

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

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IN THE MATTER OF THE :
 :
DIAMOND ALKALI SUPERFUND SITE : U.S. E.P.A. Index No.
(Newark Bay Study Area) : CERCLA-02-2004-2010
 :
Occidental Chemical Corporation, :
 :
RESPONDENT :
 :
Proceeding Under Sections 104, 106, :
122 of the Comprehensive Environmental :
Response, Compensation, and Liability :
Act as amended, 42 U.S.C. §§ 9604, :
9606, 9622 :
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This second Amendment to the above-captioned Administrative Order on Consent ("Order"), U.S. E.P.A. Index No. CERCLA-02-2004-2010, is issued pursuant to the authority vested in the Administrator of the EPA by Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §§ 9604, 9607, and 9622, which authority has been delegated to the Regional Administrators of the EPA. This authority was further redelegated by the Regional Administrator of EPA, Region II, to the Director of the Emergency and Remedial Response Division, by EPA Regional Delegation 14-4-D on November 23, 2004.

Pursuant to paragraph 90 of the Order, the Order is hereby modified as follows:

1. Paragraph 2. hh. shall be added to the Order to read as follows:

"LPRSA Order" shall mean the Settlement Agreement and Order on Consent for Remedial Investigation/Feasibility Study captioned "In the Matter of: Lower Passaic River Study Area portion of the Diamond Alkali Superfund Site, In and About Essex, Hudson, Bergen and Passaic Counties, New Jersey," CERCLA Docket No. 02-2007-2009.

2. Any costs incurred by EPA for Peer Review activities as listed in Paragraph 2. 1. shall now be included within the definition of Future Response Costs in Paragraph 2. m. Any costs incurred by the Agency for Toxic Substances and Disease Registry ("ATSDR") listed in Paragraph 2. 1. shall also be included within the definition of Future Response Costs in Paragraph 2. m. The first sentence of paragraph 2. 1. shall be modified by deleting the phrase "for which Respondent has not been given authority pursuant to this Order to perform." The last sentence of Paragraph 2. m. shall be deleted.
3. Paragraph 42. d. shall be added to the Order to read as follows:

Respondent shall coordinate with the Settling Parties listed in the LPRSA Order in submitting data obtained in the NBSA so that the Settling Parties under the LPRSA Order can develop Modeling (as defined in the LPRSA Order) that includes the Lower Passaic River and Newark Bay Study Areas.

4. Paragraph 43 shall be replaced and divided into two subparts, a. and b. Paragraph 43. a. shall be added to the Order to read as follows:

Baseline Human Health Risk Assessment and Baseline Ecological Risk Assessment. Respondent shall conduct the baseline human health risk assessment and ecological risk assessment ("Risk Assessments"). In conducting the Risk Assessments, Respondents shall take into consideration the Newark Bay Study Area Pathways Analysis Report (June 2005), the Battelle memo on Newark Bay Data Quality Objectives (June 2006), the Malcolm Pirnie table on Preliminary Geochemistry Data Quality Objectives for Newark Bay Study (June 2006), the Newark Bay Study Area Screening Level Ecological Risk Assessment (December 2008) and any other relevant Project Plans, applicable EPA guidance (including, without limitation, EPA Risk Assessment guidance referenced in this Settlement Agreement), guidelines, policies, and directives which may be found at (http://www.epa.gov/oswer/riskassessment/risk_superfund.htm), including but not limited to: "Interim Final Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Parts A to E and Volume II)," (RAGS, EPA-540-1-89-002, OSWER Directive 9285.7-01A,

December 1989); "Interim Final Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)," (RAGS, EPA-540-R-97-033, OSWER Directive 9285.7-01D, January 1998); "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments" (ERAGS, EPA-540-R-97-006, OSWER Directive 9285.7-25, June 1997) or subsequently issued guidance. The plans, reports and other deliverables described herein and in further detail in Section C of the SOW shall be provided to EPA for approval pursuant to Section VIII (EPA Review of Submissions).

5. Paragraph 43. b. shall be added to the Order to read as follows:

Peer Review. Consistent with the Peer Review Handbook, Third Edition (EPA/100/B-06/002), EPA will determine on a case-by-case basis which Newark Bay Study Area Work products should be peer reviewed, in accordance with the principle that all influential scientific and technical work products used in decision making will be peer reviewed. At a minimum, the Baseline Human Health Risk Assessment and Baseline Ecological Risk Assessment reports shall be peer reviewed. Peer involvement shall consist of the LPRSA Technical Advisory Committee ("Peer Input") and/or an external Peer Review Group ("External Peer Review"). The members of the External Peer Review will be selected by EPA based on the guidance provided in the Peer Review Handbook, Third Edition, Section 3.4. While the Respondent may propose charge questions, EPA will make the final determination on what elements to include in the charge to ensure that it meets EPA's needs for the peer review. EPA will be responsible for developing a peer review record that includes a response to peer review comments. Respondent shall incorporate comments from both the Peer Input and External Peer Review and revise reports as directed by EPA. All peer review shall be conducted in accordance with the Peer Review Handbook, Third Edition.

6. Paragraph 47. e. shall be added to the Order to read as follows:

Development of Remedial Action Objectives and Preliminary Risk-Based Remediation Goals. The

Respondent shall conduct an analysis of applicable or relevant and appropriate requirements and identify risk-based concentrations for each media for the Contaminants of Potential Concern in the baseline Human Health Risk Assessment and the baseline Ecological Risk Assessment consistent with appropriate EPA guidance, including but not limited to, "Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk - Based Preliminary Remediation Goals)," (RAGS, EPA-540/R-92/003, OSWER Directive 9285.7-01B, December 1991) or subsequently issued guidance or updates, and consistent with exposure assumptions used in the Human Health Risk Assessment. The calculations for the individual chemicals in the various media shall be submitted to EPA for review and approval pursuant to Section VIII (EPA Review of Submissions) before the FS proceeds in accordance with the EPA - approved schedule. The Remedial Action Objectives and Preliminary Remedial Goals shall be submitted to EPA for approval pursuant to Section VIII (EPA Review of Submissions) before the start of the selection of alternatives in the FS.

7. Paragraph 96. b. shall be revised to read as follows:

All payments shall be made to EPA's Account with the Federal Reserve Bank of New York by Electronic Funds Transfer ("EFT") as follows. To effectuate this payment via EFT, please instruct your bank to remit payment to EPA by providing the following information to your bank: 1) EFT to be directed to: **Federal Reserve Bank of New York**; 2) ABA Routing Number for the Federal Reserve Bank of New York: **021030004**; 3) Federal Reserve Bank of New York account number receiving payment: **68010727**; 4) SWIFT address: **FRNYUS33**; 5) Address: **Federal Reserve Bank of New York, 33 Liberty Street, New York, New York 10045**; 6) Field Tag 4200 of the Fedwire message to read: **D 68010727 Environmental Protection Agency**; 7) Case Number: **CERCLA-02-2004-2010**; 8) Amount of payment; 9) Name of Remitter; and 10) Site/Spill identifier: **02-96**. At the time of payment, Respondent shall send either an email or a letter which references the date of the EFT, the payment amount, the name of the Site, the Index number, and Respondent's name and address to the EPA Project Manager and to Richard Rice, US EPA, 26 W. Martin Luther King Dr., Attention: FINANCE, MS: NWD,

Cincinnati, OH 452268; email: rice.richard@epa.gov and AcctsReceivable.CINWD@epa.gov

8. Paragraph 96. c. shall be revised to read as follows:

Respondent shall pay to EPA all Future Response Costs not inconsistent with the NCP. On a periodic basis, EPA will send Respondent a bill requiring payment that includes a Superfund Cost Recovery Package Imaging and On-line System (SCORPIOS) Report which includes direct and indirect costs incurred by EPA and its contractors. Respondent shall make all payments within thirty (30) days of Respondent's receipt of each bill requiring payment. Respondent and EPA agree that a letter from the Strategic Integration Manager, Emergency and Remedial Response Division, EPA Region II, certifying the amount of costs incurred, and accompanied by a SCORPIOS Report shall serve as the sole basis for payment demands by EPA. Respondent shall not demand any additional documentation beyond that specified in this subparagraph as a prerequisite for making any payments demanded by EPA for Future Response Costs. Respondent shall make all payments required by this subparagraph in the manner and with notice as required by Paragraph 96.b. The amount paid will be deposited by EPA in the Diamond Alkali Superfund Site/Newark Bay Study Area Special Account and retained and used by EPA to conduct or finance response actions at or in connection to the Newark Bay Study Area. However, to the extent that payments made by Respondent are for reimbursement of funds obtained and used by EPA from the Hazardous Substance Superfund for work performed pertaining to the Newark Bay Study Area, EPA may deposit those reimbursed funds into any Diamond Alkali Superfund Site Special Account. Any amounts remaining in the Diamond Alkali Superfund Site/Newark Bay Study Area Special Account may be utilized by EPA in accordance with Paragraph 96.d.

9. Paragraph 96. d. shall be added to the Order to read as follows:

EPA will offset the final bill(s) for Future Response Costs by any unused amount of funds in the Diamond Alkali Superfund Site/Newark Bay Study Area Special Account, and if the unused amount exceeds the amount of the bill, any excess in funds shall be returned to

Respondent. EPA may, at its option, do periodic offsets during the course of the work under this AOC.

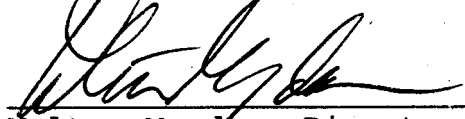
10. Paragraph 96. e. shall be added to the Order to read as follows:

This paragraph contains an accounting for Future EPA-Performed Response Costs pursuant to Paragraph 98.d., e. and f. Respondent previously paid \$2,291,321 pursuant to paragraph 96.a., 98.a., and 98.c. EPA will retain \$500,000 of the \$2,291,321 in the Diamond Alkali Superfund Site/Newark Bay Study Area Special Account to conduct or finance response actions at or in connection with the Newark Bay Study Area. The remaining \$1,791,321 shall be reduced by the amount of a bill to be produced by EPA pursuant to Paragraph 96.c. covering the time period of January 1, 2009 through July 31, 2009 and the net amount remaining shall be returned to Respondent within thirty (30) days of EPA's signature on this Amendment No. 2.

11. The Statement of Work (Appendix 1 to the Order) shall be replaced with the revised Statement of Work attached to this Amendment.

These modifications are by mutual agreement of EPA and the Respondent to the Administrative Order on Consent as evidenced by the following signatures.

For: U.S. ENVIRONMENTAL PROTECTION AGENCY



Walter Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
Region II

March 18, 2010

Date

The signatory identified below certifies that he or she is fully authorized to represent Respondent in this matter, to agree to the modification of the terms and conditions of the Administrative Order on Consent designated as U.S. E.P.A. Index No. CERCLA-02-2004-2010, on behalf of Respondent and to bind Respondent to all of the terms and conditions of the Administrative Order on Consent as modified by this Amendment.

Company Name: Occidental Chemical Corporation

By: *Dennis F. Blake* *3/10/10*
Signature Date
Dennis F. Blake
Printed Name
Senior VP Business Analysis
Title

REVISED STATEMENT OF WORK
Remedial Investigation/Feasibility Study

Newark Bay Study Area
Diamond Alkali Superfund Site

November 24, 2009

APPENDIX 1

Remedial Investigation/Feasibility Study
Statement of Work

PURPOSE

The purpose of this remedial investigation/feasibility study (RI/FS) is to determine the nature and extent of contamination within the Newark Bay Study Area of the Diamond Alkali Superfund Site and to develop and evaluate remedial alternatives. For the purposes of this effort, the boundaries of the Newark Bay Study Area are defined as Newark Bay and portions of the Hackensack River, the Arthur Kill, and the Kill van Kull. Since the Lower Passaic River Study Area and the Newark Bay Study Area are hydrodynamically linked waterbodies, the RI/FS for Newark Bay must be conducted consistently with the CERCLA components of the Lower Passaic River Restoration Project. The RI and FS are interconnected and are conducted concurrently so that the data collected in the RI influences the development of remedial alternatives in the FS, which in turn affects the data needs and the scope of treatability studies if necessary.

Respondent will conduct this RI/FS and will produce draft RI and FS reports that are in accordance with this statement of work (SOW), the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), and any other guidance that EPA uses in conducting a RI/FS, as well as any additional requirements in the Administrative Order on Consent. The RI/FS Guidance describes the required report format and content. Respondent will furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the Administrative Order on Consent.

At the completion of the RI/FS, EPA will select a remedy for the Newark Bay Study Area and will document this selection in a Record of Decision (ROD). The remedial action alternative selected by EPA will meet the cleanup standards specified in CERCLA Section 121. That is, the selected remedial action 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 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 final RI/FS report, as adopted by EPA, with the administrative record and public comment will form the basis for the selection of the site's actions.

As specified in CERCLA section 104(a) (1), EPA will provide oversight of Respondents' activities throughout the RI/FS.

Respondent will support EPA's initiation and conduct of activities related to the implementation of oversight activities.

REMEDIAL INVESTIGATION

A. Goals of the RI to be Performed

Provided below is a summary of the goals of the RI and objectives for each goal.

1. Determine the horizontal and vertical distribution and concentration of PCDDs, PCDFs, PCBs, PAHs, pesticides and metals, for the Newark Bay Study Area sediments in accordance with the provisions of this SOW;

This information is necessary to:

determine concentration gradients and, based on the gradients, identify "hot spots" for potential short term action;

identify potential exposure concentrations through the food chain for human and ecological receptors; and

evaluate prospective remedial alternatives.

2. Determine the primary human and ecological receptors (endpoints) of PCDDs, PCDFs, PCBs, PAHs, pesticides and metals contaminated sediments in the Newark Bay Study Area, in accordance with the provisions below.

This information is necessary to:

identify potential impacts to (a) humans and (b) the ecology both direct (i.e., species sustainability) and indirect (i.e., food web impacts);

identify receptors of greatest concern;

select and/or develop appropriate site-specific biological tests and contaminant uptake evaluations; and

identify human health and ecological risks and establish appropriate action levels.

3. Determine the significant direct and indirect continuing sources of PCDDs, PCDFs, PCBs, PAHs, pesticides and metals to the sediments in the Newark Bay Study Area, in accordance with EPA guidance "Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites" (OSWER Directive 9285.6-08, February 2002).

B. Remedial Investigation Work Plan (RIWP)

The RIWP will provide a detailed description of the activities to be performed during the RI. Provided below is an outline of requirements for the RIWP.

1. The Respondent will prepare a draft RIWP that specifies the Work to be performed and the schedule for implementation of the Work.

2. The Respondent will submit the draft RIWP to EPA and NJDEP (State) consistent with the schedule in the Administrative Order on Consent. EPA will review and comment on the draft RIWP. The Respondent will revise the draft RIWP as per EPA's comments. EPA will approve the final RIWP.

3. The RIWP will consist of a report and five plans: the inventory and overview report of historical data, the Investigation Work Plan (IWP), the Sampling and Analysis Plan (SAP), the site Management Plan (SMP), the Quality Assurance Project Plan (QAPP), and the Health & Safety/Contingency Plan (HASCP).

a. Respondent will create an inventory and overview report of historical data, reports, and papers that are pertinent to the Newark Bay Study Area, including but not limited to water, sediment, and biota data. An acceptable graphic representation (GIS format consistent with formats used in the Lower Passaic River Restoration Project, as specified by EPA) of the Newark Bay Study Area that contains all relevant existing data should include but not be limited to locations of known past and present outfalls, areas of sediment deposition, location of all previous sampling locations and the data associated with those samples, and contoured, contaminant concentration gradients.

b. The IWP will describe implementation of the Work to be performed under this SOW to achieve each of the three goals and corresponding objectives described in Section A above. As described in greater detail below, the Work to be performed under this SOW will include the following elements:

i. One section of the IWP will describe the implementation of the Work for the goal concerning characterization of the spatial distribution and concentration of contaminants in sediments. That section will include the following activities:

(1) Coring locations and sampling depths will be established in accordance with the provisions contained in the Approved Investigation Work Plan. Cores will be taken to

the maximum time-stratigraphic depth determined by historical radio-geochemistry or bathymetric data which corresponds to the year 1940. An additional sample will be taken from each core at the surface, in the biologically active zone, for analysis.

(2) All cores will be split, sub-sampled for sediment chemistry and radio-chemistry dating. Sediment cores remaining after sampling analyses shall be archived.

(3) All cores will be dated using the full range of radio-chemistry dating techniques, Pb^{210} , Be^7 , and CS^{137} .

ii. A second section of the IWP will describe the implementation of the Work for the goal concerning determining the risk receptors of contaminated sediments.

(1) Risk Assessments. Respondent shall conduct the baseline human health risk assessment and ecological risk assessment ("Risk Assessments"). In conducting the Risk Assessments, Respondent shall take into consideration the Newark Bay Study Area Pathways Analysis Report (June 2005), the Status Report for Newark Bay Data Quality Objective Task (June 2006), the Preliminary Geochemistry for Newark Bay Study (June 2006), the Newark Bay Study Screening-Level Ecological Risk Assessment (December 2008) and any other relevant Project Plans, applicable EPA guidance (including, without limitation, EPA Risk Assessment guidance referenced in the Settlement Agreement), guidelines, policies, and directives which may be found at (<http://www.epa.gov/oswer/riskassessment/risk/superfund.htm>), including but not limited to: "Interim Final Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Parts A to E and Volume II)," (RAGS, EPA-540-1-89-002, OSWER Directive 9285.7-01A, December 1989); "Interim Final Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)," (RAGS, EPA 540-R-97-033, OSWER Directive 9285.7-01D, January 1998); "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments" (ERAGS, EPA-540-R-97-006, OSWER Directive 9285.7-25, June 1997) or subsequently issued guidance. The plans, reports and other deliverables described herein and in the Order shall be provided to EPA for approval pursuant to Section VIII (EPA Review of Submissions) of the Order. The Risk Assessments shall include the following:

a. Baseline Human Health Risk Assessment. Respondent shall review and revise the Newark Bay Study Area Pathways Analysis Report (June 2005) following discussions with EPA to reflect changes in toxicity values, new sampling data, and revisions to guidance. Respondent shall update the Pathways Analysis Report upon receipt of new data or

new information on toxicity values and exposure variables, as necessary throughout the RI/FS process. After receipt of the last set of validated data from the final sampling event, Respondent shall submit the final Pathways Analysis Report to EPA for approval pursuant to Section VIII (EPA Review of Submissions) of the Order in accordance with the Project Schedule.

Respondent shall submit a draft Human Health Risk Assessment to EPA for approval pursuant to Section VIII (EPA Review of Submissions) of the Order.

b. Baseline Ecological Risk Assessment.

Respondent shall organize a Baseline Ecological Risk Assessment workshop following the structure of the Baseline Ecological Risk Assessment workshop that was conducted for the Passaic River in December 2005 and produce a Problem Formulation Document following the outline provided in "Consideration for Developing Problem Formulations for Ecological Risk Assessment Conducted at Contaminated Sites under CERCLA" (October 2004), available at <http://rais.ornl.gov/homepage/ProblemFormulation.pdf>. Respondent shall perform a full Baseline Ecological Risk Assessment in accordance with the Order, this SOW and EPA guidance. Respondent shall submit a draft Baseline Ecological Risk Assessment, which shall include steps 3 through 8 identified in "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments" (ERAGS, EPA-540-R-97-006, OSWER Directive 9285.7-25, June 1997), to EPA for approval pursuant to Section VIII (EPA Review of Submissions) of the Order in accordance with the Project Schedule.

c. Probabilistic Risk Assessment. Based

on the results of the Human Health Risk Assessment and Baseline Ecological Risk Assessment (point estimate or deterministic risk), Respondent shall have the opportunity to propose a probabilistic risk assessment. Whether or not Respondent proposes a probabilistic risk assessment, EPA will determine whether a probabilistic risk assessment is appropriate and, if so, Respondent shall conduct a probabilistic risk assessment consistent with the Risk Assessment Guidance for Superfund Volume III, Part A: Process for Conducting Probabilistic Risk Assessment (RAGS Part 3A, December 2001, OSWER 9285.7-45, and subsequent updates), and the Guiding Principles of Risk Assessment available at http://www.epa.gov/oswer/riskassessment/superfund_hh_characterization.htm and other related guidance. EPA will determine the level and extent of the probabilistic risk assessment in

accordance with Risk Assessment Guidance for Superfund Volume III (Part A) and other appropriate EPA guidance and policy.

(2) Peer Review. Consistent with the Peer Review Handbook, Third Edition (EPA/100/B-06/002), EPA will determine on a case-by-case basis which Newark Bay Study Work products should be peer reviewed, in accordance with the principle that all influential scientific and technical work products used in decision making will be peer reviewed. At a minimum, the Baseline Human Health Risk Assessment and Baseline Ecological Risk Assessment reports shall be peer reviewed. Peer involvement shall consist of the LPRSA Technical Advisory Committee ("Peer Input") and/or an external Peer Review Group ("External Peer Review"). The members of the External Peer Review Group will be selected by EPA based on the guidance provided in the Peer Review Handbook, Third Edition, Section 3.4. While the Respondent may propose charge questions, EPA will make the final determination on what elements to include in the charge to ensure that it meets EPA's needs for the peer review. EPA will be responsible for developing a peer review record that includes a response to peer review comments. Respondent shall incorporate comments from both the Peer Input and External Peer Review and revise reports as directed by EPA. All peer review shall be conducted in accordance with the Peer Review Handbook, Third Edition.

a. Respondent shall provide information for dissemination to the Peer Input and/or Peer Review and participate in meetings to provide supporting materials, background on the approach, assumptions, results of analysis and conclusions. The extent of Respondent's involvement in the Peer Input and/or Peer Review will be at the discretion of EPA. All Respondent-conducted activities regarding the Peer Input and/or Peer Review activities will be subject to oversight by EPA.

iii. A third section of the IWP shall acknowledge that the Settling Parties listed in the LPRSA Order will perform the Modeling for the Newark Bay Study Area, in accordance with the requirements of the LPRSA Order. The LPRSA Settling Parties' modeling results will be incorporated into the Newark Bay Study Area RI Report. Respondent will perform the data collection in the Newark Bay Study Area. Respondent's data collection will be consistent with the LPRSA Settling Parties' modeling data collection. As the Settling Parties perform the Modeling, Respondent shall coordinate with the Settling Parties listed in the LPRSA Order in submitting data obtained in the Newark Bay Study necessary to conduct the Modeling, so that the Settling

Parties under the LPRSA Order can develop one model that includes the Lower Passaic River and Newark Bay Study Areas. Respondent will provide the Settling Parties listed in the LPRSA Order with appropriate information as described below:

(1) Respondent will conduct a characterization of storm water and combined sewer overflows into the Newark Bay Study Area, consistent with the characterization of storm water and combined sewer overflows into the Lower Passaic River being conducted for the Lower Passaic River Restoration Project.

c. The SAP will describe the data to be collected during implementation of the Work for each of the three goals described above in Section A. The SAP will provide maps depicting sampling and data collection locations; a detailed description of all sampling, analysis, and testing to be performed including sampling objectives and methods, analytical and testing methods, and sampling locations and frequency; a discussion of how the sampling, analysis, and testing will produce data useful for implementation of the Work; and milestones for implementation of the Work.

d. The SMP will identify the Respondent's major contractors and their subcontractors for remedial investigation and feasibility study activities on the Newark Bay Study Area. The SMP will also identify key employees expected to participate in the work and describe their respective responsibilities.

e. The QAPP will describe the measures to be taken to provide quality assurance and maintain quality control regarding all samples collected under this SOW.

i. The QAPP will be completed taking into consideration the "EPA Requirements for QA Project Plans, QA/R-5" (EPA/240/B-01/003, March 2001) and "Region II CERCLA Quality Assurance Manual", EPA, Region II, October, 1989.

ii. The QAPP will consist of the following sections:

- Title Page
- Table of Contents
- Project Description
- Project organization and Responsibility
- Quality Assurance Objectives
- Sampling Procedures
- Sample Custody
- Calibration Procedures and Frequency
- Analytical Procedures

- Data Reduction, Validation, and Reporting
- Internal Quality Control Checks
- Performance and Systems Audits
- Preventive Maintenance
- Specific Routine Procedures Used to Assess Data Precision, Accuracy and Completeness
- Corrective Action
- Quality Assurance Reports to Management.

f. The HASCP will address the protection of health, safety and response to contingencies which could impact health, safety and the environment during the RI period.

i. The HASCP will be prepared considering the document entitled "Occupational Safety and Health Guidance Manual for Hazardous Waste site Activities" (prepared by NIOSH, OSHA, EPA and USCG, October 1985, (DHHS - NIOSH) Publication No. 85-115).

ii. The HASCP will consist of the following items:

- Description of the known hazards and evaluation of the risks associated with the Work and the potential health impacts related to the site activities;
- List of key personnel and alternates responsible for safety, response operations and governmental notification/coordination;
- Description of levels of protection (based on specified standards) to be utilized by all personnel;
- Description of decontamination procedures for personnel and equipment, and handling/removal of disposable clothing or equipment;
- Incident emergency procedures which address emergency care for personnel injuries and exposure problems, and containment measures;
- Description of the personnel Medical Surveillance Program(s) in effect;

- Description of monitoring for personnel safety; and
- Description of routine and special personnel training programs.

C. Implementation of the RIWP

The Respondent will implement the RI in conformance with the terms of the Administrative Order on Consent and the EPA approved RIWP, including the RI schedule.

All RI data and supporting information shall be presented in an electronic format to be specified by EPA to ensure compatibility with the Lower Passaic River Restoration Project.

D. Community Relations

The development and implementation of community relations activities are the responsibility of EPA. A critical community relations planning step performed by EPA is the development of a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, the Respondent may assist by providing information regarding the site's history, participating in public meetings, or preparing fact sheets for distribution to the general public. The extent of the Respondent's involvement in community relations activities is left to the discretion of EPA. The Respondents' community relations responsibilities, if any, are specified in the community relations plan. All Respondent-conducted community relations activities will be subject to oversight by EPA.

E. RI Report

1. In accordance with the schedule contained in the approved RIWP, Respondent will submit to the EPA and the State the draft RI Report presenting the results of the Work implemented, including the Modeling results and the human health and ecological Risk Assessments.

2. The RI Report will consist of the following sections:

- Introduction including purpose and site background
- Description of the Newark Bay Study Area investigation (including historical and RI data)
- Description of Newark Bay Study Area physical characteristics
- Presentation of the chemical characteristics of water, sediment and biota, including nature and extent of contamination
- Modeling results

- Baseline Human Health Risk Assessment
- Data Validation and Interpretation Report
- Summary and conclusions
- Appendices including technical memoranda on field activities, analytical data and QA/QC evaluation results

3. The Respondent will submit the draft RI Report to EPA for review and comment in conformance with the terms of the Administrative Order on Consent. The Respondent will revise the draft RI Report per EPA's comments. The RI Report may require further revision depending upon public comment. EPA will approve the final RI Report.

FEASIBILITY STUDY

A remedial action FS will be developed to evaluate remedial alternatives for the Newark Bay Study Area.

F. Feasibility Study Work Plan

1. The Respondent will prepare a draft FS Work Plan that includes a detailed description of the Work to be performed and the schedule for the implementation of the Work. The FS Work Plan will be submitted in conjunction with the RIWP.

2. The Respondent will submit the FS Work Plan to EPA and NJDEP (State) consistent with the schedule in the Administrative Order on Consent. EPA will review and comment on the draft FS Work Plan. The Respondent will revise the draft FS Work Plan as per EPA's comments. EPA will approve the final FS Work Plan.

3. Provided below is a description of each of the tasks for the FS. The FS will consist of seven tasks:

- Task 1 - Description of Remedial Action Objectives and Preliminary Risk-Based Remediation Goals
- Task 2 - Description of Current Situation and Proposed Response
- Task 3 - Development of Alternatives
- Task 4 - Initial Screening of Alternatives
- Task 5 - Treatability Studies
- Task 6 - Evaluation of the Alternatives
- Task 7 - Reports

TASK 1 - DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES AND PRELIMINARY RISK-BASED REMEDIATION GOALS

The Respondent shall conduct an analysis of applicable or relevant and appropriate requirements and identify risk-based concentrations for each media for the Contaminants of Potential

Concern in the baseline Human Health Risk Assessment and the baseline Ecological Risk Assessment consistent with appropriate EPA guidance, including but not limited to, "Risk Assessment Guidance for Superfund, Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk - Based Preliminary Remediation Goals)," (RAGS, EPA-540/R-92/003, OSWER Directive 9285.7-01B, December 1991) or subsequently issued guidance or updates, and consistent with exposure assumptions used in the Human Health Risk Assessment. The calculations for the individual chemicals in the various media shall be submitted to EPA for review and approval pursuant to Section VIII (EPA Review of Submissions) before the FS proceeds in accordance with the EPA - approved schedule. The Remedial Action Objectives and Preliminary Remedial Goals shall be submitted to EPA for approval pursuant to Section VIII (EPA Review of Submissions) before the start of the selection of alternatives in the FS.

TASK 2 - DESCRIPTION OF CURRENT SITUATION AND PROPOSED RESPONSE

Information on the site background, the nature and extent of the problem, and previous response activities presented in the RI should be summarized briefly and then be incorporated by reference.

Following this summary of the current situation, a site-specific statement of purpose for the response, based on the results of the RI, should be presented. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by remedial alternatives.

TASK 3 - DEVELOPMENT OF ALTERNATIVES

Based on the results of the RI, the Respondent shall develop a limited number of alternatives for source control of contaminated Bay sediments and surface water, and/or off-site remedial actions on the basis of objectives established for the response and applicable EPA policy. Implementation activities associated with Task 2 are described below.

a. Establishment of Remedial Action Objectives

Site-specific objectives for the response action shall be proposed by the Respondent and approved by EPA and incorporated by the Respondent into Task 3 of the FS. These objectives will be based on protecting public health and the environment through the development of Preliminary Remediation Goals, the description of the current situation, information gathered during the RI, section 300.430 of the National Contingency Plan (NCP), and the requirements of any other applicable Federal and/or State environmental standards, guidance and advisories as defined under

Section 121 of CERCLA. The remedial action objectives will specify the COPCs, water and sediment quality exposure pathways, and remediation goals that permit a range of alternatives to be developed including each of the three major approaches (MNR, capping and removal) and promising innovative technologies, such as in-situ treatment. The objectives shall consider state and local objectives for the NBSA.

b. Identification of Areas or Volumes of Media

The Respondent shall 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 and the biological, chemical and physical characteristics of each specific area in the NBSA.

c. Alternative Remedial Actions

Combinations of identified technologies that will meet remedial response objectives will be assembled into alternative remedial actions. To the extent it is both feasible and appropriate, alternatives and other appropriate considerations should be developed into a comprehensive site specific approach. Additional detail concerning the equipment, methods and locations to be evaluated for each alternative, including the three major approaches (e.g., potential natural recovery processes, potential cap materials and placement methods, number and types of dredges or excavators, transport methods, treatment methods, types of disposal units, general disposal location, need for monitoring and/or institutional controls) shall be developed. To the extent possible with information available at this stage of the FS, the time frame(s) in which the alternatives are expected to achieve cleanup levels and RAOs should be identified. Alternatives should be assembled representing a range of options, including MNR, in-situ capping, and removal options or combinations of options, as appropriate, and shall include, but not be limited to, the following:

1. Treatment alternatives for source control of contaminated Newark Bay tributary sediments that would eliminate the need for long-term management (including monitoring);
2. Alternatives involving treatment as a principal element to reduce the toxicity, mobility or volume of waste;
3. An alternative that involves containment of waste with little or no treatment, but provides protection of human health and the environment primarily by preventing potential exposure or reducing the mobility of the waste; and

4. A no action alternative.

TASK 4 - INITIAL SCREENING OF ALTERNATIVES

a. Alternatives

The alternatives developed in Task 3 will be screened to eliminate alternatives that are clearly ineffective or unimplementable, or that are clearly inferior to other alternatives being considered in terms of protecting human health and the environment, effectiveness, implementability, or cost prior to undertaking detailed evaluations of the remaining alternatives. The list of alternatives will be screened based on the NCP, CERCLA, and the rules promulgated under CERCLA.

b. Remedial Alternatives Screening Document

Upon completion of Task 4a, the Respondent shall prepare a Remedial Alternatives Screening (RAS) Technical Memorandum summarizing the Work performed and the results of each task above, including an alternatives array summary. The Respondent shall describe the alternatives screening in accordance with EPA rules and guidance. The RAS Technical Memorandum should also summarize the reasoning employed in screening, arraying alternatives that remain after screening, and identifying ARARs for the alternatives that remain after screening. These will be modified by the Respondent if required by EPA's comments to assure identification of a complete and appropriate range of viable alternatives to be considered in the detailed analysis. This deliverable will document the methods, rationale, and results of the alternatives screening process and demonstrate that the proposed alternatives meet the goals of protection of human health and the environment and meet ARARs. The Respondent shall submit the RAS Technical Memorandum to EPA for review and approval in conformance with section VIII of the Administrative Order on Consent. As appropriate, EPA will update the identified ARARs throughout the FS process.

TASK 5 - TREATABILITY STUDIES

a. Identification of Candidate Technologies

The Respondent shall identify, in a technical memorandum, candidate technologies for a treatability studies program. The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The Respondent will conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance requirements and implementability of candidate technologies. The Respondent shall submit the

Identification of Candidate Technologies Memorandum to EPA for review and approval pursuant to Section VIII (EPA Review of Submissions) of the Order.

b. Implementation and Evaluation of Treatability Studies

At EPA's request, Respondent shall conduct any necessary laboratory and bench scale treatability studies required to evaluate the effectiveness of remedial technologies and establish engineering criteria, except where Respondent demonstrates to EPA's satisfaction that they are not needed. The major components of the treatability studies shall include a determination of the need for and scope of studies, the design of the studies, and the completion of the studies. Where treatability studies are needed, initial treatability testing activities (such as research and study design) will be planned to occur concurrently with site characterization activities. Submittals will be made in the time frame required to maintain steady progress of the overall FS. Additional studies may also be conducted during the design phase if needed, to refine treatability results or develop detailed design criteria.

Respondent may perform pilot scale treatability studies consistent with the Administrative Order on Consent. Because of the time required to design, fabricate, and install pilot scale equipment as well as perform 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 of the FS.

c. Treatability Study Deliverables

If requested by EPA to undertake treatability studies, Respondent shall provide EPA with the following deliverables:

1. Treatability testing work plan

Respondent will prepare a treatability testing work plan or amendment to the original work plan for EPA review and approval describing the site background, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety procedures, and residual waste management. The data quality objectives 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.

2. Treatability study sampling and analysis plan

If the original SAP, QAPP, and/or HASCP is/are not adequate for defining the activities to be performed during the treatability tests, separate treatability study plans or amendments to the original plans will be prepared by Respondent for EPA review and approval. The study plans should also address protection of the community members during the treatability study through specific considerations of potential hazards to the community and means of preventing or limiting those exposures.

3. Treatability study evaluation report

Following completion of treatability testing, Respondent will analyze and interpret the testing results in a technical report to EPA. Depending on the sequence of activities, this report may be a part of the RI/FS report or a separate deliverable. The report will evaluate each technology's effectiveness, implementability, cost and actual 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. The treatability study evaluation report will be prepared by Respondent for EPA review and approval.

TASK 6 - EVALUATION OF THE ALTERNATIVES

a. Evaluation of the Alternatives

In accordance with CERCLA and the NCP, the Respondent shall conduct a detailed analysis of alternatives that 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. Alternatives will be analyzed in sufficient detail so that the remedies can be selected from a set of defined and discrete hazardous waste management approaches.

b. Application of Nine Criteria

The Respondent shall apply the nine evaluation criteria set forth in the NCP to the assembled remedial alternatives, including institutional controls, to ensure that the selected remedial alternative 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 through evaluation of risk based concentrations developed at appropriate risk levels for both human health and the environment and discussion where changes are made in the risk based concentrations from the point of departure; (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. Criteria 8 and 9 are considered after the RI/FS report has been released to the general public. For each alternative, the Respondent shall provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative, and (2) a discussion of the individual criterion assessment. If the Respondent does not have direct input on criteria (8) state (or support agency) acceptance and (9) community acceptance, these will be addressed by EPA.

c. Comparison of Alternatives

Compare the alternatives to each other using the full array of evaluation factors.

Component measures of effectiveness include the degree to which the alternative is protective of human health and the environment. Where health-based levels are established as ARARs, they can be used to establish the minimum level of protection needed. Where these levels do not exist, risk assessments performed by the Respondent can be used to help establish levels appropriate at the Site. The reliability of the remedy, including the potential need for a cost of replacement, is another important element of effectiveness. Specific measures may also include other health risks borne by the affected population, population sensitivities, and the impacts on environmental receptors. Another important measure of effectiveness is the degree that the mobility, toxicity, or volume of the hazardous substance, pollutant, or contaminant is reduced.

Component measures of implementability include the technical feasibility of the alternative, and the availability of any needed equipment, specialists or off-site capacity.

Component measures of cost include short-term capital and operation costs and any long-term operation or maintenance costs. Present worth analysis will be used to compare all alternatives.

Component measures should be tailored appropriately for the Newark Bay Study Area. Where the measures are likely to be important in evaluating among alternatives, more emphasis and detail may be appropriate to assist in the selection of a remedy. The Respondent shall prepare a Remedial Alternatives Evaluation Technical Memorandum summarizing the results of the comparative analysis, to be submitted to and approved by EPA pursuant to Section VIII (EPA Review of Submissions) of the Order.

TASK 7 - DRAFT FEASIBILITY STUDY REPORT

A draft FS Report presenting the results of Task 1 through 6 will be prepared.

4. The Respondent will generate the FS Report in conformance with the terms of the Administrative Order on Consent and the EPA approved FS Work Plan. In accordance with the schedule contained in the Administrative Order on Consent, Respondent will submit the draft FS Report to EPA for review and comment. The Respondent will revise the draft FS Report per EPA's comments. The FS Report may require further revision depending upon State and public comment. EPA will approve the final FS Report.

The FS Report shall consist of the following sections, in accordance with the suggested format described in Table 6-5 of EPA's "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA", October 1988, EPA/540/G-89/004:

- Introduction, including Purpose and Background Information (summarized from the RI Report)
- Identification and Screening of Technologies
- Development and Screening of Alternatives
- Detailed Analysis of Alternatives
- Summary and Conclusions