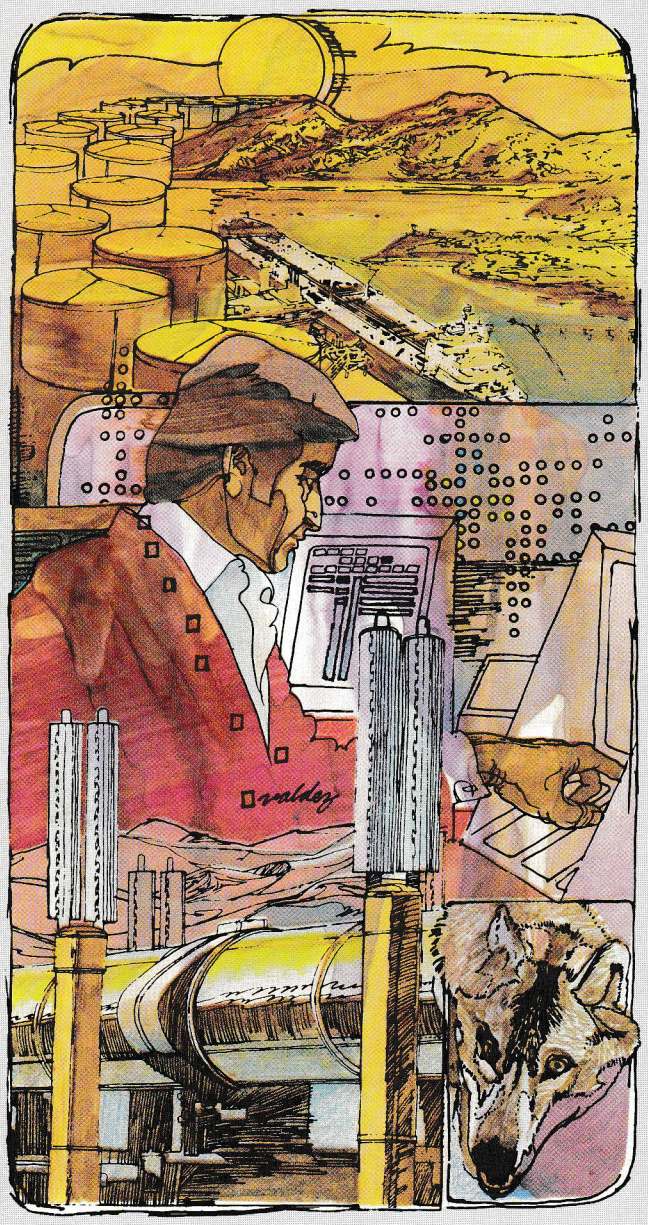
MARINE TERMINAL



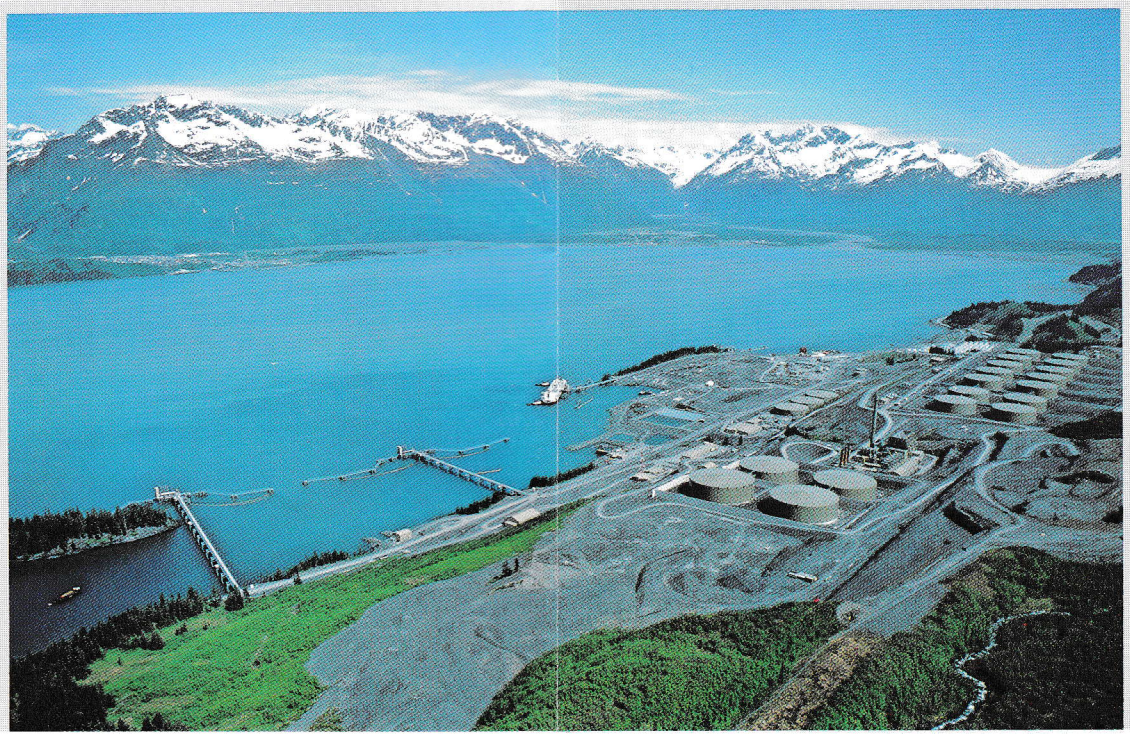
Although evidence had existed for at least a century that there might be oil in commercial quantities on the North Slope, it wasn't until July of 1968 that confirmation was made by Atlantic Richfield Company and Humble Oil (now Exxon). Within a year, plans for a pipeline were announced. After five years of study and testing, on such subjects as terrain, ecology, equipment systems, weather, materials, and revegetation, a workable plan was produced.

In 1970, a 3½-year legal battle began, when environmental and other groups filed suits to halt pipeline construction. During this time, no construction was allowed.

Also in 1970, all responsibilities for pipeline design, construction, operation and maintenance were assumed by the newly formed Alyeska Pipeline Service Company. This agent company is owned by seven pipeline companies.

On November 16, 1973, Alyeska received permission to begin construction through Presidential approval of pipeline legislation. In 1974, the 360-mile road from the Yukon River to Prudhoe Bay was built, and development was begun on Pump Stations, the pipeline work pad, and the Marine Terminal at Valdez. The first pipe was laid in the Tonsina River March 27, 1975. By May of 1977, all 800 miles of pipe had been installed and hydrostatically tested; and work on essential Pump Station, Terminal, and communications systems was almost complete. At the same time, planning and training for pipeline operation were progressing quickly. These efforts culminated in the start-up of the pipeline system on June 20, 1977.

The first oil through the line reached the Marine Terminal July 28, 1977. And on August 1, the first shipload of North Slope oil left the Port of Valdez aboard the ARCO *Juneau.*



Ballast Water Treatment System

Tankers arriving at Valdez carry water ballast in their tanks, for stability when sailing without an oil cargo. When carried in tanks otherwise used for oil, the water ballast becomes contaminated with the remnants of the oil previously contained there. Before the tankers can take on oil, all ballast must be discharged into the ballast water treatment system. All oily water collected in the Terminal area, including ballast water, is processed through the treatment system.

First, the ballast water is pumped into gravity separation tanks, where it remains for a minimum of two hours, to allow oil to rise to the surface. Two floating-boom skimmers remove the oil, and the ballast is removed for secondary treatment. Chemicals are then mixed with the ballast water to form particles, referred to as "floc." Air is pumped into the water, and air bubbles cling to the floc, carrying it to the top to be skimmed off. The remaining water then flows to a pair of lined ponds where a biological process further reduces residual crude oil components to extremely low concentration levels. The water is then discharged 700 feet offshore into Port Valdez at depths of 200 feet or more.

The recovered oil is processed in the oil recovery area, and is eventually returned to the crude oil system.

Tank Farms

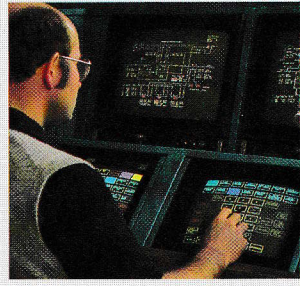
There are 18 crude oil holding tanks on the Terminal site — 4 in the west tank farm and 14 in the east tank farm. The tanks are 250 feet in diameter, 62 feet 3 inches high and can hold 510,000 barrels of oil each, for a total capacity of 9.18 million barrels. Each pair of tanks is surrounded by a concrete dike, which can hold 110 percent of the oil in the tanks, plus any water that might collect in the area.

There are both exterior and interior fire control systems on the tanks, and each tank has a 3-foot-9-inch "slosh zone" to allow oil movement in the event of earthquakes as high as 8.5 on the Richter scale.

Tanker Berths

Tanker berths at the Terminal are numbered 1, 3, 4 and 5. Berth 1 is a floating berth, while the others are fixed. The floating berth handles tankers of 50,000 to 120,000 deadweight tons. Berth 3 handles tankers up to 250,000 deadweight tons, and Berths 4 and 5 are for tankers up to 265,000 deadweight tons, or larger.

Oil is gravity-fed to tankers at each berth through four hydraulically-controlled metal arms. The four 12-inch arms at Berth 1, the floating berth, handle 80,000 barrels of oil an hour. The four 16-inch arms on the fixed berths have a capacity of 110,000 barrels per hour. Ship ballast water is also pumped out through these arms.



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Flow control and quick-shutoff valves are provided at each berth, to control the oil flow and avoid excessive pressure surges while loading. Berth work areas are surrounded by an oil-tight concrete curb, to collect spillage for ballast treatment processing.

The berths can be operated simultaneously, whether tankers are loading oil or discharging ballast.

Fire Control Systems

The tank farm control system consists of subsurface foam injection systems inside the storage tanks, as well as a water system which can provide cooling water for tank exteriors. If a fire occurs inside a tank, foam is injected beneath the surface of the stored oil, forming a blanket on the surface which extinguishes the fire. The water system, using sea water taken from Port Valdez by diesel-powered pumps, has a rated capacity of 10,000 gallons per minute. Each berth has its own firefighting facilities, with water and foam systems. Three tugs are offshore, equipped to deliver cooling water and foam to supplement firefighting equipment on the berths. If a fire should occur on a tanker, the vessel would be moved out of the berth area, and the tugs would supplement the on-board firefighting equipment. Halon and dry chemicals are also used in Terminal fire control systems.

Control Center

The 800-mile-long pipeline system is controlled from the Operations Control Center at the Marine Terminal. Working from a computer console in the Operations Control Center, a Pipeline Controller can start and stop pumps, shut down topping plants, isolate pump stations, control valves, and start and stop the entire system. The Terminal Controller can govern Terminal functions from his console in the same Control Center. He can direct the flow of pipeline oil to storage tanks, and from the tanks to vessels at the berths. He monitors the operation of the ballast water treatment system, the vapor recovery plant, and the tanker loading berths. A wide range of emergency procedures can be initiated at the Control Center, in case of any problems at the pump stations, on the line, or at the Terminal.

East Metering Building

Incoming oil from the pipeline is measured in the East Manifold and Metering Building, after it enters the Terminal through the last pipeline gate valve. The incoming oil is checked for temperature, vapor pressure, specific gravity and viscosity. Other facilities housed in this building include pressure relief valves and a trap for scrapers, or "pigs," which travel through the pipeline, cleaning it and measuring its curvature. Pressure relief valves prevent incoming oil pressure from exceeding design limits. Pressure of more than 300 pounds causes the valves to open automatically, diverting oil to two relief tanks. Meter sets for tankers loading at Berths 1 and 3 are also located here.

West Metering Building

Oil loaded into tankers at Berths 4 and 5 is measured in the West Metering Building, using 16-inch turbine meters, operated in parallel sets, to measure flow. The number of meters used is determined by flow rate. Each turbine meter can measure 25,700 barrels per hour. Meters are calibrated each time a tanker is loaded.