLLOWED BY ADDITIONAL DRILLING AND PRODUCTION WILL YOU BE ABLE TO PROJECT THE PERIMETERS AND QUALITY OF THE RESERVOIR, FROM WHICH AN ACCURATE ESTIMATE MAY THEN BE MADE AS TO THE AMOUNT OF RECOVERABLE RESERVES; HOWEVER, THE EXACT AMOUNT OF RECOVERY WILL NOT BE KNOWN UNTIL THE

RESERVOIR IS NO LONGER CAPABLE OF ECONOMIC PRODUCTION.

CURRENT INDUSTRY INTEREST VERY WELL REFLECTS THE HIGH POTENTIAL FOR ECONOMIC PRODUCTION FROM THE GULF OF ALASKA; HOWEVER, SHOULD THE RESULTS OF THE EXPLORATORY DRILLING BE NEGATIVE AND NOT WARRANT THE ESTABLISHMENT OF PRODUCING FACILITIES, THE STATE OF ALASKA, THE "LOWER 48" AND OUR NATION NEED TO BE MADE AWARE OF THIS, AS SOON AS POSSIBLE, IN ORDER TO APPROPRIATELY MODIFY SUBSEQUENT PROGRAMS LEADING TO BECOMING A SELF-SUFFICIENT ENERGY NATION.

EXTREMELY IMPORANT THAT WE KNOW SOON IF THE FRONTIER AREAS, WHICH HAVE NOT BEEN EXPLORED, WILL CONTRIBUTE TO OUR SUPPLY OR WILL BE BARREN. WE WILL NEVER KNOW HOW COSTLY DELAYS, CAUSED BY LAW SUITS, OVER-REACTION, STRICT INTERPRETATION OF LAWS, (EVEN THOUGH WELL INTENDED) AND ORDINARY OBSTRUCTIONS HAVE HINDERED THE DEVELOPMENT OF OUR NATION'S ENERGY SUPPLY, AND DIRECTLY OR INDIRECTLY HAVE INCREASED COSTS OF CRUDE PETROLEUM. SUFFICE IT TO SAY THAT WE HAVE PAID A DEAR PRICE TO BECOME ENVIRONMENTALLY AWARE.

IN THE EARLY HEARINGS HELD FOR SALES IN THE GULF OF MEXICO WE HEARD OPPOSITION PREDICT DIRE CONSEQUENCES FOR CONTINUED SALE OF LEASES IN THAT AREA. FORTUNATELY, THESE PREDICTIONS HAVE NOT MATERIALIZED AND AT THE RECENT HEARINGS, OPPOSITION HAS PRACTICALLY DISAPPEARED. HEARINGS FOR FRONTIER AREAS SUCH AS THE GULF OF ALASKA ARE A MUST AND CAN BE VERY BENEFICIAL, BUT SUCH HEARINGS SHOULD NOT BE USED AS A VEHICLE TO PROMOTE FURTHER NEEDLESS DELAY FOR DELAY'S SAKE. THE STATE OF ALASKA CAN BECOME THE NATION'S LEADING OIL PRODUCING STATE WITH THE POTENTIAL OF BECOMING ONE OF THE LEADING OIL PRODUCING AREAS OF THE WORLD. THE BENEFITS TO THE PEOPLE OF THE UNITED STATES CAN BE ENORMOUS AND ALL THIS CAN BE

ALASKA FOR THE PAST 8 YEARS. I AM HERE TODAY REPRESENTING THE AMERICAN ASSOCIATION OF PETROLEUM LANDMEN AS A MEMBER OF OUR ORGANIZATION'S BOARD OF DIRECTORS.

THE AAPL IS AN ORGANIZATION OF OVER 5000 PROFESSIONAL LANDMEN FROM BOTH THE CORPORATE AND INDEPENDENT SECTORS OF THE PETROLEUM AND MINING INDUSTRIES IN THE UNITED STATES AND CANADA. OUR EXECUTIVE OFFICES ARE LOCATED IN FORT WORTH, TEXAS, BUT MANY OF OUR MEMBERS RESIDE IN THIS AREA AND COUNTLESS OTHERS ARE ENGAGED IN PETROLEUM RELATED ACTIVITIES OFFSHORE AND ONSHORE ALASKA. OUR ORGANIZATION STRONGLY SUPPORTS THE SCHEDULING OF SALE #39 AT THE EARLIEST POSSIBLE DATE.

AAPL HAS HAD REPRESENTATIVES APPEAR IN PERSON OR HAS SUBMITTED WRITTEN STATEMENTS FOR THE RECORD AT EACH PUBLIC HEARING HELD BY INTERIOR FOR OCS SALES BEGINNING WITH YOUR FIRST HEARING IN JULY 1970 AT NEW ORLEANS. WE ALSO HAVE COMMENTED ON "PROPOSED RULE MAKINGS: WHERE THE INTERESTS OF OUR MEMBERSHIP HAVE BEEN INVOLVED. THESE HEARINGS FOR OCS SALES HAVE SERVED TO HIGHLIGHT OUR NATION'S ENERGY SHORTAGE, FURTHERED UNDERSTANDING OF THE PROBLEMS OF THE OFFSHORE PETROLEUM INDUSTRY BOTH IN THE PUBLIC AND PRIVATE SECTORS, AND HAVE PROMOTED ENVIRONMENTAL AWARENESS ON THE PART OF EVERYONE. AT THE SAME TIME, THEY HAVE CAUSED COSTLY

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AUGUST 12, 1975

MANAGER
ALASKA OUTER CONTINENTAL SHELF OFFICE
BUREAU OF LAND MANAGEMENT
ANCHORAGE, ALASKA

DEAR SIR:

MY COMMENTS WILL BE BRIEF IN THE INTEREST OF THOSE WHO
HAVE SAT THROUGH THIS LENGTHY HEARING.

OUR FIRM PRESENTLY HAS AN ALASKAN PAYROLL OF IN EXCESS
OF 60 PERSONS. WE WERE THE LARGEST ENGINEERING FIRM IN
ALASKA PRIOR TO THE ALASKA PIPELINE. BECAUSE WE ARE NOT
WORKING UNDER ANY OIL INDUSTRY CONTRACT PRESENTLY WE HAVE
BEEN SURPASSED IN SIZE BY SEVERAL OTHER ENGINEERING FIRMS
HOLDING SUBSTANTIAL OIL INDUSTRY CONTRACTS.

FIRST, I WOULD LIKE TO ENTER INTO THE RECORD PAPERS
WRITTEN BY TWO WELL-KNOWN ENGINEERS. I HAVE NO BUSINESS
RELATIONSHIP WITH EITHER ENGINEER BUT I AM CERTAIN THAT EACH
ENGINEER SPEAKS WITH A CONSIDERABLE BACKGROUND OF KNOWLEDGE
ON THE SUBJECTS OF ENERGY AND OUR ENVIRONMENTAL REGULATIONS.
THE FIRST ARTICLE IS A TRANSCRIPT OF A TALK BY DAVID R. WILLIAMS,
JR., PUBLISHED IN THE CLEVELAND "PLAIN DEALER". THE SECOND

IS AN ARTICLE PUBLISHED BY STAN KAPPE WHO IS PRESIDENT OF OUR AMERICAN ACADEMY OF ENVIRONMENTAL ENGINEERS, OF WHICH I AM A MEMBER.

THE THIRD ARTICLE PUBLISHED IN LAST SUNDAY'S ANCHORAGE TIMES WAS WRITTEN BY FORMER SPEAKER OF THE ALASKA HOUSE OF REPRESENTATIVES, TOM FINK. THESE THREE ARTICLES SPEAK ALMOST AS ONE VOICE ABOUT THE ENERGY CRISIS NOW BEFORE US AND THE NEED TO BRING SOME COMMON SENSE INTO THE PROCESS OF ENVIRONMENTAL MANAGEMENT AND CONTROLS. MR. FINK RAISES THE POINT THAT IF ALL PROJECTS THAT CREATE ECONOMIC BENEFIT MUST PREPARE ENVIRONMENTAL IMPACT STATEMENTS OUTLINING THE VARIOUS TRADE-OFFS OF ENVIRONMENTAL AND SOCIAL FACTORS RELATIVE TO THE PROPOSED PROJECT, IS IT NOT ONLY FAIR THAT THOSE ORGANIZATIONS THAT OPPOSE PROJECTS ON AN ENVIRONMENTAL BASIS SUBMIT STATEMENTS, IN GREAT DETAIL, SETTING FORTH THE POSSIBLE ECONOMIC AND SOCIAL EFFECTS (BOTH NEGATIVE AND POSITIVE) OF THEIR PROPOSED ENVIRONMENTAL CONTROLS.

THIS LEADS TO ANOTHER POINT THAT I WOULD LIKE TO MAKE THAT RELATES TO THE VERY BASIS OF BUSINESS AND GOVERNMENT SUCCESSES AND FAILURES. I SUBMIT THAT IN THE PAST GENERATION WE HAVE PASSED FROM A RELATIONSHIP OF TRUST AND GOOD FAITH TO A SYSTEM THAT IS BASED TO A GREATER EXTENT UPON DISTRUST AND LACK OF FAITH IN OUR BUSINESS AND GOVERNMENT COMMUNITIES.

THIS SEEMS TO BE A PROGRESSIVE PROCESS IN BOTH THE BUSINESS AND GOVERNMENT SECTORS. THE MENAGERIE OF FEDERAL GOVERNMENT RULES, REGULATIONS, ETC., THAT ARE SELDOM, IF EVER, EVEN PARTIALLY UNDERSTOOD, LET ALONE ENFORCED, MOST CERTAINLY CREATES A GREATER BURDEN UPON THE HONEST CITIZEN AND BUSINESSMAN WHO IS TRYING TO OBEY THESE LAWS AND REGULATIONS AND WHO HAS TO PAY THE SALARIES OF THOSE PAID TO ADMINISTER THESE REGULATIONS THAN IS THE BURDEN UPON THE DISHONEST BUSINESSMAN WHO IGNORES ALL THESE RULES AND RISKS GETTING CAUGHT WITH THE PROBABLE RESULT THAT HE WILL RECEIVE ONLY A LIGHT TAP ON THE WRIST.

WOULD IT NOT BE MUCH BETTER IF WE HAD FEWER LAWS, RULES AND REGULATIONS AND "COME DOWN HARD" ON THOSE WHO DISREGARDED THESE SIMPLER RULES? UNTIL 30 YEARS AGO AN ENGINEER WAS USUALLY GIVEN A BUDGET AND A PURCHASE ORDER BOOK AND TOLD TO "BUILD IT". THE TASK WAS ALMOST ALWAYS SUCCESSFULLY ACCOMPLISHED WITHOUT THE BENEFIT OF AN "ENVIRONMENTAL IMPACT STATEMENT" AND THE OTHER MULTITUDE OF REQUIREMENTS.

I SUBMIT THAT THE ALCAN HIGHWAY WOULD NEVER HAVE EXTENDED BEYOND EDMONTON WERE THE SAME RULES, REGULATIONS, ETC., IN FORCE THAT ARE IN EFFECT TODAY. THIS WOULD NO DOUBT ALSO BE TRUE OF THE OLD RICHARDSON TRAIL (NOW THE RICHARDSON HIGHWAY) AS WELL AS OTHER HIGHWAYS IN ALASKA.

WHAT WAS THEN CONSIDERED TO BE A NATIONAL NECESSITY WOULD TODAY BE CONSIDERED AN "ENVIRONMENTAL DISASTER". TODAY THE SCARS IMPOSED UPON MOTHER NATURE BY THAT HIGHWAY HAVE ALMOST ALL HEALED AND TRAVELING THAT HIGHWAY TODAY DOES NOT PRESENT A VIEW THAT REFLECTS AN "ENVIRONMENTAL DISASTER".

ABOUT 30 YEARS AGO OUR AMERICAN SOCIETY OF CIVIL ENGINEERS BOASTED THAT NONE OF OUR MEMBERS HAD EVER RECEIVED A CRIMINAL SENTENCE. THIS MAY NOT BE TRUE TODAY BUT I BELIEVE THAT THE ENGINEERING PROFESSION STILL RANKS EXTREMELY WELL IN THAT CATEGORY. (AT LEAST COMPARED TO ANOTHER PROFESSION THAT IS WRITING MANY OF THE LAWS, RULES AND REGULATIONS). WOULD IT NOT MAKE MORE SENSE AS A STATEMENT OF NATIONAL POLICY IF WE WERE MORE TRUSTFUL OF THOSE WHO ARE TRYING TO ACCOMPLISH A BENEFICIAL TASK?

MY FINAL POINT IS THAT YOU HAVE NO DOUBT HEARD MUCH FROM THOSE WHO BELIEVE THAT PRISTINE ALASKA WILL BE DEVASTATED BY THE "GREEDY OIL INTERESTS" FROM THE "LOWER 48". I SUBMIT THAT NEARLY EVERY ALASKAN COMMUNITY HAS RECEIVED MANY BENEFITS FROM PUBLIC WORKS TO THE EXTENT THAT THESE COMMUNITIES PRESENTLY ENJOY SCHOOLS, AIRPORTS, HARBORS, DOCKS, WATER AND SEWER SYSTEMS, STREETS, HIGHWAYS, COMMUNITY HOSPITALS, PUBLIC BUILDINGS, MORTGAGE MONEY FOR HOUSING AND MANY OTHER

FACILITIES, THAT HAVE BEEN SUPPLIED LARGELY THROUGH TAXATION AND FINANCIAL SUPPORT FROM THE "GREEDY OIL INDUSTRY" AND OTHER "SOUTH 48" TAXPAYERS. ANCHORAGE CERTAINLY WOULD NOT BE THE CITY IT IS TODAY (AND I BELIEVE IT IS A GREAT CITY TO LIVE AND WORK IN) WITHOUT THE NEARLY A HALF BILLION DOLLARS IN FEDERAL DISASTER FUNDS FOLLOWING THE 1964 EARTHQUAKE. NO DOUBT ALASKA WILL TAKE A FEW LUMPS FROM ENVIRONMENTAL IMPACTS FROM GULF OIL ACTIVITIES IF A PROVEN FIELD IS DEVELOPED. PERHAPS WE WILL HAVE TO GET A DICTIONARY OF TEXAS LINGO IN ORDER TO COMMUNICATE WITH NEWCOMERS TO ALASKA. OUR OWN FIRM HAS RECEIVED LITTLE DIRECT BENEFIT FROM THE OIL INDUSTRY IN ALASKA, AND, IN FACT, PRESENTLY HAVE NO CONTRACTS WITH THE OIL INDUSTRY. NEVERTHELESS, I BELIEVE THAT THE OFFSHORE LEASES PRESENT AN OPPORTUNITY FOR ALASKANS TO AT LEAST PARTIALLY REPAY OUR "SOUTH 48" NEIGHBORS WHO HAVE SUPPORTED MOST OF THE COMMUNITY FACILITY DEVELOPMENTS THAT ARE IN EVIDENCE TODAY.

ONE OF THE MOST IMMEDIATE PROBLEMS THAT I SEE IN ALASKA IS THAT OF DEFINING THE ROLE THAT OUR FEDERAL, STATE AND LOCAL GOVERNMENTS SHOULD PLAY. MOST PERSONS IN ALASKA WOULD AGREE THAT THE ROLE THAT OUR POLITICAL SYSTEM SHOULD PLAY IS THAT OF HELPING OUR CITIZENS TO HELP THEMSELVES AND NOT THE ROLE OF ATTEMPTING TO "DO EVERYTHING FOR EVERYBODY". IF OUR

POLITICAL SYSTEMS WILL PROVIDE GUIDANCE AND DIRECTION WITHOUT
USURPING THE ROLE OF PRIVATE ENTERPRISE AND THEREBY ALLOW
OUR RESIDENTS TO DEVELOP AND UTILIZE THEIR OWN ABILITIES AND
INITIATIVES THAT ARE PART OF OUR "PIONEER SPIRIT", ALASKA
WILL NOT ONLY SURVIVE AFTER THE GULF LEASES ARE ISSUED, IT
WILL THRIVE!

FRANK NYMAN

PARNTER, TRYCK, NYMAN & HAYES

(AN ALASKAN FOR 26 YEARS)



Environmental Controls Costly To Consumers

By Tom Fink

TODAY WE HAVE truth in lending, truth in packaging, truth in advertising and other "truth in" laws to protect the consumer. The purpose of these laws is to require the expression of costs and services in a language which is understandable and comparable. Hopefully, these laws will allow the consumer to make a choice as to the costs and services he uses.

One area today that affects the consumer's pocketbook to a great extent is completely devoid of the "truth in" principle. In the area of environmental costs the consumer is left in the dark. The consumer has no opportunity to compare, select or reject.

I BELIEVE the public is entitled to know, for example, the cost per gallon of gas as a result of the environmental controls on the trans-Alaska Pipeline. When the line is completed the costs ought to be computed. We ought to know if it's one cent a gallon, 10 cents a gallon, or 25 cents a gallon. We ought to know the increased cost per average home for heating fuel and the increased cost per average home for electricity as the result of the environmental controls placed on the trans-Alaska Pipeline.

The public is entitled to know the costs per average car for the auto emission controls that have been placed on motor vehicles in the past few years. If the cost is \$1,000 per car, I suspect that most Americans, except those living in smog-ridden Chicago and Los Angeles, will believe that cost is too high for the benefits received.

The consumer is entitled to know the average cost of the increased electricity bill, which is directly connected to environmental controls placed on utility plants. The cost of

cleaning smokestack emissions and cooling water ought to be translated to an average increase in utility costs for a home.

ABOUT A YEAR ago, Mr. Train, head of the Environmental Protection Agency, estimated that the cost for environmental clean-up of utility plants in the United States would be something like \$27.5 billion. This figure is meaningless to the consumer. We need to know if it will raise our light bills by \$5 a month, \$20 a month, \$40 a month or whatever the figure is.

When an environmental agency builds buffer zones into subdivisions for esthetic purposes, we ought to be told the increased cost per home built in that subdivision as a result of that imposition.

Needless to say, we ought to know in advance of the imposition of the environmental restriction what the unit cost will be.

All of us, generally are in favor of cleaning up the environment in which we live. I believe if we had a unit cost of some of these laws and regulations, the public would decide that some of the benefits do not equal the cost.

Also prior to the imposition of environmental controls, the more difficult but equally large unit-cost figures should be attributed to a program or project. We should know how many people will become unemployed as a result of the controls.

Many plants have been shut down because of the high cost of controls. The sales of automobiles have not met expectations, partially due to environmental costs, and employes have been laid off. Steel plants have been closed because of the controls. We should know how much of the

increased food production costs are due to environmental controls.

We are entitled to know the unit cost of energy that is attributable to our failure to develop coal in the western United States.

IN OUR hell-bent chase of the pristine environment, we have lost all sense of balance. I am not suggesting that all environmental rules, laws and regulations are improper. Some of them probably are, but the public has no way to measure or to make a decision of acceptance or rejection because we are not getting a unit cost which is meaningful to anyone.

The truth-in-lending law enables each consumer to make a comparison of interest or finance charges by any type of institution. The consumer then may purchase or not purchase for he has a rational basis to make a decision.

I estimate, without supporting statistics, that a third of our inflationary spiral is directly attributable to environmental costs. Not one day goes by but that part of the income of each American is spent to pay for various environmental controls. There are not any costs today across the country as significant to each of us as the extremely high costs of the environmental controls.

I suggest that we need a law or regulation which will give us the "truth in" environmental costs.

Tom Fink is former speaker of the Alaska House of Representatives and a veteran Republican legislator from Anchorage.

Letter

Bob: This is what all cities say
engineers have been saying all a long but
not as strongly as
Kappe. We are going
to hear more of this!

The Executive Director's Rocker

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Challenges to Endangered Species

Abstract of paper presented by Stan Kappe on April 24, 1975, at the Michigan Section American Society of Civil Engineers Conference on The Engineer in Environmental Conservation, Frankenmuth, Michigan.

Before I address myself to the subject of my presentation, I would like to state my position. As a graduate Sanitary Engineer, I grew up with a background in the service of a regulatory agency on a state level and later on a federal level in charge of a pollution survey on the navigable reaches of the Delaware River and its main tributaries.

I am a great believer in the protection of the planet Earth's environment but only to that degree that produces a return on investment whether it be with public or private funds and whether it be measured in dollars, fish, recreation, health, the well being of mankind or any other parameter that may be applicable and practicable and is not destructive to the Earth's environment and its living matter. I am not a believer, however, of just spending dollars, particularly dollars that do not produce a return on investment but are spent primarily for personal ego, greed, headlines, power and the building up of a bureaucratic empire. I am also a great believer in using good common horse sense when interpreting rules and regulations and not writing into the rules and regulations provisions that were not the intent of the law-makers.

In my time I have seen many fads come and go through cycles. They were like the old hat that was never cleaned up but dug out of the closet and reused

with much ballyhoo as a great discovery and breakthrough. Unfortunately, when closely analyzed, the startling discovery suddenly turned out to be one of the old discarded hats with the same old holes, but to the grandson who found old grandpappy's hat, a most exciting discovery until the fad wore off.

Currently, EPA is reported to have a staff in Washington, D. C., many times greater than FWPCA, its predecessor, had in the entire country at its peak and is spending many more dollars on pollution abatement. And yet, measured in dollars or staff, have the accomplishments and breakthroughs been comparatively that much greater? According to the complaints heard throughout the country by many in the scientific community, as well as in Congress, EPA has made a substantial contribution but, unfortunately, more so in red tape and paperwork. And, according to reports, if it were not for the reused paper program, the country would soon experience a serious shortage in paper products.

According to various sources of information, the processing of an average construction grant application is alleged to take 55 people and 2,000 pounds of paperwork, primarily due to duplicate efforts inhouse on both the state and federal level. There surely must be a more efficient pathway. Such red tape is costly to the program and

to the taxpayers as well as to the consultants and municipalities in dollars and also to the goals and progress of the program. It is a good thing that the Army does not need support on an equal basis for its soldiers in the front ranks. And yet, the regulatory agencies keep on expanding and taking personnel from the front ranks where it is needed without replenishing the supply through adequate training grant programs—a very poor oversight.

The National Utility Contractors Association, Inc., is deeply concerned about the current high unemployment level in the ranks of contractors and its labor forces. In its news release dated March 12, 1975, NUCA stated, "To date, only \$4.8 billion of that original \$18 billion has been obligated, and a mere \$571 million has actually been expended . . . far below the expectations and plans of Congress. We believe that there should be a minimum obligation rate of \$310 million per month nationally, instead of the current \$163 million per month. The members of our industry are deeply concerned about this, and many of them are in serious trouble. Unemployment is increasing, as it is throughout the nation, and more and more of our contracting firms are going out of business."

The basic problem and lack of noteworthy breakthrough in the art of wastewater treatment may not have been due to size and bureaucracy but, like the conglomerates in the private sector that have faltered, due to size and manageability. The real issue could be not how big can bigness expand and how big can monuments be built, but how can the increasing complexities of bigness be kept simple and manageable? The large amount of paperwork being processed by EPA may be a good example. The argument of lower costs, better efficiency and better use of skilled help through bigness to those knowledgeable of the facts is a yet-to-be-proven issue and, by many analysts of the problem, a poor answer to viability and survival.

The limits of bigness can be defined only when due consideration is given to the people problem and the drop in efficiency and productivity that is likely to occur when manageability becomes too complex. Nevertheless, the frustrating battle and power struggle behind the scenes on a local, state and federal level tirelessly goes on. The

back. Finally stops with an overburdened taxpayer paying the bill and in the bottom drops out due to a debt-overburdened economy as the world is experiencing today, not only will the taxpayer be hurt but also the program. Also, much time will be lost trying to put the program back on solid footing.

Treasury Secretary William Simon perhaps has a better explanation. He recently was reported to have told the nation's governors that government at all levels has grown too much and deficit spending by all segments of government is responsible for the current economic problems of recession and inflation.

Unfortunately, the basic parameters for wastewater treatment have not changed very much since the '30's. The early pioneers did an excellent job, but there surely must be room for improvement. As an example, why has it taken the designer and regulatory agencies so long to recognize the fact that all wastewater treatment units, except perhaps the screening unit at the headworks, should be designed and constructed on a balanced constant-flow basis? How else can quality control be attained? How else can the findings in the research laboratories developed on a steady state basis be put into practice and be attained in the field? Can you name any other industry that would even try to attain quality control by not balancing the flow and the load? And yet the overall cost would probably be cheaper. How did the profession get into such a rut? Regulatory guidelines which require plant design on a basis of the incoming flow were certainly not helpful. This is an evil of guidelines. It takes away creative ability and the development of noteworthy improvements. Guidelines not only prolong the agony but also take away from the designing and operating engineer the incentive and the creative ability which really made our nation an industrial power.

And yet, the regulatory agencies are not entirely to blame. We must address ourselves to the incompetency of many designers who just follow guidelines because it is too expensive to do otherwise in the process of securing approval from regulatory agencies and to the equipment manufacturers who just manufacture hardware to sell. EPA did not help the situation when it took away from the designer and owner the

prerogative and logic to specify and install equipment that was in the best interest of plant performance and the owner's pocketbook. And yet, when government buys, the quality product specified must be furnished. Where is the justice in such a directive? When flimsy equipment is forced on the owner, and manufacturers are forced to make flimsy equipment to stay in business, who will be responsible for the high operation and maintenance costs, down-time and impairment to the quality of the effluent that is likely to follow? Surely, no one else but the owner and the designer even though the requirement was a directive by others. Quality equipment may soon be something in the past if this directive is not corrected.

Where are the pioneers and fighters of yesterday? If the designer does not have the courage of conviction, will the owner hold the designer responsible? More than likely, and if so, will the cost of insurance coverage be more prohibitive than it is today for errors and omissions in design and construction and be as costly and as difficult to get as malpractice insurance is for the medical profession? This situation is serious. It could mean that the designer, in order to stay in business and if he is a smart business man, will be forced to write and accept contracts with fine print containing provisions that will limit the designers' liabilities and responsibilities and righteously so, if the criteria and the powers of decision are those dictated by others.

Unless some change in the guidance program is implemented to allow the grantee to select proven and reliable products, the owner is likely to end up with major maintenance and replacement considerations in future EPA-funded projects. And the major equipment manufacturers instead of spending dollars on R & D to develop sturdy and proprietary items will more than likely sit back and cheapen their products in order to stay in business.

Another example is the noise being made today about heavy metals. What are heavy metals? Are all metals heavy metals and really harmful; and, if so, in what form and in what amounts? The propaganda is not clear; it should be clarified. And yet, the unsuspecting public is likely to think from the information being distributed that all metals are dangerous. Many of the authors should know better. How many people

really know that the microorganism growth in the mixed liquor of activated sludge plants is full of so-called heavy metals? And yet in the form present most of these metals do not evidence to be harmful to the activated sludge process which some people say is very touchy. The metal sodium, for example, is harmful per se but when combined with another dangerous element chlorine forms table salt which is a necessity of life. There are many other examples of metals that in one form or another are important to life. The list is too long to tabulate. And yet, the stories being broadcast to the public are difficult to understand except as an issue for use as a scare tactic to get more money to build a bigger and bigger bureaucratic empire or to support one that is faltering for an issue. If these authors do not know, they should be awakened to the fact that all life depends on a system of enzymes, numbering perhaps in the thousands, that contain so-called heavy metals. Iron in the blood stream, cobalt in vitamin B12 and copper and zinc, essential to all organisms as a constituent of many metallo-enzymes, are good examples. There are many others.

I find the criteria set up for sanitary landfills most interesting and the parameters most disturbing. There is no argument that leachates are pollutants but the degree to underground water tables needs better definition.

The question often raised in my mind is whether all refuse should be buried and covered with earth. For example, many metals stored upon the surface of the ground exposed to the atmosphere are in general harmless as metals or stable oxides. And yet, if so stored may be unlawful but lawful when buried in a landfill as a mixture with organic material. When this regulation was formulated, the decision makers apparently were not knowledgeable of the fact that hydrogen sulphide and inorganic and organic acids are produced in landfills by the bacterial decomposition of the organic matter and that these products soon attack the metals therein and convert the metals from harmless insoluble metals to soluble metal sulphides and soluble metal chlorides which are toxic pollutants, harmful to ground waters and to the bacterial decomposition process. As a consequence, the rate of decomposition is seriously retarded, because a leachate high in toxic metal complexes has been produced. Has this

criteria been really thoroughly diagnosed? Would it not have been more advisable to separate the metals at the source to the extent feasible for separate burial or for storage on top of the ground and to dispose of the organic refuse in a separate landfill and by this action take positive measures to prevent the production of soluble toxic metal pollutant complexes? If such a practice were adopted, would the pollution of ground waters from sanitary landfills be as serious an issue? Today, because of current practice, many of the landfills decompose at a very slow rate until the metals are leached out. During this period the landfills are primarily producers of a harmful leachate that could have been otherwise but, unfortunately, due to poor judgment, has been made toxic by producing pollutants in the form of soluble metal organic and inorganic chemical complexes.

The issue of ground water pollution is an interesting issue to diagnose. The earth, when properly used, can be expected to have a much better microbial and physico-chemical purification capacity than do surface waters. All ground waters are polluted to some degree. I know of none that are not. And when the need exists, mankind has learned how to make these waters, like surface waters, usable for industrial purposes as well as for human consumption.

A landfill is a cheap method for disposing of refuse, but are the criteria established conducive to good operation or to the contrary? A two-foot cover with impervious earth may keep out the rain and reduce the quantity of leachate, but it may also impair the quality of the leachate besides putting a cover on a volcano that could erupt momentarily. An impervious cover, however, does a good job of inhibiting rapid bacterial decomposition. The entrapped gasses, particularly hydrogen sulphide and carbon monoxide, generated therein by bacterial decomposition are excellent toxic inhibitors to the microbial process. Besides, the rain that is kept out is needed very much for its oxygen content and to keep the organic material moist for bacterial decomposition. Moreover, there is a potential that the extremely poisonous gas phosgene (COCl_2) can be formed by a reaction of carbon monoxide and chlorine. Fortunately, phosgene gas dissolved in water readily breaks down to carbon dioxide and hydrochloric acid.

Perhaps some day mankind will, if the regulatory agencies permit, recycle seed microorganisms through the landfill to hasten bacterial decomposition and so that the landfill area can and will be used over and over instead of as a sink on a once basis as now practiced and for the recovery of valuable resources. The stakes are high but not as high as other means of refuse disposal and perhaps on a sounder investment basis.

Building a wastewater treatment plant by funds provided almost entirely by an angel (federal and state grants) is not difficult to accept even though it is a false illusion and in the end it is paid for at a higher premium by the taxpayer and the fine print makes the task difficult. However, even though EPA seems to be encouraging the design and construction of plants that have the least cost of construction in order to spread the monies, it would be in the best interest of the municipalities to insist on the construction of a plant that in lieu thereof has the least cost of maintenance and operation, because to keep the plant operational yearly at peak performance without the help of an angel could be prohibitive. The pay check has only so many dollars; whereas, the rising cost demands for other necessities of life are collectively getting to become too burdensome. And yet, on wastewater treatment there seems to be very little concern by the regulatory agencies or perhaps a willingness to accept cognizance of operational and maintenance costs that may follow construction, particularly for AWT.

There is no argument about the need of secondary treatment and preferably, in the speaker's opinion, in the form of biological treatment on all inland waterways but there is argument to scientifically demonstrate the need for producing an effluent containing a biological suspended solids content less than 20 mg/l , and for AWT plants. The latter could be a detriment to the waterway instead of an enhancement if the effluent should produce an environment in the waterway optimum for the growth of high oxygen demand autotrophic plants and microorganisms. And yet, many regulatory agencies are forcing AWT on many municipalities regardless of the fact that it has yet to be scientifically proven and demonstrated that such a degree of treatment will enhance and not impair the water-

way. Equally as critical and perhaps more so is the need to prove and demonstrate that the cost-benefits of AWT will produce a return for its outrageous expenditures to the public and to the waterway.

In this connection, EPA Report 660-3-75-003 dated February 1975 entitled "Eutrophication of Surface Waters—Lake Tahoe's Indian Creek Reservoir" is extremely interesting and informative. Apparently the removal of phosphates and BOD to the levels of 99.5% and 99.8% respectively at the South Tahoe AWT plant according to the report is not the answer for weed and algal control in ICR (Indian Creek Reservoir).

According to this report . . .

"The results of the ICR studies indicate clearly that purifying wastewaters to the highest degree possible by current technology does not insure its optimum suitability for all further purposes, but rather that design parameters must eventually include the entire system."

Moreover . . .

"the STPUD AWT plant is a very efficient system for removing phosphorus, and ICR is a good system for removing nitrogen." And yet, according to the report, aquatic weed growth has been a major observable trend and is interfering with recreational use and a growth of blue-green algae has tainted the flavor of the trout in the reservoir and has produced a strong shoreline odor.

Studies recently made for Blue Plains, D. C., indicated that the cost for AWT at the D. C. plant is likely to be at least ten (10) times greater than that for secondary treatment including costs for amortization, operation and maintenance, and five (5) times greater if costs for amortization are excluded. These costs are likely to be higher, because since the study was made, chemical and material costs have skyrocketed.

In the case of Blue Plains the above studies further indicated that if the proposed 309 MGD AWT plant were constructed and put into operation, the yearly operating and maintenance costs excluding amortization would be approximately \$75,000,000 per year. The question arises, for what proven asset? In Europe at least the kings put their wealth into structures and art that had

and culture and added to the wealth and well-being of the country. The question remains: Will the AWT increment be a sound investment or a "Pink Mirage" on the horizon? Will the taxpayers of the District of Columbia and the surrounding areas in Maryland and Virginia who contribute to this regional plant put up with such exorbitant expenditures annually? My guess is not likely, because all of these political entities are now having trouble raising money to meet budgets. How long can any municipality withstand such high operating costs yearly for a speculative venture regardless of size?

After much noise in the press and otherwise by local interests about costs and need of AWT, the message apparently got through to EPA. During the month of February 1975, EPA announced after studying the staggering rise in energy and construction costs and the need for denitrification at Blue Plains that the denitrification facilities of the Washington area AWT plant would be delayed at this time. This stage, according to the announcement, would have cost \$104 million to build and operating costs would have been an additional \$14.1 million yearly. It would also use large amounts of electricity, methanol, and other resources. There are implications that the nitrification stage might have also been delayed if that stage had not already been under contract. This decision must have been very difficult to make. Regardless, EPA should be commended for making such a wise decision even if it did hurt.

The nitrification stage to be installed at Blue Plains, though costly, should provide some answers to the wisdom of such a large expenditure. The nitrifiers, nitrosomas and nitrobacter are reported to be strictly aerobes closely adhering to solid particles. They also are reported to be adversely affected by light and chlorides of many common metals, and are generally not found throughout the depth of a waterway but only at the bottom of inland waterways and the ocean at the sediment-water interface where the bacterial concentration and ammonium ions adsorbed on the clay particles is an important factor in nitrification. Perhaps, not too much unlike the nitrification which takes place in the lower reaches of deep trickling filters where it is dark, the organic content is low, and the high carbon dioxide content and the presence of simple inorganic

compounds produce an optimum environment for the autotrophic nitrifying organisms. Until the erosion-sediment run-off from non-point pollution sources is abated, the bottoms of waterways will continue to be a prolific breeder of nitrification and it is extremely doubtful if the solution of the problem will be enhanced by the removal of nutrients from wastewaters. The solution is more likely to be in the use of some inhibitors or nutrient inactivants. The studies in this direction being made by EPA at the NERC-Corvallis laboratory are commendable. Its press release dated March 1975 on Zirconium as a phosphorus inactivant looks promising. According to scientific references, Zirconium compounds have been demonstrated to be powerful algaecides and alone have no significant bactericidal effects. In its experiment, EPA is using Zirconyl chloride as the nutrient phosphorus inactivant.

On nutrients, the Fifth Annual Report of the Council on Environmental Quality to Congress on its 1974 findings as required by law is not very encouraging. The report in part states and I quote "... The most disturbing trend regards nutrients. Up to 84% of the reaches exceeded phosphorus and phosphate reference levels associated with potential eutrophication and up to 54% of the reaches showed increased levels in 1968-72 over the previous years. Nitrate levels also increased in 74% of the reaches examined. Approximately one-fourth of the reaches exceeded nitrate levels."

The report further states, "In summary, the EPA study provides a mixed picture regarding trends in water quality. For oxygen demand and bacteria, progress is evident. With regard to nutrients, the disturbing trends reported in our (CEQ) 1972 Annual Report appear to have been confirmed."

If this trend continues, something will have to be done quickly because currently AWT is not too unlike a cost of living clause. Somewhere there has to be an end to the rainbow and Santa Claus.

The implication that 4.5 pounds of oxygen are required to oxidize one pound of ammonia may be stoichiometrically correct. But the implication that all ammonia present in wastewaters and in waterways will ultimately be oxidized to nitrates and such an oxygen demand will be stressed on the waterway can hardly be true. This

fact seems to be substantiated by the large unaccounted loss of ammonia scientifically documented in the limnology of Indian Creek Reservoir. The derivatives of ammonia are too many for only such a pathway to be followed. There are other pathways through which nitrogen can be released to the atmosphere from organic-inorganic complexes besides the nitrite-nitrate denitrification pathway. And I know of no policeman or other force which controls such a pathway in wastewater treatment or in waterways. At least, the manufacturers of blowers and other oxygenation facilities are very happy that there is such an implication and requirement.

The situation is not very encouraging. On the one hand, in order to increase the productivity of fish the Fisheries agencies who should know something about fish and their environment are encouraging the input of nutrient phosphorus at the rate of 35.2 pounds per acre, which is more than 3.8 times the amount entering the alleged P heavily polluted Lake Shagawa, Minn., waters. On the other hand, EPA is spending tremendous sums of money for an EPA sponsored nutrient removal project at Shagawa Lake to improve fishing.

My bet is on the fisheries agencies. When the water pollution regulatory agencies were making much noise about the "dying Great Lakes" and pollution from phosphates, the fisheries agencies, according to the press, quietly studied and learned the causes—Lamphrey eels which infested the Great Lakes when the Great Lakes were opened to the sea and overfishing by commercial fishermen. With both problems solved, according to the news media including the press and TV, the Great Lakes today are considered to be one of the best fresh-water fishing grounds in the world. And the talk of the adjoining communities in both the U. S. and Canada is about the fine catches of a variety of good-size fish including salmon and lake trout. And yet, according to the water pollution regulatory agencies, if the pollutant P had not been removed, the Great Lakes were doomed.

Nutrients are not an evil ingredient as the propaganda machines seem to indicate but to the contrary a necessary ingredient for growth of all living matter. The amounts needed are very small. A threshold limit for P below

003 mg l to control algal growth from all sources—the air, the soil and the waterway—is in my judgment a hopeless task. If algae is a problem, there must be a much better and more positive method than restricting the use of P or by its removal from wastewaters. The use of nutrient inactivators looks more promising.

If the nutrient P were ever brought down below the threshold level in a waterway, there could likely be a greater cry from environmentalists and the general public. Because without the nutrient P, the waterway would soon lose its capacity for productivity of fish and the waterway not being able to support fish life and other aquatic life would soon lose its recreational value as well as its place in the food chain.

The nutrients that were washed into the waterways and deposited in the earth and in the bottom of streams and lakes eons ago are today through the progress and growth of civilization and industrialization being recycled in ever-increasing amounts in the form of fossil

fuels, fertilizers, etc.—all a part of the complex synergistic system of the food chain and life which today some seem to be trying awfully hard to destroy. Whereas, to feed the growing population and civilization with its inhabitants be it mankind, fish, birds, animals, microorganisms, etc., more nutrients have to be mined and produced as chemical fertilizers so that the commercial fishermen can catch more fish, the farmer can grow more crops per acre, to keep the human and animal population from starving, and so that the fisheries agencies can produce more and bigger fish yields per acre as food and for recreation. To keep these nutrients cycling, the ways of nature are slow but spectacular through turnover and upwelling of the nutrients that had accumulated on the bottom of inland waterways and on ocean bottoms and on land by winds through the atmosphere, erosion by rainfalls, by the growth of all types of vegetation, by the earth being turned over by winds, earthquakes, volcanic eruptions and by the farmer's plow and earth moving contractors besides its inhabitants. Fortunately, most

the nutrient P is in the insoluble form and is slowly hydrolyzed by nature for use by all living matter so that the source should always be more than necessary. However, the Institute of Ecology reports that phosphate supplies might limit population because

the supply of phosphates could be depleted in 100 years.

Today I find myself not only on the growing list of concerned citizens due to the undue high stakes being imposed on the taxpayer for undemonstrated and scientifically unproven AWT needs but also as a concerned registered professional engineer because the stakes are too high for the engineering profession to allow itself to be led instead of leading the way. It's about time that the engineering profession became involved in politics and stood up back to back to be counted and fight for the right to think and the right to exercise creative engineering ability. The day of the ivory tower and hiding under a shell are gone. You better believe it! Only the strong will survive. The weak will only end up as an endangered species and in the evolution gradually disappear perhaps as a technician, clerk, or you name it.

For the future, the crystal ball indicates that the standard of living, particularly that enjoyed in our nation, will in all probability be materially lowered and so will the standards of water pollution abatement, particularly the need for AWT. This time, however, by the buck being dramatically stopped by the taxpayer. The overburden is getting louder with each passing day; Blue Plains is an example. The crisis could occur with a crash and a sudden downfall, the cause—the energy crunch, double-digit inflation and shortage of critical resources. Due to the higher cost of fuel and other forms of energy that the public will soon be forced to pay, there will be fewer dollars left in the pay check to spend for other priorities in life. As a consequence, a marked drop in our nation's standard of living can be expected to follow as well as many of the grander dreams of water pollution abatement.

In the period of readjustment that will follow, the engineering profession will again be called upon to use its creative and development ability. Only this time let's get involved in politics and like labor fight for our rights and particularly for prompt payment for services rendered. Prepayments, progressive payments and closure of final payments can only be attained if the engineering community fights for such provisions as a body. Today the engineer is often the last person to be paid and, unlike the merchant, banker or

IRS, without interest on principal past due. A smart business enterprise does not operate too long on such a basis, particularly when the client has invested the monies due in short-term securities to make money on someone else's money.

The time has come for the engineering profession as a whole to consider the inclusion in all engineering contracts clauses that will:

1. limit responsibility and liability to the directives and guidelines issued by others;
2. contain provisions for prepayments, progressive payments, and final payments;
3. require that all payments be made on a net 30-day basis with a penalty for delayed payments (depending on current interest rate) on all overdue balances;
4. other provisions that will improve the engineer's cash flow position. In this connection, I would like to refer you to an article published in the September 1973 issue of The Diplomat newsletter of the American Academy of Environmental Engineers entitled "Cash Flow for Meeting Consulting Engineers Day-to-Day Expenses" by Samuel I. Zack, Diplomat and retired Senior Vice President and Vice Chairman of the Board, Gannett Fleming Corddry and Carpenter, Inc. His advice at that time is still timely.

In summary, AWT could prove to be not too much unlike a cost of living clause, a dangerous plum, to the recipient and to the financial security and economy of the country.

During this critical period of unemployment and financial stress throughout the country, if Congress and its agencies are interested in (1) spreading monies over more jobs, (2) putting more people to work, and (3) completion of government-funded projects at reasonable costs and within the funds allotted, Congress should face the facts and legislate against all cost-of-living clauses, escalation in bid prices, AWT beyond the degree demonstrated and proven to be warranted and vote for repeal of the Davis-Bacon Act and related laws now on the books.

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A Presentation to the OCS Hearings
Anchorage, Alaska
August 12, 1975
by
Robert B. Smith

Thank you, Mr. Chairman, for the opportunity to speak here today. My name is Robert B. Smith; I am President and General Manager of Central Alaska Utilities, an investor owned public water utility in Anchorage, and I previously was Public Works Director for the City of Anchorage. It is my intention to address an aspect of this issue with which I am familiar, that of utility requirements in the event of large population increases in coastal communities as a result of major oil discoveries in the gulf.

First of all, I concur with the findings of a socioeconomic study made for the oil industry that it will be expensive to install or expand sewer and water systems to current environmental standards; and that the extent of that cost will depend on a broad spectrum of circumstances.

Such things as soil conditions, distance to water source, density of community development and the relative size of the development are obvious factors affecting costs. It is my contention, however, that with proper advance planning and good technical design, maximum efficiency can be achieved to hold operations and maintenance costs during subsequent operations to a minimum.

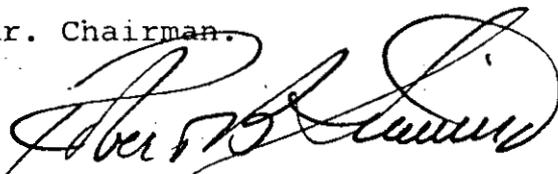
If the expansion is financed through long-term debt and if operations do not become burdensome, then the current residents of any community affected should not have to shoulder any appreciable tax load for services that do not benefit them.

The firm which I operate supplies water to some 30,000 Anchorage area residents outside of the limits of the municipally operated system. It is a private business and obviously must pay its way in order to remain in operation. Some of the areas we serve have no greater density than some of the existing coastal communities and certainly less than would be desirable in any new community development.

From my experiences with utility systems in the Anchorage area, it appears that the coastal towns should be able to meet any foreseeable utility requirements without undue burden to their taxpayers, especially if they receive some preference in federal and state funding assistance programs.

I believe that if the oil companies will work with the state and local government officials in planning and projecting the needs to provide adequate lead time, utilities can be provided to meet any reasonable requirements without seriously loading the communities capital indebtedness and property tax rates. A well balanced, productive and desirable community, an asset to the state, can be the result.

Thank you, Mr. Chairman.



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The Izaak Walton League of America

INCORPORATED
BUILDING A BETTER OUTDOOR AMERICA

Anchorage Alaska.

August 13, 1975

Subject:

Alaska, outer-continental shelf.

I Sam E. McDowell a director of the Anchorage Chapter of the Izaak Walton League of America, and Chairman of our League's Alaska fishing resources Committee do submit the following testimony on the OCS issue.

In years past the development of our petroleum resources in Alaska has been a very controversial issue among conservationists.

1st was the development of the Swanson river and Cook inlet. Then Prudhoe Bay, and the Alyeska Pipeline was the big issue.

In each of these instances the developers have gone to the ultimate limit to preserve the ecological integrity of these developments. It is therefore assumed that these same oil companies will do whatever is necessary to retain the integrity of the outer-continental shelf.

Our League believe we are obligated to consider the economic aspects of these developments if we are to avoid the possibility of continuous fuel shortage and paying