

LAW OFFICES OF
FAULKNER, BANFIELD, DOOGAN & HOLMES
A PROFESSIONAL CORPORATION

550 W. 7TH AVENUE

SUITE 1000

ANCHORAGE, ALASKA 99501-3510

(907) 274-0666

TELECOPIER: (907) 277-4657

MICHAEL M. HOLMES** JULIE E. BRYANT
RANDALL J. WEDDLE JOHN E. CASPERSON**
WILLIAM B. ROZELL ERIC A. KUEFFNER
CHARLES N. DRENNAN ANN G. VANCE
ANTHONY M. SHOLTY JOYCE E. BAMBERGER
JAMES R. WEBB SUSAN RANDALL POLLARD
MICHAEL A. BARCOTT** ROBERT J. McLAUGHLIN
RICHARD B. BROWN CONSTANCE E. LIVSEY
TIMOTHY A. McKEEVER CHARLES D. BRODERICK*
JOHN F. CLOUGH III BETHANN BOUDAH CHAPMAN
LEON T. VANCE GEORGE B. DAVENPORT
DIANE L. DALEY** BRUCE B. WEYHRAUCH
JAMES E. HUTCHINS WILLIAM D. DEVOE*

OF COUNSEL
NORMAN C. BANFIELD
LAWRENCE T. FEENEY
WILLIAM F. BRATTAIN II

HERBERT L. FAULKNER (1882-1972)
FRANK M. DOOGAN (1923-1977)

*ADM. TED IN WASHINGTON ONLY
**ADM. TED IN WASHINGTON & ALASKA
OTHERS NOT ADM. TED IN WASHINGTON

JUNEAU OFFICE
302 GOLD STREET
JUNEAU, ALASKA 99801
(907) 586-2210

SEATTLE OFFICE
FIFTH AVENUE PLAZA
800 FIFTH AVENUE, SUITE 3740
SEATTLE, WASHINGTON 98104
(206) 292-8008

August 2, 1989

Mr. Walter Parker, Chairman
Alaska Oil Spill Commission
707 A Street
Suite 202
Anchorage, Alaska 99501

ALASKA OIL SPILL

AUG - 2 1989

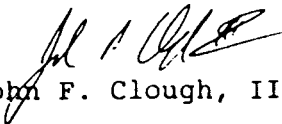
COMMISSION

Re: Exxon Chronology
Our File No.: 1588-5703

Dear Chairman Parker:

Pursuant to our earlier telephone conversation, I am enclosing the "Chronology of Exxon's Response to the Exxon Valdez Incident". I look forward to seeing you at tomorrow's session.

Very truly,


John F. Clough, III

JFC/llg
01061
enclosure

cc: Robert Wood
Constance Livsey

CHRONOLOGY

OF

EXXON'S RESPONSE TO THE EXXON VALDEZ INCIDENT

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CHRONOLOGY
OF
EXXON'S RESPONSE TO THE EXXON VALDEZ INCIDENT

INTRODUCTION

This chronology is organized into the following sections:

- (1) Introduction, Overview, and Summary;
- (2) Exxon Response and Initial Mobilization (March 24, 1989);
- (3) Buildup of Personnel and Equipment; Deployment of Booms and Skimmers; and Oil Recovered from the Water (March 24-April 12, 1989);
- (4) EXXON VALDEZ Lightering and Salvage (March 24-April 5, 1989);
- (5) Dispersants and Burning (March 24-March 29, 1989); and
- (6) Environmental Response (March 24-May 20, 1989).

OVERVIEW AND SUMMARY

Exxon Response and Initial Mobilization

Immediately upon learning about the spill, Exxon Shipping Company's management moved rapidly to assemble people, equipment, and materials; to disperse or remove the spilled oil; to lighten the approximately one million barrels of oil remaining on the vessel; and to protect the most sensitive areas of Prince William Sound. Exxon's key Response Team members were in the air the morning of the spill and were in Valdez within 18 hours of vessel grounding. Dozens more trained people and tons of supplies began arriving in Alaska that afternoon and continued arriving in the days thereafter. See Section titled, "Exxon Response and Initial Mobilization."

Buildup of Personnel and Equipment; Deployment of Booms and Skimmers; and Oil Recovered from the Water

The effort begun by Exxon in the first hours after the spill grew rapidly over succeeding days and constitutes what is probably the largest buildup of people, equipment, and materials ever assembled to combat an oil spill. The number of Exxon employees, contract personnel, and contract fishermen grew from 176 on March 24 to 1,300 by April 12. Also by April 12, over 1,800 tons of equipment had been delivered by air; and 210 vessels, 238,000 feet of containment boom, and 41 skimmers were deployed. These numbers have continued to grow as operations have moved into the shoreline cleanup phase. Currently over 8,000 people are involved in the operation.

In the days immediately following the spill, Exxon sought the help of local fishermen and government officials to protect the most environmentally sensitive areas of Prince William Sound. With the assistance of fishermen, key fish hatcheries were successfully protected from the oil spill.

Skimming operations were initially conducted on the oil spill south of the EXXON VALDEZ. Following gale force winds Sunday night and early Monday, March 26 and 27, skimmers were directed to the north end of Knight Island. Skimmers were used defensively at Sawmill Bay and were subsequently re-deployed to Point Hogan, Snug Harbor, and other locations as the free floating oil moved into the Gulf of Alaska.

By April 12, about 20,000 barrels of oil had been recovered from the water. Additional oil has been recovered since then, and the total is currently estimated to be about 52,000 barrels. See Section titled, "Buildup of Personnel and Equipment; Deployment of Booms and Skimmers; and Oil Recovered from the Water."

EXXON VALDEZ Lightering and Salvage

With the Coast Guard's active involvement, Exxon's Response Team had to deal with the major challenges of removing the approximately one million barrels of crude oil that remained on the EXXON VALDEZ while preventing the vessel from slipping from its precarious position on a rocky ledge, capsizing, and spilling the remaining crude oil into the Sound.

Among the difficulties Exxon encountered were assessing the damage to the vessel and determining how it was positioned on the ledge; ascertaining the depth of the water alongside the vessel in order to safely position the lightering vessels so that they would not become grounded as they received cargo; obtaining portable pumps to replace the cargo handling system on the EXXON VALDEZ; and weathering gale force winds (Sunday night and early Monday, March 26 and 27), which caused the vessel to pivot to a new resting position. By Tuesday, April 4, Exxon safely completed the transfer of crude oil to three Exxon tankers.

Meanwhile, salvage experts developed a plan to refloat the vessel taking into account the underwater damage to approximately 50% of the vessel's bottom and the need to take on sea water to displace the removed oil to maintain the vessel's balance. Deck openings were sealed and compressed air was pumped into the tanks to increase buoyancy. The vessel was successfully refloated shortly before high tide on April 5, 1989. See Section titled, "EXXON VALDEZ Lightering and Salvage."

Dispersants and Burning

Alyeska's approved Oil Spill Contingency Plan for Prince William Sound considered the possibility of a 200,000 barrel spill in the Sound--about the same size and in the same vicinity as the

EXXON VALDEZ oil spill. The Plan explicitly stated that such a spill could not be fully contained, large volumes of oil would reach the shore, and a significant shoreline cleanup effort would be required.

The Plan emphasized that the early use of dispersants and open burning were the most effective immediate steps that could be taken to mitigate environmental impacts. In the words of the Plan:

In reviewing the aspects of this size spill it becomes very apparent how important it is to have dispersants approved so that they can be used very effectively to prevent the continuing input of oil into the small bays and shorelines in Prince William Sound. Burning also has to be looked at as a very good alternative to the cleanup in Prince William Sound on the various inlets and bays in which oil may accumulate.

The Coast Guard did not authorize Exxon to use dispersants, other than for tests, until 1845 hours on the third day after the spill (Sunday evening, March 26). Exxon also did not receive permission to use open burning, other than for tests, until mid-afternoon of the same day. Exxon is confident that had it obtained prompt permission to use dispersants and open burning, the environmental damage from the spill would have been significantly mitigated. See Section titled, "Dispersants and Burning."

Environmental Response

While Exxon tackled the tasks of removing oil from the EXXON VALDEZ and from the water, Exxon also moved to assess and deal with the environmental effects of this spill. As part of the initial response, Exxon assembled a group of environmental experts to provide advice to its response team on the best ways to go about cleanup to mitigate damage to the environment. This team, working with federal and state personnel, moved quickly to identify sensitive areas for protection and assess biological and ecological impacts of the spill on water quality, sediment, and marine life. Samples were being taken even before the oil began to spread from the original spill site.

Within the first three days, treatment centers were set up for oiled birds and otters in Valdez, manned by experts Exxon brought in from California wildlife institutions. Later, bird and otter rehabilitation centers were established in Seward and additional bird centers were set up in Kodiak and Homer.

Exxon has agreed to provide \$15 million for a study to evaluate the impacts of the EXXON VALDEZ spill on the natural resources of Prince William Sound. Participating in this study will be the National Oceanic and Atmospheric Administration (NOAA) of

the Department of Commerce, the Department of the Interior, the Department of Agriculture, and the State of Alaska. The early data gathered by the Exxon environmental assessment team will be made available for the study.

Separately, 14 Exxon-sponsored studies are underway or are planned for the near future. Seven of these studies address various aspects of the water and sediments and of shoreline and biological recovery in Prince William Sound, on the Kenai Peninsula, and the lower Cook Inlet. Two projects involve detailed toxicity testing using water and sediment samples collected in field surveys. Three scientific studies focus on commercial finfish and crustaceans, and additional studies address effects on kelp and eelgrass and possible effects on subsistence foods.

On April 2, nine days after the spill, a shoreline cleanup priority committee was formed and on April 8 preliminary approval was obtained from the Coast Guard and eight other agencies for a shoreline cleanup strategy. An initial plan was presented by Exxon on April 14 and approved by the Coast Guard on April 17. A revised plan was submitted on May 1 incorporating new data on impacted shoreline. The May 1 plan calls for cleanup of 364 miles of shoreline. The Coast Guard reviewed the May 1 plan and requested several changes, which Exxon has made. This plan will continue to evolve with experience gained in the field. See Section titled, "Environmental Response."

EXXON RESPONSE AND
INITIAL MOBILIZATION

(March 24, 1989)

EXXON RESPONSE AND INITIAL MOBILIZATION

(March 24, 1989)

Exxon Oil Spill Response Program

Alyeska was responsible for the immediate on-scene response to the EXXON VALDEZ oil spill. Exxon Shipping Company had the responsibility for the next phase as shipowner. Because Exxon does not have an operating organization in Alaska, the initial arrangements for moving personnel, equipment, and materials to Valdez were coordinated from Houston.

Exxon's oil spill policy requires that each Exxon operating function and affiliate be responsible for responding to any oil spill resulting from its operations. Since a major oil spill could place a heavy burden on any one organization's manpower availability, Exxon has organized interfunctional oil spill response teams (IOSRT). The teams supplement manpower in the organization responding to a spill with a pool of trained oil spill cleanup supervisors and specialists from other Exxon functions and affiliates. The teams also have access to outside experts and oil spill cleanup equipment from the United States, Canada, and the United Kingdom as well as other sources. In the case of the EXXON VALDEZ oil spill, Exxon Shipping Company activated the IOSRT early Friday morning, March 24, and team members were notified according to pre-determined procedures.

Exxon Shipping Company headquarters in Houston and the West Coast Fleet office in Benicia, California had the initial responsibility to respond. Exxon Shipping Company key Response Team members were in Valdez within 18 hours of vessel grounding.

During the first 24 hours after the vessel grounding, there were significant activities by the Coast Guard, Alyeska, and others. This chronology covers only Exxon's response and initial mobilization during this period.

NOTE: ALL TIMES ARE ALASKA STANDARD TIME UNLESS OTHERWISE INDICATED. DOES NOT INCLUDE CASUALTY RESPONSE ACTIVITIES BY THE COAST GUARD, ALYESKA, OR OTHERS. TIME NOTATIONS ARE BASED ON NUMEROUS SOURCES, INCLUDING RECOLLECTIONS OF INDIVIDUALS.

FOR LIGHTERING AND SHIPBOARD OPERATIONS, SEE SECTION TITLED, "EXXON VALDEZ LIGHTERING AND SALVAGE."

FRIDAY, MARCH 24, 1989

- 0004 Ship's logs indicate EXXON VALDEZ grounded.
- 0027 Captain Hazelwood (Exxon Shipping Company) reported to Coast Guard Center in Valdez that the EXXON VALDEZ was hard aground on Bligh Reef.
- 0123 Nelson (Alyeska Pipeline Service Company) notified Warner (Exxon Pipeline Company) in Houston that the EXXON VALDEZ was grounded in Prince William Sound.
- 0125 Warner notified Iarossi (Exxon Shipping Company) in Houston and gave him Nelson's telephone number.
- Iarossi called LeGrange (Exxon Company, U.S.A.) and Borgen (Exxon Shipping Company) - told Borgen to contact vessel.
 - Iarossi called Nelson in Anchorage, Duncan (Exxon Shipping Company) at home, Borgen and then McRobbie (Exxon Shipping Company) for vessel status, Gillette (Exxon Shipping Company) at home, and Nelson for update.
 - Iarossi received call from Quinn (Exxon Company, U.S.A.).
- 0140 Borgen telephoned Myers (Exxon Shipping Company) to call ship right away.
- Myers spoke to Captain Hazelwood; water in forepeak, #2 starboard tank, ship stability is a concern.
- 0145 Borgen called Arts (Alaska Maritime Agencies). Arts will call right back; check VTS (Vessel Traffic System).
- Arts returned call and reported that ship went aground 0028 on Bligh Reef, 12' tide, maneuvering in heavy ice.
- 0200 Nelson called Warner again with a further report.
- 0210 Warner asked Iarossi to talk directly to Nelson.
- Iarossi called Borgen back; Borgen relayed information received from Myers.
- 0230 Arts called Borgen from VTS; Commander McCall (Coast Guard) there; Shier (Alyeska) there; lighter to BATON ROUGE; high tide was at 0200.

- 0300 Borgen discussed above with Myers.
- 0310 Iarossi called Borgen again; asked him to call Nelson.
- 0320 Borgen called Rassinier (Exxon Shipping Company) about Alyeska fenders for lightering. Rassinier made contact with O'Brien (oil spill consultant).
- 0330 Nelson called Borgen; reported 138,000 barrels spilled.
- 0350 Myers called Klepper (Exxon Shipping Company) and McRobbie re BATON ROUGE lightering.
- 0354 Rassinier notified Clean Bay (San Francisco) to place equipment (boom, skimmers, etc.) and operators on standby for dispatch to Valdez.
- 0400 Iarossi, Duncan, and Gillette arrived at office.
- Rassinier notified Southern Air Transport (SAT) of need for plane to mobilize ADDS (Airborne Dispersant Delivery System) unit in Phoenix and dispersant ex Houston.
- 0405 Rassinier began to alert Exxon Interfunctional Oil Spill Response Team.
- 0410 Rassinier reported to Borgen that SAT in California on standby. Trying to contact Jefferies (Biegert Aviation, owner of ADDS pack).
- 0420 Gale (B.P. Americas) called Borgen about availability for lightering of OVERSEAS WASHINGTON (90 kDWT) and ADMIRALTY BAY (80 kDWT); also discussed Sampson ocean fenders (for lightering).
- 0425 Rassinier contacted Lindblom (dispersant consultant) for dispersant application logistics.
- 0430 Borgen called Commander McCall inquiring about approval for dispersants. Borgen understood McCall to state that Exxon Shipping Company had his approval to use dispersants on the spill. Discussed volume of spill and CIRO (Cook Inlet Oil Spill Response Group); use of BATON ROUGE to lighter; 35' water at low tide; present weather: 15 kt wind, 20-30°F, rain/slush, wet and damp.
- 0435 Exxon Shipping Houston Command Center activated.
-- Phone (713-656-2720) activated as Response Number.

Iarossi reviewed initial mobilization:

- Exxon Shipping West Coast Response Team;
- Exxon Interfunctional Oil Spill Response Team;
- Spray aircraft C-130;
- Oil Spill Response Ltd. (OSR) stockpile in United Kingdom;
- Clean Bay stockpile; and
- 2 other 707 aircraft contacted for dispersant shipment.

- 0440 Rassinier telephoned Conair (Abbotsford, British Columbia) for DC-6 spray plane. Answering service indicated office not open. Left message that Exxon needed a plane.
- 0448 Borgen called Rassinier. Relayed dispersant information from Commander McCall (see 0430 Borgen call). Discussed C-130 Hercules dispersant plane; Conair DC-6; Clean Bay's 4000' boom and skimmer; OSR, Southampton, England.
- 0500 Borgen spoke to Iarossi: Confirmed Borgen, Deppe (Exxon Shipping Company) and Myers departing for Valdez, also that Commander McCall said that Exxon Shipping Company had his approval to use dispersants on the spill.
- 0510 Rassinier called Esso Petroleum Co., Ltd. (UK) to alert OSR Southampton, U.K.
- 0515 Gillette contacted Companion (Exxon Chemical Company) regarding dispersant inventories.
- 0518 Rassinier contacted O'Brien enroute to Jacksonville to divert him to Valdez.
- 0525 Rassinier confirmed weather in Valdez 20-30°F, rain/slush, winds variable 15 kts, little wave action.
- 0530 Borgen telephone call with Rassinier; Borgen had ordered 1-2 helicopters in Valdez plus plane.
- 0540 Esso Petroleum confirmed to Rassinier that OSR on standby, OSR will contact Rassinier directly.
- 0548 Rassinier and Companion discussed dispersant volume available in Houston inventory and in Clean Bay, Clean Seas, and Clean Gulf stockpiles.
- 0549 Rassinier notified Pyburn (OSR) that need was for skimmers, sorbent, and portable tankage. OSR to load out Vikoma Sea Skimmer 50's and 1 heavy oil skimmer, fast tanks, manager, and four operators on first available flight.
- 0600 Following individuals started arriving Houston Command Center: Miller, Hughes, Silloway, Walding (all Exxon Shipping Company).
 -- Started contacting/booking flights for Glock, Gorski, Botto, Hughes, Sowden (all Exxon Shipping Company), and Derryberry (Exxon Company U.S.A.).
 Duncan ordered SAT C-130 to carry ADDS Pack from Phoenix to Anchorage.
 -- Dep. 2155 March 24; Arr. 0612 March 25
- OSR contacted airplane broker to order SAT 707 to carry four skimmers from Southampton, England to Bangor, Maine to Anchorage, Alaska.
 -- Dep. 1316 March 25; Arr. Anchorage 0518 March 26.

- 06-- Mortenson (Clean Bay) indicated to Rassinier that Clean Bay had Walosep W-4, boom, and GT-185 skimmers and operators available. Rassinier lining up a DC-8 to transport to Anchorage.
- 0730 Gillette confirmed DC-8 (previously ordered by Duncan) from Three Way Charter Brokers (3-Way) to carry skimmers and Clean Bay equipment from Oakland to Anchorage.
-- Dep. 1600 March 24; Arr. 2100 March 24
- 0800 Gillette called Stephens (Exxon Company, International) to alert marine group in Exxon Company, International (Florham Park, New Jersey).
- 0810 Rassinier called Anderson (3-Way). 3-Way had a DC-8 to pick up Clean Bay Inc. equipment in Oakland.

Gillette called Crawford (Clean Caribbean Cooperative) who had ADDS pack (owned with Marine Industry Group); the Cooperative would not make it available. Must remain in area of interest.
- 0820 Borgen, Deppe, and Myers departed Oakland, CA.
- 0836 Exxon company plane departed Houston; ETA Valdez 1730.
-- Passengers: Iarossi, Duncan, Rassinier, Marston (Exxon Risk Management Services, Inc.), Nicholas (Exxon Shipping Company), and Lindblom.

Intermittent contact from aircraft (air phone) with Houston, Valdez, vessel, and Florham Park.
- 0840~ Tompkins (Exxon Shipping Company) and Hughes arrived Houston Command Center.
-- Tompkins contacted Stalzer, EXXON VALDEZ Relief Captain, and asked him to come in to provide expertise on vessel.
- 0900 Cirigliano (Exxon Company, U.S.A.) flew from Anchorage to Valdez by helicopter.

Companion and Gillette discussed dispersant availability.

Gillette made arrangements to deliver dispersant drums to Houston airport.
- 1050 Glock departed Newark, New Jersey; ETA Anchorage 2356.
- 1115 Hughes and McDonald (Exxon Shipping Company) departed Houston; ETA Anchorage 2221.
- 1210~ Weatherford (Exxon Shipping Company) diverted communication equipment from Long Beach to Valdez.
- 1215 Smith (Exxon Shipping Company) arrived; evaluating vessel stability.
- 1315 Exxon company plane made fueling stop in Seattle.

- 1322 From Seattle stopover, Rassinier contacted Alyeska Emergency Center (Anchorage) for update. Reviewed equipment availability with Henman (Alyeska).
-- Rassinier requested Alyeska explore in situ burning.
- 1348 Rassinier confirmed with Houston Command Center following planes enroute:
-- 707 ex U.K.;
-- DC-8 ex Oakland;
-- C-130 ex Houston; and
-- C-130 ex California to Phoenix.
- 1350 Gorski departed Baton Rouge LA; ETA Anchorage 2356.
- 1435 Botto, Derryberry, and Sowden departed Houston; ETA Anchorage 2356.
- 1600 3 Way DC-8 departed Oakland for Anchorage with skimmers, Clean Bay equipment.
- 1700~ Weatherford telephoned Coast Guard West Coast Strike Team. Spoke to Borden (Coast Guard) (415-883-3311) and informed him of the Houston Command Center. Borden indicated that Commander McCall was the On-Scene Coordinator (OSC) (907-835-4791). Coast Guard sent eight personnel plus equipment.
- 1730 Borgen, Deppe, and Myers arrived Valdez.
- 1737 Iarossi, Duncan, Rassinier, Marston, Nicholas, Lindblom arrived Valdez. They joined Maki (Exxon Biomedical Sciences, Inc.), Allen (oil spill burn consultant), and Cirigliano from Anchorage who were already in Valdez.
- 1755 Iarossi met Commander McCall. Discussed situation. McCall indicated need to test dispersants.
- 1800~ Press conference held at Civic Center (1 1/2 hours).
- 1825 Rassinier telephoned Houston Command Center regarding aircraft mobilization.
- 2000~ Conair contacted Rassinier who told Conair to come to Valdez with DC-6 spray aircraft.
- Iarossi held meeting with Exxon Response Team to review status of vessel, lightering plans, oil spill location, current Alyeska actions to limit spill, plans for use of dispersants, plans for use of burning, equipment mobilization status, personnel enroute, operations center, etc.
- 2040 Rassinier met with Alyeska emergency team in Valdez Terminal Center to review people and equipment available or on order.
-- Agreed to meet for overflight at airport at 0800, Saturday, March 25.

.2100. 3 Way DC-8 arrived Anchorage from Oakland with skimmers and Clean Bay equipment.

2155 SAT C-130 (originating in California) departed Phoenix (where crews and equipment had been assembled) for Anchorage with ADDS Pack.

BUILDUP OF PERSONNEL AND EQUIPMENT;
DEPLOYMENT OF BOOMS AND SKIMMERS; AND
OIL RECOVERED FROM THE WATER

(March 24 - April 12, 1989)

BUILDUP OF PERSONNEL AND EQUIPMENT:

DEPLOYMENT OF BOOMS AND SKIMMERS: AND

OIL RECOVERED FROM THE WATER

(March 24 - April 12, 1989)

The chronology of Exxon's initial mobilization on March 24, 1989, details how arrangements were made for moving people to Valdez; for procuring dispersants, dispersants spraying equipment, booms, and skimmers; and for transporting them to Valdez.

Alyeska and Exxon called upon the resources of oil industry spill cooperatives and equipment stockpiles. Alyeska arranged for equipment and operators to be brought to the scene from Alaska Clean Seas and the Cook Inlet Response Organization. Exxon obtained booms, skimmers, and operators from the San Francisco industry cooperative (Clean Bay) and from the Oil Stockpile Response Ltd. industry equipment stockpile in Southampton, England.

At Exxon's request, the Coast Guard and U.S. Navy also supplied booms and added significantly to the number of skimmers deployed to remove oil on the water.

Exxon's effort to assemble people and equipment quickly grew. Attachment 1 details the buildup of personnel in Valdez operations from the day of the spill, March 24, to April 12, about three weeks later. It shows the number of Exxon employees, contract personnel, and contract fishermen. The total grew from 176 on March 24 to 1,300 by April 12. Currently, over 8,000 persons are involved in the operation.

Attachment 2 summarizes the equipment delivered by air. Supplies delivered from the Lower 48 and abroad were landed in Anchorage and transhipped to Valdez, Cordova, Seward, Homer, and Kodiak. By April 12, over 1,800 tons of equipment had been delivered.

Attachment 3 lists equipment deployed--vessels by type, the amount of containment boom deployed, and the number of skimmers. Totals grew rapidly, especially after special communications facilities were installed and major command, supply, and housing vessels were deployed to direct and support the offshore operations on the west side of Prince William Sound, some 10-12 hours by boat from Valdez and Cordova. Of the 41 skimmers deployed by April 12, 14 were provided by the Navy and one by the Coast Guard; and additional Navy and Coast Guard equipment was being readied for deployment.

Protection of Fish Hatcheries

In the days immediately following the spill, Exxon sought the help of local fishermen and government officials to protect the most environmentally sensitive areas of Prince William Sound. On Saturday, March 25, Exxon representatives met with fishermen, the Coast Guard, the Alaska Department of Environmental Conservation (ADEC), and representatives of other state agencies to determine those areas which should be defensively boomed. Galena Bay and other locations along the eastern side of the Valdez Arm were targeted. Booms were loaded on fishing boats late in the day, allowing booming of these areas to commence on Sunday.

On Monday, March 27, it became apparent that areas east of the spill site would not be impacted due to the gale force winds of the prior night. Agreement was reached that day at a joint meeting of the Steering and Operating Committees (comprised of representatives from the Coast Guard, state agencies, fishermen, and Exxon) to protect four key fish hatcheries along the western side of Prince William Sound--Esther Bay, Main Bay, Sawmill Bay, and Eshamy Bay. Each of these areas was protected with multiple lines of boom which were deployed over the period March 28 to April 7.

In these operations, Exxon worked with fishermen on a contract basis or subsequently compensated those who volunteered their efforts. With the help of both groups of fishermen, the fish hatcheries were protected from the oil spill.

Skimming Operations

Skimmers were initially directed into the heaviest concentrations of oil south of the EXXON VALDEZ. Following gale force winds Sunday night and early Monday, March 26 and 27, skimmers pursued the oil to the north end of Knight Island, where a concentrated effort was directed. Later, available skimmers were positioned defensively near the Sawmill Bay hatchery, with the exception of the Coast Guard skimming barrier which moved southward in the Knight Island passage.

As the free floating oil moved into the Gulf of Alaska, most of the skimmers were repositioned to Point Hogan and Snug Harbor to skim the oil contained in this area.

Oil Recovered from the Water

By April 12, about 20,000 barrels of oil had been recovered from the water. Additional oil has been recovered since then, and the total is currently estimated to be about 52,000 barrels.

DAILY PERSONNEL COUNT VALDEZ OPERATIONS 3/24/89 THROUGH 4/12/89

	MARCH											APRIL											
	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12			
EXXOM:																							
ON-SITE (1)	29 (2)	30	39	45	47	53	55	56	57	68	74	76	82	84	88	87	93	92	99	101			
ROTATION/RELIEF	---	---	---	---	---	---	---	---	3	4	6	6	12	14	18	19	21	21	22	---			
SUBTOTAL EXXOM	29 (2)	30	39	45	47	53	55	56	60	72	80	82	94	98	106	106	112	113	120	123			
CONTRACT	61	148	163	207	216	277	375	323	347	367	382	449	456	492	584	620	619	624	625	790			
CONTRACT FISHING PERSONNEL																							
VALDEZ	57	48	54	15	75	78	60	36	261	252	250	270	231	285	237	237	276	246	264	258			
CORDOVA (est)	29	24	27	8	38	39	30	18	131	126	125	135	116	143	119	119	138	123	132	129			
SUBTOTAL	86	72	81	23	113	117	90	54	392	378	375	405	347	428	356	356	414	369	396	387			
TOTAL PERSONNEL	176	250	283	275	376	447	520	433	799	817	837	936	897	1018	1046	1082	1145	1106	1141	1300			

(1) Largely Valdez
 (2) Includes 18 people in Anchorage enroute to Valdez

SUMMARY OF EQUIPMENT DELIVERED BY AIR FREIGHT

DATE	NUMBER OF AIRCRAFT			CARGO ARRIVING (tons)	CUMULATIVE TOTAL (tons)	DESCRIPTION OF CARGO ARRIVING
	ordered	departed	arrived			
3/24 FRI	4	2	1	15	15	Skimmers
3/25 SAT	6	4	3	47	62	ADOS Package, dispersants, portable pumps
3/26 SUN	5	4	6	150	212	Skimmers, dispersants, portable pumps
3/27 MON	9	8	5	93	305	ADOS Package, dispersants, manifolds
3/28 TUE	3	8	9	289	594	Portable pumps, dispersants, steel weld rods
3/29 WED	5	2	2	24	618	Portable pumps, beach cleanup equipment
3/30 THU	6	6	7	180	798	Boom, boats, Exxon Command van, fenders, absorbent, dispersants, safety equipment
3/31 FRI	4	2	2	56	854	Skimmers, absorbent
4/1 SAT	6	9	3	85	939	Boom, pumps, skimmers, Navy equipment
4/2 SUN	5	5	9	189	1,128	Skimmers, beach cleanup equipment, booms, Navy equipment, dispersants, pumps
4/3 MON	0	0	3	111	1,239	Booms, Navy equipment, skimmers
4/4 TUE	4	4	3	134	1,373	Skimmer, power packs, command center, boom
4/5 WED	3	1	1	10	1,383	Boom
4/6 THU	3	4	3	30	1,413	Boom
4/7 FRI	0	1	3	80	1,493	Pumps, absorbent, boom
4/8 SAT	7	7	1	16	1,509	Steam cleaners, sorbent boom
4/9 SUN	2	2	6	90	1,599	Portable boiler, oil solvent pads, pumps, boom, generators, absorbent hoses
4/10 MON	3	3	2	39	1,638	Hose, generator parts, pumps, oilshare
4/11 TUE	2	2	5	152	1,790	Pumps, valves, boom, generator sets, video equipment, facsimile machine, hot water pressure washers
4/12 WED	2	2	2	37	1,827	Hot water pressure washers, oil water separator tanks

79 flights ordered.

76 departures, one cancelled before departure, one aircraft had not departed as of April 13.

76 arrivals, two cancelled, one had not departed as of April 13.

* Information is subject to verification.

EQUIPMENT DEPLOYED

Date	Day	VESSELS				Total	Boom ft.	Skimmers	Aircraft
		Major	Fishing	Tugs	Barges				
3/24	1 (Fri.)	5	14	5	1	25	15k	3	*
3/25	2 (Sat.)	6	46	3	1	56	26k	6	*
3/26	3 (Sun.)	8	59	3	2	72	33k	6	*
3/27	4 (Mon.)	7	51	6	2	66	34k	7	*
3/28	5 (Tues.)	7	56	6	2	71	34k	7	*
3/29	6 (Wed.)								
3/30	7 (Thurs.)	9	65	6	2	82	71k	12	*
3/31	8 (Fri.)	13	85	4	2	104	84k	12	*
4/1	9 (Sat.)	13	85	4	2	104	86k	13	14
4/2	10 (Sun.)	16	85	4	2	107	111k	13	18
4/3	11 (Mon.)	16	85	4	2	107	115k	16	18
4/4	12 (Tues.)	16	85	5	3	109	121k	18	18
4/5	13 (Wed.)	16	85	5	3	109	121k	18	18
4/6	14 (Thurs.)	16	85	5	3	109	146k	18	18
4/7	15 (Fri.)	16	85	6	3	110	158k	25	18
4/8	16 (Sat.)	16	85	6	3	110	188k	29	18
4/9	17 (Sun.)	16	123	7	5	151	200k	39	22
4/10	18 (Mon.)	16	123	7	5	151	211k	38	26
4/11	19 (Tues.)	16	123	7	5	151	211k	39	26
4/12	20 (Wed.)	16	182	7	5	210	238k	41	26

NOTE: Information is subject to verification.

* Information not yet available for these dates.

EXXON VALDEZ LIGHTERING AND SALVAGE

(March 24 - April 5, 1989)

The EXXON BATON ROUGE completed loading late on Wednesday, March 29. Early the next morning, Thursday, March 30, a second 75,000 ton tanker, the EXXON SAN FRANCISCO, came alongside the EXXON VALDEZ and cargo transfer to the second lightering vessel began. On Sunday, April 2, the EXXON SAN FRANCISCO completed its lightering operations. A third tanker, the 58,000 ton EXXON BAYTOWN, then came alongside the EXXON VALDEZ to receive substantially all of the remaining recoverable oil and also some of the oily water remaining in the damaged vessel. By Tuesday, April 4, this transfer was completed.

While lightering operations were underway, the Exxon team had worked with salvage experts to develop a plan to refloat the vessel once the recoverable oil was removed. The final plan called for sealing deck openings and using compressed air to force some of the seawater out of the damaged tanks, thus lowering the water level in the tanks and reducing the weight of the vessel. On Wednesday morning, April 5, the combination of compressed air in the damaged tanks and a rising tide resulted in the refloating of the EXXON VALDEZ. Following the refloating of the vessel, it was moved 25 miles to a sheltered cove, in order to complete an assessment of the vessel's condition and to ready it for a sea voyage to a repair facility.

Lightering Summary

	<u>Barrels (GSV)</u> <u>(Thousands)</u>
<u>EXXON VALDEZ</u> initial load	1,263
Lightered to:	
<u>EXXON BATON ROUGE</u>	462
<u>EXXON SAN FRANCISCO</u>	403
<u>EXXON BAYTOWN</u>	119
Barges (subsequent to refloating)	21
Total lightered	<u>1,005</u>
Total spilled	258

NOTE: ALL TIMES ARE ALASKA STANDARD TIME UNLESS OTHERWISE INDICATED.
TIME NOTATIONS ARE BASED ON NUMEROUS SOURCES, INCLUDING
RECOLLECTIONS OF INDIVIDUALS.

FRIDAY, MARCH 24, 1989

- 0004 Vessel grounded per ship's logs.
- 0027 Captain Hazelwood (Exxon Shipping Company) reported to Coast Guard Center in Valdez that the EXXON VALDEZ was hard aground on Bligh Reef.
- 0123 Nelson (Alyeska Pipeline Service Company) notified Warner (Exxon Pipeline Company) in Houston that the EXXON VALDEZ was grounded in Prince William Sound.
- 0125 Warner notified Iarossi (Exxon Shipping Company) in Houston and gave him Nelson's telephone number.
-- Iarossi called Borgen (Exxon Shipping Company) - told Borgen to contact vessel.
- 0140 Borgen telephoned Myers (Exxon Shipping Company) to call ship right away.

Myers called vessel - spoke with Captain Hazelwood - confirmed grounding and damage.
- 0200 Vessel sounded and ullaged all tanks - vessel stability was a concern.
- 0338 Commander Falkenstein (Coast Guard) arrived at EXXON VALDEZ to review situation.
- 0410 EXXON BATON ROUGE notified to prepare for lightering of EXXON VALDEZ.
- 0448 EXXON VALDEZ put out two shots (180') starboard anchor.
- 0718 EXXON BATON ROUGE arrived Cape Hinchinbrook.
- AM EXXON SAN FRANCISCO notified. Told to anchor and wait to lighter EXXON VALDEZ after the EXXON BATON ROUGE.
- 0842 Commander Falkenstein authorized discharge of dirty ballast from EXXON BATON ROUGE.
- 1035 Pilot boat CHERKOV sounded, surveyed port side and approaches to EXXON VALDEZ for lightering vessel approach.
- 1121 HELENKA B alongside to transfer cargo hoses.
- 1157 Tug SEAFLYER alongside EXXON BATON ROUGE.

- 1230 Tug STALWART alongside EXXON BATON ROUGE.
- 1544 Fenders secured to EXXON VALDEZ.
- 1635 Pilot Joselyn boarded EXXON BATON ROUGE for approach to EXXON VALDEZ.
- 1700~ Weatherford (Exxon Shipping Company) called Borden (Coast Guard West Coast Strike Team) and informed him of the Houston Command Center. Borden indicated that the Coast Guard had sent eight Strike Team personnel plus equipment.
- 1730 Deppe, Borgen, and Myers (all Exxon Shipping Company) arrived in Valdez from West Coast Fleet Office in Benicia, California.
- 1737 Iarossi, Duncan, Rassinier, Nicholas (all Exxon Shipping Company), Marston (Exxon Risk Management Services, Inc.), Lindblom (dispersant consultant) arrived in Valdez from Houston.
- 1745~ Iarossi instructed Deppe to go to EXXON VALDEZ to assess situation and to relieve Captain Hazelwood.
- 1922 Orders received by EXXON BATON ROUGE to go alongside EXXON VALDEZ.
- 2000~ After initial meeting with Commander McCall (Coast Guard) and press conference, Iarossi met with Exxon Response Team.
- 2030 Divers arrived at EXXON VALDEZ, began underwater survey of damage to vessel.
- 2144 EXXON BATON ROUGE all fast to EXXON VALDEZ.
- 2200 Deppe, Myers, Nicholas, Marston arrived at EXXON VALDEZ. Deppe went to bridge to determine vessel status.
- 2230 EXXON SAN FRANCISCO arrived Hinchinbrook.
- 2237 Cargo hoses connected - (2) 6" (EXXON VALDEZ - EXXON BATON ROUGE).
- 2240 Awaited diver report, consultation with Smith (Exxon Shipping Company naval architect), before began pumping.
- 2300 Discussed with Smith - gave preliminary advice not to allow vessel to move from reef (fear of capsizing). Gave preliminary advice about pumping out undamaged port side tanks.
- Hazelwood departed EXXON VALDEZ for Valdez. Deppe in command.
- Deppe agreed that portable pumps would be needed for discharge of damaged tanks - pump from top, let water enter from bottom.
- 2400 Divers found substantial damage over entire starboard side and center tanks. All tanks holed and set in. Initial report vessel aground in vicinity of tank 3C.

SATURDAY, MARCH 25, 1989

- 0600 EXXON BATON ROUGE, EXXON VALDEZ partially boomed (U-shaped configuration downwind of vessels in direction of the flow of oil).
- EXXON BATON ROUGE supplied additional pipe, blanks, reducers to EXXON VALDEZ for hose connections to increase cargo transfer rates.
- 0736 Commenced cargo discharge to EXXON BATON ROUGE via main cargo pumps.
- 0750 Divers completed initial underwater hull survey of EXXON VALDEZ.
- 0824 Observed oil leaking from EXXON VALDEZ starboard side. Shut down pumps immediately. Decided to use portable pumps for discharge of undamaged tanks. (Approximately 10,000 barrels transferred to EXXON BATON ROUGE before shutdown.)
- 1000 Coast Guard Pacific Strike Team personnel (4) aboard with two submersible pumps - started receiving equipment for on-deck lightering.
- PM Ship's engineers constructed manifold connections for Pacific Strike Team hoses using 16" blanks and 6" pipe from ship stores. Coast Guard Pacific Strike Team began setting up equipment.
- Decided to discharge damaged tanks first
-- least impact upon vessel trim/stress;
-- damaged tanks presented greatest potential for further pollution; and
-- less vertical lift required for complete discharge with small submersible pumps.
- Exxon Command Center initiated supply of submersible pumps to vessel - one from Anchorage, one from Seattle, three from Detroit.
- 2243 Began discharge via two Coast Guard submersible pumps - about 2,000 barrels per hour.
- 2400 About 12,000 barrels discharged to EXXON BATON ROUGE.

SUNDAY, MARCH 26, 1989

- 0600 Four pumps arrived in Anchorage - Exxon Command Center arranged transportation to Valdez.
- AM Connected two more 6" cargo hoses.
- 1200 One pump sent to EXXON VALDEZ via boat.

- 1230 - Three pumps arrived in Valdez - diesel fuel sent to vessel for pumps.
- 1500 One pump arrived in Valdez - arranged helicopter to vessel for pump delivery.
- 1830 Dive boat VIXEN alongside for vessel survey operations.
- 1930 Marine Pollution Control sent crew (8) out via vessel COLOMBIA QUEEN for portable pump operation.
- PM Exxon Command Center arranged boat to bring pumps to vessel - pumps transferred across deck of EXXON BATON ROUGE due to rough weather - arranged for two triple header manifolds to be flown to Valdez.

MONDAY, MARCH 27, 1989

- 0015 Triple manifold transportation delayed due to plane problem. Ship's engineers rigged double and triple manifold connections in machine shop.
- 0207 Tug STALWART on starboard bow of EXXON BATON ROUGE asked to push slow ahead on both engines to keep EXXON VALDEZ from pivoting in high winds (about 42 knots).
- 0339 Third pump started.
- AM Spray freezing on deck in heavy winds.
- 0600 Discharging at 3,600 barrels per hour - 77,000 barrels total transferred.
- 1054 Fourth pump started. Three more pumps being set up.
- 1500 Four pumps operating, 3,300 barrels per hour; 105,000 barrels transferred. Arranging three more pumps from Houston - one from New Orleans.
- 2000 EXXON BAYTOWN notified about possibility of lightering.
- 2030 Five pumps on line - about 6,000 barrels per hour.

TUESDAY, MARCH 28, 1989

- 0230 Sixth pump on line.
- 0500 184,000 barrels to BATON ROUGE averaging 7.7k barrels per hour - seven pumps operating.
- 1000 Coast Guard reported two additional strike team members were being placed aboard the EXXON VALDEZ.

- .1328 . EXXON BAYTOWN instructed by Exxon to minimize dirty ballast before arrival to maximize cargo capacity.
- 1800 274,000 barrels to BATON ROUGE - averaging 7,000 barrels per hour; six pumps operating, including three Coast Guard Strike Team pumps.
- 1930 Divers inspected under and around EXXON BATON ROUGE for pinnacles to ensure there would be no damage as vessel became lower in water as additional cargo loaded.
- 2200 EXXON BAYTOWN received order to lighter 100,000-150,000 barrels from EXXON VALDEZ.

WEDNESDAY, MARCH 29, 1989

- 0225 Started eighth pump; various pumps used due to pump maintenance, hose leaks, repairs, and shifts between tanks.
 - 0500 Transferred 355,000 barrels at about 7,700 barrels per hour - seven pumps on line, requested more pumps.
 - AM Engineers began preparations on-deck for sealing deck openings with steel blanks for refloating operation.
 - 1036 EXXON SAN FRANCISCO all fast Berth 5 in Valdez to discharge dirty ballast.
 - 1200 390,000 barrels transferred to BATON ROUGE - seven pumps operating.
 - 1728 EXXON SAN FRANCISCO underway from Berth 5 to lighter the VALDEZ.
 - 1800 451,000 barrels transferred to EXXON BATON ROUGE.
 - 1922 EXXON SAN FRANCISCO ordered to go to anchor and wait for first light.
 - 2042 Finished discharging to EXXON BATON ROUGE.
 - 2200 Hoses disconnected.
 - 2230 Began letting go.
 - 2256 Last line.
 - 2312 EXXON BATON ROUGE clear.
 - 2318 Dive boat INSPECTOR alongside to survey port side of EXXON VALDEZ hull.
- EXXON BATON ROUGE final cargo volume - 462,015 barrels (GSV).

THURSDAY, MARCH 30, 1989

0330 EXXON BAYTOWN arrived Cape Hinchinbrook.
0410 Forty drums diesel oil delivered for pumps.
0434 EXXON SAN FRANCISCO underway from Knowles Head with Pilot Elde.
0548 Divers reported hole in forepeak leaking oil.
0606 EXXON BAYTOWN anchored Knowles Head.
0759 EXXON SAN FRANCISCO off EXXON VALDEZ.
0830 First line (EXXON SAN FRANCISCO - EXXON VALDEZ).
0900 Total volume remaining aboard EXXON VALDEZ 556,098 barrels -
lightered about 461,686 barrels.
1136 All fast - EXXON SAN FRANCISCO.
1330 First hose.
1426 Last of three hoses - (2) 6", (1) 10".
1518 Started transfer of cargo to EXXON SAN FRANCISCO.
1614 Shut down cargo - line up problems aboard EXXON SAN FRANCISCO.
1745 Resumed transfer.
1800 Coast Guard reported four additional Strike Team personnel and
equipment were being transported to the EXXON VALDEZ.
2200 Rate 12,000 barrels per hour - nine pumps.

FRIDAY, MARCH 31, 1989

0220 Tenth pump on line.
AM EXXON SAN FRANCISCO engineers and EXXON VALDEZ engineers worked
to secure deck for salvage operation.
0600 Prime movers (diesel driven hydraulic power packs) - 14, 12 -
available, 10 - working; 10 - pumps.
1200 Total aboard EXXON SAN FRANCISCO - 184,000 barrels.
Coast Guard reported salvage operation equipment had been
airlifted to the EXXON VALDEZ.
PM Number of pumps varied due to tank switches.

SATURDAY, APRIL 1, 1989

0300 330,366 barrels remained aboard EXXON VALDEZ; EXXON SAN FRANCISCO lightered 260,000 barrels.

Prime movers - 14, available - 10, working - 7; pumps - 18, available - 17, working - 7.

0541 Automatic fire alarm sounded on EXXON VALDEZ - shut down all cargo lightering operations - burned toast in galley - tripped system - all personnel aboard mustered at boat stations.

AM Oil volume in tanks decreasing; therefore, more time required to "strip" and reposition pumps. Continued preparations for vessel float-off.

SUNDAY, APRIL 2, 1989

0500 200,894 barrels remained aboard EXXON VALDEZ.

0600 Eight pumps on-line - 200,000 barrels left aboard EXXON VALDEZ.

1030 Started #1 main cargo pump to discharge starboard slop tank to EXXON SAN FRANCISCO.

1300 Finished cargo to EXXON SAN FRANCISCO.

1400 Hoses disconnected.

EXXON BAYTOWN underway to lighter EXXON VALDEZ - Pilot J. Hurd.

1611 Last line.

1630 EXXON SAN FRANCISCO clear of EXXON VALDEZ.

Cargo aboard EXXON SAN FRANCISCO - 402,707 barrels (GSV).

1705 Tugs CRUSADER and STALWART alongside EXXON BAYTOWN.

1754 First line.

1915 All fast - EXXON BAYTOWN.

2000 Connected (2) 6" hoses.

2030 Started cargo transfer to EXXON BAYTOWN.

MONDAY, APRIL 3, 1989

0643 Third 6" hose connected - EXXON BAYTOWN.

0700 Seven pumps in use - 97,000 barrels left aboard EXXON VALDEZ.

1500 70,404 barrels remained on EXXON VALDEZ.

PM Continued plans - continued deck modifications for vessel float-off.

TUESDAY, APRIL 4, 1989

0800 Finished transfer of cargo to EXXON BAYTOWN - 119,306 barrels (GSV).

0850 Hoses disconnected.

0913 Began letting go.

0957 All clear - EXXON BAYTOWN.

PM 16,508 barrels remained aboard EXXON VALDEZ (later updated to 20,761 barrels).

Completed all refloating plans - dry run - final equipment checked for vessel float-off.

All nonessential shoreside employees, regulatory officials began to leave the vessel.

WEDNESDAY, APRIL 5, 1989

AM Remaining nonessential vessel crew and personnel left vessel - only salvage team members onboard.

0620 Pilot E. Murphy aboard.

0700-

0800 Tugs made fast - (2) on hawsers - bow, (1) starboard bow, (1) port bow, (1) starboard quarter, (1) port quarter; began securing tanks - pressuring tanks.

0825 Anchor aweigh.

0920 Fenders away.

1030 Vessel afloat.

NOTE: All cargo volumes from ships' measurements are approximate.

DISPERSANTS AND BURNING

(March 24 - March 29, 1989)

DISPERSANTS AND BURNING
(March 24 - March 29, 1989)

Alyeska's Oil Spill Contingency Plan for Prince William Sound (January 1987), which was approved by federal and state agencies, emphasized that the early use of dispersants and open burning were the most effective immediate steps that could be taken to mitigate environmental impacts. In the words of the Plan:

In reviewing the aspects of this size spill it becomes very apparent how important it is to have dispersants approved so that they can be used very effectively to prevent the continuing input of oil into the small bays and shorelines in Prince William Sound. Burning also has to be looked at as a very good alternative to the cleanup in Prince William Sound on the various inlets and bays in which oil may accumulate.

The Coast Guard did not authorize Exxon Shipping Company to use dispersants, other than for tests, until 1845 hours on the third day after the spill (Sunday evening, March 26). Exxon also did not receive permission to use open burning, other than for tests, until mid-afternoon of the same day. Exxon is confident that had it obtained prompt permission to use dispersants and open burning, the environmental damage from the spill would have been significantly mitigated. (See Attachment 1, "Dispersant Availability and Effectiveness.")

Establishment of Guidelines and Zones for Use of Dispersants

Under a 1986 Memorandum of Agreement, the Coast Guard, the U.S. Environmental Protection Agency (EPA), and the State of Alaska, through its Department of Environmental Conservation (ADEC), provided for the use of dispersants by predesignated Coast Guard On-Scene Coordinators (OSC) under conditions prescribed in the "Oil Dispersant Guidelines for Alaska" (Alaska Guidelines). As part of the Alaska Guidelines, a Regional Response Team (RRT) working group developed specific guidelines for Prince William Sound that classified the waters of the Sound into three separate zones for use of dispersants. The RRT is a joint federal and state group consisting of ADEC and the following 12 federal agencies: the Departments of Agriculture, Commerce, Defense, Energy, Health and Human Services, Interior, Justice, Labor, State, and Transportation (Coast Guard); the EPA; and the Federal Emergency Management Agency.

MAP 1 shows the three zones. In Zone One, the Coast Guard OSC can authorize the use of dispersants. He is not required to seek further approval, concurrence, or consultation from the EPA or ADEC, on behalf of the State of Alaska, prior to use.

In Zone Two, use of dispersants is conditional, and the OSC must obtain EPA and ADEC approval prior to application. Finally, in Zone Three, use of dispersants is generally not recommended, and the EPA and ADEC must approve their use on a case-by-case basis.

Therefore, in the case of the EXXON VALDEZ oil spill, Exxon could not use dispersants anywhere, including in Zone One, without the OSC's specific approval.

In developing the specific dispersant use guidelines for Prince William Sound, the RRT recognized the likelihood that dispersants would assist in minimizing environmental damage from an oil spill. In the words of the guidelines:

The dispersant use guidelines for Prince William Sound focus on the target traffic lanes and reflect the remoteness and fragile nature of the Sound. Designation of the target lanes primarily as Zone I was deemed desirable due to:

- the large volume of oil tankers that transit the Sound via these lanes;
- the difficulty of reaching these lanes with aircraft dispersant application;
- the likelihood that dispersant use would assist in minimizing the environmental effects of a spill, particularly in the case of severe weather conditions.

The specific dispersant use guidelines for Prince William Sound were developed in accordance with the guidelines of EPA, approved by the Coast Guard and the FAA. Major dispersant operations were conducted in March 1989. The dispersant operations were conducted in Zone I.

Chronology

In reading through the chronology of events, the following should be kept in mind: see MAP 1.

Friday, March 24: Oil spill detected east of the oil spill zone.
Saturday, March 25: Early afternoon, NOAA surveillance flight verified that oil spill located; oil had moved into Zone One.
Sunday, March 26: All day, oil spill largely remained in Zone One.
Monday, March 27: Early morning, gale force winds blew most of the oil into Zone Three in the vicinity of Naked and Knight Islands.

Attachment 1 summarizes the availability of dispersants to conduct spraying operations and the effectiveness of dispersants.

NOTE: ALL TIMES ARE ALASKA STANDARD TIME UNLESS OTHERWISE INDICATED.
TIME NOTATIONS ARE BASED ON NUMEROUS SOURCES, INCLUDING
RECOLLECTIONS OF INDIVIDUALS.

FRIDAY, MARCH 24, 1989

NOTE: For additional details about the mobilization during the first 24 hours of spray planes, dispersants, and dispersant equipment, see Section titled, " Exxon Response and Initial Mobilization."

- 0935 Shiel (Alcesia Pipeline Service Company) spoke to Commander McCall, the Coast Guard (CG), and orally requested use of dispersants.
- 1010 Hussey (Hussey Shipping Company) called Commander McCall regarding use of dispersants. Hussey indicated McCall stated that dispersants would be used if necessary.
- 1030 Hussey (Hussey Shipping Company) called AT-101 (Alcesia Pipeline Service Company) and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1040 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1050 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1100 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1110 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1120 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1130 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1140 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1150 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
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- 1240 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
- 1250 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
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- 1600 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
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- 1700 Hussey (Hussey Shipping Company) called AT-101 and requested use of dispersants. Hussey indicated that AT-101 was not authorized to use dispersants.
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- 1800- Press conference held at Civic Center (1 1/2 hours). Larossi emphasized need to move quickly to disperse oil.
-- At the press conference Governor Cowper stated: "There has been a lot of speculation on the use of dispersant. Everybody realizes the risk that that poses to marine life. We are already seeing some effect on marine life just

because of the oil. I want to assure everybody that dispersant is not going to be used in anything other than a carefully targeted way. We want to try to make sure that we check back with the fishing community, that we check with the fish and game and to do as little damage as possible. You can't use dispersant without doing damage to marine life. That's clear. But we want if possible to keep the oil off the beaches."

2155 SAT C-130 (originating in California) departed Phoenix (where crews and equipment had been assembled) for Anchorage with ADDS Pack.

SATURDAY, MARCH 25, 1989

0612 SAT C-130 (first spray plane) arrived Anchorage from Phoenix with spraying equipment. C-130 had two crews aboard so that one was rested and ready to start spraying missions upon arrival.

NOTE: 20,075 gallons (365 drums) of dispersants were available in Alaska.

Early
PM

NOAA surveillance flight verified that the leading edge of the oil spill had moved into Zone One.

1315 Iarossi reviewed with Lindblom (dispersants consultant) plans to use dispersants in Zone One.
-- Discussed Commander McCall's requirement for testing the effectiveness of dispersants in Zone One, and his need to review results before Exxon could use dispersants.
-- Exxon requested McCall view dispersant test using C-130 aircraft spraying dispersants in Zone One. Coordination meeting planned at Valdez airport.

1425 Loaded C-130 in Anchorage with dispersants.

1437 Conair DC-6 (second spray plane) arrived Anchorage and began process of clearing U.S. customs.

1508 SAT C-130 spray plane departed Anchorage for Valdez with dispersants. Plane was light loaded to permit subsequent takeoff from Valdez airport for dispersant test.

1551 SAT C-130 arrived Valdez from Anchorage. Iarossi, Lindblom, Emery (dispersants consultant), and Commander McCall held coordination meeting with aircraft and spotter crews.

1635~ SAT C-130 departed Valdez for spray mission.

1658 Iarossi, Lindblom, Emery, and McCall departed in helicopter for test run. Departure delayed while Commander McCall got video camera from Marine Safety Office.

- 1658 . Iarossi, Lindblom, Emery, and Commander McCall witnessed C-130 dispersant test (multiple passes using approximately 3,750 gallons (68 drums) of dispersants) in Zone One south/southwest of the grounding site. Commander McCall using video camera.
- Iarossi, Lindblom, and Emery concluded that the test was successful. They noted much more light reflection off surface and higher surface agitation, indicating dispersants effectively interacting with spilled oil.
 - Commander McCall stated that he was unable to get good video due to poor light. Said he needed to have good video to show effectiveness to others. Said he needed to be convinced of effectiveness and to demonstrate it to others before he could approve the use of dispersants on the spill. Commander McCall said that further testing on Sunday would be required.
- 1745 SAT C-130 directed to load dispersants for Sunday morning tests. SAT C-130 loaded approximately 5,100 gallons (93 drums) of dispersants in Kenai and returned to Anchorage at 2144.
- 1800~ During Valdez press conference, Lieutenant Wieliczkiwicz, Coast Guard spokesman, stated, "Exxon has been granted permission by the state and federal agencies to test effectiveness of chemical dispersants on the oil and in-place burning methods; however, Exxon will need additional Coast Guard and state approval before further use of either method."
- 1914 Conair DC-6 sprayed 500 gallons (9 drums) of dispersants. Spraying not ordered by Exxon. (Conair subsequently notified Commander McCall of the spraying mission.)
- 1950 Craig Rassinier (Exxon Shipping Company) and John Clough (Exxon Shipping Company Alaska legal counsel) met with Michelle Brown (Alaska Assistant Attorney General) and Larry Dietrick and Bill Lamoreaux (both ADEC) regarding spill cleanup plans and activities. Rassinier outlined cleanup, lightering activities, and equipment en route. Rassinier also gave a report of the successful dispersant test that afternoon. Dietrick stressed that the State had a strong preference for "aggressive mechanical efforts" and that "dispersants should only be used as a last resort."
- 2045 Successful burn test of an estimated 15,000 gallons of crude oil conducted near Goose Island.
- 2130 Iarossi met with Alaska Lieutenant Governor McAlpine and aides, Admiral Nelson, Commander McCall, and Kennedy (NOAA). One of the State's concerns was the impact of dispersants on the water column. Maki (Exxon Biomedical Sciences, Inc.) joined the meeting and gave the group a brief oral summary of some of the aquatic toxicology data for oil/dispersant combinations and underscored that the relative risks to aquatic life from the use of dispersants were minimal.

SUNDAY, MARCH 26, 1989

- 0925 Conair DC-6 left Anchorage for Valdez.
- 1127 Conair DC-6 left Valdez; spray mission conducted, used 2,500 gallons (45 drums) of dispersants. Spray equipment limited the effectiveness of the distribution of dispersants.
- 1400 Iarossi spoke to Stevens, Harrison, LeGrange (Exxon Company, U.S.A.) and Gillette and Weatherford (both Exxon Shipping Company) in Houston about the use of dispersants.
-- Iarossi reported that Exxon must have consent of Coast Guard. Apparently Coast Guard felt need for State's consent even though such consent was not required because the oil was in Zone One.
-- Iarossi stated that he was frustrated because dispersants use was being held up.
- 1411 SAT C-130 left Anchorage; spray mission conducted, used 5,100 gallons (93 drums) of dispersants.
- 1430 Lindblom, Emery, and Exxon contract video technician viewed test. No Coast Guard observer available. Dispersant test using SAT C-130 very successful showing same results as previous day verified by unmistakable dispersal of crude and clear video representation.
- 1500 Iarossi met with Admiral Nelson and Commander McCall at Marine Safety Office. Iarossi again requested permission to begin dispersants use. Admiral Nelson left the meeting to have an extensive telephone conversation with Governor Cowper. Iarossi continued discussion with other Coast Guard representatives.
- 1700 Coast Guard (Admiral Nelson, Commander McCall, and Commander Rome), Exxon (Iarossi, Rassinier, O'Brien, and Clough), and Alaska representatives (Kelso, Brown, Dietrick, Lamoreaux, and Lloyd (Governor's office)) met to discuss use of dispersants and overall cleanup coordination.
-- Admiral Nelson said he had just been on the telephone with Governor Cowper about dispersants and cleanup operations. The Admiral explained that a spill of this size dwarfed the ability of mechanical cleanup, noting that you could "skim forever, but not get rid of it."
-- Iarossi urgently pressed for immediate authorization to use dispersants. Iarossi noted that time was crucial and that the parties were "slowly being consumed with political issues versus spill issues" and that this was draining precious time and resources. Iarossi agreed with Admiral Nelson that the spill was too large for mechanical recovery efforts, and further noted that the failure to authorize dispersants was creating an enormous problem and that Exxon should be spraying dispersants right now.
-- Commander McCall, the OSC, said that he had no qualms regarding using dispersants in Zone One. He stressed the emergency and said that unless dispersants were used the oil

would end up "some place" eventually. He argued that major dispersant operations be commenced on the leading edge of the oil in Zone One.

- Kelso said the State was not ready to sign off on open-ended use of dispersants.
- Instead, the State would consider appropriate applications on a case-by-case basis.
- State evaluating "trade off," looking at mix of environmental effects and impacts that would occur if dispersants were applied versus allowing the spill to be washed up on the shoreline and thereafter cleaned up with mechanical efforts.
- The meeting continued with both Iarossi and the Coast Guard arguing for immediate use of dispersants in Zone One.
- Commander McCall finally concluded that there was agreement to use dispersants in Zone One. ADEC representatives made no comment to the contrary.

1845 Meeting concluded. Exxon had received authority from Commander McCall to use dispersants in Zone One.

2230 Iarossi and Lindblom reviewed comprehensive plans to start full-scale use of dispersants at first light Monday morning.

MONDAY, MARCH 27, 1989

Early

AM Sunday night and early Monday morning, gale force winds spread out the oil spill and blew most of it into Zone Three.

1015 First surveillance aircraft took off from Valdez airport.

1256 SAT C-130 attempted to leave Anchorage for spray mission, but was not given air traffic control clearance to take off.

1300 Admiral Nelson and Iarossi compared latest surveillance data showing the new location of the spill and scheduled helicopter overflight.

1415 Spraying equipment for a Mark Air C-130 (third spray plane) arrived in Anchorage from Phoenix.

1425 SAT C-130 left Anchorage; spray mission conducted with satisfactory results, used 5,250 gallons (95 drums) of dispersants on oil remaining in Zone One. C-130 returned to Kenai to reload dispersants.

1530 Iarossi and Nelson returned from two-hour surveillance overflight. Iarossi requested RRT to approve dispersants use in Zone Three in vicinity of Smith Island. Iarossi waited in Marine Safety Office until 1700 for reply.

1730 Exxon was notified of conditional approval of specific request. Exxon ordered SAT C-130 mission in Zone Three.
-- C-130 partially loaded with dispersants from Kenai flew to Anchorage to load additional dispersants, for a total of 5,010 gallons (91 drums).

1900 SAT C-130 left Anchorage; after arrival on site, the mission was aborted due to darkness.

NOTE: State subsequently withdrew approval for this mission.

TUESDAY, MARCH 28, 1989

1212 SAT C-130 left Anchorage loaded with dispersants.

1251 Mark Air C-130 left Anchorage loaded with dispersants.

At Commander McCall's direction, SAT C-130 and Mark Air C-130 sprayed near tanker to disperse oil released when boom broke during the storm. Approximately 7,181 gallons (131 drums) sprayed.

PM Afternoon aerial surveillance indicated heavy concentration of oil to the northeast and northwest of Knight Island that would probably move southward down both sides of Knight Island in Zone Three.

Burn test at Eleanor Island unsuccessful because of high water content in crude oil-water emulsion.

2100 Paul (Exxon Shipping Company) in meeting of Operations Coordination Committee (Exxon, Coast Guard, ADEC), requested emergency permission to use dispersants in Zone Three during next two days to prevent spill from moving southward. Exxon requested response by midnight so that operations could begin at first light Wednesday morning. Commander Rome replied that the request needed to be made in writing.

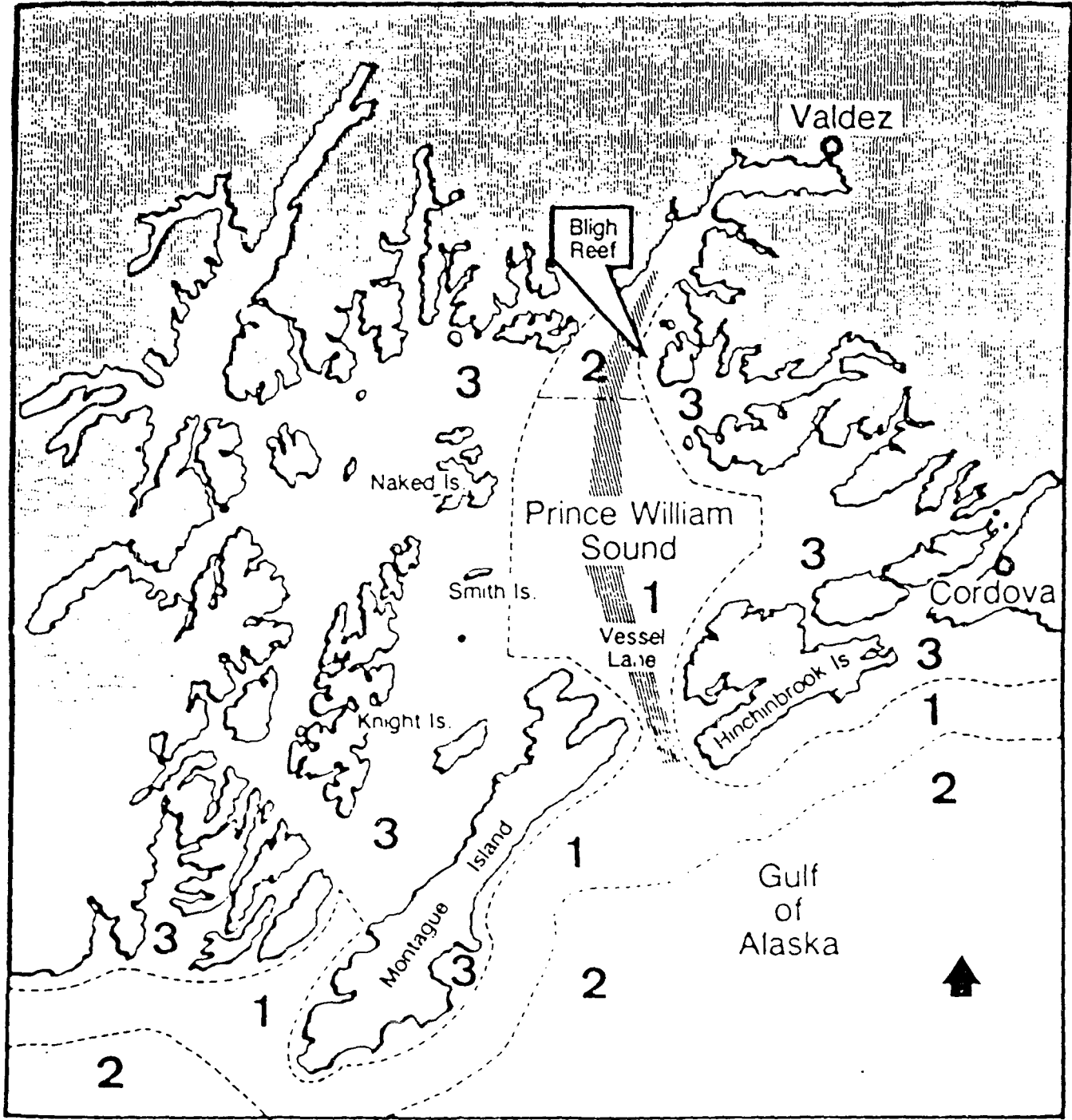
WEDNESDAY, MARCH 29, 1989

0900 Iarossi hand delivered written request to use dispersants in Zone Three to Commander McCall. Borgen gave copies to Lamoreaux (ADEC), Baker (Alaska Fish and Game), and EPA by fax.

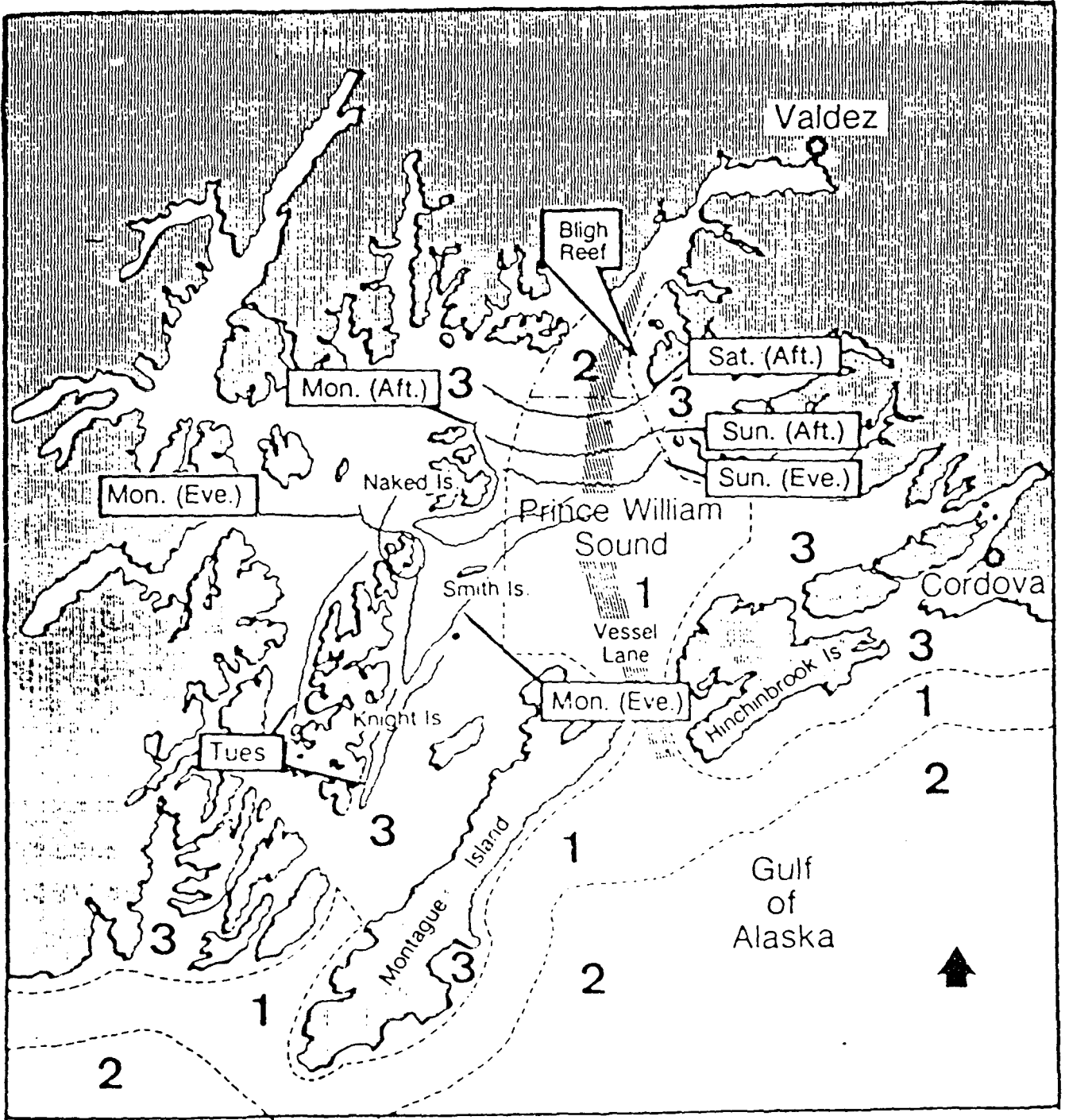
1230 Iarossi learned that the RRT was not acting on the request. Exxon learned later that the State declined to approve the use of dispersants in Zone Three.

NOTE: Further attempts to burn crude oil-water emulsion were unsuccessful.

ZONE DESIGNATIONS



PROGRESSION OF SPILL LEADING EDGE
SAT. 3/25/89 - TUES. 3/28/89



DISPERSANT AVAILABILITY AND EFFECTIVENESS

	<u>Alaska Inventory (55-gallon drums)</u>				
	<u>Opening</u>	<u>Additions</u>	<u>Cum. Supplied</u>	<u>Cum. Sprayed</u>	<u>Remaining Inventory</u>
Friday, March 24	365	--	365	--	--
Saturday, March 25	365	--	--	--	--
1635 C-130 test application	--	--	--	(68)	297
1914 DC-6 flight	--	--	--	(77)	288
2155 Receipt from Houston	--	88	453	--	376
Sunday, March 26	376	--	--	--	--
0954 Receipt from Houston	--	149	602	--	525
1127 DC-6 test application	--	--	--	(122)	480
1411 C-130 test application	--	--	--	(215)	387
1734 Receipt from California	--	150	752	--	537
1808 Receipt from Houston	--	172	924	--	709
Monday, March 27	709	303	1,227	(310)	917
Tuesday, March 28	917	847	2,074	(441)	1,633

If unconditional authority had been granted to use dispersants beginning with C-130 plane availability early Saturday, March 25, the day after the spill, seven C-130 flights could have been made on Saturday and Sunday, using 637 drums (35,000 gallons). As shown in the above table, as of 1734 on Sunday, Exxon had accumulated a total supply of 752 drums of COREXIT 9527 in Alaska. This would have left 115 drums to spare.

A second C-130 was equipped to spray on Monday. Had Exxon been allowed to use dispersants in Zone Three utilizing the two C-130s available, significant volumes of additional oil would have been dispersed and the effects of the spill significantly mitigated.

The volume of oil that can be dispersed with COREXIT 9527 depends on a number of factors including the type of crude oil being dispersed, the thickness of the oil slick, and how recently it was spilled. Laboratory and field tests have shown that Prudhoe Bay crude is among the most susceptible to the use of chemical dispersants and that dispersants are effective in the sea state conditions which prevailed on Saturday and Sunday. Given the favorable thickness and timing conditions which existed, particularly on Saturday and Sunday, large volumes of oil could have been dispersed.

ENVIRONMENTAL RESPONSE

(March 24 - May 20, 1989)

ENVIRONMENTAL RESPONSE
(March 24 - May 20, 1989)

INTRODUCTION

Exxon's Response Team dealt with a number of high-priority environmental concerns following the spill. These were to protect environmentally sensitive areas, to assess the biological and ecological impacts of the spill, and to protect wildlife to the extent possible. Dr. Alan Maki, an Exxon environmental scientist stationed in Anchorage, Alaska, was at the scene of the spill in the early morning of March 24, the day of the grounding. Since that time, Dr. Maki has been stationed in Valdez and, along with other Exxon and contracted scientists from environmental laboratories and academia, has been responsible for initiating and coordinating activities and studies responsive to the above-stated concerns.

While Exxon's current activities are heavily focused on short-term activities such as shoreline cleanup, the importance of longer term ecological consequences is fully recognized. A number of Exxon's studies are addressing long-term effects. While Prince William Sound has its own unique characteristics, a review of other large oil spills indicates that there is reason to be optimistic regarding the future outlook for the Sound. A review by Exxon Production Research Company of available evidence from other large, open-water oil spills indicates that although short-term local effects are observed, oil spills have not caused evident, irrevocable damage to marine resources on a broad oceanic scale, and local damage is transitory, with recovery time being dependent primarily upon the localized energy environment (primarily wind and wave action). Environmental and biological data taken from Prince William Sound since March 24 tends to support that these conclusions will also be applicable to the EXXON VALDEZ spill, but additional data collection and analysis will be required before any definitive assessment is possible.

The following discuss specific areas of environmental activity:

ENVIRONMENTAL STUDIES

Dr. Maki and his team of scientists have been coordinating efforts with the Alaska Department of Environmental Conservation (ADEC) in conducting water-column and sediment-sampling programs. ADEC has provided sampling assistance and observers on several of the sampling vessels. Strict adherence to chain-of-custody procedures is being followed as samples are transferred from field locations to laboratories. Environmental Protection Agency (EPA) and other standard protocols are being followed in the laboratory analysis of the samples. Additionally, a wide range of studies address biological effects. The

studies will also generate scientific data to assess potential damages to natural resources. Attachment 1 contains short summaries of the studies and indicates the dates they were initiated.

At the present time 14 Exxon-sponsored studies are underway or are planned for the near future. Seven of these studies address various aspects of the water and sediments and of shoreline and biological recovery in Prince William Sound, on the Kenai Peninsula, and the lower Cook Inlet. Two projects involve detailed toxicity testing using water and sediment samples collected in field surveys. Three scientific studies focus on commercial finfish and crustaceans, and additional studies address effects on kelp and eelgrass and possible effects on subsistence foods.

Water Column, Sediment, and Biological Studies

The primary objectives in the water column, sediment, and biological studies are to collect and analyze samples for petroleum hydrocarbon content. Work in Prince William Sound was initiated within two days of the spill and soon thereafter in the Kenai Peninsula area. In charge of these studies are several Exxon-contracted principal investigators, who are recognized experts in their fields:

- Dr. Jerry Neff, Director of Battelle Ocean Sciences Laboratory, senior author of several books on the effects of petroleum hydrocarbons on marine environments.
- Lisa Haas, M.S., Principal of American North, former Illinois EPA Superfund project manager, who has conducted marine and onshore spill damage assessments in Alaska.
- Dr. Pat Kinney, Principal of Kinnetics Laboratories and senior author of several publications on the biological effects of oil spills on marine fish and wildlife.
- Dr. Paul Boehm, Director of Arthur D. Little Oil and Chemistry Spill Assessment Unit.
- Dennis Lees, M.S., an experienced intertidal biologist with ERC Environmental & Energy Services Company and author of several publications on the intertidal biology of Prince William Sound.

On May 4, 1989, 320 tests on water samples collected at 32 sites were either complete or in progress. Through May 20, 1989, several water quality and sediment surveys had been completed in Prince William Sound and in the Kenai Peninsula areas. Additional surveys are to be conducted in late May and at varying intervals in future months.

Tests of water samples taken through May 4 indicate very little petroleum has entered the water column and that hydrocarbon concentrations are far below those known to be toxic to

fish. The most toxic components of crude oil, which include volatile aromatics such as benzene, in the samples had concentrations averaging less than 1 part per billion. The National Primary Drinking Water Standard is 5 parts per billion of benzene. Eighty-four tests on sediments, collected at 31 sites, were either complete or in progress.

Several biological sampling programs are underway to develop baseline information and recovery on such items as zooplankton, phytoplankton, and tidal and subtidal plant and animal fauna. Several field surveys have been completed, but no data is yet available on these programs. Additional surveys are planned for the summer of 1989 in both Prince William Sound and the Kenai Peninsula areas. Several of these programs will likely be extended into 1990.

Species Studies

Three studies are underway to determine the spill impact on certain commercial finfish and crustaceans. The effects on Pacific herring, pink salmon, crab, and shrimp are being investigated. These efforts are being directed by highly qualified specialists in their fields under contract to Exxon:

- Pacific Herring--Dr. Walter H. Pearson of Battelle Marine Sciences Laboratory, senior author of a major report on the effects of oil on spawning behavior and reproduction of Pacific herring.
- Pink Salmon--Dr. Douglas J. Martin of Pacific Environmental Technologies, Inc., a fisheries biologist with 16 years' experience in research and consulting in the Pacific Northwest and Alaska.
- Crustaceans--Dr. David A. Armstrong, Associate Professor at the University of Washington, who is a specialist in crustacean biology.

Work is underway on all three studies. Of nine oiled areas visited, five had herring spawn, and of eight unoiled areas surveyed, six had spawn. Herring hatching is being monitored both in the field and under laboratory controlled conditions. Some abnormalities have been observed, but all laboratory work is being done "blind" with respect to the sample origin so it is premature to draw any conclusions. In situ 14-day bioassays of pink salmon have been conducted in three locations. No salmon mortalities were observed during the study. Daily sampling for downstream migration of juvenile salmon is also underway. Other activities in progress or planned in these fish studies include analyses of tissue, water, and sediment hydrocarbon content; hydrocarbon analysis of herring eggs on kelp; determination of the condition of herring larvae; histopathological studies; and salmon studies of nearshore prey availability, habitat utilization, and escapement.

Crustacean fishery literature has been reviewed, a site visit conducted, and extensive discussion held with the Alaska Department of Fish and Game biologists to refine the crustacean study plan. The first sampling cruise is scheduled for the week of May 22. Sampling activities planned include plankton, crab/shrimp pot, trawl, and quadrat sampling of shrimp and crabs in oiled and unoiled areas.

Toxicity Tests

Toxicity tests are being performed on water and sediment samples obtained in Prince William Sound. These tests are being directed by Dr. William A. Stubblefield of ENSR Consulting, who is a toxicologist with experience in environmental risk assessment and oil pollution studies. Dr. Stubblefield is being assisted by three other environmental experts. Water and sediment samples have been obtained and sent for acute toxicity testing.

Springborn Life Sciences is conducting acute toxicity tests with mysid shrimp, short-term larval-growth toxicity tests with sheepshead minnows, and toxicity tests with the marine alga, Skeletonema. Data from tests completed to date indicate no toxicity associated with the water-column samples using these sensitive indicator species. Additional test series are planned for nearshore and offshore areas within Prince William Sound and offshore Kenai Peninsula.

Sediment toxicity testing is being conducted by EVS Consultants to determine the effects on benthic worm and oyster larvae. Results to date have shown expected adverse effects. For example, benthic worms did not survive when exposed to sediments from heavily oiled areas off Eleanor Island. Additional samples will be collected from oiled intertidal areas to further define toxicity profiles.

Other Studies

A study to compare the growth and productivity of kelp and eelgrass populations in oiled and unoiled areas of Prince William Sound is being conducted by a noted marine biologist, Dennis Lees of ERC Environmental & Energy Services Company, under contract to Exxon. Mr. Lees has over 15 years' experience working in this region of Alaska, and he is being assisted by Dr. Ronald Phillips, an eelgrass specialist from Seattle Pacific University. Initial sampling and measurements were taken a few weeks ago from oiled and unoiled areas, and plants have been tagged to enable growth measurement. Laboratory analyses of plant tissue chemistry, water quality, and sediment chemistry are planned.

A study is under consideration to determine the health risk to subsistence hunters and gatherers where food supply is based in oiled areas. This study is currently on hold pending

receipt of results of a joint Alaska Department of Fish and Game/U.S. Food and Drug Administration study on the same issue. Exxon has provided logistics support and sampling technology to assist the effort and help ensure accuracy of the field sampling.

PROTECTION AND REHABILITATION OF WILDLIFE AND FISHERIES

Marine Birds and Mammals

Effects on marine birds and vulnerable marine mammals during the crucial days immediately following the spill were expected to be severe. Attention was first focused on establishing facilities and providing qualified expertise for rescue and rehabilitation of marine birds and sea otters. Alice Berkner, Director of the International Bird Rescue Center, was asked to lead efforts to recover and rehabilitate oiled marine birds. Ms. Berkner is one of the pioneers in rehabilitation of oiled birds and has been involved in over 30 spills in North America. She arrived on site early on the day of the spill and established the first bird rescue operation in Valdez on Saturday, March 25, the day after the spill. That same day a crew was dispatched to Bligh Island to begin retrieval of oiled birds and other wildlife.

Dr. Randall Davis of Seaworld Research Institute in San Diego arrived in Valdez on Sunday, March 26, and began immediately to establish the sea mammal rescue operations which were to focus on sea otter rescue and rehabilitation. The bird center and the otter center initially shared space in Copper Basin Hall. Work began to assemble a fleet of boats and aircraft dedicated to retrieval of oiled birds and otters. This fleet was to grow to over 100 boats and 16 aircraft. Oiled live birds and otters began arriving at the centers on March 30. The U.S. Fish and Wildlife Service set up a refrigerated van in Valdez for receipt of dead wildlife. The removal of oiled carcasses, on which birds and animals might otherwise feed, was an additional wildlife protective measure.

Beginning on Sunday, April 2, the otter center was transferred to a newly constructed facility in a school gymnasium. The new Valdez center has a capacity of 96 sea otters and a veterinary/pathology department which includes many of North America's most well-known sea otter experts. Among them is Dr. R. V. Chalam who has, with his on-site colleagues, made remarkable progress in the development of otter treatment procedures at the center. Otters received at the center are first examined by veterinarians and, if found to have been in contact with oil, are then cleaned thoroughly, rinsed, and dried. They are transferred to a recovery room where they are monitored. During recuperation, the otters are fed fresh crab, shrimp, and fish. When they are judged healthy enough to enter

water, they are placed in special salt water holding pens prior to controlled release back to their natural habitat. New medical technology and techniques developed during operation of the center have even included work on treatments to restore natural fluids to the otters' fur.

Similar procedures have been developed and tested for bird treatment. Oiled birds are given careful initial washings with detergent and then bathed even more thoroughly a second time. The birds are fed a liquefied nutrient and, when sufficiently treated and recovered, are placed in specially-constructed pens for further rehabilitation before release.

On April 12, a second Exxon-funded bird center was established at Seward. A third bird center was opened at Kodiak on April 18 and a fourth at Homer on April 21. The second otter center was opened on May 5 at Seward and later expanded to capacity for 30-100 otters. Community groups in Homer, using Exxon funds, had begun to construct otter holding facilities in Jakalof Bay. On May 16 these facilities were made part of the operating plans for transfer of otters from Seward.

As of May 13, bird and otter treatment was:

	<u>Received</u> <u>Live at</u> <u>Centers</u>	<u>Died</u> <u>at</u> <u>Centers</u>	<u>Transferred</u> <u>Live to Other</u> <u>Locations</u>	<u>Being</u> <u>Held</u> <u>Live</u>
Birds	825	424	199	35
Otters	267	89	37	133

Dead birds and otters were also collected and delivered to refrigerated vans provided by the U.S. Fish and Wildlife Service. Total known dead as of May 13 was 12,575 birds and 585 otters. On May 15, seven rehabilitated otters, equipped with radio transmitters to monitor movements, were released.

Highest priority for shoreline cleanup was assigned to seal pupping areas in another important move to protect wildlife. Between April 18 and May 5, six oiled seal pups were received at the Valdez otter center. They were successfully cleaned and sent to Dr. Joyce Murphy at the Alpine Veterinary Clinic in Anchorage for additional treatment. The pups are now in Homer for long-term rehabilitation, estimated at two months.

As effects of the spill progressed from Prince William Sound to the Gulf of Alaska, mortality peaks of birds and otters moved from Valdez to Seward and then to Homer and Kodiak.

Nine live eagles had been received at the bird centers by May 22. Six were oiled and three suffered from non-spill-related injuries such as broken wings. One of the oiled eagles has died and seven were transferred to Anchorage for treatment. Special facilities are being built and experts retained for rehabilitation and care of eagles and other birds of prey which might be affected by the spill.

Prince William Sound is used as a staging and resting area for water birds and shore birds on their annual migrations to and from breeding grounds elsewhere in Alaska. Some stay for several weeks, but most stay in the area for a few hours to a few days. The winter bird population is relatively small. About 100 species of coastal birds are regularly observed in the Prince William Sound area. Approximately 135,000 birds nest in colonies in the Sound, 65% of them located in the eastern part of the Sound. Although no scientific counts are available, it is estimated that the number of migratory birds which use the Sound each year measures in the millions. Horns and other noise-making devices were used to keep migratory and local birds from landing or feeding in oiled areas.

Hatcheries and Fisheries

Actions to protect hatcheries and sensitive fisheries environments were initiated on March 25, the day after the spill, when Exxon representatives met with local fishermen and government officials to discuss areas requiring protection. It was not clear at this first meeting how the spill might move and which areas might be impacted. When the winds increased, it became apparent that areas east of the spill site were unlikely to be affected. At a March 27 joint meeting of the Steering and Operating Committees, priorities were set and a protection plan established. A third meeting was held with local fishermen and officials on March 28. Boom deployment at Sawmill Bay, Esther Bay, Eshamy Bay, and Main Bay began on that date. Boom deployment is described in the Section titled, "Buildup of Personnel and Equipment; Deployment of Booms and Skimmers; and Oil Recovered from the Water."

As of May 15, all of the hatchery protection efforts had succeeded. All booms remain in place and are carefully tended. Internal booms are free of oil and no oil has been detected in any of the hatcheries. Several releases of fry have taken place since the spill, with no observable adverse effects. Fry releases have taken place essentially in accordance with pre-spill schedules without modification. The study of pink salmon survival and habitat use, previously described, provides early evidence that juvenile salmon should not be adversely impacted.

Commercial herring fisheries in the Prince William Sound and Cook Inlet Management Areas were closed for the spring seasons. Other closures included shrimp, sablefish, Dungeness crab, other bottom fish and smelt, and miscellaneous shellfish in Prince William Sound; bottom fish, sablefish, and smelt in Cook Inlet; and shrimp in Outer Cook Inlet.

Salmon seasons are ordinarily set by emergency order of the Alaska Department of Fish & Game depending on availability of fish and nature of the catch. Decisions about openings in water near the path of the spill have not yet been made. The salmon

opening in the Copper River district on May 15 produced a catch of 45,000 red and king salmon, more than double the first-day harvest of last year. The catch was taken with a smaller fleet due to commitment of boats to spill cleanup. The salmon tested free of any oil contamination and were judged top quality by Japanese buyers. Although the Copper River district is part of the Prince William Sound Management Area, it was not in the path of the spilled oil. However, the successful opening of the salmon season is further indication that large areas in and near Prince William Sound remain unaffected by the spill. Halibut fisheries also opened on schedule beginning May 15. Catch was limited by bad weather. No evidence of oil contamination was found.

SHORELINE CLEANUP

On April 2, a shoreline cleanup priority committee was formed and on April 8 preliminary approval was obtained from the Coast Guard and eight other agencies for a shoreline cleanup strategy. An initial plan was presented by Exxon on April 14 and approved by the Coast Guard on April 17. A revised plan was submitted on May 1 incorporating new data on impacted shoreline. The May 1 plan calls for cleanup of 364 miles of shoreline. The Coast Guard reviewed the May 1 plan and requested several changes, which Exxon has made. This plan will continue to evolve with experience gained in the field. The estimates of impacted shoreline are based primarily on aerial surveys conducted by Exxon, the National Oceanic and Atmospheric Administration (NOAA), and ADEC, and will be updated as additional data, such as those from on-site shoreline assessments, become available.

Shoreline cleanup techniques should be selected to provide the best combination of effectiveness and environmental compatibility, and care must be taken to minimize adverse ecological impacts during cleanup. For example, in some locations natural processes which avoid the mechanical impact of human cleanup activities may be preferable even though some oil may remain in the environment while these processes work. Exxon's intent has been to proceed with shoreline cleanup as rapidly as possible in an environmentally acceptable manner. This involves careful evaluation of the trade-offs attendant to various cleanup techniques to ensure that minimum damage to sensitive environments results, as well as close monitoring of the environment while testing other methods, such as use of non-toxic chemical agents.

All cleanup activities involve close interfacing with numerous state and federal agencies, such as ADEC, the Alaska Department of Fish and Game, NOAA, the EPA, the Coast Guard, the U.S. Fish and Wildlife Service, and the Department of Agriculture Forest Service; native corporations; local governments; and other interested parties such as local commercial fishermen. The expertise of the environmental and other agencies, who are trustees for the public interest, has contributed to the cleanup plans that have been adopted.

NATURAL RESOURCE DAMAGE ASSESSMENT

On March 31, Exxon Shipping Company was contacted by NOAA with a request that Exxon provide \$15 million to fund activities associated with a scientific natural resources damage assessment. Exxon committed to fund the assessment on that date, and the parties prepared a formal agreement. The trustees of the affected natural resources are the Departments of Interior, Commerce (NOAA), and Agriculture, and the State of Alaska. On April 13, Exxon Shipping Company executed a Memorandum of Agreement with the trustees whereby Exxon agreed to provide \$15 million to fund activities the trustees will undertake in association with their assessment of costs for restoration, replacement, or loss of use of natural resources affected by oil released from the EXXON VALDEZ. Although there is no statutory requirement for up-front funding, this commitment is further evidence of Exxon's desire to support the study and to scientifically and objectively assess the effects of the spill. It is anticipated that it will take several years to complete the full assessment.

RESOURCES UTILIZED

Manpower and equipment buildup has been significant and rapid in support of the foregoing environmental efforts. As of May 13, 334 persons were working in support of these activities. Over 90% of these persons were on site by April 17. Attachment 2 is a graph showing personnel buildup and manpower devoted to various environmental activities. By April 4, 30 boats and 4 aircraft were involved in collection of wildlife which were brought to the Valdez bird and otter centers. This had grown to 109 boats and 14 aircraft by April 26, as operations were expanded to include Seward, Homer, and Kodiak. As activities in the Valdez area declined and the effects became less severe, the total number of boats and aircraft employed on May 16 was 102 and 6, respectively. In addition, 3-4 boats, on average, have been used to support the Exxon studies referred to above.

ATTACHMENT 1

Exxon Environmental Studies

Study 1. Water Quality Surveys of Hydrocarbon Distribution in Prince William Sound (initiated March 28, 1989)

The objective is to identify the horizontal and vertical distribution of hydrocarbons in the waters of Prince William Sound. The Alaska Department of Environmental Conservation (ADEC) approved the selected stations and assisted in sample collection for the first two cruises. In the first six weeks, samples are to be taken every two weeks from four different depths (surface, 1m, 3m, and 9m). Thereafter, monthly samples are obtained at two depths (surface and 3m). Each sample will be analyzed for volatile and semi-volatile organics, and total petroleum hydrocarbons using EPA approved methods.

Study 2. Sediment Distribution of Hydrocarbons in Prince William Sound (initiated March 30, 1989)

The objective is to identify the horizontal distribution of hydrocarbons in the sediments in Prince William Sound. Sediment samples will be collected from 19 stations in Prince William Sound representing key habitat areas both affected and unaffected by the oil spill. Several resource agencies assisted in selecting the sampling stations. Monthly samples are to be taken during the first three months followed by bimonthly sampling. Each sample will be analyzed for volatile and semi-volatile organics, and total petroleum hydrocarbons using EPA approved methods.

Study 3. Far Field Water Quality and Oil Weathering Studies (initiated April 12, 1989)

The major objectives of this study are:

- To determine the hydrocarbon concentrations of petroleum hydrocarbons and specific polycyclic aromatic hydrocarbons in the near-surface water column in association with surface oil,
- To continue to document changes in chemical characterization of sea-surface mousse, and
- To continue chemical characterization of spilled oil stranded on hard substrates (beach, nearshore sediment, and rocks).

Study 4. Shoreline Oil Weathering and Biological Recovery Study
(initiated May 8, 1989)

The objective is to monitor the chemical, physical, and biological environmental recovery of oiled shorelines in Prince William Sound. Seven locations representing varied beach and shoreline types will be sampled in splash, intertidal, subtidal, and offshore zones. Substrate, biota tissue, and water samples will be collected monthly until October and thereafter every six months. Each sample will be analyzed for petroleum hydrocarbons and polycyclic aromatic hydrocarbons.

Study 5. Marine Biological Baseline Studies in Prince William Sound (initiated March 26, 1989)

The objective of this study is to obtain pre-oiled baseline and acute information in intertidal and subtidal habitats in Prince William Sound. Surveys will examine water, sediment, and tissue hydrocarbon content, phytoplankton, zooplankton, macroalgal growth, kelp, invertebrates, and nearshore demersal fishes. Surveys began March 28 and April 24.

Study 6. Kelp and Eelgrass Growth and Productivity Studies
(initiated April 7, 1989)

The objective is to compare growth and productivity of kelp and eelgrass beds in oiled and unoiled areas of Prince William Sound. The study will be conducted at seven different locations and two different depths. Measurements include parameters important for plant growth (light, nutrients, temperature) as well as total petroleum and polyaromatic hydrocarbons in sediment, water, and plant tissue. The work will begin in spring/summer 1989.

Study 7. Intertidal Marine Biological Baseline Studies on the Kenai Peninsula and Lower Cook Inlet
(initiated April 7, 1989)

The objective is to obtain pre-oiling baseline and acute information on the intertidal habitats in the Kenai Peninsula and lower Cook Inlet. The project will survey both rocky and soft-bottom areas at five different locations. Measurements include relative cover, density, size, reproductive condition, and growth of macroalgae, epifauna, and infauna. The initial field survey began April 20 with a follow-up survey scheduled during August 1989.

Study 8. Kenai Peninsula and Lower Cook Inlet Surveys of Petroleum Hydrocarbons in Water Sediment and Mussel Tissue
(initiated April 12, 1989)

The objective is to identify the distribution of petroleum hydrocarbons and polycyclic aromatic hydrocarbons in the waters, sediment and biota in the Kenai Peninsula and lower

- Cook Inlet. This includes analyzing the chemical characteristics of sea-surface mousse and shoreline substrates. Tissues from mussels, starfish, clams and demersal fish will also be analyzed. Sampling at five stations began April 20. Follow-up sampling will occur in August 1989.

Study 9. Pacific Herring Reproduction and Disease Effects
(initiated April 10, 1989)

The objective is to examine the occurrence and extent of injury to the herring resource in Prince William Sound. Measured parameters include histopathology, hatching success of oiled and unoled laboratory reared and field collected eggs, hydrocarbon concentrations in bile and roe, and a field survey of abundance and condition of larvae, juveniles, and post spawn adults. Samples will be collected beginning April 1989.

Study 10. Pink Salmon Survival and Habitat Effect
(initiated April 14, 1989)

The objectives are as follows: 1) Assess the effects on egg-to-smolt survival; 2) Assess the effects of estuarine oil sampling on smolt-to-adult survival; 3) Evaluate the habitat quality and use of nearshore waters by juvenile salmon; 4) Evaluate the survivability and growth of juvenile pink salmon of hatchery and wild origin in oiled and unoled bays; 5) Evaluate the habitat quality and use of offshore waters by juvenile salmon; and 6) Provide quantitative estimates of adult salmon escapement to index streams under investigation for the freshwater production program. Sampling locations include spawning streams, beaches, and open water areas. Daily sampling for downstream migrants began in April 1989 combined with twice weekly sampling at the mouth of the streams. A spawner survey will be done in the fall of 1989.

Study 11. Toxicity Tests with Water Column Species: Algae, Shrimp, and Fish (initiated April 3, 1989)

The objective is to conduct toxicity tests with samples of Prince William Sound water in accordance with current American Society for Testing Materials (ASTM) and EPA approved procedures. Thirty water quality stations were established in the sound. Samples of water are taken just below the surface, and at depths of 1m, 3m, and 9m. Dates for field sampling are once every two weeks for April-May 1989, and monthly thereafter. Test species for toxicity measurements are a marine algal species, Skeletonema, Mysid shrimp, and marine fish larvae.

Study 12. Sediment Toxicity Tests with Benthic Amphipod and Oyster Larvae (initiated April 3, 1989)

The objective is to conduct toxicity tests with sediment samples from Prince William Sound in accordance with current ASTM and EPA approved procedures. Eighteen sediment quality

stations were established in the sound. The stations are in medium depth nearshore areas and were chosen to provide sediment quality information near critical fish and wildlife areas. Dates for field sampling are once every two weeks for three sampling sessions during April-May 1989, and monthly thereafter. Test species are a marine amphipod, Rhepoxnius, and an oyster, Crassostrea.

Study 13. Subsistence Use of Aquatic Resources Study
(to be initiated)

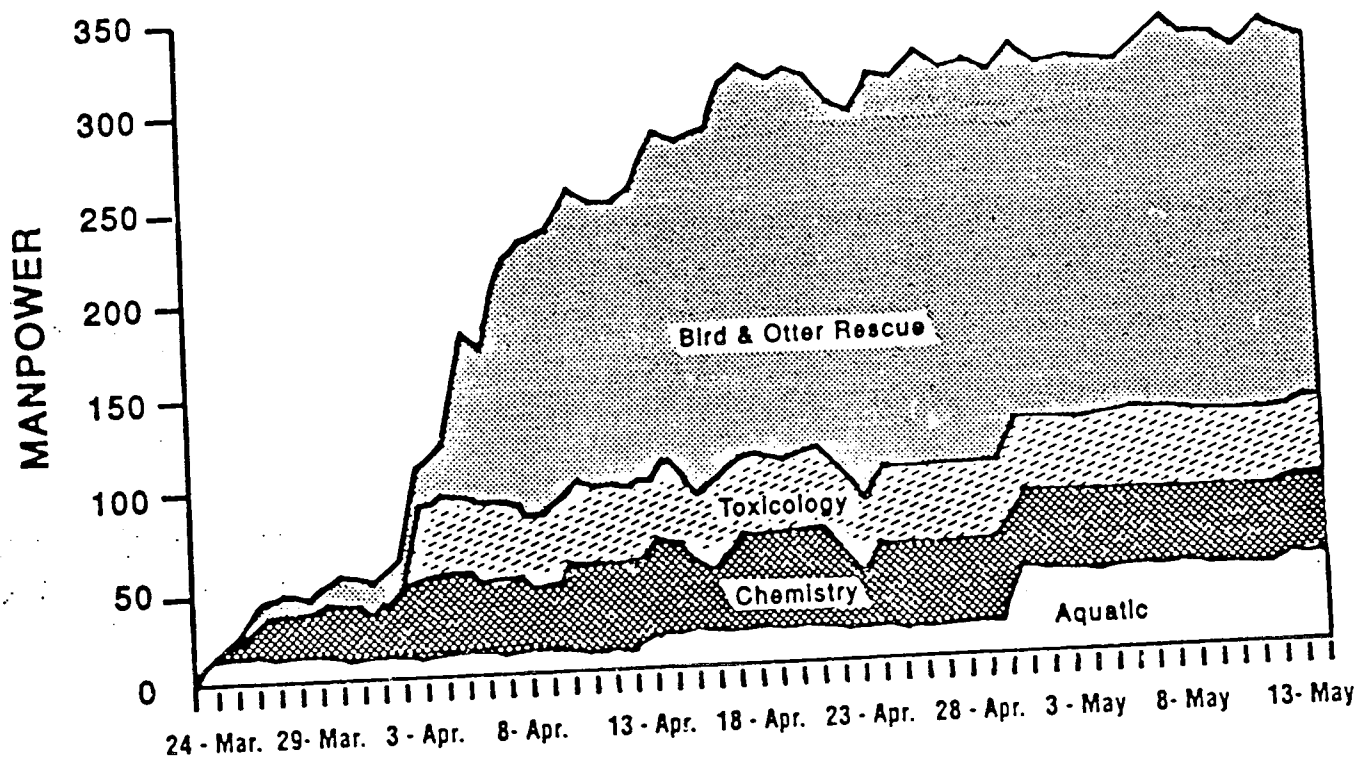
The objective is to determine health risk to subsistence hunters and gatherers whose food supply is based in oiled areas. Food use patterns, species, and locations will be determined through interviews with local inhabitants. Samples will be collected after completion of interviews.

Study 14. Crustacean Fisheries' Effects (initiated May 16, 1989)

The objective is to examine the impact on crustacean fisheries. Activities planned include: 1) plankton sampling to determine relative density and larval stage composition; 2) crab/shrimp pot sampling to determine distribution of benthic juveniles and adults; 3) trawl sampling where possible for shrimp and crab; and 4) intertidal quadrat sampling to monitor recruitment, survival, and growth of post-larval king crab in oiled and unoiled areas.

ATTACHMENT 2

Manpower Buildup on Environmental Response Activities



NAMES REFERENCED IN CHRONOLOGY

<u>NAME</u>	<u>AFFILIATION</u>
Allen, Al	Spiltec (Oil Spill Burn Consultant)
Anderson, Jim	Three Way Charter Brokers
Arts, Bob	Alaska Maritime Agencies
Baker, Bruce	Alaska Fish and Game
Borden	United States Coast Guard Pacific Area Strike Team
Borgen, Harvey J.	Exxon Shipping Company West Coast Fleet Manager
Botto, Ray J.	Exxon Shipping Company Personnel Admin.
Brown, Michelle	Alaska Assistant Attorney General
Cirigliano, Tom J.	Exxon Company, U.S.A. Public Affairs Representative
Clough, John	Exxon Shipping Company--Alaska Legal Counsel
Companion, Michael P.	Exxon Chemical Americas
Cowper, Steve	Alaska Governor
Crawford, Tom	Clean Caribbean Cooperative Manager
Deppe, William J.	Exxon Shipping Company Ship Group Coordinator
Derryberry, Donald R.	Exxon Company, U.S.A. Information and Communication Systems
Dietrick, Larry	Alaska Dept. of Environmental Conservation
Duncan, William G.	Exxon Shipping Company Senior Marine Advisor
Elde, Kare	Pilot
Emery, Bruce	Dispersant Consultant with Conair
Falkenstein, Thomas G.	United States Coast Guard
Gale, Roger A.	B. P. Americas
Gillette, Thomas W.	Exxon Shipping Company External Affairs Consultant
Glock, Charles J.	Exxon Shipping Company Senior Transportation Allocator
Gorski, Gary S.	Exxon Shipping Company Tanker Section Supervisor
Harrison, C. Melvin	Exxon Company, U.S.A. Exec. Vice President
Hazelwood, Joseph J.	Exxon Shipping Company Master
Henman, Ivan	Alyeska Pipeline Service Company Vice President
Hughes, Patrick L.	Exxon Shipping Company Staff Administrative Analyst
Hurd, Jim	Pilot
Iarossi, Frank J.	Exxon Shipping Company President
Jefferies, Jim	Biegert Aviation President
Joselyn, Anthony "Tony"	Pilot
Kelso, Dennis	Alaska Dept. of Environmental Conservation
Kennedy, David	National Oceanographic and Atmospheric Admin.
Klepper, John C.	Exxon Shipping Company Transportation Coordinator

NAMES REFERENCED IN CHRONOLOGY

<u>NAME</u>	<u>AFFILIATION</u>
Lamoreaux, Bill H.	Alaska Dept. of Environmental Conservation
LeGrange, Ulyesse J.	Exxon Company, U.S.A. Senior Vice President
Lindblom, Gordon P.	Dispersant Consultant
Lloyd, Denby	Special Assistant to Alaska Governor
Maki, Alan W.	Exxon Biomedical Sciences, Inc.
Marston, Donald R.	Exxon Risk Management Services, Inc.
McAlpine, Steven	Alaska Lieutenant Governor
McCall, Steve	United States Coast Guard
McDonald, Edward J.	Exxon Shipping Company Ship Group Coordinator
McRobbie, Stuart W.	Exxon Shipping Company Ship Group Coordinator
Miller, Thelma J.	Exxon Shipping Company Secretary
Mortenson, Jack	Clean Bay, Inc. Manager
Murphy, W. E. "Ed"	Pilot
Myers, Paul B.	Exxon Shipping Company Ship Group Coordinator
Nelson, Edward	United States Coast Guard
Nelson, George	Alyeska Pipeline Service Company President
Nicholas, Robert H.	Exxon Shipping Company Counsel
O'Brien, James L.	O'Brien Oil Pollution Service (Oil Spill Consultant)
Paul, Dan	Exxon Shipping Company Human Resources Manager
Pyburn, Brent	OSR, Ltd. Service Centre Manager
Quinn, Michael C.	Exxon Company, U.S.A. Public Affairs Western Division Manager
Rassinier, Craig M.	Exxon Shipping Company Environmental Conservation Coordinator
Rome, Dennis D.	United States Coast Guard
Shier, Larry D.	Alyeska Pipeline Service Company
Salloway, Richard F.	Exxon Shipping Company Staff Business Analyst
Smith, Richard A.	Exxon Shipping Company Staff Engineer
Sowden, Arnie J.	Exxon Company, U.S.A. Accountant
Stalzer, Michael A.	Exxon Shipping Company Master
Stephens, Art J.	Exxon Company, International Transportation
Stevens, William D.	Exxon Company, U.S.A. President
Tompkins, John A.	Exxon Shipping Company Fleet Services Manager
Walding, Connie I.	Exxon Shipping Company Financial Analysis Coordinator
Warner, Darrell G.	Exxon Pipeline Company President
Weatherford, Robert M.	Exxon Shipping Company Business Analysis Manager
Wieliczekiewicz, Edward J.	United States Coast Guard

Filmed at
University of Alaska
Arctic Environmental Information and Data Center
707 A Street
Anchorage, Alaska 99701