CHAPTER 7

FINAL WORDS: A SYNTHESIS

This final chapter synthesizes the results of the study conducted under the Department of Health — University of Hawaii contract and presented in the first six chapters of this report. The scope of work was divided into six study areas to enable the researchers to focus on a given issue area in some depth. This chapter provides a synoptic view of the significant impacts of a catastrophic oil spill on Hawaii's economy and environment.

There is no question that economics is the driving force that will continue to steer the actions of both the public sector and private sector decisionmakers in considering oil spill impacts just as it drives and steers actions related to other public policy issues. Economics is the bottomline that triggered the unwillingness of the interisland shipper, Hawaiian Tug and Barge Corp., to continue transporting residual fuel oils to the neighbor islands. Economics is at the base of the fear that if a barge had a residual fuel oil cargo spill, it could severely damage coastal sites and resources, and the cost of the cleanup of such an accident could economically devastate not only the subsidiary, Hawaiian Tug and Barge Corp., but would reach into the multi-billion dollar assets of its parent company, Hawaiian Electric Industries, Inc.

It was also the bottomline that prompted the 1992 State Legislature to enact Act 130 to provide a temporary ceiling of $700 million for oil spill liability to enable the neighbor island counties to continue to have affordable power. However, if a major oil spill were to occur, it is doubtful that the cleanup of such a spill could be done without federal involvement. Once an oil spill is federalized, federal rules under the Oil Pollution Act (OPA) of 1990 will be imposed on the cleanup procedures. This includes the charge back of all costs incurred by the federal government or any state or local agency involvement in wildlife mitigation, etc. to the barge owner(s).

The legislative intent contained in Conference Committee Report No. 135 of the 1992 session of the State Legislature specifically limits the application of Act 130's ceiling only to shipments of fuel oil by interisland tanker barges that have a capacity of not more than 60,000 barrels. The shipments must also be subject to OPA regulations because the state would be able to obtain funding for cleanup from the $1 billion oil spill liability trust fund under the National Contingency Plan (Section 4201(b)(H)). In the event of gross negligence or violation of applicable federal safety, construction, or operating regulation (Section 1004(c)(1)(A,B)), all limits on liability will no longer apply. Moreover, since OPA is predicated on the "polluter pays" principle, regardless of the state's $700 million cap on liability, any funding obtained from the Oil Spill Liability Trust Fund by the state for expenses incurred would be charged back to the barge owners. There is explicit language under Section 1004(c)(3) which pertains to Outer Continental Shelf facilities or vessels carrying oil as cargo from such facilities that states:

> Notwithstanding the limitations established under subsection (a) [which outlines a schedule of liability limits] and the defenses of section 1003, all removal costs incurred by the United States Government or any State or local official or agency in connection with a discharge or substantial threat of a discharge of oil from any Outer Continental Shelf facility or a vessel carrying oil as cargo from such a facility *shall be borne by the owner or operator of such facility or vessel.* (Emphasis added.)

The application of Section 1004(c)(3) to vessel discharges is appropriate because, under OPA, a mobile offshore drilling unit which is used as an offshore facility is **"deemed to be a tank vessel** with respect to the discharge, or substantial threat of discharge, of oil on or above the surface of the water" (Section 1004(b)(1)). (Emphasis added.)

However, the $700 million liability coverage available through the P & I Clubs should be sufficient to cover even the total discharge of an interisland tanker barge of 2.52 million gallons. Our study determined that the cost of cleanup for the U.S. Coast Guard's worst case scenario of a 9.8 million gallon spill would be $305 million at the high end and the cleanup costs for a 1.26 million gallon discharge (one-half of the cargo of a 60,000 barrel capacity barge) is $30 million. There may be substantial additional costs in the damages to

natural resources and private property. In addition, if the oil spill occurred in the much used Kaiwi Channel and coated the southern coastline of Oahu, there would be substantial impact on the state's tourism revenues.

This study contributed to the U.S. Coast Guard's proposed establishment of a tanker-free zone in the Kaiwi Channel by routing all tanker traffic through the Kauai Channel. The advisory is now before the International Maritime Organization for adoption. This action could reduce the potential risk of tanker accidents which could oil much of Oahu's southern coastline and spread to the east and west shorelines as well.

Based on reported spills, the statistical probability of a small spill (<20,000 gallons) is once in 2.25 years; mid-range spill (40–50,000 gallons) is once in 4.5 years; and a catastrophic spill of 10–11,000,000 gallons is once in 135 years. Between 1984 and 1991, the largest single oil spill in Hawaii that released 120,000 gallons into the ocean was caused by a ruptured pipeline at Pearl Harbor. The largest grounding accident that dumped 48,000 gallons into the ocean also occurred at Pearl Harbor. The most likely accident in Hawaii will be structural failure, which accounted for nearly 40 percent of all oil spills. Pearl Harbor appears to be the most likely site (53 percent of the oil spills >5,000 gallons occurred there). Honolulu Harbor has been the site of 23 percent of oil spills >5,000 gallons caused by non-vessel accidents. Barbers Point was the site of only one large oil spill (33,800 gallons) caused by grounding. Nearly 60 percent of all reported oil spills occurred off the southern coast of Oahu, between Honolulu Harbor and Barbers Point.

While the historic data identifies Pearl Harbor as the likely site of oil spills (one in two oil spills occurred there), the good news is that with advanced preparation, spills can be contained within the lochs because of the narrow entrance. Oil spills in Honolulu Harbor can also be contained, but the danger might be the toxicity and/or volatility of the refined oil products. About 17 percent of the 81 oil spills off Oahu during 1983–91 occurred at Barbers Point. In absolute numbers, there was an average of about four spills (<1,000 gallons) per month over the nine years. Because of the nature of the off-loading system of crude oil at the two offshore moorings 2 and 2.5 miles from shore, oil spills at Barbers Point will always be "at-sea." Even with the designation of the Kaiwi Channel as a tanker-free zone, Barbers Point could be the site of an oil spill as catastrophic as any in the Kaiwi Channel. Easterly currents, enhanced by Kona weather conditions, could carry the crude oil from the offshore mooring site to Waikiki and the Waianae coast and through the Kaiwi Channel to the windward coast of Oahu.

Overall, there are compelling reasons for preventing oil spills. However, if one were to occur, extraordinary methods need to be taken to keep the oil from reaching the site of the state's prime source of revenue — Oahu's southeastern coastline from Diamond Head to Honolulu Harbor. One of these technologies is the controversial in situ burning. Before this technology is adopted or rejected, a thorough study should be done to evaluate its usefulness to Hawaii. Existing studies are inappropriate because decisionmakers must consider the technology within a unique set of circumstances, including Hawaii's mid-Pacific location, proximity of deep water to the shoreline, significance of a pristine coastal environment to the state's $10 billion tourism industry, and prevailing oceanic and meteorological conditions. Because of the very limited optimal response time, if in situ burning is to be considered as an oil spill response option, formal pre-agreements, such as a memoranda of understanding between the state and federal governments, need to be in place. Without such action, the oil industry will not invest in the equipment and supplies necessary to optimize response. As extreme as in situ burning may seem, when the trade off is a $3 billion loss in state revenues and over $1 billion in household income, a pragmatic consideration needs to be given to this technology. There is no question that if it were possible to tow the Exxon Valdez to the open ocean and to set it afire before the oil reached the coastline along Prince William Sound, even if the tanker and its entire cargo were destroyed, the cost would have been a fraction of the more than $2 billion Exxon paid in cleanup costs.

A second technology that appears to have potential for keeping oil from reaching the coastal areas is dispersants. While there is a memorandum of understanding on the use of dispersant in waters more than 60 feet deep, there needs to be a shorter connect time between the decision to use and the actual application of

the dispersants by aircraft. Although application by ship is possible, it is far less efficient than overflight application. As with nearly all oil spill response technology, the window of opportunity is narrow. The effectiveness of this and other response technologies rapidly diminishes with the passage of time. If this technology is to be effectively used in Hawaii, there must be a drastic reduction in the lag between the decision to use and actual overflight application at sea.

In addition, there are other preventive measures that can be implemented by vessel and facility owners under the OPA-mandated requirements to reduce oil spill accidents. These range from retrofitting mechanical or structural changes to the tightening of licensing requirements for ships' crew and vessel manning provisions. This study examined the state's statutes and administrative rules that pertain to oil spills and found that there were substantial gaps. In the area of state response to an oil spill (or discharge of other hazardous materials), the state contingency plan lacks provisions for promoting prevention. This report identified administrative rules and statutes that could serve as the starting point for adding prevention to the contingency plan. These include:

1. Developing an oil spill database that can be used to establish a MIS for the prevention of oil spills; this effort should include clear definition of terms used to record causes, etc. of oil spills and should be jointly developed with the U.S. Coast Guard.
2. Mapping and sealing of all unused pipelines buried in state, county, and federal lands and in water, including those on military installations.
3. Expanding use of Hawaii's superfund to include monitoring, research, and public education or exploring the option of creating a special oil spill fund by assessing a $.05/barrel fee on all imports of oil and oil products.
4. Incorporating the results requested in Resolution 137 to the study on the conflict between tug vessels and recreational boaters in Maui County's channel waters into Hawaii Revised Statutes (HRS) or administrative rules for promoting recreational boater safety.
5. Designating vessel transit lanes in the Auau, Kalohi, and Pailolo channels of the county of Maui.
6. Studying and revising the physical and mental disability provisions for pilots under HRS, Chapter 462A and Administrative Rules 16, Chapter 96; tightening the relicensing procedures for pilots and ships' crew; establishing a credential evaluation panel.
7. Requiring the inclusion of risk management and loss control procedures and inclusion of facility and equipment maintenance and replacement schedules in facility contingency plans.

While this study did not examine damage assessment, this issue will be the subject of debate until precedence is established through the courts. It is in this issue area that local values can have great significance. The designation of local and state governments as trustees of their natural resources and the non-preemption provisions in OPA allow for local input. However, establishing monetary values for non-market goods is a difficult exercise. To compound the difficulty associated with valuation of the environment, for Hawaii and other tourist destinations, there are non-use or existence values of the marine environment and its resources that are a significant component in the attractiveness of a tourism destination that could have a far greater monetary value than the actual consumptive use value of the natural resources. The long-lived imagery of a devastated environment would probably preclude Hawaii from fully regaining its mystique as a pristine paradise on earth. The success or failure of the Italian government in pressing its case for damages associated with loss of non-use values currently being considered by an international tribunal for payment from an international oil spill fund will add to the support or denial of the legitimacy of claims for recovery based on non-use values.

Finally, there is the issue of response prioritization. A panel of biologists indicated that there were no critical habitats as such because of the wide distribution of wildlife and fisheries throughout the archipelago.

However, they placed sites frequented by endangered species and embayments as high priority areas from the standpoint of wildlife and natural resources. The tourism panel fully recognized the importance of a pristine environment to tourism, but they indicated that Waikiki was the single most important site if tourism revenues were to be protected. Figure 1.1 in Chapter 1 identifies in gross detail the important ecological and economic sites. These sites are being plotted on more detailed maps and will be prioritized for response in the event of an oil spill by the Area Committee, in compliance with OPA. (The local Area Committee was created under OPA to develop a Contingency plan for Hawaii.) However, it is important that the priority ranking is validated by the public.

Recommendations

While recommendations addressing the salient problems raised and discussed are included in each chapter, they do not provide an overview and synthesis of the fit of Hawaii's extant oil spill response plan with the Oil Pollution Act of 1990. It is clear that oil spills are not as yet a significant public policy issue even though a major oil spill off Hawaii's southern coast could trigger a significant downward economic spiral that would cut deeply into the state's economy. Given the fickleness of consumer choice, the mystique of a pristine environment which lures visitors to pay higher transportation costs to stay in upscale beachfront resort hotels could be shattered, if the news media were to transmit worldwide pictures of Hawaii's coastal vistas coated with black oil.

Given these serious consequences of a major oil spill, we concluded that as the trustee of its natural resources, the state needs to give prevention of oil spills its highest priority. Our analysis identified two critical recommendations that would enable the state to address oil spill prevention effectively:

1. *A comprehensive oil spill prevention plan to augment the plans currently being developed under the auspices of the U.S. Coast Guard, as mandated by OPA, and the "Hawaii Energy Strategy Plan," being developed by the state Energy Office.* The state's extant "oil spill contingency plan" identifies state agencies that will play a role in responding to a major at-sea oil spill, but it stops short of precisely defining and operationalizing its OPA-mandated trusteeship functions.

2. *A small staff in the Hazards Evaluation and Emergency Response (HEER) office responsible for responding solely to oil spills.* Unless HEER is provided additional staff positions with specific responsibility for oil spill monitoring and prevention, it is unlikely that adequate attention can be given to developing a plan for the prevention of oil spills or to address fully the complex institutional issues surrounding the implementation of OPA.

A Comprehensive Plan

We recommend the development of a comprehensive strategic plan for the prevention of oil spills to be developed in tandem with efforts currently underway by the state's Energy Division and the U.S. Coast Guard's Area Committee.

The cost of prevention will never exceed the cost of response and damage of an oil spill to public and private properties. The most critical issues that need to be addressed in the comprehensive oil spill prevention plan are:

1. *Articulation and definition of the roles of county and state governments vis-a-vis each other and with the federal government formalized in memoranda of agreement.* Because OPA precludes the federal government from preempting state's rights, to avoid inaction, there needs to be formal pre-agreements on where and how each jurisdiction's responsibilities interface with those of the other two. When oil is sweeping shoreward there is little time to debate these issues.

2. *Pre-agreed uniform statewide standards for establishing acceptable levels of "clean," based on wide input from the public and special interest groups.* This is, perhaps, one of the most complex issues that needs to be addressed. A long lead time will be required to reach consensus among governments, the public, and special interest groups on acceptable levels of "clean." Should the standards be subjective or objectively established? The nature of subjective decisionmaking raises still other basic issue of values. Whose values should prevail? Should the standards be based on esthetics or ecology? Or can standards be based on some objectively derived threshold levels of key compounds in the sand/sediment or on dosage tolerance?

3. *Institutional infrastructure to operationalize pre-agreements on appropriate response technologies and to designate and manage holding/disposal sites.* Response efforts and technology are costly and their effectiveness for recovering oil at sea is time dependent. As such, mobilization procedures, inter-jurisdictional memoranda of understanding for establishing conditions for use of response technologies of choice, and disposal/holding sites need to be pre-determined.

4. *Identification and mapping of all significant institutional and non-governmental linkages and the inter-related reciprocal and triggering impacts of the linkages that affect the import and distribution of oil.* Because the Hawaii Energy Strategy Program, projected for completion in 1994, will not adequately map the energy policy field or examine the full impacts of OPA on oil and oil product production and consumption, the oil spill prevention plan must consider ways to reduce demand through public education on energy conservation. In addition, the plan should include a realistic assessment of the state's options for alternative energy and a critical evaluation of the state's energy policy in relation to OPA. Without a comprehensive analysis of OPA within the context of the state's energy policy, tinkering with one area could generate unexpected negative consequences in another. For example, the curtailment of interisland shipments of "cheap" No. 6 fuel oil was an unexpected consequence of OPA's oil spill liability provisions and the state's unlimited liability statutes on hazardous materials pollution.

5. *Regulations and administrative rulemaking for fulfilling the state's role as trustee under OPA.* An inventory of the state's coastal resources is needed to serve as the baseline for damage assessment. A pre-approved methodology for determining non-market value for coastal sites and wildlife will materially reduce damage assessment costs resulting from litigation. Regulations and procedures for evaluation the adequacy of safeguards in the loss prevention and risk management procedures in the tanker and facility contingency plans mandated by OPA also need to establish apriori.

Oil Spill Evaluation and Monitoring Staff for Hazard Evaluation and Emergency Response Office

We recommend a uniformly applied fee/barrel on oil and oil products to provide HEER with the required staff dedicated to dealing with oil-related problems.

Such a fee internalizes the cost of prevention; response costs are already a part of the price paid by consumers for fuel and energy. The oil industry indicated support for the imposition of a fee (with fund cap) provided that the fee is used for oil-related purposes only.

Hawaii has escaped the ravages of a major oil spill largely because of low historic demand for oil and oil products during the pre-statehood years. However, the scenario has changed dramatically in the past three decades. The burgeoning state economy and population, following statehood in 1959, sharply increased the demand for energy and the risk of at-sea oil spills because of increased tanker and other ship traffic. The oil industry responded by increasing their capacity to supply the nearly three billion gallons of oil and oil products now required to meet the state's transportation, commercial/industrial, and residential fuel and energy

demand. Unlike the ready market response, the state's monitoring and oversight infrastructure and administrative rulemaking have not kept pace with the growth in the demand and risks associated with imported oil, undoubtedly because no catastrophic oil spills have occurred to make them an urgent public policy issue.

This study clearly showed the vulnerability of the state to a major oil spill because of its reliance on maritime shipping and its lack of viable alternative energy sources. In addition, there is a high statistical probability of a large oil spill caused by human error and outdated or malfunctioning equipment or facilities. Although the state must be prepared to function as the trustee of its natural resources when OPA kicks into gear in 1993, *it is currently not fully prepared to assume this responsibility.*

The HEER office lacks staff to monitor and evaluate current procedures used by private and public sectors to maintain coastal facilities and pipelines and to provide the aggressive leadership needed to develop and implement a plan for the prevention and mitigation of oil spills. Staff is also needed to ensure the smooth integration of state plans and policies with the federally mandated OPA.

A small staff will enable the state to carry out its responsibilities as trustee of its natural resources and to develop a comprehensive strategic plan for oil spill prevention. The staff can also conduct much needed public education programs, maintain an oil spill database, oversee the testing of new response technologies in Hawaiian waters, and coordinate field and table-top oil spill response drills.

The impact of OPA will be far-reaching. It has already had an impact on Hawaii's interisland shipping of fuel oil. The final outcome of fuel for the neighbor island counties' power generation is far from settled. But whatever policy is instituted, there will be an increase in the price of electricity in all the neighbor island counties as the cost of retrofitting the power plants to utilize diesel or other cleaner fuel oil is internalized, especially where the power plants are currently not equipped to burn the lighter oils. Even if the decision is to continue use of No. 6 fuel oil, the increased cost of insurance coverage incurred by the shipper would be passed on to the power consumer, or if insurance is unavailable to completely cover total costs and the state assumes the excess, the cost will be distributed to all Hawaii taxpayers. In addition, there will be added cost to the consumers as oil carriers and producers incur higher costs to comply with other safety requirements under OPA because not to do so will mean that the shippers and producers will incur unlimited liability and stiff fines. As the required changes in operational procedures, vessel structure, and management are made by the oil industry, there will also be an escalation in the price of all oil products including gasoline.

In the final analysis, the added costs reflect the cost of internalizing the protection of the environment and wildlife. Prior to the development of the supertankers to keep pace with demand for oil and oil products, oil spills and operational discharges were relatively small and localized because tankers were small. With the grounding of *Torrey Canyon* in 1967, world attention was focused on catastrophic oil spills and their potential as a source of widespread environmental pollution. OPA is Congress' recognition of the need to minimize accidental oil spills by instituting more stringent prevention measures and to punish polluters. Since accidents by their nature are random occurrences, there is no way to exempt any shipper or facility owner. Therefore, while OPA is essentially predicated on the "polluter pays" principle, the bottom line is, it is not the oil company but the consumer who pays.

APPENDICES

Appendix A: Comparison of OPA and State Statutes

Entities Subject to Provision

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Vessels or other artificial contrivance used as a means of transportation. Owner and/or operator of vessels or facilities. Facilities - any building or structure.	Owner or operator of a tank vessel carrying oil as fuel or cargo. Any motor vehicle, rolling stock or pipeline used for product-handling, storing, etc. Applies to vessels and facilities operating within Louisiana's jurisdiction. Terminal facilities including pipelines, pumping equipment and storage areas, etc.	Owners and operators at terminal facilities, vessels operating in state waters carrying more than 10,000 gallons of fuel or cargo, bulk product facilities and cargo owners to the extent damages not covered by vessel insurer.	Applies to all vessels operating within U.S. jurisdiction which are capable of carrying oil in bulk, including barges but excepting vessels owned or operated by a government entity (including foreign). Includes all on-shore and offshore facilities, including pipelines, trucks, and rail cars, used for the transportation, storage, or processing of oil.	Additionally includes public tank vessels and all passenger and cargo vessels greater than 300 Gross Tons. Limited to vessels operating within Washington jurisdiction. Includes only those facilities which could discharge oil into navigable waters and which transfer oil to or from tank vessels in quantities greater than 3000 gallons. Trucks, rail cars, gasoline stations, marinas, etc. are also excluded.

Coordination of State and Federal Responsibilities

State contingency plan shall complement the National Contingency Plan (NCP). Several sections cite particular federal laws as basis for definitions and description.	Act requires the Louisiana statute be consistent with federal OPA.	There are no specific references to coordination with federal processes. However, it recognizes particular action required by OPA such as vessel and facility prevention plans, etc.	Specifically maintains state prerogatives for: setting financial liability limits, enforcing federal financial responsibility requirements, imposing taxation to create funds for mitigating damages, setting standards for removal of oil, etc. Directs the inclusion of state representatives in planning activities. Directs NCP to provide for state response activities and reimbursement. However, president is required to direct spill response when a discharge (or potential discharge) poses a substantial threat to public health or welfare, including that of natural resources. State response activities directed to be in accordance with the NCP, but does not pre-empt state action.	Stated purpose of Act is to complement OPA. Act contains many instances of directives that consistency with federal regulations be maintained "to the greatest extent practicable", to include federal agency representatives on committees implementing state response procedures, to coordinate with federal activities, to accept documentation prepared in response to federal requirements when they are responsive to state requirements, etc.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Prevention Plans				
Not a feature of HRS 128D.	All vessels and facilities are required to have prevention plans. Facilities cannot operate without a discharge prevention and response certificate which requires a prevention and response plan and the facility can provide for the cleanup of unauthorized oil discharges. Statewide oil spill prevention and contingency plan.	Requires vessel with storage capacities of more than 10,000 gallons must have spill prevent-and-control contingency plans. Plans that are in compliance with federal plans will meet state requirement. Each vessel must have an individual to serve as a spill officer who will train crew and ensure that vessel has up-to-date plan and equipment.	Regulations to be promulgated for: use of autopilot, requirements for tug escorts (including in Puget Sound and Rosario Straits), vessel structures, radio communications. Studies to be performed on subjects, including: enhancement of vessel traffic control, use of simulator training, crew size, safety of navigation under various conditions, inspection programs, etc. Double hulls required. Crew duty hours limited.	Prevention Plans required for vessels and facilities, demonstrating the incorporation of the best available technology for prevention. Training is required or indicated, including: for pilots (simulator training and progressive responsibility), key employees in facilities, employees engaged in bunkering and lightering, alcohol and drug awareness, small spill prevention for the public. Regional Marine Safety Committees (4) to be established to create safety plan for their areas of operation. Marine Oversight Board to independently study and make recommendations on safety issues. State to create tanker vessel inspection program to supplement U.S. Coast Guard, if deemed necessary. Reporting system to record accidents and serious incidents to be established. Data base of casualty history for cargo and passenger vessels to be created to identify high-risk vessels. Emergency response system to be established in the Strait of Juan de Fuca. Economic incentives to be studied to reward the implementation of specific safety features on vessels.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Government Contingency Plans				
Hawaii Oil and Hazardous Substances Emergency Response Plan (Draft 5 Oct. 1989). State handles land-based emergency. Coast Guard handles oil spill. State supports federal agencies. Plan is established for both oil spill and chemical releases.	State oil spill contingency plan for response and cleanup for unauthorized spill will be promulgated by the oil spill coordinator. Dept. of Environmental Quality (DEQ), Dept. of Natural Resources, Dept. of Public Safety in cooperation with the oil spill coordinator recommend provision of the plan. Plan formulation includes consultation with local government.	Florida Coastal Pollutant Spill Contingency Plan — being developed by the Department of Natural Resources.	**National Contingency Plan:** modification to address "worst case discharges" and "substantial threats of discharge", use of spill-mitigating procedures having least effect on the environment and coordination of federal spill-response entities. **Area Contingency Plan:** to be prepared by Area Committees to address worst case spill, or substantial threat thereof, from vessel or facility, and considering: environmentally sensitive areas; responsibilities of all potential participating entities(including state agencies); decisions on use of dispersants; description of integration with other plans; and availability of response personnel, equipment, and supplies.	**State Master Oil and Hazardous Substance Spill Prevention and Contingency Plan** for vessels and facilities modified to address "worst case spill" (essentially the same definition as federal), to include consultation with U.S. Coast Guard, EPA, British Columbia, and Oregon, to consider prevention responsibilities, and to establish an Incident Command System (re: Federal mode of operation.) DOE authorized to make rules defining circumstances in which dispersants, coagulants, and bioreme- diation may be used.
Vessel and Facility Contingency				
None specifically required by state law or regulation. State contingency plans covering both marine and shoreside spills of any hazardous waste including oil covered in state plan.	Vessel and facility contingency plans required. Terminal facilities must have discharge and response plans in order to obtain a discharge and prevention certificate. Vessel must have a contingency plan on board and personnel and equipment to implement the plan. Vessel must submit to the oil spill coordinator with a copy of the contingency plan required by OPA 1990 Sect. 4202(a)(5). Vessel may be required to show the coordinator that they have a vessel discharge prevention and response plan in order to gain entry into Louisiana's ports.	Ship Specific Spill Prevention and Control Contingency Plan: plans required for all ships carrying over 10,000 gallons or more of pollutants as fuel or cargo. Content requirements outlined in the guideline for the plans. Contents spelled out in Regulation 16N-16.035. Terminal Facility Spill Prevention Plan: by 1992 all facilities over 10,000 gallons must have a specific plan for reqporting discharges, means and equipment for cleanup. Plans must be in compliance with federal requirements for the worst case oil spill. Contents spelled out in Regulation 16N-16.033. Facilities under 10,000 gallons have similar requirements.	Tanker and facility response plans required to show capability for response to worst case spill, describe personnel assignments and training, equipment availability and readiness testing, and demonstrate consistency with National and Area Plans.	Vessel and facility contingency plans required to contain: measures for reducing probability of spill; description of method of response to worst case spill; consideration of environmental sensitivity; personnel, equipment, and material availability; personnel qualifications and training; use of dispersants; and integration with other plans.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Response Planning Organization				
No new response organizations are created by state law. Under SARA Hawaii established the Hawaii State Emergency Response Commission (HSERC). HSERC in turn appointed local emergency planning committees (LEPC).	Oil Spill Coordinator position created within the Office of Governor to coordinate planning for oil spill prevention and response. Interagency council including four members chosen outside of government and department heads of various agencies to assist in planning and coordination.	Pollutant Spill Technical Advisory Council: advise the Dept. of Natural Resources and Dept. of Environmental Regulation on matters relating to pollution control response. DNR will chair the council. Group meets at least quarterly and includes representatives from shipping, bunkering, terminal facilities, port pilots, environment, wildlife recovery, spillage control cooperative and others.	Area Committee, directed by Federal Area On-Scene Coordinator, created, consisting of representatives of state, local and federal agencies appointed by the president. Prepares Area Contingency Plan and ensures preplanning of joint federal, state and local response efforts. National Response Unit created to maintain comprehensive list of available equipment and personnel, provide technical assistance, coordinate public and private resources, and administer U.S. Coast Guard Strike Teams.	DOE directed to create an Advisory Committee representing diverse interests, including U.S. Coast Guard and the EPA, State agencies, local governments, etc. to assist in preparing the Statewide Contingency Plan. Washington State Maritime Commission exists for purpose of providing response capability for vessels not otherwise having access to such resources, and may submit Contingency Plans on behalf of subscribing vessels. Regional Marine Safety Committees are created to evaluate methods for improving the safety of marine operations and navigation, and to submit plans for implementation.
Liability				
Applications: Applies to owners and operators of a facility or vessel. **Purpose:** Liability is for costs of removal and for damages. **Limits:** Liability is unlimited. **Defense:** Act of riot, sabotage or war, natural disasters etc. **"Good Samaritan":** Same exemptions as in federal legislation for person rendering care, assistance or advice consistent with federal or state on-scene coordinator.	**Application:** Applies to owners and operators of vessels and facilities. **Purpose:** Liability is for costs of removal and for damages. **Limits:** Same as federal limits. **Defense:** Act of God or terrorism, violence of nature, act of government, negligence or willful misconduct of a third party. **"Good Samaritan":** Same exemption for person rendering care, assistance or advice consistent with NCP, federal or state on-scene coordinator. Responsible party responsible for the exempted liability.	**Application:** Applies to owners and operators of vessels and facilities and owners of product to the extent that the owner or operator cannot pay. **Purpose:** Cleanup costs and damages to natural resources. **Limits:** $50 million for vessels or $625 per gross ton of vessel, whichever is less for cleanup. $14 million for terminal facilities. Vessel or facility's operator or owner has unlimited liability for damages. Liability for cleanup and abatement unlimited in case of negligence. **Defense:** Act of war or God; negligence by government or act of a third party.	**Application:** Applies to owners and operators of vessels and facilities. **Purpose:** Liability for costs of removal and damages to property, subsistence use, revenues, earning capacity, public services, and natural resources. **Limits:** Tank Vessels: The greater of $1,200 per gross ton or $2 million for vessels up to 3,000 gross tons or $10 million for vessels over 3,000 gross tons. **Other Vessels:** The greater of $600 per gross ton or $500,000. **Offshore Facilities:** $75 million for damages plus unlimited liability for cleanup costs. **On-shore Facilities:** $350 million.	**Application:** Applies to owners and operators of facilities and covered vessels, and to owner of oil. **Purpose:** Liability is for costs of removal and for damages. **Limits:** Liability is unlimited in all cases. **Defenses:** Spills due solely to Act of God, sabotage or war; or negligence by federal or state governments. **"Good Samaritan":** Same exemption, for persons "rendering care, assistance or advice consistent with NCP, federal or state On-Scene Coordinators. Responsible Party responsible for the exempted liabilities.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
		"Good Samaritan": Are exempt for liability when rendering assistance as long as no willful or negligent damage.	Liability is unlimited in cases of gross negligence, willful misconduct, violation of federal standards, or failure to report, cooperate, or comply. President authorized to lower liability limits for on-shore facilities to as low as $8 million, based on a required study. Liability limits also to be modified every three years to account for inflation. **Defenses:** Act of God or war, or to third party; but defenses not available in cases of failure to comply. **"Good Samaritan":** Persons acting consistent with National Contingency Plan, or under direction of federal On-Scene Coordinator, are not liable, except for gross negligence, willful misconduct, personal injury, or wrongful death. All liability accrues to Responsible party.	
Financial Responsibility				
None required specifically by state law.	Owners or operators of tank vessel with capacity for 10,000 gallons of oil or fuel or cargo must furnish and maintain evidence that it can cover the limits set by OPA '90. After an oil discharge a vessel must remain in the jurisdiction of the state until the vessel owner or operators show proof of financial responsibility.	All owners and operators of vessels transporting pollutant must have insurance equal to or greater than their liability. Document proof must be kept on board.	Adequate to cover maximum liability. Owner of multiple vessel or facilities need only have coverage adequate for the single vessel or facility having maximum liability.	Tank vessels, $500 Million; other regulated vessels, the greater of $600 per gross ton or $500,000. On-shore and Offshore Facilities amount to be determined by DOE, based on hazard of spill, potential damages, and availability of insurance. Financial responsibility requirements may be reduced for tank vessels meeting safety standards established by the Office of Marine Safety.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Funding				
Fund Type: Environmental response revolving fund is created to recover cost of cleanup and used in remedial action. No funds from the revolving fund may be used for administration of statute and regulation. **Revenue:** State treasury and fines and penalties collected. **Amount:** None specified (no lower or upper limit for fund.)	**Fund Type:** Oil Spill Contingency Fund, created to cover the cost of cleanup from gas and damages to natural resources. Fund to be used for administrative cost of the office of the coordinator not to exceed $250,000. Funds can be used for grant for research not to exceed $750,000 in any one year. **Revenue:** Oil Spill Contingency Fee imposed on person owning crude oil in the vessel. Fee set at $.02/barrel until the fund reaches $15 million. If the fund falls below $8 million, fee is re-imposed. In the case of large discharges the fee can be doubled to $.04/barrel until the fund reaches $15 million. **Amount:** Fee shall not exceed $30 million.	**Fund Type:** Coastal protection trust fund. Created to pay for all costs and expenses of the cleanup. restoration and rehabilitation of waterfowl, wildlife, and other natural resources damaged including cost of assessing damage. Person claiming to have suffered damage as a result of discharge within 180 days may be reimbursed. **Revenue:** Revenue from two cents per barrel tax on oil and oil products off-loaded or produced in the state. Monies received from responsible party is split between fund and general fund to pay any cost taken from those sources. **Amount:** Account maintained at $50 million. When the fund has $50 million, tax is not collected. If fund drops below $50 million, tax to resume.	**Fund Type:** Oil Spill Liability Trust Fund (OSLTF) created to cover expenses of removal costs (consistent with NCP) and natural resource damage assessments. State immediate draw for removal of up to $250 thousand, uncompensated damage claims, studies mandated by OPA, research and development, costs of National Response Unit and System, and general administrative costs. **Revenue:** Revenues from $.05/barrel tax on oil produced domestically or imported and penalties collected under oil pollution legislation. **Amount:** Fund has $1 billion capacity.	**Fund Type:** Oil Spill Administration Account: created to cover costs of administering programs of DOE and OMS and response to "routine" spills. Oil Spill Response Account created: to cover costs of spill responses when likely to exceed $50 thousand, including natural resource damage assessments. **Coastal Protection Fund:** (existing) to be used for restoration of natural resources, research into long-term effects of pollution. **Revenue:** Revenues from $.05/barrel tax on oil off-loaded from a vessel in state, and not exported from state, include $.03/barrel for administration of oil spill legislation and $.02/barrel for response costs. All response costs reimbursed by responsible parties are deposited in the response account, which is meant to provide quick access to funds if federal funds (from the OSLTF) are not available. **Amount:** Response account maintained between $15 million and $25 million, administration account maintained adequate to cover appropriation, and Coastal Protection has no criterion for limitation.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Natural Resources Damages				
Reimbursement by responsible party to be pursued via authorized legal action. Natural resource trustee (under NCP, OPA) shall act on behalf of the state to determine natural resource damages.	State trustee agencies for resources damaged conduct direct assessment. Reimbursement by responsible party to be pursued through legal action initiated by oil spill coordinator.	Dept. of Natural Resources (DNR) responsible for assessing damages and recovering cost of damages. Costs recovered go into state trust fund. DNR in consultation with Dept. of Environmental Regulation and the Game and Freshwater Fish Commission establish — by rule — compensation schedules for restoration value of injured and destroyed natural resources and to coastal water, estuaries, tidal flats, etc., and for non-restorable natural resources. DNR may use trust fund to help determine amount of damages.	Assessment of damages performed by federal, state, tribal, and foreign Trustees. Schedule of compensation to be developed by NOAA. $50 million available from Trust Fund for assessment. Maximum of $500 million per incident available from Fund for restoration, etc. Federal Officials with authority to obligate fund to be designated by regulation.	Preassessment Screening Committee decides method of assessment: Compensation Table or Direct Assessment of Damages. State trustee agencies for resources damaged conduct direct assessments. Compensation Table based on relative hazard to environment of discharges and sensitivity of areas affected to be developed with assistance of Scientific Advisory Board, and involved state agencies. Coastal Protection Fund available for disbursement by Steering Committee. Reimbursement by responsible party to be pursued via authorized legal action.
On-Board Response				
No special provisions under state law.	Evidence of equipment availability and trained personnel for all vessels must be available prior to entry to port.	Containment and recovery equipment must be available during unloading operations. Ships must be boomed. Each ship must have a person in charge of spill control available at unloading.	Within two years of enactment, tank vessels operating in the navigable waters of the U.S. must carry appropriate removal equipment incorporating best economically feasible technology.	Containment and recovery equipment must be available during refueling or lightering operations and participating personnel must be trained in their use.
Drug and Alcohol Abuse				
No special provisions under state law.	No specific requirements.	None outlined in law.	Applicants for Mariner's licenses must release data from National Drivers' Register. Licenses may be revoked or denied for conviction for serious driving violations, or for operating a ship while intoxicated. Applicants and holders of licenses must submit to testing.	Prevention Plans require description of Alcohol and Drug Awareness programs. Operation of a vessel under the influence of drugs or alcohol is a Class C felony. Criterion for "under the influence of alcohol" set at 0.06 per cent blood alcohol.

HAWAII	LOUISIANA	FLORIDA	OPA 90	WASHINGTON
Enforcement — Penalties				
Civil penalty of not more than $10,000/day for knowingly releasing a hazardous substance - Class C felony. Punitive damage of up to three times the cost to the fund if liable party refuses to cooperate with director's orders. $50,000/day fine for not complying with the statute.	Similar to the penalties in OPA 90.	Spill prevention and response certificate must be obtained by owner of terminal facility which outlines facility's plan for prevention and states equipment on hand. Violations of provisions of the Act are punishable by a fine of up to $50,000 per violation per day. Other penalties include: person with two or more spills in 12-month period must pay $1,000 for over five gallons and fifty cents for under five gallons.	Administrative, Civil, and Criminal penalties available: Up to $25,000 per day for operation without required financial responsibility. Up to $25,000 per violation per day (or up to $1,000 per barrel) for discharge of oil. At least $100,000 (Or up to $3,000 per barrel) if gross negligence or willful misconduct involved. Up to $500,000 for failure to report discharge. Up to $25,000 per day for failure to remove oil or comply with an order or regulation. Sanctions such as seizure of ship, removal or limits on liability, or denial of use of defenses against liability apply in certain cases. Negligent operation of a vessel is a Class A misdemeanor.	Civil and criminal penalties, including: Up to $100,000 per day, each, for operation without a valid prevention and contingency plan and adequate financial responsibility. Up to $100,000 per day for doing business with a vessel or facility which lacks any of them. Up to $100,000 per day for reckless discharge of oil. Existing law provides for: Up to $10,000 per day penalty for discharge of oil. Up to $20,000 per day if discharge was the result of negligence. Up to $100,000 per day if due to recklessness or intent. Reckless operation of a vessel is a Class C felony.

Appendix B: Description of Oil Spill Response Technology

Three major options for responding to oil spills are discussed including:

1. mechanical containment and collection,
2. chemical technology, and
3. others, including burning, bioremediation, etc.

1. Mechanical technology

Mechanical spill response technology includes mechanical devices used to confine an oil spill near its source, or divert it to some other area where spreading can be reduced, thereby increasing the thickness of the oil to recover or remove it from the surface of the water. Recovery rate of these devices is affected by ocean conditions and weather, including currents, waves and wind, and by the nature of the oil slick. In the case of the open sea for example, recovery is only possible in relatively calm water.

Booms are the most common containment barrier, especially for biologically sensitive areas. They are vertical curtain-like floating devices which extend above and below the surface of the water and are designed to prevent or divert the spread or movement of an oil spill. Booms are used to: 1) to enclose oil slicks to reduce spreading and build thickness; 2) to protect specific areas, such as entrances to harbors, rivers, and regions known or expected to contain biologically important or sensitive resources; and 3) to divert the oil to areas where recovery is possible.

As with other mechanical spill response technology, successful use of booms depends on wind, waves and current conditions. The most common type of failure is their inability to prevent oil from escaping under the curtain. Use of booms in open water should take into account dimensions of the boom, flexibility, and strength.

Skimmers are mechanical devices used to remove oil from the surface of the water without causing major alterations to the oil's physical or chemical properties. Design, capacity, and efficiency vary from skimmer to skimmer. For example, there are stationary skimmers, mobile devices, those requiring currents to carry oil to the device when it is stationary, and skimmers which are attachments to other vessels.

Among the various factors that affect mechanical spill response devices, local climatic conditions have the strongest influence on the efficiency of skimmers. Wind can cause the slick to move away from the skimmer or toward it. Wave action on the other hand, can reduce the mobility of some types of skimmers and decrease the recovery efficiency of nearly all types.

Debris or ice on the surface of the water may cause some skimmers to stop operating or suffer a substantial decrease in operating efficiency once these are picked up from the surface of the water. The same is true for the intake of air. In addition, some skimmers also have difficulty with water-in-oil emulsions and heavy oils, especially in cold water since these may prevent intake of the oil by conventional vacuum pumps.

2. Chemical technology

Dispersants are part of an assortment of chemical agents which can be added to oil to facilitate its clean-up or removal from the surface of the water. Specifically, they are chemicals that reduce the surface tension between oil and water, thereby, facilitating the break-up and dispersal of the oil throughout the water column in the form of an oil-in-water emulsion. In some cases, they are also used to prevent oil from adhering to solid surfaces such as piers.

Its use for oil spill recovery remains highly controversial. Those in favor of its use argue that dispersants increase the opportunity for oxidation, biodegradation, and other weathering processes and reduce immediate damage to waterfowl or other wildlife which could be adversely affected by a surface slick. On the other hand, there are those who believe that the toxic effects of dispersants far outweigh the benefits from its use, especially since older dispersants contained a substantial proportion of toxic hydrocarbon-based solvents such as kerosene, mineral spirits, and naphtha.

Gelling agents are chemicals which increase the viscosity of the oil slick either by converting oil to a cellular-like foam or coating the oil with a material having the consistency of plastic thread. In this way, oil is converted to a jelly-like form and can prevent the spread of oil over the

surface of the water and prevent oil in tankers from escaping during leaks. To date, gelling agents are rarely used owing to cost considerations and the substantial amount of mixing energy required.

Sinking agents are generally fine grained, high density materials (e.g., treated sand, brick dust, cement, silicone-treated materials, fly ash, chalk and special types of clay) that are used to sink floating oil. The principle behind the use of sinking agents is simple. The oil-sinking agent combination is heavier than water and therefore sinks. Efficiency varies across sinking materials, although it has been observed that efficiency is highest with heavy or viscous oils.

This technique has been recognized as a mere "cosmetic" approach to oil spill clean-up where the problem is transferred from the surface to the bottom of the water column. Concern over damage to bottom-dwelling organisms (especially in environmentally sensitive areas) has been raised. Other limitations in the use of sinking agents include, required large quantities of sinking agents relative to the size of the slick and low efficiency with low viscosity oils.

3. Other technology

Under appropriate conditions, (e.g., isolated location, limited human exposure from burning), **in situ burning at sea** may be an option to consider. There are, however, several problems which need to be addressed when considering the use of in situ burning. For example, there is a difficulty in lighting crude oil that is not fresh and lighting the floating oil would more often than not also include burning the vessel. Also, the usual thin layer of oil makes it difficult to raise the temperature to an ignitable level. Although, where spilled oil cannot flow well, as in the Arctic and on ice, there has been effective use of in situ burning. It should be noted that even under ideal conditions, combustion is not complete and air pollution remains a concern.

Bioremediation involves the use of hydrocarbon oxidizing micro-organisms which are relatively abundant in nature (e.g., bacteria, algae, protozoa, marine fungi and other bioengineered microbes) to hasten the degradation of oil after a spill. This extremely slow process occurs only on the surface layers. Therefore, success of microbiological degradation is more likely with a surface spill or with thin layers of dispersed and weathered oil. Other factors which affect the efficiency and rate of degradation include temperature, nutrients, and oxygen availability. Over 100 species of micro-organisms have been identified to utilize hydrocarbons as an energy source, however, no single specie can degrade more than two or three of the many compounds normally found in oil.

Combustion promoters are compounds used to ignite and sustain the combustion of weathered, spilled oil (e.g., gasoline, light crude oils and various flammable commercial products) since volatile, low flashpoint hydrocarbons are rapidly lost through evaporation. Burning agents are of two generic types, sorbents and pyrotechnical compositions.

Sorbents are materials used to recover oil either by allowing oil to adhere to the surface of the material or penetrate its internal structure. In addition, sorbents are used to promote combustion by collecting oil in thicker masses to assist in burning. The three general classes of sorbents are:

1. natural organic materials such as peat moss, straw, hay and sawdust;
2. mineral-based materials such as vermiculite, perlite and volcanic ash; and
3. synthetic organic sorbents such as rubber, polyester foam, polystyrene and polyurethane.

The latter class of sorbents are most often favored because of their greater capacity for oil per unit volume and the fact that many are reusable.

Performance of sorbents depend on the size of their surface area, porousness, specific gravity, and viscosity of the spilled oil. To improve performance, sorbents are in some cases treated with compounds that attract oil and/or repel water. These compounds also prevent sinking of the sorbents once they have absorbed oil.

Pyrotechnical compositions, otherwise known as wicking agents, increase oxygen availability and insulate the burning oil from the water. Various substances such as straw, wood chips, glass beads and treated silica are used as wicking agents.

Response Tech	Description	Evaluation of Capabilities	
		Strengths (+)	Weaknesses (-)
State of the Art in Oil Spill Response Technology			
I. Mechanical Spill Response Technology	• Primary oil spill response methods in the U.S. are mechanical containment and recovery methods • While new designs have appeared over the years, the basic technology has not changed in the past decade. • Has improved marginally over the past two decades, but private and Federal research efforts in the U.S. have decreased greatly in the 1980s. • One prospect for reducing the high cost of more effective containment and recovery equipment for large spills is to employ dual purpose vessels (e.g., U.S. Army Corps of Engineers' dredges). Such an approach may also offer the advantage of keeping more equipment in strategic locations.	• Can be deployed in almost any region without concern about additional environmental damage	• Limited in capacity and capability (e.g., limited in effectiveness to waves of less than six feet winds of less than 20 knots and currents less than one knot) • Little margin for effective use (since average wind and current conditions in many U.S. port areas, not to mention offshore areas, often exceed these limits) • Low recovery rate (e.g., even under ideal conditions with equipment, trained personnel nearby and good weather, recovery of oil from a major spill will not be more than 30 percent) • Cannot be deployed at the site without provision of significant support resources (e.g., forklifts and cranes, boom and skimmer handling vessels, storage vessels, surveillance airplanes and trained personnel)
1. Booms/Containment Barriers	• Floating devices generally resembling short curtains that restrict an oil slick from spreading beyond the barrier. • Generally have five operating components: float, freeboard, skirt, tension member and ballast. • Several designs have been produced for conditions ranging from protected waters to open ocean. • Some are designed to be towed while others remain stationary. • Vertical dimension: under one foot for protecting calm water areas— seven feet for offshore applications. • Smaller booms: less expensive, lighter and easier to deploy • Large offshore booms: require larger boats, heavier equipment to deploy and recover • Barriers designed for protected waters are more easily deployed than offshore booms	• Effective in relatively calm conditions	• Ineffective in currents over one knot and wave heights over six feet (oil escapes the boom); problems of: 1. containing oil in a current due to the hydrodynamics of oil in moving water and 2. entrainment or dispersion of oil droplets in the water as it flows past oil held against a barrier • Barriers designed for protected waters would be less effective in strong currents or heavy waves

Response Tech	Description	Evaluation of Capabilities	
		Strengths (+)	Weaknesses (-)
	• In wind and currents, must be designed with proper ballast to remain vertical and to maintain effective height in the water • Probably reached their practical limits in terms of the maximum wind and wave conditions in which they can be expected to retain oil • Future development: Toward ease of deployment and possible development of new, lighter weight, durable materials and not in greater ability to operate under harsher sea conditions • Major difference between the two types of booms lies in the way in which they respond to waves, current and wind		
a. **Fence**	• Have rigid or semi-rigid materials as a containment screen for oil floating in the water		• If current and wind roll a fence boom away from the vertical, there is loss of freeboard and draft
b. **Curtain**	• Have a flexible skirt held down by ballast weights or tension chain or cable	• Movement of the skirt away from the vertical does not necessarily mean loss of freeboard	
2. **Recovery Devices/ Skimmers**	• Developed to collect oil from the surface • Frequently used in combination with containment barriers (since efficiency of oil recovery devices is improved by increasing thickness or depth of an oil slick) • Several types; no single type is best for all situations or types of oil • Performance varies widely depending on viscosity of oil being recovered • Improvements can be expected from stepped up research	• Effective in calm waters or enclosed waters	• Rarely accounted for recovery of more than a few percent of oil from large spills • Development efforts are unlikely to result in dramatic increases in total oil recovered from a catastrophic spill • In general, the improvements that are likely to offer greater effectiveness involve larger, more costly equipment strategically located for quick response
a. **Suction**	• A simple suction head acting somewhat like a weir used on a floating hose from a vacuum truck or portable suction pump	• Simple to operate, shallow draft and can be used nearly everywhere, even under piers • Fairly high pumping rate • Work best in the recovery of light oil	• Do not discriminate well between oil and water, thus have low recovery efficiency particularly in thin slick • Do not work well in choppy waves
b. **Weir**	• A skimmer that has an interior basin with a slightly submerged lip over which oil floats and is	• Simple, reliable and commonly available • High recovery rate (e.g., recovery efficiency	• Most (especially rigid types) do not work well in waves • Conventional types become clogged with debris

Response Tech	Description	Evaluation of Capabilities	
		Strengths (+)	Weaknesses (-)
	collected by gravity • Generally a floating skimming head used with a pump to continuously empty the collecting basin	of about 50 percent in thick layers of oil (25 mm or more), 10 percent in thinner slicks (1–8 mm) • Work best in the recovery of light oil	• Work best if the edge of the weir is right at the oil/water interface, but in practice, this adjustment is difficult to achieve and maintain
c. **Boom Skimmer**	• A recovery system with one or more skimmers mounted in the face of a spill containment boom, regardless of the skimmer type, although the recovery device is generally a weir	• High recovery rate in general • Since weir is employed in the collection pocket of the boom, recovery efficiency is increased • Designed for dealing with large spills at-sea	• Are large pieces of equipment with many working parts needing maintenance • Adversely affected by the same debris problems as other weirs
d. **Vortex**	• Draws oil and water into a collection chamber and separates it by centrifugal force	• Can achieve reasonable recovery in medium and heavy oil	• Fairly low efficiency
e. **Moving Surface**	• Utilize a moving material that absorbs or causes oil to adhere to it in preference to water		
i. **Disk or Drum**	• Any disk or drum that rely on the adhesion of oil to a solid surface • Disk type devices have a series of vertical disks that are rotated through the oil surface • Drum skimmers have a horizontal drum that rotates through the slick	• Relatively more effective in waves due to the large vertical dimension of disks • Some large skimmers are effective in fairly high sea states • High recovery efficiency • Large disk skimmers are likely to be more durable	• Vulnerability to becoming clogged with debris; some disk skimmers have vanes or screens to keep out debris • Ineffective with mousse • More complicated design (making it more likely to break down)
ii. **Brush**	• Skimmer with a horizontal brush that rotates through the oil and past a scraper which removes the oil into a sump	• Designed for recovering highly viscous oil and oil in ice	
iii. **Rope Mop**	• Have a long loop of absorbent oleophilic (oil loving material) that floats on water surface and is then pulled through a wringer to remove oil along with some water • Can be deployed from shore and the rope guided around a pulley that has been secured offshore or can be operated from boats	• High recovery efficiency • Easy to deploy off the side of a vessel • Relatively easy to maintain • Can operate in shallow water, water filled with debris, water mixed with ice and under ice • Most effective in medium viscosity oils	
1v. **Belt**	• Identical in that they all employ a moving belt which may or may not be of absorbent material	• Relatively high recovery and efficiency	
iv-a. **Paddle Belts**	• Paddles are attached to the belt to lift oil out of the water	• High recovery rate • Handle debris very well • Operate best in medium viscosity oil	• Likely to have problems in short period waves
iv-b. **Sorbent Belts**	• One that has a continuous flat belt that moves	• High recovery rate	

Response Tech	Description	Evaluation of Capabilities	
		Strengths (+)	Weaknesses (-)
	horizontally over the water in the well of the collection vessel	• Excellent in handling debris	
iv-c. **Sorbent Lifting Belts**	• Has a belt inclined to the water's surface and lifts the oil out of the water • Made of porous oleophilic material that allows water to pass through • Often mounted on fairly large vessels and are intended for use in harbors and offshore	• High recovery rate and efficiency	
iv-d. **Brush Lifting Belts**	• Have a chain of brushes that lift the oil from the water	• Particularly useful in large spills of highly viscous oil	
iv-e. **Submersion Belts**	• Instead of carrying the oil up out of the water, the submersion belt moves along a plane forcing the oil under water and oil then surfaces in a collection sump	• Work best in low viscosity oil and thin slicks	
iv-f. **Sorbent Submersion Belts**	• Have a submersion belt that also acts as a sorbent • Work best in calm seas or seas with a swell up to three feet	• Effective in light to heavy oils in thickness of several millimeters	
f. **Submersion Plane**	• Has a fixed plane which is advanced through the oil, submerging it and directing it into a collection area aft	• Work best in light to medium viscosity oils	
II. Chemical Technology			
1. **Dispersants**	• A dispersant is sprayed onto a slick to reduce cohesiveness of the slick so that oil can be broken into small droplets by wind, wave and current action. Oil droplets disperse into the water column where they become diluted to low concentrations and are subject to natural processes such as biodegration • Most efficient system for large spills is the Airborne • Dispersants that are effective on higher viscosity oils are being developed • Major consideration in applying dispersants: achieve a relatively uniform application on the oil without undue wind drift loss • Most require an application of dispersant to oil in	• Primary biological benefits: reduce hazard to birds (unless sprayed directly on them) and prevent oil from stranding on shorelines • Rapidly deployed (by aircraft) over a large area • May be used when sea conditions preclude • If successful, can be cost-effective • Can be applied to a large area in a timely manner • Most effective when applied early (because oil becomes less dispersible as its viscosity increases) • Controversy: Potential short-term environmental	• Greater use has been hampered by concerns about toxicity and in part by concerns about effectiveness • The effectiveness of dispersants is perhaps of more concern than their toxicity. A number of experts disagree about the effectiveness of dispersants and there is as yet no reliable method to test effectiveness in field options • Although some dispersants have proved effective in ideal situations, ideal conditions rarely exist in the real world; research on improving dispersants is continuing and appears to be producing some encouraging results

Response Tech	Description	Evaluation of Capabilities	
		Strengths (+)	Weaknesses (-)
	ration of about 1:10 – 1:20 •As with mechanical equipments prepositioning of a dispersant is necessary to have early and effective response • The National Research Council approved its use and recommended they be considered as a potential first response option along with mechanical cleanup • Effectiveness depends on sea conditions, application techniques and the chemical nature of both dispersants and oil		effects of a treated slick versus possible long-term shoreline impacts and other effects of an untreated one (early dispersants were toxic, modern dispersants are less toxic than oil itself) • Sometimes aesthetic value is more protected (particularly if stranded oil is removed from beaches and rocky shorelines by high pressure hot water) at the expense of the local biological ecosystem
2. Gelling Agents	• Change liquid oil into a solid to aid in recovery or are directed toward tanker accidents where pollution might be avoided or diminished by gelling remaining oil in the tanks • Require mixing with oil and allowing adequate time for the gel to set		• Field tests show large amounts of gelling agents may be required (e.g., up to 40 percent of oil volume)
3. Sinking Agents	• Used to prevent oil from reaching the shore (e.g., hydrophobic chalk)	• Successfully used off the *Torrey Canyon* oil spill in 1967	• Canadian tests of several sinking agents have shown that none were effective in holding oil after the initial sinking and that it slowly leached back to the surface over a few days • Generally forbidden by environmental regulatory agencies because the sinking mass causes suffocation of bottom-life and exposes many bottom-dwelling organisms to oil
III. Other Technology			
1. In Situ Burning	• Process of burning an oil spill in place with or without the use of a fire containment boom • Varying degrees of success • Not an important oil spill countermeasure at present, but is being investigated further in the U.S.	• Burn efficiencies of over 90 percent can be obtained especially if oil is confined with booms or other means to keep oil layer as thick as possible • More successful in cold areas	• Burning is probably limited in its applications • Igniting and keeping a slick burning may be a problem in some circumstances; in others, burning may jeopardize the stricken vessel and any oil remaining on board, oil which might otherwise be off-loaded and the visible air pollution • Aesthetic trade-offs: 1. removing oil from water versus releasing products combustion into the atmosphere;

Response Tech	Description	Strengths (+)	Evaluation of Capabilities Weaknesses (-)
			2. short-term impact of oil versus longer-term impact of oiled shoreline • Measurements show that combustion products released into the atmosphere are no more hazardous than those released by evaporating oil and that total environmental loading of toxic components remains the same or is reduced by combustion of crude oil spills on water
2. **Bioremediation**	• The application of nutrients to speed up the biodegradation of oil	• Use on impacted shorelines has been successful in some cases • Potentially the least damaging and least costly of the cleanup techniques, particularly for soiled beaches	• Tests have shown little or no enhancement over naturally occurring biodegradation • Use on water would appear limited except perhaps as a follow-up to other actions • Long time frame involved
3. **Miscellaneous Chemical Agents**			
a. **Combustion Promoters**	• Developed to assist in combustion of oil		
i. **Sorbents**	• Function by collecting oil in thicker masses to assist in burning		• Generally have not functioned well in actual practice
ii. **Pyrotech. Compositions**	• Keep the slick burning		• Limited use because of the large amount of material needed for beneficial effect and by the fact that in situ burning can be accomplished without them

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Appendix C: Oil Spill Equipment Inventory

Oil Spill Equipment Inventory in Oahu[1]

Quantity	Description	Source
Skimmers, skimming systems, and accessories		
1	ASI 75 gpm hydraulic unit *	CIC
2	GT 185 hydraulic skimmer *	CIC
1	Mini-Walosep weir type skimmer with 11 HP hydraulic power pack	CIC
1	Skim pak skimmer with wand attachments	CIC
2	Oleo skimmers	CIC
1	GT 185 weir type skimmer with 25 gpm ASI duetz hydraulic unit	CIC
4	Skimmer (small)	CPB
1	Skimmer (medium)	CPB
1	Skimmer (small)	CPB
1	Skimmer (large DIP 3001)	CPB
1	36-ft skimmer vessel	NSS
1	skimpak unit	PENCO
1	Swiss oleo skimmer	PENCO
1	slurp skimmer	PENCO
1	Walosep skimmer	ML
1	Walosep skimmer	ML
2	skimpak skimmer (18,000 gph; 300 gpm)	IT
2	Skimpak skimmers	P&S
1	GT 185 oil skimmer	HIRI
Booms, boom systems, and accessories		
1	600' OWOCRS boom with without drive motor	CG
1	hydraulic boom reel with 1,500 ft. Expandi 4300 boom *	CIC
2	100-ft, 30-in Troilboom oil curtain *	CIC
1	ASI Roto Pak hydraulic boom recovery system *	CIC
1	240 VAC electric powered boom reel with 3,000 ft, 6-in x 9-in harbor boom	CIC
1	240 VAC electric powered boom reel with 1,200 ft, 8-in x 12-in harbor boom	CIC
1	6,000-lb capacity 240 VAC davit with 14-ft boom	CIC
6	500-ft class I boom system	CPB
8	boom mooring systems	CPB
48	500-ft class I boom	CPB
5	500-ft permanent boom	CPB
4	boom mooring system	NSS
1	3,000-ft harbor boom	PENCO
1	400-ft mini boom	PENCO
100	bales 5-inch sorbent boom	PENCO
50	bales 8-inch sorbent boom	PENCO
1	4,300-ft boom	ML

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; CPB-COMNAVBASE Pearl Harbor; NSS-U.S. Navy Supervisor of Salvage; PENCO-Pacific Environmental Corp.; ML-Marine Logistics; IT-Industrial Technology; P&S-P&S Pacific; HIRI-Hawaiian Independent Refinery; Inc.; UNITEK-Unitek Environmental Services, Inc.

Quantity	Description	Source
1	hydraulic boom reel (on NAKUE)	ML
1	hydraulic boom reel (on NOHO LOA)	ML
1	1,500-ft Expandi 3,000 boom	ML
1	ASI Rotopak and recovery system	ML
-	120-in sections oil curtain	ML
1	800-ft harbor boom	P&S
1	4,000-ft, 43-inch boom	HIRI
Water vessels		
1	16-ft rigid hull inflatable boat	CG
1	CGC JARVIS (WHEC-725)	CG
1	CGC MALLOW (WLB-396)	CG
1	CGC SASSAFRASS (WLB-401)	CG
1	CGC WASHINGTON (WPB-1331)	CG
1	Rigid hull inflatable boats	CG
2	41-ft utility boat	CG
1	10 ft Livingston workboats with 6 HP engines	CG
1	130-ft OSRV "Clean Islands", 95,000-gal recovered oil holding capacity	CIC
1	12-ft skiff with 9.9 HP outboard *	CIC
1	21-ft aluminum Munson boomboat with 120 HP outboard and trailer *	CIC
1	12-ft sears gamefisher skiff	CIC
1	24-ft Marco platform workboat on trailer with 35 HP outboard	CIC
1	14-ft Acme workboat on trailer with 15 HP outboard	CIC
1	10-ft rowing skiff	CIC
3	18-ft utility boats	CPB
4	18-ft utility boats	CPB
4	SWOB barge	CPB
2	24-ft, 260 HP diesel boom handling boat	NSS
1	19-ft inflatable boom tending boat	NSS
1	18-ft rigid hull boom tending boat	NSS
1	70-ft tug boat	PENCO
1	45-ft tug boat	PENCO
2	17-ft Boston whaler with 1-70 HP outboard	PENCO
1	12-ft tender with 5 HP	PENCO
2	8-ft tender without motor	PENCO
1	8-ft skiff with oars	PENCO
1	8-ft skiff with 1-35 Hp outboard	PENCO
1	18-ft Boston Whaler with trailer	ML
1	36-ft, 800 gal oil spill containment vessel (NAKUE)	ML
1	120-ft, 4000-gal oil spill response vessel (NOHO LOA)	ML
2	12.5-ft workboats	P&S

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; CPB-COMNAVBASE Pearl Harbor; NSS-U.S. Navy Supervisor of Salvage; PENCO-Pacific Environmental Corp.; ML-Marine Logistics; IT-Industrial Technology; P&S-P&S Pacific; HIRI-Hawaiian Independent Refinery; Inc.; UNITEK-Unitek Environmental Services, Inc.

Quantity	Description	Source
Aircrafts		
3	Fixed-wing C-130 planes	CG
3	HH-65 helicopters	CG
Trucks, trailers, and other land transportation		
1	emergency response trailer with 900-ft, 6-in x 9-in harbor boom and sorbents	CIC
1	Ford Cutaway van with accessories (e.g. sorbents, tools, first aid kit,etc)	CIC
1	1-ton Ford 350-series flatbed truck	CIC
4	work trucks	PENCO
2	motorized beach caddies	ML
1	flatbed truck	ML
1	emergency response van	ML
1	6,000-ft gallon tank truck	IT
4	vacuum trailer	UNITEK
5	2,000-gal vacuum truck	UNITEK
3	vacuum trucks (2000 gal)	P&S
Dispersants and dispersant application systems		
2	40-ft aluminum sweep arms port and starboard for dispersant spraying *	CIC
1	gasoline-engine-driven dispersant metering pump *	CIC
1	hydraulically powered dispersant metering pump *	CIC
2	25-ft plumbed sprayer nozzles for dispersant sprayer pump	CIC
23	55-gallon drums of COREXIT 9527 dispersant	HIRI
Sorbents		
10	bales of sorbent sweep	CG
10	bales of sorbent pad	CG
1	OMI 1-4D mop wringer with 300-ft mop	CIC
1	OMI 11-D mop wringer with 150-ft mop	CIC
1	OMI 111-D mop wringer with 100-ft mop	CIC
2	55-gal drum sorbent wringer systems	CIC
300	bales grade 100 sorbent pads	PENCO
300	bales grade 200 sorbent pads	PENCO
50	bales grade 50 sorbent pads	PENCO
300	bales sorbent sweeps	PENCO
20	rolls blanket pads	PENCO
50	boxes oil snares (pom-poms)	PENCO
	sorbents	ML
-	sorbent booms, sweeps, snares	UNITEK
Storage systems		
1	4,000-gal oil-water separator tank with filtration system *	CIC
1	500-gal hard wall oil-water separator	CIC

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; CPB-COMNAVBASE Pearl Harbor; NSS-U.S. Navy Supervisor of Salvage; PENCO-Pacific Environmental Corp.; ML-Marine Logistics; IT-Industrial Technology; P&S-P&S Pacific; HIRI-Hawaiian Independent Refinery; Inc.; UNITEK-Unitek Environmental Services, Inc.

Quantity	Description	Source
1	floating oil-water separator with 6-ft curtain and ballast	CIC
1	floating oil bladder	CIC
5	Texaboom oil bladders	CIC
1	2,000-gal fastank	CIC
20	26,000-gallon donuts, closed bottom type	CPB
6	26,000-gallon donuts, open bottom type	CPB
1	26,000 gallon oil storage bladder	NSS
1	500 gallon storage tank on trailer	PENCO
1	800-gal oil-water separator (trailer)	PENCO
1	300-gal oil-water separator	PENCO
1	1,000-gal storage tank (skid)	PENCO
1	2,000-gal storage tank (skid)	PENCO
2	3,600-gal storage tank (sub?)	PENCO
1	oil-water separator	HIRI
6	2,000-gallon storage bladders	HIRI
Pumps and accessories		
3	150 gpm gas powered centrifugal pumps	CIC
2	pneumatic diaphragm pumps	CIC
1	Acme floating washdown pump	CIC
1	Acme floating washdown pump, 3 HP gas powered	CIC
1	Acme floating circulation pump, 3 HP gas powered	CIC
2	6-inch submersible pump	NSS
1	2-inch floating washdown pump	PENCO
2	2-inch centrifugal pump (150 gpm)	PENCO
1	2-inch jet pump	PENCO
1	4-inch jet pump	PENCO
4	2-inch electric submersible pump	PENCO
4	2-inch diaphram pump (150 gpm)	PENCO
4	1-inch diaphram pump	PENCO
1	0.5-inch diaphram pump	PENCO
6	2-inch trash pump	PENCO
2	double diaphram spark proof pumps (200 gpm)	IT
1	pneumatic suction pump (50gpm)	IT
2	diaphram pump	UNITEK
2	double diaphram spark proof pumps (200 gpm)	P&S
1	pneumatic suction pump (50 gpm)	P&S
Miscellaneous equipment		
4	portable generator, 1.5 kw	PENCO
2	portable generator, 5.0 kw	PENCO
1	portable generator, 10.0 kw	PENCO

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; CPB-COMNAVBASE Pearl Harbor; NSS-U.S. Navy Supervisor of Salvage; PENCO-Pacific Environmental Corp.; ML-Marine Logistics; IT-Industrial Technology; P&S-P&S Pacific; HIRI-Hawaiian Independent Refinery; Inc.; UNITEK-Unitek Environmental Services, Inc.

Quantity	Description	Source
2	5 CFM electric compressor	PENCO
1	15 CFM gasoline compressor	PENCO
1	165 CFM diesel compressor	PENCO
2	265 CFM diesel compressor	PENCO
1	15-HP Evenrude outboard engine	CIC
1	twin light tower on trailer	CIC
3	25-watt ICOM handled VHF Marine band radios	CIC
1	blower, 1,400 cfm	PENCO
4	welding machine	PENCO
1	steam cleaner	PENCO
2	pressure washer	PENCO
-	assorted rakes, scoop pans & hand tools	PENCO
2	steam cleaners	ML
2	50-foot aluminum sweep arms	ML
1	high pressure water herder (360 gpm)	IT
2	high pressure water herder (360 gpm)	P&S

Note: PLUS other companies for support equipment.
[1]Inventory for U.S. Coast Guard, Clean Islands Council, PENCO and Marine Logistics were updated as of December 1991. Inventory of all other equipment sources are based on the 1989 Oil Spill Contingency Plan developed by the U.S. Coast Guard, Honolulu.
* on board the OSRV Clean Islands
Sources:
U.S. Coast Guard, 1989 Oil Spill Contingency plan
LCDR Mary Landry and staff, U.S. Coast Guard, MSO-Honolulu
Kim Beasley, CIC Manager

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; CPB-COMNAVBASE Pearl Harbor, NSS-U.S. Navy Supervisor of Salvage; PENCO-Pacific Environmental Corp.; ML-Marine Logistics; IT-Industrial Technology, P&S-P&S Pacific; HIRI-Hawaiian Independent Refinery; Inc.; UNITEK-Unitek Environmental Services, Inc.

Oil Spill Equipment Inventory in Kauai.[1]

Quantity	Description	Source
Skimmers, skimming systems, and accessories		
1	skimpak with wand	CIC
1	swiss oleo skimmer	CIC
1	Skimpak with wand	CIC
1	Oela III skimmer with 20 ft x 2 in hose and gas pump	CHEVRON
Booms, boom systems, and accessories		
1	300-ft mini boom	CIC
10	bales sorbent boom	CIC
10	bales sorbent boom	CIC
1	200-ft Kepner containment boom	CHEVRON
1	400-ft Kepner containment boom	KP
1	300-ft 6-inch Kepner boom	SHELL
1	1,000-ft trailered boom	SHELL
1	200 feet, 2-inch slick bar mini-boom	SHELL
Water vessels		
1	CGC PT HARRIS (WPB-82376)	CG
1	17-ft Boston whaler with 90 HO outboard and trailer	CIC
1	17.5-ft McKee Craft boomboat with 88 HP outboard and trailer	CIC
1	10-ft fiberglass under pier skiff	CIC
2	Trailered boats	USNF
1	Recovery boat	USNF
1	Runabout	HD
2	Small boats	FD
Aircraft		
2	Helicopters	USNF
Trucks, trailers, and other land transportation		
1	emergency response trailer with 1000-ft, 6-in x 12-in harbor boom	CIC
1	emergency response trailer	CIC
Sorbents		
10	bales sorbent pads	CIC
10	bales sorbent sweeps	CIC
10	bales sorbent pads	CIC
10	bales sorbent sweeps	CIC
4	bales 3M type 151 sorbent sheets	CHEVRO
2	bales 3M type 151 sorbent sheets	KP
4	bales sorbent material	SHELL
2	bales sorbent sweeps	SHELL

Codes: CIC-Clean Islands Council; USNF-U.S. Navy Facility; HD-State of Hawaii Harbors Division; FD-State of Hawaii Forestry Dept.; CHEVRON-Chevron, USA, Inc.; KP-Kauai Petroleum; SHELL-Shell Oil Co.

Quantity	Description	Source
Storage systems and accessories		
1	1,500 gal fastank	CIC
1	500 gal towable bladder	CIC
1	25-ft storage container with 800-ft, 6-in x 12-in harbor boom	CIC
1	1,500-gal fastank	CIC
50	empty 55 gallon drums	KP
Pumps and accessories		
1	ACME washdown pump	CIC
1	American pneumatic diaphram pump	CIC
1	Homelite gasoline pump	CIC
1	Homelite diaphram pump	CIC
1	12-inch portable self-priming centrifugal pump	KP
Miscellaneous equipment		
1	1.75 KW gasoline generator	CIC
1	electric megaphone	CIC
1	JW type explosive vapor detection device	CIC
1	battery charger	CIC
1	solar tricker charger	CIC
12	pairs oil protective gloves	CIC
4	13-S Danforth type boom anchors	CIC
1	12 VDC battery charger	CIC
12	pair gauntlet oil protective gloves	CIC
2	13-S Danforth style boom anchors	CIC

Note: PLUS other companies for support equipment

[1]Inventory for U.S. Coast Guard and Clean Islands Council were updated as of December 1991. Inventory of all other equipment sources are based on the 1989 Oil Spill Contingency Plan developed by the U.S. Coast Guard, Honolulu.

Sources:

U.S. Coast Guard, 1989 Oil Spill Contingency plan

LCDR Mary Landry and staff, U.S. Coast Guard, MSO-Honolulu

Kim Beasley, CIC Manager

Codes: CIC-Clean Islands Council; USNF-U.S. Navy Facility; HD-State of Hawaii Harbors Division; FD-State of Hawaii Forestry Dept.; CHEVRON-Chevron, USA, Inc.; KP-Kauai Petroleum; SHELL-Shell Oil Co.

Oil Spill Equipment Inventory in Hawaii[1]

Quantity	Description	Source
Skimmers, skimming systems, and accessories		
1	Skimpak with wand	CIC
1	Swiss Oleo skimmer	CIC
1	Swiss Oleo skimmer	CIC
Booms, boom systems and accessories		
2	boom trailers with 1,000-ft, 6-in x 12-in boom each	CIC
1	150-ft miniboom	CIC
10	bales sorbent boom	CIC
1	Boom trailer with 600-ft 6-in x 12-in harbor boom	CIC
10	bales sorbent booms	CIC
1	300-ft sea curtain	HD
1	200-ft containment boom	HD
1	400-ft Kepner sea curtain	KHD
1	Type 270 sorbent boom	KHD
1	200-ft, 2-in slick bar mini boom	SHELL
Water vessels		
1	USCGC KISKA	CG
1	10 ft Livingston workboats with six HP engines	CG
1	21-ft Boston Whaler Outrage with twin 70 HP outboard and trailer	CIC
1	10-ft fiberglass under pier skiff with 4 HP outboard	CIC
1	17-ft Boston Whaler Boom boat with 100 HP outboard and trailer	CIC
1	13-ft Boston Whaler with 20 HP outboard	HD
1	12-ft fiberglass boat	KHD
Trucks, trailers, and other land transportation		
1	dump truck	USAPTA
Sorbents		
10	bales sorbent pads	CIC
10	bales sorbent sweeps	CIC
10	bales sorbent pads	CIC
10	bales sorbent sweeps	CIC
-	3M Type 126 sorbent sweeps	HD
-	3M Type 156 sorbent pads	HD
2	bales 100-ft by 3/8-in sorbent sweep	KHD
2	bales Type 157 sorbent pads	KHD
2	bales sorbent sweep	SHELL
3	bales sorbent material	SHELL

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; USAPTA-U.S. Army Pohakuloa Training Area; KHD-Kawaihae Harbors Division Warehouse; SHELL-Shell Oil Co.

Quantity	Description	Source
Storage systems and equipment		
1	1,500-gal fastank	CIC
1	Kepner oil-water separator	CIC
Pumps and accessories		
1	American pneumatic pump	CIC
1	ACME washdown pump	CIC
1	Homelite diaphram pump	CIC
1	American pneumatic pump	CIC
1	75 gpm gasoline pump with hoses	HD
1	skimmer pump	KHD
Miscellaneous equipment		
1	2.25-KW generator	CIC
1	gasoline generator	HD
1	JW type explosive vapor detection device	CIC
1	12 VDC battery charger	CIC
1	solar tricker charger	CIC
1	electric megaphone	CIC
12	pairs gauntlet oil protective gloves	CIC
2	13-S Danforth type boom anchors	CIC
12	pairs gauntlet oil protective gloves	CIC
2	13-S Danforth type boom anchors	CIC

Note: PLUS various other companies that can provide dump trucks, front end loaders, bulldozers, roadgraders, pumps and generators.

[1]Inventory for U.S. Coast Guard and Clean Islands Council were updated as of December 1991. Inventory of all other equipment sources are based on the 1989 Oil Spill Contingency Plan developed by the U.S. Coast Guard, Honolulu.

Sources:

U.S. Coast Guard, 1989 Oil Spill Contingency plan

LCDR Mary Landry and staff, U.S. Coast Guard, MSO-Honolulu

Kim Beasley, CIC Manager.

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council; USAPTA-U.S. Army Pohakuloa Training Area; KHD-Kawaihae Harbors Division Warehouse; SHELL-Shell Oil Co.

Oil Spill Equipment Inventory in Maui[1]

Quantity	Description	Source
Skimmers, skimming systems, and accessories		
1	skimpak with wand oil recovery skimmer	CIC
1	Swiss Oleo skimmer	CIC
Booms, boom systems, and accessories		
1	1,500-ft, 8-in x 10-in harbor boom	CIC
10	bales sorbent boom	CIC
Water vessels		
1	24-ft rigid-hull inflatable boat on trailer	CG
1	22-ft utility boat on trailer	CG
1	17-ft McKee Craft boom/recovery boat with twin 60 HP outboard	CIC
1	14-ft Aluminum under pier skiff	CIC
Sorbents		
10	bales sorbent pads	CIC
10	bales sorbent sweeps	CIC
Storage systems and accessories		
1	1,500-gal portable fastank	CIC
1	Kepner oil-water separator	CIC
Pumps and accessories		
1	American pneumatic diaphram pump	CIC
1	Homelite gas powered diaphram pump	CIC
1	ACME washdown pump	CIC
Miscellaneous equipment		
1	1.75-KW generator	CIC
1	gasoline powered blower	CIC
1	gas detection device	CIC
1	megaphone	CIC
1	12-volt battery charger	CIC
12	pairs gauntlet oil protective gloves	CIC
4	13-S Danforth type boom anchors	CIC

Note: PLUS other companies for support equipment.
[1]Inventory for U.S. Coast Guard and Clean Islands Council are as of December 1991.
Sources:
U.S. Coast Guard, 1989 Oil Spill Contingency plan
LCDR Mary Landry and staff, U.S. Coast Guard, MSO-Honolulu
Kim Beasley, CIC Manager

Codes: CG-U.S. Coast Guard; CIC-Clean Islands Council.