ATTACHMENTS

FINAL 12/02

STATEMENT OF WORK
for
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
at the
Crab Orchard National Wildlife Refuge NPL Site

ADDITIONAL AND UNCHARACTERIZED SITES OPERABLE UNIT

1.0 INTRODUCTION

This Statement of Work (SOW) sets forth requirements for preparation of a remedial investigation and feasibility study (RI/FS) for the Additional and Uncharacterized Sites Operable Unit (AUS OU) at the Crab Orchard National Wildlife Refuge National Priority List (NPL) Site in Marion, Illinois.

The purposes of the remedial investigation (RI) are to assess site conditions and to collect data necessary to adequately characterize the site for the purpose of developing and evaluating effective remedial alternatives. The primary objective of the feasibility study (FS) is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the remedial action options can be presented to a decision-maker and an appropriate remedy selected. The RI/FS shall comply with all requirements and guidance for RI/FS reports (see list below) and with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300.

The Respondent will conduct the RI/FS, except for the baseline risk assessment component, which will be done by the U.S. Fish and Wildlife Service (FWS), and will produce draft RI and FS reports that are in accordance with this SOW, all applicable guidances, including the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), and in accordance with the procedures in the Federal Facility Agreement (FFA), which is Attachment A to the Administrative Order on Consent (AOC) to which this SOW is appended. The RI/FS Guidance describes the report format and the required report content; Section 11 of the FFA also describes the report format for certain primary documents. The Respondent will furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the AOC.

At the completion of the RI/FS, the Federal Agencies, in consultation with the Illinois Environmental Protection Agency (IEPA), will be responsible for the selection of a remedy or remedies for the AUS OU sites and will document this selection in a Record of Decision (ROD). The remedial action alternative(s) selected by the agencies will meet the cleanup standards specified in CERCLA Section 121. That is, the selected remedial action(s) will be protective of human health and the environment,

will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs) of other laws, will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element. The "statutory preference for treatment," when referenced in this SOW, refers to the preference established by Section 121 of CERCLA that remedial actions include as a principal element treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances, pollutants, and contaminants. The final RI/FS report and the baseline risk assessment will, with the administrative record, form the basis for the selection of the remedies for the AUS OU sites and will provide the information necessary to support development of the ROD.

As specified in CERCLA Section 104(a)(1), as amended by SARA, the FWS, in coordination with U.S. EPA and IEPA, will provide oversight of the Respondent's activities throughout the RI/FS. The Respondent will support initiation and conduct of activities related to implementation of such oversight functions.

2.0 TASK 1 - SCOPING *(RI/FS Guidance, Chapter 2)*

The FWS, in consultation with the FFA parties, has determined a site-specific approach for the AUS OU sites. Consistent with this site-specific approach, the project scope will be documented by the Respondent in a work plan. Because the work required to perform an RI/FS is not fully known at the onset, and is phased in accordance with a site's complexity and the amount of available information, it may be necessary to amend the work plan during the RI/FS to satisfy the objectives of the study.

2.1 Site Objectives

The general objectives for the AUS OU RI/FS are:

- To identify and characterize all contamination that poses unacceptable risks to human health or the environment.

- To develop and evaluate remedial alternatives to address the unacceptable risk to human health and the environment.

The purposes of these activities are to refine preliminary remediation goals (PRGs) and develop remedial action objectives (RAOs). EPA's six expectations for remedial actions, listed at NCP Section 300.430(a)(iii) shall be considered. PRGs have been established and were used to define the screening values identified in the Preliminary Assessment/Site Inspection (PA/SI). These PRGs are based on preliminary chemical-specific ARARs or on generic risk assumptions, and, in accordance with the NCP, will be modified, as necessary, as more information becomes available during the RI/FS. Media of concern identified to date include soil, sediment, surface water, groundwater, and debris. Exposure routes, used in developing the screening values, are inhalation,

ingestion, and dermal contact for humans; and direct contact and bioaccumulation for ecological receptors. The chemicals of potential concern for human health (COPCs) and chemicals of potential ecological concern (COPECs) for each site are discussed elsewhere in this SOW. The RI field investigation will assess site-specific, actual and potential exposure pathways and actual and potential exposure routes. The baseline risk assessment will characterize site-specific current and potential threats to human health and the environment, and will help establish acceptable exposure levels.

In the FS, final RAOs will be established, which specify contaminants and media of concern, potential exposure pathways, and remediation goals. Preliminary RAOs, which will be refined during the RI/FS process, are as follows:

1. Soils/Sediments/Debris Surface Water RAOs

A. Containment, removal and/or treatment of contaminated soils, sediments, debris or or surface water to prevent exposure to hazardous substances at concentrations that pose an unacceptable risk to human receptions under land use scenarios consistent with current land use and reasonably anticipated future use. The following routes of exposure are to be considered: ingestion, dermal contact, and inhalation.

B. Containment, removal and/or treatment of contaminated soils, sediments, debris or surface water to prevent exposure to hazardous substances at concentrations that pose an unacceptable risk to ecological resources under land use scenarios consistent with current land use and reasonably anticipated future use. The following routes of exposure are to be considered: 1) direct contact with soil or debris; 2) direct contact with surface water; 3) direct contact with sediments; and 4) ingestion of dietary items containing contaminant as a result of direct or indirect contact with contaminant in surface water, soils or sediments.

2. Groundwater RAOs

Containment, removal and/or treatment of contaminated groundwater and associated soils to prevent exposure to hazardous substances at concentrations that pose an unacceptable risk to human receptors under land use scenarios consistent with current land use and reasonably anticipated future use. The following routes of groundwater exposure are to be considered: ingestion, dermal contact, and inhalation.

Exceedances of Screening Criteria.

For each of the sites in the AUS OU that are included in the RI, the draft final PA/SI for the AUS OU (FWS, September 2001) identifies COPCs/COPECs in all known affected media. Some COPCs/COPECs may be eliminated and other COPCs/COPECs may be identified as RAOs are refined or additional data obtained. It also includes figures that show the locations of all exceedances of the PA/Sl screening criteria for all chemicals and media analyzed. All these COPCs

and COPECs need to be addressed in the RI. Delineation of contamination extent must include an evaluation of fate and transport, including the potential for contamination of media other than those identified in the PA/SI report. For example, when soil is identified as a media of concern, the potential for migration of contaminants to groundwater must also be considered.

2.3 Other Potential Releases

In addition to the areas identified in the AUS OU PA/SI report which require investigation because of exceedances of screening criteria, this SOW identifies other potential release areas in the AUS OU sites that require investigation. Most of these potential release areas were not investigated as part of the PA/SI. For others, the limited investigation conducted is judged to be insufficient to eliminate them as potential areas of concern. These potential release areas were identified based primarily on past industrial usage, or inferences about past industrial usage. These potential release areas, which are listed below by AUS OU site, will be investigated in the RI. The Respondent will evaluate the potential for other releases based on information in the PA/SI report and the Respondent's own knowledge of the sites.

The demolished remains of many former industrial buildings are buried at various sites within the AUS OU, particularly in Areas 11 and 12. (See the AUS OU PA/SI report for further discussion.) The Respondent should evaluate the need to investigate this buried building debris.

In addition to the potential release areas within AUS OU sites that were investigated in the AUS OU PA/SI, industrial Area 3 on the Refuge has been identified as a site that warrants investigation because of past industrial usage. Area 3 was not included in the AUS OU PA/SI, but has since been added to the AUS OU as Site AUS-OA03. (See the AUS OU PA/SI report for a description and location of Area 3). A historic records search and preliminary investigation of this site will be included in the AUS OU RI.

The Respondent is also responsible for investigation of any other known or suspected potential releases not specifically identified as such in the PA/SI report or in this SOW, but for which other information is available.

The analytes, sample media, sample locations and sample depths should be appropriate for the types of releases that may be associated with each potential release area listed below. These locations of potential releases are listed below, by AUS OU site. Note that not all 31 sites identified for the RI are included in this list of additional potential release areas. For building locations and descriptions, and locations and descriptions of other features, see the PA/SI report.

2.3.1 *Site AUS 0A2B*

- Area of dumped propellant north of Building B-2-13.
- Building B-2-1, which contained presses and later a trichloroethane vapor degreaser.
- Building B-2-2, which contained presses and was used for loading and machining.

- Building B-2-5, which was used for flare production.
- Building B-2-6, which contained presses.
- Olin Building B-2-9, used for chemical storage.
- Buildings B-2-13, B-2-25, and B-2-26; and Olin Building B-2-9, which were used for storage of waste.
- Olin Building B-2-14, used for testing.
- Building B-2-19, used for storage of propellant.
- A burning pad at the former location of IOP Building B-2-9 (groundwater not investigated).

2.3.2 Site AUS-0A2D

- Explosives mixing facilities (e.g., Buildings D-1-43, D-1-44, D-1-47, D-1-57, D-1-58).
- Explosives storage facilities (e.g., Olin Buildings D-1-14, D-1-15; IOP Buildings D-1-4 and D-1-15.)
- Building D-1-49, which was used for solvent storage.
- Buildings D-1-23, D-1-28 D-1-29, and D-1-34, which were used for fulminate/azide storage.
- Olin Building D-1-17, which contained a boiler.
- Building D-1-36, used for research and development.
- Buildings used for waste storage (e.g., D-1-6, D-1-7, D-1-8, IOP D-1-15, D-1-49, D-1-65, D-1-77, D-1-85, D-1-86, D-1-90; and Olin Building D-1-5.)

2.3.3 Site AUS-0A2F

- Entire area occupied by the nine building facility which was constructed and removed during the 1960s, located at southwest side of Area 2F, including the former location of horizontal tanks at the northwest corner of that facility.
- Building F-2-1, a former foundry.
- Building F-2-2, which was used from 1970-1973 for machining Howitzer shells. (At other sites, cutting oils containing PCBs are known to have been used in machining Vietnam-era Howitzer shells; also PCBs should be suspected at any machining site.)
- Buildings F-2-5 and F-2-1 0, which were used for primer loading and gas generator manufacturing.
- Building F-2-1 1, which was used for assembly of 120 mm cartridges.
- Building F-6-45, which contained a trichloroethane degreaser.
- Buildings used for storage of PCB transformers (e.g., F-2-2, F-2-3, and F-2-4).
- Building F-2-36, which was used for propellant grain pressing.
- Building F-2-9, which was used for loading and contained 12 presses.
- Buildings used for waste storage (e.g., F-2-2, F-2-24A, F-2-33).

2.3.4 Site AUS-OA2P

- Manufacturing buildings that housed degreasers (e.g., P-1-3 and P-1-10).
- Explosives storage buildings (e.g., P-1-63 and P-1-76).

- Waste storage buildings (e.g., P-1-3, IOP P-1-6, P-1-62, P-1-70, P-1-84).
- Building P-1-13, used for solvent storage.
- Building P-1-80, used for propellant mixing. Building P-1-1 1, used for research and development.

2.3.5 Site AUS-A11A

- The acid manufacturing area.
- The former location of the dynoil mix house.
- The former TNT screening building, which contained a press (groundwater not investigated).

2.3.6 Site AUS-A11H

- Mix houses (Buildings 12,17, and 18) and pack houses (Buildings 13, 14,15, 16 and 18) (only surface fill was investigated).
- Storage buildings 7 and 67 (former melt loading).
- Mound of dumped soil at south end of site.

2.3.7 Site AUS-A11N

- Former disposal trenches at southwest part of site.
- Nitroglycerin manufacturing area.

2.3.8 Site AUS-0A4W

- The former diesel repair building (S-1-1).
- The former tool and gauge building (S-1-2).
- The former millwright building (S-2-1). The former machine shop (S-2-2).
- The former boiler house (S-2-3).
- The former carpenter shop (S-3-1).
- The former warehouse building (S-3-2).
- The former electric and communications building (S-3-3).

2.3.9 Site AUS-0A06

Only random samples were taken at this site. The results of the random sampling and the history of the site usage indicate that all storage igloos should be sampled at locations most likely to detect releases originating from the use of the igloos.

2.3.10 Site AUS-OA07

- Building IN-2-1, used for chemical processing and packaging.
- Buildings IN-2-4, IN-2-5, and IN-2-6, used for woodworking.

- Buildings IN-3-4, IN-3-5, and IN-4-4, used for oil products distribution. Building IN-3-4 may also have been used for radio component manufacturing.
- Buildings IN-3-5 and IN-3-6, possibly used for machining.
- Building IN-4-5, possibly used for transformer manufacturing.
- Buildings IN-5-2, IN-5-3, and IN-6-2, used for metal fabrication and for rebuilding mining equipment.
- Buildings IN-5-5 and IN-5-6, used for boat manufacturing.
- Building IN-6-4, used for mine car rebuilding.
- Determine the nature and extent of pesticide contamination at site AUS-OA07, including its contribution, if any, to elevated levels in fish in Crab Orchard Lake.

2.3.11 Site AUS-0A08

- Bermed area around former above ground storage tank, near north end of site.
- Scarred area visible on aerial photographs from 1951 to 2000, located about 600 feet southeast of Miscellaneous Areas OU Site 14.
- Post-1951 bermed area identified in aerial photograph, located about 800 feet southwest of Miscellaneous Areas OU Site 14.
- All ponds (surface water and sediment) at the south end of the site that have not been previously sampled (this is in the vicinity of a suspected dump site).

2.3.12 Site AUS-OA09

Explosives storage area located at north end of site.

2.3.13 Site AUS-0A10

- Igloos leased by Sangamo 1949-1951 (FBM 1-4 and 1-5).
- Igloos possibly used for propellant casting (FBM 3-1, 3-2, and 3-3).
- Area of surface discoloration from 1951 aerial photograph, around Igloo FBM-4-1.

2.3.14 Site AUS-0A13

Only random samples were taken at this site. The results of the random sampling and the history of the site usage indicate that all storage igloos should be sampled at locations most likely to detect releases originating from the use of the igloos.

2.3.15 Site AUS-0001

- Location of ground discoloration noted in 1965 aerial photograph, in parking area at east end of site.

2.3.16 Site AUS-0002

- Location of former wastewater treatment plant building.
- Sewer manholes leading from the treatment plant to the lagoons.

2.3.17 Site AUS-0061

- Entire portion of the site designated as the "Disposal Area".

2.3.18 Site AUS-0018

- Former railroad track areas.

2.4 General Management Strategies

2.4.1 Site Boundaries

The locations of each of the AUS OU sites are shown in the AUS OU PA/SI report. The final boundaries of each site will be defined after the extent of contamination at each site is delineated.

2.4.2 Integration of Problem Formulation into Initial RI Activities

The FWS will prepare both the human health and ecological baseline risk assessments. For the ecological risk assessment, formal ecological problem formulation is warranted to refine COPECs and ecological assessment measurement endpoints, and to better define specific data needs for further sampling in the RI. FWS is currently developing the problem formulation document, which may include biological testing, as part of the ecological risk assessment. The Respondent shall incorporate the results of the problem formulation into its RI activities.

2.5 Scoping Activities

When scoping the specific aspects of a project, the Respondent shall meet with the Project Coordinators to discuss all project planning decisions and special concerns associated with the AUS OU sites. The following activities shall be performed by the Respondent as a function of the project planning process.

2.5.1 Site Background

The PA/SI report is a comprehensive document which includes information that is considered relevant to the AUS OU (except for certain information in the Lake Monitoring OU report). It includes the results of a detailed historic record search, previous analytical results, and the results of the PA/SI screening process. Additional information has since been collected for Areas 4 and 7. This information will be provided to Respondent. The Respondent will become familiar with the

information contained in the PA/SI report and the additional information and will conduct site visits to assist in planning the scope of the RI/FS.

The need for additional data is documented in the PA/SI report, as supplemented by the information provided in this SOW.

The Respondent will refer to Table 2-1 of the RI/FS Guidance for a comprehensive list of data collection information sources. This information will be utilized in determining additional data needed to characterize the AUS OU sites, better define potential applicable or relevant and appropriate requirements (ARARs), and develop a range of preliminarily identified remedial alternatives.

2.5.2 Conduct Site Visit

The Respondent will conduct site visits during the project scoping phase to assist in developing a conceptual understanding of sources and areas of contamination as well as potential exposure pathways and receptors at the AUS OU sites. During the site visits the Respondent should observe the sites' physiography, hydrology, geology, and demographics, as well as natural resource, ecological and cultural features. This information will be utilized to better scope the project and to determine the extent of additional data necessary to characterize the sites, better define potential ARARs, and narrow the range of preliminarily identified remedial alternatives. Note that available relevant data on the sites' physiography, hydrology, and geology is included in the PA/SI report.

2.5.3 Project Planning

After the Respondent has become familiar with the contents of the PA/SI report and visited the sites, the specific project scope will be planned. Project planning activities include those tasks described below as well as identifying data needs, developing a work plan, designing a data collection program, and identifying health and safety protocols. The Respondent will meet with the Project Coordinators regarding the following activities and before the drafting of the scoping deliverables below. These tasks are described in Section 2.5.4 of this SOW since they result in the development of specific required deliverables.

2.5.3.1 Preliminary Range of Remedial Action Alternatives

The Respondent will identify a preliminary range of broadly defined potential remedial action alternatives and associated technologies. The range of potential alternatives should encompass, where appropriate, alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the waste; alternatives that involve containment with little or no treatment; and a no-action alternative. These should be included in the draft work plan.

2.5.3.2 Document the Need for Treatability Studies

If remedial actions involving treatment have been identified by the Respondent or FWS in consultation with the FFA agencies, Respondent shall conduct treatability studies as needed to adequately identify and screen potential remedial measures, and later to adequately assess them in accordance with CERCLA and the NCP.

2.5.3.3 Begin Preliminary Identification of Potential ARARs

The Respondent will conduct a preliminary identification of potential state and federal ARARs (chemical-specific, location- specific and action-specific) in the work plan to assist in the refinement of remedial action objectives, and the initial identification of remedial alternatives and ARARs associated with particular actions. ARAR identification will continue as site conditions, contaminants, and remedial action alternatives are better defined.

2.5.4 Scoping Deliverables

The Respondent will submit a conceptual RI scoping document, an RI/FS work plan, a quality assurance project plan, a field sampling plan, and an AUS OU health and safety plan. The conceptual RI scoping document will present the Respondent's proposed approach to identifying data needs for the RI. The purpose of the conceptual RI scoping document is to facilitate development of the RI/FS work plan by giving the agencies the opportunity to comment on the Respondent's proposed approach as it is developed. The RI/FS work plan, quality assurance project plan, and field sampling plans must be reviewed and approved by the FWS, in consultation with the FFA parties, prior to the initiation of field activities. If more than one phase is required, appropriate addenda will be made to the work plan, sampling and analysis plan, and health and safety plan, following the same procedures required for the original documents.

2.5.4.1 RI/FS Work Plan

An RI/FS work plan documenting the decisions and evaluations completed during the scoping process will be submitted for review and approval by the FWS in consultation with the FFA parties. The work plan should be developed in conjunction with the sampling and analysis plan and the AUS OU health and safety plan, although each plan may be delivered under separate cover. The work plan will include a comprehensive description of the work to be performed, including the methodologies to be utilized, as well as a corresponding schedule for completion. In addition, the work plan must include the rationale for performing the required activities. Specifically, the work plan will present a statement of the problems and potential problems posed by the AUS OU sites and the objectives of the RI/FS. Furthermore, the plan will include a background summary setting forth the description including the geographic location of the sites, and to the extent possible, a description of the sites' physiography, hydrology, geology, demographics, ecological, cultural and natural resource features; a synopsis of the site history and a description of previous responses, if any, that have been conducted by local, state, federal, or private parties; a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the sites. Most of this information is contained in the PA/SI

report. The plan should include a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives, as appropriate. The plan will reflect coordination with treatability study requirements (see Tasks 1 and 4). It will also include a process for and manner of identifying federal and state ARARs (chemical-specific, location-specific and action-specific). The major part of the work plan is a detailed description of the tasks to be performed, information needed for each task and for FWS' baseline risk assessment, information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to the FFA parties. This includes the deliverables set forth in the remainder of this statement of work; a schedule for each of the required activities through submittal of the draft RI report, which is consistent with the RI/FS guidance and the FFA; and a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management), monthly reports to the FFA parties, and meetings and presentations to the agencies.

Base topographic maps with 2-foot contour intervals have been developed for many of the AUS OU sites, from aerial photographs taken in January 2000, and are used as base maps in the AUS OU PA/SI report. The electronic files for these maps will be provided to the Respondent for use in the RI/FS. The Respondent's work will include developing topographic maps equivalent to those derived from the January 2000 aerial photographs, for those AUS OU sites that have not been surveyed to produce maps.

All analytical results are to be made available in electronic form compatible with Microsoft Excel. The electronic data deliverable will be a flat file (single table) format based upon the U.S. Air Force PIMS data model. The particular columns (fields) and valid values (lookup lists) and other details to be included in the tables will be specified by FWS. Locational data is to be provided for all results. A professional land surveyor is to certify all survey locations. All spatial data will be delivered in ESRI ArcView shape files. The files must define a point, line or area, according to the most appropriate data type for the entity being represented. The shape file will contain a metadata text file and legend (.avl). The horizontal data will be reported using the horizontal data system of Universal Transverse Mercator, Zone 16, NAD 83, in meters. The elevation data will be reported in feet based on the GRS-80 ellipsoid.

Copies of each report, including figures, will be submitted in hard copy and electronic format. The electronic version of the report will be published in Portable Document Format (PDF), Acrobat (PDF), at a resolution of 600 dpi with embedded fonts. The file will contain bookmarks for table of content items. If not otherwise specified, all figures will be native size. The electronic file is to be submitted on compact disks, which are to be labeled with operable unit and other appropriate title page information.

The Respondent will refer to Appendix B of the RI/FS Guidance for a comprehensive description of the contents of the required work plan. Because of the unknown nature of the sites and the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. The Respondent will submit a technical memorandum documenting the need for

additional data, and identifying the DQOs whenever such requirements are identified. In any event, the Respondent is responsible for fulfilling additional data and analysis needs identified by the FWS in consultation with the FFA parties.

Note that the use of the term "work plan" in this SOW refers to the RI/FS work plan and any addenda thereto.

2.5.4.2 Sampling and Analysis Plan

Respondent will prepare a sampling and analysis plan (SAP) to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data meet DQOs. The SAP provides a mechanism for planning field activities and consists of a field sampling plan (FSP) and a quality assurance project plan (QAPP). The RI will require as many phases as necessary to develop the data to delineate the nature and extent of contamination and to identify appropriate remedial action alternatives. The FSP will define in detail the sampling and data-gathering methods that will be used. It will include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. All sample locations will be surveyed by a professional surveyor registered in the State of Illinois. The FSP will specify methods and tolerances for survey data for various sample types and for monitoring wells. All addenda, if needed, will contain the same detail.

Standard operating procedures (SOPs) will be included in the SAP, and may be bound in a separate document. SOPs will be included for all field activities such as documentation; decontamination; sample numbering, handling, custody, tracking, and shipping; monitoring well installation; monitoring well development; monitoring well sampling; measurement of water levels; direct push sampling; soil sampling; hand auger sampling; sediment sampling; surface water sampling; drum sampling; handling, storage, and disposal of investigation-derived waste, and any other activities as appropriate.

The QAPP will describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired DQOs. The QAPP will be prepared in accordance with EPA Requirements for Quality Assurance Project Plans (QA/R-5) (EPA/240/B-01/003, March 2001) and EPA Guidance for Quality Assurance Project Plans (EPA/600/R-98/018, February 1998). The DQOs will at a minimum reflect use of analytical methods for identifying contamination and remediating contamination consistent with the levels for remedial action objectives identified in the proposed National Contingency Plan, pages 51425-26 and 51433 (December 21, 1988). In addition, the QAPP will address sampling procedures, sample custody, analytical procedures, and data reduction, validation, reporting and personnel qualifications. One hundred percent of the data will undergo a data review. The data review will include the review of the QC parameters listed below, following general guidance from USEPA National Functional Guidelines for Organic/Inorganic Review (1999/1994).

- Chain of custody

- Cooler receipt form
- Case narrative
- Method blanks
- Reagent/preparation blanks (applicable to inorganic analysis).
- MS/MSDs
- Surrogate spikes
- Laboratory duplicates
- Laboratory control standards

In addition, approximately 10 percent of the data will undergo a data validation. This validation will follow the USEPA National Functional Guidelines for Organic/Inorganic Review (1999/1994). The data validation will include the review and recalculation of the raw data, whereas the data review does not include the review and recalculation of raw data. The QC parameters to be validated include the following:

- Method blanks
- Reagent/preparation blanks (applicable to inorganic analysis)
- Instrument blanks
- MS/MSDs
- Surrogate spikes
- Analytical spikes (graphite furnace)
- Laboratory duplicates
- Laboratory control standards
- Internal standard areas for GC/MS analysis
- Mass tuning for GC/MS analysis
- Endrin/DDT degradation checks for GC/EC analysis
- Second, dissimilar column confirmation for GC/EC and HPLC analyses

While the referenced National Functional Guidelines for Organic/Inorganic Review (1999/1994) document will be used as guidance during the data review and validation procedures, the document was written for Contract Laboratory Program (CLP) Statement of Work (SOW) analyses. However, samples will be analyzed by USEPA SW-846 when methods are available, and the National Functional Guidelines for Organic/Inorganic Review (1999/1994) will be used where applicable to the methods used for analysis.

Field personnel should be available for QA/QC training and orientation where applicable. The Respondent will demonstrate, in advance to the FWS' satisfaction, that each laboratory it may use is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and DQOs approved in the QAPP for the OU. The laboratory must have and follow an approved QA program. The Respondent shall only use laboratories which have a documented Quality Assurance Program which complies with ANSI/ASQC E-4 1994, "Specifications and Guidelines for Quality Systems for Environmental Data

collection and Environmental Technology Programs," (American National Standard, January 5, 1995) and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01-002, March 2001) or equivalent documentation as determined by EPA. A laboratory QA program must be submitted for review and approval by the FWS in consultation with the FFA parties. The laboratory must be accredited through the National Environmental Accreditation Program (NELAP). The FWS may require that the Respondent submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment and material specifications. The Respondent will provide assurances that the agencies have access to laboratory personnel, equipment and records for sample collection, transportation and analysis.

2.5.4.3 Site Health and Safety Plan

A health and safety plan will be prepared in conformance with the Respondent's health and safety program, and in compliance with OSHA regulations and protocols. The health and safety plan will include the 11 elements described in the RI/FS Guidance, such as a health and safety risk analysis, a description of monitoring and personal protective equipment, medical monitoring, and site control. It should be noted that the Federal Agencies do not "approve" the PRPs' health and safety plan; rather, they review it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

3.0 TASK 2 - COMMUNITY RELATIONS

The development and implementation of community relations activities are the responsibility of the FWS. Although planning, updating and implementing the community relations plan is the responsibility of the FWS, the Respondent may assist by providing information regarding the history of sites in the AUS OU, participating in public meetings, or by preparing fact sheets for distribution to the general public. FWS will prepare baseline risk assessment memoranda which will summarize the toxicity assessment and components of the baseline risk assessment. These memoranda will be placed in the Administrative Record. In addition, the FWS may establish a community information repository, at or near the site, to house one copy of the administrative record. The extent of PRP involvement in community relations activities is left to the discretion of the FWS. The Respondent's community relations responsibilities, if any, will be specified in the community relations plan and will be subject to oversight by the FWS.

4.0 TASK 3 - SITE CHARACTERIZATION *(RI/FS Guidance, Chapter 3)*

As part of the RI, the Respondent will perform the activities described in this task, including the preparation of a AUS OU site characterization summary and RI report. The overall objective of site characterization is to describe areas of a site that may pose a threat to human health or the environment. This is accomplished by first determining each site's physiography, geology, and hydrology. Surface and subsurface pathways of migration will be defined. The Respondent will identify the sources of contamination and define the nature, extent, and volume of the sources of

contamination. The Respondent will also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the sites. Using this information, contaminant fate and transport is then determined and projected. During this phase of the RI/FS, the work plan, SAP, and health and safety plan are implemented. Field data are collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondent will notify the FFA parties at least two weeks in advance of the field work regarding the planned dates for all field activities related to the RI/FS. The Respondent will demonstrate that the laboratory and type of laboratory analyses that will be utilized during site characterization meets the specific QA/QC requirements and the DQOs of the investigation as specified in the SAP. In addition to the deliverables below, the Respondent will provide a monthly progress report and participate in meetings at major points in the RI/FS.

4.1 Field Investigation

The field investigation includes the gathering of data to define site physical and biologic al characteristics, sources of contamination, and the nature and extent of contamination at the AUS OU sites. These activities will be performed by the Respondent in accordance with the work plan and SAP and any applicable addenda. The ecological and human health risk assessments to be conducted by FWS will be subject to FFA review procedures. At a minimum, the field investigation shall address the following:

4.1.1 Implement and Document Field Support Activities

The Respondent will initiate field support activities following approval of the work plan and SAP. Field support activities may include obtaining access to the sites, scheduling, and procuring equipment, office space, laboratory services, and/or contractors. The Respondent will notify the FFA parties at least two weeks prior to initiating field support activities so they may adequately schedule oversight tasks. The Respondent will also notify the FFA parties in writing upon completion of field support activities.

4.1.2 Investigate and Define Site Physical and Biological Characteristics

The Respondent will collect data on the characteristics of the sites and their surrounding areas including the physiography, geology, and hydrology, and specific physical characteristics identified in the work plan. In defining the sites' physical characteristics the Respondent will also obtain sufficient engineering data for the projection of contaminant fate and transport, and development and screening of remedial action alternatives, including information to assess treatment technologies.

4.1.3 Define Sources of Contamination

Respondent will locate each source of contamination. For each location, the areal extent and depth of contamination will be determined. The physical characteristics and chemical constituents and

their concentrations will be determined for all known and discovered sources of contamination. The Respondent shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the QAPP and DQOs. Defining the source of contamination will include analyzing the potential for contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies.

4.1.4 Describe the Nature and Extent of Contamination

The Respondent will gather information to describe the nature and extent of contamination as a final step during the field investigation. To describe the nature and extent of contamination, the Respondent will utilize the information on the sites' physical and biological characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated. The Respondent will then implement an iterative monitoring program and any study program identified in the work plan or SAP such that by using analytical techniques sufficient to detect and quantify the concentration of contaminants, the migration of contaminants through the various media at the sites can be determined. In addition, the Respondent will gather data for calculations of contaminant fate and transport. This process is continued until the area and depth of contamination are known to the level of contamination established in the QAPP and DQOs. FWS, in consultation with the FFA parties, will use the information on the nature and extent of contamination to determine the level of risk presented by the sites. Respondent will use this information to help to determine aspects of the appropriate remedial action alternatives to be evaluated.

4.2 Data Analysis

4.2.1 Evaluate Site Characteristics

The Respondent will analyze and evaluate the data to describe: (1) the sites' physical and biological characteristics, (2) contaminant source characteristics, (3) nature and extent of contamination and (4) contaminant fate and transport. Results of these analyses are utilized in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models shall be identified to the FFA parties in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to the agencies, together with a sensitivity analysis. The Respondent shall discuss and then collect any data identified by the FWS that are needed to complete the baseline risk assessment. (See "Guidance for Data Usability in Risk Assessment - OSWER Directive # 9285.7- 05 - October 1990.) Also, this evaluation shall include any information relevant to site characteristics necessary for evaluation of the need for remedial action in the baseline risk assessment and for the development and evaluation of remedial alternatives. Analysis of data collected for site characterization will meet the DQOs developed in the work plan.

4.3 Data Management Procedures

The Respondent will consistently document the quality and validity of field and laboratory data compiled during the RI.

4.3.1 Document Field Activities

Information gathered during site characterization will be consistently documented and adequately recorded by the Respondent in well maintained field logs and laboratory reports, and in accordance with the Respondent's SOPs which will have been submitted with the SAP. The methods of field documentation must be specified in the SOPs included with the SAP. Field logs must be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

4.3.2 Maintain Sample Management and Tracking

The Respondent will maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only valid analytical data are reported and utilized in the evaluation of remedial alternatives. Analytical results developed under the work plan will not be included in any site characterization reports unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent will establish a data security system to safeguard chain-of custody forms and other project records to prevent loss, damage, or alteration of project documentation.

4.4 Site Characterization Deliverables

The Respondents will prepare the preliminary site characterization summary and the remedial investigation report.

4.4.1 Preliminary Site Characterization Summary

After completing the first phase of field sampling and analysis, the Respondent will prepare a concise characterization summary. This summary will review the investigative activities that have taken place, and describe and display validated data documenting the location and characteristics of surface and subsurface features and contamination at the sites including the affected medium, types, location types, physical state, concentration of contaminants and quantity. In addition, the location, dimensions, physical condition and varying concentrations of each contaminant throughout each source and the extent of contaminant migration through each of the affected media will be documented. The site characterization summary will provide a preliminary reference for developing the risk assessment, and evaluating the development and screening of remedial alternatives and the refinement and identification of ARARs.

4.4.2 Remedial Investigation (RI)

The Respondent will prepare and submit a draft RI for review and approval by the FWS in consultation with the FFA parties. This report shall summarize results of field activities to characterize the site, sources of contamination and the fate and transport of contaminants and shall include the results of the human health and ecological risk assessments. The Respondent will refer to the RI/FS Guidance for an outline of the report format and contents. Following receipt of comments by FWS in consultation with the FFA parties, the Respondent will prepare a final RI report which satisfactorily addresses the agencies' comments.

5.0 TASK 4 - TREATABILITY STUDIES *(RI/FS Guidance, Chapter 5)*

If appropriate, treatability testing will be performed by the Respondent to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions will used in the detailed design of the selected remedial technology. The following activities will be performed by the Respondent.

5.1 Determination of Candidate Technologies and of the Need for Testing

5.1.1 Testing

The specific data requirements for the testing program will be determined and refined during site characterization and the development and screening of remedial alternatives (Tasks 2 and 6, respectively).

5.1.2 Conduct Literature Survey and Determine the Need for Treatability Testing

The Respondent will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. Where it is determined by the FWS, in consultation with the FFA parties, that treatability testing is required, and unless the Respondent can demonstrate to the agencies' satisfaction that they are not needed, the Respondent will submit a statement of work outlining the steps and data necessary to evaluate and initiate the treatability testing program.

5.1.3 Evaluate Treatability Testing

If a decision has been made to performed treatability testing, the Respondent and the FWS will decide on the type of treatability testing to use (e.g., bench versus pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as performed testing for various operating conditions, the decision to perform pilot testing should be made as early in the process as possible to minimize potential delays in the FS.

5.2 Treatability Testing and Deliverables

The deliverables that are required include a statement of work, work plan, a sampling and analysis plan, and a final treatability evaluation report. The agencies may also require a treatability testing health and safety plan, where appropriate.

5.2.1 Treatability Testing Work Plan Addendum

The Respondent will prepare a treatability testing work plan as either part of the RI/FS work plan or as an addendum to the RI/FS work plan for review and approval by the FWS in consultation with the FFA parties. The treatability testing work plan shall describe the sites' background, remedial technologies to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for treatability testing should be documented as well. If pilot scale treatability testing is to be performed, the pilot-scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed off-site, permitting requirements will be addressed

5.2.2 Treatability Testing SAP Addendum

If the original QAPP or FSP is not adequate for defining the activities to be performed during the treatability testing, an addendum to the original SAP will be prepared by the Respondent for review and approval by the FWS in consultation with the FFA parties. Task 1, Section 2.5.4 of this statement of work provides additional information on the requirements of the SAP.

5.2.3 Treatability Testing Health and Safety Plan

If the original health and safety plan is not adequate for defining the activities to be performed during the treatability tests, a separate or amended health and safety plan will be developed by the Respondent. Task 1, Section 2.5.4 of this statement of work provides additional information on the requirements of the health and safety plan. As noted above, the FFA parties do not "approve" the treatability testing health and safety plan.

5.2.4 Treatability Testing Evaluation Report

Following completion of treatability testing, if it is done, the Respondent will analyze and interpret the testing results in a technical report to the FFA parties. The report will evaluate each technology's effectiveness, implementability, cost and actual results as compared with predicted results as compared with predicted results. The report will also evaluate full scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

6.0 TASK 5 - DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES *(RI/FS Guidance, Chapter 4)*

The development and screening of remedial alternatives is performed to develop an appropriate range of waste management options that will be evaluated. This range of alternatives should include as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but varying in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed; options involving containment with little or no treatment; options involving both treatment and containment; and a no-action alternative. The following activities will be performed as a function of the development and screening of remedial alternatives.

6.1 Development and Screening of Remedial Alternatives

The Respondent will begin to develop and evaluate a range of appropriate waste management options that ensure protection of human health and the environment, concurrent with the RI site characterization task.

6.1.1 Refine and Document Remedial Action Objectives

Based on the baseline risk assessment, the Respondent will review and if necessary modify the site-specific remedial action objectives, especially the PRGs, that were established prior to or during negotiations between the agencies and the Respondent. The revised PRGs will be documented in a technical memorandum and submitted to the agencies for review and comment. These modified PRGs will specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route).

6.1.2 Develop General Response Action

The Respondent will develop general actions for each medium of interest defining containment, treatment, excavation, pumping, or other actions, singly or in combination, to satisfy the remedial action objectives.

6.1.3 Identify Areas or Volumes of Media

The Respondent will identify areas or volumes of media to which general response actions may apply, taking into account requirements for protectiveness as identified in the remedial action objectives. The chemical and physical characterization of the sites will also be taken into account.

6.1.4 Identify, Screen, and Document Remedial Technologies

The Respondent will identify and evaluate technologies applicable to each general response action to eliminate those that cannot be implemented at the sites. General response action will be refined to specify remedial technology types. Technology process options for each of the technology types

will be identified either concurrent with the identification of technology types, or following the screening of the considered technology types. Process options will be evaluated on the basis of effectiveness, implementability, and cost factors to select and retain one or, if necessary, more representative processes for each or, if necessary, more representative processes for each technology type. The technology types and process options will be summarized for inclusion in a technical memorandum. The reasons for eliminating alternatives must be specified.

6.1.5 Assemble and Document Alternatives

The Respondent will assemble selected representative technologies into alternatives for each affected medium or site within the operable unit. Together, all of the alternatives will represent a review of treatment and containment combinations that will address the individual sites or the operable unit as a whole. A summary of the assembled alternatives and their related action-specific ARARS will be prepared by the Respondent for inclusion in a technical memorandum. The reasons for eliminating alternatives during the preliminary screening process must be specified.

6.1.6 Refine Alternatives

Respondent will refine the remedial alternatives to identify contaminant volume addressed by the proposed process and sizing of critical unit operations as necessary. Sufficient information will be collected for an adequate comparison of alternatives. PRGs for each chemical in each medium will also be modified as necessary to incorporate any new risk assessment information presented in the baseline risk assessment report. Additionally, action-specific ARARs will be updated as the remedial alternatives are refined.

6.1.7 Conduct and Document Screening Evaluation of Each Alternative

The Respondent may perform a final screening process based on short and long term aspects of effectiveness, implementability, and relative cost. Generally, this screening process is only necessary when there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives will be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. As appropriate, the screening will preserve the range of treatment and containment alternatives that was initially developed. The range of remaining alternatives will include options that use treatment technologies and permanent solutions to the maximum extent practicable. The Respondent will prepare a technical memorandum summarizing the results and reasoning employed in screening, arraying alternatives that remain after screening, and identifying the action-specific ARARs for the alternatives that remain after screening.

6.2 Alternatives Development and Screening Deliverables

The Respondent will prepare a technical memorandum summarizing the work performed in and the results of each task above, including an alternatives array summary for agency review and comment.

This deliverable will document the methods, rationale, and results of the alternatives screening process.

7.0 TASK 6 - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES *(RIFS Guidance, Chapter 6)*

The detailed analysis will be conducted by the Respondent to provide the agencies with the information needed to allow for the selection of a site remedy. This analysis is the final task to be performed by Respondent during the FS.

7.1 Detailed Analysis of Alternatives

The Respondent will conduct a detailed analysis of alternatives which will consist of an analysis of each option against a set of nine evaluation criteria and a comparative analysis of all options using the same evaluation criteria as a basis for comparison.

7.1.1 Apply Nine Criteria and Document Analysis

The Respondent will apply nine evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternatives will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARS; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) cost; (8) state (or support agency) acceptance; and (9) community acceptance. (Note: criteria 8 and 9 are considered after the RI/FS report has been released to the general public.) For each alternative the Respondent should provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated which each alternative, and (2) a discussion of the individual criterion assessment. If the Respondent does not have direct input on criterion (9) community acceptance, this will be addressed by the FWS.

7.1.2 Compare Alternatives Against Each Other and Document the Comparison of Alternatives

The Respondent will perform a comparative analysis between the remedial alternatives. That is, each alternative will be compared against the others using the evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by the Federal Agencies in consultation with IEPA. The Respondent will prepare a technical memorandum summarizing the results of the comparative analysis.

7.2 Detailed Analysis Deliverables

In addition to the technical memorandum summarizing the results of the comparative analysis, the Respondent will submit a draft FS report for review and approval by the FWS in consultation with the FFA parties.

7.2.1 Feasibility Study Report

The Respondent will prepare a draft FS report for review and approval by the FWS in consultation with the FFA parties. This report, as ultimately adopted or amended provides a basis for remedy selection and documents the development and analysis of remedial alternatives. The Respondent will refer to the RI/FS Guidance for an outline of the report format and the required report content. The Respondent will prepare a FS report which satisfactorily addresses the FWS comments.

8.0 REFERENCES FOR CITATION

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process:

The (revised) National Contingency Plan

"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, " U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01

"Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 93 5 5.3 -0 1.

"Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume I," U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9 8 3 5. 1 (c).

"Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume II," U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835. 1 (d).

"A Compendium of Superfund Field Operations Methods," Two Volumes, U.S. EPA,. Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

"Guidance for the Data Quality Objectives Process (QA-G-4)," (EPA/600/R-96/055, August 2000).

"Guidance for the Data Quality Objectives Process for Hazardous Waste Sites (QA/G-4HW)," (EPA/600/R-00/007, January 2000).

"Guidance for the Preparation of Standard Operating Procedures (QA-G-6)," (EPA/240/B-01/004, March 2001).

"EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001).

"EPA Requirements for Quality Assurance Project Plans (QA/R-5)," (EPA/240/B-01/003, March 2001).

"Guidance for Quality Assurance Project Plans (QA/G-5)," (EPA 600/R-98/018, February 1998).

"User's Guide to the EPA Contract Laboratory," U.S. EPA, Sample Management Office, January 1991, OSWER Directive No. 9240.0-0 1 D.

"CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234. 1 -01 and -02.

"Guidance on Remedial Actions for Contaminated Ground Water at Superfund Sites," U.S.EPA, Office of Emergency and Remedial Response, (draft), OSWER Directive No. 9283.1-2.

"Draft Guidance on Superfund Decision Documents," U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355.-02.

"Risk Assessment Guidance for Superfund - Volume I Human Health Evaluation Manual (Part A)," EPA/540/1-89/002.

"Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments," U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997.

"Guidance for Data Usability in Risk Assessment," October, 1990, EPA/540/G-90/008

"Performance of Risk Assessments in Remedial Investigation/Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," August 28,1990, OSWER Directive No.983 5.15.

"Supplemental Guidance on Performing Risk Assessments in Remedial Investigation Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," July 2, 1991, OSWER Directive No. 9835.15(a).

"Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions," April 22,1991, OSWER Directive No. 9355.0-30.

"Health and Safety Requirements of Employed in Field Activities," U.S.EPA, Office of Emergency and Remedial Response, July 12, 198 1, EPA Order No. 1440.2.

OSHA Regulations at 29 CFR 1910.120.

"Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement. March 1,1989, OSWER Directive No. 9833.3A.

"Community Relations in Superfund: A Handbook," U.S. EPA, Office of Emergency and Remedial Response, January 1992, OSWER Directive No. 9230.0-3C.

"Community Relations During Enforcement Activities And Development of the Administrative Record," U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1 a.