Recommendations for Conducting Cooperative Natural Resource Damage Assessment

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West Coast Joint Assessment Team

PREFACE

The purpose of this document is to provide guidance to state and federal natural resources trustee agencies (Trustees) and parties responsible for oil spills or other pollution events (Responsible Parties) on how to: 1) initiate a cooperative natural resource damage assessment (NRDA) during an oil spill, and 2) move from the initial chaotic phase of response to a cooperative injury assessment as soon as possible. Although this document focuses on marine oil spills, the concepts expressed here could be used for any other incident requiring a NRDA.

This document summarizes the goals, key elements, and boundaries of cooperative assessments, with the objective of educating both trustees and responsible parties on the guiding principals for a successful cooperative assessment as envisioned by the West Coast Joint Assessment Team. The West Coast Joint Assessment Team (JAT) is an ad hoc group of representatives from various state and federal trustee agencies, spill response organizations, and representatives from the oil industry, including major and independent oil companies and oil transportation companies. The JAT was formed in 1996 to explore avenues for conducting cooperative NRDAs in the event of an oil spill. The JAT meets three times a year to discuss a variety of topics related to conducting cooperative assessments including collection of ephemeral data, injury assessment, NRDA case histories, recent developments in NRDA, available resources, and many more.

The active members of the JAT include:

- Alaska Tanker Company
- California Department of Fish and Game, Office of Spill Prevention and Response
- Chevron
- Conoco Phillips
- Kinder Morgan
- National Oceanic and Atmospheric Administration
- Oregon Department of Environmental Quality
- Oregon Department of Fish and Wildlife
- Pacific States-BC Oil Spill Task Force
- Tesoro
- U.S. Fish and Wildlife Service
- U.S. Navy
- Washington Department of Ecology
- Washington Department of Fish and Wildlife

These guidelines were initiated and developed jointly and collaboratively by industry and trustee agency representatives. It is important to note that these guidelines do not have the force of law and are not in any way enforceable, and do not necessarily represent the policies of the member entities of the JAT. These guidelines are solely intended to help the parties involved in a spill incident to understand the potential benefits and typical attributes of a cooperative effort. Specifically, they outline factors to consider early during the response phase of an incident to facilitate cooperation and expedite the damage assessment process. Guidance is also provided concerning:

- notification of NRDA Team members
- developing a coordinated NRDA response organization
- conducting various ephemeral data collection activities
- developing an interim cooperative assessment agreement
- using the data quality objectives process

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1.0 INTRODUCTION

1.1 Background

The Oil Pollution Act of 1990 (OPA), 33 U.S.C. § 2701 *et seq.*, establishes liability for cleanup costs and for damages for the restoration of natural resources and related services injured by oil spills. When a spill occurs, Trustees may conduct a natural resource damage assessment (NRDA) to evaluate injuries to natural resources and determine the need for restoration actions. The NRDA process is conceptually simple but the quantification and restoration of oil spill impacts raises complicated technical and legal issues. This factor, combined with the possibility of litigation, has historically led to an assessment process where both the Responsible Party (RP) and the Trustees conducted separate and carefully guarded studies. However, these independent assessments were expensive and often led to drawn out and unproductive debates over the underlying technical issues and data. The adversarial experience of the Exxon Valdez damage assessment and other early cases led Trustees and industry to seek alternative approaches.

Early experiences with cooperative assessments were mixed but mostly positive. Therefore, the National Oceanic and Atmospheric Administration (NOAA) promoted the concept of cooperative assessments in the 1996 regulations for conducting NRDAs under OPA (15 C.F.R. Part 990, § 990.14). NOAA believed that open and cooperative assessments are likely to be expeditious and cost-effective. Furthermore, the end goal of restoration may be achieved earlier, benefiting the environment and all stakeholders by reducing interim lost services.

The regulations require that RPs be given the opportunity to participate in the damage assessment process and, when appropriate, to jointly conduct a coordinated and open damage assessment with the Trustees. Cooperative assessments under OPA are now commonplace, but the extent of cooperation and the roles of the Trustees and the RP vary by incident. Furthermore, while the regulations encourage cooperation, the guidance on the specific terms and nature of that cooperation is limited. This has allowed Trustees and RPs to negotiate satisfactory agreements, but has also led to misunderstandings over the extent, timing, and degree of cooperation.

1.2 Cooperative Assessment Process

Simply stated, a cooperative assessment is one where the Trustees and the RP are jointly involved in conducting one or more phases of the NRDA process, including natural resource injury assessment, restoration planning, and implementation. The degree of cooperation can vary, from simply sharing assessment plans and data, to a fully cooperative process where the Trustees and the RP jointly design and conduct studies and work together to develop and implement a restoration program.

One of the key factors in a successful cooperative assessment is obtaining agreement from all parties on the principles that will guide the assessment process. Obtaining a common vision of the endpoint of the assessment and the process by which that endpoint will be achieved (*e.g.,* how to evaluate the type and extent of injuries to natural resources and the scale of restoration projects) is also critical in a successful cooperative assessment. This common vision can then be used as the basis for developing a framework to provide specific guidance on how the assessment will be conducted.

Some potential elements or attributes of a cooperative assessment are provided below to assist in design and implementation of a successful assessment process:

- Real time access to data
- Real time funding provided by the RPs
- Agreement on analytical laboratories and analysis protocols
- Joint selection and use of scientific experts
- Equal access to samples
- Unified approach to public information
- Joint development of assessment strategies, studies and restoration planning
- Common data management tool(s) employed
- Common record of decisions (administrative record)
- Open discussion of logistic needs and sharing of available resources
- Active participation by the Trustee and the RP representatives having decision-making authority

Parties reserve rights to do independent studies but agree to communicate with others about studies. Studies conducted without the knowledge of the other party ("shadow studies") are discouraged.

1.3 Benefits

The premise of cooperation is that working together will result in cost savings, reduced potential for litigation and shortened time to restoration. For example, a fully cooperative assessment would rely on a single set of studies, which should increase the likelihood for reaching similar conclusions. This would increase the likelihood of settling the case without litigation, implications of which include time/cost savings and opportunity to proceed more quickly to restoration. Hence, if technical consensus on injuries can be reached, efforts can be shifted to designing restoration projects rather than preparing for litigation. To summarize these and other benefits of cooperation:

- Allows both parties to conduct studies that neither may have the expertise or funds to conduct individually.
- Allows both parties to pool resources such as vessels, aircraft, laboratories, etc.
- Develops trust and promotes a more open assessment process where data can be openly shared with the response agencies, academic researchers and the public.
- Promotes an expedited assessment process that should be less costly than a non-cooperative damage assessment, and provide for earlier restoration.

1.4 Regulatory Guidance

The nature of a cooperative assessment is up to the Trustees and the RP to negotiate, but the OPA regulations provide guidance as described below.

1.4.1 Timing and Duration

Trustees must invite identified RPs to participate in the assessment as early as practicable, but no later than the delivery of the "Notice of Intent to Conduct Restoration Planning" to the RP as required by the OPA regulations.[1] The invitation to participate should be in writing, and a written response by the RPs is required to confirm the desire

[1] Cooperative efforts often begin during the first few days of an incident but may not be formalized for several weeks or months.

to participate. E-mail invitations and responses are generally discouraged but can be used if necessary. Cooperation need not be limited to the conduct of assessment studies; as indicated above, cooperative work can extend through data interpretation, restoration planning, and restoration implementation.

1.4.2 Control and Decision-Making

Although a cooperative NRDA process involves representatives from the RP and their contractors and consultants, the process is generally led by the Trustees. The Trustees retain the authority to determine to what extent an RP may participate, and Trustees can terminate or limit RP participation if it interferes with Trustees fulfilling their statutory obligations. In most cases the Trustees and RP have equal status in a cooperative assessment and in many cases the majority of the assessment activities are conducted by the RP with Trustee participation and/or oversight. The Trustees are required to objectively consider all written comments, proposals or recommendations provided by the RP and, while the Trustees will attempt to reach consensus with the RP, the final authority to make determinations regarding injury and restoration rests solely with the Trustees.

1.4.3 Level of Participation

The RP is not required to participate and there is no predetermined level of participation. However, if the RP accepts the invitation to participate, participation includes at a minimum notice of Trustee determinations as required in the OPA regulations, and notice and opportunity to comment on documents or plans that significantly affect the nature and extent of the assessment. Increased level of participation by the RP may be developed at the mutual agreement of the Trustees and the RP. As noted above, the Trustees retain the authority to determine the scope of the RP's participation and, in so doing, consider the following factors:

- whether the RP has been identified;
- the willingness of the RP to participate in the assessment;
- the willingness of the RP to fund assessment activities;
- the willingness and ability of RP to conduct assessment activities in a technically sound and timely manner and to be bound by the results of jointly agreed-upon studies;
- the degree of cooperation of the RPs in response to the incident; and
- the actions of the RPs in prior assessments.

1.4.4 Agreements

Regulations strongly encourage formal funding and participation agreements between Trustees and RPs on how the cooperative process will be structured. The parties are also encouraged to develop a set of agreed-upon facts concerning the incident and/or assessment such as the natural resources injured, the extent of the injury, the most appropriate assessment procedures to determine injury and/or restoration needs, and how the results of the procedures will be interpreted.

Immediately following a spill it is generally not practical or possible to prepare a funding and participation agreement that: (a) provides a framework for the collection and analysis of ephemeral data and the execution of injury studies; and (b) obligates the RP to pay the Trustees for their assessment costs. Often times these agreements take several months and even years to prepare and negotiate. Consequently, the preparation of a commitment letter by the RP will usually suffice and allow the cooperative process to proceed. The commitment letter should include an agreement by the RP to advance funds and/or reimburse the Trustee's reasonable assessment costs for a specified period and amount of money. The letter may also include an assurance that the RP will negotiate a formal funding and participation agreement at a later date for conducting the cooperative assessment with the Trustees. An example of a commitment letter, developed during the 2004 Spill of National Significance drill in San Diego and Long Beach, is provided in Attachment A.

1.4.5 Public Involvement

The Trustees represent the public and, therefore, any cooperative process between the Trustees and RP must be open and allow for public involvement as assessment and restoration plans are developed. Any data or reports generated through a cooperative assessment may be released in accordance with agency requirements and guidelines. While the Trustees must provide the opportunity for public involvement after the Trustees' decision to develop restoration plans or issuance of any notice to that effect, the Trustees may decide to provide earlier opportunities for public involvement if such involvement may enhance the Trustees' decision-making or avoid delays in restoration.

1.5 Cooperative Process Considerations

Successful cooperation requires trust and integrity but, as described below, there are several specific activities that tend to maximize the likelihood of success of cooperative assessments. The success of this program also directly depends upon the expertise, experience and decision-making abilities of those involved. It is critical that decision-makers be knowledgeable about the resources that may be affected.

1.5.1 Pre-Spill Coordination

Building trust before a spill is essential to successful cooperative assessments. Trustee and industry managers should meet regularly and be aware of each other's concerns and issues before an incident occurs.

1.5.2 Early Technical and Logistical Coordination

Response and cleanup are the first priority during spills and assets such as boats and aircraft may be difficult to obtain for NRDA activities. Both parties need to ensure that time is set aside to openly discuss logistical needs and share available resources. Most cooperative assessments evolve from the early technical leadership of the government and RP scientists responding to an incident for the cleanup and preliminary damage assessment. Working together in the field during the emergency phase of an incident helps to build the trust necessary to make a cooperative assessment work.

1.5.3 Commitment to Timely Restoration

The parties need to share the common goal of reaching a timely and fair resolution of the natural resource damages. Keeping the goal of restoration in mind helps keep the cooperative relationship from being derailed by minor issues. In small or moderately sized spills, the parties may be able to reach consensus on the overall need for, and type of, restoration without conducting costly and time-consuming assessment studies.

1.5.4 Joint Development of a Focused Assessment Strategy

The parties should jointly develop an assessment strategy and plan studies. The parties should focus their assessment efforts on the most significant categories of injury and lost use. Studies that may be technically interesting, but are not focused on determining injury or useful in restoration planning are discouraged.

1.5.5 Funding

Advance funding is not a formal requirement for cooperation, but as a show of good faith by the RP, it can be a significant motivation for the Trustees to enter into a cooperative relationship.

1.5.6 Stipulations

Stipulations allow the parties to narrow the scope of the investigation and avoid incurring unnecessary costs. To the extent possible, the parties should attempt to reach consensus on factual issues and avoid costly documentation of certain impacts.

1.5.7 Clear Record of Decisions and Administrative Record

Throughout the course of a cooperative assessment, many technical and administrative decisions will be made between the parties. These decisions need to be clearly documented to avoid later confusion. An administrative record should be developed that includes documents relied upon during the assessment such as any notices, draft and final restoration plans, public comments, relevant data, investigation reports, scientific studies, work plans, quality assurance plans, literature, and agreements (not otherwise privileged) among the Trustees or with the RPs. This type of record is necessary for an open public process and is required by the National Pollution Fund Center.

1.5.8 Common Laboratory

The parties should try to reach agreement on analytical laboratories and analysis protocols to ensure compatibility of data collected by different teams. Ideally, the parties should consider having a single, jointly selected laboratory conduct the majority of the analyses, with audits conducted by an independent firm. A single laboratory can reduce the potential for data interpretation problems and result in significant cost savings. The Trustees and the RP consultants should jointly determine which samples should be analyzed, the type of analysis, and the prioritization of the samples and analyses. If agreement cannot be reached on particular types of analyses or which samples should be analyzed, either party can have additional analyses done, but they should let the other party know in writing of their action.

1.5.9 Joint Experts

The parties should consider jointly designated experts to conduct studies. If possible, any technical directions and communications with an expert should be in writing and agreed upon by both parties. The expert's raw data and draft and final documents should be shared simultaneously.

1.5.10 Information Management

A shared database containing data, evidence, and documents relied upon or produced during the assessment should be developed and maintained. There should be real-time access to data by all parties and equal access to samples. No samples should be destroyed without written direction from both parties. A shared database should be developed in a common electronic format and should include all samples, all photographs, videotapes, maps, field logs, analytical results, study plans, and other critical documents.

1.5.11 Technical Working Groups

The parties should consider developing small working groups to address injury categories. Each working group should have representatives of both the RP and the Trustees and all decisions should be documented in writing.

1.5.12 Strong Leadership

Cooperative assessments work best when the Trustees and RPs provide leadership and are directly involved in the process. While there is a clear role and need for consultants and experts, the Trustees cannot and the RPs should not abdicate their responsibilities for decision-making and management to third parties.

1.5.13 Common Public Communication

The parties should attempt to work together when communicating with the public and the media. Divergent communications can quickly derail a cooperative assessment, especially if antagonistic (real or perceived) statements are made. Trustees and RPs should provide each other with advance notice of key decisions prior to their dissemination to the media.

1.5.14 Agree to Disagree

Disagreements will occur, but they should not undermine the entire cooperative process. The inability to reach a consensus on all aspects of an assessment should not be a barrier to cooperating on other activities. Building trust before a spill is also essential as typically the initial data are uncertain and positional bargaining is commonplace. The parties may be able to cooperate on some or most of the activities and proceed separately on the remaining tasks. If consensus can't be reached on a task, parties should be able to do independent studies, but should communicate with the other party about the study(ies). However, neither party should conduct "shadow studies" with the intent to discredit or obfuscate joint studies.

1.5.15 Data Quality Objectives

When determining what data to collect or studies to perform during an injury assessment, many disagreements can arise over what data should be collected or how the data will be used. Data quality objectives (DQOs) can be used to help determine what injury questions need to be answered and the data required to answer those questions. Guidance on the use of DQOs is provided in Attachment B.

2.0 NRDA TEAM ORGANIZATION

2.1 General

Although the early stages of an incident may not allow for the establishment of a structured and organized team, to the extent practicable it is generally beneficial to do so both in the short term as well as in the event of a prolonged assessment effort. Immediately following an oil spill incident, the rapid collection of ephemeral data is critical and should be facilitated by the formation of an Ephemeral Data Collection Team which can be expanded into a larger NRDA Team as necessary. This team would continue data collection as well as interpret the data and manage and conduct all aspects of the NRDA. For continuity, the Ephemeral Data Collection Team Joint Leaders should transition to the NRDA Team Branch Directors and continue to manage and direct all team activities.

The NRDA organization during a response should be designed to be easily expanded or contracted depending on the situation and size of the incident. For example, in a small spill only the Ephemeral Data Collection Team may require activation and may consist of only three or four members whereas a larger incident may require a larger Ephemeral Data Collection Team and, subsequently, the complete NRDA Team.

The NRDA teams should also be designed to:

- facilitate effective and efficient decision making;
- determine data needs and coordinate the collection of such data;
- provide effective communications to all team members as well as the Unified Command (UC) and other groups within the Incident Command System (ICS); and
- manage and disseminate the data collected to the appropriate parties, and coordinate the NRDA activities with the ICS.

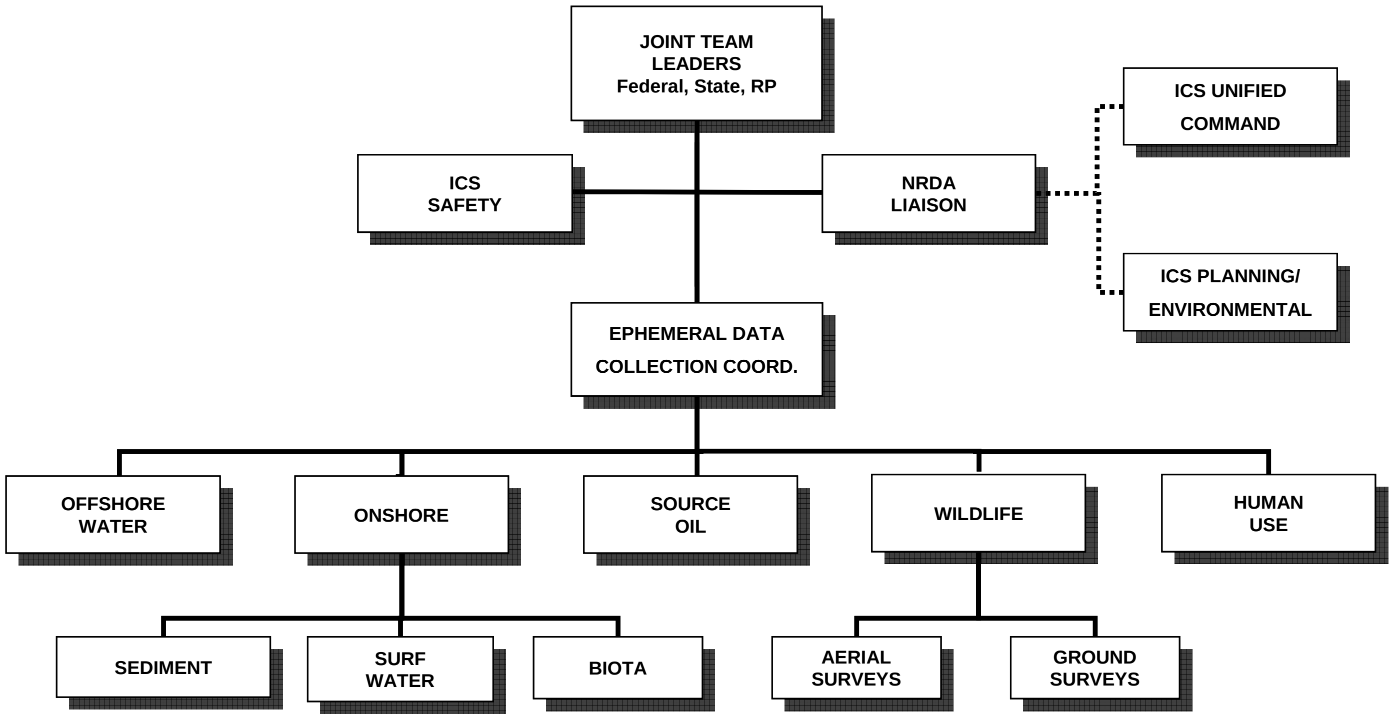
Both the Initial and full NRDA Teams should mirror the UC with one representative each of the RP, federal Trustees, state Trustees, and tribal/local Trustees forming the group that provides overall direction to the teams. Each representative should have equal authority and should strive to obtain consensus on the scope and intent of all activities conducted by the team.

2.2 Ephemeral Data Collection Team

The primary effort of the Ephemeral Data Collection Team should be to initiate ephemeral data collection as described in Section 4.0 as well as the identification of existing data/field studies to establish baseline conditions. The Team will generally be staffed by RP and Trustee personnel with assignments to specific positions made at the time of the incident based primarily on expertise and/or desire to conduct specific activities. The Team also will likely be supplemented by technical experts from both the private and public sectors to assist with the study design and data collection. Additionally, the ICS response organization can generally be requested to provide support to the Team in the areas of safety, logistics, and procurement.

The Ephemeral Data Collection Team should be comprised primarily of sampling teams designated to collect samples and/or data related to key resources or media (*i.e.,* wildlife, source oil, human use, onshore sediments, etc.). All activities should be coordinated with the ICS and in particular the Planning Section/Environmental Unit and Operations Section/Wildlife Unit. An example of an Ephemeral Data Collection Team Organization Chart is provided in Figure 2-1.

Figure 2-1. Ephemeral Data Collection Team



2.3 NRDA Team

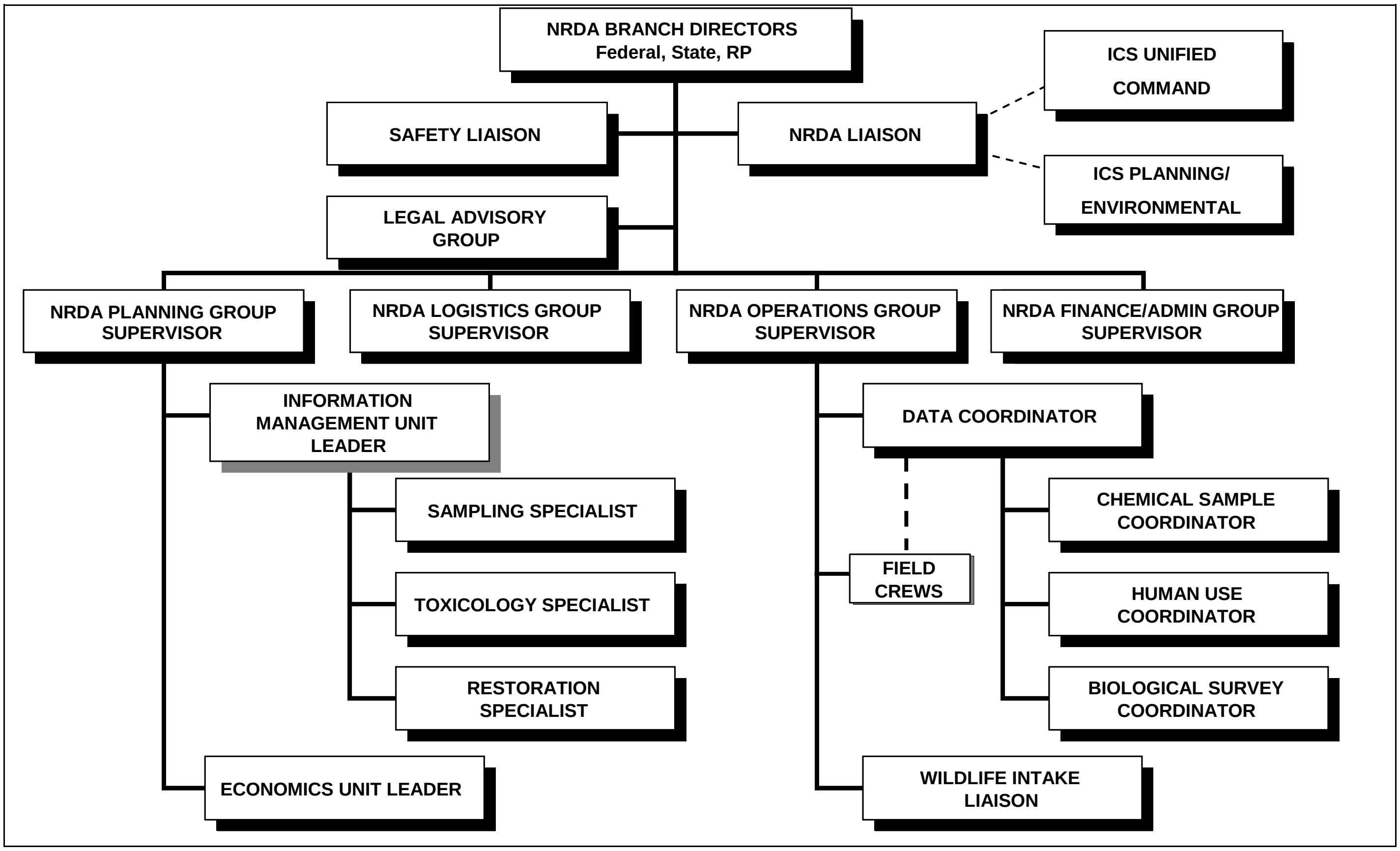
Depending on the complexity and scale of the spill injuries, the Ephemeral Data Collection Team may be expanded as needed to incorporate additional tasks and roles. The full NRDA Team or branch structure should be similar to the ICS organization in that a chain-of-command is used, with a unified command group, or branch directors, that manages the activities of the Teams' Operations, Planning, Logistics and Finance activities. Team functions such as Safety, Logistics, and Finance can, and often times should, be provided by the ICS

An example of a full NRDA Team is provided in Figure 2-2 and the descriptions of the various positions are provided below. As indicated above, a given spill may only require that a few NRDA Team roles be filled (e.g., Planning and Operations Supervisors) to supplement the Ephemeral Data Collection Team and there is no required organizational structure. In addition, individuals may fulfill more than one role, particularly for roles with closely related functions (*i.e.*, Information Management Unit Leader and Data Coordinator). However, the team should be sufficiently large and adequately structured to effectively manage all aspects of a cooperative assessment.

2.3.1 NRDA Team/Branch Directors

The NRDA Branch Directors are responsible for managing all activities related to NRDA information collection and coordinating NRDA activities with the Unified Command for the duration of spill response. In the context of cooperative assessments, these positions are staffed by lead Trustee and RP Representatives.

Figure 2-2. NRDA Team



Examples of specific duties and responsibilities of the Branch Directors include:

- Represent agency position and policies to co-Trustees and RP(s)
- Secure a NRDA Branch office location at or near the Command Post
- Assist in developing a Cooperative Assessment Agreement among Trustee agencies and RP(s).
- Implement the NRDA Cooperative Agreement.
- Provide incident briefings to NRDA Branch personnel.
- Schedule and provide assignments to NRDA Branch personnel.
- Determine and execute funding/cost-tracking mechanisms for NRDA activities specific to his/her agency or company
- Act as NRDA liaison to the Unified Command (UC); attend meetings of the UC; communicate NRDA activities, updates and needs to the UC (liaison officer of the Command Staff); relay relevant spill response information/updates from the UC to NRDA staff.
- Schedule NRDA planning meetings to develop action plans and identify resource needs. Coordinate NRDA planning with the UC operational planning cycle as appropriate.

2.3.2 Safety Liaison

The Safety Liaison is responsible for coordinating with the ICS Safety Officer to assure personnel safety during all NRDA Branch activities. The Safety Liaison maintains awareness of active and developing situations for NRDA Branch activities, and monitors and assesses hazardous and unsafe situations. The responsibilities of this position may be fulfilled by the ICS Safety Officer. Examples of specific duties and responsibilities of the Safety Liaison include:

- Obtain the Site Safety and Health Plan from the UC and ensure it is implemented during all NRDA Branch activities.
- Review NRDA Incident Action Plans for safety implications.
- Exercise emergency authority to stop unsafe actions.
- Investigate accidents that have occurred during NRDA Branch activities.
- Brief NRDA Branch Director(s) and ICS Safety Officer on activities.

2.3.3 NRDA Liaison

Under the supervision of the NRDA Branch Directors, this person serves as the NRDA liaison to the Planning/Environmental Units as well as the UC. Examples of specific duties and responsibilities of the NRDA Liaison include:

- Attend meetings of the UC.
- Communicate NRDA activities, updates and needs to the UC.
- Relay relevant spill response information/updates from the UC to NRDA staff.
- Brief NRDA Planning Group Supervisor on activities.

2.3.4 Legal Advisor

Working with the NRDA Branch Directors, the Legal Advisor or Legal Advisory Group is responsible for providing legal oversight and consultation for NRDA activities. In the context of cooperative assessments, this position can be jointly staffed by lead Trustee and RP legal representatives. Examples of specific duties and responsibilities of the Legal Advisor include:

- Negotiate terms of the Cooperative Assessment Agreement and develop a written document for the signatures of participating Trustees and RP(s).
- Assist in the development of contracts for external experts utilized for NRDA studies.
- Provide consultation on all other legal matters pertaining to NRDA in federal and state laws, regulations and mandates (*e.g.*, OPA 90, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), federal Clean Water Act (CWA), California Lempert-Keene Seastrand Oil Spill Prevention and Response Act, Washington Compensation Tables, etc.).
- Ensure that an adequate Administrative Record is developed and maintained.

2.3.5 NRDA Planning Group Supervisor

Under the direction of the NRDA Branch Director, the NRDA Planning Group Supervisor is primarily responsible for determining NRDA data needs and resources necessary to collect the data and interfacing with appropriate planning and operational sections of the ICS to coordinate NRDA-relevant response data collection; collecting data beyond response data as needed. Examples of specific duties and responsibilities of the Planning Group Supervisor include:

- Assess available information and determine NRDA data needs.
- Communicate NRDA data needs to ICS Planning and Operation Sections and facilitate response data collection.

- Determine the resources required to collect the data and coordinate with Logistics to acquire the resources.
- Organize and oversee demobilization activities.
- Brief NRDA Branch Chief on activities.
- Attend NRDA planning meetings

2.3.6 Information Management Unit Leader

Under the supervision of the NRDA Planning Group Supervisor, the Information Management Unit Leader is responsible for evaluating the incident in the context of natural resource damages, predicting probable NRDA data needs versus response data collection and developing NRDA action plans. Examples of specific duties and responsibilities of the Information Management Unit Leader include:

- Conduct notifications of contractors and other contacts relevant to NRDA data collection.
- Determine logistical capabilities and needs of the NRDA branch and coordinate with Logistics Section of the IC to obtain resources (ICS form 215).
- Brief and assign NRDA planning personnel.
- Track and obtain data collected by the ICS Planning and Operations Section, including trajectory, resources at risk, Shoreline Cleanup Assessment Team (SCAT), and wildlife search and intake information.
- Based on available spill information, develop an NRDA data collection plan to address documentation of exposure pathways and spill-related injuries to natural resources. This plan can include review of existing data sources, describing baseline conditions/resources at risk, sampling plan to collect ephemeral and longer term data, and other studies of exposure or effects.
- Develop NRDA action plans for each operational period (ICS form 204).
- Brief the NRDA Planning Group Supervisor on activities.

2.3.7 Sampling Specialist

Under the supervision of the Information Management Unit Leader, the Sampling Specialist is responsible for developing NRDA sampling plans. Examples of specific duties and responsibilities of the Sampling Specialist include:

- Assess response data availability.
- Determine NRDA ephemeral and long term data needs that are in addition to response data.
- Develop NRDA sampling plans, including spatial and temporal distribution of samples, numbers of samples, and resource requirements.
- Brief the Information Management Unit Leader on activities.

2.3.8 Toxicology Specialist

Under the supervision of the Information Management Unit Leader, the Toxicology Specialist is responsible for providing toxicology input on data collection planning. Examples of specific duties and responsibilities of the Toxicology Specialist include:

- Provide timely access to relevant human and ecological toxicology information for spilled product(s).
- Determine likely exposure patterns for wildlife resources, based on spill conditions, survey data, and other available information.

- Assess data needs for wildlife injury determination.
- Assist Sampling Specialist in sample plan development.
- Brief the Information Management Unit Leader on activities.

2.3.9 Restoration Specialist

Under the supervision of the Information Management Unit Leader, the Restoration Specialist is responsible for ensuring that data collection needs for restoration planning are incorporated into the field sampling plan.

2.3.10 Economics Unit

Under the supervision of the NRDA Planning Group Supervisor, the Economics Unit is responsible for providing consultation on economic data needs for NRDA. Examples of specific duties and responsibilities of the Economics Unit include:

- Assess data needs for human use injury determination.
- Assess data needs for wildlife injury determination.
- Assist Sampling Specialist in sample plan development.
- Brief the NRDA Planning Group Supervisor on activities.

2.3.11 NRDA Operations Group Supervisor

Under the supervision of the NRDA Branch Director, the NRDA Operations Group Supervisor is responsible for the field collection of NRDA data and management of chemical and biological data required for NRDA. Examples of specific duties and responsibilities of the NRDA Operations Group Supervisor include:

- Conduct operational portion of the NRDA action plan for data collection, including input on sampling and other data collection methodologies.
- Supervise implementation of the NRDA operations.
- Brief and assign NRDA operations personnel.
- Oversee data storage, analyses (as needed), and reporting.
- Ensure safe tactical operations.
- Make expedient changes to the NRDA action plan during the operation period, as necessary; brief Planning Unit Leader on changes.
- Brief the NRDA Data Management Supervisor on activities.
- Attend NRDA planning meetings.

2.3.12 Data Coordinator

Under the Supervision of the NRDA Operations Group Supervisor, the Data Coordinator is responsible for all aspects of NRDA data collection and overseeing sample handling through to analyses. This position may be assisted by chemical sample, human use, and biological survey coordinators, as needed. Examples of specific duties and responsibilities of the Data Coordinator include:

- Organize and conduct sampling as prescribed in NRDA action plans.
- Coordinate with ICS on data collection where applicable.
- Track and inventory all NRDA samples and data collected for the duration of the response.
- Brief the NRDA Operations Group Supervisor on activities and provide updates of data analyses as needed/feasible.

2.3.13 Chemical Sample Coordinator

Under the supervision of the Data Coordinator, the Chemical Sample Coordinator will collect, store, and transport samples for chemical analyses (e.g., source, water, sediment, tissue); complete and maintain records of all Chain-of-Custody forms required for chemical analyses will conduct chemical sampling as prescribed in NRDA action plans.

2.3.14 Human Use Coordinator

Under the supervision of the Data Coordinator, the Human Use Coordinator will collect and store data regarding human use of resources in the impacted area.

2.3.15 Biological Survey Coordinator

- Under the supervision of the Data Coordinator, the Biological Survey Coordinator will collect and store survey data for natural resources (*e.g.,* fish, wildlife, and habitats) in the impacted area.

2.3.16 Wildlife Intake Liaison

Under the supervision of the NRDA Operations Group Supervisor, the Wildlife Intake Liaison is responsible for wildlife intake data collection for purposes of NRDA. Examples of specific duties and responsibilities of the Wildlife Intake Liaison include:

- Remain at the Wildlife Intake Processing Center during periods of wildlife intake.
- Collect Search Effort Forms from search and collection personnel and ensure forms are completed.
- Oversee wildlife intake data collection for purposes of NRDA and obtain copies of all wildlife intake forms.
- Coordinate with Wildlife Branch of the ICS.
- Brief NRDA Operations Group Supervisor.

2.3.17 NRDA Logistics Group Supervisor

The NRDA Logistics Group Supervisor is responsible for providing facilities, services and material to support NRDA Branch activities. The NRDA Logistics Group Supervisor will coordinate with the NRDA Liaison and ICS Logistics Section Chief to obtain resources (*e.g.*, supplies, facilities, equipment, services). The responsibilities of this position may be delegated to the ICS Logistics Section Chief. Examples of specific duties and responsibilities of the NRDA Logistics Group Supervisor include:

- Identify service and support requirements for planned and expected operations.
- Coordinate and process requests for additional resources.
- Advise NRDA Branch personnel of current service and support capabilities.
- Prepare service and support section of the Incident Action Plan.
- Assist NRDA Planning Group Supervisor in demobilization activities.

2.3.18 NRDA Finance/Administration Group Supervisor

The NRDA Finance/Administration Group Supervisor is responsible for all financial and cost analysis for NRDA Branch activities. The responsibilities of this position may be delegated to, or at a minimum coordinated with, the ICS Finance Section Chief.

Examples of specific duties and responsibilities of the NRDA Finance/Administration Group Supervisor include:

- Determine resource needs.
- Collect all cost data and provide cost estimates to NRDA Branch personnel.
- Coordinate with Trustee and RP headquarters on cost reporting procedures.
- Prepare all cost documents related to NRDA Branch activities.
- Collect and maintain a file of personnel time records.
- Establish and administer vendor and consultant contracts.

3.0 NOTIFICATION

In the event of an incident, prompt notification and mobilization of the RP and all Trustees with jurisdiction over the potentially injured natural resources as well as other JAT members that could provide support is critical in conducting a successful cooperative NRD assessment. To that end, Table 3-1 provides a template that can be used to display contact information for the various Trustee and industry representatives on a particular JAT or Cooperative NRDA Response Team. In general, the RP initiates the notification process, but Trustees can also perform this activity.

It is important that relationships between industry and the Trustees be developed as a normal course of business to develop some level of familiarity and trust. This ensures the appropriate representatives are promptly notified and enhances efficiency in the early stages of an incident. The development of NRDA preplans for industry facilities and operations will also facilitate rapid notification of the appropriate Trustee representatives, as well as contractors that can assist in the collection of ephemeral data. At a minimum, each industry facility or operation should develop a notification list of Trustee representatives with jurisdiction over the local resources as well as contractors and other industry representatives in the area that could be called upon to assist in the event of an incident.

Table 3-1. Notification Summary

INFORMATION TYPE	Organization Name		
	Representative Name	Representative Name	Representative Name
Title			
Office Phone			
FAX			
Cell Phone			
Pager			
Home Phone			
E-Mail			
Address			

INFORMATION TYPE	Organization Name		
	Representative Name	Representative Name	Representative Name
Title			
Office Phone			
FAX			
Cell Phone			
Pager			
Home Phone			
E-Mail			
Address			

4.0 EPHEMERAL DATA COLLECTION

Immediately following a spill and the formation of an Ephemeral Data Collection Team, an Ephemeral Data Collection Plan should be prepared to facilitate the identification of the critical data collection activities and procedures and their communication to the team members and the relevant ICS representatives. Examples of the various components that may be included in an Ephemeral Data Collection Plan are provided below.

4.1 Purpose, Objective, Goal, Focus, and Scope of Ephemeral Data Collection Plan

- **Goals:** To 1) confirm the source of the spilled oil(s); 2) determine environmental conditions in water, sediment, and selected marine organisms prior to contact by the oil; 3) document concentrations of petroleum hydrocarbons in the water column, sediments and biota, subsequent to oil contact; and 4) document extent of wildlife and human uses of the local area at the time of, or shortly after, the incident.
- **Objectives:** To collect source oil, water, sediment, and select biological samples (or survey data) as well as make wildlife and human use observations within the first hours or days after a spill. Because of the narrow window of opportunity for collection of these data, they are referred to as "ephemeral" data (*i.e.*, if the samples are not collected, the opportunity to collect them will be lost permanently). Ephemeral data aids in understanding baseline environmental conditions prior to oil contact and can be critical in identifying the need for, and scope of, subsequent environmental sampling, and injury assessment.
- **Focus of Sample Collection:** Collection of ephemeral data related samples should generally focus on the following media and areas: 1) source oil(s) to confirm the release is the source of the oil found in the environment and for possible toxicological testing); 2) water and sediment samples from areas not yet oiled but likely to be oiled (reference/baseline conditions) particularly sensitive areas such as sea grass and oyster beds to document pre-oil contact conditions; 3) biota (clams, oysters, mussels, macro-invertebrates, etc.) samples from areas that will likely be oiled to also document pre-oil contact conditions, 4) wildlife and human use observations/photo documentation of the general spill area, and 5) water samples under the slick to obtain information on the concentration of selected petroleum constituents in the water column.
- **Study Area:** Primarily the area likely to be impacted in the first few days following a spill but should also include other ecologically or culturally sensitive areas within the entire zone that could be impacted.

4.2 Safety

Safety is the most important consideration when implementing data collection activities. All field team members will read the incident-specific site safety plan and receive a daily safety briefing before going into the field. Field team members collecting samples by boat will receive a boat safety briefing by the boat operator prior to leaving the dock. When on the water, field team members will wear personal floatation devices at all times. Good judgment must be used, particularly when considering fieldwork during inclement weather. No sampling will be conducted in the dark. While working on the shoreline, field team members should be mindful of slippery surfaces (e.g., rocks) and sharp objects. Field team members should wear safety glasses, sunscreen, appropriate footwear, and other personal protective equipment (PPE) as might be required by the Safety Officer. Any incident will be promptly reported in accordance with the site-specific site safety plan. All individuals responding in the field must have appropriate HAZWOPER training and documentation. Sampling activities must be conducted in accordance with the incident-specific site safety plan for the response, including the determination that vapor concentrations in the work area are below those required for safe operations. When working in oiled areas, field sampling team members will wear appropriate protective equipment (*e.g.*, Tyvek suits or rain gear, rubber boots, gloves, etc.). Nitrile gloves will be worn when collecting samples and must be changed between each sampling site to avoid cross-contamination.

4.3 General Sampling Procedures

4.3.1 Introduction

This section describes suggested general methods for collecting source oil, water, sediment, and biological samples as well as conducting aerial surveillance and remote sensing for documenting wildlife and human use and oil distribution. The methods described herein are not intended to be prescriptive. The Trustees and the RP must determine, on a case by case basis, appropriate methods given their particular data needs as well as situational and resource limitations. Methodologies will often be determined by specialists hired to collect specific types of data. Regarding samples collected for chemical analyses, sampling methods and other protocols should be coordinated, to the extent possible, with the laboratory that will be conducting the analyses. Finally, some or all of the data discussed are potentially collected as part of spill response activities and should not be duplicated by the NRDA team unless sampling or QA/QC procedures are not adequate for NRDA purposes. Further resources and guidelines regarding oil spill sampling and data collection can be found at: http://response.restoration.noaa.gov.

4.3.2 Top Data Collection Priorities

- Collection of source oil(s).
- Water, sediment, and biological samples (*e.g.*, bivalves) in areas that are not yet oiled but are expected to be oiled based on trajectory analyses.
- Aerial and ground surveys of sensitive wildlife areas and public use areas.
- Water, sediment, and biological samples (*e.g.*, bivalves) in oiled areas, provided it is safe and permitted by the ICS.

4.3.3 Recordkeeping and Chain of Custody

Record keeping should include the following:

- Field sampling record for each field team. Each team should assign this to a specific member of the team. At the end of each day or field sampling trip, the time and date should be noted and the record keeper should sign the field record. Information in the record should include sampling details (*i.e.*, sampler name, sample type, location, and time) and other observations (*i.e.*, presence of wildlife and humans, oil observations, weather).
- Photo log, signed and time/dated at end of each day.
- Chain-of-custody forms for all samples properly filled out and signed per COC procedures.
- Contact list for all sampling team members with address, phone, cell phone, pager, fax, email, etc.

- Record GPS positions as follows: lat NDD.ddddd; lon WDD.ddddd; WGS 84 datum.

Chain-of-custody must be maintained at all times. Chain-of-custody means that the sample or data are under the possession and control of the person identified on the form for the period specified on the form. Possession and control can mean literally in possession, within sight, or in secure storage where the access is limited to the person in possession. The person relinquishing the samples and the person taking control of the samples need to sign the chain-of-custody form.

Before shipping samples:

- make sure that each chain-of-custody form is filled out completely and properly,
- check that the sample identification on sample bottles matches the sample identification on the chain-of-custody, and
- ensure that the date, time, type, matrix, container types, and analyses requested are clearly indicated.

After the chain-of-custody has been checked and verified, sign where indicated in the "Relinquish By" box at the bottom of the form. Make sure that the date and time that you relinquished the samples are recorded on the chain-of –custody. Put the chain-of-custody forms in a zip lock bag and place the bag in the ice chest. Remember to put ice in the ice chest and tape the lid shut with duct tape. Take the ice chest to an over-night courier service and ship the samples to the lab as directed. When the ice chest is received at the lab, the person accepting the samples will sign his or her name in the "Received By" box on the bottom of the chain-of-custody form.

The original chain-of-custody form always goes with the samples. Upon receipt of the samples, request the laboratory to send a copy of the chain-of-custody to the sender.

4.3.4 Sample Storage

Most samples can be temporarily stored in appropriate containers in ice chests with ice cubes or crushed ice, or placed in a refrigerator. During the holding period, the sample temperature should not exceed 6^{o}C, or become frozen. Keeping the samples well packed in wet ice will keep the sample in the required temperature range.

4.3.5 Labeling

Label sample jar using a permanent marker just before collecting samples if possible and cover label with clear tape. Include the following information on the sample label:

- sample number;
- sample type (e.g., source oil, sediment, water, etc.);
- date, time, and location of sample collection; and
- collector's name.

4.3.6 Photo-Documentation

Prior to conducting any sampling and after marking the station location and/or recording the GPS coordinates, photographs or videos should be taken of the sampling site. Recommend using a program that will automatically put GPS coordinates on your digital photographs. For onshore samples, take video and/or photos in both directions along the shore as well as from the waterline toward the backshore, and from the backshore to the waterline. For offshore sites within reasonable distance from the land, take photos or video directly towards the shore as well as upshore and downshore directions. In both cases, try to get permanent and distinctive landmarks in some photos and/or videos for future reference. In all cases, include a permanent or distinctive landmark or some measure of scale in photos or videos for future reference.

4.3.7 Field Sketch

When collecting sediment samples, make a quick sketch of the beach and sampling area in the field book showing the general beach configuration, sampling locations and pattern of sample collection. A similar sketch should be made for documenting biological sample locations.

4.3.8 Airborne Contamination

Avoid sampling or storage of equipment downwind of solvents or engine exhaust. This is particularly the case for samples that will be analyzed for volatile organic compounds (VOCs) and usually avoided by approaching the sampling location into the wind and current if practical.

4.3.9 Decontamination and Waste Handling

Clean sampling equipment with an Alconox and water solution followed by two distilled water rinses between each sample collection. Methanol may also be used to clean sampling equipment. When decontaminating sampling equipment, wash and rinse over a plastic bucket with a lid and retain the wash water. Store all oily rags, gloves, and other material in a plastic bag. Dispose of rinse water and oil material in accordance with the waste management plan prepared by the Environmental Unit.

4.3.10 Shipping

Sample shipment must be consistent with federal Department of Transportation regulations governing the shipment of flammable materials.

4.4 Source Oil Sampling

It is critical that all sources of spilled oil be identified and sampled to enable forensics analyses and toxicity testing of the source oil as well as comparison to the oil that may be detected in samples collected from various media (water, shoreline, subtidal, etc.) during the injury assessment. Analytical methods are discussed in Section 4.9. Source oil sample(s) should be separated from other samples.

- **Timing:** Collect as soon as possible.
- **Where to Sample:** If possible, collect oil samples from the facility storage tank(s) or vessel compartment(s) from with the spill originated. If all of the oil has been released from the tank or compartment, then collect the sample from the water or land surface as close to the source as possible or safe to access. If there is only a sheen on water, float four 3 x 12 inch pieces of fiberglass cloth on the surface of the water.
- **Sample Equipment:** Sample equipment for collecting source oil generally consists of a drum thief, sample bomb, bailer, or other similar devices. In many cases, samples can be collected by simply dipping a sample jar into the oil.
- **Sample Volume:** 1 liter if oil and water; at least 30 ml if neat oil. Collect in triplicate.
- **Sample Container:** Pre-cleaned, glass jar with Teflon lined cap. Do not let glove come into contact with petroleum. If gloves come into contact with the petroleum sample,

change gloves and take another sample. If additional sources of oil are sampled, change gloves between each sample collection.

- **Labeling:** Mark the label as "Source Oil" using a permanent marker and, being as specific as possible, include the following information:
    - type of product spilled (e.g., diesel, bunker fuel, gasoline);
    - source of the spilled product (e.g., name of the vessel transporting product;
    - fuel tank of vessel transporting the product);
    - sample number;
    - date and time; and
    - collector's name.

4.5 Water Sampling

The primary purpose of collecting water samples is to determine baseline conditions by collecting samples in unimpacted areas as well as to determine the concentrations of petroleum components in the water as a result of the release by sampling the impacted area. The more toxic components generally include VOCs (*e.g.*, benzene, toluene, ethylbenzene, and xylenes) and low molecular weight polycyclic aromatic hydrocarbons (PAHs), as well as other PAHs that may contribute to chronic toxicity (*e.g.*, benzo[a]pyrene). Analytical methods are provided in Section 4.9.

The secondary purpose is to determine the concentration of the petroleum hydrocarbons (both baseline and post-release) that may have entered the water column from physical processes such as mixing, dispersion, dissolution, etc. and/or adsorption to suspended particles or other materials. The concentrations of petroleum hydrocarbons in the water column are highest in the first few hours to one day following a release and then decrease rapidly. Therefore, it is critical that samples be collected as soon as possible during the first day after the release occurs.

Water samples should be collected from both oiled and unoiled areas and from both the intertidal/surf zone (near-shore) and, if sampling boats are available, off-shore areas. Near-shore samples can be collected by wading into the water and collecting samples about mid-way between the bottom and the water surface. At a minimum, off-shore water samples should be collected from the upper 1 m (near-surface water).

- **Timing:** Prior to oil impacting the sampling area or as soon as possible after impact and periodically thereafter if practical.
- **Where to Sample:** Sampling locations should be representative of the areas that have been, or are likely to become, impacted by the spill (open water, sheltered bays, industrial waterfronts, undeveloped shorelines, etc.). Sampling locations should be identified by GPS. On-shore water samples can be collected in conjunction with on-shore sediment sampling described in Section 4.6 and illustrated in Figure 4-1. Collect at least one set of water samples from the seaward end of the three transects at each sample site (Figure 4-1).
- **Sampling Equipment:** For off-shore samples, a sub-surface grab sampler should be used. The sub-surface sampler can also be used to collect samples from the intertidal areas. If a subsurface sampler is not available, the top of the sample jar can be positioned beneath the water surface and the lid removed to fill the jar and then replaced prior to bringing the jar to the surface.

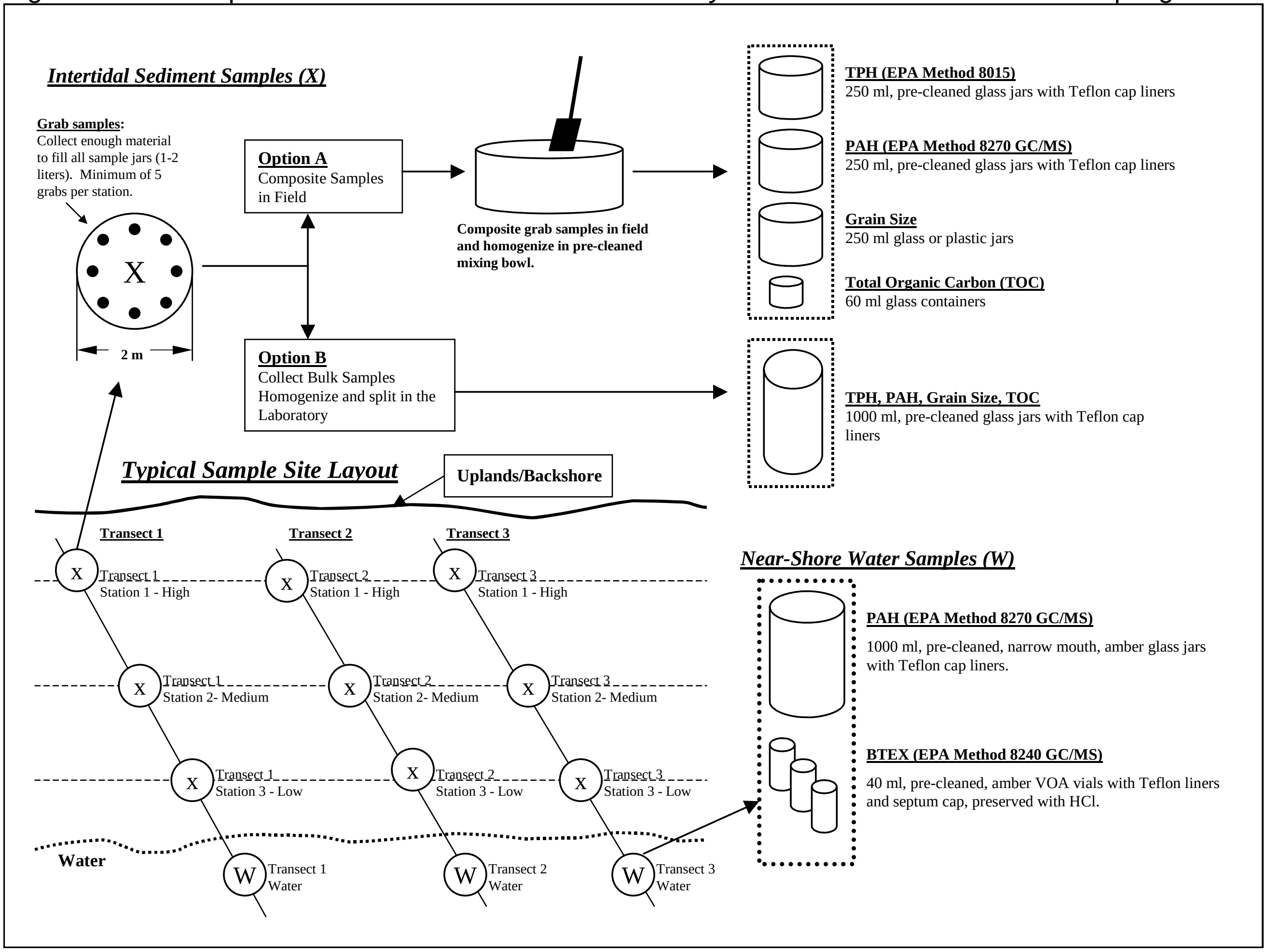
- **Sample Volume:** Water samples are collected in one, pre-cleaned 1 liter, amber-glass wide-mouth jars and three, 40 ml glass, screw-cap vials with Teflon-faced silicone septum, containing 2 drops of analytical grade 6N hydrochloric acid as a preservative. The 1-liter sample will be used for analyses of PAHs and the 40 ml vials for VOCs.
- **Number of Samples and Collection Depth:**
  - **Off-shore:** Collect at least one 1-liter and three 40 ml water samples at depths of approximately 0.5m and 3.0m, if possible, from each location.
  - **Near-shore:** Collect at least one 1-liter and three 40 ml water samples between the surface and the bottom in the surf/intertidal zone, or at approximately 0.5 m if the water is more than 1 m deep at the sampling point. Near-shore water samples can be collected in conjunction with sediment sampling described in Section 4.6 and illustrated in Figure 4-1.
  - **Sampling Through Slick:** If visible oil is present on the water surface should be moved aside with a water hose, compressed air, or paddle. Care should be taken not to disperse oil into the water column.
- **Collection of VOA Samples in 40 ml Vials:** To virtually eliminate the potential for loss of volatile hydrocarbons, collect a sub-surface sample by lowering the jar or VOA vial beneath the surface, removing the lid allowing the jar or VOA vial to fill completely, and replacing the lid while the jar is still under water. Attempt to keep the jar or VOA vial at least one-foot beneath the surface while collecting the sample to prevent surface oil from entering the jar or VOA vials. If necessary, a bulk sample can be collected and water transferred to VOA jars. From the bulk sample, gently pour some of this water sample into VOA bottle to avoid bubble formation. Fill vial until the meniscus forms over the vial's lip. If sea conditions are difficult, collect the best sample possible and note conditions of sample collection in the field book. Cover with screw-cap lid, tighten lid and invert the bottle and tap end to check for air bubbles. If bubbles are present, pour out the sample and resample with a new VOA vial.
- **Trip and Field Blanks:** Both near-shore and off-shore field teams should carry one trip blank and one field blank each for the VOA and PAH/TPH analyses. Before leaving for the field, each field team should prepare one trip blank and one field blank by filling two, 1- liter, wide-mouth amber sampling bottles and six 40 mL VOA bottles with distilled water. Trip blanks are to remain sealed and in the ice chest during sample collection. Each field team will open their field blank at one sampling site of their choosing while samples are collected at that site exposing the sample to any airborne contaminates that could be present. After all the samples at that site are collected, the field blank will be sealed and placed in the ice chest with the rest of the samples. Distilled or de-ionized water blanks (un-opened bottle from the same production lot, if possible, as the make-up water for the trip and field blanks) should be sealed and saved for possible analysis, if necessary.

4.6 Sediment Sampling

Sediment samples should be collected in both oiled and un-oiled areas along the shoreline. The purpose of sampling in un-oiled areas is to determine baseline conditions of oil components, especially toxic compounds such as polynuclear aromatic hydrocarbons (PAH), that existed prior to being impacted by an oil spill. The sampling of impacted areas is intended to determine what portion of the petroleum hydrocarbon mixture present in the sediments as a result of the spill by comparison to baseline conditions. If oil is present in samples, fingerprinting may be conducted to determine the source. Where practical, collect samples in areas with fine-grained sediments and avoid gravel or cobble beaches. If samples must be collected in areas with coarse-grained materials, remove the overlying gravel/cobble layer and sample the underlying finer-grained sediment. Analytical methods are provided in Section 4.9.

- **Where to Sample:** For unimpacted (baseline) shorelines, first conduct a brief survey of the beach to look for obviously oiled sediment, rock, intertidal organisms, feathers, or debris that may be present from previous spills. If hydrocarbons or hydrocarbon stains are observed, collect a sample of the oiled material and place it in a sample jar. Note on the label and in the field noted that it appears to be pre-existing oil. Subsequent sediment sampling in both un-impacted and impacted areas should proceed as described below.
- **Sample Transects:** At each site, three transects, equally spaced and perpendicular to the shoreline should be established with Transects 1 and 3 being at least 100m apart where practical (Figure 4-1). Try to select an area of the beach with fine sediments, and avoid gravel or cobble beaches, where practical. If coarse material (gravel/cobble) is encountered and a sample is required, remove the cobble/gravel layer and sample the underlying finer-grain sediment.
- **Sampling Equipment:** Pre-cleaned or disposable stainless steel trowel, spoon, spatula, or scoop and stainless steel bowl.
- **Depth of Sample:** Approximately 2 cm deep.

Figure 4-1. Example of sediment and water collection layout at intertidal/near-shore sampling sites.



- **Sample Containers and Volume by Analytical Method:** (See Figure 4-1)

  Option A. Field Compositing
  TPH: pre-cleaned 8-oz. wide-mouth glass jars, screw-cap with Teflon liner.
  PAHs: pre-cleaned 8-oz. wide-mouth glass jars, screw-cap with Teflon liner.
  TOC: pre-cleaned 4-oz. wide-mouth glass jars, screw-cap with Teflon liner.
  Grain size: 4 to 8 oz plastic jar, Ziploc bag, or whirl-pack baggie (fill adequately to the equivalent of a 4 to 8 oz plastic jar).

  Option B. Collection of Bulk samples for Laboratory Compositing
  TPH, PAHs, TOC and grain size: Collect bulk samples in pre-cleaned 1-liter wide-mouth glass jars, screw-cap with Teflon liner. Laboratory will homogenize and split for appropriate analyses.

- **Number of Samples:** Collect separate composite samples from the high, mid, and low tide elevations (if possible, depending on current tidal elevation) on each transect. This will result in a total of **nine** composite samples at a site. The high tide elevation may be determined by the upper limit of the wetted area and/or the presence of drift material (=strand line). Low tide elevation may be estimated based on time of sampling relative to predicted low tide but may be, by default, the lowest portion of the intertidal zone above the current waterline. Use a tape measure to record the distance from the high tide line to each sampling station on the transect.

- **Sample Collection:** Each composite sediment sample should include at least five sub-samples collected within a 2-m radius from each of the three sample stations on each transect (see Figure 4-1) for illustration). Collect sediment with a pre-cleaned stainless steel spoon, removing only the top 2 cm.

  Option A. Field Compositing: (Figure 4-1) Place sediment into a pre-cleaned stainless steel bowl, collecting enough sediment to fill the three containers listed above ¾ full. Once enough sediment has been collected, mix the sub-samples thoroughly until the sediment appears homogeneous. Remove rocks and debris that are not representative of the typical sediment type being sampled. Use the spoon to fill the jars from the composite sample in the bowl. Decontaminate (or discard disposable) equipment between each sample collection.

  Option B. Collection of Bulk samples for Laboratory Compositing: Place sediment samples into a pre-cleaned 1-liter jar, collecting enough sediment to fill each container(s). Laboratory will homogenize and process samples for total petroleum hydrocarbons (TPH), PAHs, total organic carbon (TOC) and grain size as appropriate.

Other considerations include avoiding cross-contamination by cleaning boots between sampling sites. If disposable Tyvek shoe covers are available, they may be used and changed between sample locations. Place the shoe covers in a plastic bag and dispose of according to the waste management plan prepared by the Environmental Unit.

4.7 Biological/Tissue Samples

There are a variety of types of biota that can be sampled to establish baseline contamination as well as to assess the extent of potential injuries but bivalves may be preferred since they generally do not metabolize hydrocarbons well. Species suitable for collection include mussels, clams, oysters, crabs, surf smelt eggs, surf grass and others. The person collecting the samples may be required to have a scientific collection permit or appropriate fishing license and all sampling activities should be coordinated with the appropriate resource agencies. Other commonly sampled tissues are feathers and fur from contaminated live and dead birds and mammals. Analytical methods are provided in Section 4.9.

- **Where to Sample:** Shoreline areas where mussels, clams, oysters, etc. are present and easily accessible in the intertidal area. Remove the animals from the rocky shore or surface of the sediment, and rinse the debris and sediment from their shells using (in order of preference) distilled water, clean tap water, or clean seawater. Oiled birds, mammals and other wildlife can often be sampled at a centralized intake/processing center.
- **Sample Equipment:** Precleaned or disposable stainless steel trowel or shovel for exposing subsurface bivalves or stainless steel trowel, large knife or similar tools for removing surface bivalves.
- **Sample Volume and Containers:** From 15-30 individuals of the same species (enough for at least a 30 g tissue/ sample) should be collected and wrapped in heavy duty aluminum foil (dull side facing sample) and double-bagged in appropriately sized, re-sealable freezer bags. Feather and fur sample sizes should be coordinated if possible with the analytical lab. In general, 5 oiled feathers are a sufficient sample size for PAH analyses. Fur and feathers can be stored in foil (dull side facing sample) or in clean glass sample jars with Teflon cap liners.
- **Sample Storage:** Transport as soon as practical (within 12 hours for bivalves) to the laboratory or a secure freezer where the samples can be stored at 20°C until a decision about subsequent analyses can be made.

4.8 Quality Control Samples

In addition to collection of primary samples for characterizing field conditions (see Sections 4.5 to 4.7), there are five types of samples that are considered quality control (QC) samples.

These QC samples are:

- Field replicates are unknown to the laboratory and are independently collected samples at the same station as the primary field sample (i.e., they are two separate composites collected at the same station and at the same time).
- Laboratory duplicate samples to check on the precision of the analyses.
- Matrix spike needed to verify recovery of the chemicals requested for analysis from the particular medium being tested.
- Rinsate from equipment to determine if there is contamination of equipment that might be carried over to another set of samples. Collection of equipment rinsates is discretionary and is only a concern with cross-contamination, which can be avoided by using disposable sampling gear when available, strictly adhering to decontamination procedures, described in Section 4.3.9, and changing gear entirely when moving from a contaminated area to another area.
- “Trip” blanks simply accompany the samples in the cooler and require no handling. They are provided by the laboratory samples when VOA samples are being collected for the analysis of volatile organic compound (VOC). Trip blanks are unnecessary for other kinds of analyses.

For laboratory QC testing, QC samples are typically collected at five percent of the total number of sampled stations. For example, if 40 stations are to be sampled, extra material is needed from two stations for laboratory duplicate samples and from two other stations for laboratory matrix spike samples. These QC samples are in addition to any field replicate samples.

4.9 Chemical Analyses

Two important considerations are:

- Exposure of natural resources to oil that is present in the water or sediment, and/or on/in organisms; and
- Detected oil is from the spill and not some other source.

A qualified laboratory under the direction of the Toxicology Specialist or other qualified NRDA Branch chemist should analyze the ephemeral samples of oil, sediment, water, and tissues. The Toxicology Specialist or NRDA chemist will make the decisions about what samples will be analyzed, the methods to be used and the necessary Quality Control/Quality Assurance standards.. The following sections are for background information and provide a general description of the typical analyses that may be requested from the analytical laboratory.

In all cases, a complete data reporting package should be requested from the laboratory including the standard operating procedures (SOPs), complete gas chromatograph/mass spectrometer/selective ion monitoring (GC/MS/SIM) chromatograms and results, and the associated QA/QC analyses. Data and chromatograms should also be provided as electronic files on CD (PDF files of initial and final reporting packages can also be requested of the laboratory for e-mail delivery).

4.9.1 Methods and Analyses

The following methods and analyses may be requested. The NRDA Planning Group Supervisor and Toxicology Specialist will make decisions on sample analyses prior to expiration of holding times.

Volatile Organic Compounds (VOCs)

VOCs, including BTEX (benzene, toluene, ethylbenzene and xylene) as well as other aromatic and non-aromatic compounds, are easily dispersed in water but evaporate quickly. For this reason, sampling for BTEX and other toxic volatile compounds are of high priority during ephemeral sampling efforts following oil spills.

For oil spill applications, the standard purge and trap extraction and analysis by EPA Method 8260B (GC/MS with capillary column) should be modified by running the GC/MS in SIM or in full scan mode to include the higher alkylated benzenes (i.e., a benzene ring with alkyl side chains containing 3 to 5 carbons). Detection limits should be less than 2 parts per billion (ppb) for individual analytes; 0.1 ppb is easily achievable in SIM mode.

Total Petroleum Hydrocarbons (TPH)

Total hydrocarbons are often referred to as total petroleum hydrocarbons (TPH), but most TPH methods do not differentiate among petroleum, petrogenic, and biogenic hydrocarbons when simply reported as totals. For NRDA, results from these methods will not provide the data needed to support calculation of toxic effects from BTEX or PAH exposure. The TPH results, however, can be used to track oil weathering and map extent of exposure of water column resources, if meaningful detection limits can be reached. TPH also can be used as a screening tool to estimate the presence and amount of hydrocarbons in the sample media and provide an indication of which samples should receive highest priority for more extensive analyses.

TPH by EPA Method 8015 (aliphatic and aromatic hydrocarbons, and other non-chlorinated volatile organic compounds) is often the preferred method for analysis of “total hydrocarbons”. This method, which uses a GC and flame ionization detector (FID), provides a direct measure of total hydrocarbons in the gasoline- and diesel- and heavy oil-range and has a low detection limit compared with that of infrared methods. This method does not detect low boiling compounds (below n-C8).

Polycyclic Aromatic Hydrocarbons (PAH)
Quantification of PAHs can be useful for NRDA because it provides an indication of the toxicity of a given spill to range of organisms. However, PAH analyses are relatively expensive and require some special considerations. In addition to the standard PAH priority pollutants ("parent" PAH compounds), the list of PAH analytes should, if possible, include the alkylated homologues and other compounds of interest, using GC/MS in SIM mode. EPA Method 8270 (GC/MS) for semi-volatile compounds would be the method of choice for this analysis. Detection levels should be 0.1 ppb for individual PAHs to support injury assessment using toxicity thresholds.

Biological Markers
Analysis of biological marker compounds (*i.e.*, steranes, hopanes and others) may also be desired if oil fingerprinting is needed. Analytical fingerprinting methods vary by laboratory and should be reviewed by the interested parties (Trustees and RP) prior to analyses. EPA Method 8270 can be modified for biomarker analyses.

4.9.2 Recommended Analyses by Media

- **Source Oil Sample:** Complete characterization, including PAH's (EPA Method 8270-GC/MS); BTEX (EPA Method 8260B GC/MS); TPH (EPA Method 8015); density; boiling curve; metals; sulfur content; and weight fraction in oil of aromatics, naphthenes, total paraffins, asphaltenes/resins, and sulfur. Fingerprinting should be conducted if needed.
- **Water Samples:** TPH (EPA Method 8015, GC/FID, extended range), PAH's (EPA Method 8270-GC/MS), BTEX (EPA Method 8240 GC/MS). Fingerprinting should be conducted if needed.
- **Sediment Samples:** TPH (EPA Method 8015, GC/FID, extended range), PAH's (EPA Method 8270 -GC/MS). Ask the laboratory to determine total organic carbon of the sediment. Fingerprinting should be conducted if needed.
- **Tissue Samples:** PAH's (EPA Method 8270- GC/MS), BTEX (EPA Method 8240 GC/MS). Request lipid and water content and report the results as dry weight. Fingerprinting should be conducted if needed.

4.10 Aerial Surveys

Specific goals of aerial surveys for wildlife and human use impacts include:

- Obtain information on wildlife (species and numbers) that may be affected by the spill.
- Obtain information on numbers of humans that may be affected by the spill.
- Obtain information on offshore spill distribution relative to wildlife and human uses.
- Support identification and mapping of sensitive resources.

Aerial surveys should be conducted by experienced contractors and trained wildlife observers. Use of a high-wing aircraft, such as a Partenavia, facilitates observations below and to the sides of the plane. The survey route and transect design is established just prior to the flight to accommodate the specific areas, issues, and species of concern for a particular spill. The transect design should efficiently and effectively sample areas in and around the spill site which represent areas of potential impact and/or which potentially contain resources at risk of oiling. In addition, designations of critical habitats such as rookeries or colonies as well as associated buffer strips should be determined prior to the survey so that the aircraft can avoid disturbance of sensitive areas.

Surveys may include near shore, offshore, or bay/estuarine components. Offshore surveys usually consist of multiple long legs running perpendicular to the shoreline. Smaller areas of interest (highly sensitive areas or areas especially likely to be affected by a spill) may be surveyed using fairly closely spaced parallel lines. Birds in the nearshore environment tend to be grouped in linear patterns, just seaward of the surf line. These birds are best sampled by flying parallel to the coast, about 100m seaward of the breakers. Within small bays and estuaries, repeated circling allows observers to estimate the entire population of the various bird species within the area.

Recording observations/data is challenging due to the speed of the aircraft. Flying at 200 feet altitude and at a speed of 90 knots, it is possible to record all species within a 50 m transect on either side of the plane, which provides estimations of densities. Observations should be recorded by a dedicated person who can record wildlife, human densities (if applicable), spatial, and ambient data onto a laptop computer connected to a Global Positioning System (GPS). In addition, observations can also be recorded by each observer using a hand-held tape recorder. These audio data can be transcribed by the observer biologists and entered into a spreadsheet. Observations are combined with the track of the aircraft by interpolating the position according to the time of each observation. If required, the tape-recorded data can subsequently be used for more detailed analysis of animal and human distributions. Additional information can be obtained by taking photos and/or videos from the air; some guidelines for obtaining useful images can be found in Attachment C. Depending on the level and types of data required from aerial surveys, multiple flights/separate surveys may be required.

ATTACHMENT A.

EXAMPLE (HYPOTHETICAL)

TRUSTEE FUNDING COMMITMENT LETTER

KEYDET ENERGY CORPORATION
123 Petroleum Road
Los Angeles, CA

April 22, 2004

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Office of the Solicitor
U.S. Dept. of Interior
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LCDR Reismer, JACG, USN
Office of the Staff of Judge Advocate
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Wendy Johnson
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California Dept. of Fish and Game
1700 K St., Ste 250
Sacramento, CA 95814

Katherine Pease
Office of General Counsel
NOAA
501 W. Ocean Blvd., Ste. 4470
Long Beach, CA 90802

Re: Funding Commitment for Joint Preassessment/Assessment Activities

This is to confirm that Keydet Energy Corporation (Keydet) wishes to participate with the Natural Resource Trustees (trustees) who are in receipt of this letter in their preassessment and assessment of injuries to natural resources related to the oil spill which occurred on or about April 20, 2004 in the waters approximately 10 miles northwest of San Diego, California. In consideration of the trustees' agreement to allow Keydet to participate cooperatively in these activities, Keydet hereby agrees to pay the reasonable costs previously incurred or to be incurred by the Department of the Interior (including the Fish and Wildlife Service, Bureau of Land Management, National Park Service, Office of Environmental Policy and Compliance, and Office of the Solicitor), the State of California (including the Department of Fish and Game and Office of Oil Spill Prevention and Response), the Department of Commerce (including the National Oceanic and Atmospheric Administration), and the Department of Defense (including the United States Navy), or their designees, (collectively known as the "agencies"), for such activities.

So as to avoid any potential for violation of the Anti-Deficiency Act, Keydet agrees to provide within fifteen (15) days an initial payment of $100,000 to the Department of the Interior for its costs, via electronic funds transfer, pursuant to instructions to be provided by the Department of the Interior. Additionally, Keydet agrees to provide within fifteen (15) days an initial payment of $400,000 to the Department of Defense for its costs via electronic funds transfer, pursuant to instructions to be provided by the Department of Defense. Expenses incurred by the Department of Commerce will be reimbursed within 15 days of receipt of invoices. All requests for reimbursement for these activities should be provided, along with supporting documentation, to Jay Jones, Keydet Energy, at the above address.

The Agencies
April 22, 2004
Page 2

The trustees and Keydet expect to negotiate and enter into a Cooperative Agreement for further specific cooperative assessment activities.

The costs of the cooperative assessment covered under this Agreement will be limited to the reasonable costs to implement the activities outlined in the attached “Exhibit A”. The commitment contained in this letter will also cover all other costs incurred by the Agencies until five (5) days after Keydet provides the Agencies with written notice terminating the Funding Commitment, provided that Keydet’s liability for such costs under this commitment shall not exceed $1,000,000 without prior written agreement between Keydet and the Agencies.

Jay Jones
Incident Commander
Keydet Energy Corporation

ATTACHMENT B.

DATA QUALITY OBJECTIVES

DATA QUALITY OBJECTIVES

Prior to initiating any studies and in most cases even ephemeral data collection, it is important to follow the data quality objective (DQO) process to ensure only the appropriate and relevant data is collected and that it is of sufficient quality to satisfy the injury assessment needs. This process provides for careful consideration of how data are to be used (in the context of injury assessment) prior to collection. This can help avoid situations where data are insufficient for the assessment or collected unnecessarily. Consequently, the DQO process is critical in avoiding those pitfalls and ensuring that only data that is essential in assessing injury and determining restoration needs will be collected. The DQO process is also an effective means of expediting injury assessment and getting to restoration in a timely manner.

An overview of the DQO process is outlined below with a template that can be used to facilitate the process provided in Figure B-1. An example of a template completed for a sediment study in New Jersey is provided in Figure B-2.

B.1 DQO Process #1: Overall Problem Definition and Decisions/Objectives

- Step 1. Define the Problem: This step includes components of the pre-assessment screen, including a review and description of all previous studies (e.g., RI/FS, RFI/CMS, ERA, HHRA, etc.). The resources and services of concern would also be defined. An overall problem definition statement would be provided that addresses the question “Are the resources/services of concern likely affected, at least to some degree, by unpermitted releases of hazardous substances?” The problem statement would be in the form “Releases of [XXX] have likely affected [YYY] resources/services with supporting information from previous studies.
- Step 2. Identify the Decision(s): The overall objectives and overarching decisions would be described in this step. If the answer to the question described above is “no” then the process would end and a NRDA would not go forward. If the answer is “yes,” potential decisions include:
    - If sufficient information is available and a release, pathway, and exposure can be confirmed, proceed with the injury determination and quantification phases.
    - If sufficient information is not available, collect additional data to (1) confirm the release, pathway, and exposure and (2) provide data needed for the injury determination and quantification phases.
    - Can a settlement and restoration process be agreed upon early in the process?

  The above questions would lead into DQO Steps 2A and 2B or DQO Step 3 below. Clear objectives for the NRDA and/or restoration process would be developed at this step as well.

B.2 DQO Process #2A: Release-Related Injury Determination and Quantification

- **Step 1.** Define the Problem: The objective of the investigation is to determine if there has been, is currently, and/or will continue to be release-related natural resource injuries and, if so, to quantify these injuries. Injury is defined as a measurable adverse change in a resource. However, injuries are quantifiable only if there has been a measurable loss of ecological and/or human services provided by the resource.
- **Step 2. Identify the Decision(s):** On a resource-specific basis: (1) is there injury; and, if so (2) is the injury quantifiable as a measurable lost service?
- **Step 3. Identify Decision Inputs:** What are appropriate action levels to use as an injury screening mechanism? How do we modify these screening levels to be more realistic, site-specific, and relevant? Do we need to conduct field and/or laboratory studies? What endpoints will we measure in the field and/or laboratory that will be relevant to the determination and quantification of injury? The key is to combine investigations in order to determine whether or not there is a measurable adverse change in a resource and whether or not there is an adverse change in the overall health and viability of that resource.
- **Step 4. Define Study Boundaries:** Specify the spatial and temporal boundaries. Spatial scales may be small in an injury determination context but should be more expansive (at an ecologically relevant scale) for purposes of determining whether any measurable adverse changes in a resource is having an effect on the overall viability of that resource.
- **Step 5. Develop Specific Decision Criteria:** On a resource-specific basis, what services will we focus on? How will we measure a reduction in services?
- **Step 6. Specify Tolerable Limits on Decision Errors:** In most cases, the impact of uncertainty will play out during the identification, selection, and scaling of compensatory restoration activities that will be used to compensate for measurable lost services resulting from injury. The marginal cost of providing more of these compensatory services as a way to account for uncertainty should be compared to the cost of collecting additional information that will reduce uncertainty in the determination and quantification of injury.
- **Step 7. Optimize the Design for Obtaining Data:** The sampling and analysis plan should consider both the need to determine injury at an individual level and the need to determine whether there is a change in the overall health and viability of the resource.
- **Step 8. Evaluate:** Does the design meet both criteria (determination and quantification)?

B.3 DQO Process #2B: Baseline-Related Effects

This process is very similar to DQO Process #1 except t will likely include a more expansive list of chemical stressors and will include other physical and biological stressors in addition to chemical stressors. In addition, baseline issues may be felt over a greater spatial area and over longer periods of time than release-related effects may be and therefore, the geographic and temporal scope may need to be adjusted accordingly.

B.4 DQO Process #3: Determination of Restoration Opportunities

- **Step 1. Define the Problem:** The objective of the investigation is to identify relevant restoration opportunities that can be used as compensation for quantifiable release-related natural resource injuries and to quantify the level of services provided over time by these restoration opportunities.
- **Step 2. Identify the Decision(s):** On a resource-specific basis: (1) what types of restoration activities are appropriate as compensation for lost resource services; and (2) how much of each type of restoration activity is needed to appropriately compensate for lost resource services?
- **Step 3. Identify Decision Inputs:** Viable restoration opportunities will provide adequate compensation for specific lost resource services. Generally, "in-kind" projects are greatly preferred, though "out-of-kind" projects can also be considered if there are no feasible "in-kind" projects for a given service loss. Key decision inputs required include: size of the project, current baseline conditions (i.e., what level of resource-specific services is the project providing at its current baseline levels), future resource-specific service levels over time (recovery curves and long-term service levels post-restoration). To accomplish this, do we need to conduct field studies at candidate sites? What end points will we measure in the field that will be relevant to the determination and quantification of baseline conditions? What types of restoration activities will occur – how will these activities change baseline conditions and how will the site recover post-restoration? If the restoration project is out-of-kind, how will the different types of services be quantified relative to the quantifiable service losses identified during the injury phase of the project?
- **Step 4. Define Study Boundaries:** Specify the spatial boundaries. Candidate restoration projects may be on-site or off-site.
- **Step 5. Develop Specific Decision Criteria:** On a resource-specific basis, what services will we focus on? How will we measure an increase in services relative to an existing baseline?
- **Step 6. Specify Tolerable Limits on Decision Errors:** In most cases, uncertainty will be an important factor in the identification, selection, and scaling of compensatory restoration activities that will compensate for measurable lost services (i.e., given uncertainty in the injury determination/quantification phase, how much restoration is required to compensate for this uncertainty). In addition, there is uncertainty associated with the level of services that will actually be provided by a restoration project. The marginal cost of providing additional compensatory services should be compared to the cost of additional information that will reduce uncertainty, both in the injury determination/quantification phase and the restoration design/implementation phase.
- **Step 7. Optimize the Design for Obtaining Data:** The sampling and analysis plan should be optimized to collect the data necessary to determine existing baseline conditions at a candidate restoration site and to collect the necessary data to input to the restoration design process.
- **Step 8. Evaluate:** Does the design meet both of the criteria listed in Step 7? If not then modify the design and re-evaluate.

Attachment B - Figure 1. DATA QUALITY OBJECTIVES WORKSHEET TEMPLATE

State the Problem	Identify the Decisions	Inputs to the Decisions	Define Study Boundaries	Decision Rules	Specify Limits on Decision Errors	Optimize the Sampling Design
	Principal Study Questions .					

Attachment B - Figure 2. EXAMPLE DQO WORKSHEET.

Data Quality Objectives for Rahway River Surface Water and Sediment Sampling, Linden, New Jersey

State the Problem	Identify the Decisions	Inputs to the Decisions	Define Study Boundaries	Decision Rules	Specify Limits on Decision Errors	Optimize Sampling Design
Potential constituents of environmental concern (PCOEC); separate phase hydrocarbons (SPH), volatile organic compounds (VOC), semivolatile organic compounds (SVOC), and metals, may be present in sediment and surface water in the Rahway River (RR). Certain SPH-related dissolved-phase VOC and SVOC, and metals are present in groundwater on the Former Gulf Oil Products Terminal (the site) adjacent to the RR. Groundwater flows from the site in a shallow, unconfined aquifer and potentially discharges to the RR. A drainage ditch and unnamed tributary also connect the site oil/water separator discharge to the RR. PCOEC of interest in site groundwater are: VOC include chloroform, 1,1-dichloroethene, 1,2-dichloroethene, methylene chloride, trichloroethene, benzene, toluene, ethylbenzene, and xylenes. SVOC include acenaphthene, anthracene, fluorene, naphthalene, 2-methylnaphthalene, and phenanthrene. Metals include copper, lead, and zinc. A sampling program is proposed to: characterize distribution of PCOEC in RR sediment and surface water; refine the conceptual model presented in the Baseline Ecological Evaluation (BEE); and contribute to an assessment of potential risks to aquatic, wildlife, and human receptors using the RR.	Principal Study Questions • What are background levels of PCOEC in the RR? • Are PCOEC present in RR sediment or surface water adjacent to the site at levels greater than background? • Are site-related PCOEC present in RR sediment or surface water at concentrations greater than screening criteria? • Is additional assessment needed to evaluate potential risks to aquatic, wildlife, or human receptors that may use the RR? Decision Statement Decide whether comparison of PCOEC concentrations in the RR to screening criteria suggests the potential for unacceptable risks to aquatic, wildlife, or human receptors that merit further assessment or other action.	• Existing PCOEC data from site groundwater and soil sampling. • Surface-water and sediment screening criteria protective of human health, based on designated uses. • Surface-water and sediment screening criteria for ecological receptors. • PCOEC concentrations in sediment and surface water, grain size analysis, total organic carbon, pH. • Physical conditions including: tidal stage, river flow rate, total water depth, sediment thickness • If further assessment is the decision (see the Decision Statement), then bioassay, tissue, habitat and community structure data are possible additional inputs to subsequent decisions.	Physical boundaries include: • RR – 1,500 feet upriver; • RR – Amtrak bridge, approximately 2,000 feet downriver; and • unnamed tributary of the Rahway River-confluence of tributary and drainage ditch to the discharge of the tributary into the RR. • drainage ditch – Outfall No.1 to confluence of drainage ditch and the unnamed tributary of the Rahway River.	• If surface water and sediment concentrations are elevated relative to background then those PCOEC will be considered site-related. Concentration trends in surface water and sediments will also be evaluated to support "site-related" decision. • If site-related PCOEC are present in RR sediment and/or surface water at concentrations greater than screening criteria, then appropriate data will be collected to support risk assessment. • If subsequent risk assessment identifies potential unacceptable risks to aquatic, wildlife, or human receptors, then appropriate response actions will be identified.	Potential sources of decision errors include: underestimating extent of PCOEC in RR owing to insufficient sampling; insufficient characterization of background concentrations of PCOEC in the RR; analytical measurement errors; and sample design errors. Methods to control the decision errors are listed below. Collect sufficient data to characterize PCOEC. Use appropriate analytical methods to achieve required detection limits. Sample representative study area and background locations.	Identified in Scope of Work

ATTACHMENT C.

AERIAL SURVEILLANCE, VIDEO TAPING AND REMOTE SENSING

AERIAL SURVEILLANCE, VIDEO TAPING AND REMOTE SENSING

C.1 GENERAL

The primary objectives of aerial surveillance, video taping and/or remote sensing is to document the location of floating and stranded oil but can also be used to document the presence or absence and types of wildlife and human uses in the spill area. The latter is described in greater detail in Section 4.10 Aerial Surveys. Remote sensing can also be used to identify areas of environmental impacts such as stressed vegetation and other indicators. These activities are generally conducted as part of the spill response by the ICS Planning or Operations Sections but if not should be considered for implementation as part of the NRDA activities.

Specifically the goals include:

- Provide accurate and up-to-date information on offshore spill distribution.
- Provide accurate information on onshore spill distribution.
- Support identification and mapping of sensitive resources.
- Identify human and wildlife uses of the general spill area.
- Support development of oil spill mass balance.
- Support Communications and Public Affairs needs.
-

The tasks typically involved in these activities are:

- Conduct aerial overflights to visually assess onshore and offshore oil distribution and the absence or presence and general abundance of human and wildlife uses by taking notes and annotating maps to record information.
- While conducting aerial surveys, use handheld cameras to acquire photographs and/or video images.
- If possible, acquire imagery (not from handheld cameras) that was collected by aircraft operated by governmental agencies, companies and response organizations.
- Acquire satellite data as required and as available.

When conducting aerial surveillance or remote sensing there are various considerations or reminders that should be taken into account including:

- There are two basic categories of remote sensing data for incident response which are complementary but not interchangeable:
    1. Downward-looking images from special instruments in airplanes or satellites that can be used as base maps and to map impacts.
    2. Oblique images from hand-held still and video cameras for recording impacts and response activities.

- Agency/trustee personnel can assist with these activities and should be included whenever possible.
- USCG, NOAA, and other agencies have access to Remote Sensing aircraft and satellite information and NOAA maintains a specialized team for offshore oil mapping and modeling and can be contacted via the USCG or Scientific Support Coordinator. Images and other data should be obtained from these sources whenever possible.
- Satellite operators can provide information directly. As of May 2000, the best source for all-weather, day/night satellite images is Radarsat International, http:/www.rsi.ca/home.htm.
- For detecting oil on water using remote sensing instruments, radar, ultraviolet, and thermal spectral bands are best.
- For detecting oil and oil impacts on land or vegetation using remote sensing instruments, visible and near-infrared spectral bands are usually the best.

Specific guidelines that should be followed when conducting still photography or videotaping are provided below:

- Conduct a reconnaissance at 1000–1500 ft altitude followed by a detailed survey at 250-500 ft.
- Record continuously to include the oiled and non-oiled areas to document where the oil was and was not. If the latter becomes oiled later, you will have some documentation to estimate the duration of the oil present at that location.
- Conduct surveys twice per day, particularly reconnaissance level, preferably as early as practical in the morning and in mid-afternoon.
- Use a helicopter with the door or window removed to allow recording without reflection and/or distortion.
- Use a high quality video camera with time and date imprinting capabilities and preferably connected to a GPS unit that will also imprint the coordinates on the video image. A good digital or 35mm SLR camera should also be used to supplement or as a back up to, the video.
- Angle the video or still camera forward (i.e., more or less in the direction of the aircraft flight line) to minimize vibration effects and/or rapid movement of the scene through the recording field, and to provide location.
- Keep the shoreline or other geographic reference locations in frame as much as possible; identify distinctive geographic locations, especially if there is an audio track; pan the whole area occasionally for location reference, as many shorelines look the same for long stretches.

- Plan a flight path that minimizes the amount of time that reflection of the sun off the water (and oil) occurs as glare will reduce the value of the video or photographs.
- Document every video or photograph with the date, time, location, sequence number, and photographer; include a map or sketch of the flight path and record the time and aircraft location on the flight path every few minutes. The times on the flight path can be compared to the time stamp on the video tape to more accurately locate each section of shoreline that was filmed.
- Document in writing or on the audio track, the weather, sea conditions, general oil characteristics, cleanup activities, equipment or logistical problems, or other conditions that may affect the quality of the recordings or the interpretation of the images.
- Use a video camera that allows for audio recording directly on the tape via remote microphones (preferably the aircraft headsets as they often have noise canceling microphones) and include the pilot if possible.
- Aerial videotaping typically involves three people; the camera operator and narrator who generally sits in the back of the helicopter and films out the side and provides a verbal description of what is being videotaped, the navigator who sits in the front and provides commentary on the location of the area being filmed, and the pilot.

Additional guidelines to better ensure successful aerial surveillance/videotaping or photography includes things not to do such as:

- Do not zoom for close-ups unless the helicopter is hovering or you are facing forward, and then only sparingly.
- Do not record with camera perpendicular to the aircraft flight line unless the helicopter is hovering or the altitude is > 1,000 ft.
- Do not move the video camera around a lot and/or quickly; pan slowly and smoothly.
- Do not forget that many people may use the recording for a wide variety of purposes; therefore be objective and appropriate in photo and audio documentation.