

STUDY TITLE: Navarin Basin (TR-84) and Diapir Field (TR-105) Transportation Systems Impact Analysis and Unimak Pass Vessel Analysis (TR-108).

REPORT TITLE: Unimak Pass Vessel Analysis.

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SPONSORING OCS REGION: Alaska.

APPLICABLE PLANNING AREA(S): North Aleutian Basin; St. George Basin; Navarin Basin; Norton Basin; Diapir Field.

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PROJECT MANAGER(S): P. Cook.

AFFILIATION: Louis Berger and Associates, Inc.

ADDRESS: 1819 H Street, N.W., Suite 900, Washington, D.C. 20006.

PRINCIPAL INVESTIGATOR(S)*: P. Cook, G. Hennigh, J. Pederson.

KEY WORDS: North Aleutian Basin; St. George Basin; Navarin Basin; Norton Basin; Diapir Field; Unimak Pass; transportation economics; marine traffic; forecast; development; commercial fishing.

BACKGROUND: Unimak Pass is the primary Aleutian Islands ship passage that connects the Bering Sea with the Pacific Ocean. Traffic utilizing this pass includes vessels for fishing, commercial shipping, natural resources shipping, and outer continental shelf (OCS) activities. The U.S. Department of the Interior, interested in evaluating a broad range of social and economic impacts related to OCS development in Alaska, funded this transportation-related evaluation and forecast on Unimak Pass vessel traffic.

OBJECTIVES: (1) To evaluate present and future vessel traffic using Unimak Pass; and (2) To determine if an increase in Unimak Pass vessel traffic will result in a higher level of collision incidents in the Pass.

DESCRIPTION: Unimak Pass, located in the Fox Island subgroup of the Aleutian Islands, is approximately 28 miles in length and varies from approximately 12 miles to 26 miles in width. Vessel traffic data from Unimak Pass were evaluated for fishing, natural resources, OCS, and commercial shipping vessels. Statistical models were developed to predict future traffic and collisions. Existing and future navigational issues were discussed with various shipping and fishing operators. Telephone interviews were held with the U.S. Coast Guard (USCG) and the southwest Alaska Pilots Association regarding conditions in Unimak Pass. Collision information was gleaned from Alaskan newspaper files from the mid-1970s to 1983. A USCG study conducted to determine the need for a vessel traffic separation scheme in Unimak Pass also provided information. Predictive collision models defined the probability of collision as the product of the probabilities of two separate events: (1) two vessels encounter each other; and (2) the vessels collide in the encounter zone. The probability of an encounter is a function of traffic levels, size of the passage or channel, and speed and length of the vessels. The probability of collision given that two ships have an encounter is a function of visibility, condition of the ships, crew experience, communication between ships, and a set of random factors that might cause a ship to deviate from its course.

SIGNIFICANT CONCLUSIONS: Present and future vessel traffic estimates suggested that natural resource shipping would increase but fishing vessel traffic would remain constant through the year 2000.

Total annual vessel traffic through Unimak Pass for the year 2000 was projected to increase nearly 100% from approximately 2,290 trips in 1985 to 4,600 trips in 2000. Probability of vessel collisions in the year 2000 without OCS traffic is one collision every 57 years. The probability of vessel collisions with increased OCS traffic was estimated to be one collision every 33 years. Vessel traffic increases commensurate with projected OCS activities would not significantly impact navigation through Unimak Pass.

STUDY RESULTS: Available historical information regarding collisions in Unimak Pass indicated that few collisions occurred and no human lives were lost. Two collisions were reported in 1983, both apparently the result of pilot error or carelessness. Results from a USCG study of Unimak Pass revealed that a vessel traffic separation scheme was not necessary to maintain safe navigation. Weather conditions were considered a primary factor in collision probabilities.

Current estimates of vessel trips through Unimak Pass totaled 2,300. Fishing vessels accounted for approximately 60% of the total trips. An estimated 1,370 fishing-related trips were made through Unimak Pass during the 1982 to 1983 fishing season. Of these trips, 53% were made by the international fleet and 47% by the domestic fleet. Emanating primarily from Seattle and Puget Sound, the domestic fleet consisted of 566 vessels making 651 annual movements through Unimak Pass. The international fleet consisted of 336 vessels making an estimated 719 annual vessel trips through Unimak Pass. Natural resource shipping consisted primarily of timber products transportation. Approximately 225 vessel trips were associated with natural resource shipping during the base year. Waterborne freight contributed an estimated 272 vessel movements through the Pass during the 1982 to 1983 season.

Future traffic projections for OCS, fishing, natural resources, and commercial shipping vessels were estimated at five-year intervals. Projected traffic contributed by OCS vessels ranging from 100 to 800 ft in length was 170 vessel trips in 1985, 550 trips in 1990, 700 trips in 1995, and 1,120 vessel trips in 2000. These projections depended on leasing schedules and strike levels. In 1990, resource tankers serving St. George and Navarin Basin were projected to be the major component of OCS traffic in western Alaska. Numbers of supply vessels, barges, and tugs operating in these areas were projected to remain constant after commercial petroleum production begins. Fishing vessel traffic was not expected to change from 1985 to 2000, with total domestic and international vessels remaining constant at 1,370. Size of the international fleet was expected to decrease and the American fleet was expected to increase. Fishing vessels ranged in length from 35 to 200 ft. Natural resource shipping was expected to increase in the late 1980s and early 1990s, depending primarily on coal exports to the Near East. The timber industry will generate approximately 225 vessel trips through Unimak Pass each year. These vessels average 750 ft in length. Projected natural resource vessel traffic was 240 vessel trips in 1985, 270 vessel trips in 1990, 470 vessel trips in 1995, and 1,270 vessel trips in 2000.

Future domestic commercial shipping was estimated by assuming that such shipments would increase at the average annual rate of population growth. The increase in vessel traffic associated with commercial shipping projected for domestic and foreign commercial shipping vessel traffic was estimated at 620 vessel trips in 1985, 680 vessel trips in 1990, 750 vessel trips in 1995, and 840 vessel trips in 2000. Total projected annual vessel trips for Unimak Pass were 2,400 in 1985, 2,870 in 1990, 3,290 in 1995, and 4,600 in 2000. Estimated average speed for all vessel types through Unimak Pass was 10 kn.

Collision forecasts for Unimak Pass, with expected OCS activity, indicated one collision every 132 years in 1983, one collision every 84 years in 1990, and one collision every 33 years for 2000. Without OCS activity, the number of years for one collision to be expected was 147 in 1983, 128 in 1990, and 57 in 2000. Poor visibility was considered a major factor contributing to vessel collisions. Without OCS activity, collision probability for 1983 was estimated at 0.0068; 0.0078 during 1990, and 0.0174 in 2000. With OCS activity, the probability of collisions in one year was 0.0076 for 1983, 0.0119 for 1990, and 0.305 for 2000. Vessel traffic which would lead to a collision every year would require 26,350 total vessel trips per year; one collision every two years would require 18,630 total vessel trips per year.

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These values are approximately 12 times the maximum OCS vessel traffic expected through the Unimak Pass through the year 2000.

STUDY PRODUCT(S): Louis Berger and Associates, Inc. 1984. Unimak Pass Vessel Analysis. A final report for the U.S. Department of the Interior, Minerals Management Service Alaska OCS Region, Anchorage, AK. Social and Economic Studies Program Technical Report No. 108. Contract No. 14-12-0001-29068. 41 pp.

*P.I.'s affiliation may be different than that listed for Project Manager(s).