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MASTER

Alaskan Oil Transportation Issues

THE ENERGY/ENVIRONMENT R&D DECISION SERIES

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Alaskan Oil Transportation Issues

Preface

The tapping of the 9.6 billion barrel oil field on Alaska's North Slope required the development and implementation of numerous environmental safeguards before the 8 billion dollar, 800 mile, trans-Alaska pipeline could be built. The transport and distribution of this oil poses serious problems with respect to potential impacts upon the quality of air, water, and land, especially in the Western United States.

Early in 1977, EPA prepared a summary of environmental issues associated with the movement of Alaskan oil. The report was intended to acquaint administrators, scientists, and concerned citizens with the history and problems associated with assuring environmental compatibility in the disposition of Alaskan oil reserves. This document presents the highlights of that report.

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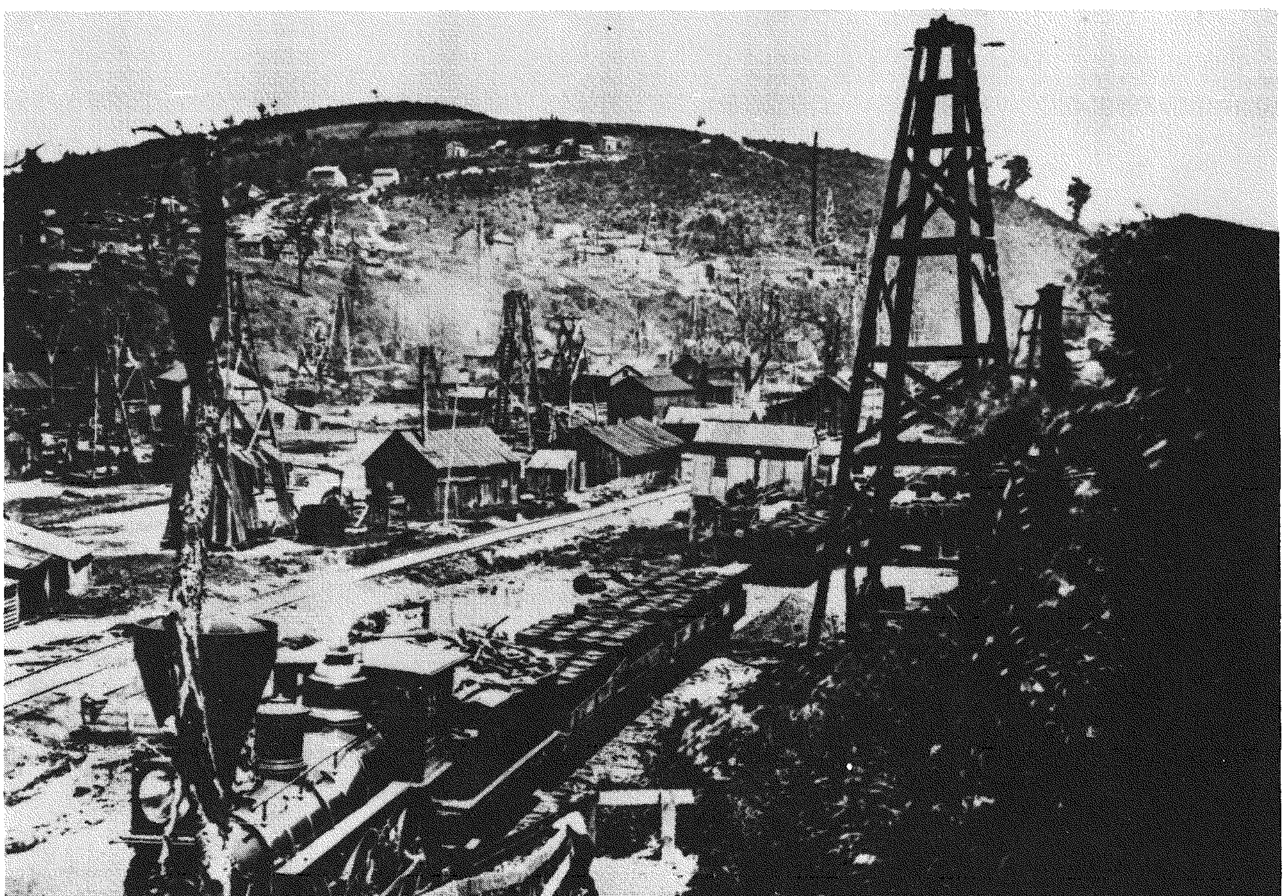
History of Oil Transportation

In the early 1800's, oil was collected from surface deposits and sold as medicine and for lubrication or lighting. Following the "Drake" oil well completion in 1859, crude was carried in wooden barrels to western Pennsylvania refineries by riverboats, horse-drawn wagons, and railroad flatcars. At only 1/20th the price for the same service, pipelines quickly replaced other forms of oil transportation by 1900.

Subsequent to 1900 crude production shifted from the east-central states of Pennsylvania, Ohio, Indiana, West Virginia, and Kentucky to newly discovered fields in Texas, Oklahoma, Louisiana, and California. By 1940 more than 85 percent of crude supplies to eastern refineries were derived from production areas located west of the Mississippi River.

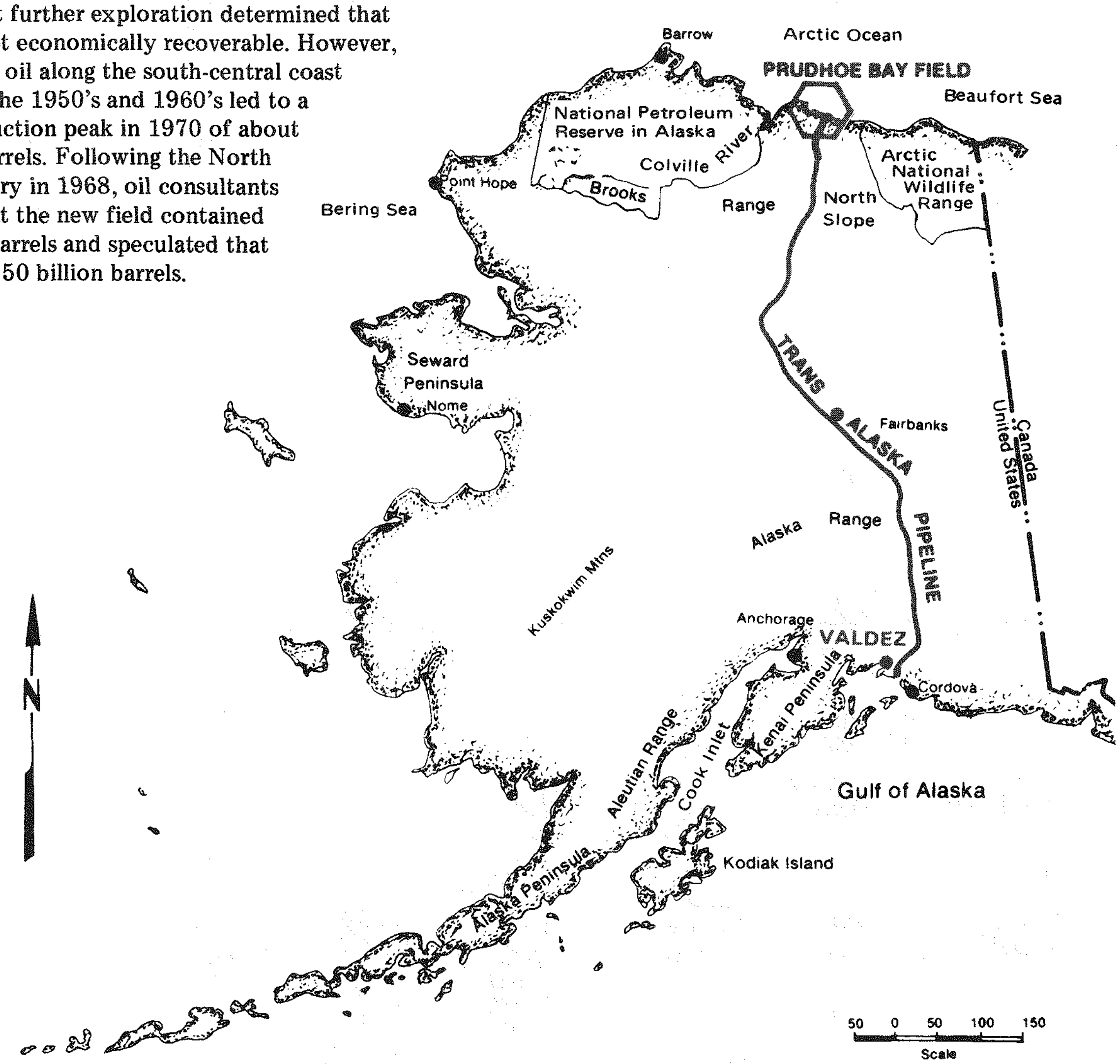
To aid acceleration of oil pipeline construction during World War II, Congress passed the Cole Act in 1942 which allowed the President to grant a petroleum pipeline the right of eminent domain when acquiring land and rights-of-way during wartime. Within two years this accelerated construction provided more than 11 thousand miles of new pipeline, 3,000 miles of relocation and modernization of older lines, and 3,000 miles of reversed flow in existent lines. Pipeline flow to the East Coast increased from prewar levels of less than 50 thousand barrels per day to a maximum of 754 thousand barrels.

As military demands declined after the war, pipelines were taken out of service, reversed, or converted to gas pipelines. Tankers soon became available for intercoastal shipments. During the war, large diameter trunk lines (20-24 inch) proved capable of transporting considerable amounts of oil at a low cost relative to the prewar small diameter lines (less than 16 inches). Such a situation marked the beginning of a new era in U.S. pipeline construction characterized by the building of large, long distance pipelines. This trend began in the 1950's and continues to the present. Many of the older lines have been removed, used for the transport of products (gasoline, kerosene, turbine fuel, diesel fuel, and heating oil), or converted for the transmission of natural gas.



Focus on Alaska

In the early 1900's, many oil seeps were discovered in Alaska, but further exploration determined that these were not economically recoverable. However, discoveries of oil along the south-central coast of Alaska in the 1950's and 1960's led to a modest production peak in 1970 of about 80 million barrels. Following the North Slope discovery in 1968, oil consultants estimated that the new field contained 5-20 billion barrels and speculated that there may be 50 billion barrels.



After a series of court injunctions and trials, the Trans-Alaska Pipeline Act of 1973 authorized construction of the Alaskan oil pipeline. Work began in 1974 under the direction of Alyeska Pipeline Service Company and involved the construction of almost 800 miles of 48 inch pipe, twelve pump stations, three crude topping plants (which provide turbine fuel for pump stations), an oil storage and shipping complex at the southern terminus in Valdez, and various other support facilities. The pipeline is planned to deliver 600 thousand barrels a day beginning this year, and reach a normal flow of 1.2 million barrels a day by 1978.

At present, about 9.6 billion barrels in the Prudhoe Bay field has proved to be economically recoverable. Other North Slope reserves and those under the Beaufort Sea are expected to bring the total proved reserves in North Alaska to 15.1 billion barrels by 1989. As these reserves are brought on line, the peak of production should occur in 1985 at about 3 million barrels a day and account for 21 percent of the total U.S. crude production. Maintaining the flow after this time will be dependent upon new findings in existing fields or from potential new sources such as the National Petroleum Reserve in northwest Alaska.

A Problem of Surplus

During the debates and hearings on the proposed trans-Alaska pipeline, the expected pipeline flow was not anticipated to exceed present West Coast demand. At that time crude oil prices had remained relatively stable since the 1950's and, until 1970, the major oil producing states had held production well below full capacity. Low cost foreign crude overshadowed the world petroleum market.

Just prior to the 1973 Arabian oil embargo, the U.S. petroleum market was influenced by the following factors:

- Due to many elements including rising costs, low cost foreign oil, and the lack of access to unexplored Federal lands (outer continental shelf and Alaska), domestic oil drilling declined after 1959.
- As a result, domestic oil reserves (except for the Prudhoe Bay field added in 1970) declined after 1966.
- Domestic production reached a peak in 1970 and subsequently declined steadily.
- Meanwhile, domestic oil consumption increased, reaching a pre-embargo peak in 1973 of over 17 million barrels per day.
- The ever widening gap between domestic consumption and production of oil was filled with low cost imports.

After the embargo, the historical trends in the factors which determined petroleum supply and demand changed drastically. A new situation prevailed which was characterized by expensive imports (up to $12 a barrel, excluding import fees) and high domestic crude prices (an increase from $3 to over $8 or to $5 when adjusted for inflation). These factors determined the following conditions in 1974 and 1975:

- Until the enactment of the Energy Policy and Conservation Act in December 1975, price controls continued for "old" oil (on the market before the embargo), but "new" oil brought into production after the embargo sold at the wellhead at market price.
- For the first time in recent history, domestic demand declined.
- New drilling sites increased dramatically in 1974 and 1975 to the highest level since 1962.
- An accelerated pace of offshore leasing was undertaken.
- The higher prices stimulated the use of advanced and costly processes to increase oil recovery in existing wells.
- The rate of decline in domestic crude production began to slacken.
- The Congress authorized full production from the Naval Petroleum Reserve No. 1 (Elk Hills, California) which by 1980 will supply oil at a rate of 200 to 250 thousand barrels per day to the West Coast (if production is not curtailed).

In 1974 and 1975 higher oil prices, economic slowdown, and energy conservation measures resulted in a 6 percent decline in oil demand. Since that time, however, domestic consumption has been increasing as the economy recovers. Current price and conservation measures, however, are expected to result in an estimated increase in consumption of 2 percent a year as compared to a 4 percent rate forecasted before the embargo.

With this information, most forecasts of petroleum supply and demand on the West Coast predict a crude surplus when North Slope oil is available. Generally, this surplus is created by a West Coast crude supply which is in excess of demand.

WEST COAST SUPPLY AND DEMAND BALANCE

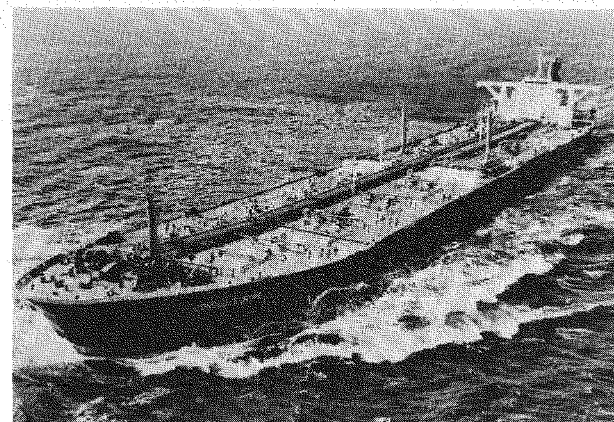
	(Millions of Barrels per Day)		
	1978	1980	1985
Alaska and West Coast Production	2.4	2.9	3.3-3.7
Foreign Imports	.5	.3-.5	.3-.5
Total Supply	2.9	3.2-3.4	3.6-4.2
West Coast Demand	2.4	2.3	2.9
Projected Excess	.5	.9-1.1	.7-1.3

A basic assumption of all forecasts has been that production would not be constrained to maintain an equilibrium between West Coast supply and demand. Based on this assumption, a need exists to develop a transportation method for moving the excess oil from the West Coast to other parts of the U.S. such as the central and eastern areas, which are becoming increasingly dependent upon foreign crude sources.

Transportation Alternatives

The short-term options for handling the projected West Coast surplus of North Slope crude include international exchanges, transshipment through the Panama Canal, transport by railroad, transport by tanker around Cape Horn, Canadian exchanges (for present imports) to offset crude curtailments to the Northern Tier States (Washington, Oregon, Idaho, Montana, North Dakota, Minnesota, Michigan, Wisconsin, Illinois, Indiana, and Ohio), reduced Northern Slope production, or possibly strategic storage. By the end of 1978 at the earliest and probably in 1979, more permanent long-term solutions could be realized in the form of the Trans-Provincial Pipeline, the SOHIO Pipeline, and others. By the end of 1979 or during 1980 a Northern Tier Pipeline could be realized as well as a pipeline across Central America. On line in 1981 could be the proposed deepwater Gulf ports of LOOP (Louisiana Offshore Oil Port) and SEADOCK (a deep-water mooring in the Gulf of Mexico), the reversal of the Four Corners Pipeline which currently supplies crude to southern California, and perhaps an equitable balance between crude supply and demand on the West Coast.

The pipeline, proposed by the Northern Tier Pipeline Company is in the initial stage of federal-state permitting processes. The project involves the construction of a 1,550 mile, 740 thousand barrel a day pipeline for receiving Alaskan and low sulfur foreign crude at Port Angeles, Washington and transporting it to refineries in Montana and North Dakota and to Clearbrook, Minnesota. From there, connections would be made with existing Minnesota and Lakehead Pipelines. This project may be a means of transporting Alaskan crude to Midwestern and Eastern U.S. In addition, a major function of the pipeline would be to supply Northern Tier refineries, which becomes increasingly important with decreasing Canadian deliveries. Emerging environmental issues related to the project are air and water pollution within the Puget Sound area.



Tanker at Sea

The SOHIO Proposal

A proposal for the transportation of North Slope crude, which is furthest along in the permitting process, is sponsored by the SOHIO Transportation Company of California, a wholly owned subsidiary of the Standard Oil Company of Ohio. The Company proposes a 3,500 mile sea/land transportation system to move North Slope crude from the trans-Alaska pipeline marine terminal at Valdez, Alaska, to Midland, Texas. From Midland the crude would be distributed eastward through existing pipeline networks. A tanker fleet would carry the crude 2,000 miles to the Port of Long Beach, California where it would be delivered to a storage terminal. From there it would be transferred to Texas by way of a 1,026 mile pipeline system composed of 790 miles of natural gas pipeline converted for the transportation of crude oil.

The conversion of the natural gas pipeline for oil transmission has caused public concern that such action may preclude the transportation of adequate natural gas supplies to meet future California demand. It has been estimated that the loss of one 30-inch pipeline would reduce the throughput capacity of the Southern California interstate gas network by about 5 percent. The pipeline delivery curtailment is a result of rapidly declining supplies of natural gas to California from sources located east of the State boundary. The Bureau of Land Management has indicated that a very unlikely combination of circumstances must occur before the abandoned capacity would be required.

Another area of public concern centers on the potential of further deterioration of a degraded air quality condition in the Los Angeles Basin. At present, temperature inversions occur on 90 percent of the mornings. Such a condition, together with low wind speeds, causes entrapment and poor dispersion of pollutants such as oxides of nitrogen and reactive hydrocarbons. The abundant sunshine in this region promotes photochemical reactions of these pollutants which produce ozone, a primary constituent of smog. The SOHIO proposal poses a threat of releasing more pollutants, especially hydrocarbons, into the air during off-loading of oil from tankers and tugboats, and from storage tanks. In order to assure that no "net" increase in air pollution will result from this "new stationary source," SOHIO proposes to use several mitigating measures which may include the use of low-sulfur fuel, seven fully segregated and four partially segregated ballasted tankers, closed inerting systems, exhaust scrubbers, avoidance of purging inside the port, use of vapor recovery systems on storage tanks, restricting the ballasting of cargo tanks while in the South Coast Air Basin, use of foam-covering systems to blanket tank spills, oil spill contingency plans, and the abandonment of 33 existing storage tanks.

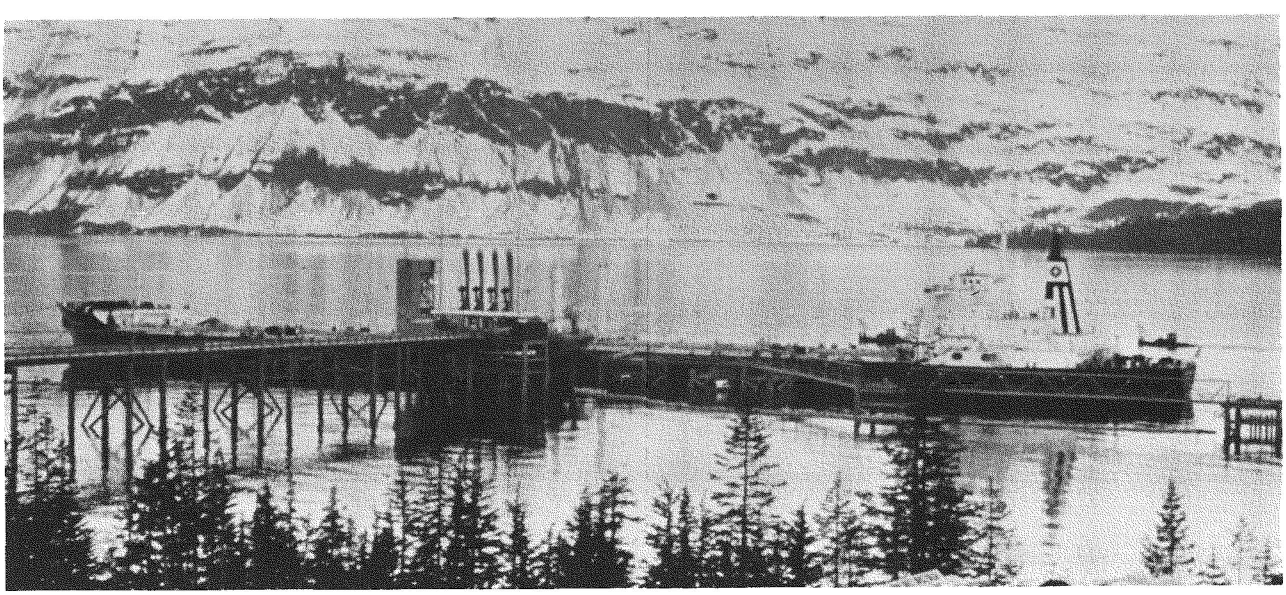
Since the transportation of North Slope oil to Long Beach or any other West Coast port presents the possibility of oil spills, several analyses have been performed to determine the likelihood of their occurrence and extent. With respect to the SOHIO project, the most likely places for accidents resulting in major spills are in Prince William Sound, Alaska, and in the Santa Barbara Channel off Southern California. There is a greater possibility for severe damage to the coastline along the southern part of the route from Valdez to Washington, Oregon, or California unloading sites, as tankers will be traveling closer to shore.

Crude Oil Tankers

A major part of the transportation network that will carry Alaskan crude oil to the lower 48 states involves large crude oil tankers ranging in size from 50 thousand deadweight tons (dwt) to 200 thousand dwt. The number and size of these tankers calling at various West Coast ports will be a function of interacting factors such as port location relative to Valdez, Alaska, the amount of crude oil to be delivered, crude oil economic market, and the location of proposed major west-east pipelines.

The current West Coast port areas expected to handle a portion of the Alaskan crude are in or near Puget Sound, Washington, and the Los Angeles/Long Beach area (San Francisco, due to harbor depth limitations, will not likely be a major Alaskan crude port destination). Either of these locations, if it were to become the principal port location for Alaskan tankers, will require new construction of berthing docks, storage tanks, and auxiliary facilities to handle the number and size of the anticipated Alaskan tanker fleet. Of the U.S. tanker ports, the 1.2 million barrels per day expected from the Alaskan pipeline in 1978 far surpasses the 0.14 million barrels per day currently handled by the Long Beach and Puget Sound port areas, as it does virtually every other U.S. port.

The number of trips to the Puget Sound area has been estimated to range from 400 per year to 600 per year, depending on the tanker fleet mix. Should tanker size limitations be imposed within Puget Sound (e.g., a maximum of 125 thousand dwt), then the 600 visits per year would be necessary. If this size limitation were not imposed, or if a port location outside of Puget Sound were chosen (e.g., Port Angeles), then the lower figure is more likely. For the Port of Long Beach area, specifically the SOHIO project, estimates have indicated that approximately 280 visits per year (based on an average of a two week round trip for the 12 SOHIO ships) would occur from tankers carrying Alaskan crude oil. The 280 visits would account for 700 thousand barrels per day, with the remaining 500 thousand barrels delivered to other areas in Los Angeles/Long Beach, Puget Sound, San Francisco, and the Panama Canal. It is recognized that the movements of these tankers and their dockside operations pose substantial environmental hazards of oil pollution due to accidental and operational spills and degradation of air quality due to the release of crude oil vapors and tanker stack emissions.



Tanker in Port, Valdez, Alaska

Air Quality Issues

Assuming that one or more of the West Coast port alternatives will be chosen as an entry point for Alaskan crude, the air quality issues focus on the impact of large crude oil tankers and of crude oil storage tank facilities on the immediate port area and its associated air basin. In the loading port of Valdez and at possible unloading sites along the Washington, Oregon and Northern California coasts the issue is one of possible degradation of ambient air quality in areas that are, for the most part, currently meeting state and federal air quality standards. For the southern California alternatives, and specifically the SOHIO project at the Port of Long Beach, the issue is one of possible degradation of air quality at a time when extensive efforts are being made to bring poor air quality to within state and national air quality standards.

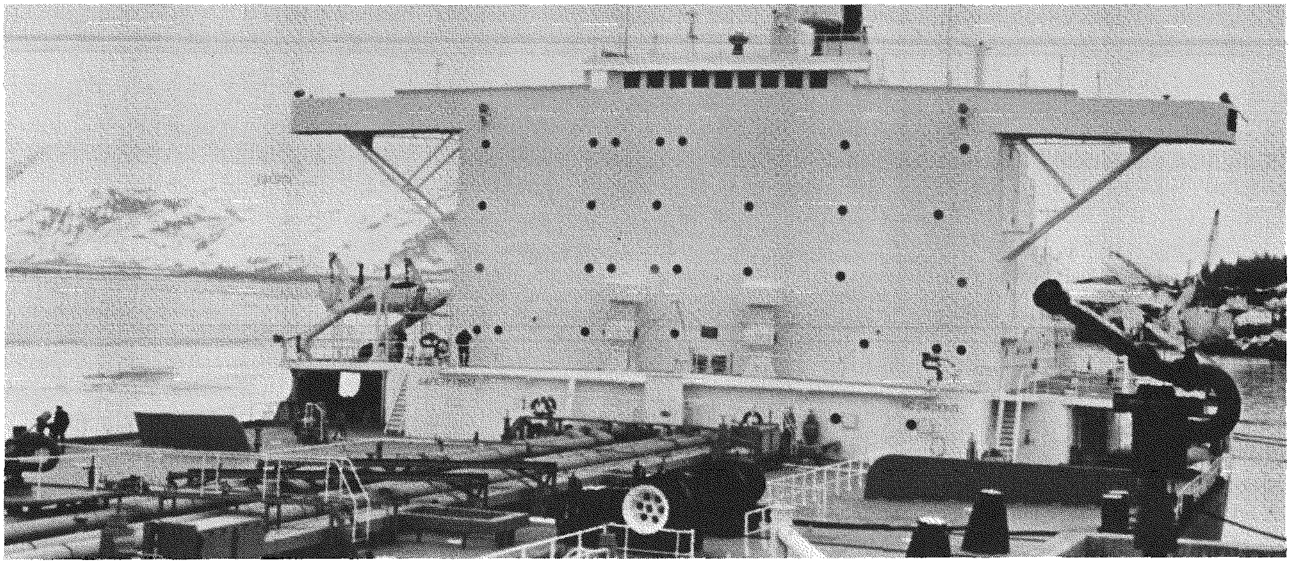
The majority of emissions which could emanate from Alaskan tankers are in the form of escaping hydrocarbon (HC) vapors from onboard and fixed storage tanks and oxides of nitrogen (NO_x) and oxides of sulfur (SO_x) from stack emissions during the offloading procedure (The offloading procedure for large tankers involves using onboard engines at about 80 percent full power for 10-12 hours to pump the crude to shore.)

Estimates based on the SOHIO project, the proposed major terminal at the Port of Long Beach for handling approximately 700 thousand barrels per day of Alaskan crude (involving approximately 280 tanker visits per year), indicate that on a yearly basis SO_x emissions could range from 220 tons per year to 880 tons per year. The ranges are based on differences in fuel sulfur content (0.5-2.0 percent). If transit time in the port vicinity is included, the range would be from 500-2,000 tons per year. It is evident that requiring low sulfur fuel to be burned near or in port greatly reduces these emissions. NO_x emissions are estimated to range from 120 tons per year to 210 tons per year, again dependent on whether transit time is included. Carbon monoxide and particulate emissions are minimal and have not been an issue (particulates are estimated to be 40 tons per year and CO estimates have generally not been calculated).

The outstanding issue involves the release of hydrocarbons which, with NO_x, are precursors to the formation of oxidants. The operations of ballasting in nonsegregated ballast tankers and purging by tankers may involve the release of large quantities of hydrocarbon vapors in or near port.

Ballasting involves taking on board sufficient water to permit unloaded ship's screws and rudders to be low enough below the surface to control the ship's movements. Approximately 15 percent of the ship's dwt is necessary to leave port and 35-50 percent of the dwt is necessary for open sea operation. In nonsegregated ballasted tankers water is placed in the empty crude storage causing hydrocarbon vapors to be displaced to the atmosphere through the tanker's vents.

Purging of empty cargo tanks is performed primarily before tank washing when a new cargo type is to be introduced or when human access to the cargo tank is necessary for maintenance. Air or an inerted (oxygen poor) gas mixture is used to displace the hydrocarbon (HC) vapors that are present from oil clinging to the tank sides and bottom. The range of HC estimates that could occur is extremely large, reflecting differing assumptions as to the operations to be performed and the types of tankers to call. For the SOHIO project, the yearly estimates have run from essentially zero HC emissions to as high as 10 thousand tons per year. The lower figure represents a fleet of fully segregated ballast tankers and no release of HC to the atmosphere from tank cleaning (purging) operations. The latter figure represents



emissions that could occur if ballasting and tank cleaning occurred while in port and along the coast near port.

An additional source of hydrocarbon emissions involves the large capacity crude oil storage tank facilities that would be needed at a port terminal. Estimates made for the SOHIO project of yearly hydrocarbon emissions from these facilities indicate that approximately 365 tons per year may enter the atmosphere.

Analyses of the relationship between emissions and their effects on air quality have, to date, been inconclusive. Most of the analyses have involved "worst-case" situations for the evaluation of the potential for hourly and daily air pollution standards violations. Estimates of between 1-15 parts per hundred million (pphm) maximum increase in hourly SO_x concentrations; 4-22 pphm maximum increase in hourly NO_x concentrations; and 1-8 pphm maximum increase in oxidant concentrations due to hydrocarbon and NO_x emissions have been reported in the analysis of the SOHIO project. The range in results is due to varying model assumptions with respect to meteorological conditions and emission rates.

There are several measures that can be taken to significantly reduce adverse impacts upon air quality in or near port locations. These include:

- Minimum of 35 percent Ballast Capacity—While the majority of the world's tankers do not have segregated ballast, both the Inter-Governmental Maritime Consultive Organization (IMCO) and U.S. Ports and Waterways Act of 1972 require new vessels of 70 thousand dwt or more to have fully segregated (35 percent) ballast facilities. It is expected that many of the large Alaskan trade tankers will have this capability.
- Inerting Systems—The use of flue gas from tankers' stacks to provide an inert (oxygen-poor) atmosphere in the cargo tanks can eliminate the need to vent hydrocarbon vapors in port.
- Flue Gas Scrubber—It may be possible to scrub all flue gas emissions while in port to reduce SO_x emissions. Currently, inerted tankers use once through scrubbers to reduce the potential of corrosion in the cargo tanks due to SO_x. However, only 15 percent of the stack gas is currently diverted for this purpose.
- Vapor Recovery Systems—To avoid vapor loss in storage tanks and possibly in tanker loading and offloading operations, hydrocarbon vapor recovery systems may be feasible.
- Low Sulfur Fuel—The sulfur content of shipboard fuel used to power the ship while underway near port or while in port offloading could be kept to a low level through the use of special "in port" fuel storage facilities. Some of the Alaskan trade tankers will use this mechanism to reduce sulfur oxide emissions.
- Purging In/Or Near Port—Since purging cargo tanks would be the single largest source of hydrocarbon emissions in port, legislation to prohibit such operations, except under emergency conditions, could be enacted. However, methods of enforcement such as onboard monitoring would be necessary and the legal authority for enforcement would have to be identified.

The legal authority for controlling air emissions in port and once a tanker is underway has become an important issue. The placing of constraints on allowable operations while in port may be difficult due to the common carrier status of a port facility (e.g., tankers unable to meet the constraint requirements could not use the facility). After getting underway, the tanker captain, Coast Guard, Environmental Protection Agency, and/or the local or state agency may each have varying authority over operations. Current statutes are not explicit as to where legal responsibility for underway tanker air emissions lies and no explicit limiting regulations exist. In California, this lack of explicit legal authority has been a key factor in the evaluation of the proposed SOHIO project in the Port of Long Beach.

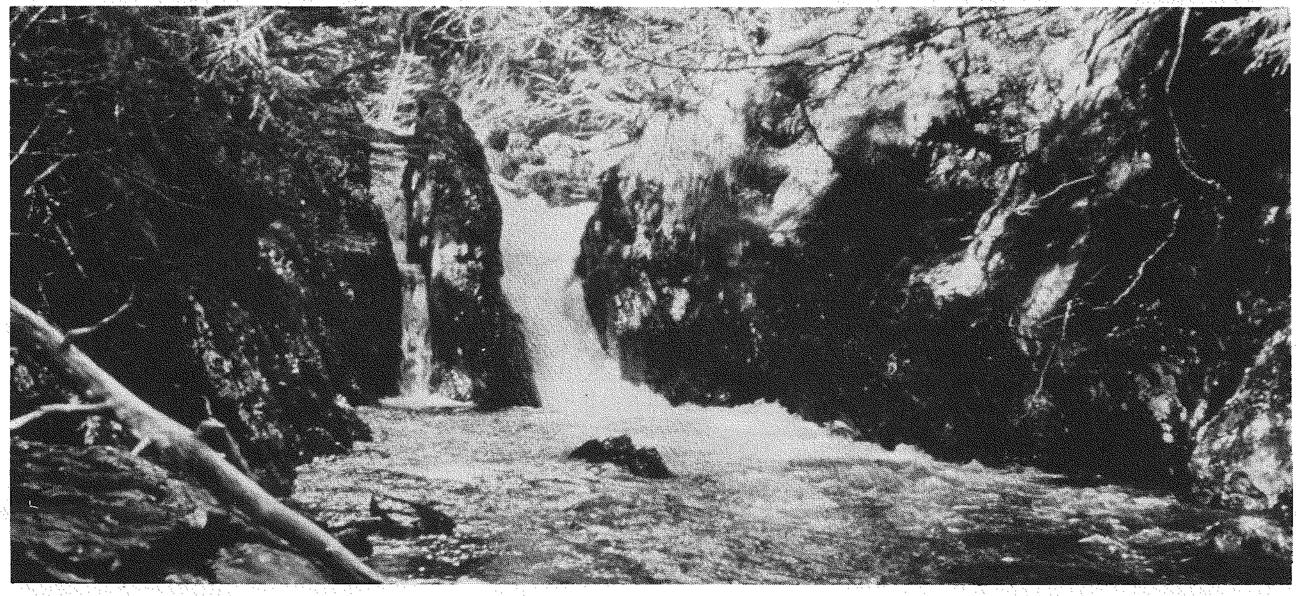
Water Issues

Many sources of pollutants may impair water quality as a result of the construction and operation of pipelines, marine terminals, and associated tanker movements. Such sources include downstream sedimentation from construction at stream crossings, oil spills from pipeline breakage or leakage, the discharge of water used for hydrostatic testing, the flushing of ballast tanks, discharges of bilge water and sewage, and turbidity during dredging of harbor sediments. Many of these sources can be easily abated or controlled.

Recent data on West Coast tanker spills indicate the following:

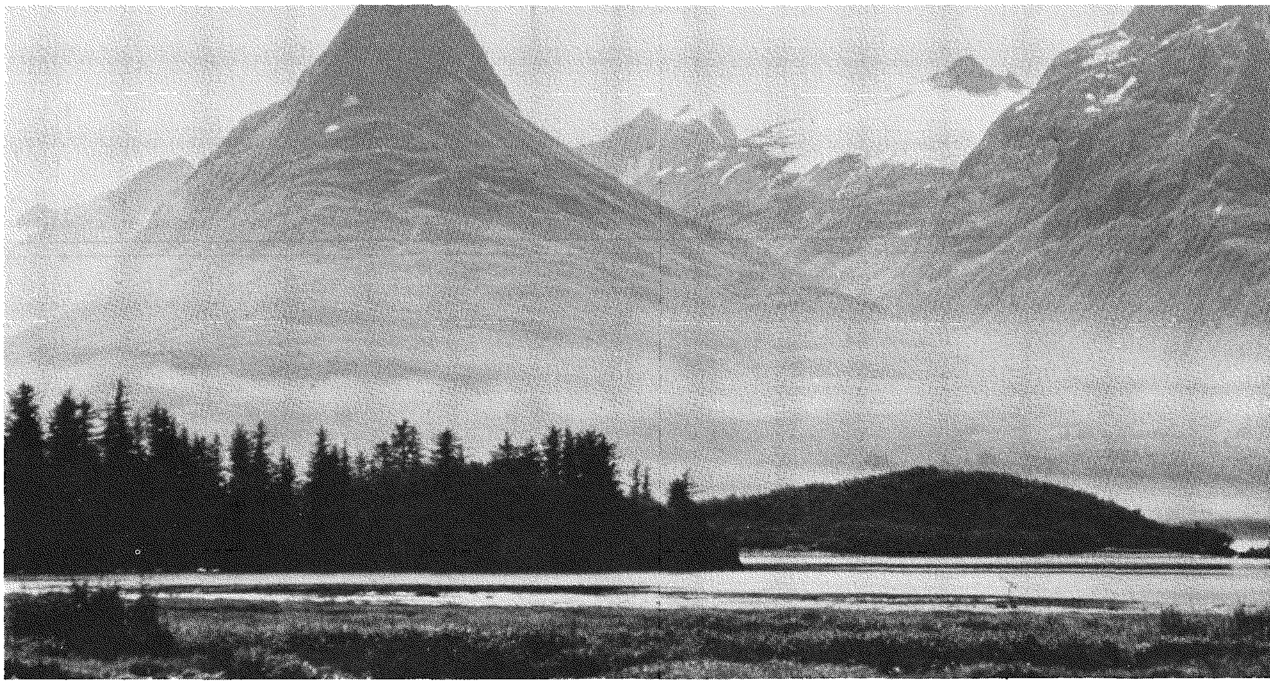
- There is high variability in the amount of oil spilled from year to year. Catastrophic spills tend to distort trend data.
- Tankers account for 20 percent of the spills and 34 percent of the amount of oil spilled. Marine terminals account for 9 percent of the spills, but only 1 percent of the volume.
- Other sources of spills include pipelines, storage facilities, nontanker vessels, and miscellaneous transportation modes such as tank trucks and railroad tank cars.
- As much as 70 percent of oil spill incidents are attributable to personnel errors.
- There does not appear to be a relationship between tanker age or size and the frequency of spill incidents.
- Many spills are associated with the tanker-terminal interface and indicate that in-port terminals generally represent higher risk areas for oil spills (however, these areas may provide for efficient containment of spilled oil).

All of the tankers which will transport the North Slope crude to U.S. ports will be subject to the regulations of the Merchant Marine Act of 1920, commonly known as the Jones Act. This act requires that such coastal movement between domestic ports be carried out by U.S. built and owned tankers operated by U.S. masters and crews under the U.S. flag. Currently, these vessels are subject to Coast Guard regulations which require tankers larger than 70 thousand dwt to have segregated ballast which serves as protection for the cargo, two slop tanks (for retention of tank washings, oil residues, and dirty ballast residues), and an oily residue tank for the containment of oil leakage and sludge. The Coast Guard plans to extend such standards to U.S. vessels in foreign trade as well as foreign vessels entering U.S. waters. Recently, the Coast Guard has proposed additional regulations to control oil emitted during its transfer among vessels and transfer facilities. These measures are intended to reduce substantially the amount of oil released to the ocean by U.S. seagoing tank vessels as well as foreign tankers in U.S. waters. Since existing requirements apply to Jones Act tankers and therefore to tankers carrying North Slope crude to U.S. ports, the entire fleet of tankers carrying North Slope oil is expected to possess fully segregated ballast by 1980. Also by 1980 approximately 50 percent are expected to have collision avoidance radar systems and about 35 percent to have double bottoms or hulls to reduce the potential risk of cargo tank ruptures from grounding or minor collisions.



Waterfall, Lush Surroundings, Alaska

Problems



Land Issues

Land issues center on the use of the coastal zone for the construction of marine terminals and support facilities. Induced development as a result of such projects may require large areas of the coastal zone, and agricultural and urban areas for refineries and petrochemical industries. The construction of west-to-east pipelines across national forests and desert areas poses a threat to the environment. The deterioration of natural areas and decreased productivity of agricultural lands will need to be mitigated.

Immediate Issues

The search for a system to carry the North Slope crude to market has been in effect since an Alaskan pipeline was first proposed in 1969. By 1972 the following major alternatives were being evaluated:

1. New pipelines from the U.S. West Coast to markets east of the Rockies.
2. Selling Alaskan oil to Japan in return for increased imports on the East Coast of the United States.
3. A new pipeline in Central America for transporting Alaskan oil to East Coast markets.
4. Transporting the oil through the Panama Canal to Gulf Coast ports.
5. Shipping oil around Cape Horn to East Coast markets.

Today these and other routes such as that of the Trans-Mountain and Trans-Provincial pipelines which generally follow the original route of the Trans-Canadian Pipeline (an overland alternative to the trans-Alaska pipeline), are envisioned not only to serve Eastern U.S. markets but also to provide a source of crude to the Northern Tier States.

The solutions, in the form of proposed transportation routes, must relate to one or both of these problems:

- To dissipate the expected West Coast crude excess—hopefully by movement to demand areas east of the Rocky mountains.
- To supply the Northern Tier States which are confronted by a curtailment in oil imports from Canada by 1982.

In the face of these problems, the Federal Government must respond in a manner consistent with the Trans-Alaska Pipeline Act to assure equitable allocation of North Slope crude oil:

Section 410. The Congress declares that the crude oil on the North Slope of Alaska is an important part of the Nation's oil resources, and that the benefits of such crude oil should be equitably shared, directly or indirectly, by all regions of the country. The President shall use any authority he may have to insure an equitable allocation of available North Slope and other crude oil resources and petroleum products among all regions and all of the several States.

The environmental impact statement process will be used by Federal agencies to improve decisions affecting the environment and provides a useful tool to incorporate public opinion, as well as that of diverse agencies, into the decision-making process. Currently this process is being applied to two proposed alternatives for the movement of North Slope crude. An environmental impact statement has been prepared by the Bureau of Land Management (Department of the Interior) for the SOHIO proposal, and a draft environmental impact statement is being prepared by the Department of the Interior for the Northern Tier Pipeline proposal.

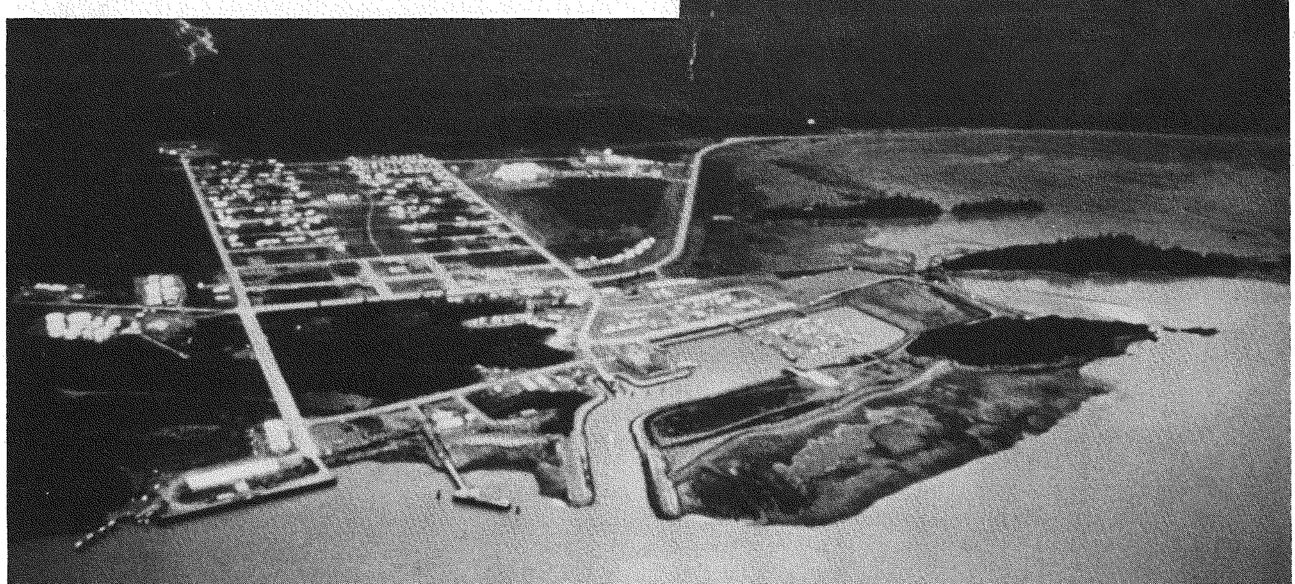
In the future, changes in the sources of crude supplied on the West Coast are inevitable. Should an optimistic rate of Northern Alaskan crude production be realized, the West Coast may be subjected to a substantially greater excess of crude supply over demand. Increased production, above current expectation, for the Bering Sea, the Aleutian Island chain, the Gulf of Alaska, and the West Coast outer continental shelf could further aggravate a surplus situation. Estimates of recoverable Alaskan oil range from 12 billion to over 76 billion barrels.

The problem which emerges is how to handle the potential surplus. As many as 7,500 miles of pipeline solely within Alaska may be required. Future Alaskan production may necessitate a new overland pipeline passing through Canada and a number of west-to-east U.S. pipelines. Thus, the potential for a large Alaskan and West Coast crude production to be realized within the next decade may require the development of a highly flexible and integrated crude oil distribution system.

Information Needs

In meeting the challenge of assuring environmental compatibility in the face of developing Alaskan and offshore western oil reserves, new questions need to be addressed:

- How will air quality impacts be forecasted for new oil terminals to be located in remote areas where air quality data are not adequate? Baseline data may need to be collected.
- What are appropriate assumptions relating to vessel traffic, emissions, and meteorological conditions when modelling air quality impacts associated with oil tankers?
- What is the state-of-art and potential for use of vapor recovery systems, automated monitoring systems, and exhaust scrubbers when applied to oil tankers?
- Is a vessel traffic control system warranted for the West Coast? Would such a system be efficient? Would it be cost effective?
- How do strict pollution control measures imposed on the proposed SOHIO project create a disincentive to companies proposing similar energy projects?



Port of Valdez, Alaska

FOR FURTHER READING

Joint Hearing on the Potential Problems Associated with the Delivery of Crude Oil from Alaska's North Slope. Committees on Interior and Insular Affairs and Commerce. United States Senate, Washington, D.C. 1976.

This is the record of a Senate hearing convened on September 26, 1976 to examine problems in markets. Statements were given by representatives of the Department of the Interior, Department of Commerce, Federal Energy Administration, and various senators. A copy may be obtained from the U.S. Government Printing Office, Washington, D.C. 20402.

Environmental Impact Statement. Crude Oil Transportation System: Valdez, Alaska to Midland, Texas, Department of Interior. Bureau of Land Management, Washington, D.C. 1977.

This is an environmental impact statement (EIS) prepared for the SOHIO proposal. A limited number of single copies of the draft are available and may be obtained by writing to: Public Affairs Office, Bureau of Land Management, 2800 Cottage Way, Sacramento, California 95825.

Review of Environmental Issues of the Transportation of Alaskan North Slope Crude Oil EPA-600/7-77-046. Environmental Protection Agency. Office of Energy, Minerals, and Industry, Washington, D.C. May 1977.

This report contains substantive information from which these proceeding highlights have been taken. The report may be obtained by writing to the Office of Energy, Minerals, and Industry, RD-681, U.S. EPA, Washington, D.C. 20460.

An Analysis of the Alternatives Available for the Transportation and Disposition of Alaskan North Slope Crude. Federal Energy Administration, Washington, D.C. 1976.

This report was prepared for the Federal Energy Administration for the Energy Resources Council and examines supply and demand issues, evaluates transportation alternatives, considers environmental problems, and analyzes potential markets for North Slope crude. A limited number of copies are available and may be obtained by writing to: Office of Energy Resource Development, Federal Energy Administration, Washington, D.C. 20461.

Mitigating and Offsetting Emissions from West-East Oil Movement. Nehring, Richard. WN-9719-CEQ. Rand Corporation, Santa Monica, California. 1977.

This document identifies policy options for reducing adverse impacts on air quality associated with the transportation of Alaskan oil eastward through a West Coast port. The study was undertaken under contract with the Council on Environmental Quality on the basis of an interagency agreement between it and the U.S. Environmental Protection Agency. To obtain a copy, write: Council on Environmental Quality, 722 Jackson Place, NW, Washington, D.C. 20006.

Draft Environmental Impact Report: SOHIO West Coast to Mid-Continent Pipeline Project. Port of Long Beach and the California Public Utilities Commission., Long Beach, California. 1976.

This is a draft environmental impact report, similar to an EIS, prepared by the Port of Long Beach and the California Public Utilities Commission in compliance with the California Environmental Quality Act. A limited number of copies are available and may be obtained by writing: The Port of Long Beach, P.O. Box 570, Long Beach, California 90801.