4. INITIAL RESPONSE ACTIONS

Contents

4.1 SYNOPSIS

When a spill occurs from NRC Plan Covered Vessel, the NRC Plan provides for the prompt, safe and efficient containment, recovery, cleanup / restoration and interim disposal of all oil and oily debris. All Covered Vessels will be contracted directly with NRC for both SMT and PRC services. Therefore, there will be no transition to the RP as the NRC Plan IC will be representing the RP under contract. However, the RP may elect to replace the NRC IC and/or SMT with other contracted SMT personnel as they are available. These Transitions will be orderly and documented on the Responsible Party's Acknowledgement of Transfer form (see Appendix C) and coordinated with the SOSC and FOSC. The NRC Plan IC will also provide the NRC IC Spill Checklist (Appendix C) and the ICS Form 201 to the RP for a thorough transition of actions taken. If a full unified command is in place the transition will be approved by unified command. The RP for the Covered Vessel has full responsibility for the recovery / cleanup operations, subject to federal and / or state approval.

The NRC IOC Watchstander receiving the initial report of spill will complete the NRC Initial Spill Report form to the extent information is known and available at that time of the initial call. This entails collecting initial spill information which includes:

- Vessel name
- Point of contact information
- Date, time and location of spill
- Amount and type of oil spilled
- Amount of oil in the water
- Whether the source has been secured
- Status of the vessel
- Action(s) taken
- Notifications already made by the vessel

The NRC On-call Supervisor and NRC Plan IC will then be contacted by the NRC IOC Watchstander and this information relayed. If requested by the RP, the IOC Watchstander will also make notifications to the WDEM and/or the USCG National Response Center.

The NRC Plan IC shall confirm the status of the steps taken to ensure safety of the crew and vessel and to mitigate the spill as outlined in the Field Document (Appendix C). The NRC Plan IC shall also use the NRC IC Spill Checklist (Appendix C) to help ensure the proper steps are taken to mount an appropriate response and the ICS Form 201 to document initial response actions and decisions. Pursuant to Covered Vessel contracts, the NRC Plan IC has authority to mobilize any response resources available under the NRC Plan necessary to accomplish these steps.

4.2 PRIORITIES

The following priorities are general guidelines for responding to oil spills that may occur on any NRC Plan Covered Vessel. They are based on the premise that the safety of life is of paramount importance in any pollution incident. The protection of the environment and property, although important, is secondary. Nothing in this part is meant to indicate that higher priority items must be completed before performing a lower priority task. They may be carried out simultaneously or in the most logical sequence for each individual incident.

PRIORITY # 1: SAFETY OF LIFE

The safety of personnel must be given absolute priority. This applies to personnel, including members of the response team. No personnel are to be sent into an affected area without first determining the hazards involved and subsequently, taking adequate precautions.

PRIORITY # 2: SAFETY OF VESSEL, FACILITY AND CARGO

Every effort must be made to secure the safety of the vessel including damage control, corrective stability measures, product transfer, etc. These activities support both, Priority #1, Safety of Life and also Priority #3, Protection of the Environment, with measures that prevent and/or minimize further damage to the environment.

PRIORITY # 3: PROTECTION OF THE ENVIRONMENT - BY:

A. SECURE -- STOP -- THE SOURCE OF THE SPILL
Every effort must be made to secure -- stop -- the source of the spill to prevent further damage. Securing the source is especially critical and should normally be the first line of defense. This is critical.

B. CONTAINMENT AND RECOVERY OF OIL ON OPEN WATER

Must be effected expeditiously to prevent and/or minimize impact to beaches and shorelines.

C. DIVERSION / EXCLUSION BOOMING TECHNIQUES / DAMMING
In the event that the location of the spill or the weather conditions do not permit open water recovery, protection of the shoreline becomes paramount.

NOTE: NRC will utilize the GRPs to determine priorities and strategies to minimize impact on sensitive resources. See Section 6.4 for details.

4.3 SAFETY

Safety of all personnel must be given absolute priority. Adequate safeguards and procedures must be established to protect personnel. Everyone involved in an oil spill response operation is encouraged to promote conditions, practices and attitudes which will enhance this objective.

4.3.1 Legal Requirements

Numerous federal requirements are contained in OSHA and can be found in 29 CFR 1910.120. WISHA regulations regarding Hazardous Waste Operations and Emergency Response can be found in WAC 296-824.

4.3.2 Site Safety and Hazard Characterization

Before any cleanup operation can begin, it is the responsibility of the Unified Command, response supervisors and all response personnel collectively and/or individually as applicable to determine the hazards present at a spill site. Hazards and safety considerations identified will go into the Site Safety Plan. Safety considerations include:

<u>On-water conditions potentially affecting the operation of response vessels.</u>

This will be assessed taking into consideration sea state, visibility, vessel traffic, rain, fog, snow, etc.

<u>Slips, trips and fall hazards associated with dockside and shoreline clean up.</u>

This will be assessed taking into consideration access to the work area, stage of the tide, work surface (e.g. wet rocks, dock planking), etc.

<u>Hazardous atmospheres in the vicinity of the spilled oil.</u>

This will be assessed by a qualified responder approaching the spill scene from upwind. The atmosphere at the spill scene will then be assessed using an air monitor. Air monitoring will determine the safety of the atmosphere by assessing parameters such as oxygen levels, presence of flammable gases and benzene concentrations. Based on this information they will determine what level of personal protective equipment and safety practices will be required, and what level of safeguards must be instituted. In all cases, this can initially be facilitated by referencing the MSDS for the particular product that has been spilled, and/or utilizing the services of an industrial hygienist or chemist to determine the oil's volatility or toxicity concentration with regard to the PEL. If test results are above the PEL, site control will be implemented in accordance with 29 CFR 1910.120(d) -- before any cleanup work begins -- to control employee exposure to hazardous substances. This may include

requiring workers to wear LEVEL C or higher personal protective equipment and appropriate air-purifying respirators when working in the hazardous atmosphere. Alternatively responders may be required to delay entry into the hazardous atmosphere until the natural processes (weatherization, evaporation, oxidation, dissolution, dispersion, emulsification or biodegradation) reduce the toxicity level below the PEL.

4.3.3 Personal Protective Equipment

Levels of Protection (A-D), from OSHA regulation (29 CFR 1910.120, Appendix B) are summarized in Table 4-1. Response personnel involved in oil spill cleanup operations will comply with all Federal, State and Company safety regulations and policies. All response personnel will use an acceptable level of PPE for their working environment based on the chemical or physical properties of the hazards present.

Table 4-1 Personal Protective Equipment / Levels of Protection: A-D

PERSONAL PROTECTION EQUIPMENT / LEVELS OF PROTECTION: A-D
---FROM OSHA REGULATIONS: 29 CFR 1910.120, APPENDIX B---

CONDITIONS FOR USE	EQUIPMENT (PPE)
LEVEL A: Greatest level of protection for skin, respiratory, and eyes. SHOULD BE USED WHEN: 1. Hazardous substances identified for highest level of protection. * High concentration of atmospheric vapors, gases or particles. * Work functions potential for splash, immersion, or exposure. 2. Substances with a high degree of hazard to skin. 3. Operations being conducted in confined, poorly ventilated area, and not yet determined to de-escalate from Level A.	a. Positive-pressure, full face-piece SCBA. b. Totally encapsulating chemical protective suit. c. Gloves: inner and outer chemical resistant. d. Boots: chemical resistant with steel toe, and shank. * OPTIONAL, as applicable: Coveralls, long underwear, hard hat under suit.
LEVEL B: Highest level of respiratory protection but lesser level for skin protection SHOULD BE USED WHEN: 1. Type and atmospheric concentration identified. 2. Atmosphere contains less than 19.5% oxygen. 3. Presence of incompletely identified substance is indicated by organic vapor detection instrument, but are not suspected of containing high levels of chemicals harmful to skin or easily absorbed.	a. Positive-pressure, full face-piece SCBA. b. Hooded chemical resistant clothing. c. Gloves: inner and outer chemical resistant. d. Boots: chemical resistant, with steel toe and shank. * OPTIONAL, as applicable: Coveralls, boot covers, hard hat, face shield.
LEVEL C: SHOULD BE USED WHEN: 1. Atmospheric contaminants, liquid splashes, or other direct contact will adversely affect or be absorbed through skin. 2. Types of contaminants have been identified, concentrations measured, and an air purifying respirator can remove contaminant. 3. All criteria for use of air purifying respirators are met.	a. Full-face or half-mask air-purifying respirator. b. Hooded chemical resistant clothing. c. Gloves: inner and outer chemical resistant. * OPTIONAL, as applicable: Coveralls, boots (outer), boot covers, hard hat, escape mask, face shield.
LEVEL D: SHOULD BE USED WHEN: 1. Atmosphere contains no known hazard, AND 2. Work functions preclude splashes, immersion, or potential for unexpected inhalation or contact with hazardous levels of any chemicals.	a. Work uniform; used for nuisance contamination. b. Coveralls. c. Boots/shoes: chemical resistant, steel toe and shank. d. Safety glasses. * OPTIONAL, as applicable: Gloves, boots (outer), hard hat, escape mask, face shield.

4.3.4 Decontamination

Decontamination means the removal of hazardous substances from employees and equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects. All personnel, tools and equipment that have entered the contaminated area (exclusion zone), require decontamination upon leaving the exclusion zone as required in 29 CFR 1910.120.

The site health and safety plan will include a section regarding decontamination. Specific decontamination requirements will be included.

Decontamination areas will be located with the following considerations:

- Downwind from command post (prevailing winds do not blow decon dust /materials into clean zones
- Convenient access for exit from hot zones
- In areas that will minimize exposure of uncontaminated employees or equipment

Every exit from the exclusion zone requires decontamination. The exception is an emergency situation. If an employee is injured, decontaminate to the extent possible given the nature of the injury.

Large equipment such as vessels, skimmers and heavy equipment will be decontaminated by using a steam or hot water wash or by an appropriate detergent wash.

Personnel decontamination will vary from site to site but will always include the following steps:

- Equipment drop
- Outer boots and gloves wash/rinse (step off)
- Outer boots and gloves removal
- Suit wash/rinse/removal
- Inner glove wash/rinse
- Face piece removal, wash/rinse
- Inner glove removal
- Field wash (face, hands)

Personnel assigned to the decontamination process will assist workers and decontaminate equipment and reusable protective gear.

An on-site portable shower facility will be provided whenever necessary. If temperature conditions (freezing) prevent the effective use of water, other effective means (dry decon) shall be provided and used.

During hazardous waste site activities, the Project Manager, Safety Manager or the Site Supervisor will verify that proper decontamination procedures are being followed. Verification of decontamination for personal protective equipment and equipment may be accomplished by direct reading monitoring instruments and/or visual inspection as it is brought out of the contamination reduction zone. In some cases samples may be collected to document that the decontamination effort is effective.

PPE and personal equipment will be decontaminated, cleaned, laundered, maintained or disposed of and replaced as needed to maintain their effectiveness. Clothing or materials that cannot be effectively decontaminated will be disposed of and removed with other contaminated materials. Unauthorized employees shall not remove protective clothing or equipment from change rooms. Potentially contaminated clothing will not be taken home for laundering.

In the event that decontamination is ineffective based upon site samples or biological testing results, the decontamination plan will be redesigned to ensure effectiveness.

4.3.5 Medical Surveillance

Medical surveillance will meet the requirements, including frequency, content and record keeping, contained in 29 CFR 1910.120(f) and RCW 49.17.010, 49.17.050, 49.17.060.

4.3.6 General Safety Requirement

Slips, Trips, and Falls
Slips, trips and falls are the major source of injuries for spill responders. The primary cause is inattention while walking across rocks, boarding boats, walking on boats and/or carrying objects. Footwear with soft, flexible soles that fit well is a must.

Vessel/Water Safety
All vessels must comply with USCG regulations for their size and class. Radio equipment shall be in good working order and compatible with standard operating frequencies. Personnel must wear a USCG approved PFD any time there is a potential to fall into the water. This includes, for example, riding in open boats, moving personnel or transferring equipment (hand-to-hand) between vessels, working over the side of a vessel, working near the edge of docks/piers, or line handling for large vessels. Handling anchors, anchor ropes and lines will be done with care. Common accidents to avoid include dropping an anchor on a foot and catching a hand between boat sides and anchor rope. Extreme care will be exercised when beaching boats due to surf conditions, currents, rocks, etc.

DO NOT:

- Stand up and move around in small boats.
- Overload boat or distribute loads unevenly.
- Decelerate suddenly, allowing the stern wake to overtake and swamp the boat by washing over the transom.

DO:

- Hold on to the boat when underway.
- Wear PFD from boat to boat, and boat to shore.

Air Safety
No one will board or exit any aircraft unless directed by pilot. When entering or exiting a helicopter, walk straight to it from the front or side; never from the rear. The invisible tail rotor has caused most severe injuries. Seat belts are required to be worn at all times. Watch foot placement on pop-out pontoons on helicopters when embarking and disembarking to avoid puncturing the pontoons. Hearing protection should be worn at all times when involved with air operations

Buddy System
The buddy system assures that emergency assistance is always available. Watch each other for signs of overexposure, fatigue or any conditions that pose a potential health and safety issue; make periodic checks of personal protective equipment. How it works:

- Never let buddy out of your sight.
- Always be able to communicate with buddy.
- Talk with and/or observe buddy frequently.

Accidents
All occupational injuries, illness or accidents must be reported to the supervisor. The supervisor has responsibility to investigate all accidents/illness, and make sure corrective action is taken. All work crews should have a first aid kit on site which is to be used for minor cuts, scrapes, etc. If an injury is severe enough to require removal of the employee for medical treatment, the supervisor will notify the incident command center and take appropriate action.

4.3.7 Site Safety Plan

The NWACP, Section 9203, includes a Health and Safety Job Aid for spill response. The Site Specific Safety Plan in this section provides the Safety Officer and ICS personnel a template for safeguarding personnel during the response. NRC maintains an Injury and Illness Prevention Plan that has multiple versions of daily safety tailgate forms for use in the field.

4.4 DETECTION

Detection of a spill occurring is extremely important to the success of any cleanup action. The NRC Plan covers different vessel types with varying vessel operations that could lead to a discharge of oil. The following is a list of actions that a Covered Vessel can take to aid in early detection of a spill:

- Vessels while underway or moored should periodically check the surrounding water for signs of oil.
- Vessel crew members should investigate unexplained petroleum odors.
- When receiving fuel or cargo all crew members should be alert for possible spills using all their senses as applicable.
- High tank level alarms, if installed, could be an indication of a possible overflow and investigated accordingly.
- Any discharge of oil or oily water should be immediately reported and documented in the oil record book as applicable.

The primary method of oil spill detection aboard NRC Plan Covered Vessels will generally be by visual observation. A secondary method of detection would be by smell. Vessels equipped with tank level alarms, overflow alarms, or other indicating devices, would use them to detect a possible spill and investigate alarm conditions accordingly. When a spill or threat of spill is detected, it should be promptly reported to NRC.

4.5 ASSESSMENT

Accurate assessment of the spill and surrounding circumstances is essential to initiating an appropriate response. The NRC IC should utilize the NRC Plan IC Checklist (Appendix C) as a guide to their assessment. During the response the NRC IC will provide an updated report if the initial report significantly changes. See Appendix C for "Procedures to Detect, Assess, and Document the Presence and Size of Oil Spill For Initial Assessment from Vessel Crew."

4.5.1 Importance of Determining Spill Volume and Movement

An important part of handling any oil spill response action is assessing the volume and direction of movement of the spill. An estimate of the oil spill volume allows response teams to determine both the type and quantity of equipment, and labor, necessary to recover the spilled oil.

In larger off-shore and / or coastal spills, tracking and forecasting the spill movement allows response teams the time to plan their recovery strategies as well as protect environmentally sensitive areas.

It is the policy of the Northwest Area Committee that the response to a spill incident should be promptly "ramped up" to provide adequate equipment and trained personnel to effectively respond to the highest quantity of product which will most likely be released. If it is determined that excessive response resources are ordered or mustered they may be canceled or demobilized to help control the cost of the response action to the RP and responding agencies.

4.5.2 Spill Categorization

Inland waters are waters of the U.S. that are not subject to the tidal ebb and flow. From a federal standpoint, such areas are usually under the jurisdiction of the U.S. EPA. In inland water areas, spills are generally categorized as follows:

- Minor Spill: A spill or discharge of oil of less than 24 bbls (1,000 gallons)
- Medium Spill: A spill or discharge of oil of 24 bbls (1,000 gallons) to 240 bbls (10,000 gallons) or a discharge of any quantity that poses a threat to public health and welfare
- Major Spill: A spill or discharge of oil of more than 240 bbls (10,000 gallons) or the discharge of any quantity that poses a substantial threat to public health and welfare

Coastal waters are the navigable waters of the U.S. that are subject to the ebb and flow of the tide. From a federal standpoint, such areas are usually under the jurisdiction of the U.S. Coast Guard. In coastal waters, spills are generally categorized as follows:

- Minor Spill: A spill or discharge of oil of less than 240 bbls (10,000 gallons)
- Medium Spill: A spill or discharge of oil of 240 bbls (10,000 gallons) to 2400 bbls (100,000 gallons) or a discharge of any quantity that poses a threat to public health and welfare
- Major Spill: A spill or discharge of oil of more than 2400 bbls (100,000 gallons) or the discharge of any quantity that poses a substantial threat to public health and welfare

A minor spill may and should be elevated to the category of medium or major spill at the discretion of the FOSC/SOSC if any of the following apply:

- Occurs in endangered critical water areas
- Generates critical public concern
- Becomes the focus of an enforcement action
- Poses a threat to public health and welfare

When one or more of these factors exists, it may be appropriate to "ramp-up", i.e., increase, response actions.

4.5.3 Surveillance / Tracking

Visual observation from aircraft, particularly helicopters, is essential for spill tracking and operations planning. To the extent practical, this will be the primary means to locate and track the spilled oil. During periods of low visibility, tracking can also be supported by aircraft equipped with Forward Looking Airborne Radar (FLAR) or personnel with handheld Forward Looking Infra Red (FLIR) or infrared and ultraviolet sensors / cameras.

LOIs for companies providing aerial support are listed in Appendix D, Special Services. Pursuant to WAC 173-182-321 (2), NRC provides complete details of available aerial resources, both under contract and LOI, that may be available for activities such as spill tracking, guiding enhanced skimming and supporting shoreline cleaning operations, in its PRC Application.

Tracking of an oil slick can also be done using a specially designed and transponder equipped "tracking buoy." These buoys are designed to move with the wind and current similar to the movement of oil on water and produce an electronic signal that provides location information.

Alternatively, “low tech” approaches to tracking oil slick may utilize buoys equipped with radar reflectors or flagging that can be deployed and tracked from vessels. During night or low visibility conditions, the radar reflector on the buoys may be tracked using vessel radar to help enhance recovery and protection strategy effectiveness. Tracking buoys with flagging will require clear weather with good visibility to be used as an effective means of tracking the oil slick.

An even simpler method of tracking oil that may be effective to track movement of small spills in a more contained setting would be to use sorbent pads deployed at the leading edge of a slick. These pads should move largely by the current alone and will likely stay in the spilled oil. This is a quick and easy method that may enhance the ability of the responders to identify and track the leading edge of the spill.

4.5.4 Estimating Spill Volumes

Estimating spill volumes is an essential element of any response. The estimated spill volume helps to scale the response. However, caution is advised since the initial reported release volume is often incorrect and is therefore not to be taken as a totally reliable or accurate estimation of spill volume. Where possible, accurate means to assess and quantify the amount lost should be sought.

Direct contact with the vessel captain to obtain detailed information on their estimated amount spilled is recommended. Additionally, information on the circumstances surrounding the spill as

well as the total spill potential volume should be obtained and factor into a determination of the actual or potential spill amount.

It is best to be conservative (assume the worst) when scaling the response. It is always prudent to rely more on the extent of oil observed to have been released, responding accordingly, rather than to scale the response based solely on the initial reports or estimates of oil released.

Typically USCG and Ecology investigators will work with the vessel captain and owner to identify the source of a spill and estimate spill volumes.

Table 4-2 Estimating Oil Spill Volume

Volume of a spill can also be roughly estimated based on slick size and color using the following standards based on visual observation:

Standard Term Appearance	**Approximate Layer Thickness (Inches)**	**Estimated Volume (gallons/sq. mile)**
Barely Visible: Barely visible in favorable light conditions	0.0000016	5
Silvery: Visible as silvery sheen on the surface	0.000003	10
Slightly Colored: First trace of color observed	0.000006	20
Brightly Colored: Bands of color are visible	0.000012	42
Dull: Color predominantly dull brown	0.00004	125
Dark: Dark brown	0.00012	380
Note: Estimating volume of an oil spill by color and size is extremely rough; however estimates can be used to generate approximate figures for planning purposes.		

4.5.5 Oil Slick Movement

Movement of an oil slick is dependent on the physical characteristics of the oil, the predominant surface currents, wind direction and velocity. Surface currents will dominate spill movement unless winds are strong. However, wind will cause an oil slick to move at approximately 3% of the wind speed. Slick spreading will dictate spill movement only when very close to the point of release.

The on-scene wind and current information may be obtained from a reliable source such as the master of the vessel, terminal operators, or from a spill response vessel. Wind and current information may also be obtained via the NOAA web sites or from the NOAA SSC.

The NOAA SSC also provides computer modeled oil spill trajectory information in response to a spill. This model is the General NOAA Operational Modeling Environment (GNOME).
This model predicts how an oil spill will spread and move within a local area taking into account the following:

- the bathymetry and shoreline configuration of a particular body of water, including its channels, bays, and significant rivers
- currents and winds
- shoreline characteristics that determine beaching and refloating of oil

Trajectories typically should encompass forecasts for 6, 12, 24, 36, and 48 hours as part of the initial response. Oil spill trajectories may be obtained from the NOAA SSC by requesting them through the USCG FOSC.

Prediction of oil slick movement in an actual spill situation may also be accomplished by vector analysis of the two main forces that influence open water oil slick movement: surface currents and winds (FIGURE 4-1).

STEPS: How to use SLICK PREDICTION BY VECTOR ANALYSIS

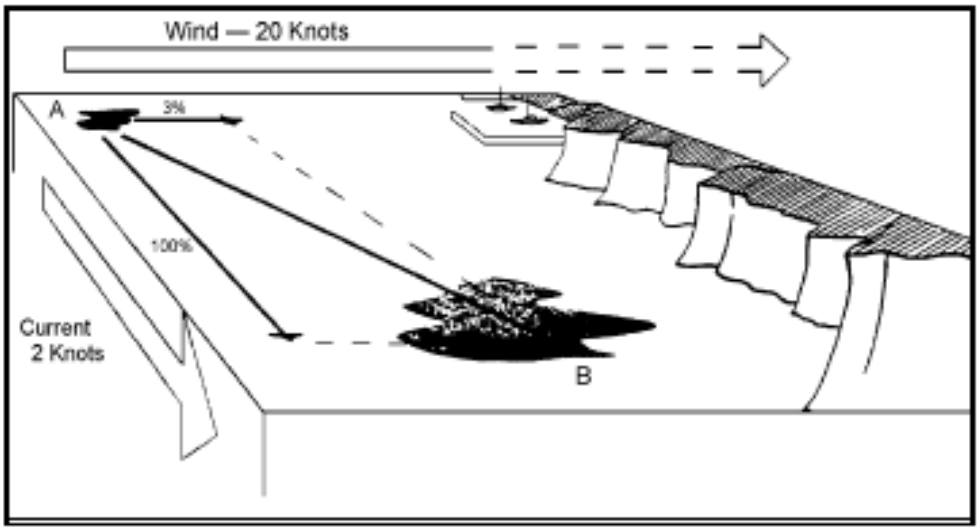
1. Ascertain the direction and speed of both surface water currents and the wind.

2. Next, draw ocean current and wind component vectors showing their relative directions and lengths. The velocity of the current and wind is represented by the length of the vector.

3. Draw a line parallel to the wind vector starting from the tip of the current vector and measuring the exact length of the wind vector.

4. Draw a line from the point of origin to the tip of the parallel wind vector line. The final line is the resultant vector that gives the direction and speed of the slick movement. The direction can be measured with a protractor. The speed is determined by measuring the length of the resultant vector relative to the scale in use.

Figure 4-1 Slick Prediction by Vector Analysis



4.5.6 Oil Spill Behavior

The term "oil" is applied to a wide variety of petroleum and non-petroleum products ranging from crude oils to vegetable oil and different grades of refined products derived from both sources. Crude oil is not a uniform substance and its properties vary widely from one location of origin to another. Oil spill behavior is a function of the oil's physical and chemical properties which include:

- Density
- Viscosity
- Pour point
- Flash point
- Solubility in water

The rates at which oil spreads, evaporates, and breaks down into the environment are all influenced by the processes of oxidation, dissolution, dispersion, emulsification and biodegradation. These processes over a period of days and / or weeks will alter the characteristics of spilled oil; thus, sometimes requiring a change in oil recovery equipment. However, in most cases, these processes aid in the cleanup operation by reducing the volume spilled. Weathering processes also reduce the toxicity of spilled oil, reducing its impact on the environment.

The NOAA ADIOS II model can be used to assess a mass balance and fate for spilled oil on water. Users select from a range of oil types, input spill and environmental conditions, and obtain results of oil loss through evaporation, dispersion, and dissolution. For some oils, estimates of oil emulsification are also provided. These criteria are used to communicate estimated spill mass balance, as recorded on ICS 209 forms (see also Section 7.11, Model Disposal Plan). The physical properties of oil will vary depending on local environmental conditions. The methods for dealing with the weathering spilled oil should be based on field observations.