3000 Operations

3100 Operations Section Organization

Refer to Section 3000 of the Region 9 Regional Contingency Plan (RCP).

The Operations Section of ICS is responsible for all operations directly applicable to the primary mission. The section directs the preparation of unit operational plans, requests or releases resources, makes expedient changes to the Incident Action Plan as necessary, and reports such to the Incident Commander (IC/UC).

In the RCP, this section also lists the various operations branches.

Refer also to Chapter 7 of the Incident Management Handbook (IMH).

3110 Organization Options

Refer to Section 3002 of the Region 9 RCP.

In the RCP, this section defines the Operations Section Chief's roles and responsibilities and includes a diagram illustrating the organization chain of command.

Refer to Section 3600 of this Plan for information on management of wildlife operations.

3200 Recovery and Protection

This section will discuss the strategic objectives as well as the general response philosophy, strategies, and countermeasures that will be applied by the Unified Command System (UCS) to discharges of oil within the boundaries of the area delineated in Section 1000. In addition, the various oil containment, recovery, and removal methods available to the UCS will also be discussed along with shoreline cleanup options that could be employed during a spill response.

United States Policy: In the Clean Water Act, Congress declared "... it is the policy of the United States that there should be no discharges of oil or hazardous substance..., and that necessary actions shall be undertaken to remove discharges and eliminate the threat of imminent discharges." This policy is reiterated to serve as a guiding light for the flow of response decisions and allocation of resources. In support of U.S. policy, the paramount response strategy that should be implemented by the Unified Command (UC) is to allocate resources to their optimum use (i.e., the most oil recovered, contained, or prevented from being discharged per expenditure of resources). The only variance from this strategy should be considerations of safety and of particularly critical natural (environmentally sensitive) or man-made (economically significant) resources that may demand protection even though manpower and equipment may be deployed elsewhere to more efficiently recover oil. Examples of the latter may include protecting a waterfront area that may be threatened by fire or explosion if impacted, and protecting a municipality's water supply. The strategic objectives priorities must be carefully considered since they vary from case to case, but generally they are as follows:

Stop the Source: Typically the highest priority. When a damaged vessel(s), shore side facility or pipeline poses a risk of an imminent major discharge, preventative action to mitigate the size of the spill is the logical first priority (i.e., stabilize and lighter a vessel; contain and secure the shore-based source).

Open Water Containment and Recovery: Once the effort is underway to secure the source, containment and recovery of the spilled oil prior to shoreline impact is the next logical priority. Deploy major recovery

vessels, boom-towing vessels and other skimmers to intercept oil before it impacts critical areas or becomes a more costly and environmentally damaging shoreline cleanup problem.

Protection of Sensitive Areas: Depending on the ability to contain and collect spilled oil prior to impact, the protection of resources can compete with containment and collection resources. Priority for protecting these areas is a function of the value of the areas (as prioritized in Section 3610 and 3620) and the feasibility of protecting them. Dedicating open water containment equipment to protecting these areas is not wise if oil that would otherwise have been recovered is merely free to strike other sensitive areas that have not been “prophylactically” boomed. In general, employ tactics that do not weaken open water recovery operations; deploy resources that are not needed in the open water operations; relocate threatened wildlife by means such as capturing or scaring with propane noise making cannons; and close off narrow channels with sediment dikes, boom, siphon dams, or other natural or man-made materials.

Shoreline Cleanup: Shoreline cleanup should be undertaken only when the risk of recontamination from floating oil passes. Pre-cleaning the beaches of trash and debris prior to impact from oil can greatly facilitate the cleanup. The UC must decide if shorelines will be cleaned at each tidal change or just once after all the anticipated oil has come ashore.

The preservation of human life and health shall be the overriding priority for any response to a discharge of oil. There are two elements to this principle: public safety and response personnel safety.

A large release of oil in the vicinity of houseboats, inhabited shoreline areas, or at an oil transfer facility could pose a health or explosion hazard, especially if the discharge is in a confined area (e.g., under a dock). Benzene, hydrogen sulfide, and other toxic, explosive, or oxygen-displacing vapors could be generated. Evacuation of the area, even at the expense of delaying the cleanup, may be necessary until the danger has passed. Evacuation of homes or other public and private facilities, if recommended by the UC, is the responsibility of state and local emergency agencies.

All response personnel must comply with all applicable worker health and safety laws and regulations. Initial response and rescue personnel (who may be underway on self-propelled skimmers and other vessels) and shoreline cleanup personnel could be exposed to health and safety risk(s). Therefore, personnel safety is paramount and responders shall comply with the guidelines set forth in OSHA Publication 3172, “Training Marine Oil Spill Response Workers Under OSHA’s Hazardous Waste Operations and Emergency Response Standard” located at http://www.osha.gov/ and the site safety plan(s) generated by the UCS.

After the threat to personnel safety has been eliminated or reduced to safe levels, response strategies should be implemented to first minimize the ecological impact and then the economic and public impact as discussed in the following section.

3210 Response Prioritization

Initial response is focused minimizing impacts though the strategic objectives of Stopping the Source, Containment and Recovery, and Protection of Sensitive Areas objectives (see Section 3200). In a spill event, Sensitive Area Protection prioritization should be determined by three considerations: which sites are at risk (how soon the oil will get to each sensitive site); the predefined hierarchy of protection priorities (Section 3210.2 below); and the time and response resources available to implement protection. Responders should not assume that sensitive locales equidistant from the source of a spill are at equal risk from the oil. For the purpose of prioritization, "risk" is defined as "the probability of spilled oil reaching the vicinity of a sensitive

site of concern." This means that the urgency to protect a key resource is first determined by the likelihood that it will be impacted in the near future and the mobilization time for requisite response staff and equipment (can the sites at risk be protected by available resources before oil arrives?) If the sites are too numerous to protect with the response resources available within the projected times of impact, then triage of protection follows a prescribe order.

During an actual oil spill event, the relative likelihood of a site coming into contact with the oil is a function of the proximity of the spill to the site and whether prevailing conditions (the wind, current, and tides) at the time of the spill, will move the oil toward or away from it. At a minimum, first responders to a spill in the marine environment should obtain an initial forecast of oil movement speed and direction from a reliable source such as NOAA SSC or OSPR or forecast it based on present and impingent tides, currents, winds, and rainfall runoff conditions. This requires responders to use best information (optimally, real time information) about the local weather, tides, and currents to make the best prediction possible about the movement of the oil away from the spill release location. This information can be used to model the probable trajectory. Models can be as simple as estimates of movement on a chart / map or a computer simulation.

3210.1 Forecasting Oil Trajectories

Oil trajectories may be effectively forecast by several means and should always be done by skilled staff and usually trajectories are created and assessed by the Environmental Unit (see Section 4600). Each method can be limited by conditions or unforeseen patterns, and no method is guaranteed to accurately predict the future distribution of the oil. Because success or failure of response to near shore spills is usually determined by actions in the early timeframes, UC and on-scene responders must take immediate action using simple predictive methods rather than delaying action until perfect information becomes available. Spill responders must act on the best information available at the moment. If time and resource permit, as many means as possible should be engaged to maximize the probability of accurately identifying slick movement and likely impacts, but this should never slow response. Regardless of the trajectory method used, it should always be recognized that such projections are helpful guidance but do not substitute for using on-scene information about currents and winds which determine slick movements.

If Environmental Unit or other skilled trajectory analysis is not available, initial response may need to proceed based on simple mathematical calculations of oil movement commonly called “back-of-the-envelope” or “envelope” trajectories. “Envelope” trajectories provide a quick yet fairly accurate estimate of the trajectory using best available information (which may not be accurate enough for more sophisticated modeling). It can quickly be recalculated using improved information. (After initial response, trajectories will be developed by Planning / Environmental as part of the IAP.)

Envelope trajectories are simple pencil and paper computations based on currents, tides and winds. Although an envelop trajectory is only gross approximation which does not take into consideration spreading or local turbulence, it will often be used as the first estimate of oil trajectory until better information is available from computer modeling or aerial perspective. This method is quick as well as effective and is not restricted by visibility. It has wide effectiveness and provides gross projections. The method is based on the premise that oil moves at 100% of current velocity and 3% of wind velocity. In areas with strong tidal currents the location of the leading edge of the oil slick can be quite accurately predicted using current estimates or information available in many tide books. If real time measurements of currents and winds are available from internet sources such as PORTS, or CODAR websites (such as SoCOOS or CenCoos), then such real time wind and current information can be used significantly improve the predicted oil distribution, However in bays and estuaries time is critical and an initial trajectory estimate should not be delayed to perfect winds and currents. There are several methods of estimating trajectories; following is one method used to execute envelope trajectory calculations:

- Determine as nearly as possible the time and location of release.
- Get best available prevailing tides and currents at the location from tide & current tables. (In bays and rivers, data may be affected by high runoff of rainy seasons.)
- Calculate the movement of oil. Movement of oil = max current velocity X time from spill to next slack water. Using max current provides a projection of least regret since it will maximize the oil trajectory.
- Using a nautical chart or similarly geographically accurate map, draw a vector on the map from the point of origin for the distance that the current moves for the elapsed time. This may be subdivided by hours to estimate the hourly incremental advance of the trajectory.
- Winds influence oil movement slightly: wind movement = 0.03 X wind velocity. So, in open ocean and at slack tides in estuaries, wind adjustments become important (although some along coast currents can reach 2 knots.) From the end point of an interval of interest, draw a vector expressing the computed value in the direction of the wind.
- The resulting location is an approximation of the leading edge of the slick.
- Sites of concern which are proximal (in or near) the projected slick should be added to the list of sites to be protected. This method can be used to forecast the time by which a site is likely to be threatened and draft a timetable for protection of sites at risk. (See Section 9800 for pre-identified sites and strategies which may be at risk.)
- When the tide phase shifts, this process is best started again from the point of origin, based on the presumption that oil is still releasing or escaping containment at that location, but remember that there is now an elongate smear of oil from the slick's initial path which must also be accounted for.

Once a trajectory has been developed, the threat to significant resources must be assessed. The trajectory should be used to determine the probable sequence of impacts to shorelines and probable times of impacts. These calculations can be computed even if the person is not on-site and information can be transmitted by email, fax or phone to the command post. This would best be done by a local OSPR scientific field staff (who have tools in the SISRS database to assist them) since they are most familiar with local resources at risk including seasonal variability. Another good analyst would be the SSC. If neither is available, responders should refer to the catalog of resources at risk which is Section 9800 of this document. Whoever is entrusted with developing the trajectory and recommended deployments should, if possible, provide written recommendations (or fax or email) to the UC/Ops chief as soon as possible.

3210.2 Established Hierarchy of Protection Priorities

In general, State and Federal law establish three priority levels for dedication of emergency oil spill response resources.

First Priority - Protection of human health and safety
Second Priority - Protection of environmental resources
Third Priority - Protection of economic resources

Examples of resources that will receive a first priority response (human health and safety) includes:

-power plant intakes -desalinization plants
-drinking water intakes -other health/safety intakes
-critical public use areas at risk (e.g. fire departments)
(e.g. hazardous fumes)

The second priority group is thoroughly treated in Section 9800. Section 9800 is a catalog of identified resources at risk including Sensitive Ecological sites, other ecological resources, cultural/historic concerns, and economic concerns. Ecological sites are given a ranking of sensitivity of A, B, or C which reflects the sensitivity of the site and the relative ecological consequences if the site is impacted by oil or other pollutants. The rationale for this ranking is in the introduction to Section 9800, and the ranking may be useful if response resources are limited.

Economic sites have a D, E, or F designation to reflect the type of resources at risk. However, as mentioned before, resources and sites determined to be critical to the preservation of human health and safety – such as drinking water intakes, power plant intakes and desalinization plants – afford first priority, ahead of environmentally sensitive sites and economic sites.

The UC will make the final decision regarding protection priorities for the environmentally sensitive and economically significant areas. In order to further assist the UC, additional prioritization of equally categorized areas that could be impacted may, in the future, be included in this plan. This will allow the UC to determine which priority sites should be protected when initial resources will only allow the protection of a few of them.

The UC may utilize the predetermined response strategies for environmentally sensitive sites and economically significant sites. Section 9800 includes response strategy recommendations for sensitive sites should be implemented as indicated in the included site strategy sheets. However, the UC and the responders should remain flexible and be receptive to additional information when implementing the booming plan or other countermeasures. Factors such as unusually high winds, strong tidal currents or freshets, equipment limitations, bottom conditions, and the type of oil can have a significant effect on the proposed strategy. Modifications to the preplanned strategies should be expected.

In addition to the seasonal variances, the protection priority of an entire area could foreseeably be changed. For example, if the NOAA Scientific Support Coordinator (SSC) or a Department of Fish and Wildlife (DFW) biologist determines that a certain section of marshland or coastline previously categorized as a lower priority (or not categorized at all) is currently a breeding ground for an endangered species, then protection of that site may be afforded the utmost priority even at the expense of a previously categorized A site located adjacent to it. Contra wise, sensitive locales which may be already impacted or become unprotect able in a particular event may be used to collect or retain oil so that other nearby sites can be protected.

3210.3 Protection

In general, protection of potentially impacted environmentally sensitive areas will receive a higher priority than economically significant sites. This hierarchy was established in the ranking of the environmentally sensitive sites as A, B and C and the economically significant sites as D, E, and F with the highest priority being A. However, as mentioned before, resources and sites determined to be critical to the preservation of human health and safety – such as drinking water intakes, power plant intakes and desalinization plants – afford first priority, ahead of environmentally sensitive sites.

The UC will make the final decision regarding protection priorities for the environmentally sensitive and economically significant areas. In order to further assist the UC, additional prioritization of equally categorized areas that could be impacted may, in the future, be included in this plan. This will allow the UC to determine which priority sites should be protected when initial resources will only allow the protection of a few of them.

The UC may utilize the predetermined response strategies for environmentally sensitive sites and economically significant sites. The UC must decide which sites are in jeopardy of being oiled and the response strategy should be implemented as indicated in the response strategy site summary sheets included in Section 3610. However, the UC and the responders should remain flexible and be receptive to additional information when instituting the booming plan or other countermeasures. Factors such as unusually high winds, strong tidal currents or freshets, equipment limitations, bottom conditions, and the type of oil can have a significant effect on the proposed strategy. Modifications to the preplanned strategies should be expected.

In addition to the seasonal variances, the protection priority of an entire area could foreseeably be changed. For example, if the Scientific Support Coordinator (SSC) or a Department of Fish and Game (DFG) biologist determines that a certain section of marshland or coastline previously categorized as a lower priority (or not categorized at all) is currently a breeding ground for an endangered species, then protection of that site may be afforded the utmost priority even at the expense of a previously categorized A site located adjacent to it.

3210.4 Containment and Protection Options

Before spilled oil can be effectively recovered, spreading must be controlled and the oil contained in an area accessible to oil recovery devices. This section discusses various oil containment strategies. Generally, spilled oil is contained using oil containment boom. Typical boom has a flotation section that provides a barrier on and above the water surface and a skirt section that provides a barrier below the water surface. The physical dimensions of the boom to be used for a particular spill will be dependent on local conditions: In the open ocean boom that is several feet tall may be required. In a protected marsh, it may be appropriate to use a boom that is only a few inches tall.

There are limitations on the effectiveness of any boom. Oil can be lost if breaking waves cause a splash over the top of the boom. Oil can also be carried under the boom if currents cause the oil to impact the boom with a velocity perpendicular to the boom of greater than 0.7 knots. Once a boom has been deployed, it may be necessary to reposition it due to changing tides and currents. It is desirable to have personnel available to readjust the boom as necessary. In all cases of boom deployment, consideration must be given to protecting the safety of those involved.

Open Water Containment: Oil spilled on open water is normally contained using boom. The boom will be deployed using vessels that will tow the boom around the perimeter of the oil spill. The type of boom to be deployed will depend on local conditions, including Sea State, tides, currents, and wind. To be most effective, booming on open water must be done as soon as possible after a spill.

Protective Booming: The goal of most oil containment and recovery strategies is to collect the spilled oil from the water and prevent it from reaching sensitive resources. Frequently, however, this is not possible and sensitive resources are oiled in spite of response efforts, especially during large oil spills. In these cases, the goal will be to minimize environmental injury using a variety of booming, containment, and recovery techniques. The following are techniques that the Booming

Branch of the UCS' Operations section use for containing spilled oil on water or as a means to direct it away from sensitive natural resources or cultural amenities. Shoreline cleanup and treatment methods are discussed in more detail in Section 4530.

Exclusionary booming is performed prior to the advance of the oil and is used to prevent or exclude oil from entering a harbor inlet, slough, marsh, or estuary. Either skirted or sorbent boom can be used for this type of booming. Factors that must be considered are: type and size of boom, natural outflow of the body of water, wind, tide, and currents or a combination of both. These factors can be predetermined by the establishment of a priority system, training and local knowledge of underwater topography, weather conditions, and boom anchoring capabilities. It is important to remember that the boom needs to be tended and monitored as weather and tidal conditions can change.

Diversionary booming should be set so that oil movement is reduced to under 0.7 knots. This can be accomplished by angling the boom in relation to the current's direction, which reduces the velocity of the floating oil in relation to the boom. Diversionary or deflection booms can be set up in series along a waterway to increase their effectiveness. As stated before, the boom(s) needs to be tended and monitored as weather and tidal conditions can change.

Containment booming is used to prevent spreading and to concentrate the oil so it can be skimmed or vacuumed. Factors that must be considered are: type and size of boom required for weather, winds, tides, and currents in the vicinity of potential spill areas; the type of deployment vessel needed; the amount of boom needed for effective containment; and available skimming capabilities. Fixed or natural anchor points should be selected. These factors can be predetermined by emphasizing worst case spill scenarios and using local knowledge of weather and sea conditions.

Sorbent booming is useful when the amount of oil is minimal, when tides and currents are light, or when shorelines require protection. Heavier oil can be recovered using adsorbents (oil adheres to material) and lighter fuels generally are recovered using absorbents (materials such as sausage, sweep, or diapers that absorbs the oil). Sorbent booming can also be used as a backup for other booming types to recover product that may have entrained past the primary barrier.

Factors that must be considered are wind and wave action; type of sorbent required (i.e., rocky or sandy shoreline, marsh area, etc.) and type and viscosity of product to be recovered.

Berms and Dams: Coastal shores are natural barriers to spreading oil. Temporary berms, dikes, and dams can also serve as effective barriers against oil contamination of sensitive natural resources and economic amenities. Berms, dikes, and dams are simply another form of booming and are subject to the same environmental stresses. The appropriate protection technique for a particular shore depends on several factors:

- Water body type (open water, bay, tidal channel, inlet);
- Water current velocity;
- Water depth;
- Wave height; and
- Shore type (sand, gravel, boulder).

Generally, sediment berms, dikes, and dams will most often be used to protect small coastal inlets or tidal channels that serve wetlands and marshes when these channels are accessible. Berms, dikes, and
dams are designed to keep oil outside an inlet to protect the abundant natural resources and economically significant areas that use the sheltered waters of bays and estuaries within. Occasionally, dikes and dams have been used across a channel to contain the oil within a portion of marsh to prevent widespread contamination of other resources.

Dikes and dams are not practical to use in strong currents, deep waters, and large waves. Beaches abundant with sand are generally the most suitable for building dikes and dams. Berms can be built above the active beach face to prevent the contamination of high beaches during spring tides. Alternative strategies should be prepared and the necessary supplies and equipment be in place should a berm, dike, or dam fail.

3210.5 Near Spill Containment and Recovery

Containment is the most effective strategy to aid in oil collection and removal. All oil removal and recovery techniques are most effective where oil is thickest, which is typically at or near the release site. As oil escapes containment it becomes increasingly difficult to recover and recovery success diminishes rapidly. Therefore, the most effective use of resources is to insure containment at the primary release site. This must include surrounding the release site with impervious oil barriers, including multiple layers of boom as necessary.

Inevitably, oil escapes containment. As a result, additional measures must be included to anticipate and deal with this escape. This is a particular necessity where oil booming is subject to winds and waves or strong currents and entrains or is splashed over boom. Two measures must be incorporated into boom deployment.

Containment booms must be configured to focus on and limit any oil escapement to preplanned points along the boom perimeter, for both the ebb and flood tides. These points should be selected to optimize recovery of any escaping oil. A skimmer should then be positioned downstream from these locations to continue skimming escaping oil throughout the 24-hour tide cycle, regardless of light or weather conditions. This is very practical in bay conditions where both boom and skimmers can be anchored. It is more difficult to implement in open ocean conditions.

Secondary booming should be employed in the spill area. This strategy is most effective in nearshore areas typical to bays, though opportunities may occur in open water to slow the spread from the primary containment area. In bays, spill locations are often near shorelines. Shorelines act as natural containment since they prevent free movement of oil. Also, winds and tides often drive oil toward the shore. Once oil is ashore or in a low current area, it should be confined and recovered there, if possible, to minimize its movement and contamination of other locales. Shores which have already been oiled can no longer be protected; therefore, use them as containment and recovery sites. This changes the objective from protection to containment and preventing oil escape to unoiled areas.

If the oil moves from a near shore spill site to open water, the recovery potential will diminish dramatically. As with primary containment, escapement from secondary containment booms is predictable and skimmers should be positioned to capture oil throughout the day and night, particularly during the ebb tide. These secondary shoreline confinement strategies should always be reviewed with the Resources at Risk Specialist.

Shoreline Collection: There are predictable locales where recovery efforts can be optimized at shorelines. Since oil re-accumulates, oil collection should be vigorously attempted at the shoreline in two situations: 1. Places where winds and currents cause oil to naturally collect at the shoreline and 2. Diversion and capture of oil as it flows past or along shorelines and points with low environmental sensitivities.

(Oil recollects because it is a substance that spreads primarily in two dimensions on the water surface while water moves in three dimensions. Oil will spread and thin but it will also re-accumulate at predictable locales; wherever water has downward currents – such as tide rips along mud flats – and at windward coves.)

Here are the operational considerations when establishing a shoreline collection site when oil is moving along or near shore should be: Boom should be positioned at an acute angle to the current to move oil toward the shore collection site (cascading boom arrangements may be necessary). Once oil is at the shoreline, it may be necessary to deploy additional boom to trap the accumulated oil at the shore collection site when the tide reverses. Good land accessibility is an important part of selecting capture sites since it permits site support and easy removal of collected oil. Though some natural collection sites may have poor land access, they may be important accumulation points that can be exploited effectively via water.

Deployments of this type should be made only per recommendation of the ACP, Incident Action Plan, or with the direction of the Resources at Risk Specialist and the UC.

Natural collection points for debris are on all shorelines. These points are so predictable that it is very difficult to keep oil off even with pre-deployments. An alternative is to anticipate such collections and leverage the opportunity for oil capture. This entails developing the site for collection while limiting and focusing undesirable impacts to the habitat. Though this entails risk, the trade-off is likely to be nominal since the impacts are virtually inevitable.

Diversion to shores with low environmental sensitivities is a desirable alternative to unmitigated oil spread. As described above, oil spreads rapidly on open water and effective on-water skimming is difficult in a high current environment. Diversion can shunt oil out of the high current and into quiet water capture points at shore. It can be an effective addition to on-water skimming recovery.

3220 On-Water Recovery

Oil spilled in open water spreads quickly and weathers rapidly. Often, rough wind and sea conditions will be contributing factors to the cause of the spill and these same conditions will preclude response and deployment of surface equipment or minimize their effectiveness. Such conditions may cause the oil to be dispersed into the water column, evaporated into the atmosphere, and/or transported away from sensitive areas and resources. These conditions may prescribe a decreased response with an action plan that allows a natural “weathering and cleansing” process. If possible, however, an active response must be undertaken in order to remove oil from the environment and thereby reduce the threat to sensitive natural resources.

Usually a series of successive strategies are necessary and appropriate for any spill. Each set of environmental and situational conditions limit the array of possible useful strategies. Omission of any appropriate strategy can have severe results. Consequently, it is very important that every effort be given to implementation of the strategies described.

Mechanical control and recovery countermeasures are most effective immediately after a spill when the oil is in a thick layer and covers a small area. When oil is spilled in or allowed to escape to open water,

the possibility of containment and recovery is limited by the weather and sea conditions. Booms and skimmers are most effective in calm waters but can also work during moderate weather and sea conditions. When the open water is rough, booms and skimmers become ineffective and containment is
impossible and weir skimmers are particularly ineffective. Windy conditions speed the rate of spreading, resulting in diminishing opportunity for open water recovery.

On Water Recovery Branch: On-water recovery is in the Operations Section of the UCS. The On Water Recovery Branch reports to the Operations Section Chief. Major responsibilities are as follows:

- Implement assigned portion of spill action plan to contain and recover spilled oil;
- Request needed resources and assign to group supervisors;
- Maintain ship to shore communications;
- Provide situation and resource status information to the Operations Section;
- Coordinate activities with Shoreline Cleanup and Booming Branches;
- Report all events and accidents to the Operations Section Chief;
- Evaluate the performance of containment and recovery equipment; and
- Participate in strategy development with Planning and Logistics Sections.

3220.1 Recovery Options

3220.11 Offshore/Open Water Operations

Once the oil has been contained, oil removal/recovery in open water can be accomplished with skimming devices. Skimmers can be freestanding devices in which the skimmer is a separate piece of equipment that pumps the oil/water mixture from the contained surface into tanks on a vessel. These skimmers are usually driven by hydraulic units on board a vessel. Self-propelled skimmers have a skimmer as an integral part of the vessel. The skimming vessel positions itself at the head of a concentrated or contained pool of oil and recovers the oil into tanks on board the vessel.

“Vessels of opportunity,” such as fishing vessels, may be used to deploy or tow boom and, depending on their size, be equipped with skimming equipment. They need to have adequate deck space and lifting cranes to carry the necessary equipment. The Coast Guard’s Vessel of Opportunity Skimming System (VOSS) could be deployed on a variety of vessels.

To be most effective, oil spill recovery equipment must be directed to the location of the thickest oil accumulation. Observers on vessels at water level are unable to see a vast area and are unable to recognize the most optimum skimming locations. Skimming activities are best directed by trained observers aloft in helicopters. One observer may be able to direct several skimming units to optimum skimming locations. During hours of darkness or poor visibility, tracking devices that emit radiolocation signals can be placed in the spilled oil to trace the oil movement. Remote

sensing systems have been developed which can track oil movement even in darkness and poor visibility. The sensor is mounted in an aircraft that overflies the spill area. The sensor systems include Side Looking Airborne Radar (SLAR), infrared and radiometric.

3220.12 Nearshore/Shallow Water

Oil recovery techniques and equipment are different in nearshore/shallow water locations than in open water. Shallow draft vessels and smaller boom and skimmers are used in these situations. These vessels can maneuver into confined spaces behind and under wharves or in sloughs and can actually skim next to shore in many nearshore locations.

Strategies for nearshore cleanup can differ depending on the depth of the water and the location. Nearshore operations within a bay or inlet will also require shallow draft vessels, work boats, and skimmers. However, the vessels may only be operable at high tide. At or near low tide, the operation may evolve into a shoreline cleanup operation. Any boom-towing boats or skimmers must be able to withstand going aground without sustaining major damage.

Coastal shallow water or nearshore strategies will differ in certain respects. In addition to the need for small, shallow draft vessels, specialized vessels such as kelp cutters and harvesters may also be needed. California's rocky coast can make nearshore operations difficult and even dangerous during high surf and winter conditions. Once again, the safety of personnel involved in these operations is the UC's paramount concern.

Weir Skimmers: These skimmers recover oil by aligning a barrier just below the surface of the water and having oil floating on the water surface pass over the weir into a recovery box or into a pump. Weir skimmers are not the most efficient recovery systems because a large amount of water is usually collected along with the recovered oil. They are very limited when conditions are not calm or where current exceed 0.7 kts or waves.

Vortex Skimmers: In a vortex skimmer, a turbine-like fan, mounted below the surface, is used to create a current that draws in oil floating on the water. It is then pumped to a collection tank. The device is mounted on a vessel or floats at the water surface.

Sorption/Oleophilic Skimmers: This type of skimmer uses materials that will retain a high percentage of oil, minimizing the amount of water collected with the oil. The skimming devices can be belts, ropes, brushes or discs that come in contact with the oil. The device will then either wring or scrape the oil from the material into a collection point for removal to a storage tank. Some belt or brush skimmers have high efficacy even in currents exceeding 2 knots and rough conditions.

Suction Skimmers: These devices operate in conjunction with a pump that draws liquid into the skimming device. The skimmer head generally floats on the water with an oil/water mixture being drawn into the skimmer. A typical application would include a skim head used with a truck-mounted vacuum system.

Suction Dredges: These are rarely used to recover oil or oiled sediments from the bottom of a water body because oil usually does not sink or, if it does, the amount is small and not recoverable. There are exceptions, however. Whether an oil sinks or floats depends primarily on the specific gravity of the oil and the temperature and salinity of the water. Oil may also sink once it is adsorbed to exposed sediment like sand or gravel, which is subsequently mobilized and redeposited in deeper water.

If dredging is considered as a recovery technique, there must be provision for containment and storage of large quantities of water recovered along with the oil or oiled sediment. A large quantity of oil-

contaminated water can present significant storage, transport, and disposal problems, which must be resolved before the activity is begun. These problems can be diminished if oil/water separation is provided, and State and Federal agencies allow decanting of water back to the containment area.

Dredging can be coupled with low-volume, low-pressure washing of the bottom to direct the sunken oil down-gradient to some collection point where a dredge can recover the accumulated oil. Currents and
flow patterns may cause the sunken oil to naturally collect in low spots that can serve this same purpose. The use of a hopper barge's inverted draghead as a weir skimmer was fairly successful in Prince William Sound and could be employed in calm seas.

Vacuum trucks are frequently essential equipment for oil spill cleanup. A hose is extended from the truck to the oil collection or containment site to pick up the oil. If the oil is floating on water, the suction hose can be connected to a "duck bill" nozzle that has a long horizontal slot to allow the oil to be picked up with a minimal the amount of water. A weir-type skimmer can also be connected to the suction hose to suck the thin layer of oil from the surface and minimize the amount of water collected at the same time. Both methods require a full-time attendant to adjust the equipment and clear debris.

Vacuum trucks work best when the oil layer is thick. If there is only a thin layer of oil on the water, much more water will be collected than oil. Recovery of a large quantity of water can make a vacuum truck operation very inefficient because the tank will fill quickly with water and increase transport and disposal costs. The operation can be made more efficient if the oil/water mix recovered is allowed to separate in the tank and the water decanted back to the containment area. According to state law, decanting can be approved by the UC.

3220.2 Storage

To expedite removal of spilled oil, refined products, and contaminated materials from marine waters during an emergency response, containment activities (to include temporary waste storage) may be conducted at appropriate on-shore locations [22 CCR 66270.1(c)3]. The transportation of oil and contaminated material to temporary waste storage sites during an emergency response is exempt from transportation and manifesting requirements, per the draft MOU between OSPR and DTSC (these requirements are also exempted per 22 CCR 66263.30 and/or 66263.43 for transportation-related emergency responses).

During an immediate response, all oil and/or oily materials may be recovered, transported, or transferred to temporary waste storage sites and are exempt from any hazardous waste generator and facility permit requirements for a period of 30 days, per the draft MOU between OSPR and DTSC. Additional 30-day extensions may be granted by DTSC, under appropriate circumstances.

Temporary storage sites can be an area or facility approved by the IC or UC for characterizing and/or temporarily storing recovered oil and/or oily materials used, collected, or recovered during an oil spill response. Such an area may include, but is not limited to, permitted or interim status hazardous waste storage facilities, other non-permitted facilities, vessels, barges, tanks, vacuum trucks, barrels, containers, storage piles, or other appropriate containment methods and locations that may be used to hold recovered oil and/or oily materials. Temporary storage sites need not be owned, operated, or leased by the RP. Temporary storage sites that are on-shore should be established at locations that are convenient to the recovery operations for the temporary storage

of recovered petroleum products, and contaminated materials and debris. Establishment of the temporary storage site, however, must be done with the concurrence of the following:

- FOSC
- (DTSC)- The DTSC Duty Officer can be contacted at (800) 260-3972 or (916) 255-6504. After hours, on weekends and on holidays, contact the Governor's Office of Emergency Services Warning Control Center at (800) 852-7550.
- California Coastal Commission: (1) CCC Oil Spill Program (Deputy Director 415-904-5205, or 24-hour cell phone 415-693-8375); or (2) if CCC Oil Spill Program cannot be reached, call CCC San Diego District Manager (619-767-2375).
- Regional Water Quality Control Board (RWQCB); and
- Local health, fire and emergency services departments.
- If a Unified Command (UC) is established, OSPR will facilitate the contact of the State and local government agencies through the Liaison Officer.

3230 Shoreside Recovery

Shoreline Types

The most obvious differences between shorelines along the California coast are due to geomorphology. Geomorphological differences are caused by exposure to different quantities of water and wind-driven forces of shoreline energy (specifically waves and currents) and the actual shoreline type (substrate, grain size, tidal elevation, origin). The geomorphology and the degree of exposure to waves and currents combine to influence the plants and animals that inhabit the intertidal and shallow subtidal areas of the shoreline and the natural persistence of stranded oil. These same factors provide the criteria to determine the appropriate shoreline cleanup techniques.

These concepts were the basis for development of the Environmental Sensitivity Index (ESI) by the Research Planning Institute (RPI), which ranks 15 major shoreline types according to their sensitivity to oiling and shoreline cleanup activity. The ESI provides a useful first step in the design of contingency plans because it enables the ready identification of priority areas for protection from oiling and determination of appropriate shoreline cleanup methods during response activities. Summarized, the ESI ranges from least sensitive to oil (lowest numbers) to most sensitive to oil (highest numbers). Detailed descriptions of the ESI shoreline types and likely oil impacts can be found in the National Oceanic & Atmospheric Administration (NOAA) Shoreline Assessment Manual at: http://response.restoration.noaa.gov/shor_aid/shor_aid.html

Shoreline types are ranked as follows:

RANK	SHORE	(NOAA ESI Map Shore Type)
1	Exposed rocky shores	(1)
2	Exposed rocky platforms	(2)
3	Fine-grained sand beaches	(3)
4	Coarse-grained sand beaches	(4)
5	Mixed sand and gravel beaches	(5)
6	Gravel beaches	(6a)

7	Riprap structures	(6b)
8	Exposed tidal flats	(7)
9	Sheltered rocky shores	(8a)
10	Sheltered artificial structures	(8b)
11	Sheltered tidal flats	(9)
12	Salt to brackish marshes	(10a)
13	Freshwater marshes	(10b)
14	Swamps	(10c)
15	Mangrove	(10d)

3230.1 Shoreline Cleanup Options

Shoreline Cleanup:

Under certain conditions it will be appropriate to take actions to remediate the effects of oil on shorelines. Other conditions may dictate that no actions should be taken. The primary goal of the implementation of any shoreline countermeasure is the removal of oil from the environment with no further injury or destruction to that environment. A list of the 21 different countermeasures is provided. These 21 countermeasures, including natural recovery, have been evaluated for the appropriateness of their use on five major categories of petroleum products (very light, light, medium, heavy, and non-floating) stranded on 10 shoreline types. The results of these evaluations are presented on five matrices attached at the end of this section. These matrices are intended to be used as a planning guide by the Shoreside Recovery Group of the Operations Section.

The countermeasures listed may not be the best for use under all possible circumstances, and multiple countermeasures may need to be used on the same shoreline. Selection of specific countermeasures for use during a spill response will be based on the properties of the stranded oil, the degree of contamination, the shoreline type, and the presence of sensitive natural resources. The FOSC or the State OSC has the authority to select or approve specific countermeasures for use during an oil spill response.

Potential Shoreline Treatment Methods:

The following section lists and describes those techniques which may be required for use during a shoreline cleanup. Methods and equipment currently in use for these shoreline treatment methods are described in more detail in the Shoreline Assessment Manual. These methods, when used according to the guidelines in this document, may be used on most sites as part of the UC-directed response. It should be noted that methods noted with an (*) will require special consideration and authorization by the natural resource trustee prior to commencement of work. The trustee agency(s) for fish and wildlife resources will make the final recommendations to the UC on which specific method(s) to employ on a case-by-case basis. Regardless of this decision, contingency plans should provide for an array of identified methods to be used. Currently approved methods are:

- Natural Recovery
- Barriers/Berms
- Manual Oil Removal/Cleaning

    - Mechanical Oil Removal
    - Sorbents
    - Vacuum
    - Debris Removal
    - Sediment Reworking/Tilling
- Vegetation Cutting/Removal
- Flooding (deluge)
- Low Pressure, Ambient Water Flush (<50 psi)
- High Pressure, Ambient Water Flush (50-100 psi)
- Low Pressure, Hot Water (<50 psi)
- High Pressure, Hot Water (50-100 psi)
- Steam Cleaning
- Sand Blasting
- Solidifiers
- Shoreline Cleaning Agents
- Nutrient Enrichments
- Natural Microbe Seeding
- In-situ Burning

A description of each shoreline cleanup method is discussed below:

3230.11 Natural Recovery

Objective: No attempt is made to remove any stranded oil when there is no effective method for cleanup or to minimize impact to the environment. Oil is left to degrade naturally.

Description: No action is taken, although monitoring of contaminated areas is required.

Applicable Habitat Types: All habitat types.

When to Use: When natural removal rates are fast (e.g., gasoline evaporation or high energy coastlines), when the degree of oiling is light, access is severely restricted or dangerous to cleanup crews, or when cleanup actions will do more harm than natural removal.

Biological Constraints: This method may be inappropriate for areas used by high numbers of mobile animals (birds, marine mammals) or endangered species.

Environmental Effects: Same as from the oil alone.

Waste Generation: None.

3230.12 Barriers/Berms

Objective: To prevent entry of oil into a sensitive area or to divert oil to a collection area.

Description: A physical barrier other than a boom is placed across an area to prevent oil from passing through into sensitive habitats. Barriers can consist of earthen berms or filter fences. When it is necessary for water to pass because of water volume, underflow or overflow dams are used.

Applicable Habitat Types: At the mouths of creeks or streams to prevent oil from entering from offshore, or to prevent oil from being released from the creek into offshore waters. Also, on beaches where a high berm can be built above the high-tide line to prevent oil from washing over the beach and entering a sensitive back-beach habitat (e.g. lagoon).

When to Use: When the oil threatens sensitive habitats and other barriers are not feasible. To protect sensitive areas when cleaning adjacent shorelines.

Environmental Effects: May disrupt or contaminate sediments and adjacent vegetation. The natural beach or shore profile should be restored (may take weeks to months on gravel beaches).

Biological Constraints: Responders must minimize disturbance to sensitive areas, such as shorebird nesting sites on beaches. Placement of dams and filter fences could cause excessive physical disruptions to the site, particularly in wetlands.

Waste Generation: Sediment barriers will become contaminated on the oil side and filter fence materials must be disposed of as oily wastes.

3230.13 Manual Oil Removal/Cleaning

Objective: To remove oil with hand tools and manual labor.

Description: Removal of surface oil with hands, rakes, shovels, buckets, scrappers, sorbents, pitchforks, etc., and placing in containers. No mechanized equipment is used. Includes underwater recovery of submerged oil by divers with hand tools, for example.

Applicable Habitat Types: All habitat types.

When to Use: In light to moderate oiling conditions for stranded oil or heavy oils that have formed semi-solid to solid masses that can be picked up manually.

Biological Constraints: Foot traffic over sensitive areas (wetlands, tidal pools, etc.) should be restricted or prevented. There may be periods when shoreline access should be avoided, such as during bird nesting.

Environmental Effects: Minimal, if surface disturbance by crew movement and waste generation is controlled.

Waste Generation: May generate significant quantities of oil mixed with sediment, which must be properly disposed of or treated. Decontamination of hand tools may produce oily wastewater that must be treated properly. Worker personal protective gear is usually disposed of daily or decontaminated and the resulting oily wastewater treated properly.

3230.14 Mechanical Oil Removal

Objective: To remove oil from shorelines and bottom sediments with mechanical equipment.

Description: Oil and oiled sediments are collected and removed using mechanical equipment such as backhoes, graders, bulldozers, dredges, draglines, etc. Requires systems for temporary storage, transportation, and final treatment and disposal.

Applicable Habitat Types: On land, wherever surface sediments are both amenable to and accessible to heavy equipment. For submerged oil, used in sheltered areas where oil accumulates. On water, used on viscous to solid oil.

When to Use: When large amounts of oiled materials must be removed. Care should be taken to remove sediments only to the depth of oil penetration, which can be difficult when using heavy equipment. Should be used carefully where excessive sediment removal may cause erosion.

Biological Constraints: Heavy equipment may be restricted in sensitive habitats (e.g., wetlands, soft substrate) or areas containing endangered species. Will need special permission to use in areas with known cultural resources. Dredging in seagrass beds or coral reef habitats may be prohibited. The noise generated by the mechanical equipment may also be a constraint.

Environmental Effects: The equipment is heavy, with many support personnel required. May be detrimental if excessive sediments are removed without replacement. All organisms in the sediments will be affected, although the need to remove the oil may make this response method the best overall alternative. Resuspension of exposed oil and fine-grained oily sediments can affect adjacent bodies of water.

Waste Generation: Can generate significant quantities of contaminated sediment that must be cleaned or landfilled. The amount of waste generated by this cleanup option should be given careful consideration by response planners when reviewing potential environmental impacts of the oily wastes, debris, and residues.

3230.15 Sorbents

Objective: To remove surface oil by absorption onto oleophilic (oil-attracting) material placed in water or at the waterline.

Description: Sorbent material is placed on the floating oil or water surface to allow it to absorb oil, or alternatively, the material can be used to wipe or dab stranded oil. Forms include sausage boom, pads, rolls, sweeps, snares, and loose granules or particles. These products can be either synthetic or natural substances. Efficacy depends upon the capacity of the particular sorbent, energy available for lifting oil off the substrate, and stickiness of the oil. Recovery of all sorbent material is mandatory. Loose particulate sorbents must be contained in a mesh or other material.

Applicable Habitat Types: Can be used on any habitat or environment type.
When to Use: When oil is free-floating close to shore or stranded on shore. The oil must be able to be released from the substrate and be absorbed by the sorbent. Often used as a secondary treatment method after gross oil removal and in sensitive areas where access is restricted. Selection of sorbent varies by oil type; heavy oils only coat surfaces, requiring a high surface area to be effective, whereas lighter oils can penetrate sorbent material.

Biological Constraints: Access for deploying and retrieving sorbents should not be through soft or sensitive habitats or affect wildlife. Sorbent use should be monitored to prevent overuse and generation of large volumes of waste. Sorbents should not be used in a fashion that would endanger or trap wildlife. Sorbents left in place too long can break apart and present an ingestion hazard to wildlife.

Environmental Effects: Physical disturbance of habitat during deployment and retrieval. Improperly deployed or tended sorbent material can crush or smother sensitive substrates.

Waste Generation: Sorbents must eventually be collected for proper disposal so care should be taken to select and use sorbents properly, and prevent generation of large amounts of lightly-oiled sorbents. Recycling should be emphasized rather than disposal.

3230.16 Vacuum

Objective: To remove oil pooled on a shoreline substrate or subtidal sediments.

Description: A vacuum unit is attached via a flexible hose to a suction head that recovers free oil. The equipment can range from small, portable units that fill individual 55-gallon drums to large supersuckers that are truck or vessel-mounted and can generate enough suction to lift large rocks. Removal rates from substrates can be extremely slow.

Applicable Habitat Types: Any accessible habitat type. May be mounted on barges for water-based operations, on trucks driven to the recovery area, or hand-carried to remote sites.

When to Use: When oil is stranded on the substrate, concentrated in trenches or trapped in vegetation. Usually requires shoreline access points.

Biological Constraints: Special restrictions should be established for areas where foot traffic and equipment operation may be damaging, such as soft substrates. Operations in wetlands need to be very closely monitored, with a site-specific list of restrictions developed to prevent damage to vegetation.

Environmental Effects: Minimal, if foot and vehicular traffic is controlled and minimal substrate is damaged or removed.

Waste Generation: Collected oil and or oil/water mix will need to be stored temporarily prior to recycling or disposal. Oil may be recyclable; if not, it will require proper disposal. Large amounts of water are often recovered, requiring separation and treatment.

3230.17 Debris Removal

Objective: To remove contaminated debris from the shoreline or water surface.

Description: Manual or mechanical removal of debris from the shore or water surface. Can include cutting and removal of oiled logs.

Applicable Habitat Types: Can be used on any habitat or environment type where access is safe.

When to Use: When driftwood and debris are heavily contaminated and provide a potential source of chronic oil release. When it may create aesthetic problems, be a source of contamination for other resources in the area, cause clogging problems in the skimmer, or create safety problems for responders. Used in areas of debris accumulation on beaches prior to oiling to minimize the amount of oiled debris to be handled.

Biological Constraints: Foot traffic over sensitive areas (wetlands, spawning grounds) needs to be restricted. May be periods when access should be restricted (spawning periods, influx of large numbers of migratory water birds).

Environmental Effects: Physical disruption of substrate, especially when mechanized equipment must be deployed to recover a large quantity of debris.
Waste Generation: Will generate contaminated debris (volume depends on what, and how much, is collected; e.g., logs, brush). Unless there is an approved hazardous waste incinerator that will take oily debris, burning will seldom be allowed, especially on-site burning. However, this option should still be explored, especially for remote locations, with the appropriate state or federal agencies that must give approvals for burning.

3230.18 Sediment Reworking/Tilling

Objective: To enhance the rate of degradation, by breaking up oily sediments and surface oil deposits, increasing the surface area, and raising deep subsurface oil layers to the surface.

Description: The oiled sediments are roto-tilled, disked, or otherwise mixed using mechanical equipment or manual tools. Along beaches, oiled sediments may also be pushed to the water's edge (surf washing) to enhance natural cleanup by wave activity. The process may be aided with high-volume flushing of gravel.
Applicable Habitat Types: On any sedimentary substrate that can support mechanical equipment or foot traffic.

When to Use: On sand to gravel beaches with subsurface oil, where sediment removal is not feasible (due to erosion or disposal problems). On sand beaches, where the sediment is stained or lightly oiled; appropriate where oil is stranded above normal high waterline.

Biological Constraints: Avoid use on shores near sensitive wildlife habitat, such as fish-spawning areas or bird-nesting or concentration areas due to the potential for release of oil and oiled sediments into adjacent bodies of water. Should not be used in shellfish beds.

Environmental Effects: Due to the mixing of oil into sediments, this method could further expose organisms that live below the original layer of oil. Repeated mixing over time could delay reestablishing organisms. Refloated oil from treated sites could contaminate adjacent areas.

Waste Generation: None.

3230.19 Vegetation Cutting/Removal

Objective: To remove portions of oiled vegetation or oil trapped in vegetation to prevent oiling of wildlife or secondary oil releases.

Description: Oiled vegetation is cut with weed-wackers, blades, etc., and picked/raked up and bagged for disposal.

Applicable Habitat Types: Habitats composed of vegetation such as wetlands, seagrass beds, and kelp beds.

When to Use: When the risk of oiled vegetation contaminating wildlife is greater than the value of the vegetation that is to be cut, and there is no less-destructive method that removes or reduces the risk to acceptable levels.

Biological Constraints: Operations must be strictly monitored to minimize the degree of root destruction and mixing of oil deeper into the sediments. Access in bird-nesting areas should be restricted during nesting seasons. Cutting only the oiled portions of the plants and leaving roots and as much of the stem as possible minimizes impact to affected plants.

Environmental Effects: Vegetation removal will destroy habitat for many animals. Cut areas will have reduced plant growth, and in some instances, plants may be killed. Cutting at the base of the plant stem may allow oil to penetrate into the substrate, causing subsurface contamination. Along exposed sections of shoreline, the vegetation may not recover, resulting in erosion and habitat loss. Trampled areas will recover much more slowly.

Waste Generation: Cut portions of oiled plants must be collected and disposed.

3230.110 Flooding

Objective: To wash oil stranded on the land surface to the water's edge for collection.

Description: A perforated header pipe or hose is placed above the oiled shore or bank. Ambient-temperature water is pumped through the header pipe at low pressures and flows downslope to the water. On porous sediments, water flows through the substrate, pushing loose oil ahead of it, or floating oil to the water's surface and transporting the oil down the slope for pickup. On saturated, fine-grained sediments, the technique becomes more of a flushing of the surface.

Applicable Habitat Types: All shoreline types where the equipment can be effectively deployed. This is non-effective in steep intertidal areas.

When to Use: In heavily oiled areas when the oil is still fluid and adheres loosely to the substrate, and where oil has penetrated into gravel sediments. This method is frequently used with other washing techniques (low- or high-pressure, cold-to-hot-water flushing).

Biological Constraints: Special care should be taken to recover oil where nearshore habitats contain rich biological communities. Not appropriate for muddy substrates.

Environmental Effects: Habitat may be physically disturbed by foot traffic during operations and smothered by sediments washed down the slope. Oiled sediment may be transported to shallow, nearshore areas, contaminating them and burying benthic organisms.

Waste Generation: Depends on the effectiveness of the collection method.

3230.111 Low-Pressure, Ambient Water Flushing

Objective: To remove fluid oil that has adhered to the substrate or man-made structures, pooled on the surface, or become trapped in vegetation.

Description: Ambient-temperature water is sprayed at low pressures (<10 psi), usually from hand-held hoses, to lift oil from the substrate and direct it to the water's edge for recovery by skimmers, vacuum, or sorbents. Can be used with a flooding system to prevent released oil from re-adhering to the substrate down-stream of the treatment area.

Applicable Habitat Types: On substrates, riprap, and solid man-made structures, where the oil is still fluid. In wetlands and along vegetated banks where oil is trapped in vegetation.

When to Use: Where fluid oil is stranded onshore or floating on shallow intertidal areas.

Biological Constraints: May need to restrict use so that the oil/water effluent does not drain across sensitive intertidal habitats and mobilized sediments do not affect rich subtidal communities. Use from boats will reduce the need for foot traffic in soft substrates and vegetation. Flushed oil must be recovered to prevent further oiling of adjacent areas.

Environmental Effects: If containment methods are not sufficient, oil and oiled sediments may be flushed into offshore areas. Some trampling of substrate and attached biota will occur.

Waste Generation: Depends on the effectiveness of the collection method.

3230.112 High-Pressure, Ambient Water Flushing

Objective: To remove oil that has adhered to hard substrates of man-made structures.

Description: Similar to low-pressure flushing except that water pressure is 100-1,000 psi. High-pressure spray will more effectively remove sticky or viscous oils. If low water volumes are used, sorbents are placed directly below the treatment area to recover oil.

Applicable Habitat Types: On bedrock, man-made structures, and gravel substrates.

When to Use: When low-pressure flushing is not effective at removing adhered oil that must be removed to prevent continued oil release or for aesthetic reasons. Also use when a directed water jet can remove oil from hard-to-reach sites.

Biological Constraints: May have to restrict flushing so that the oil does not drain across sensitive habitats. Flushed oil must be recovered to prevent further oiling of adjacent areas. Attached animals and plants in the direct spray zone will be removed.

Environmental Effects: May drive oil deeper into the substrate or erode shorelines of fine sediments if water jet is improperly applied. If containment methods are not sufficient, oil and oiled sediments may be flushed into offshore areas. Some trampling of substrate and attached biota will occur.

Waste Generation: Depends on the effectiveness of the collection method.

3230.113 Low-Pressure, Hot Water Flushing

Objective: To remove non-fluid oil that has adhered to the substrate or man-made structures, or pooled on the surface.

Description: Hot water [90.F (30.C) up to 170.F (70.C)] is sprayed from hoses at low pressures (<10 psi) to liquefy and lift oil from the substrate and direct it to the water's edge for recovery by skimmers, vacuums, or sorbents. Used with flooding to prevent released oil from re-adhering to the substrate.

Applicable Habitat Types: On bedrock, sand to gravel substrates, and man-made structures.

When to Use: Where heavy, but relatively fresh, oil is stranded onshore. The oil must be heated above its pour point, so it will flow. This is less effective on sticky oils.

Biological Constraints: Avoid wetlands or rich intertidal communities so that hot oil/water effluent does not contact sensitive habitats. Operations from boats will help reduce foot traffic in soft substrates and vegetation. Flushed oil must be recovered to prevent further oiling of adjacent areas.

Environmental Effects: Hot water contact can kill all attached animals and plants. If containment methods are not sufficient, oil may be flushed into downstream areas. Some trampling of substrate and biota will occur.

Waste Generation: Depends on the effectiveness of the collection method.

3230.114 High-Pressure, Hot Water Flushing

Objective: To mobilize weathered and viscous oil strongly adhered to surfaces.

Description: Hot water [90.F (30.C) up to 170.F (70.C)] is sprayed with hand-held wands at pressures greater than 100 psi. If used without water flooding, this procedure requires immediate use of vacuum or sorbents to recover the oil/water runoff. When used with a flooding system, the oil is flushed to the water surface for collection by skimmers, vacuum or sorbents.

Applicable Habitat Types: Gravel substrates, bedrock and man-made structures.
When to Use: When oil has weathered to the point that warm water at low pressure no longer effectively removes oil. To remove viscous oil from man-made structures for aesthetic reasons.

Biological Constraints: Use should be restricted so that the oil/water effluent does not drain across sensitive habitats (damage can result from exposure to oil, oiled sediments, and hot water). Should not be used directly on attached algae or in rich inter-tidal areas. Released oil must be recovered to prevent further oiling of adjacent areas.

Environmental Effects: All attached animals and plants in the direct spray zone will be removed or killed, even when used properly. Oiled sediment may be transported to shallow nearshore areas, contaminating them and burying benthic organisms.

Waste Generation: Depends on the effectiveness of the collection method.

3230.115 Steam Cleaning

Objective: To remove heavy residual oil from solid substrates or man-made structures.

Description: Steam or very hot water [171.F (77.C) to 212.F (100.C)] is sprayed with hand-held wands at high pressure (2000+ psi). Water volumes are very low compared to flushing methods.

Applicable Habitat Types: Man-made structures such as seawalls and riprap.
When to Use: When heavy oil residue must be removed for aesthetic reasons and when hot-water flushing is not effective and no living resources are present.
Biological Constraints: Not to be used in areas of soft substrates, vegetation, or high biological abundance directly on, or below, the structure.

Environmental Effects: Complete destruction of all organisms in the spray zone. Difficult to recover all released oil.

Waste Generation: Depends on the effectiveness of the collection method. Usually sorbents are used, generating significant waste volumes.

3230.116 Sand Blasting

Objective: To remove heavy residual oil from solid substrates or man-made structures.

Description: Use of sandblasting equipment to remove oil from the substrate. May include recovery of used (oiled) sand in some cases.

Applicable Habitat Types: On heavily oiled bedrock and artificial structures such as seawalls and riprap.

When to Use: When heavy oil residue must be cleaned for aesthetic reasons and even steam cleaning is not effective.

Biological Constraints: Not to be used in areas of soft substrate, vegetation, or high biological abundance directly below, or adjacent to, the structures.

Environmental Effects: Complete destruction of all organisms in the blast zone. Possible smothering of downstream organisms. Unrecovered, used sand will introduce oiled sediments into the adjacent habitat.

Waste Generation: Will need to recover and dispose of oiled sand used in blasting.

3230.117 Solidifiers

Objective: To change the physical state of spilled oil from a liquid to a solid.

Description: Chemical agents (polymers) are applied to oil at rates of 10-45 percent or more, solidifying the oil in minutes to hours. Various broadcast systems, such as a leaf blowers, water cannons, or fire suppression systems, can be modified to apply the product over large areas. It can be applied to both floating and stranded oil. Can be placed in booms, pillows, sausages, etc. and used like sorbents, although this type of solidifier application has not been used operationally.

Applicable Habitat Types: All water environments, bedrock, sediments, and artificial structures.

When to Use: When immobilization of the oil is desired, to prevent refloating from a shoreline, penetration into the substrate, or further spreading. However, the oil may not fully solidify unless the product is well mixed with the oil, and may result in a mix of solid and untreated oil. Generally not used on heavy oil spills, which are already viscous.

Biological Constraints: Must be able to recover all treated material.

Environmental Effects: Available products are insoluble and have very low aquatic toxicity. Unrecovered solidified oil may have longer impact because of slow weathering rates. Physical disturbance of habitat is likely during application and recovery.

Waste Generation: If skimming efficiency is increased, solidifiers may reduce the volume of water collected during oil recovery. Most solidifier producers state that treated oil can pass leachate tests, allowing disposal in landfills.

3230.118 Shoreline Cleaning Agents (Surface Washing Agents)

Objective: To increase the efficiency of oil removal from contaminated substrates.

Description: Special formulations are applied to the substrate as a presoak and/or flushing solution to soften or lift weathered or heavy oils from the substrate to enhance flushing methods. The intent is to lower the water temperature and pressure required to mobilize the oil from the substrate during flushing. Some agents will disperse the oil as it is washed off the beach; others will not. The list of pre-approved agents is unique for California (more restrictive than EPA list) and may be found on the DFG – OSPR website www.dfg.ca.gov/ospr . Only agents list for the specified application may be used in California without RRT special approval. Also see RCP Appendix XI.

Applicable Habitat Types: On any habitat where water flooding and flushing procedures are applicable.

When to Use: When the oil has weathered to the point where it cannot be removed using ambient water temperatures and low pressures. This approach may be most applicable where flushing effectiveness decreases as the oil weathers.

Biological Constraints: When the product does not disperse the oil into the water column, the released oil must be recovered from the water surface. Use may be restricted where suspended sediment concentrations are high, near wetlands and near sensitive nearshore resources.

Environmental Effects: The toxicity and effects on dispersability of treated oil vary widely among products. Selection of a product should consider the toxicity of the product.

Waste Generation: Because treated oil must be recovered, waste generation is a function of recovery method, which often includes sorbents.

3230.119 Nutrient Enrichment (Biostimulation)

Objective: To accelerate the rate of oil hydrocarbon degradation due to natural microbial processes using a form of bioremediation that adds nutrients (generally nitrogen and phosphorus) that stimulate microbial growth. If nutrients are a limiting factor (as measured using the interstitial pore water) in an area where shoreline oiling has occurred, water-soluble nutrients can be applied by a spray irrigation system. See RCP Appendix XIX for Bioremediation Check List

Description: Nutrients should be applied daily if the impacted area gets completely submerged by tides and waves and if maximum biostimulation is desired. If the impacted area gets submerged only during spring tides, the frequency of nutrient addition will be determined by the intertidal zone water coverage. Using slow-release granular or encapsulated nutrients or oleophilic fertilizer

(which adheres to the oil residue on the surface) should require less frequent addition, but time-series monitoring of interstitial pore water nutrient levels is needed to ensure target levels are being maintained, especially throughout the depth of the impacted intertidal zone.

Applicable Habitat Types: On moderate to heavily oiled substrates (after other techniques have been used to remove free product on lightly-oiled shorelines and where other techniques are destructive or ineffective) and where nutrients limit natural attenuation. Most effective on light to medium crude oils and fuel oils (asphaltenes tend to inhibit rapid biodegradation). Less effective where oil residues are thick. Not considered for gasoline spills, which evaporate rapidly.

When to Use: Any shoreline habitat type where access is allowed and nutrients are deficient.

Biological Constraints: Avoid using ammonia-based fertilizers at highly elevated concentrations because un-ionized ammonia is toxic to aquatic life. Nitrate is an equally good nitrogen source, minus the toxicity. Sodium tripolyphosphate is a better phosphorus source than orthophosphates because it is more soluble in seawater. If nutrients are applied properly with adequate monitoring, eutrophication should not be a problem. Only nutrient additives proven to be nontoxic and effective in either the laboratory or the field should be used in the environment. Contact toxicity of oleophilic nutrients may restrict their use as other chemicals in the product could be more toxic to aquatic organisms in the presence of oil.

Environmental Effects: Detrimental effects to shoreline from foot or vehicle traffic caused by workers applying nutrients (unless nutrients are sprayed from a vessel or aircraft).

Waste Generation: None.

3230.120 Natural Microbe Seeding (Bioaugmentation)

Objective: To accelerate natural microbial degradation of oil by using a form of bioremediation that adds high numbers of oil-degrading microorganisms.

Description: Formulations containing specific hydrocarbon-degrading microbes are added to the oiled area because indigenous hydrocarbon degraders are low in number, or those that are present cannot degrade the oil effectively. Since microbes require nitrogen and phosphorus to convert hydrocarbons to biomass, formulations containing these oil degraders must also contain adequate nutrients. Research studies conducted with bioengineered organisms or organisms enriched from different environments grown in the laboratory to high numbers, and applied to an oiled beach to stimulate rapid biodegradation, have failed to prove conclusively that seeding is effective. See RCP Appendix XIX for Bioremediation Check List.

Bioaugmentation appears less effective than biostimulation because hydrocarbon degraders are ubiquitous in nature and, when an oil spill occurs at a given site, the influx of oil will cause an immediate increased response in the hydrocarbon degrading populations. But if nutrients are in limited supply, the rate of oil biodegradation will be less than optimal. Thus, supplying nutrients will enhance the process initiated by the spill, but adding microorganisms will not, because they still lack the necessary nitrogen and phosphorus to support growth.

Applicable Habitat Types: There is insufficient information on impact or effectiveness of this method to make a judgment on applicable habitat.

When to Use: There is insufficient information on impact or effectiveness of this method to make a judgment on when to use it.

Biological Constraints: Avoid using products containing ammonia-based fertilizers at elevated concentrations because un-ionized ammonia is toxic to aquatic life. Nitrate is an equally good nitrogen source, minus the toxicity. If the product containing nutrients is applied properly with adequate monitoring, eutrophication should not be a problem. However, toxicity tests should be evaluated carefully, as other chemicals in the product could be toxic to aquatic organisms.

Environmental Effects: Detrimental physical effects to shoreline from foot or vehicle traffic caused by workers applying bioaugmentation products (unless nutrients are sprayed from a vessel or aircraft).

Waste Generation: None.

3230.121 In-Situ Burning

Objective: To remove oil from the water surface or habitat by burning it in place.

Description: Oil floating on the water surface is collected into slicks at least 2-3 mm thick and ignited. The oil can be contained in fire-resistant booms, or by natural barriers such as ice or the shore. On land, oil can be burned when it is on a combustible substrate such as vegetation, logs, and other debris. Oil can be burned from non-flammable substrates using a burn promoter. On sedimentary substrates, it may be necessary to dig trenches for oil to accumulate in pools to a thickness that will sustain burning. Heavy oils are hard to ignite but can sustain a burn. Emulsified oils may not ignite nor sustain a burn when the water content is greater than 30 to 50 percent. See RCP Appendix XIII In Situ Burn guidance

Applicable Habitat Types: On land, where there is heavy oil in sites neither amenable nor accessible to physical removal and it is important to remove the stranded oil quickly. In wetlands and mud habitats, a water layer will minimize impacts to sediments and roots. Many potential applications for spills in ice. There are many operational and public health limitations.

When to Use: On most habitats except dry or muddy substrates where heat may impact the biological productivity of the habitat. May increase oil penetration into permeable substrates. Use in marshes should be undertaken using special precautions. Not suitable for woody vegetation such as mangroves and hardwood swamps.

Biological Constraints: The possible effect of smoke on wildlife and populated areas should be evaluated.

Environmental Effects: Temperature and air quality effects are likely to be localized and short-lived. Toxicological impact from burn residues has not been evaluated. On water, burn residues are likely to sink. On land, removal of residues is often necessary for crude and heavy oils. Limited data on burning oiled wetlands indicate recovery of wetland vegetation will depend on season of burn, type of vegetation, and water level in the marsh at time of burn.

Waste Generation: Any residues remaining after burning will need to be collected and land filled, but with an efficient burn this will be a small fraction of the original oil volume.

Note: Any in-situ burning must be requested/vetted through the Region 9 Regional Response Team.

3230.122 Coastal Inlets

The coastal inlets of California are the focal points for designing strategies to protect the vital resources of the State's estuaries and bays. It is through these inlets that oil spilled on open ocean waters could reach inland resources. A publication titled Coastal Inlet Protection Strategies for Oil-Spill Response was prepared jointly by Miles O. Hayes and Todd M. Montello. This document provides a synopsis of the relevant characteristics of the coastal inlets in the State, as well as a discussion of potential protection strategies for each inlet. The discussion of each inlet alludes to the range of conditions that might occur at the inlet; however, the proposed protection strategies are based on the best professional judgment of what would work under average wave and tide conditions.

3230.123 Cleanup Counter Measure Matrices (see following tables)

Table 44. GASOLINE PRODUCTS (Category I): Relative environmental impact from response methods for SHORELINE INTERTIDAL habitats.

This table should not be used without the accompanying text in the document.

Response Method	Exposed Rocky Shores (1a)	Exposed Solid Man-made Structures (1b)	Exposed Wave-cut Platforms (2a)	Sand Beaches (3) & (4)	Mixed Sand and Gravel Beaches (5)	Gravel Beaches (6a)	Riprap (6b)	Exposed Tidal Flats (7)	Sheltered Rocky Shores (8a)	Sheltered Solid Man-made Structures (8b)	Sheltered Tidal Flats (9a)	Salt to Brackish Marshes (10a)
Natural Recovery	A	A	A	A	A	A	A	A	A	A	A	A
Barriers/Berms	–	–	–	B	C	–	–	B	–	–	B	B
Manual Oil Removal/Cleaning	–	–	–	D	D	D	–	–	–	–	–	D
Mechanical Oil Removal	–	–	–	D	D	D	–	–	–	–	–	D
Sorbents	–	–	–	–	–	–	–	–	A	–	–	–
Vacuum	–	–	–	–	–	–	–	–	–	–	–	–
Debris Removal	–	–	–	–	–	–	–	–	–	–	–	–
Sediment Reworking/Tilling	–	–	–	D	D	D	–	–	–	–	–	D
Vegetation Cutting/Removal	–	–	–	–	–	–	–	–	–	–	–	D
Flooding (deluge)	–	–	–	A	A	A	A	–	–	–	–	B
Low-pressure, Ambient Water Flushing	–	–	–	B	B	A	A	–	–	–	–	B
High-pressure, Ambient Water Flushing	–	–	–	–	–	–	A	–	–	–	–	–
Low-pressure, Hot Water Flushing	–	–	–	–	–	–	–	–	–	–	–	–
High-pressure, Hot Water Flushing	–	–	–	–	–	–	–	–	–	–	–	–
Steam Cleaning	–	–	–	–	–	–	–	–	–	–	–	–
Sand Blasting	–	–	–	–	–	–	–	–	–	–	–	–
Solidifiers	–	–	–	–	–	–	–	–	–	–	–	–
Shoreline Cleaning Agents	–	–	–	–	–	–	–	–	–	–	–	–
Nutrient Enrichment	–	–	–	–	–	–	–	–	–	–	–	–
Natural Microbe Seeding	–	–	–	–	–	–	–	–	–	–	–	–
In-situ Burning	–	–	–	–	–	–	–	–	–	–	–	–

The following categories are used to compare the relative environmental impact of each response method for the specific environment or habitat for each oil type:
A = May cause the least adverse habitat impact.
B = May cause some adverse habitat impact.
C = May cause significant adverse habitat impact.
D = May cause the most adverse habitat impact.
I = Insufficient Information - impact or effectiveness of the method could not be evaluated.
— = Not applicable.

Table 45. DIESEL-LIKE PRODUCTS AND LIGHT CRUDE OILS (Category II): Relative environmental impact from response methods for SHORELINE INTERTIDAL habitats.

This table should not be used without the accompanying text in the document.

Response Method	Exposed Rocky Shores (1a)	Exposed Solid Man-made Structures (1b)	Exposed Wave-cut Platforms (2a)	Sand Beaches (3) & (4)	Mixed Sand and Gravel Beaches (5)	Gravel Beaches (6a)	Riprap (6b)	Exposed Tidal Flats (7)	Sheltered Rocky Shores (8a)	Sheltered Solid Man-made Structures (8b)	Sheltered Tidal Flats (9a)	Salt to Brackish Marshes (10a)
Natural Recovery	A	A	A	B	B	A	A	A	A	A	A	A
Barriers/Berms	–	–	–	B	C	B	–	B	–	–	B	B
Manual Oil Removal/Cleaning	–	–	B	B	C	C	A	C	C	B	D	D
Mechanical Oil Removal	–	–	–	B	C	D	–	D	–	–	–	D
Sorbents	B	B	B	B	A	A	A	A	A	A	A	A
Vacuum	A	–	A	–	–	–	–	C	B	–	C	B
Debris Removal	A	–	A	A	A	A	A	B	A	A	B	B
Sediment Reworking/Tilling	–	–	–	B	B	B	–	–	–	–	–	D
Vegetation Cutting/Removal	–	–	–	C	C	–	–	D	–	–	–	D
Flooding (deluge)	–	–	A	A	A	A	A	A	A	–	B	B
Low-pressure, Ambient Water Flushing	–	–	A	B	A	A	A	B	A	A	C	B
High-pressure, Ambient Water Flushing	–	–	B	–	–	–	A	–	C	B	–	–
Low-pressure, Hot Water Flushing	–	–	D	–	–	–	C	–	–	–	–	–
High-pressure, Hot Water Flushing	–	–	D	–	–	–	C	–	–	–	–	–
Steam Cleaning	–	–	–	–	–	–	–	–	–	–	–	–
Sand Blasting	–	–	–	–	–	–	–	–	–	–	–	–
Solidifiers	–	–	C	–	–	–	B	C	C	–	C	C
Shoreline Cleaning Agents	–	–	–	–	–	–	–	–	–	–	–	–
Nutrient Enrichment	–	–	–	A	A	A	A	I	A	I	I	A
Natural Microbe Seeding	–	–	I	I	I	I	I	I	I	I	I	I
In-situ Burning	–	–	D	–	–	–	–	–	D	–	–	B

The following categories are used to compare the relative environmental impact of each response method for the specific environment or habitat for each oil type:

A = May cause the least adverse habitat impact.

B = May cause some adverse habitat impact.

C = May cause significant adverse habitat impact.

D = May cause the most adverse habitat impact.

I = Insufficient Information - impact or effectiveness of the method could not be evaluated.

Table 46. MEDIUM GRADE CRUDE OILS AND INTERMEDIATE PRODUCTS (Category III): Relative environmental impact from response methods for SHORELINE INTERTIDAL habitats.

This table should not be used without the accompanying text in the document.

Response Method	Exposed Rocky Shores (1a)	Exposed Solid Man-made Structures (1b)	Exposed Wave-cut Platforms (2a)	Sand Beaches (3) & (4)	Mixed Sand and Gravel Beaches (5)	Gravel Beaches (6a)	Riprap (6b)	Exposed Tidal Flats (7)	Sheltered Rocky Shores (8a)	Sheltered Solid Man-made Structures (8b)	Sheltered Tidal Flats (9a)	Salt to Brackish Marshes (10a)
Natural Recovery	A	A	A	B	B	B	B	A	B	B	B	B
Barriers/Berms	–	–	–	B	C	B	–	B	–	–	B	B
Manual Oil Removal/Cleaning	B	B	B	A	B	B	A	B	B	B	C	C
Mechanical Oil Removal	–	–	–	B	B	C	B	D	–	–	–	D
Sorbents	A	A	A	A	A	A	A	A	B	A	A	A
Vacuum	A	–	A	B	B	B	A	B	B	–	B	B
Debris Removal	A	–	A	A	A	A	A	B	A	A	B	B
Sediment Reworking/Tilling	–	–	–	B	B	B	–	C	–	–	–	D
Vegetation Cutting/Removal	–	–	–	C	C	–	–	D	D	–	D	C
Flooding (deluge)	–	–	A	A	B	B	B	A	A	–	B	B
Low-pressure, Ambient Water Flushing			A	B	A	A	B	B	A	B	C	B
High-pressure, Ambient Water Flushing			B	–	C	B	B	–	B	B	–	–
Low-pressure, Hot Water Flushing			C	C	C	C	C	–	D	C	–	–
High-pressure, Hot Water Flushing			C	–	D	C	C	–	D	C	–	–
Steam Cleaning	D	D	D	–	D	D	D	–	D	D	–	–
Sand Blasting	D	D	D	–	–	–	D	–	D	D	–	–
Solidifiers	–	–	C	B	B	B	B	C	C	–	C	C
Shoreline Cleaning Agents	C	B	C	C	C	B	B	–	B	B	–	B
Nutrient Enrichment	–	–	–	A	A	A	A	I	B	I	I	B
Natural Microbe Seeding	–	–	I	I	I	I	I	I	I	I	I	I
In-situ Burning	–	–	D	C	C	C	D	–	C	–	–	B

The following categories are used to compare the relative environmental impact of each response method for the specific environment or habitat for each oil type:

A = May cause the least adverse habitat impact.

B = May cause some adverse habitat impact.

C = May cause significant adverse habitat impact.

D = May cause the most adverse habitat impact.

I = Insufficient Information - impact or effectiveness of the method could not be evaluated.

— = Not applicable.

Table 47.HEAVY CRUDE OILS AND RESIDUAL PRODUCTS (Category IV): Relative environmental impact from response methods

This table should not be used without the accompanying text in the document.

Response Method	Exposed Rocky Shores (1a)	Exposed Solid Man-made Structures (1b)	Exposed Wave-cut Platforms (2a)	Sand Beaches (3) & (4)	Mixed Sand and Gravel Beaches (5)	Gravel Beaches (6a)	Riprap (6b)	Exposed Tidal Flats (7)	Sheltered Rocky Shores (8a)	Sheltered Solid Man-made Structures (8b)	Sheltered Tidal Flats (9a)	Salt to Brackish Marshes (10a)
Natural Recovery	A	A	A	C	C	B	B	A	B	B	B	B
Barriers/Berms	–	–	–	B	B	B	–	B	–	–	B	B
Manual Oil Removal/Cleaning	–	–	B	A	A	B	A	B	C	B	C	C
Mechanical Oil Removal	–	–	–	B	B	C	C	D	–	–	–	D
Sorbents	A	A	A	A	B	B	B	B	C	B	B	A
Vacuum	A	–	A	A	B	B	A	B	B	–	B	B
Debris Removal	A	–	A	A	A	A	A	B	A	A	B	B
Sediment Reworking/Tilling	–	–	–	B	B	B	–	C	–	–	–	D
Vegetation Cutting/Removal	–	–	–	C	C	–	–	D	D	–	D	C
Flooding (deluge)	–	–	B	B	C	C	C	A	B	–	B	B
Low-pressure, Ambient Water Flushing	–	–	B	B	B	B	C	C	B	C	D	B
High-pressure, Ambient Water Flushing	–	–	B	–	D	B	B	–	B	C	–	–
Low-pressure, Hot Water Flushing	–	–	C	C	C	B	C	–	D	C	–	–
High-pressure, Hot Water Flushing	–	–	C	–	D	C	C	–	D	C	–	–
Steam Cleaning	D	D	D	–	D	D	D	–	D	D	–	–
Sand Blasting	D	D	D	–	–	–	D	–	D	D	–	–
Solidifiers	–	–	–	–	–	–	–	–	–	–	–	–
Shoreline Cleaning Agents	–	–	C	C	C	B	B	–	B	B	–	B
Nutrient Enrichment	–	–	–	B	B	B	B	I	C	I	I	B
Natural Microbe Seeding	–	–	I	I	I	I	I	I	I	I	I	I
In-situ Burning	–	–	D	C	C	C	D	–	C	–	–	B

The following categories are used to compare the relative environmental impact of each response method for the specific environment or habitat for each oil type
A = May cause the least adverse habitat impact.
B = May cause some adverse habitat impact.
C = May cause significant adverse habitat impact.
D = May cause the most adverse habitat impact.
I = Insufficient Information - impact or effectiveness of the method could not be evaluated.
— = Not applicable.

Table 48. NON-FLOATING OIL PRODUCTS (Category V): Relative environmental impact from response methods for SHORELINE INTERTIDAL habitats.
This table should not be used without the accompanying text in the document.

Response Method	Exposed Rocky Shores (1a)	Exposed Solid Man-made Structures (1b)	Exposed Wave-cut Platforms (2a)	Sand Beaches (3) & (4)	Mixed Sand and Gravel Beaches (5)	Gravel Beaches (6a)	Riprap (6b)	Exposed Tidal Flats (7)	Sheltered Rocky Shores (8a)	Sheltered Solid Man-made Structures (8b)	Sheltered Tidal Flats (9a)	Salt to Brackish Marshes (10a)
Natural Recovery	A	A	A	D	C	B	B	A	B	B	B	B
Barriers/Berms	–	–	–	B	B	B	–	B	–	–	B	B
Manual Oil Removal/Cleaning	B	B	B	A	A	A	A	B	C	B	C	C
Mechanical Oil Removal	–	–	–	B	B	C	C	D	–	–	–	D
Sorbents	A	A	A	B	B	B	B	B	C	B	B	B
Vacuum	A	–	A	A	B	B	A	B	C	–	B	B
Debris Removal	A	–	A	A	A	A	A	B	A	A	B	B
Sediment Reworking/Tilling	–	–	–	B	B	B	–	C	–	–	–	D
Vegetation Cutting/Removal	–	–	–	C	C	–	–	D	D	–	D	C
Flooding (deluge)	–	–	B	C	C	C	C	B	C	–	C	B
Low-pressure, Ambient Water Flushing	–	–	B	C	C	C	C	C	C	C	D	B
High-pressure, Ambient Water Flushing	–	–	B	–	D	B	C	–	C	C	–	–
Low-pressure, Hot Water Flushing	–	–	C	C	C	B	C	–	D	C	–	–
High-pressure, Hot Water Flushing	–	–	C	–	D	C	C	–	D	C	–	–
Steam Cleaning	D	D	D	–	D	D	D	–	D	D	–	–
Sand Blasting	D	D	D	–	–	–	D	–	D	D	–	–
Solidifiers	–	–	–	–	–	–	–	–	–	–	–	–
Shoreline Cleaning Agents	C	B	C	C	C	B	B	–	B	B	–	I
Nutrient Enrichment	–	–	–	C	C	B	B	I	C	I	I	B
Natural Microbe Seeding	–	–	I	I	I	I	I	I	I	I	I	I
In-situ Burning	–	–	–	C	C	C	–	–	C	–	–	C

The following categories are used to compare the relative environmental impact of each response method for the specific environment or habitat for each oil type:
A = May cause the least adverse habitat impact.
B = May cause some adverse habitat impact.
C = May cause significant adverse habitat impact.
D = May cause the most adverse habitat impact.
I = Insufficient Information - impact or effectiveness of the method could not be evaluated.
— = Not applicable.

3230.2 Pre-Beach Cleanup

Volunteers can be a helpful resource in removing debris from beaches prior to a spill or response effort. Refer to Section 4320 of this Plan on volunteers for more information.

3230.3 Storage

See Section 3220.2 of this Plan for more information.

3240 Disposal

Crude oil and Refined Petroleum Products

Under California law, material released or discharged to marine waters of the state are defined as waste. Once the final disposition of a specific waste is determined, the waste may be redefined as a product or material and may no longer be subject to waste management requirements.

Also refer to Sections 3008 and 4006 of the Region 9 RCP for information.

3240.1 Waste Management and Temporary Storage Options

One of the major issues associated with an oil spill response is the proper management of the recovered petroleum product, as well as the contaminated cleanup materials, soil, and debris. How these are managed is dependent on how they are characterized - as either a solid waste, hazardous waste or a hazardous material (used or reused).

3240.11 Waste Management Strategies

One of the major problems associated with an oil spill response is the disposal of collected product and contaminated cleanup materials, soil, and debris. Each category of waste has it own type of response and management problem. The following discussion presents a general approach to the management of the various types of wastes collected during an oil spill. The charts following this section presents an encapsulated view of what types of waste are generated by an oil spill and the disposal options for each type.

3240.11.1 Disposal Options

Crude oil and refined petroleum products. Under California law, material released or discharged to marine waters of the State are defined as waste. Once the final disposition of a specific waste is determined, the waste may be redefined as a product or material and may no longer be subject to waste management requirements.

Crude oil spilled into marine waters, recovered, and transported to a refinery may be considered a product and may not be subject to hazardous waste management regulations [California Health and Safety Code (CHSC), 25943.2]. The collected crude oil may be shipped to the refinery of original destination or a refinery that can accept the spilled crude oil. Refined petroleum products that are recovered from marine waters may also be handled as a product if they can be used for their originally intended purpose (i.e., fuel, fuel oil, etc.)(CHSC 25250.3).

There are other avenues by which recovered petroleum may be managed as a material (CHSC 25143.2). These approaches include recycling the petroleum through incineration, as a fuel, as a substitute for raw material feedstock, or as an ingredient used in the production of a product (i.e., asphalt). The California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) should be consulted for more information on these and other management options. The DTSC San Diego Field Office can be reached at (858) 637-5531.

State law requires the consideration of recycling, therefore recycling should be a top priority and will be undertaken if at all possible. The latest published list of companies who recycle oil, and the latest published list of licensed used oil haulers are presented in tables following this subsection. A discussion of waste minimization and recycling options is included in this subsection.

Recovered petroleum “products” that are not accepted by a refinery or that cannot be recycled must be managed as a waste. In order that the appropriate management mechanism is determined for the recovered petroleum, the waste must be characterized by a State certified laboratory to determine if the waste is hazardous or non-hazardous. It is the responsibility of the Responsible Party (RP) to have the waste accurately characterized for proper disposition [Title 22, Sec. 66260.200(C) of the California Code of Regulations (22 CCR)].

Disposal at Sea of Water Separated from Recovered Oil. Oil recovered at sea typically contains significant amounts of seawater. In order to maintain the efficiency of the skimming process this water must be separated/decanted from the oil and discharged back to the ocean during recovery operations. Separated seawater typically contains elevated levels of hydrocarbons and thus the discharge of this material may constitute a discharge of a pollutant. The USCG On-Scene Commander (OSC) recognizes the "discharge" of separated/decanted water as an integral part of offshore skimming operations and as an excellent waste minimization tool. Therefore, the USCG OSC or his/her representative may authorize the discharge of separated/decanted water back into the catenary area of a boom/skimming system outside of State waters (three miles). The exception to this will be in NOAA Marine Sanctuary waters, however, there are no National Marine Sanctuaries in the San Diego Area.

Contaminated Debris. Contaminated debris, including organic material, contaminated cleanup equipment (i.e., booms, pompoms, sorbents, etc.) and other contaminated materials that cannot be recycled must be managed as a waste. The materials must also be characterized before the appropriate waste management option is determined.

Oiled Animal Carcasses. Handling of oiled wildlife and carcasses is not permitted by law unless under the direction of California Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR) representatives who are responsible for wildlife rehabilitation and collection of carcasses for natural resource damage assessment (NRDA) investigations. The identification and location of OSPR representatives can be provided by the Unified Command Center. Collection, handling, and disposal should only proceed at the direction of OSPR which is the designated responsible trustee. RCP Appendices XXII (a) and (b), the California Wildlife Response Plan, provides details about handling and preservation of oiled wildlife and carcasses.

Refer to Section 9240.5 for information on San Diego Wildlife Rescue Organizations within the Oiled Wildlife Care Network (OWCN) and Section 9250 of this Plan for contact information on “Activating the OWCN.”

3240.11.2 Waste Minimization and Recycling Opportunities

Debris Avoidance. It is generally not possible to avoid the generation of oily debris resulting from the contact of floating oil with waterborne solids. However, it is possible to minimize the generation of oily debris in the coastal intertidal zone if the anticipated area of oil impact can be cleaned prior to stranding of the spilled oil. This has been successfully accomplished in a small number of past spills (W. Schumaker, personal communication).

Personnel can be deployed to remove debris from beach intertidal areas above the high tide line in order to minimize oiling of stranded debris/trash. It is important to note that such crews are not likely to be certified as required under OSHA 1910.120 and can only perform this task prior to the stranding of spilled oil. A safety/industrial hygiene specialist should be consulted regarding the limitations of these crews and the effective establishment of exclusion zones in the area of beach impact.

Selection of Personal Protective Equipment (PPE). Depending upon climatic conditions and material compatibilities of PPE, waste can be minimized through the selection of reusable equipment, when possible. For instance, heavy gloves and boots that can be effectively decontaminated and reused can minimize the generation of oil-contaminated disposable gloves and boots, as long as the site safety officer approves such equipment use. Reusable rain gear may also be used instead of disposable suits, if approved. Such decisions should be made early in the response process in order to minimize generating containerized, contaminated PPE which is generally disposed at Class I facilities.

Recovered Oil and Oily Water. In order to maximize skimmer efficiency and effectiveness, water should be decanted to the spill impact area with the approval of the Federal OSC and relevant State agency representatives. Operational standards (e.g., decanting only in the impact area where water depth is sufficient, no free oil) should be established as soon as skimming is initiated. In Federal waters, decanting can be approved through a request to the Federal OSC. As discussed earlier, in State waters approval must be secured from the Regional Water Quality Control Board (RWQCB); Mark Alpert is the San Diego RWQCB contact (858-467-2963).

Both oil and oily water recovered from skimming operations should be off loaded to facilities where it can be effectively recycled/ managed within established process and treatment streams. Such facilities would include terminals, refineries and commercial refiners/reclaimers/recyclers. These facilities can often provide temporary tank storage, when necessary. Oiled debris that is recovered with skimmed oil should be maintained in secure, temporary storage until it is sufficiently characterized for disposal.

Sorbent Use/Reuse. Synthetic sorbents (i.e., pads, sweeps, and booms) have become standard response materials in the “mechanical recovery” of spilled oil. Their oleophilic, hydrophobic character makes them efficient at separating oil and water and they are routinely used to recover oil from solid surfaces as well (e.g., rubble, cobble and boulder shorelines; equipment/gear; vessels; etc.). Since oiled sorbent material often constitutes a substantial percentage of the oily solid waste generated during spill response and cleanup, opportunities for minimizing this waste volume should be considered.

Some sorbents are designed to be reusable (i.e., mechanized rope-mop skimmers) or can be recycled onsite with inexpensive gear (e.g., appropriate barrel-mounted wringers). Sorbent manufacturer's instructions should be followed regarding the limits of effective reuse for their individual products. It is also possible to replace sorbent sweeps and booms with recyclable boom and other appropriate gear in circumstances where floating oil can be efficiently recovered without generating oiled sorbents. For example, in good-access, low-energy shoreline areas (harbors, bays, inlets), it may be possible to use containment boom and recover the trapped oil with vacuum trucks instead of contaminating large volumes of sorbent.

Petroleum-Contaminated Spill Recycling and Reuse. While the volume of petroleum-contaminated soil associated with coastal spills is generally lower than such volumes resulting from large inland spills, opportunities for recycling/reuse should be considered. For soils satisfying the waste profiling requirements of the State and commercial facilities, beneficial reuse as daily landfill cover after appropriate treatment is an available option in California (see Response Resources lists). Recycling of oil-contaminated soil as aggregate in cold-mix and hot batch asphalt is available at four facilities in the State of Washington (Nash, et. al, 1992).

Furthermore, a recently completed study of the incorporation of oily/solid residuals into construction materials concluded that a large market exists in California and that these recycling/reuse opportunities should be pursued and encouraged (Mittelhauser Corporation, 1992). It is important to note that both the costs and benefits of such recycling (less than $100/ton and low future liability) versus disposal in a California Class I or II disposal facility (greater than $100/ton and moderate to high future liability) are substantial. Removal of contaminated soil from temporary storage will require the authorization of the OSC.

3240.11.3 Temporary Storage

To expedite removal of spilled oil, refined products, and contaminated material from marine waters during an emergency response, temporary storage sites may be erected at appropriate shore locations [22 CCR 66270.1(c)3]. The transportation of oil and contaminated material to temporary storage sites during the emergency response is exempt from handling and permitting requirements [22 CCR 66263.30 and/or 66263.43]. Contact DTSC at (800) 260-3972 or (916) 255-6504 and request to speak to the DTSC Emergency Response Duty Officer. After hours, weekends, or on holidays, call the Governor's Office of Emergency Services (OES) Warning Control Center at (800) 852-7550 and OES will notify the DTSC Duty Officer.

Temporary storage facilities can include Baker tanks, tank trucks, oil drums, or empty fuel storage tanks. If suitable containers are not available, oily wastes may be temporarily stored in roll-off bins.

Temporary storage sites should be available at an onshore location convenient to the recovery operations to temporarily store recovered petroleum products and contaminated materials and debris. A temporary storage site may require a permit from the California Coastal Commission (CCC). For information on emergency permits for temporary storage sites within the coastal zone, call: (1) CCC Oil Spill Program (Deputy Director 415-904-5205, or 24-hour cell phone 415-693-8375); or (2) if CCC Oil Spill Program cannot be reached, call CCC San Diego District Manager (619-767-2375).

Sitting of the temporary storage site, however, must be done with the concurrence of the following:

DTSC [The DTSC duty officer can be contacted at one of the following phone numbers: Region 1 (Sacramento) @ 916-255-3545; Region 2 (Berkeley) @ 510-540-2122; and Region 4 (Long Beach) @ 714-484-5300.];

California Coastal Commission (CCC): For information on obtaining emergency permits within the coastal zone, call: (1) CCC Oil Spill Program (Deputy Director 415-904-5205, or 24-hour cell phone 415-693-8375); or (2) if CCC Oil Spill Program cannot be reached, call CCC San Diego District Manager (619-767-2375);

Regional Water Quality Control Board (RWQCB); and Local health, fire and emergency services departments.

If a Unified Command is established, OSPR will facilitate the contact of the state and local government agencies through the Liaison Officer.

3240.11.4 Initial Treatment

Petroleum and petroleum-contaminated cleanup materials can potentially be treated at a temporary storage site. One of the treatment processes that may be used is Transportable Treatment Units (TTU). The most likely treatment process undertaken with a TTU will be separation of seawater from collected petroleum. Another method employed for separating water is decanting water from temporary storage tanks.

Any water generated through the separation of petroleum and seawater may be potentially discharged to a sanitary sewer system or back to marine waters. The sanitary sewer discharge will require a permit from the local sanitation district that will establish effluent requirements for the discharged water. Should a sanitation district not allow the discharge of water to its system, the recovered sea water would either be discharged back to the adjacent marine waters or transported off-site for disposal. The discharge of recovered seawater to State waters will require a NPDES permit from the local RWQCB.

A portable incinerator may be another type of TTU available during a spill response for use with contaminated material. The use of an incinerator will require a permit from the local air quality agency. The potential use of any TTU and regulatory standards must be discussed with DTSC.

3240.11.5 Characterization of Recovered Material

Recovered petroleum and contaminated debris not recycled must be characterized to determine their waste classification before the waste can be shipped to a proper waste management facility for final disposal. A State of California certified laboratory may conduct the actual testing on representative samples of each type of waste.

It is the responsibility of the generator/RP to have petroleum and contaminated material managed as waste accurately classified as hazardous or non-hazardous for proper disposition [22 CCR 66260.200(c)]. A generator who incorrectly determines and manages a hazardous waste as non-hazardous is in violation of the hazardous waste requirements and may be subject to DTSC enforcement action.

22 CCR 66264.13 and 66265.13 states that before an owner or operator of a treatment, storage, or disposal facility transfers, treats or disposes of any hazardous waste, the owner or operator shall obtain a detailed chemical and physical analysis of a representative sample of the waste. Characterization of the waste must be provided to DTSC (via profile sheet). DTSC then designates the waste acceptable prior to shipment. State criteria for characterizing a waste hazardous or non-hazardous is found in 22 CCR 66261.10 and 66261.20-66261.24 while federal criteria is presented in 40 CFR 261.30-261.33. These criteria can apply to any oily water; sorbents, booms, and debris generated as a result of oil spill cleanup. Based on waste characterization, the wastes can be further defined as either a Federal Resource Conservation and Recovery Act (RCRA) waste (hazardous waste regulated under federal regulations), non-RCRA waste (hazardous waste regulated under California regulations), or non-hazardous waste. Non-hazardous waste in this instance is defined as designated waste per 23 CCR 25522. Once the waste is characterized, disposition options can then be selected. Removal of recovered material from temporary storage will require the authorization of the OSC.

3240.11.6 Transportation

Recovered petroleum product not accepted at a refinery or recycling facility and contaminated material must be transported to an approved waste management facility. The type of waste management facility will be based on the results of the waste characterization performed.

Hazardous Waste. Waste classified as hazardous under either Federal or State regulations must be transported to a permitted or interim status hazardous waste facility. A State licensed hazardous materials hauler must do hauling of the waste. The licensed hauler must have a U.S. EPA ID number and State transporter ID number. Prior to removal of the hazardous material from temporary storage, a uniform hazardous waste manifest (form DHS-8022A) must be prepared by the generator (RP or his representative) for recovered petroleum and other contaminated materials (22 CCR 66263.20 - 66263.23). If assistance is required for manifesting, the RP may request it from the on-scene DTSC representative or the state DTSC duty officer (916-255-6504).

When Coast Guard Sector San Diego is a waste generator, contact the FOSC Duty Spill Phone at (619) 571-8772 and request the Federal generator and State generator ID number.

All hazardous materials shipped off-site must be transported in compliance with applicable regulations. These include the RCRA regulations in 40 CFR 262-263, DOT Hazardous Materials Regulations (49 CFR 171-178), and any applicable State regulations (22 CCR 6626.20-6626.23).

Non-Hazardous Waste. Waste determined to be non-hazardous but designated waste (23 CCR 2522) will be transported to a Class II waste management facility. Manifesting of the waste is not required but a Bill of Lading is required for transportation. The appropriate RWQCB and local health department should be contacted to determine which waste management facility would accept the waste and any additional test requirements the facility might require. Removal of non-hazardous waste from temporary storage will require authorization of the OSC.

3240.12 Waste Management Facilities

There are three licensed hazardous waste management facilities in California. They are:

a. Kettleman Hills Chemical Waste Management Co., Kettleman City (Kern County), California.

Contact customer service at (559) 309-7688. They will provide name and number of local agent to contact for disposal information.

It is the only Class I facility that accepts liquid waste in any sizable quantity. Liquid petroleum accepted at Kettleman Hills will be transported to its subsidiary in Azusa, California and further transported out-of-state for incineration.

b. Clean Harbors, Westmorland (Imperial County), California.
Contact customer service at (760) 344-9400 for information. This facility will accept only solid waste.

c. Clean Harbors, Buttonwillow (Kern County), California.
Contact customer service at (661) 762-6200. This facility accepts only solid waste, although it is developing the ability to process small volumes of liquid waste.

Licensed Oil Recyclers in California		
Company Name	Location	Phone Number
D.K. Environmental	Los Angeles	(323) 268-3387
DeMenno/Kerdoon	Compton	(310) 537-7100
Evergreen Oil, Inc.	Newark	(510) 795-4400
Industrial Service Oil Co.	Downey	(562) 598-5577
Leach Oil, Inc.	Compton	(310) 323-0226
Ramos Environmental	West Sacramento	(916) 371-5747
For more information on these companies, see California Environmental Protection Agency, DTSC Alternative Technology Division's DIRECTORY OF INDUSTRIAL RECYCLERS, 1991.		

Licensed Used Oil Haulers in San Diego	
Action Cleaning Corp.	(619) 233-1881
Asbury Environmental	(619) 463-1126

Regional Water Quality Control Boards			
Region	Location	City	Telephone Number
Region 1	North Coast	Santa Rosa	(707) 576-2220
Region 2	San Francisco Bay	Oakland	(510) 622-2300
Region 3	Central Coast	San Luis Obispo	(805) 549-3147
Region 4	Los Angeles	Monterey Park	(213) 576-6600
Region 5	Central Valley	Sacramento	(916) 464-3291
Region 8	Santa Ana	Riverside	(951) 782-4130
Region 9	San Diego	San Diego	(858) 467-2952

3240.12.1 Literature Cited

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3240.2 Decanting Policy

Refer to “Disposal at Sea of Water Separated from Recovered Oil” under “Disposal Options” in Section 3240.11.1 of this Plan for information on decanting policy.

See also the MOU for State Waters found in Appendix VIII of the Region 9 RCP.

3240.3 Sample Waste Management Plan

Refer to Appendix XXVII of the Region 9 RCP.

3250 Decon

This section identifies general guidance procedures to be followed for vessels and equipment involved with oil spill response operations. Because these operations may involve operating within oiled waters or recovery operations, we may assume that vessels, equipment, machinery, and other gear will be impacted with oil. This plan will be used for all vessels and equipment either contaminated or suspected of being contaminated with oil to return to a non-oiled state. Note: Plan should identify decontamination location or site.

Refer to the Environmental Protection Agency’s Environmental Response Team website for more information. See also Section 3006 of the Region 9 RCP.

In view of the extensive equipment inventory involved in a response effort, the On Scene Coordinator will establish decontamination zones.

All contaminated items will be cleaned to a condition of cleanliness mutually agreed upon by the Unified Command and the equipment owner.

The primary focus of this operation will be to expedite cleanup of oiled vessels and response equipment in a safe, organized and efficient manner while minimizing further damage to the environment and waste generation.

3250.1 Sample Decon Plans

The following are decon plan formats for the Unified Command to use during an incident. The UC must recognize the unique circumstances of each incident and see which one is more suitable to follow. The UC can also create an entirely different format it they feel it is more appropriate.

Format Number One

Equipment Decontamination Form						
Company						
Contact Person			By			
Phone			Contract			
Item	Quantity	Unit	Location	Date Started	Date Released	FOSC

Format Number Two

EQUIPMENT DECONTAMINATION PLAN

Date: _____

FOSC _____
SOSC _____
RP _____

PREPARED BY: _____

CONTENTS:

PURPOSE

This plan serves to identify general guidance procedures to be followed by vessels involved with oil spill response operations. Because these operations may involve transiting through slicks, operating within oiled waters or recovery operations, we may assume that vessel hulls, decks, machinery, tanks, piping, deck gear and other areas will be impacted with oil. This plan will be used for all vessels and support equipment, either contaminated or suspected of being contaminated with oil, to return to a non-oiled state.

SITE SPECIFICS

Site Location: _____
Description: _____
Oil Type: _____
Contact Person: _____
Phone: _____

CONCEPT OVERVIEW

In view of the extensive equipment inventory involved in this response effort, the responsible party will:

- oversee gross decontamination of vessels;
- establish and oversee temporary berthing of oiled vessels; and
- oversee final decontamination of oil spill recovery vessels and equipment.

The primary focus of this operation will be to expedite cleanup of oiled vessels and response equipment in a safe, organized and efficient manner while minimizing further damage to the environment and waste generation.

Equipment decontamination is planned to occur in two phases:
Recovered oil is to be off-loaded from skimmers cargo tanks to portable storage tanks and or vacuum trucks pending disposal as per the “Approved” Disposal Plan.
Equipment is to be transferred into a bermed area and be decontaminated.

All equipment will undergo full decontamination prior to demobilization.

CLEANING PROCESS

A Hypalon liner or like (secondary containment) will be placed under each decon pool with the perimeter sufficiently bermed to allow for wastewater and rainwater evacuation. All wastewater will be pumped to a poly portable storage tank vacuum truck for disposal. All pumps, hoses and piping will be left in place to facilitate speedy evacuation of retained oil / water. The final disposal of wash water, oiled sorbents and materials will be accomplished in accordance with the “approved” Disposal Plan.

A cleaning solution (PES 51 or like) will be utilized as a degreaser and will be applied by a Hudson sprayer as applicable. By utilizing the PES 51 product, which will not emulsify the oily water, it is possible to recycle/reclaim the rinsates.

A MSDS for PES 51 is available at _____. Actual pressure washing, if required, will utilize a Landa (or like) hot/cold pressure washer with a temperature range up to 220° F and a pressure rating up to 3000 psi. Every attempt will be exercised to mitigate noise-generating equipment by placing it in insulated areas. Once the piece has been determined clean to the owner’s standard, the equipment will be demobilized.

See site safety plan for PPE requirements for decontamination activities.

METHODOLOGY FOR TYPES OF VESSELS

TANKER VESSELS

Decontamination of the hull of the T/V _____ is to occur at anchor within _____. The affected area will be placed inside standard contractor containment boom (8x12) during the decontamination process. If weather conditions

permit, smaller vessels will be used as platforms to facilitate cleanup operations. The hull of the vessel will be wiped by hand with cotton rags. A cleaning solution will be used to remove residue oil from the hull. All oil will be wiped from the hull in this manner. Personnel involved in this operation will wear modified PPE Level D including raingear, gloves, eye protection and floatation work vest. Preplanning for protection of adjacent areas shall be accomplished in order to minimize cross contamination. Floating oil from sheen-emanating vessels will be minimized with sorbents as necessary to reduce potential loss outside the containment boom. Floating sorbent materials shall be utilized in natural collection points as needed to retain free-floating oil. These sorbents will be tended daily.

OIL SPILL RESPONSE VESSELS

Decontamination of spill response vessels is to occur at _____ . The following vessels have been identified for decontamination _____.

Each vessel will be placed inside standard contractor containment boom (8x12) during the decontamination process. This decontamination zone area may utilize a boom anchoring system to prevent the collapse of the perimeter protection during tidal changes and surges.

A decontamination work plan will be created for each OSRV. These plans may be added as appendices to this document. Preplanning for protection of adjacent areas shall be accomplished in order to minimize cross contamination.

If required, vessels with significant oil may be hauled from the water. The vessel will be transferred to a bermed area. The vessel will be blocked using jack stands and wood cribbing. A decontamination team will be assigned to the bermed area. Most vessels require the hull to be washed / wiped to remove residual oil.

RECREATIONAL VESSELS

Recreational vessels which were oiled during the response will be sent to the _____. They will be stored in a designated area. When the vessel is to be cleaned it will be moved into a containment berm. The hull and affected areas will be cleaned with a marine cleaner. All efforts will be made to remove residual oil from the hull and machinery. The vessel will be released from the decon area following an inspection by the USCG and the P & I Club representative.

CONTAINMENT BOOM AND PORTABLE EQUIPMENT

A separate decontamination area has been identified for containment boom and small equipment. The site is located at _____.
_____ has positioned a Shoreline Cleanup Trailer at this location to provide a support zone to be used for consumable supplies.

EQUIPMENT PRIORITY

A priority assessment will be attached to each piece of equipment to ensure a timely flow of equipment through the cleaning process. The Decon team leader will work with the appropriate OSRO representative to prioritize the vessels to be cleaned. Information will be recorded on a Resource Tracking Form.

CONFINED SPACE

There are no confined space entries required as part of this decontamination project.

CERTIFICATE OF DECONTAMINATION

For this project, the equipment owner's representative will certify that equipment has been decontaminated. The FOSC shall provide final certification of decontamination in a form he or she deems appropriate. A tracking form will be used to document cleaning and acceptance by the equipment advisor.

3260 Dispersants

The following process has been developed by the California Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR) and the National Oceanic and Atmospheric Administration's Hazardous Materials Response and Assessment Division to provide for the timely and effective use of dispersants for oil spills in marine waters off California. The California Dispersant Plan, RCP 9 Appendix XII details the full process for engaging dispersants in US waters and State waters.

There are presently two commonly recognized approaches to remove significant quantities of spilled petroleum from marine surface waters. The most common technique involves mechanical skimming devices, which typically remove less than 20% of the spilled petroleum (National Research Council [NRC], 1989). The second and more controversial method is the use of chemical agents (e.g. dispersants) to disperse oil into the water column. The effectiveness of chemical dispersants has been reported to range from zero to 100 percent depending on the type of petroleum spilled, the dispersant used, and the approach employed to estimate effectiveness (NRC, 1989). A third approach, in-situ burning, is still in the developmental stage.

Dispersants offer advantages over skimming technology when addressing dispersible oils. These include: dispersants can be applied in offshore or remote areas where the use of skimming vessels may be limited or response times protracted; dispersants can be used more effectively in sea states where skimming vessels may not be able to operate; and aerial application of dispersants can more quickly address larger areas of spilled petroleum than skimming technology. In addition, dispersants can be used in concert with mechanical skimming devices to increase the rate of surface oil removal.

Dispersion of petroleum into the water column does not alleviate the risk of petroleum-related impacts on the environment. Dispersant application does however, have the potential to accelerate cleanup of spilled petroleum on the surface of the water and at the same time reduce the risk of petroleum-related impacts on environmentally sensitive areas. In the case of California, environmentally sensitive areas include the productive intertidal regions, tidal inlets, tidal marshes and other wetland areas of the coastal islands and mainland and the surface waters where endangered marine mammals and large concentrations of sea birds might exist.

The controversial aspects of dispersants relate primarily to their effectiveness and toxicity. The effectiveness of dispersant application depends on many factors including: type and weathered state of spilled petroleum; the dispersant used; sea state; and application efficiency. It is thus difficult to predict in advance the precise effectiveness of dispersant application at any one spill due to the many controlling variables (NRC, 1989).

A recent review of dispersant toxicity studies (NRC, 1989) suggests that the present generation of dispersants do not themselves present a significant threat to marine life. The primary dispersant related threat to the environment comes from the dispersion of spilled oil constituents into the water column. However, studies show that the acute toxicity associated with dispersed oil is likely to be short term as

the dispersed oil is typically diluted within hours to levels below those expected to produce impacts on the water column community. These findings, coupled with the potentially severe consequences to natural living resources when oil is on the water's surface or deposited within the productive intertidal regions, suggest that when possible the dispersion of oil may be the best response choice after an oil spill has occurred.

The California marine oil spill response community relies almost exclusively on skimming technology to recover spilled petroleum in the open ocean. Though dispersants have been used in the past, consideration of and consent for their use has been slowed by the lack of an effective, well reasoned decision-making/approval process. Owing to the logistical constraints and relatively small window of opportunity in which dispersants may be effectively applied, the decision to use dispersants must be made in a timely fashion.

The purpose of this document is to combine an existing Quick Approval Zone policy for use of dispersant in the waters 15 nautical miles or more off the coast of California with California's draft policy for use of dispersants in state waters. The resulting dispersant use decision-making policy is designed to address the use of dispersants in all waters off the coast of California.

Regional Philosophy

In 1994, the 11th U.S. Coast Guard District and Region IX of the U.S. Environmental Protection Agency (EPA) along with the State of California and other members of the Regional Response Team (RRT), developed a Quick Approval Zone Plan to expedite dispersant use in the offshore water of California at a "safe" distance from environmentally sensitive areas (Region 9 RRT. 1994). The actual area of the Quick Approval Zone (QAZ) is the waters from the Oregon border to a point 15 nautical miles from the Mexican border (to provide the Mexican government with input into dispersant use decisions that may affect their waters), and west from a line 15 nautical miles from the nearest point of land and extending out to the western most limits of the national Exclusive Economic Zone (Figure 1). Special cases were made for offshore islands, which also had a 15 nautical mile dispersant use buffer zone. The separation of the QAZ from California waters was undertaken to accommodate the State until it could develop a dispersant decision process for California waters including the environmentally sensitive near shore areas as required by State statute.

The QAZ Plan was a streamlined dispersant use checklist process to provide the Federal On Scene Coordinator (FOSC), who is the federal representative in the Unified Command (UC), with a mechanism to secure RRT permission or denial for dispersant use within one to two hours.

Until the present, the State had no uniform published approach or guidelines for dispersant use. In early 1995, the OSPR finalized a "draft" Dispersant Use Decision Process (DUDP) pursuant to State statutory requirements which addressed the use of dispersants in State waters (OSPR, 1995). The purposes of the 1995 document were to provide: a written position and guidelines for dispersant use in state waters; a process for incorporating dispersant efficacy and biological resources data into the decision making process; and a speedy DUDP for examining dispersant.

While the QAZ process was designed to provide a quick dispersant response in waters away from environmentally sensitive areas, the State's DUDP was designed to protect the most environmentally sensitive areas, when possible, through selected dispersant use. In general, the State has identified environmentally sensitive areas as the near shore surface waters, including those surrounding the offshore islands of the state, where endangered marine mammals and thousands to hundreds of thousands of sea birds may exist at any one time and the highly productive tidal inlets and intertidal regions of the mainland and offshore islands.

The State's premise on dispersant use is that in general, petroleum on the surface of the ocean poses more of an immediate and long-term risk to living marine resources and habitats than petroleum dispersed into the water column. There are exceptions to this approach and they are identified in the

Quick Approval Process (QAP) boundary definition and discussed in the QAP Checklist backup material provided in Appendix I.

The California Dispersant Plan, Appendix XII of the RRT IX Regional Contingency Plan, details in full the agencies, authorities, and process involved in making a dispersant use decision in US and State waters.

The most common technique for removing spilled oil from marine surface waters involves mechanical skimming devices, which typically remove less than 20% of the spilled petroleum (National research Council [NRC], 1989). The second most commonly considered method is the use of chemical agents (e.g., dispersants) to disperse oil into the water column. The effectiveness of this approach can range from zero to 100 percent, depending on the type of petroleum spilled, the dispersant used, oceanographic conditions, and the approach employed to estimate effectiveness (NRC, 1989).

While dispersant use can be controversial, some operational advantages are that dispersants can be applied in offshore or remote areas where the use of skimming vessels may be limited or response times protracted, in high sea states where skimming vessels may not be able to operate, and via aerial application to more quickly address larger areas. While moving dispersed oil into the water column does not alleviate the risk of impacts to that environment, it does have the potential to accelerate cleanup of spilled oil on the water surface and at the same time reduce the environmental risk of oil-related impacts on more environmentally sensitive areas and species, including the intertidal, tidal inlets, marshes and wetlands, coastline areas, and surface waters where endangered marine mammals and large concentrations of sea birds might exist.

Studies indicate that the present generation of dispersants do not themselves present a significant threat to marine life, but their action to move more oil as small droplets into the water column can present an acute toxicity to sensitive species in the upper water column (and to about 30' below the water surface). These effects will be relatively short term, as the dispersed oil is typically diluted within hours to levels below those expected to product impacts on the water column community. Before a decision is made to use dispersants, the trustee agencies will determine if, in exchange for this impact to the upper water column,
there is an expected "net environmental benefit" to the more sensitive habitats and oil-sensitive species, which would otherwise be oiled if unrecovered oil was left on the surface to drift inshore and strand on beaches. Net Environmental Benefit Analyses (NEBA) have already been conducted for all marine areas of the California coastline (0-200 miles from shore) and for San Francisco Bay. Results of the NEBAs are included in the California Dispersant Plan, and are revisited during a spill response to fine-tune the information on sensitive species and habitats in the spill impact area to make sure the NEBA findings in the planning phase are still current and applicable to a given response.

Dispersant effectiveness is difficult to predict in advance due to the many controlling variables (e.g., type and weathered state of the spilled oil, the dispersant used, sea state, application efficiency). The use of SMART (Specialized Monitoring of Applied Response Technologies) is part of the California Dispersant Plan, and will be used as appropriate during real spills to estimate the effectiveness of a dispersant application, and to make informed decisions about whether continued application is warranted. SMART is also discussed in Section 4720.6.

Dispersants can also in some cases be considered for use in conjunction with mechanical skimming (and in-situ burning, Section 3270) to increase the rate of surface oil removal.

Refer to Sections 4007.05 and 1007.05 of the Region 9 RCP. The use of dispersants may trigger fishery closure or tainting issues which are addressed in RCP Appendix XXXII and XII.

3260.1 RRT Dispersant Use Policy

The RRT has approved two types of dispersant use zones in California:

1) Dispersant Pre-Approval Zones.
All waters 3-200 nm from any shoreline except those within a National Marine Sanctuary, or within 3 nm of the California/Mexico border.
This pre-approval is only extended by the RRT to the On-Scene Coordinator (OSC).

2) RRT Incident-Specific Approval.
Required for all other waters (e.g., within state waters, including bays and estuaries, and within 3 nm of the California/Mexico border).

It is expected that the RRT will also require that any subsurface use of dispersants, or a surface use extending beyond 5-7 days, will also need to come to the RRT for their incident-specific approval.

Only dispersants that are on the federal NCP Product Schedule and licensed by the State of California may be used.

Conditions of dispersant use apply, even within the pre-approval zone. These and other recommended practices and processes are detailed in full in the California Dispersant Plan.

During a spill, dispersant use decisions (as well as other ART decisions) are run from under the Environmental Unit in Planning (see Section 4720.7), facilitated by the OSPR ART Technical Specialist and, as available, the NOAA SSC. Both are members of the Region IX RRT, and will be the primary persons tasked with working through the dispersant use flowcharts and checklists, and briefing the UC and RRT with their recommendations. If a decision is made to use dispersants, a Liaison position between Planning and Operations will be established to facilitate some operational aspects of that decision, with a focus on ensuring that all conditions of dispersant use are being met, and all Best Management Practices, effectiveness monitoring, water/toxicity sampling, wildlife monitoring, etc., are incorporated and used, as appropriate to each incident. Other aspects of dispersant use (e.g., public outreach and risk communication, seafood safety) can continue to call on the technical and process expertise available through the specialists within the Environmental Unit.

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3260.2 Dispersant Checklists

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3260.3 Preauthorized Zones

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3260.4 Dispersant Response Plan Worksheet

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3260.5 SMART Protocol

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3260.6 Types of Equipment Required

Refer to the California Dispersant Plan found in Appendix XII of the RCP.

3270 In-Situ Burning (ISB)

There are presently two commonly recognized approaches to remove significant quantities of spilled petroleum from marine surface waters. The most common technique involves mechanical skimming devices, which, for large spills, typically remove less than 20% of the spilled petroleum (National Research Council, 1989). The second and more controversial method is the use of chemical agents (e.g., dispersants) to disperse oil into the water column. The effectiveness of chemical dispersants has been reported to range from zero to 100% depending on the type of petroleum spilled, the dispersant used, and the approach employed to estimate effectiveness (National Research Council, 1989). The In-Situ Burn Plan, RCP 9 Appendix XIII details the full process for In-Situ burning.

Burning has distinct advantages over other oil spill countermeasures. It offers the potential to rapidly convert large quantities of oil into its primary combustion products with a small percentage of other unburned and residue byproducts (Evans et al., 1992). This technique could be the most effective of all in dealing with a large spill at sea and in removing large quantities of oil from the water environment before it comes ashore (S.L. Ross Environmental, 1990). Until recently, this response technology has not been regularly used, due largely to the lack of understanding of the combustion products and the principles governing the combustibility of oil-on-water (Evans, et al., 1992) as well as the lack of the equipment necessary to carry out a burn within the window of opportunity. Much of the renewed interest in in-situ burning has resulted from years of study of both the dynamics of burning oil on the water and the combustion products produced during an in-situ burn.

In-situ burning removes the surface oil by driving much of it into the atmosphere in the form of combustion gases and soot. As such, in-situ burning reduces the environmental threat and impacts posed by on-water spills but only at the cost of increasing the potential threat posed by the airborne plume. In-situ burning, however, does have the potential to accelerate cleanup of spilled petroleum on the surface of the water and at the same time reduce the risk of petroleum-related impacts on environmentally sensitive areas. In the case of California, environmentally sensitive areas include the productive intertidal regions, tidal inlets, tidal marshes and other wetland areas of the coastal islands and mainland, and the surface waters where endangered marine mammals and large concentrations of sea birds might exist. The problem for decision makers is to compare the effects of burning versus not burning and choose the option that provides the greatest net benefit to the environment, without causing undue public health impacts. Every oil spill situation is unique. Weather and sea state conditions that are most favorable for mechanical cleanup (calm winds and sea state), are not favorable for dispersants. However, dispersants might be the best response option in remote off-coast areas with choppy seas. Although limited by the ability to contain oil, in-situ burning might be the best option in

areas where it is imperative to remove large quantities of oil quickly to protect on-water resources. It is important that all response options be available for use at the time of a spill so that the best, most appropriate response can be used.

Regional Philosophy
The primary object of oil spill abatement and cleanup is to reduce the adverse effect of spilled oil on the environment. Physical removal and subsequent disposal or recycling/re-use is the preferred method. However, mechanical recover may be limited by equipment capability, weather and sea state, storage and disposal problems, and spill magnitude. Use of in-situ burning may be considered by the OSC when the preferred recovery techniques are inadequate and in-situ burning will lessen the environmental impacts of the spill.

Authority
The National Contingency Plan, Section 300.910 authorizes the OSC, with the concurrence of the EPA representative to the RRT and, as appropriate, the concurrence of the State representative to the RRT with jurisdiction over navigable waters threatened by the release of discharge (of oil) and in consultation with the DOC and DOI natural resource trustees, when practicable, to authorize the use of in-situ burning on a case-by-case basis. The Commandant of the USCG has pre-designated the USCG Captains of the Port under his jurisdiction of On-Scene Coordinators for oil spills, and has delegate authority and responsibility for compliance with Section 311 of the Federal Water Pollution Control Act to them. The USEPA has been delegated authority under Subpart J of the NCP to authorize use of in-situ burning for control of oil spills.

California Government Code Section 8670.7(f) delineates the Administrator of the Office of Spill Prevention and Response, Department of Fish and Wildlife as having the State authority over the use of all response methods, including, but not limited to in-situ burning. The Governor of the State of California has delegated state representation on the RRT to the Administrator of the OSPR.

Annual Review
It will be the charge of the RRT ART Working Group to annually review the use of in-situ burning and report its findings to the RRT at a scheduled meeting. The group will be responsible for the administrative upkeep of the contact list as well as insuring that the plan is updated to reflect any changes in regional polices (including those of Region X, the state of Oregon and Mexico), and technological advances.

The In-Situ Burn Plan, Appendix XIII of the RRT IX Regional Contingency Plan, details in full the agencies, authorities, and process involved in making an in-situ burn use decision in US and State waters.

At the time of an oil spill, the FOSC is authorized to evaluate the use of in-situ (“controlled”) burning. The use of in-situ burning should be considered when it will lessen the overall environmental impact of the spill, and when permitted under specified circumstances. A distinct advantage of in-situ burning of oil is that it permanently removes oil from the surface, with little or no impacts to environmentally sensitive resources outside the burn area (e.g., outside the air space, off the water surface, and deeper than the surface micro-layer of the water column). Disadvantages are that successful burns create a very visible and dark soot plume, which will need to be monitored to ensure particulate matter within the plume does not exceed allowed standards, and that it is not drifting toward human populated areas or occurring within the minimal distances from shore established by local air districts. In-situ burning of oil also poses some operational constraints: the oil must first be contained (which can be difficult in higher sea states) within specialized fire boom (not currently generally available in California), winds must

be favorable, the oil must be thick enough and not too emulsified to burn, and trained burn teams and monitors (wildlife, SMART, air) should be available before and during most burn events.

In-situ burning can also in some cases be considered for use in conjunction with mechanical skimming (and chemical dispersants, Section 3260) to increase the rate of surface oil removal.

Refer to Sections 4007.06 and 1007.06 of the Region 9 RCP.

3270.1 RRT ISB Policies

The RRT has approved two types of in-situ burn use zones in California:

1) RRT In-situ Burn Pre-Approval Zone.
   All waters 35-200 nm from any California shoreline. This pre-approval is only extended by the RRT to the On-Scene Coordinator (OSC). This Pre-Approval is conveyed in a Letter of Agreement among the Coast Guard, EPA, NOAA and DOI, and may be found in its entirety in Appendix XIII of the RCP.

2) RRT Incident-Specific Approval.
   Required for all other California waters (e.g., 3-35 nm from shore, and within state waters, including bays and estuaries), and on land. A case-by-case checklist for RRT in-situ burn approval, as well as other decision support material, is in Appendix XIII of the RCP.

During a spill, in-situ burn use decisions (as well as other ART decisions) are run from under the Environmental Unit in Planning (see Section 4720.7), facilitated by the OSPR ART Technical Specialist and, as available, the NOAA SSC. Both are members of the Region IX RRT, and will be the primary persons tasked with working through the in-situ burn use flowcharts and checklists, and briefing the UC and RRT with their recommendations. If a decision is made to conduct an in-situ burn, a Liaison position between Planning and Operations will be established to facilitate some operational aspects of that decision, with a focus on ensuring that all conditions of in-situ burn use are being met, and all Best Management Practices, effectiveness monitoring, air and water sampling, wildlife monitoring, etc., are incorporated and used, as appropriate to each incident.

Refer to following section.

3270.2 ISB Checklists

1) The FOSC contacts the proper agency representatives on the RRT (Appx II of the RCP for RRT membership; Appx XIII (ISB Plan) for approval process - EPA, CG, DOI, DOC and State if within three nautical miles) and informs them that a request to utilize in-situ burning may be forthcoming. The FOSC will have the RRT remain on standby for the conference call in step 3.

2) ART Unit of Planning Section completes the In-Situ Burning Decision-Making Process submits summary of findings and information to UC on Case-by-Case Checklist Form and Supplemental Information Form.

3) If FOSC, based on information submitted by the ART Section, decides that a request for in-situ burning is appropriate, the FOSC schedules conference call with RRT representatives or alternates at first reasonable opportunity.

4) Conference call is conducted and Yes/No decision made based on information provided on FOSC Checklist, Supplemental Information Form or any other sources requested by the RRT, including information from the local air district.

5) The ART Unit of the Planning Section will commence with operations if a YES Decision is forthcoming.

3270.3 Preauthorized Zones

3270.3.1 Pre-approval Zone

This zone is designated in the "Letter of Agreement (LOA) Between US Coast Guard, US EPA, and US Department of commerce and the US Department of the Interior Concerning the Use of In-situ Burning as a Response Method to Oil Pollution for areas 35 to 200 nautical miles off the California coast. Pre-approval areas are defined as those areas 35 to 200 miles off the California Coast and the areas around special jurisdictions, such as the Marine Sanctuaries, National Parks and National Wildlife Refuges, Department of Defense reservations or other jurisdictions at San Nicholas and San Clemente Islands, and any other Federal lands or jurisdictions. The FOSC will determine if conditions are met to authorize an in-situ burn as delineated in the Letter of Agreement and notify the RRT and the California Department of Fish and Wildlife as soon as feasible after the decision is made.

3270.3.2 Case-by-Case Zone

Case-by-case areas are defined as those areas not designated within the pre-approval zones. This includes all marine waters within 35 miles off the California coast as well as areas of special jurisdiction as detailed above. The FOSC will obtain approval from the EPA representative to the RRT and the California Department of Fish and Wildlife representing the State of California. Whenever fish or wildlife resources may be affected, the EPA and State representative to the RRT may consult with the DOI and DOC natural resource Trustees, including Sanctuary Managers as applicable.

3270.3.3 Letter of Agreement for ISB in Federal Waters

The following is a Letter of Agreement among the U.S. Coast Guard, U.S. Environmental Protection Agency (EPA), National Oceanic and Atmospheric Administration (NOAA) and U.S. Department of the Interior (DOI) discussing the potential use of In-situ Burn in Federal waters (35-200 miles). It includes an In-Burning Plan, In-Situ Burn Monitoring Plan, Site Safety Plan for In-Situ Burning, and In-situ Burn Boom Operations Procedures.

3270.4 Types of Equipment Required

3280 Bioremediation

Bioremediation is a treatment technology that enhances existing biological processes to accelerate the decomposition of petroleum hydrocarbons and some hazardous wastes. Bioremediation has been used extensively in wastewater treatment of spilled oil. The most extensive field research efforts have been the shoreline treatment studies in Alaska following the Valdez incident. This research suggested that shoreline treatment by nutrient enhancement

significantly increased degradation rates of oil when compared to untreated shoreline areas. The benefits of bioremediation, however, have not been adequately demonstrated through field applications. Consequently, this technology should be considered more experimental than an accepted standard for cleanup of oil spills. The promise of bioremediation providing increased rates of oil degradation with minimal input of human effort to cleanup the spilled oil is attractive. However, the technology is time consuming, unproved in open water environments, and probably best suited to the treatment of specific types of shorelines and marsh habitats. At present, bioremediation should be viewed as a polishing agent for the final stages of cleanup rather than as a primary response tool - especially considering the slow rates of reaction to degrade the oil.

Appendix XIV of the RRT IX Regional Contingency Plan describes the agencies, authorities, and process involved in making a decision to use bioremediation for oil spill incidents in US and State waters, and on land.

The primary objective of oil spill abatement and cleanup is to reduce the effect of spilled oil on the environment. Physical removal of oil is the preferred method. However, mechanical recovery may be limited by equipment capability, weather and sea conditions, spill magnitude, safety considerations, site accessibility, and surface load restrictions. In addition, efforts and equipment used for mechanical recovery of oil, especially in sensitive habitats such as marshes and wetlands, may prove to be more destructive to these environments than the original contamination with oil, leaving bioremediation as the more preferred option for consideration.

Bioremediation is a treatment technology that enhances existing biological processes to accelerate the decomposition of petroleum hydrocarbons and some hazardous wastes. Bioremediation has been used extensively in waste water treatment of spilled oil. Research in Alaska following the Valdez incident suggested that shoreline treatment by nutrient enhancement significantly increased degradation rates of oil, compared to untreated shoreline areas. The benefits of bioremediation, however, have not been adequately demonstrated through field applications during spills post-Exxon Valdez (in most cases, native oil-eating microbes effectively degrade the residual oil without additional input).

The prospect of bioremediation providing increased rates of oil degradation with minimal input of human effort is attractive. However, the technology is time consuming, unproved in open water environments, and probably best suited to the treatment of stranded oil on specific types of shorelines and in marsh habitats. At present, bioremediation should be viewed as a polishing agent for the final stages of cleanup rather than as a primary response tool, especially considering the slow rates of reaction to degrade the oil.

Refer to Section 1007.08 and Appendix XIV of the Region 9 RCP.

3280.1 RRT Bioremediation Policy

It is RRT policy that bioremediation should be used strictly as a shoreline remediation tool with a preference for nutrient enhancement and without the introduction of indigenous and/or non-indigenous microbes.

Only bioremediants that are on the federal NCP Product Schedule and licensed by the State of California may be used.

During a spill, decisions involving the use of bioremediation (as well as other ART decisions) are run from under the Environmental Unit in Planning (see Section 4720.7),

facilitated by the OSPR ART Technical Specialist and, as available, the NOAA SSC. Both are members of the Region IX RRT, and will be the primary persons tasked with working through the bioremediation flowcharts and checklists in Appendix XIV of the RCP, and briefing the UC and RRT with their recommendations.

However, based on current knowledge and research, the use of bioremediation will generally not be advised as a response tool to remove bulk oil, but reserved and further researched as a way to removed stranded oil from sensitive habitats after all threats of re-oiling have been mitigated.

3290 Use of Oil Spill Cleanup Agents (OSCAs)

Appendix XI of the RRT IX Regional Contingency Plan describes the agencies, authorities, and process involved in making a decision to use OSCAs for oil spill incidents in US and State waters, and on land.

Chemical dispersants and bioremediants are two types of oil spill cleanup agents (OSCAs) already addressed in sections 3260 and 3280, respectively. Generally, OSCAs are defined by the State of California as:

" …a chemical, or any other substance, used for removing, dispersing, or otherwise cleaning up oil or any residual products of petroleum in, or on, any waters of the state. This category of substances would include surface washing agents, dispersants, gelling agents, herding agents, emulsifiers and de-emulsifiers, chemical booms, sorbents and bioremediants."

To be considered for use in California, OSCAs must be both:

1) Listed on the federal EPA NCP Product Schedule (http://www.epa.gov/emergencies/content/ncp/index.htm), and

2) Licensed by the California Department of Fish and Wildlife, Office of Spill Prevention and Response (OSPR) (https://www.wildlife.ca.gov/OSPR).

The EPA exempts all sorbent and sorbent-type products from listing procedures. Sorbents are not automatically exempted from the State licensing process – they must first prove they are "inert" according to definitions in State Government Code Section 8670.13.1(b) before a state license exemption will be granted.

Once an OSCA is appropriately listed and licensed, it must still be approved for use by the RRT. If the use is in state waters, approval must also be granted by the OSPR Administrator.

Some cases of OSCA use, such as dispersants, have already been reviewed by the RRT, and pre-approval granted by the RRT to the OSC for specified areas and conditions of use. All other OSCA use (for example, use of surface washing agents to clean oiled rip-rap or ship hulls) must be approved for use on a case-by-case basis.

During a spill, decisions involving the use of OSCAs (as well as other ART decisions) are run from under the Environmental Unit in Planning (see Section 4720.7), facilitated by the OSPR ART Technical Specialist and, as available, the NOAA SSC. Both are members of the Region IX RRT, and will be the primary persons tasked with working through the OSCA use flowcharts and checklists in Appendix XI of the RCP, and briefing the UC and RRT with their recommendations. The Incident Commander/Unified Command will then determine the appropriateness of any particular OSCA use during a given spill incident, and will forward their request to use an OSCA to the RRT for RRT decision. If the OSCA use is in state waters, the OSPR Administrator will also issue a letter approving (or refusing approval) of an OSCA in a response. OSCA approvals (from either/or the RRT and the OSPR Administrator) may also stipulate conditions of use.

3300 Emergency Response

Refer to Section 3003.01 of the Region 9 RCP.

3310 Search and Rescue (SAR)

SAR efforts focus primarily on finding and assisting person in actual or apparent distress and are carried out within a well-defined SAR response system. When an emergency warrants responses in addition to SAR, the National Incident Management System (NIMS) Incident Command System (ICS) organizational structure shall be used for overall response management.

Examples of other activities that are not SAR, but are often closely associated with a SAR incident, include search and recovery, salvage, investigation, fire-fighting, pollution response, etc.

For more information on SAR and its use in ICS, refer to Chapter 18 of the Incident Management Handbook (IMH).

Section 3003.01.1 of the Region 9 RCP also contains helpful information on various aspects of SAR.

3310.1 SAR Area Resources

For information on San Diego Area SAR Resources, contact Coast Guard Sector San Diego's Joint Harbor Operation Center (JHOC) at (619) 278-7033 or the San Diego Regional Aquatic Lifesaving Emergency Response Task Force (SDRAlert) at (619) 980-1576.

Also refer to Section 3003.01.1 of the Region 9 RCP.

3320 Salvage/Source Control

Refer to Section 3003.01.2 of the Region 9 RCP.

3320.1 Assessment and Survey

Refer to Section 3003.01.2 of the Region 9 RCP.

3320.2 Stabilization

Refer to Section 3003.01.2 of the Region 9 RCP.

3320.3 Specialized Salvage Operations

Refer to Section 3003.01.2 of the Region 9 RCP.

3320.4 Types of Equipment Required

Refer to Section 3003.01.2 of the Region 9 RCP.

3320.5 Salvage Guidelines

Refer to Section 3003.01.2 of the Region 9 RCP.

3330 Marine Fire Fighting

Refer to Section 3003.01.3 of the Region 9 RCP and Section 8000 of this Plan.

3340 Hazmat

Refer to Section 7000 of this Plan or to Section 3003.01.4 of the Region 9 Regional Contingency.

3340.1 Initial Emergency Response Procedures

Refer to Section 7000 of this Plan for more information.

3340.2 Evacuation Procedures

Refer to Section 7000 of this Plan for more information.

3340.3 Hazmat POC's

Refer to Section 7000 of this Plan for more information.

3340.4 Types of Equipment Required

Refer to Section 7000 of this Plan for more information.

3350 Emergency Medical Services (EMS)

Refer to Section 3003.01.5 of the Region 9 RCP.

3350.1 Emergency Medical Services

In 1997, the San Diego Fire Department partnered with Rural/Metro Ambulance of San Diego to form San Diego Medical Services Enterprise LLC, the nation’s first public-private partnership to provide 911 paramedic services.

Emergency Medical Services are now coordinated between the City’s first responders and the transporting ambulance crews. Both fire and ambulance crews use the same equipment and work under

the same medical guidelines. San Diego Medical Services Enterprise crews are on the front lines of EMS technology and are currently participating in several clinical programs designed to improve emergency medical services.

Refer to Section 9250, “Medical/Ambulance/EMS Services,” of this Plan for more information.

3360 Law Enforcement

Refer to Section 3003.01.6 of the Region 9 RCP.

3360.1 Perimeter/Crowd/Traffic/Beach Control

Refer to Section 3003.01.6 of the Region 9 RCP.

3360.2 Safety/Security Zones

For information on safety/security zones, see the United States Coast Pilot, a series of nautical books that cover information important to navigators. Chapter 4 of the Coast Pilot contains San Diego-specific information.

3400 Air Operations

Air Operations will ensure that agency directives, flight manuals, unit restrictions, and other regulations will not be violated by incident aircraft (e.g., flight hours, hoist limitations, night flying, etc.). Individual air crews retain primary responsibility to ensure their aircraft are operated in accordance with their own agency’s restrictions and directives. It is also the responsibility of individual aircrews to keep the Air Operations Branch Director informed of their agency’s restrictions and directives that may affect their ability to execute incident assignments.

Refer to Chapter 7 of the Incident Management Handbook (IMH), COMDTPUB P3120.17 for more information.

3410 Air Tactical

The Air Tactical Group Supervisor (ATGS) is primarily responsible for tactical operations of aircraft and aircrews. This includes: 1) providing fuel and other supplies; 2) providing maintenance and repair of aircraft; 3) keeping records of aircraft activity, and 4) providing enforcement of safety regulations.

Refer to Chapter 7 of the Incident Management Handbook (IMH), COMDTPUB P3120.17 for more information.

3410.1 Aerial Surveillance

Aerial surveillance can be used during pollution response to gather information about the size and nature of an oil spill. Coast Guard rotary-wing (R/W) aircraft are highly maneuverable and well-suited to surveillance in crowded or congested areas, such as ports and harbors. Information on the spill may be gathered through visual observation of the spill or photography by the aircrew, or by a subject matter expert carried on board the aircraft. Coast Guard fixed-wing (F/W) aircraft are better suited to long-range or off-shore aerial surveillance. Information on the spill may be gathered through visual observation, photography, or the aircraft may be configured with Side Looking Airborne RADAR (SLAR) that can be used to detect and map oil spills.

Sector San Diego has three MH-60J Jayhawk helicopters, suitable for aerial surveillance and photography. C-130 (F/W) support is located at AIRSTA Sacramento, and can be coordinated by Air Operations through District 11.

For more information on specific capabilities of Coast Guard aircraft, refer to Appendix B of the Coast Guard Air Operations Manual, COMDTINST M3710.1F.

3410.2 Aerial Dispersant Application

MSRC has a nationwide dispersant program utilizing C-130 aircraft based in Coolidge, Arizona that have a load capacity of 3,250 gallons. Planes and crews are available 24 hours per day, are required to be off the ground within four hours of notification, and can apply dispersant up to 200 nautical miles offshore. Spotter aircraft are sourced locally or through MSRC's contracted King Air aircraft based in Stennis, MS. MSRC can be reached at (562) 981-7600.

The Air Force Reserve’s 910th Airlift Wing, located at Youngstown Air Reserve Station, Ohio has four specially modified C-130H aircraft with Modular Aerial Spray Systems (MASS) that can disperse oil spills. The Aerial Spray Squadron can be contacted at (330) 609-1412, (330) 609-1965, or (330) 609-1111.

3410.3 Procedures for Temporary Flight Restrictions

A Temporary Flight Restriction (TFR) is a type of Notice to Airmen (NOTAM) that informs pilots and aircrew of an area restricted to air travel due to a hazardous condition, a special event, or a general warning. A TFR may be requested by various entities, including military commands, Federal security/intelligence agencies, regional directors of the Office of Emergency Planning, etc. If it is determined that a TFR is required, the Air Operations Officer should make a written request through the FAA’s Flight Standards District Office (see contact information below).

Situations that may warrant a TFR in accordance with 14 CFR 91.137 includes, but are not limited to, the following:

14CFR 91.137(a)(1): toxic gas leaks or spills; flammable agents, or fumes which, if fanned by rotor or propeller wash, could endanger persons or property on the surface, or if entered by an aircraft could endanger persons or property in the air; volcanic eruptions that could endanger airborne aircraft and occupants; nuclear accident or incident; and hijackings.

14CFR 91.137(a)(2): aviation or ground resources engaged in wildfire suppression; and aircraft relief activities following a disaster (e.g., earthquake, tidal wave, flood, etc.).

14CFR 91.137(a)(3): disaster/hazard incidents of limited duration that would attract an unsafe congestion of sightseeing aircraft.

San Diego Flight Standards District Office
8525 Gibbs Drive, Suite 120
San Diego, CA 92123
(858) 502-9882, (858) 502-9985 (fax)
http://www.faa.gov/about/office_org/field_offices/fsdo/san/contact/

3410.4 Permanent Area Restrictions

Restricted areas in San Diego County include: R-2503A, R-2503B, R-2503C, R02503D. All are associated with Camp Pendleton, but have varying altitudes and times of use. Refer to the San Diego VFR Terminal Area Chart for detailed information.

3420 Air Support

The Air Support Group Supervisor (ASGS) is primarily responsible for supporting aircraft and aircrews. This includes: 1) providing fuel and other supplies; 2) providing maintenance and repair of aircraft; 3) keeping records of aircraft activity, and 4) providing enforcement of safety regulations.

Refer to Chapter 7 of the Incident Management Handbook (IMH), COMDTPUB P3120.17 for more information.

3420.1 Airports/Helibases

There are many airports and helibases through the San Diego area. The runway, lighting, maintenance and fuel support vary greatly between the facilities, therefore detailed planning is required before using a facility to determine if it meets operational needs. Detailed information about airports is contained in the Airport/Facility Directory, Southwest U.S, a Flight Information Publication (FLIP) of the FAA.

Refer to Section 9250 under “Airfields” for additional contact information.

3420.2 Helospots

Contact the Air Operations Division Officer of Sector San Diego at (619) 278-7651

3420.3 List of Certified Helo's/Aircraft Providers

Refer to the California Dispersant Plan Appendix XII of the RCP

3420.4 Fuel/Maintenance Sources

Contact the Air Operations Division Officer of Sector San Diego at (619) 278-7651

3420.5 Air Traffic Control Procedures

Contact the Air Operations Division Officer of Sector San Diego at (619) 278-7651.

3500 Staging Areas

3510 Pre-Identified Staging Areas

Refer to current Thomas Brothers Guide for locations. Published by RandMcNally, the Thomas Brothers Guides, or Thomas Guides, offer extensively detailed and highly accurate maps of most California Counties in either book or wall map formats.

The following locations have been identified as having potential to be utilized for the staging of equipment and personnel. Refer to Section 9800 of this Plan for beach/shoreline locations.

3510.1 Metropolitan Areas

These areas located throughout San Diego County have permanent parking space that can be utilized during a spill response.

- B Street Pier
- Belmont Parking Lot
- Dana Landing Parking Lot
- Dog Beach Parking Lot
- G Street Pier, Tuna Harbor Basin
- La Jolla Cove Parking Lot
- La Jolla Shores Parking Lot
- Lifeguard Headquarters, Quivira Basin Parking Lot
- Lifeguard Tower Parking Lot at Ventura (Mission Beach)
- Lifeguard Tower Parking Lot on Abbott (Ocean Beach)
- Marina Park Parking Lot (Behind the Convention Center)
- NAS North Island
- Ocean Beach Pier Parking Lot

- Scripps Institute of Oceanography Parking Lot
- South Mission Beach Jetty Parking Lot
- Shelter Island Parking Lot
- Vacation Isle Parking Lot (by Ingraham Street Boat Ramp)

3510.2 North County

Del Mar Fair Grounds

Oceanside Harbor Parking Lot

South Carlsbad State Beach Parking Lot

3510.3 South Bay

Border Field State Park

Silver Strand State Beach Parking Lot

Naval Amphibious Base Coronado

Naval Station

Naval Auxiliary Landing Field Imperial Beach

3520 Security

During an incident, refer to Chapter 16 of the Incident Management Handbook for guidance on maritime security and law enforcement.

3600 Wildlife

Following is a brief summary of the Wildlife Response Plan for oil spills in California (Wildlife Plan), RCP Appendix XXII.

Wildlife and habitats are put at risk or injured when oil is spilled into the marine environment. Both Federal and State statutes mandate protection, rescue and rehabilitation of oiled wildlife.

The Federal Spill Pollution Act of 1990 requires that a Fish and Wildlife and Sensitive Environments Plan be developed and include immediate and effective protection, rescue and rehabilitation of wildlife resources and habitat that are harmed by a spill.

The State of California's Lempert-Keene-Seastrand Oil Spill Prevention and Response Act requires:

- Development of contingency plans for the protection of fish and wildlife
- Establishment of rescue and rehabilitation facilities

- Establishment and funding of a network of rescue and rehabilitation facilities, known as the Oiled Wildlife Care Network
- Assessment of injuries to natural resources from a spill
- Development of restoration plans to compensate for adversely affected wildlife resources and habitats.

To address these statutory mandates, the Wildlife Plan has been developed by a group of federal and state agencies and other interested parties. The Wildlife Plan is part of the RCP/ACP for California, a joint document of U.S. Coast Guard (USCG) and OSPR.

The Wildlife Plan details the Wildlife Operations Branch purposes, goals, objectives, responsibilities, and structure. The Wildlife Operations Branch is in the Operations Section of the Incident Command System (ICS) for oil spill response. The Wildlife Operations Branch structure needed in California and detailed in this plan is expanded beyond that described in the USCG Incident Management Handbook (IMH) at the Group level.

As is always true with ICS, the structure may be expanded or contracted to fit the need, but the mission remains unchanged.

In California, the principal objectives of Wildlife Operations during a spill response are to:

- Protect wildlife and habitats from contamination;
- Minimize injuries to wildlife and habitats from the contamination;
- Minimize injuries to wildlife from the cleanup;
- Provide best achievable care for injured wildlife; and
- Document adverse effects that result from the spill and cleanup.

To ensure these objectives are achieved with maximum efficiency, the Wildlife Branch Director coordinates and manages the activities of all personnel in the Wildlife Branch who fall under the authority of the Unified Command during spill response. These include federal, state, and local agencies along with commercial and non-profit organizations performing wildlife protection and management.

Within the Wildlife Operations Branch, there are four Groups who report to the Wildlife Branch Director:

- Wildlife Reconnaissance Group (aerial, ground, and on-water reconnaissance of wildlife in the spill area)
- Wildlife Hazing Group
- Wildlife Recovery and Transportation Group (search and collection)
- Wildlife Care and Processing Group (rehabilitation and logging in).

Even though Wildlife Operations is integrated into the ICS, it is self-directed in many ways and self-contained with regard to wildlife response resources (both staff and equipment). Wildlife Operations gathers much of its own spill information through wildlife reconnaissance, staffs its own Branch with pre-trained experts (e.g. veterinarians, rehabilitation staff, processing staff, capture experts, volunteers), and prepares its own sections of the Incident Action Plan for the Planning Section.

The Wildlife Plan has been modified and expanded to ensure the statutory requirements of best achievable treatment, protection, and restoration of wildlife is met. This revision clarifies the organizational structure and details the required duties of the different positions within the Wildlife Operations Branch.

The Wildlife Plan has been written with the view that OSPR staff will usually assume the role of Wildlife Branch Director during a spill response. This is a natural consequence of the pivotal position of the Department of Fish and Wildlife, because the Department:

- is the lead state trustee agency for California's fish and wildlife;
- has permits and agreements with other agencies, to care for special status species and other protected wildlife;
- has legal mandates to protect wildlife, beyond OPA 90 and OSPR; and
- has the needed expertise, training and experience

While the Wildlife Plan has been designed principally to cover oil spills in marine waters as required by Federal and State law, it is applicable to inland oil and non-oil spills as well. The organizational structure, roles and responsibilities remain the same, although some functions may be altered, as appropriate

3610 Fish and Wildlife Protection Options

Refer to Sections 3007.0 and 4008.01 of the Region 9 RCP.

3620 Wildlife Recovery

Refer to Appendix XXII of the Region 9 RCP.

3620.1 Wildlife Recovery Operations/Procedures

Refer to Wildlife Response Plan for California. Appendix XXII.

3620.2 Recovery Processing

Refer to Wildlife Response Plan for California Appendix XXII.

3620.3 Carcass Retrieval and Processing

Refer to Wildlife Response Plan for California Appendix XXII.

3630 Wildlife Rehabilitation

Refer to Appendix XXII of the Region 9 RCP.

3630.1 Wildlife Rehab Operations

Refer to Appendix XXII of the Region 9 RCP.

3630.2 Rehab Facilities

Refer to Appendix XXII of the Region 9 RCP.

3630.3 Rehab Procedures

Refer to Appendix XXIIa of the Region 9 RCP.

3640 Essential Fish Habitat

Refer to Section 9802.2 of the San Diego ACP.

3700 Places of Safe Refuge

Refer to Section 8300 of the San Diego ACP.

3800 Reserved

3900 Reserved for Area/District

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