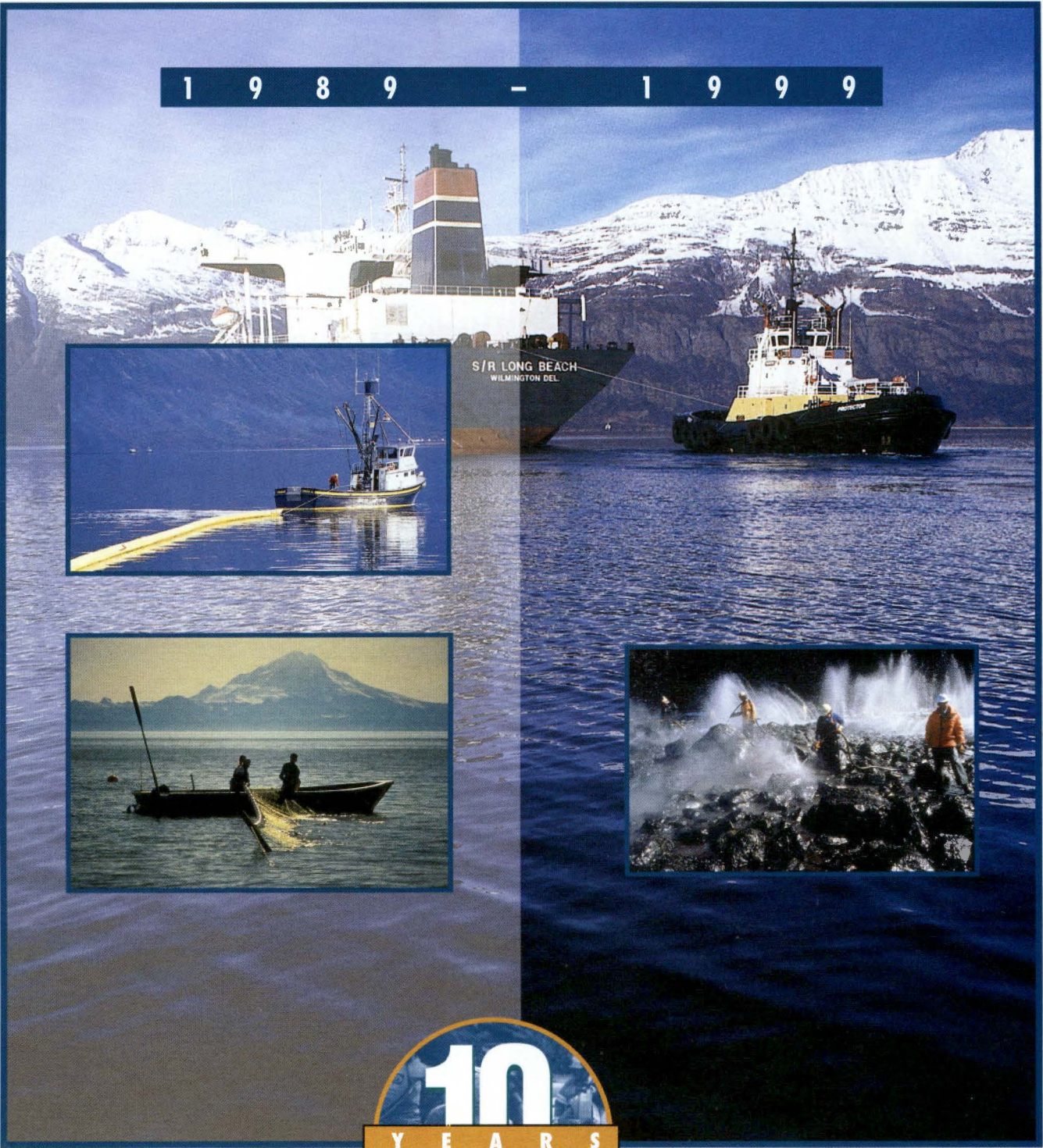


THEN AND NOW — CHANGES IN OIL TRANSPORTATION SINCE THE EXXON VALDEZ SPILL

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Cover photos:

Fishing vessel towing boom: Randy Brandon.

Cook Inlet Setnetters: Oil Spill Public Information Center.

Cleaning oiled beach: Oil Spill Public Information Center.

Background photo of tanker with tethered tug: Patrick C. Welch.

Page 6 background photo: © Dennis Remick

The Prince William Sound Regional Citizens' Advisory Council is an independent, non-profit corporation formed after the 1989 Exxon Valdez oil spill to minimize the environmental impacts of the trans-Alaska pipeline terminal and tanker fleet. The council has 18 member organizations, including communities affected by the Exxon Valdez oil spill and groups representing Alaska Native, aquaculture, environmental, commercial fishing, recreation and tourism interests in the spill region. The council is certified under the federal Oil Pollution Act of 1990 as the citizens' advisory group for Prince William Sound, and operates under a contract with Alyeska Pipeline Service Co. The contract, which is in effect as long as oil flows through the pipeline, guarantees the council's independence, provides annual funding, and ensures the council the same access to terminal facilities as state and federal regulatory agencies.

PATH OF OIL SPILLED FROM THE EXXON VALDEZ



The Exxon Valdez spilled 11 million gallons of North Slope crude into Prince William Sound. Over the subsequent weeks, the oil spread south and west affecting parts of more than 1,500 miles of Alaska shoreline. The extent of oiling varied from heavy to light, sheen and tar balls.

INTRODUCTION — THEN & NOW

The Exxon Valdez oil spill was not simply a freak accident. While Exxon Corp. was immediately responsible, other factors were also at work. The oil industry, government agencies, elected officials and the citizens of Alaska share responsibility for the complacency that allowed the spill to occur and failed to ensure a prompt, effective cleanup.

The oil industry failed to maintain adequate systems for preventing and responding to oil spills.

Regulatory agencies failed to protect public resources because of ineffective or inadequate oversight.

State and federal elected officials failed to pass laws strong enough to protect the environment and give regulatory agencies the funds they needed to protect public resources.

Except for a few outspoken local citizens, most Alaskans simply failed to pay attention.

The result was a spill on March 24, 1989, of about 11 million gallons* of North Slope crude oil into Prince

William Sound less than 30 miles from Valdez, the city for which the tanker had been named. The ship ran aground on Bligh Reef after leaving the designated tanker lanes because of earlier reports of icebergs in the area.

The Exxon spill could have been averted by stronger prevention practices and more vigilant government oversight. Better response planning in advance could have lessened the impacts of the spill.

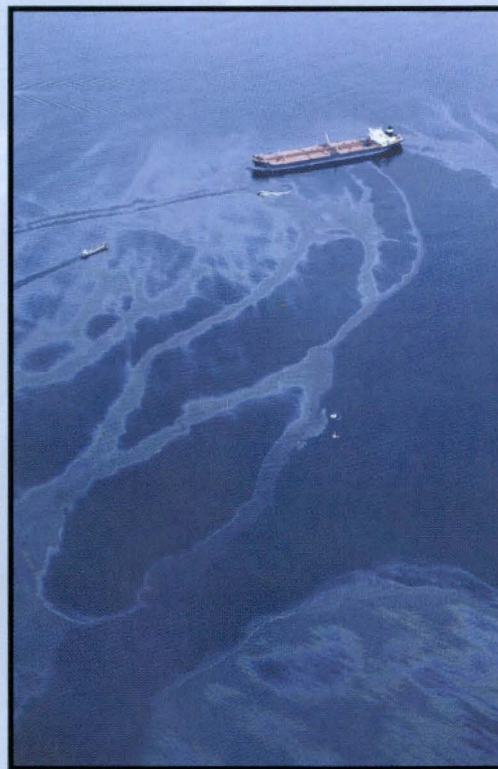
Birds, beaches and otters were oiled and people in the region suffered psychological and economic harm. In some cases, the ill effects of the spill linger today.

This publication explores how factors that led to the nation's worst oil spill have been addressed in the decade since. Much has been done. New and revised federal and state laws and regulations are in

place, and the oil industry operates with a heightened awareness of the consequences of a catastrophic spill.

Are the resources and communities of Prince William Sound and the Gulf of Alaska safer from a major oil spill than they were in 1989? Can Alaskans now relax?

The Prince William Sound Regional Citizens' Advisory Council, which produced this report, believes Alaska waters and the communities affected by the Exxon spill are, in fact, safer today. But we can



The Exxon Valdez, March 24, 1989. Photo: Erik Hill/Anchorage Daily News.

never relax. Continued vigilance is essential to ensure that protections are not diluted and gains are not lost as memories of the spill fade.

Indeed, as this report goes to press, oil prices are in one of their periodic slumps and the industry is announcing cutbacks in several areas of its operations. Much to the council's concern, some of these cutbacks – such as layoffs of spill-response personnel and delays in the construction of double-hull tankers – have the potential to affect safety. In the council's view, safety is a fixed cost of transporting oil and should not be subject to the vagaries of the oil market.

The council is an independent non-profit organization formed after the Exxon Valdez oil spill to promote environmentally safe operation of the crude oil terminal in Valdez and the tankers it serves.

Under a contract with Alyeska Pipeline Service Co., we monitor and advise Alyeska on terminal operations, spill prevention, response planning, and other environmental issues. We conduct independent research, monitor regulatory activity and advise tanker owners and opera-

groups with a stake in the affected region.

The federal Oil Pollution Act of 1990 requires an industry-funded citizens' advisory group for Prince William Sound; we are certified as meeting that requirement.

The views expressed here are ours, and we are



The tractor tug Protector is tethered to its charge, the SeaRiver Long Beach, for the first part of the tanker's journey out of Prince William Sound. The upgrading of escort vessels and escort practices is one of the most significant safety improvements of the last decade. Photo: Patrick C. Welch.

tors, regulatory agencies and the public on issues related to oil transportation and its environmental impacts.

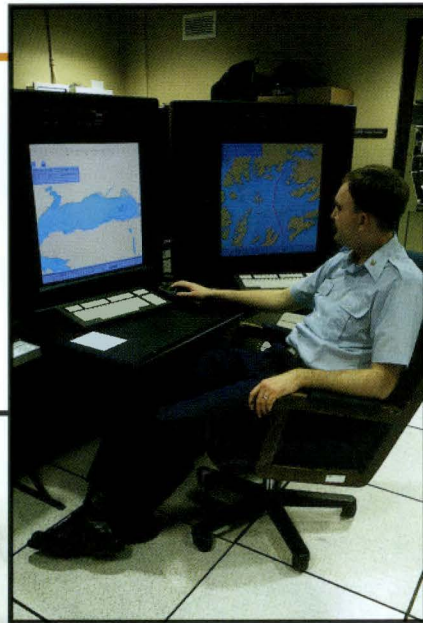
Our 18 member organizations include communities affected by the Exxon Valdez oil spill and interest

solely responsible for the content of this report.

– Prince William Sound
Regional Citizens' Advisory
Council
March 24, 1999

At the U.S. Coast Guard Vessel Traffic Service in Valdez, personnel track tankers from the terminal to the Gulf of Alaska. Photo: Patrick C. Welch.

An escort response vessel (ERV), such as the Heritage Service, carries spill response equipment as it accompanies laden tankers. Beginning in 2000, the ERVs will be replaced by more powerful and better equipped vessels known as Prevention and Response Tugs, or PRTs. Photo: David Adams.



I. PREVENTION — REDUCING THE SIZE AND FREQUENCY OF OIL SPILLS

History shows that oil, once spilled on the sea, is never fully contained and recovered. Despite improvements in containment and cleanup technology, it has proven impossible to recover all the oil from a major spill even under the best of conditions. Indeed, the best-laid response plans

in the world are no guarantee that any spilled oil will be recovered from the water since severe weather can defeat even a good plan.

The first line of defense must be prevention.

VESSEL TRAFFIC AND NAVIGATION

The U.S. Coast Guard's Vessel Traffic Service functions as the waterway manager for major shipping including tankers traveling to and from Alyeska Pipeline's Valdez Marine Terminal. The traffic ser-

vice includes the Coast Guard's control center in Valdez, a system of designated lanes for separating inbound and outbound tankers, and electronic equipment for determining and displaying the positions of tankers in or near Prince William Sound.

Numerous improvements have been made to the traffic service since 1989. These changes enhance the traffic center's ability to monitor inbound and outbound tankers and to provide them with traffic advisories.

Ten years ago, radar coverage was limited, failing to detect the Exxon Valdez as it grounded on Bligh Reef less than 30 miles from the Coast Guard traffic center in Valdez. Today, the system has been upgraded to provide better resolution in varying weather conditions and at an extended range. The integration of satellite positioning data allows tracking of all tankers from the Valdez terminal through Hinchinbrook Entrance, where Prince William Sound opens into the Gulf of Alaska.

Coast Guard personnel now track tankers continuously in the Valdez Narrows and as often as once a minute in the rest of the Sound and out into the Gulf of Alaska.

In 1989, only two people were on duty in the Vessel Traffic Center when the Exxon Valdez ran aground. Today, a third person, the watch supervisor, is present to oversee the radar and radio watch standers.

Qualifications and training for watch standers have also been upgraded and expanded.

Reporting and communications have been upgraded by the industry. New repeater

towers installed by Alyeska Pipeline allow better communication between tankers and the Valdez Marine Terminal.

TANKER OPERATIONS AND ESCORT SYSTEM

The Exxon Valdez was traveling without an escort vessel at about 14 mph* when it approached icebergs northwest of Bligh Reef and deviated from the established tanker lanes to avoid the ice.

Today, loaded tankers in Prince William Sound are subject to speed limits, are under constant escort, and normally must remain in the tanker lanes at all times.

The Coast Guard has always required loaded tankers to have a tug escort through the Valdez Narrows. Now, a system of close escorts and vessels on station

covers the tanker route from the berths at Valdez to the Gulf of Alaska at Hinchinbrook Entrance.

Each loaded tanker has at least two escorts; in Valdez Narrows, one of the escorts must actually be tethered to the tanker's stern. Another special restriction in Valdez Narrows: In times of high winds, three escorts are required.

At the north end of the Sound (from the Valdez terminal to Bligh Reef) and at the south end, where tankers enter the Gulf of Alaska via Hinchinbrook Entrance, all escorts must stay within a quarter-mile of the tanker.

However, in the central part of the Sound – from Bligh Reef to Hinchinbrook Entrance – there is more sea room and only one of the

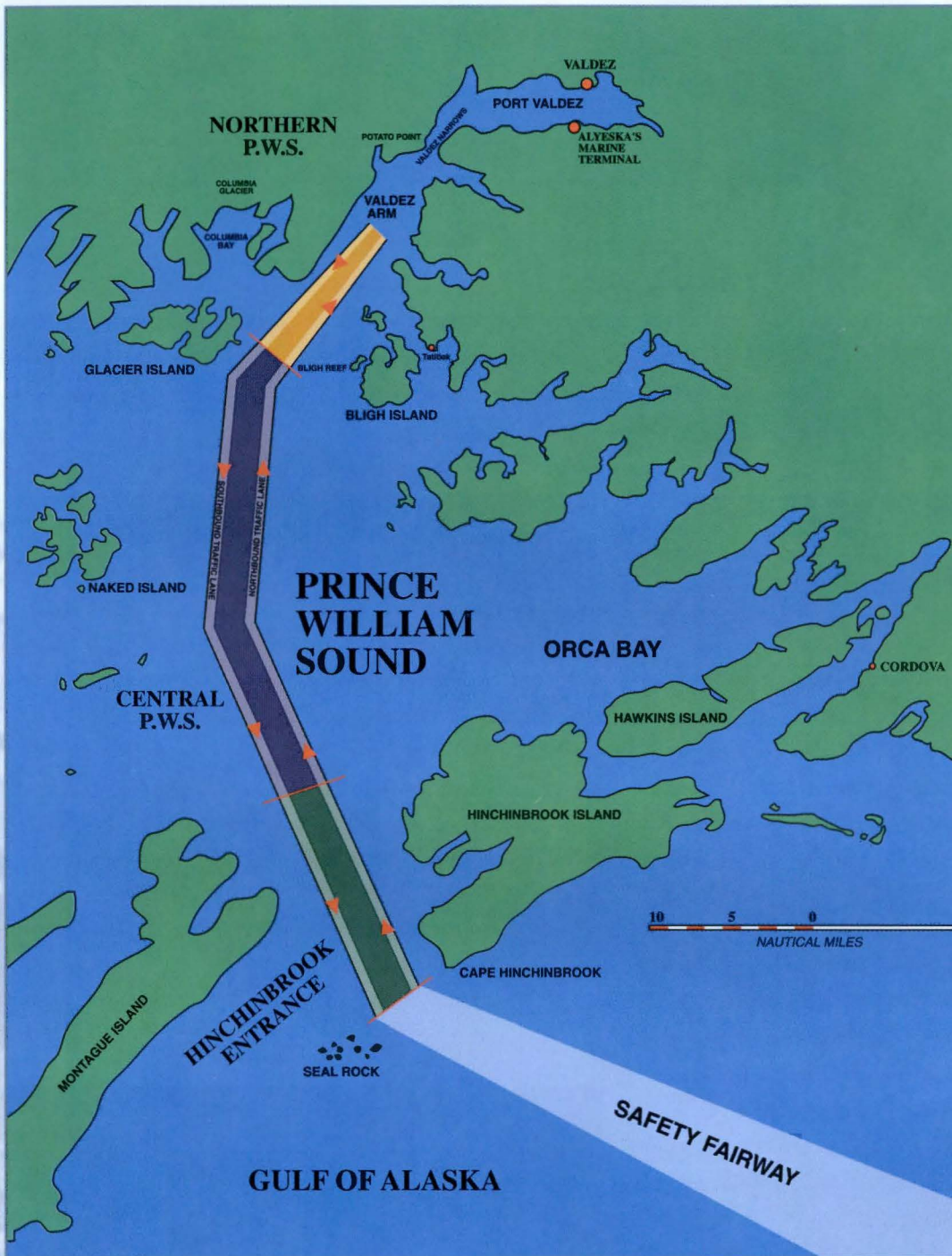
PROTECTOR
Continued on page 8

**Speeds in this report are expressed in statute miles per hour, or mph, for the convenience of general readers. Mariners, however, usually express speed in knots, or nautical miles per hour. The conversion is as follows: 10 knots equals 11.5 mph.*



In 1998, oil shippers and Alyeska began using the "Protector," a class of tractor tugs more powerful and maneuverable than the conventional tugs that had been used. The Protector tugs are being replaced by new and even more powerful tugs. (See Page 7.) Photo courtesy Crowley Maritime, Inc.

PRINCE WILLIAM SOUND TANKER LANES



Tankers transit three zones as they head south from Valdez: Northern Prince William Sound (orange), Central Prince William Sound (purple) and Hinchinbrook Entrance (green). Speed limits, escort requirements and weather restrictions apply in each of the three zones.

ESCORT PROGRESS

One of the most profound areas of safety improvement has occurred in the escort vessels that accompany laden tankers. Until March 1989, tankers were accompanied by only one escort and only from the terminal through Valdez Narrows. Over the years, the escort system has changed in four significant ways:

- *at least two vessels now escort each laden tanker;*
- *the escort path now extends to Hinchinbrook Entrance;*
- *procedures have been improved to increase the odds of saving a tanker in trouble; and*
- *new and better escorts – tugs and response vessels – have been or are being custom built for the Valdez trade.*



Two new enhanced tractor tugs - the most powerful ever built – were designed for service in Prince William Sound. The Nanuq (polar bear), shown above, arrived in January, 1999 and the Tan'erliq (black bear) was expected later in the year. The new tugs represent an important milestone in the effort to improve tanker safety. Photo: Pete Dickes.

Also in the works was a new, more versatile and more powerful response vessel (left) to replace the current fleet of Escort Response Vessels, or ERVs. Alyeska Pipeline Service Co. ordered three of the so-called PRTs – Prevention and Response Tugs – which have spill-response, towing and firefighting capabilities. Alyeska expects the PRTs will substantially upgrade prevention and improve response. They were expected to arrive in Alaska in 2000.





Weary work. Limits have been placed on crew work hours in an effort to mitigate crew fatigue. Photo: ©1989 Craig Fujii/Seattle Times.

The tanker Braer aground on the Shetland coast in 1993. The combination of a severe storm, poor decision-making, and poor seamanship caused the loss of the ship and its entire 20 million gallon cargo. Photo by Scott Sterling.

escorts is required to stay within a quarter mile of the tanker. The other escort – called a “Sentinel” – may be stationed a few miles away at one of three points along the route, where it remains under way for quick response.

After a tanker leaves Prince William Sound, a rescue tug must stay on station near Hinchinbrook Entrance until the tanker is at least 17 miles out to sea.

Escort vessels have several important functions: to watch for and report any sign of problems with a tanker, to assist if a tanker

encounters trouble, and to provide the first response should a spill occur, as described in Section II.

At least one of the escorts is equipped with containment boom, oil skimmers, a work boat to deploy boom, storage capacity and a trained response crew.

Within the Sound, tankers are subject to various speed limits. The highest speed limit, 12 mph, applies in Port Valdez and Valdez Arm. The lowest, 6 mph, applies in Valdez Narrows.

In central Prince William Sound there is, technically speaking, no speed limit. However, the tankers can't outpace their escort vessels, creating an effective speed limit of about 12 mph.

TANKER CREWS

Until 1989, signs of alcohol use did not prevent tanker crews from returning to their vessels through the terminal. Now, under alcohol screening procedures instituted by Alyeska Pipeline, all tanker captains are given breath tests an hour before sailing. Crew

members suspected of consuming alcohol are tested; any with blood alcohol content of 0.04 percent or greater are denied access to the terminal and their vessel.

In 1989, a state-certified ship's pilot was required to be aboard loaded tankers only until they reached Rocky Point, about 20 miles out from the terminal. Now the pilot remains aboard as far as Bligh Reef.

In all parts of Prince William Sound, two of the ship's licensed deck officers must be on the bridge at all times. A federally licensed pilot is also required; that role is normally filled by one of the deck officers. (A pilot is a licensed mariner familiar with local waters who is required to be aboard ship to assist the crew in prescribed areas.)

Today, unlike in 1989, federal law limits the number of hours crew members may work, to reduce the risk of fatigue-induced accidents.

In addition, tanker crews – as well as tugboat officers and state coastal pilots – receive bridge simulator

training under conditions reproducing tug and tanker interactions in Prince William Sound.

Also, on-water rescue training has been increased for tugboat and tanker officers.

TANKER INSPECTIONS

The structural integrity of the tanker Exxon Valdez was not an issue in its grounding. However, in 1988, a report issued by the Coast Guard identified the Valdez fleet as disproportionately affected by structural failures. The problem was underscored in January 1989, when the tanker Thompson Pass spilled 71,000 gallons of crude oil at the terminal because of cracks in its hull. The Coast Guard and the state of Alaska now require more stringent inspections of

tankers vulnerable to structural failure.

In addition, all tankers docked at the Valdez Marine Terminal are now surrounded with containment boom while oil is transferred.

WEATHER CONSIDERATIONS

Weather restrictions on tanker traffic were instituted after the Exxon Valdez oil spill.

The Valdez Narrows are now closed to large tankers when the wind exceeds 35 mph; when it exceeds 46 mph, smaller tankers are banned, too.

In addition, Hinchinbrook Entrance is closed to tankers if the wind exceeds 52 mph or the seas exceed 15 feet.

In the past, lack of information about weather and sea conditions in Prince William Sound and



Oil tankers encounter a range of sea and weather conditions on the trip south from Prince William Sound.

Hinchinbrook Entrance was a problem. Because of wind patterns and local topography, readings from the wind measuring station at Potato Point are not always a reliable gauge of actual conditions. The lack of other reporting stations in the Sound meant that frequently the only information available about wind and sea conditions was from a vessel already under way, or from a weather station at Middleton Island, in the Gulf of Alaska more than 100 miles from Valdez.

In 1995, that changed when weather equipment was installed at Potato Point, at Bligh Reef, in the center of Prince William Sound and at Hinchinbrook Entrance. The new equipment reports wind speed and direction, barometric pressure, temperatures, and wave action.

Thanks to the efforts of the citizens' council, the oil industry and regulators,

Congress appropriated \$500,000 to pay for the buoys. In 1998, weather equipment was installed on Middle Rock so that wind speeds in the Valdez Narrows would be more accurately reported.

MONITORING AND OVERSIGHT BY REGULATORY AGENCIES

The Alaska Department of Environmental Conservation and the U.S. Coast Guard are the agencies most directly responsible for oversight and monitoring of the Valdez Marine Terminal and oil tanker traffic. After the Exxon Valdez oil spill, both agencies were criticized for failing to either implement or enforce adequate prevention measures.

Changes have been made in both agencies.

At the state level, the Exxon Valdez oil spill focused public and political attention on the need for the Department of Environmental Conservation to have the authority and funding to monitor and oversee terminal and tanker operations, programs which had been underfunded through the late 1970s and '80s.

After 1989, state funding increased significantly for spill drills, facility and vessel inspections, and review of the voluminous oil spill contingency plans prepared by Alyeska Pipeline and the oil shipping companies.

Oil-related functions were consolidated into one division, called Spill Prevention and Response. State legislation passed in 1990 provided the authority, resources and

Icebergs from the rapidly retreating Columbia Glacier pose a threat to oil tankers. Photo: Austin Post.





Weather buoys installed in Prince William Sound in 1995 provide more accurate and timely information about wind and sea conditions. Photo: Vince Mitchell.

State and federal agencies now commit more resources to oil spill prevention and response, which includes participating in major spill drills. John Whitney, NOAA, and U.S. Coast Guard Capt. Ron Morris confer at a 1998 drill conducted by BP. Photo: Courtesy BP.

funding that the Department of Environmental Conservation needed to monitor and oversee industry operations and implement spill prevention and response programs. New regulations implemented in 1998 require the industry to employ the best available technology in oil spill prevention and response.

The Department of Environmental Conservation now has the authority, which it didn't have before, to require and enforce prevention measures as a condition for

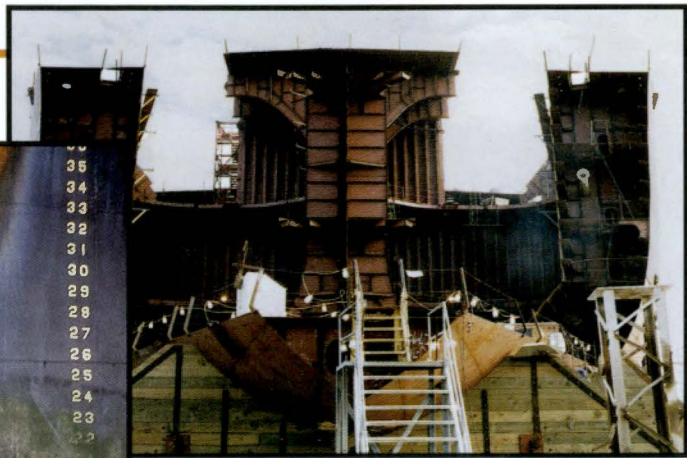
approval of oil spill contingency plans. Those measures include more training, more equipment, more inspection and maintenance of equipment, better record-keeping and specific requirements for loaded tankers.

The Coast Guard is the federal agency most affected by the Exxon Valdez. As a result of the problems that emerged from the spill, the Coast Guard has a more direct role in spill prevention and response and much greater regulatory oversight of the oil

transportation industry. It is responsible for implementing most of the new prevention measures required by the Oil Pollution Act of 1990 and by other federal regulations passed later.

ICE STUDIES

According to a 1995 study co-sponsored by the citizens' council, the oil industry, and regulators, one of the most serious remaining risks to tankers in Prince William Sound is posed by icebergs from Columbia Glacier.



A *One of three double-hull tankers under construction for ARCO Marine, Inc. The first of the new tankers, which ARCO calls its Millennium Class, is due to begin service in 2000. Photo: © Russ Weston.*

◀ *The Overseas Ohio suffered major damage when it struck an iceberg in 1994. The tanker was not carrying crude oil at the time. Photo: Port of Portland.*

This glacier has been disintegrating and retreating rapidly since 1980. Each year, it calves thousands of icebergs into Columbia Bay, about 25 miles southwest of Valdez. Some of these icebergs drift into the tanker lanes.

Besides playing a role in the Exxon Valdez grounding, ice from Columbia Glacier caused another major accident in 1994, when the empty tanker Overseas Ohio struck a berg and suffered more than \$1 million in damage to its bow.

The citizens' council is funding research to find ways to predict when icebergs are likeliest to enter the tanker lanes, and technology to detect them in the water.

DOUBLE HULLS

One of the most important steps taken to prevent and reduce oil spills like the Exxon Valdez is the federal requirement that all oil tankers in U.S. waters have double hulls by 2015. Double hulls are to be phased in, with existing vessels in the Valdez trade

to be converted or replaced on a schedule that depends on size and age.

Double hulls are important because studies indicate they can eliminate or dramatically reduce the size of oil spills. In the case of the Exxon Valdez, a Coast Guard study said a double hull could have cut the size of the spill by 60 to 80 percent.

Double-hulled vessels existed long before 1989, and more have been built since then. As this report was being prepared in early 1999, ARCO had three

new double-hulled vessels under construction for the Prince William Sound trade.

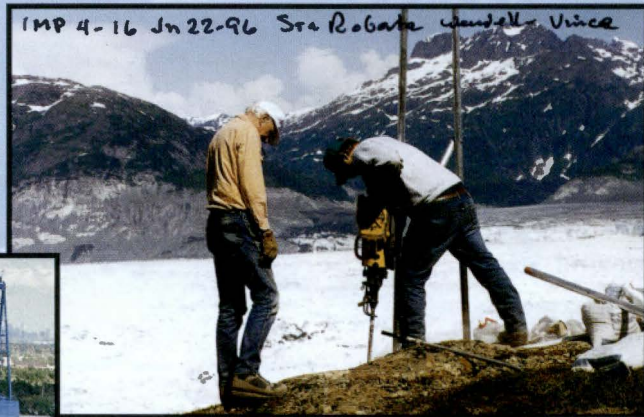
However, only three double-hull tankers – all under charter to BP – were in actual service in the Sound. Some other tankers had double bottoms and some operators were leaving outer tanks partly empty to reduce oil loss in the event of a hull puncture.

Most of the tankers calling at the terminal in Valdez were built in the 1970s and the age of the fleet is becoming a concern to the citizens' council.

In addition, the council is concerned about possible slowdowns to the phaseout schedule in the Oil Pollution Act.

Until 1998, an ambiguity in the act permitted single-hull tankers to be remeasured – a process where their cargo capacity was reduced – in order to extend how long they could stay in service. Four such vessels that operate in Prince William Sound were remeasured before Congress eliminated the ambiguity in 1998. The council will be vigilant against other provisions that would permit single-hull tankers to remain in service past their original retirement dates.

The Coast Guard is currently considering a request from the oil industry to allow single-hulled tankers to extend their retirement dates by being retrofitted with double bottoms or double sides. The council is opposing this proposal, supporting a strict interpretation of the Oil Pollution Act that would take aging single-hull tankers out of service on the original schedule.



Contractors set up equipment to monitor the retreat of Columbia Glacier, under an ice monitoring project conducted by the Prince William Sound Regional Citizens' Council. Photo: Austin Post.



Double hulls, like this one on a tanker under construction for ARCO, will be required by federal law for all tankers in U.S. waters, including Prince William Sound, by 2015. Double hulls can dramatically reduce the incidence and size of oil spills from certain types of tanker casualties. Photo: Wayne Duhon.

II. RESPONSE — REDUCING THE HARM FROM OIL SPILLS

Prevention measures can reduce the size and frequency of oil spills. But prevention efforts will never become fail-safe, so the industry, regulatory agencies and the public must be prepared to respond to spills that do occur. It is incumbent upon those who handle and carry crude oil, as well as regulatory agencies and the public, to make sure that spilled oil is contained and recovered to the greatest extent humanly possible.

The speed and effectiveness of the response to an oil spill depend on the availability of equipment, resources and trained personnel, on planning and preparation and, ultimately, on favorable weather.

CONTINGENCY PLANS

Anyone who handles or transports crude oil or refined products as cargo must have a government-approved contingency plan for preventing

and responding to spills. What must be in the plan and what must be provided in the way of drills, training, acquisition of equipment, etc., are determined by state and federal laws and regulations. The requirements depend on the type of vessel or facility, the location, and the amount and type of cargo involved.

Alyeska Pipeline was required to have a contingency plan before the Exxon Valdez spill, but it was not well implemented. Spill-response duties were assigned to personnel with other day-to-day operational tasks and equipment was not adequately maintained. The initial response in March 1989 was slow, ineffective and poorly coordinated.

Since then, state and federal agencies have expanded

plan requirements and changed some of the assumptions. The federal Oil Pollution Act of 1990 and Alaska state laws passed after the Exxon Valdez spill led to the first regulations requiring contingency plans for individual tankers.

Those who must have contingency plans to operate must provide greater assurances that personnel are being trained, that equipment and resources are available to be mobilized quickly, and that all players have practiced their roles in preparation for an actual spill.

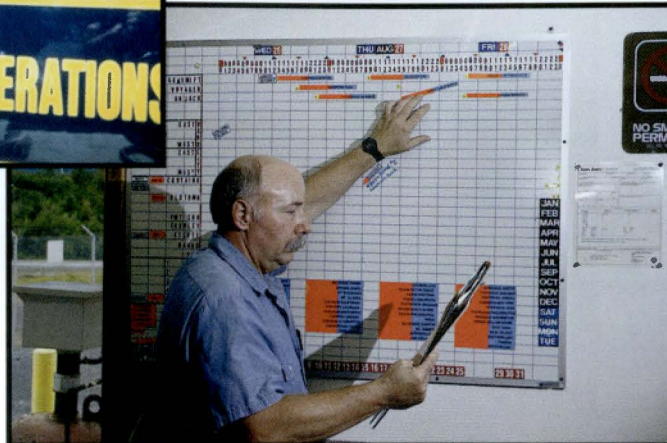
The size of spill assumed in a response plan makes a tremendous difference in the resources and equipment that must be available. Alyeska Pipeline's 1987 contingency plan, approved by the state,



Lisa Ka'aihue, of the citizens' council staff, reviews some of the documents that make up an oil spill contingency plan for tankers in the Valdez trade. Contingency plans must include extensive detail about the equipment, personnel and procedures to be used in the event of an oil spill.



Mounting a coordinated and integrated response to an oil spill requires practice. From left, drill observer Tim Jones, Pat Carney of BP and Mike Byington, Alaska Division of Emergency Services, confer during the BP Spill of National Significance drill in September 1998. Photo: Courtesy BP Exploration (Alaska).



The traffic board at Alyeska's Ship Escort/Response Vessel System (SERVS) office. Photo © Sean Reid.

said a spill of 8.4 million gallons (three-quarters the size of the Exxon Valdez spill) was highly unlikely and reasoned that "Catastrophic events of this nature are further reduced because the majority of tankers calling on Port Valdez are of American registry and all of these are piloted by licensed masters or pilots."

Both state and federal law now require planning for larger potential spills than in the past, and require more spill response equipment to be immediately available.

Plan holders must have enough equipment immediately available to deal with a spill of 12.6 million gallons of oil (slightly larger than the Exxon Valdez spill) within 72 hours.

They must also plan for spills of almost 40 million gallons, but may rely more on equipment to be brought in from outside the Prince William Sound area for these larger spills.

As the consortium that operates the trans-Alaska pipeline and terminal for its seven owner companies, Alyeska Pipeline holds the contingency plans for spills

on the pipeline and at the Valdez tanker terminal.

In Prince William Sound, the tanker owners and operators must have their own approved contingency plans, although they contract with Alyeska Pipeline to provide the initial response described in the plans.

Under these contracts, Alyeska Pipeline manages the spill response for up to the first 72 hours after a spill. After that, it may transfer management of the response to the spiller, so long as the U.S. Coast Guard and the Alaska



Despite disagreement about when dispersants are appropriate to use on an oil spill, dispersant application still must be practiced, as in this on-water demonstration in October 1996. Photo: David Adams.

Fishing boats and spill response vessels regularly practice deploying boom, which would be used to contain oil and protect uncontaminated areas, in the event of a spill. Photo: Randy Brandon.

Department of Environmental Conservation agree that the spiller or its representative is ready to take over.

EQUIPMENT READY

The first three days after the Exxon Valdez oil spill afforded nearly ideal weather for oil recovery. Seas and winds were calm. But the equipment wasn't ready. Seventeen hours after the grounding, neither the leading edge of the spill nor the grounded tanker had been boomed and the few skimmers on-scene were operating ineffectively. Skimming soon halted because there was no more

room to store the recovered oil-water mixture.

Throughout the first few days, debate raged about use of dispersants. Exxon argued for widespread dispersant use, but didn't have enough dispersant or the equipment to do the job and never received regulatory approval.

The situation now is quite different. Prince William Sound is home to Alyeska Pipeline's Ship Escort/Response Vessel System, or SERVVS, one of the top oil spill response forces in the world.

SERVVS has several func-

tions. It helps tankers navigate safely through Prince William Sound and responds to a tanker problem or a spill. SERVVS also responds to spills on the southern portion of the trans-Alaska pipeline and at the Valdez tanker terminal.

SERVVS employs approximately 200 trained personnel; another 60 people comprise Alyeska Pipeline's crisis management team in the event of a spill.

The SERVVS escort/response vessels are equipped to tow or otherwise assist tankers. Also, some carry spill response

equipment and can contain, recover and – to a limited extent – store oil.

At least one escort vessel is always within a half-mile of each loaded tanker and in radio communication with the tanker's bridge until it reaches Seal Rocks, outside Hinchinbrook Entrance. After that, a rescue tug stands by until the tanker is 17 miles into the Gulf of Alaska.

Trained Alyeska Pipeline response crews are on duty around the clock and the response fleet is on standby alert whenever a loaded tanker is traveling in the Sound.

SERVS' response resources include 35 miles of containment boom (versus less than five miles in 1989), 37 high-volume skimming systems, barges to receive recovered oil and water mixture, and equipment to pump and transfer oil-water mix. SERVS also has 3,600 feet of fire boom with helicopter-carried igniter systems. Equipment is tested in drills and exercises, to reduce the chances of confusion and surprises in an actual incident.

Four open-water task forces, each with a trained

crew and a large barge with three skimming systems on-board, are stationed in Prince William Sound. Two are in Port Valdez – the body of water where the city of Valdez and the Alyeska tanker terminal are located. The other two task forces are located elsewhere in the Sound, along the tanker route to Hinchinbrook Entrance.

Today, Alyeska Pipeline has at its disposal more than 60 skimming systems with a combined recovery capacity of over 12 million gallons of oil-water mixture in 72 hours. In 1989, only 13 systems were available; their combined capacity was about 1.2 million gallons in 72 hours.

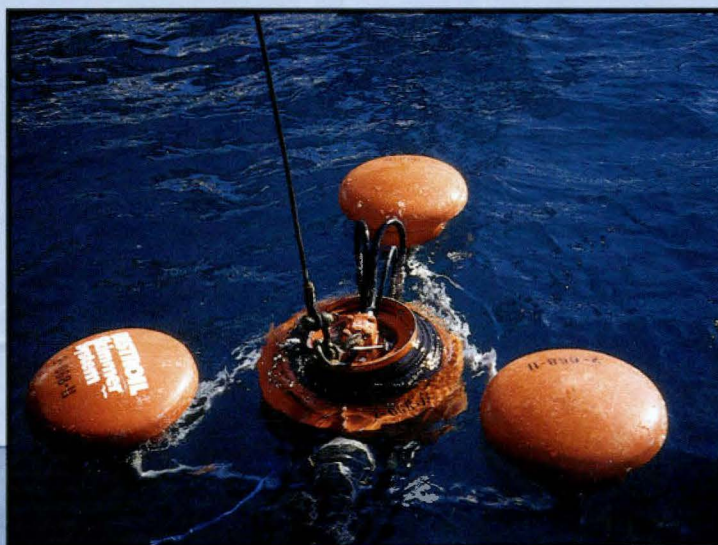
Dispersants are now stockpiled in Anchorage, Valdez and outside Alaska,

along with equipment to deliver them from ships, airplanes and helicopters.

Current state and federal laws and regulations hold that dispersants should be used only if it is clear that mechanical cleanup methods such as booming and skimming won't work. The citizens' council supports these laws and opposes efforts to loosen these restrictions.

Among the council's concerns is the scarcity of reliable scientific data about the efficiency, toxicity and persistence of dispersants and dispersed oil in actual Prince William Sound/Gulf of Alaska conditions. The council is participating in design of a study to resolve these questions.

More generally, the council is concerned that the oil



Spilled oil is first surrounded by containment boom, then picked up with skimmers like this DESMI 250.

industry may not be able to import spill-response equipment from outside the Prince William Sound region with the rapidity and in the quantities called for in the contingency plans. In a September 1998 drill, BP demonstrated it could import and deploy limited quantities of equipment from outside the region, but the council will continue to press government regulators to ensure the industry can perform on the scale required in this area.

NEARSHORE RESPONSE

Some of the changes since 1989 put more emphasis on shoreline protection, identification of sensitive areas such as hatcheries, and wildlife protection. A new term was coined — Nearshore Response — to describe the effort to protect shorelines threatened by spilled oil that has escaped initial containment.

Nearshore response is a major component of spill response, in which local personnel, knowledge and resources can be used to protect critical resources and

shorelines. Industry groups, the citizens' council and regulatory agencies have worked cooperatively to develop nearshore response plans.

Local fishing vessels are part of Alyeska Pipeline's planned nearshore response. They are used, among other things, to transport response equipment, deploy and tend boom, and mobilize pre-staged equipment to protect fish hatcheries. Alyeska Pipeline has provided response training to over 300 fishing boats and their crews. The fishing vessels, based in communities in Prince William Sound, the Kenai Peninsula and Kodiak Island, are under contract with Alyeska Pipeline to respond to spills if willing and available at the time of an incident.

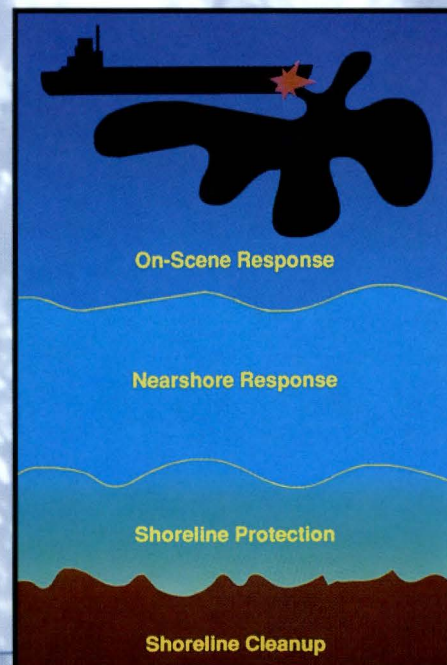
The oil industry has stockpiled spill containment and removal equipment at five fish hatcheries in Prince William Sound and at five community response centers that have been estab-

lished in the Sound. They are at Chenega, Cordova, Tatitlek, Whittier and Valdez.

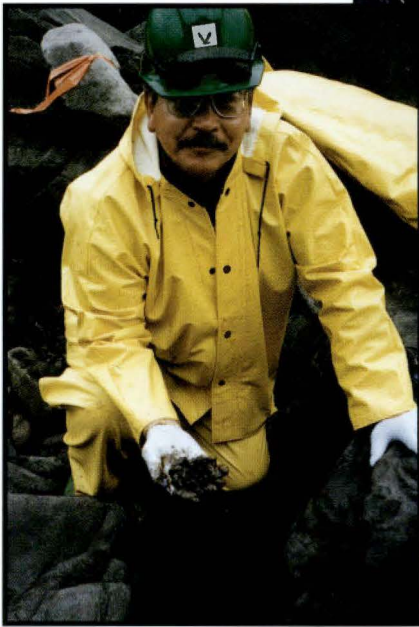
Two similarly equipped centers have been set up outside Prince William Sound. They are in Kodiak and Seldovia, and were established by the communities and the state of Alaska.

Each center provides manpower, equipment, and coordination of emergency responses. Response training for fishing vessel operators is provided by the industry, the state of Alaska, the Coast Guard and the communities themselves.

Storage capacity for recovered oil was a problem



After the 1989 oil spill, a new element entered the lexicon: Nearshore Response, the effort to contain spilled oil before it hits shorelines.



Effective nearshore response would help prevent scenes like this, when oil spill workers attempted to clean oiled shorelines. Photo: Oil Spill Public Information Center.

Larry Evanoff shows oil remaining near Chenega in 1997, eight years after the Exxon Valdez spill. Photo: Leann Ferry/Citizens' Council.

in the 1989 recovery effort, when only a single barge with room for 500,000 gallons of oil was available. Boats would pick up the emulsified oil, only to find there was nowhere to put it. Alyeska Pipeline now maintains storage capacity, much of it on barges, for over 34 million gallons of recovered oil and water mixture. However, the availability of adequate storage for recovered oil is still an outstanding question. The citizens' council has requested demonstrations to verify that lack of

storage won't hinder nearshore oil recovery operations.

The oil industry is much better prepared today for nearshore response than it was a decade ago, but there is still room for improvement. The council believes the latest versions of the plans aren't specific enough about where boats and other equipment for nearshore response will come from. In particular, the council believes the full implementation of the nearshore plans as written would require the use of

more commercial fishing vessels than are likely to be available at one time.

DRILLS, MANAGEMENT AND OTHER ASPECTS OF RESPONSE

Spill drills enable response personnel to become knowledgeable and proficient in the strengths and weaknesses of equipment and procedures. Before 1989, there were no major oil spill drills; today, major drills are conducted once a year, with frequent smaller drills. The major drills include state and fed-

A unified command leaves no question about who's in charge of the spill response. At a BP drill in 1998, the players practice a press conference: Brad Hahn, Alaska Department of Environmental Conservation, Capt. Ron Morris, U.S. Coast Guard, and Steve Marshall, BP. Photo courtesy BP.



eral agencies, fishing vessels, tanker owners and operators and the citizens' council.

An important aspect of spill response implemented since 1989 is use of the National Interagency Incident Management System, an incident command system first developed by fire fighters in California to coordinate management, resources and roles during an emergency response.

In Alaska, this approach integrates the party responsible for the spill, the state and the Coast Guard in a unified command structure that expands according to need. It also establishes a pre-determined decision-making process and a common language that significantly reduces confusion and misunderstandings among personnel from dif-

ferent organizations. This structure has been adapted by industry and government agencies to define and coordinate their roles and responsibilities in the event of a spill. The Incident Command System has been tested and practiced extensively in drills.

The Incident Command System's need for quick, wide-ranging communications is supported by a radio repeater system installed to cover Prince William Sound, Cook Inlet and parts of the Gulf of Alaska.

STATE FUNDING FOR SPILL RESPONSE

After the Exxon Valdez oil spill, an existing spill response fund was expanded to ensure that reserves would be available for a major oil spill and to provide a long-term funding

source for the state of Alaska's spill prevention and response programs. The money for this expanded role comes from a 5-cent conservation surcharge on every barrel of oil produced in Alaska. The surcharge drops to 3 cents when the reserve set aside for oil-spill response reaches \$50 million; if the reserve is drawn down in an actual response, the surcharge rises to 5 cents again until the reserve is replenished.

FEDERAL FUNDING FOR SPILL RESPONSE

To ensure that money will be available to pay for responding to and cleaning up major spills nationwide, the federal Oil Pollution Act required establishment of a \$1 billion oil spill liability trust fund, funded by the oil industry.

The Oil Pollution Act strengthened federal authority to order spill cleanup action and requires the Coast Guard to direct spill response actions when any spill poses a risk to public health or safety. It also provides tougher criminal penalties and higher civil penalties for the spiller.

COMMUNITY IMPACTS

Technological disasters, such as the Exxon Valdez spill, disrupt communities in many ways.

The most obvious and tangible disruptions occur to the ordinary flow of goods, services, and jobs. For example, the spill created thousands of high-paid jobs in cleanup work. As a result, ordinary employers in communities – village stores, Native corporations and city governments – lost workers and found it even harder to function normally during the crisis.

These kinds of disruptions are highly visible and usually straightforward to remedy. But disasters also damage communities in ways that are less obvious and longer-lasting.

For example, studies of Prince William Sound communities indicate that mental health problems caused by the Exxon spill still linger a decade after the event.

In 1989, there was no plan for helping communities deal with such problems.

Today, the citizens' council is applying the results of several years of socio-economic research to produce a guidebook explaining how communities can deal with technological disasters. Some strategies: a newspaper education program; training for

community professionals such as school teachers, clergy, police and mental-health counselors; and even training so that community members can provide basic mental-health counseling to each other.

With the guidebook's assistance, the council hopes communities and individuals will be able to understand what a technological disaster is, how it differs from a natural disaster, what to expect during the disaster, and how to find help. The guidebook will be available in 1999.



The effects of a major oil spill can be far-reaching and long-lasting. The social and psychological impacts of the Exxon Valdez oil spill were particularly strong in Cordova. Photo: Oil Spill Public Information Office.

III. OPERATIONAL POLLUTION — PROTECTING THE ENVIRON- MENT WHEN THERE'S NOT A SPILL

While it was the Exxon Valdez accident that focused world attention on Prince William Sound 10 years ago, a catastrophic spill is not the only risk posed by the crude oil trade. The Sound and its residents are also at risk of pollution from routine operations – such things as small spills of crude oil or refined products by tankers and other vessels at the Valdez terminal, leaks or permitted discharges from the terminal itself, air pollution, and even the invasion of Prince William Sound by non-native sea life.

The citizens' council monitors mussels and sediments for hydrocarbons on a regular basis. The monitoring program provides information about the effects of on-going terminal and tanker operations, as well as benchmark data in case of oil spills. Photo: Kinnetic Laboratories, Inc.

LONG-TERM ENVIRONMENTAL MONITORING

In 1993, the citizens' council started long-term environmental monitoring at nine sites in Prince William Sound and the Gulf of Alaska. The sites are monitored for hydrocarbons in the water and sediment. Samples are collected in summer and late winter. Results are presented in an annual report.

This information provides a benchmark for assessing the ongoing impacts of routine tanker and terminal operations. In addition, it will permit a better before-and-after assessment of the impacts if there is another catastrophic spill.

BALLAST WATER TREATMENT

Tankers arriving in Valdez carry ballast water in the same tanks used to haul crude oil south. This water,

which picks up oil from the residue in the tanks, has to be off-loaded before the ships can take on a new cargo of crude oil.

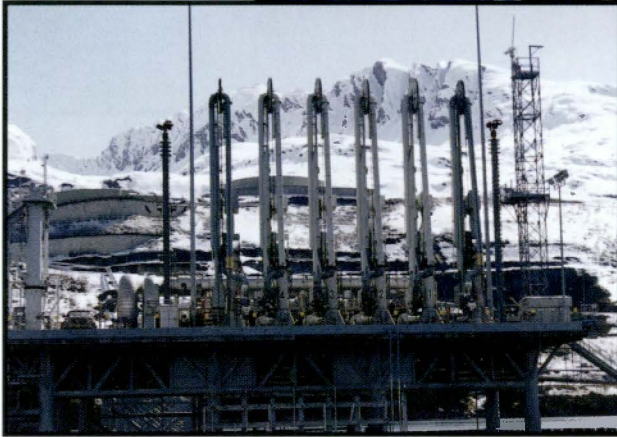
A facility at Alyeska's tanker terminal receives this oily seawater, treats it, and discharges it into Prince William Sound at the rate of 16 million gallons a day.

The environmental effects of this wastewater, which carries traces of oil even after treatment, has been a concern for local citizens since oil first flowed through the Trans-Alaska Pipeline.

In the decade since 1989, the treatment plant has been improved, meaning less oil in the treated water going into the Sound. The levels of the most harmful compounds in the treated ballast water have fallen dramatically.

Still, the news is not all good. Oil is present in bot-





Joel Kopp, a project manager with the citizens' council, labels an influent sample at Valdez Marine Terminal's ballast water treatment facility. The council monitors ballast water discharged by tankers. Photo: Kevin Hartwell.

Two of the four berths at the Valdez Marine Terminal have six "arms" – four to load oil into the tanker, and one at each end to capture vapors released during the loading process. Prior to construction of the vapor control system, the vapors were released into the atmosphere. Photo: Stan Jones/Citizens' Council.

tom sediments near the treatment facility, and in some "hot spots," organisms that live in those sediments are dropping in number and variety. And the facility continues to release petroleum vapors into the air, including cancer-causing benzene, from its basins and tanks.

In early 1999, Alyeska was working with the citizens' council and regulators to map the zone of contaminated mud. And the company agreed to put a device on the treatment plant's outlet pipe to continuously

monitor the amount of petroleum hydrocarbons being discharged into public waters.

VAPOR CONTROLS

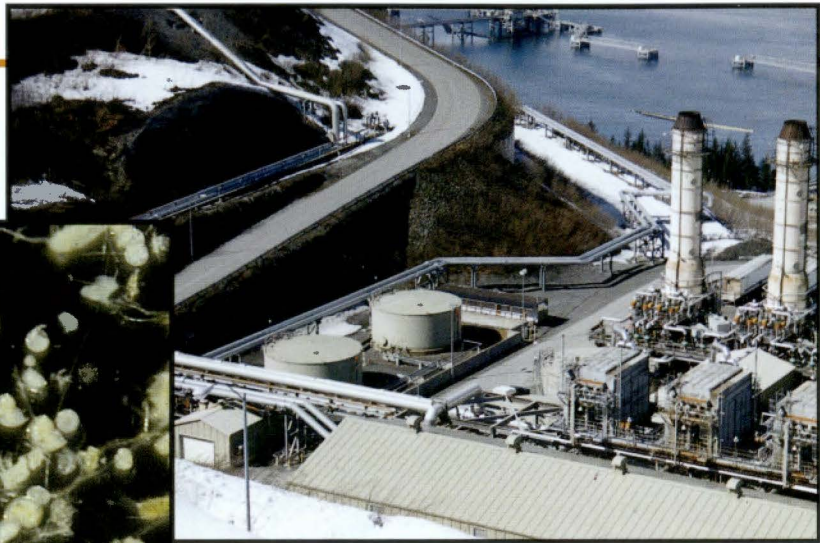
When tankers load crude oil at Alyeska Pipeline's Valdez terminal, thousands of tons of oily vapors containing the potent cancer-causing chemical benzene are forced out of their tanks. For two decades after oil first flowed through the trans-Alaska pipeline in 1977, those vapors were vented to the air, creating a

health hazard for workers at the terminal and nearby residents.

In early 1998, Alyeska Pipeline activated equipment that captures those vapors and either burns them or pumps them into the crude oil storage tanks at the tanker terminal.

The citizens' council was a long-time advocate of vapor controls, and was pleased with the federal government's decision to require them at two of the terminal's four tanker berths.

However, the state of Alaska's official projections



Vapor control pipes (running from lower left to upper right in photo) carry vapors released when oil is loaded into the tankers. Two of the four berths at the terminal are equipped with vapor controls. Photo: Stan Jones/Citizens' Council.

Myriad microscopic creatures appear in this sample collected from ballast water for a non-indigenous species study conducted by the citizens' council. Photo courtesy Smithsonian Environmental Research Center.

of future North Slope oil production have increased since the vapor control project began. The council now believes that oil production may exceed the handling capacity of the two berths equipped with vapor controls.

Accordingly, the council has called on Alyeska Pipeline to install vapor controls at a third berth. As of early 1999, the company was still analyzing the need for the third control system.

ALIEN INVADERS

Some ports, including the Great Lakes and San Francisco Bay, have been invaded by species not indigenous to the area. These non-indigenous species can compete with native species and cause severe ecological and economic damage. One example is the zebra mussel, a fresh-water species blamed for clogging intake pipes and displacing native species in many parts of the Lower 48.

The citizens' council has an ongoing project to study whether Prince William Sound is at risk of being colonized by non-indigenous species arriving in the ballast water of oil tankers.

Such invaders often arrive in the ballast water carried from one waterway to another by tankers and other large ships, raising concerns that the millions of tons of ballast water flushed from oil tankers could result in similar problems in Prince William Sound.

In 1997, the citizens' council and several co-sponsors began a study of the invasion risk in Prince William Sound. The council's pilot study showed that plankton are abundant and diverse in the arriving ballast water and that some are not indigenous to Prince William Sound. The consultants doing the study concluded the Sound is at risk of invasion as a result, and the study was extended into 1999.

This effort includes further investigation into the content and management of ballast water as well as collection and analysis of samples from the Sound to see what non-indigenous species have already become established.

Further, the American Petroleum Institute contributed money to study whether exchanging ballast water at sea is a practical way of keeping non-indige-

nous species out of the Sound, and tanker companies have supported the effort with test exchanges during their trips north. This technique is of interest because mid-ocean waters typically carry fewer organisms than coastal waters, and mid-ocean species tend not to thrive if discharged near shore.



Samples of ballast water are collected (left) and analyzed (below) in an effort to determine the presence and identity of non-native organisms carried into Prince William Sound in ballast water. Photos: Joel Kopp/Citizens' Council.



CONCLUSION: CITIZEN INVOLVEMENT — A NEW TOOL FOR COMBATTING COM- PLACENCY

Perhaps the most radical innovation to come out of the Exxon Valdez oil spill was the establishment of permanent, industry-funded citizens' councils to oversee both the oil transportation industry and its government regulators.

Before 1989, there was no mechanism, other than public hearings by regulatory agencies, for citizens to advise the oil industry or otherwise speak directly on operations affecting their communities and livelihoods. Earlier attempts by Prince William Sound residents to give their input to oil industry representatives were generally met with negative responses.

That began to change in the summer of 1989, when then-Alyeska Pipeline President James Hermiller actively supported formation of the Prince William Sound

Regional Citizens' Advisory Council with Alyeska funding.

The citizens'-council concept was written into federal law in 1990, when Congress identified complacency on the part of the oil industry and government regulators as a root cause of the Exxon Valdez spill. In the Oil Pollution Act of that year, Congress mandated citizens' councils for Cook Inlet and Prince William Sound as a tool to prevent that complacency from re-emerging as memories of the spill faded.

The citizens' councils are the third leg of a tripod supporting safer oil transportation, the other two being industry and government.

While each of the three legs has an interest in environmental safety, the citizens' councils are unique in having no mission except promoting safety and informing the public about it, while industry and government must manage competing missions.

Industry must balance the need for environmental protection against the pressure for profits, while government agencies are always subject to political pressure to promote economic development and minimize the regulatory burden on industry.

The citizens' councils, by contrast, are relatively free from political and financial pressure.



Project Manager Joe Bridgman (left) and former Executive Director Stan Stanley, of the citizens' council staff, monitor a spill from the tanker Eastern Lion in May 1994.



JoAnn McDowell, City of Valdez representative on the citizens' council Board of Directors, and Deputy Director Marilyn Leland staff an information booth at the 1997 International Oil Spill Conference in Florida. Photo: Leann Ferry/Citizens' Council.



Citizens' council board members Stan Stephens, Tim Robertson and Bill Walker listen to Riki Ott, at a 1991 council board meeting in Cordova.

For the Prince William Sound citizens' council, our long-term contract with Alyeska provides a fairly stable base of funding. At the same time, our advisory role and our diverse, community-based board largely insulates us from direct lobbying and the other usual forms of political pressure. We are immediately accountable to those we represent, the people and groups with the most to lose from another catastrophic oil spill in Prince William Sound. They include communities and

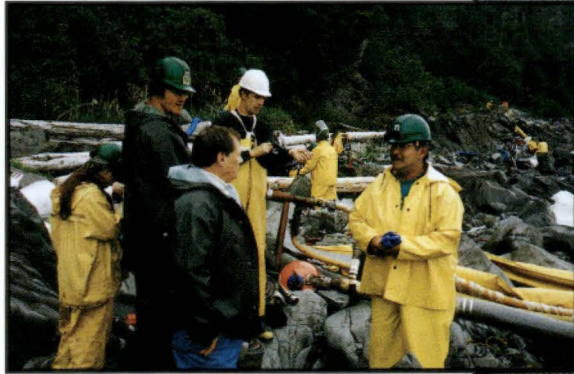
interest groups in a region stretching from the Sound itself to Kodiak Island to lower Cook Inlet – all areas that were touched by oil from the Exxon Valdez spill.

Our influence depends on the quality of our analytical work on oil transportation safety, not on regulatory powers or political connections.

None of this can guarantee that complacency will not set in again, but we do serve as an early warning system to alert industry, government and the public of problem areas.

We monitor terminal and tanker operations, we conduct independent research and we advise industry and government on ways to prevent oil spills and respond effectively if spills do occur.

One of our jobs is to monitor the adequacy of spill response, so we participate in drills and actual responses in several ways. Our representatives convey local concerns, advice and observations to the officials managing the response. They also help communi-



Citizens' council Executive Director John Devens (front) observes the cleanup of persistent Exxon Valdez oil on beaches near Chenega Bay. Larry Evanoff (right) is Chenega's representative on the council Board of Directors. Photo: Leann Ferry/Citizens' Council.



The citizens' council sponsored a 1997 symposium to train and certify land-based firefighters to respond to shipboard fires. The symposium led to certification of more than 100 firefighters.

cate developments in the response effort to local communities.

By 1995, the safeguards adopted after the Exxon Valdez spill had reduced the likelihood of another such accident by 75 percent, according to a risk assessment study of tanker operations in the Sound.

Many risks remain and there is still room for improvement, of course, but this should not obscure the very substantial overall progress made by industry, regulatory agencies and the citizens we represent.

We at the Prince William Sound Regional Citizens' Advisory Council believe Alaska's people and environment are better protected from marine oil spills today than they were in 1989. We intend to do all in our power to make sure this is still true on March 24, 2009, the 20th anniversary of the Exxon Valdez tragedy.



On-going community concerns about the effects of treated ballast water in Port Valdez led the citizens' council to use caged mussels to monitor water quality near the ballast water treatment facility. Photo: Joel Kopp/Citizens' Council.

Prince William Sound Regional Citizens' Advisory Council

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