PFISTER - ALLIANCE
DIAMOND ALKALI/104(e)

ADMINISTRATIVE ORDER ON CONSENT
Diamond Alkalie Superfund Site

PSI-070479

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

IN THE MATTER OF THE	ADMINISTRATIVE ORDER ON CONSENT
DIAMOND ALKALI SUPERFUND SITE (Passaic River Study Area)	
Occidental Chemical Corporation,	
Respondent	
	Index No. II-CERCLA-0117
Proceeding Under Sections 104 and 122 of the Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. § 9604 and § 9622	

I. JURISDICTION

1. This Administrative Order on Consent ("Order") is entered into voluntarily by the above-named Respondent and by the United States Environmental Protection Agency ("EPA") pursuant to the authority vested in the President of the United States by Sections 104, 122(a), and 122(d)(3) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. §§ 9606, 9622(a), and 9622(d)(3). This authority was delegated to the Administrator of the EPA by Executive Order 12580, dated January 23, 1987, and duly redelegated to the Regional Administrator, EPA Region II. Notice of this Order has been given to the New Jersey Department of Environmental Protection and Energy ("DEPE").

II. DEFINITIONS

2. As used in this Order, unless the context clearly requires some other meaning, the following terms shall have the following meanings:

a. ACO I shall mean the Administrative Consent Order entered into between DEPE and Diamond Shamrock Chemicals Company and Marisol, Inc. on March 13, 1984.

b. ACO II shall mean the Administrative Consent Order entered into between DEPE and Diamond Shamrock Chemicals Company on December 21, 1984.

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c. Bench-Scale Treatability Studies shall mean those tests usually performed in a laboratory in which small volumes or batches of waste are tested to determine if and how the "chemistry" of the process works as individual treatment parameters varied.

d. CERCLA shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9601 et seq.

e. Day shall mean calendar day.

f. DEPE shall mean the New Jersey Department of Environmental Protection and Energy, an agency of the State of New Jersey, which was known formerly as the New Jersey Department of Environmental Protection.

g. Diamond Alkali Facility shall mean the properties in Newark, New Jersey, designated as Block 2348, Lots 57, 58, and 59, located at 80 and 120 Lister Avenue.

h. Diamond Alkali Superfund Site shall mean the Diamond Alkali Facility, and the areal extent of the contamination to which hazardous substances from that facility were transported, have or may have migrated or otherwise threatened to migrate, including into the Passaic River Study Area.

i. EPA shall mean the United States Environmental Protection Agency.

j. Facility Coordinator shall mean the person designated by Respondent who shall be charged with the duty of being at all times knowledgeable of the performance of all work performed pursuant to this Order.

k. Feasibility Study shall mean those activities required in paragraph 40 through 43 below.

l. Hazardous substance(s) shall mean that term as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and shall also mean any mixture(s) containing any such hazardous substance(s) at any concentration.

m. National Contingency Plan ("NCP") shall mean the National Oil and Hazardous Substances Pollution

Contingency Plan, 40 C.F.R. Part 300, and all amendments thereto.

n. Occidental Chemical Corporation or OCC shall mean the Occidental Chemical Corporation, the Respondent under this Order, which has its headquarters and principal place of business in Dallas, Texas.

o. Passaic River Study Area shall mean that portion of the Passaic River from the abandoned ConRail Railroad bridge at the downriver boundary of the Area located at the U.S. Army Corps of Engineers ("USACE") station designation of 40+00 (i.e., a transect running perpendicular to the USACE Federal Project Limit for dredging 4000 feet upstream from the red channel junction marker at the confluence of the Hackensack and Passaic Rivers) to a transect six miles (31680 feet) upriver located at the USACE station designation of 356+80.

p. Pilot-Scale Treatability Studies shall mean those tests that are intended to simulate the physical as well as chemical parameters of a full-scale process by increasing the treatment unit sizes and the volume of waste processed over those of bench scale treatability studies.

q. Project Manager shall mean the person designated by EPA to be responsible for monitoring of all actions and activities required pursuant to this Order, and for receipt of all items submitted to EPA under this Order. The Project Manager shall have the authority lawfully vested in a Remedial Project Manager and an On-Scene Coordinator by the National Contingency Plan, 40 C.F.R. Part 300.

r. Regional Administrator shall mean the Regional Administrator for EPA-Region II.

s. Remedial Investigation shall mean those activities required in paragraphs 35 through 38, below.

t. Remedial Investigation Work Plan shall mean the document submitted pursuant to paragraph 35 below that details the performance of the Remedial Investigation in conformance with the Statement of Work.

u. Respondent shall mean the party on the caption of this Order.

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v. Response Costs shall mean all costs, not inconsistent with the NCP, including, but not limited to, those direct and indirect costs and accrued interest which EPA, or its contractors, agents or representatives incur to perform or support response actions relating to this Order, including activities relating to the development, issuance, and implementation of this Order. Response costs also include, but are not limited to:

i. negotiating, preparing, and reviewing this Order;

ii. reviewing and providing comments on documents prepared pursuant to this Order;

iii. organization and participation in technical meetings between EPA and Respondent conducted to implement this Order;

iv. conducting of any required community relations tasks, including briefing of state and local officials and preparation of press releases or fact sheets for the public with respect to the activities to be performed under this Order;

v. on-site presence and periodic Site inspections to oversee the implementation of this Order;

vi. environmental monitoring, if deemed necessary by EPA, to determine Respondent's compliance with this Order;

vii. taking of confirmatory samples, if deemed necessary by EPA;

viii. certification that the work under this Order has been completed;

ix. EPA activities associated with obtaining access to off-site properties, if required for the implementation of this Order; and

x. EPA enforcement activities, as required for the implementation of this Order.

w. Site, for purposes of this Order, shall mean the Passaic River Study Area.

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x. Statement of Work or SOW shall mean the document attached to this Order as Appendix 1, which is incorporated into this Order by reference, and all provisions and schedules of which shall be enforceable as part of this Order.

III. PARTIES BOUND

3. This Order shall apply to and be binding upon the Respondent and Respondent's successors, receivers, trustees, and assigns who are charged with performing any activities pursuant to this Order.

4. Respondent shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondent's assets, property rights or stock is transferred to the prospective owner or successor. Respondent shall provide a copy of this Order to each chief contractor and chief subcontractor retained to perform any work under this Order, within seven (7) days after the effective date of this Order or on the date such services are retained, whichever date occurs later. Chief contractors or chief subcontractors shall be those contractors or subcontractors whose contracts or subcontracts for work performed pursuant to this Order have a total value exceeding ten thousand dollars ($10,000) per year. Respondent shall also provide a copy of this Order to each person representing Respondent with respect to the Site or the work related thereto. With regard to the activities undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to the Respondent within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondent is responsible for compliance with this Order and for ensuring that its contractors, subcontractors, and agents comply with this Order, and perform any work in accordance with this Order.

IV. FINDINGS OF FACT

5. Since the late 1800s, the lower Passaic River, including the Passaic River Study Area, has been a highly industrialized waterway, receiving direct and indirect discharges from industrial facilities.

6. The bottom sediments of the Passaic River Study Area contain concentrations of numerous hazardous substances, including, but not limited to, cadmium, copper, lead, mercury, nickel, zinc, polyaromatic hydrocarbons ("PAHs") bis(2-ethylhexyl) phthalate, polychlorinated biphenyls ("PCBs") dichlorodiphenyl-trichloroethate ("DDT"), diesel ("TELPH"), 2,3,7,8-Tetrachloro-dibenzo-p-dioxin ("2,3,7,8-TCDD"), 2,4-Dichlorophenoxy acetic acid ("2,4-D"), 2,4,5-Trichlorophenoxy acetic acid ("2,4,5-T") and 2,4,5-Trichlorophenol ("2,4,5-TCP").

7. Between March 1951 and August 1969, the Diamond Alkali Company operated a facility located at 80 Lister Avenue. Among other chemicals, the company manufactured 2,4-D, 2,4,5-T, and 2,4,5-TCP, from which 2,3,7,8-TCDD is a by-product.

8. Production activities at the Diamond Alkali Facility ceased in August 1969. The entity which operated the Diamond Alkali Facility from 1951-1969 was Diamond Alkali Company, which changed its name in 1967 to Diamond Shamrock Corporation, and, in 1983, to Diamond Shamrock Chemicals Company.

9. On September 4, 1986, all the outstanding stock in Diamond Shamrock Chemicals Company was acquired by Oxy-Diamond Alkali Corporation, a wholly-owned indirect subsidiary of Occidental Petroleum Corporation. Diamond Shamrock Chemicals Company was then renamed Occidental Electrochemicals Corporation.

10. Effective November 30, 1987, Occidental Electrochemicals Corporation was merged into Occidental Chemical Corporation, a wholly-owned indirect subsidiary of Occidental Petroleum Corporation.

History of Response Actions

11. During the summer of 1983, hazardous substances were detected at various locations in Newark, New Jersey, including 80 Lister Avenue.

12. Removal activities were initiated by EPA and DEPE in 1983 and were completed by Diamond Shamrock Chemicals Company in 1984 through 1986.

13. The removal activities at the 80 Lister Avenue location included the placement of a geotextile fabric on the property. Hazardous substances were vacuumed from the streets in the vicinity of 80 Lister Avenue. The soils and debris vacuumed from the streets, along with excavated soils that were also contaminated with hazardous substances, were later secured on the 120 Lister Avenue property.

14. EPA, pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, placed the Diamond Alkali Superfund Site on the National Priorities List, which is set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 21, 1984, 49 Fed Reg. 37070.

15. Pursuant to ACO I and ACO II, Diamond Shamrock Chemicals Company conducted a remedial investigation and a feasibility study for the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site. This remedial investigation included the sampling and assessment of sediment contamination within the Passaic River. EPA issued an operable unit Record of

Decision on September 30, 1987, which documents the selection of a remedial action plan for the cleanup of the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site. Pursuant to a judicial Consent Decree with EPA, Occidental Chemical Corporation and Chemical Land Holdings, Inc. agreed to implement the 1987 ROD.

16. Sampling of the Passaic River sediment during the course of the remedial investigation showed the presence of 2,3,7,8-TCDD, DDT, 2,4-D, 2,4,5-T, and 2,4,5-TCP, which were substances like those generated at the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site, as well as other contaminants.

17. Some of the chemicals found in the sediments during the course of the remedial investigation may have migrated from the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site into the Passaic River through ground-water and surface-water runoff.

18. On March 28, 1986, Diamond Shamrock Corporation submitted a report entitled "Passaic River Sediment Study," which further defined the extent of 2,3,7,8-TCDD contamination in the Passaic River sediments. Core (i.e., samples taken at depth) and surface grab samples were taken from the mouth of the Passaic River upstream to Dundee Dam. The highest levels of 2,3,7,8-TCDD were encountered in deep sediments (maximum of 1.8 parts per million) adjacent to and downstream from the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site.

19. Bulk surficial sediment data sampling events in the 1980s and 1990s across from and immediately downstream of the 80 and 120 Lister Avenue portion of the Diamond Alkali Superfund Site show concentrations of 2,3,7,8-TCDD ranging from approximately 400 parts per trillion (ppt) to 8400 ppt; further downstream (south of the New Jersey Turnpike overpass) concentrations range from 60-6300 ppt. These concentrations referenced above significantly exceed the levels that can produce toxic effects to biota. Recent studies have shown that 2,3,7,8-TCDD bio-accumulates in fish, to levels rendering the fish unfit for human consumption, from sediment with a much lower level of 2,3,7,8-TCDD than found in these sediments.

20. Data show that beginning in a sampling location about one mile south of the Second River, a tributary of the Passaic River, levels of 2,3,7,8-TCDD show a marked increase in both shallow and deep sediments. These higher levels of 2,3,7,8-TCDD continue from this sampling location to the mouth of the Passaic River.

21. These sampling events also showed the presence of other hazardous substances including, but not limited to,

cadmium, copper, lead, mercury, nickel, zinc, PAHs, DDT, and PCBs, among other hazardous substances. The concentrations of some of these hazardous substances exceed the levels that can produce toxic effects to biota.

22. Based on the results of monitoring and research undertaken since the mid-1970s, the State of New Jersey has taken a number of steps, in the form of consumption advisories, closures, and sales bans, to limit the exposure of the fish-eating public to toxic contaminants in the Passaic River Study Area. The initial measures prohibited the sale, and advised against the consumption, of several species of fish and eel and was based on the presence of PCB contamination in the seafood. The discovery of widespread dioxin contamination in the Newark Bay Complex led the State of New Jersey to issue a number of Administrative Orders in 1983 and 1984 which prohibited the sale or consumption of all fish, shellfish, and crustaceans from the Passaic River Study Area. These State fish advisories and prohibitions are still in effect.

23. Studies have shown that many of the substances referred to in the preceding paragraphs can cause a variety of adverse, acute and/or chronic effects in exposed population groups.

a. 2,4-D and 2,4,5-T have been shown to be mutagenic or teratogenic to some organisms with demonstrated toxicity to fish and fish food organisms. 2,4,5-TCP is toxic to fish, accumulates in fatty tissue and is inert to biodegradation.

b. 2,3,7,8-TCDD is known to produce various systemic effects in animals. The systemic effects produced by 2,3,7,8-TCDD include tumorigenesis, immunological dysfunction, and teratogenesis. In humans 2,3,7,8-TCDD-contaminated materials are known to cause chloracne, metabolic disorders, and other systemic effects. Some studies are suggestive of 2,3,7,8-TCDD's abilities to cause cancer.

c. Lead has been shown to produce various systemic effects in humans, waterbirds, fish, and aquatic invertebrates. The systemic effects to humans include neurological impairment, kidney dysfunction, and decreased mental ability in infants and small children. Physiological indicators of chronic exposure in fish include a variety of deformities in larval and juvenile lifestages.

d. Mercury has been shown to be genotoxic in humans and animals. Long-term exposure to either inorganic or organic mercury can permanently damage the brain,

kidney, and the developing fetus in humans. In fish and shellfish, toxic effects include a variety of reproductive, growth, and metabolic dysfunctions, as well as increased mortality in larval and juvenile stages.

e. Zinc has been shown to disrupt metabolic processes and inhibit growth and development in aquatic organisms. Prolonged exposures cause extensive edema and necrosis of liver tissue in fish. Inhibition or severe retardation of shell growth and increased larval mortality occur in shellfish. Anemia and damage to the pancreas are common symptoms of chronic sublethal exposure in humans.

f. PAHs have been shown to cause a wide range of responses in fish and other aquatic organisms, including behavioral, metabolic, reproductive, and growth dysfunction, as well as increased mortality in larval and juvenile lifestages. Several PAHs or their metabolic intermediates may be carcinogenic and mutagenic in humans and aquatic organisms.

g. PCBs may reasonably be anticipated to be carcinogenic, teratogenic, and mutagenic in humans and animals. In humans, PCBs have been shown to cause chloracne, liver damage, and other systemic effects. Typical PCB toxic responses in fish, shellfish, and waterbirds include weight loss, thymic atrophy, immunological impairment, hepatoxicity, porphyria, and reproductive impairment.

V. CONCLUSIONS OF LAW

24. Respondent is a "person" within the meaning of that term as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

25. The Site is a "facility" within the meaning of that term as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

26. The substances and contaminants found in the sediments of the Passaic River Study Area and identified in the FINDINGS section of this Order, including, but not limited to 2,4-D, 2,4,5-T, 2,4,5-TCP, 2,3,7,8-TCDD, cadmium, copper, lead, mercury, nickel, zinc, PAHs, DDT, and PCBs are found at the Site and are "hazardous substances" within the meaning of that term as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14) or constitute "any pollutant or contaminant" that may present an imminent or substantial danger to public health or welfare under § 104(a)(1) of CERCLA, 42 U.S.C. § 9604(a)(1).

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27. The disposal of hazardous substances at the Site, the presence of hazardous substances in the sediment at the Site, the subsequent migration of hazardous substances within the Site, and the potential migration of all such substances outside of the boundaries of the Site as described in the FINDINGS, are actual and/or threatened "releases" within the meaning of that term as it is defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22) and is a "release" or "substantial threat of such a release" into the environment for purposes of Section 104(a)(1).

28. Respondent is a person as defined in section 101(21) of CERCLA, 42 U.S.C. § 9601(21) and for purposes of liability under one of more subsections of Section 107(a) of CERCLA, 42 U.S.C. § 9607.

29. Respondent is a responsible party under Sections 104, 107, and 122 of CERCLA, 42 U.S.C. §§ 9604, 9607, and 9622.

VI. DETERMINATIONS

30. Based upon the FINDINGS set forth above and the entire Administrative Record, EPA has determined that a response action of the type contemplated by the NCP in 40 C.F.R. § 300.430 is required at the Site to assess Site conditions and evaluate alternatives to prevent and/or mitigate any actual and/or potential threat of harm to human health or welfare or the environment caused by the release and threatened release of hazardous substances from the Site.

31. The actions required by this Order are necessary to protect the public health or welfare or the environment, are in the public interest, 42 U.S.C. § 9622(a), are consistent with CERCLA and the NCP, 42 U.S.C. §§ 9604(a)(1), 9622(a), and will expedite effective remedial action and minimize litigation, 42 U.S.C. § 9622(a).

32. EPA has determined that the Respondent is qualified to conduct the Remedial Investigation/Feasibility Study ("RI/FS") and that such RI/FS will be done properly and promptly and in accordance with the NCP and all other applicable regulations.

VII. ORDER

33. Based on the foregoing FINDINGS and DETERMINATIONS, it is hereby ordered and agreed that Respondent shall undertake a RI/FS with respect to the Site as defined in this Order and in accordance with all of the terms and provisions stated below.

Remedial Investigation

34. The Respondent shall finance and perform all activities required under this Order, as described in the SOW.

35. Within sixty (60) days of the effective date of this Order, Respondent shall submit to EPA for review and approval a detailed Remedial Investigation Work Plan ("RIWP") for the performance of a Remedial Investigation ("RI") for the Site. The RIWP shall provide for the performance of the RI in conformance with the SOW and the requirements of CERCLA and the NCP, as well as applicable guidance documents issued by EPA under CERCLA. The RIWP shall include a reasonable schedule for the performance of the tasks comprising the RI. The RIWP shall fully describe how the activities specified in the SOW will be implemented, and shall include, but not necessarily be limited to, the following:

a. a Site Management Plan ("SMP");

b. an Investigation Work Plan ("IWP");

c. a Field Sampling Plan ("FSP");

d. a Quality Assurance Project Plan ("QAPP"); and

e. a Health & Safety/Contingency Plan ("HASCP").

36. a. EPA will review the RIWP and comment thereon in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed to by EPA. Respondent shall amend the RIWP as required by EPA's comments or as otherwise agreed upon by EPA in writing and shall submit the amended RIWP to EPA within thirty (30) days of receipt of EPA's comments on the RIWP or thirty (30) days of the date of the conference with EPA, whichever is later, or such longer time period as specified by EPA in writing.

b. At such time as EPA determines that the RIWP is acceptable, EPA will transmit to Respondent a written statement to that effect.

37. Respondent shall perform the RI in conformance with the SOW and the EPA-approved RIWP (including the implementation schedule contained therein). Respondent shall complete all activities specified in the approved RIWP and, in conformance with the schedule included in the approved RIWP, shall submit to EPA for review and approval a draft report detailing the results of the RI ("Draft RI Report").

38. a. Upon receipt of the Draft RI Report, EPA will review the report and comment thereon in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed to by EPA. Respondent shall amend the Draft RI Report as required by EPA's comments or as otherwise agreed upon by EPA in writing, and shall submit the amended report to EPA within thirty (30) days of receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later or such longer time period as specified by EPA in writing.

b. EPA's comments on the Draft RI Report may require Respondent to perform such additional investigatory work as EPA finds necessary, pursuant to Paragraph 45. Such work (including any necessary work plans and reports) shall be performed by Respondent in conformance with a reasonable schedule approved by EPA.

c. If Respondent disagrees with EPA's comments with respect to the Draft RI Report, Respondent may invoke the Dispute Resolution provisions in Section XVIII. At such time as EPA determines that the Draft RI Report is acceptable, EPA will transmit to Respondent a written statement to that effect and the report will be deemed the Final RI Report.

Human and Ecological Risk Assessment

39. Respondent shall complete the first three parts of the Human and Ecological Risk Assessment ("HERA") in conformance with the SOW, Part B.3.a.ii.2(a) through (c) and the EPA-approved RIWP, in conformance with the schedule included therein. Respondent shall submit to EPA for review and approval a draft screening level human and ecological risk assessment report detailing the results of the first three parts of the HERA and Respondent's recommendations for further sampling, if appropriate. Performance of the first three parts of the HERA by the Respondent shall be mandatory, while performance of the last two parts shall be dependent on the results of the first three parts as set out below.

a. If EPA determines, based on its review of the draft screening level human and ecological risk assessment, that field sampling is not needed, the Respondent will prepare and submit, as a separate deliverable, the draft HERA report to the EPA, in accordance with the schedule contained in the EPA-approved RIWP.

b. If EPA determines, based on its review of the draft screening level human and ecological risk assessment, that insufficient information is available to complete the HERA, field

sampling will be performed to determine ecological and human health effects according to the following procedures:

i. A draft Ecological Sampling Plan (ESP) will be prepared by the Respondent that sets out further biological, sediment, and water sampling and toxicity testing. The Respondent shall prepare and submit to EPA the ESP no later than sixty (60) days after the receipt of EPA's written determination regarding the additional work.

ii. Upon receipt of the draft ESP, EPA will review the draft ESP and comment in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed to by EPA. Respondent shall revise the draft ESP as required by EPA's comments or as otherwise agreed upon by EPA in writing, and shall submit the amended report to EPA within thirty (30) days of receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later or such longer time period as specified by EPA in writing.

iii. The Respondent shall implement the revised ESP.

iv. Following the collection of additional field data the Respondent will prepare and submit, as a separate deliverable the draft HERA report to the EPA, in accordance with the schedule contained in the EPA-approved ecological sampling plan.

c. Upon receipt of the draft HERA Report, EPA will review the report and comment thereon in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed to by EPA in writing. Respondent shall revise the draft HERA report as required by EPA's comments, or as otherwise agreed upon by EPA in writing, and shall submit the revised report to EPA within thirty (30) days of receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later or such longer time period as specified by EPA in writing.

d. If the Respondent does not agree with EPA's determination that insufficient information is available to complete the HERA, EPA will generate the ESP and conduct the necessary sampling. If Respondent generates the ESP, but does not agree to implement the ESP, EPA will conduct the necessary

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sampling. Preparation and/or implementation of an ESP shall not constitute additional work for purposes of Paragraph 45. In either case, the HERA report will be prepared by EPA following the collection of this additional field data.

Feasibility Study

40. Within sixty (60) days after the effective date of this Order, Respondent shall submit to EPA for review and approval a detailed work plan for the performance of an FS with respect to the Site. This FS Work Plan shall provide for the performance of the FS in conformance with the SOW and the requirements of CERCLA (including, but not limited to, Section 121 of the Act) and the NCP, as well as applicable EPA guidance documents relating to the performance of feasibility studies under CERCLA. The FS Work Plan shall include a reasonable schedule for the performance of the tasks comprising the FS.

41. a. EPA will review and comment on the FS Work Plan in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed by EPA. Respondent shall amend the FS Work Plan as required by EPA's comments or as otherwise agreed upon by EPA in writing and shall submit the amended FS Work Plan to EPA within thirty (30) days of receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later, or such longer time period as specified by EPA in writing.

b. At such time as EPA determines that the FS Work Plan is acceptable, EPA will transmit to Respondent a written statement to that effect.

42. a. Respondent shall perform the FS in conformance with the EPA-approved FS Work Plan and the schedule contained therein. By the date specified in the schedule contained in the EPA-approved FS Work Plan, Respondent shall submit to EPA for review a Draft FS Report, which shall include a recommended remedial alternative and a conceptual design, if EPA deems appropriate, of that alternative.

b. Respondent shall conduct all necessary laboratory and bench scale treatability studies required by EPA to evaluate the effectiveness of remedial technologies and establish engineering criteria, except where Respondent in writing demonstrates to EPA's satisfaction that they are not needed to support the FS or to avoid duplication of the same or substantially the same studies as may be reported in literature or elsewhere.

c. If, after performance of treatability studies referenced in subparagraph b. above, EPA determines that a pilot scale treatability study is necessary to support the FS:

i. Respondent may perform the pilot scale treatability study under such requirements, including a schedule, as are developed under a supplemental submittal to the FS Work Plan; or

ii. In the event that Respondent declines to perform the pilot scale treatability study, Respondent shall submit to EPA in writing its reasons for not agreeing to implement the pilot scale treatability study. EPA may, in its own discretion, undertake the pilot scale treatability study.

In either case, if deemed appropriate by EPA, the results of such pilot scale treatability study shall be incorporated in the results of the Draft FS Report.

d. Preparation and/or implementation of a pilot scale treatability study shall not constitute additional work for purposes of Paragraph 45.

43. a. EPA will review and comment on the Draft FS Report in writing. Respondent may request a conference with EPA to discuss these comments. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed by EPA. Respondent shall amend the Draft FS Report as required by EPA's comments or as otherwise agreed upon by EPA, and shall submit the amended report to EPA within thirty (30) days of receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later, or such longer time period as specified by EPA in writing.

b. EPA's comments on the Draft FS Report may require that Respondent conduct such additional evaluations as EPA finds necessary, pursuant to Paragraph 45. Such work (including any necessary work plans and reports) shall be performed in accordance with a reasonable schedule approved by EPA.

c. If Respondent disagrees with EPA's comments with respect to the Draft FS Report, Respondent may invoke the Dispute Resolution provisions in Section XVIII. At such time as EPA determines that the Draft FS Report is acceptable, EPA will transmit to Respondent a written statement to that effect, and the report will be deemed the Draft FS Report.

44. Following submittal of the Draft FS Report, EPA will announce the availability of both the Final RI Report and

the Draft FS Report to the public for review and comment. Following the public comment period (which may involve both written and oral comments), EPA will determine if the reports should be modified and will notify Respondent in writing of its determination. Respondent shall modify the report(s) as directed by EPA and shall submit the modified document(s) to EPA within thirty (30) days, or such other longer period as specified by EPA in writing, of receipt of EPA's determination. EPA shall remain the final arbiter in any dispute regarding the sufficiency or acceptability of both the RI and FS Reports, and EPA may modify them unilaterally.

45. EPA may determine that in addition to tasks defined in the initially approved RIWP and FS Work Plan, other additional work may be necessary to accomplish the objectives of the RI and FS. EPA may require, pursuant to this Order, that Respondent perform these response actions in addition to those required by the initially approved RIWP and FS Work Plan, including any subsequently approved modifications, if EPA determines that such actions are necessary for a complete RI and FS. Any additional work shall either be of the same type or nature as required by and consistent with the objectives of the SOW. Respondent shall implement the additional tasks which EPA determines are necessary. The additional work shall be completed according to the standards, specifications and schedule set forth or approved by EPA in a written modification to the RIWP or FS Work Plan. If Respondent disagrees with EPA's determination that additional work is necessary, Respondent may invoke the Dispute Resolution provisions in Section XVIII. EPA reserves the right to conduct the work itself at any point, to seek reimbursement for the costs associated with the work from Respondent, and/or to seek any other appropriate relief.

46. EPA will make the final selection of the remedial alternative(s) to be evaluated and implemented with respect to the Site.

VIII. EPA REVIEW OF SUBMISSIONS

47. After review of any deliverable, plan, report or other item which is required to be submitted for review and approval pursuant to this Order, EPA may: (a) approve the submission; (b) approve the submission with modification; (c) disapprove the submission and direct Respondent to resubmit the document after incorporating EPA's comments; or (d) disapprove the submission and assume responsibility for performing all or any part of the response action.

48. If EPA approves a submittal required by this Order, EPA will so inform Respondent in writing. Any approval by EPA that is not in writing shall not be effective or binding upon EPA.

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49. a. EPA remains the final arbiter in any dispute regarding the sufficiency or acceptability of any document submitted pursuant to this Order. However, nothing in this Order shall affect any rights that Respondent may have to judicial review, if any, of EPA's actions or determinations under this Order, and, except as provided in Paragraph 105, EPA and Respondent expressly reserve all rights and defenses that they may have pursuant to applicable law.

b. If EPA disapproves or directs a modification of a submittal, Respondent may request a conference with EPA to discuss such disapproval or modification. This conference shall be held within 10 days of Respondent's receipt of the comments, unless otherwise agreed by EPA. Respondent shall amend the plan, report or other item as required by EPA's comments or as otherwise agreed upon by EPA and resubmit it for approval, within thirty (30) days of the receipt of EPA's comments or thirty (30) days of the date of the conference with EPA, whichever is later, or such longer time period as specified by EPA in writing. Notwithstanding the notice of disapproval, Respondent shall proceed, at the direction of EPA, to take any action required by any non-deficient portion of the submittal.

c. In the event that any comment on any submittal required pursuant to this Order is not incorporated to EPA's satisfaction in the subsequent submittal by Respondent, Respondent may, in EPA's unreviewable discretion, be deemed in violation of this Order. If EPA does not approve the subsequent submittal or portion of the submittal, EPA may unilaterally amend or modify the submittal. Respondent shall implement any such submittal as amended or developed by EPA. EPA may modify its comments and/or extend the due date for a subsequent submittal.

50. Upon written approval or approval with modifications by EPA of any submittals pursuant to this Order, Respondent shall proceed to take any action required by the submittal, as approved or modified by EPA and in accordance with applicable schedules.

51. Upon written approval by EPA, submittals pursuant to this Order or the SOW shall be deemed incorporated into this Order as a requirement of this Order and shall be an enforceable part of this Order.

IX. EPA PROJECT MANAGER AND RESPONDENT'S FACILITY COORDINATOR

Identification of Project Manager

52. Within fifteen (15) days of the effective date of this Order, EPA will designate a Project Manager to monitor the progress of the work and to coordinate communication between EPA

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and the Respondent. EPA may also designate an alternate representative.

53. EPA's Project Manager shall have the authority set forth in 40 C.F.R. § 300.120. The Project Manager shall have the authority to require a cessation of the performance of any activity at the Site that, in the Project Manager's opinion, may present or contribute to an endangerment of public health, welfare, or the environment or may cause or threaten to cause the release of hazardous substances from the Site. If the Project Manager suspends any activity at the Site, EPA may extend the compliance schedule of this Order, as appropriate. EPA shall notify the Respondent in writing of any extension of time. In addition, the Project Manager shall have the authority to take any necessary response action.

54. The Project Manager may authorize field modifications to the studies, designs, techniques or procedures undertaken or utilized in performing the work required under this Order, provided that any such modifications are consistent with the SOW attached to this Order. All such modifications must be approved in writing and signed by the Project Manager. Field modifications within the scope of the SOW do not require the submission and approval of work plans and are not to be classified as additional submittals or response activities.

55. EPA has the unreviewable right to change its Project Manager. If EPA changes its Project Manager, EPA will inform Respondent in writing of the name, address, and telephone number of the new Project Manager.

56. The Project Manager may assign other representatives, including but not limited to, other EPA employees, contractors, and subcontractors, to serve as his or her representative for oversight of performance of daily operations during implementation of the work.

57. The absence of EPA's Project Manager from the Site shall not delay or stop any portion of the work.

Identification of Facility Coordinator

58. All aspects of the work to be performed by Respondent pursuant to this Order shall be under the direction and supervision of a qualified Facility Coordinator, the selection of whom shall be subject to written approval by EPA. Within fifteen (15) days of the effective date of this Order, Respondent shall designate a Facility Coordinator and shall provide EPA in writing with the name, address, phone number, and qualifications of the Facility Coordinator and alternate Facility Coordinator, including primary support entities and staff, proposed to be used in carrying out work under this Order. The

Facility Coordinator shall be responsible for the day-to-day management of all the work to be performed pursuant to this Order. The Facility Coordinator shall not be an attorney. The Facility Coordinator shall have adequate technical and managerial experience to manage all work under this Order, including all activities relating to the Site. The Facility Coordinator shall be knowledgeable at all times about all matters relating to the work being performed under this Order. The Facility Coordinator shall be the primary contact for EPA on all matters relating to the work at the Site. A Facility Coordinator must be available to communicate with EPA during all days until this Order is terminated. At the request of the Facility Coordinator or Project Manager, legal counsel may participate in any communications with EPA.

59. Notice by EPA to the Facility Coordinator shall be deemed notice to the Respondent for all matters relating to the work under this Order.

60. If at any time Respondent proposes to use a different Facility Coordinator, Respondent shall provide written notice of the proposed change to EPA at least fifteen (15) days prior to such proposed change and shall obtain written approval from EPA before the new Facility Coordinator assumes any responsibilities under this Order.

61. EPA will review Respondent's selection of a Facility Coordinator according to the terms of this paragraph. If EPA disapproves the selection of the Facility Coordinator, Respondent shall submit to EPA within fifteen (15) days after receipt of EPA's disapproval of the Facility Coordinator previously selected, a list of Facility Coordinators, including primary support entities and staff, that would be acceptable to Respondent. EPA will thereafter provide written notice to Respondent of the names of the Facility Coordinators that are acceptable to EPA. Respondent may then select any approved Facility Coordinators from that list and shall notify EPA of the name of the Facility Coordinator selected within fifteen (15) days of EPA's designation of approved Facility Coordinators.

X. NOTIFICATION AND REPORTING REQUIREMENTS

62. Respondent shall give EPA seven (7) days advance notice of the commencement of any field activities undertaken pursuant to this Order.

63. Respondent shall provide notice to local officials and other agencies as designated by EPA prior to the start of any work at the Site pursuant to the terms of this Order.

64. In addition to other deliverables set forth in this Order, Respondent shall submit to EPA and DEPE monthly

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written progress reports by the twentieth day of each month following the effective date of this Order. Respondent's obligation to submit progress reports continues until EPA gives Respondent written notice under this Order ending this requirement. For each calendar month, or part thereof, the monthly progress reports shall include, at least, the following:

a. a description of actions which have been taken toward achieving compliance with this Order during the prior month;

b. a description of actual or potential violations of this Order and other problems encountered during the prior month;

c. a description of all corrective actions taken in response to alleged, actual or potential violations or problems which occurred during the prior month;

d. the results of sampling, test results, and other data received or generated by Respondent during the course of implementing the work during the prior month. Such results shall be validated in accordance with the approved Quality Assurance Project Plan (QAPP) developed in conformity with the SOW. Data submitted as part of monthly reports need not be analyzed, interpreted or otherwise summarized, except as required by the QAPP;

e. a description of plans, actions, and data which are scheduled for the next two months;

f. a quantified estimate of the percentage of the Work required by this Order which has been completed as of the date of progress report; and

g. an identification of delays encountered or anticipated that may affect the future schedule for performance of the Work, and efforts made by Respondent to mitigate delays or anticipated delays.

65. EPA will notify the Respondent in writing, if EPA determines that a progress report is incomplete or deficient. Respondent shall make the necessary revisions and resubmit the revised progress report with the next scheduled progress report or, if the next scheduled progress report is due less than seven

(7) days following Respondent's receipt of the notice of deficiency, with the subsequently scheduled progress report.

66. Respondent shall be deemed in violation of this Order if EPA determines that a revised progress report is deficient.

67. Two copies of all work plans, reports, and any other documents required to be submitted to EPA under this Order shall be sent by certified mail, return receipt requested, or express delivery to the following address:

Chief, New Jersey Superfund Branch-2
Emergency & Remedial Response Division
U.S. Environmental Protection Agency, Region II
26 Federal Plaza
New York, NY 10278
Attn: Diamond Alkali Project Manager-Passaic River Study Area

Diamond Alkali Project Manager-Passaic River Study Area
New Jersey Department of Environmental Protection and Energy
401 East State Street, 5th Floor
CN-028
Trenton, New Jersey 08625
Attn: Nicholas Marton

A copy of all written communications shall also be sent to:

Chief, New Jersey Superfund Branch
Office of Regional Counsel
U.S. Environmental Protection Agency
26 Federal Plaza
New York, NY 10278
Attn: Diamond Alkali Site Attorney-Passaic River Study Area

68. In the event that EPA requests more than the number of copies stated above of any report or other documents required by this Order, Respondent shall provide the number of copies requested.

XI. SITE ACCESS, SAMPLING, AND AVAILABILITY OF INFORMATION

69. Respondent will use its best efforts to obtain all access agreements which are needed to implement the terms of this Order. Best efforts include, but are not limited to, reasonable efforts to identify, locate, and contact (in writing) the owner of the property, paying reasonable compensation in consideration of access, if access is not available pursuant to ISRA Section 40 (N.J.S.A. 58:10b-15), and participating in any necessary litigation, under ISRA or another applicable authority, to obtain access. If, after such efforts, Respondent cannot obtain any

particular access agreement which is required for implementation of the terms of this Order, Respondent shall so notify the Project Manager in writing and shall specify the real property in question and efforts which Respondent has taken to obtain entry onto the property in question. If EPA determines that access onto the parcel in question is needed to implement any of the terms of this Order, EPA will make reasonable efforts to facilitate access by Respondent to that parcel of land. However, Respondent shall continue to implement all other terms of this Order which, in the view of EPA, can still be implemented regardless of the failure to obtain access to the parcel of land in question.

70. Respondent shall allow unimpeded access to all areas of the Site and into all structures thereon by all EPA representatives, agents, contractors, and consultants. Consistent with its access rights Respondent shall permit such EPA agents to enter and move about the Site at will at all times and shall allow such officials or agents of EPA to undertake any observations, response actions or any other activities which EPA elects to undertake at the Site at EPA's option.

71. Respondent shall use Quality Control/Quality Assurance and chain of custody methodologies as set forth in Test Methods for Evaluating Solid Waste, SW-846. Any laboratory used by Respondent for sampling and analysis shall subscribe to EPA Quality Assurance Procedures and submit all protocols to be used for analyses to EPA at least thirty (30) days before beginning analysis. For any analytical work performed, including that done in a fixed laboratory, in a mobile laboratory, or in on-site screening analyses, Respondent must submit to EPA a "non-CLP Superfund Analytical Services Tracking System" document for each laboratory utilized during a given sampling event. Upon completion, such documents shall be submitted, in the form required by the Remedial Project Manager to:

RSCC Task Monitor
U.S. EPA-Edison Field Office
Environmental Services Division
2890 Woodbridge Avenue
Edison, NJ 08837

72. Respondent shall notify EPA not less than sixty (60) days in advance of any sample collection activity or such other shorter time period as agreed to by EPA in writing. Respondent shall allow EPA or its designated representative to take duplicate and/or split samples of any samples collected in connection with work performed in accordance with this Order. Upon request by EPA, Respondent shall direct a designated

laboratory to analyze samples submitted by EPA for quality assurance purposes.

73. All documents, data or information, including raw sampling and monitoring data, produced by Respondent and submitted to EPA in the course of implementing this Order shall be available to the public unless Respondent identifies them as confidential and EPA determines that they meet the confidentiality requirements stated in 40 CFR Part 2, Subpart B and Section 104 of CERCLA, 42 U.S.C. § 9604. In addition, EPA may release all such documents to DEPE, which may make those documents available to the public unless Respondent conforms with appropriate New Jersey law and regulations regarding confidentiality. No sampling, hydrological, geological, biological, soil or sediment chemical analyses or surface water quality data or ground-water quality data collected pursuant to this Order shall be considered confidential.

74. EPA and its contractors and agents shall have access to all records relating to implementation of the work under this Order, except for records or documents that are protected as attorney-client communications or attorney work product. Notwithstanding the exceptions identified above, no information specified in Section 104(e)(7)(F) of CERCLA, 42 U.S.C. § 9604, shall be withheld. All such records shall be made available to EPA upon request to Respondent's Facility Coordinator, and all employees of Respondent, including contractors, who engage in activity under this Order shall be available to and shall cooperate with EPA.

75. No such records shall be destroyed for a period of ten (10) years after completion of the work required by this Order without the express written approval of EPA or a written offer by the Respondent to provide such material to EPA, followed by EPA'S written rejection of that offer.

76. Nothing in this Order shall be construed as limiting Respondent's right to collect or submit data, reports and/or other submissions that are not required by this Order.

XII. COMPLIANCE WITH APPLICABLE LAWS

77. All work conducted pursuant to this Order shall be performed in accordance with prevailing professional standards.

78. Respondent shall comply with all applicable provisions of the NCP, 40 C.F.R. 300 et seq. and all other applicable Federal and State statutes and regulations while performing all of the work required by this Order.

79. Respondent shall comply with all applicable Federal and State health and safety requirements by all workers

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and agents of Respondent who enter the Site, including compliance with all applicable regulations of the Occupational Safety and Health Administration, as contained in 29 C.F.R. § 1910 et seq. and elsewhere.

80. Respondent shall be responsible for obtaining all necessary permits, licenses, and other authorizations needed to carry out the work required by this Order.

XIII. FORCE MAJEURE

81. a. Respondent's activities under this Order shall be performed within the time limits set forth herein or otherwise established or approved by EPA, unless performance is delayed by events that constitutes a force majeure. For the purposes of this Order, a force majeure is defined as any event arising from causes entirely beyond the control of Respondent or Respondent's contractors and subcontractors. Increased costs or changed financial circumstances shall not constitute a force majeure.

b. Respondent shall orally notify EPA as soon as possible, but in no event later than forty-eight (48) hours, after Respondent become aware or should have become aware of any circumstances which have occurred or which are likely to occur which would constitute a force majeure. Respondent will notify the Project Manager in writing no later than five (5) days after Respondent became aware of or should have become aware of the event(s) which would or could constitute a force majeure under this paragraph. Such notification to EPA shall not relieve Respondent of any of its obligations under this Order. Failure by Respondent to provide either the oral notice or the written notice to EPA as required by this paragraph shall act as a waiver to assert the occurrence of a force majeure as a defense to any proceedings for stipulated penalties under this Order. Respondent shall be deemed to have notice of any circumstances of which its contractors or subcontractors were aware or should have been aware.

c. In its notice letter to EPA, Respondent shall fully describe the nature of the delay, the expected duration of the delay, the actions taken or to be taken to mitigate the delay, the timetable within such actions to mitigate any further delay will be taken, and the Respondent's rationale for attributing such delay to a force majeure event.

d. Respondent shall have the burden of proving that any requirement of this Order is excused by this force majeure provision. If EPA agrees that the delay is attributable to a force majeure event, EPA will notify Respondent in writing of the length of extension, if any, for performance of the obligations affected by the force majeure event. An extension of the time for performance of the obligations affected by the force

majeure event shall not, of itself, extend the time for performance of any other obligation. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, EPA will notify Respondent in writing. EPA will be the final arbiter of any issues or disputes concerning force majeure.

XIV. MODIFICATIONS TO THIS ORDER

82. Respondent may request that EPA approve modification(s) to the EPA-approved RIWP, RI, FS Work Plan or FS Report at any time during the implementation of the work required by this Order. All such modifications to these documents must be approved in a writing signed by the Chief, New Jersey Superfund Branch 2, Emergency and Remedial Response Division, EPA Region II.

83. This Order may be modified by mutual agreement of EPA and Respondent. All modifications to this Order shall be in writing and signed by Respondent and by EPA and shall have as their effective date that date on which such modifications are signed by EPA. EPA Project Managers do not have the authority to sign amendments to the Order. Such amendments shall be deemed to be incorporated in and enforceable parts of this Order.

84. No informal advice, guidance, suggestions or comments by EPA or NJDEPE shall be construed to relieve Respondent of any of its obligations under this Order.

XV. ASSURANCE OF ABILITY TO COMPLETE THE WORK

85. Respondent shall demonstrate its ability to complete the work required by this Order and to pay all claims that arise from the performance of the work. Within 15 days after the effective date of this Order, Respondent shall fund a financial instrument or trust account sufficiently to perform the work required under this Order beginning with the effective date of the Order through two (2) calendar year quarters. Thereafter, Respondent shall fund the financial instrument or trust account such that at the beginning of each calendar year quarter, there shall be sufficient funds available to finance the work and other activities required under this Order projected for the succeeding calendar year quarter.

XVI. INSURANCE AND INDEMNIFICATION

86. All contractors and subcontractors that Respondent uses for work at the Site must have at least the limits of liability coverage or indemnification set out below for any liability which may result from any activities conducted pursuant to this Order. At least seven (7) days prior to commencement of activities under this Order, Respondent shall obtain or require

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that their contractors and subcontractors obtain, and submit to EPA a policy or policies of insurance, for duration of the Order, providing comprehensive general liability insurance for $1 million per occurrence with deletion of the Watercraft Exclusion (for watercraft/maritime operations) and Auto liability insurance for $1 million per occurrence. In addition, Respondent shall satisfy or ensure that its contractors or subcontractors satisfy all applicable laws and regulations, regarding the provision of workers' compensation insurance. Certificates evidencing such coverage as required herein shall be submitted to EPA on the anniversary of the effective date of this Order.

87. The United States and any and all agencies thereof shall not be liable for any injuries or damages to any person or property resulting from any acts or omissions of Respondent's officers, directors, employees, contractors or agents when carrying out any activity related to this Order; Respondent shall not represent to anyone that the United States or any agency thereof is or may be a party to any contract entered into by Respondent in carrying out any activity pursuant to this Order.

88. This Order is without prejudice to actions against the United States based on negligent actions taken directly by the United States (not including oversight or approval of Respondent's plans or activities) that are brought pursuant to any statute other than CERCLA and for which the waiver of sovereign immunity is found in a statute other than CERCLA.

XVII. REIMBURSEMENT

89. a. Within 30 days of the effective date of this Order, Respondent shall remit a certified or cashier's check to EPA in the amount of $97,205.96 in reimbursement of all Response Costs incurred by EPA on or before the effective date of this Order. Checks should be made payable to "Hazardous Substances Superfund" and mailed to the following address:

EPA - Region II
Attn: Superfund Accounting
P.O. Box 360188M
Pittsburgh, PA 15251

Such payment shall be accompanied by a letter stating the name and address of Respondent, the name of the Site and operable unit, and the number on this Order. A copy of the letter and check must also be sent to the Project Manager and Site Attorney at the address noted in Paragraph 67. Effective upon EPA's receipt of payment pursuant to this subparagraph, EPA covenants not to sue or to take administrative action against Respondent for Response Costs incurred prior to the effective date of this Order.

b. With respect to Response Costs incurred by EPA after the effective date of this Order, Respondent agrees to reimburse EPA for all Response Costs which are incurred by EPA and all of its agents, contractors and employees relating to this Order. At various times after the effective date of this Order, EPA will submit to Respondent a demand for payment of Response Costs. Respondent and EPA agree that a letter from the Director, Emergency and Remedial Response Division, EPA Region II, certifying the amount of costs incurred, and accompanied by a SCORE$ printout of cost data from EPA's financial management system shall serve as the sole basis for payment demands by EPA. Respondent will, within thirty (30) days of receipt of such demand, reimburse such costs. Respondent shall not demand any additional documentation beyond that specified in this sub-paragraph as a prerequisite for making any payments demanded by EPA for Response Costs incurred pursuant to this Order. All payments by Respondent to EPA pursuant to this sub-paragraph terms of this Order shall be consistent with the procedures detailed in sub-paragraph a., above.

XVIII. DISPUTE RESOLUTION

90. Respondent and EPA shall make reasonable efforts to informally and in good faith resolve all disputes or differences of opinion which arise with respect to the implementation of this Order. Disputes under provisions of this Order shall be resolved according to the following procedures:

a. If Respondent, in good faith, disagrees in whole or in part, with comments made by EPA pursuant to Paragraph 38, 43, 45, or 92, Respondent shall notify EPA in writing of its objection, stating the basis for its objection, as soon as possible, but not later than 14 calendar days after receipt of such comments or notice of such determination by EPA. If Respondent so notifies EPA within the aforesaid period, the Chief of the New Jersey Superfund Branch 2 of the Emergency and Remedial Response Division, EPA Region II (hereinafter, the "Chief"), shall provide a written response to Respondent setting forth EPA's position and the basis for that position. The written response of the Chief shall constitute EPA's final decision with regard to the resolution of the dispute and shall be deemed to be incorporated in this Order.

b. If a dispute and its resolution, as described in subparagraph a. above, cause a delay that makes it impossible for Respondent to meet a deadline set forth in or established pursuant to this Order, then that deadline shall be extended by EPA by a period of time not to exceed the delay resulting

from the dispute and its resolution; PROVIDED, that Respondent shall not be entitled to any such extension if the Chief, New Jersey Superfund Branch 2, determines that Respondent's disagreement with the comments or determinations specified above is not in good faith or otherwise lacks a reasonable basis. Notwithstanding any of the foregoing, if Respondent requests an extension of a deadline set forth in or established pursuant to this Order, and if EPA declines to grant an extension in response to such a request, any delay, caused solely by the resolution of such a dispute shall not entitle Respondent to an extension of time.

c. Notwithstanding any of the foregoing, EPA will be the final arbiter of all disputes under this Order and the final arbiter as to the sufficiency and acceptability of all work conducted pursuant to this Order. However, nothing in this Paragraph shall affect any rights that Respondent may have to judicial review, if any, of EPA's actions or determinations under this Order, and, except as provided in Paragraph 105, EPA and Respondent expressly reserve all rights and defenses that they may have pursuant to applicable law.

XIX. ENFORCEMENT AND RESERVATIONS

91. a. If Respondent fails to submit the RIWP, the Draft RI Report, the draft screening level human and ecological risk assessment, the draft HERA report, the FS Work Plan, the Draft FS or any revisions of such documents or fails to complete activities required pursuant to these documents within the applicable time periods, Respondent shall be subject to a stipulated penalty to EPA in the amount indicated below for each and every calendar day of noncompliance:

Days After Required Date	Penalty per Violation per Day
1 to 10 days	$ 800/day
11 days to 20	$1500/day
21 days to 30 days	$3000/day
31 days or more	$6000/day

b. If Respondent fail to comply with any other requirements or time limits set forth in or established pursuant to this Order, Respondent shall be subject to a stipulated penalty to EPA in the amount indicated below for each and every calendar day of noncompliance:

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Days After Required Date	Penalty per Violation per Day
1 to 10 days	$ 250/day
11 days to 20	$ 500/day
21 days to 30 days	$1000/day
31 days or more	$2000/day

Any such penalty shall accrue as of the first calendar day after the applicable deadline has passed and shall continue to accrue until the noncompliance is corrected. Such penalties shall be due and payable ten (10) days after the date that Respondent receives a written demand from EPA for such penalties. Payment of any such penalties to EPA shall be made payable to the "Hazardous Substance Superfund" in the same manner as stated in Paragraph 89 and with copies to the same people as stated in Paragraph 67.

92. Any failure by Respondent to comply with any provision in this Order, including, but not limited to, any failure to comply with any terms of the SOW, EPA-approved RIWP or FS Work Plan will be considered a violation of this Order. In such an event, EPA may elect to:

a. Demand that Respondent ceases work under the Order;

b. Use federal funds to complete the work required by the Order; and/or

c. Take any other action authorized under federal law or regulations.

Respondent may invoke the Dispute Resolution provisions in Section XVIII to dispute that it has failed to comply with a provision of this Order.

93. If Respondent elects not to perform the work requested by EPA under the terms of Paragraph 39 or Paragraph 42.c.ii of this Order, EPA reserves the right to seek reimbursement for the costs associated with the work and/or to seek any other appropriate relief from Respondent in another judicial or administrative action.

94. Nothing contained in this Order shall affect the right of EPA to pursue an action for civil penalties against any entity pursuant to Section 106(b) of CERCLA, 42 U.S.C. § 9606.

95. Nothing contained in this Order shall affect the right of EPA to pursue an action against Respondent or any other responsible party pursuant to Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any costs incurred by EPA relating to this Order and/or for any other response costs which have been

incurred or will be incurred by the United States relating to this Site.

96. Except as expressly provided in this Order, each party reserves all rights and defenses it may have. Nothing in this Consent Order shall affect EPA's removal authority or EPA's response or enforcement authorities including, but not limited to, the issuance of Administrative Orders for activities not required or performed under this Order or the right to seek injunctive relief, stipulated penalties, statutory penalties, and/or punitive damages.

97. Nothing contained in this Order shall affect any right, claim, interest, defense or cause of action of EPA or Respondent with respect to any entity which is not a party to this Order.

98. Nothing in this Order constitutes a decision on pre-authorization or approval of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

99. Respondent agree not to make any claim(s) pursuant to Sections 106(b)(2), 111 and/or 112 of CERCLA, 42 U.S.C. §§ 9606(b)(2), 9611, 9612, either directly or indirectly, for reimbursement from the Hazardous Substance Superfund for any costs incurred by Respondent in complying with the terms of this Order.

100. The parties may agree to add other responsible parties as Respondent to this Order, provided that such other parties shall agree to participate on terms agreeable to Respondent and EPA. The decision to add such other parties shall be in the unreviewable discretion of EPA and OCC, both of which must agree upon such addition.

101. With regard to claims for contribution against Respondent for matters addressed in this Order, the parties hereto agree that the Respondent is entitled to such protection from contribution actions or claims as may be provided by CERCLA Sections 113 and 122, 42 U.S.C. §§ 9613 and 9622.

102. By signing this Order and taking actions under this Order, the Respondent does not necessarily agree with EPA's Findings of Fact and Conclusions of Law. Furthermore, the participation of the Respondent in this Order shall not be considered an admission of liability and is not admissible in evidence against the Respondent in any judicial or administrative proceeding other than a proceeding by the United States, including EPA, to enforce this Order or a judgment relating to it. Respondent's consent to this Order shall not be construed as an estoppel or waiver of any defenses that Respondent wish to raise in any other proceedings. Respondent retains its rights to

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assert claims against other potentially responsible parties at the Site.

XX. TERMINATION AND SATISFACTION

103. At such time as EPA determines that the work required by this Order has been satisfactorily completed, the Director, Emergency and Remedial Response Division, EPA Region II will notify Respondent that the requirements of this Order have been satisfied. The provisions of this Order shall be deemed satisfied when Respondent receives this written notice signed by the Director, Emergency and Remedial Response Division, EPA Region II which states that all the actions required by this Order have been satisfactorily completed. Respondent may petition EPA in writing for a written termination.

XXI. EFFECTIVE DATE AND EFFECT OF CONSENT

104. This Order shall become effective on the date it is signed by the Regional Administrator as indicated below. ,All activities required pursuant to this Order with deadlines measured from the effective date shall be calculated from this effective date.

105. Respondent agrees not to contest any of the following in any proceeding in any federal court after the effective date of this Order:

a. the validity of this Order; and

b. the authority of the Regional Administrator of EPA Region II to enter into this Order.

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For: U.S. ENVIRONMENTAL PROTECTION AGENCY

Jeanne M. Fox

Jeanne M. Fox
Regional Administrator
U.S. Environmental Protection Agency
Region II

4/20/94
DATE

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CONSENT

The signatory identified below certifies that he or she is fully authorized to represent Respondent in this matter, to agree to the terms and conditions of this Order on behalf of Respondent and to bind Respondent to all of the terms and conditions of this Order. Respondent agrees to enter into this Order and to be bound by its terms.

OCCIDENTAL CHEMICAL CORPORATION

By: Michael J. Rudick
Michael J. Rudick
Vice President and General Counsel

March 25, 1994
DATE

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STATEMENT OF WORK

Remedial Investigation/Feasibility Study

Passaic River Study Area
Diamond Alkali Superfund Site

March 18, 1994

APPENDIX 1

PSI-070513

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 Passaic River 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 Passaic River Study Area are defined as those reaches of the Passaic River from the abandoned ConRail Railroad bridge located at the USACE station designation of 40+00 (i.e., a transect running perpendicular to the USACE Federal Project Limit for dredging 4000 feet upstream from the red channel junction marker at the confluence of the Hackensack and Passaic Rivers) to a transect six miles (31,680 feet) upriver located at the USACE station designation of 356+80. 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 a draft RI and FS report 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 Passaic River 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, and Human and Ecological Risk Assessment (HERA) report, as adopted by EPA, with the administrative record and public comment will form the basis for the selection of the site's

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 Work 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, from Passaic River sediments from the Passaic River Study Area conducted in accordance with the provisions of this SOW;

This information is necessary to:

determine concentration gradients and, based on the gradients, identifying "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 Passaic River 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 short- and long-term risks and establish appropriate action levels.

3. Determine contaminated sediment transport within the boundaries of the Passaic River Study Area in accordance with the SOW.

This information is necessary to:

define past, present and future migratory pathways under normal and stressed conditions (e.g., storm events including 100 year flood, etc.)

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 NJDEPE (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 five plans: 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. 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 will be done along transects, spaced 1200 feet apart, with 3 sediment core borings per transect for a total of seventy-eight (78) sediment cores. The three sediment cores will be taken along each transect in the following manner: one in the right channel bed, one in the middle section (thalweg) and one in the left channel bed.

(2) Cores will be taken to the maximum time-stratigraphic depth determined by historical radio-geochemistry or bathymetric data which corresponds to the year 1940. All cores will be split, sub-sampled for sediment chemistry and radio-geochemical dating. Sediment cores remaining after sampling analyses shall be archived.

(3) Ten (10) additional sediment cores will be taken. The locations of these additional cores will be determined by EPA after EPA has an acceptable graphic representation (GIS or CAD format) of the Passaic River Study Area which contains all relevant data. Relevant data include, 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 within the Passaic River Study Area.

(4) All cores will be dated using the full range of radio-chemistry dating techniques, Pb^{210}, Be^{7}, and Cs^{137}. DDT will also be used as a dating tool where deemed appropriate by EPA. A description of how the radio-dating protocol will complement the proposed interval sampling (see following paragraph) and available bathymetry data will be included in the IWP along with a discussion of post analysis correlation.

(5) Sediment samples sub-sampled in the cores will be homogenates of sediment throughout the decade interval starting in the 1940-50 decade through to the 1980-90 decade. This will provide an indication of sediment quality from the time the Diamond Alkali facility began operating to the present. An additional sample will be taken from each core at the surface, in the biologically active zone for analysis. In addition, EPA has also determined that a separate sediment sample from each core will be taken consisting of a homogenate sample from the time-stratigraphic period of 1955-65.

(6) In areas of scour or where existing radio-geochemistry dating, bathymetry, and other data are unable to delineate a time-stratigraphic interval, cores will be homogenated in the following manner: a) five one-foot long composite samples will be taken at equally spaced intervals from the sediment surface to the depth of five feet or b) if historical data (or appropriate EPA approved calculations or modelling) delineates the depth of scour for a 500 year flood, one-foot long composite samples at equally spaced intervals from the sediment surface to this depth will be taken, whichever is deeper.

ii. A second section of the IWP shall describe the implementation of the Work for the goal concerning evaluation of contaminant exposure to human and ecological receptors.

(1) This Work will include the following activities for the Passaic River Study Area: a) identify contaminants of concern in sediment and water; b) identify ecotoxicological endpoints and ecological effects associated with contaminant exposure to key organisms; and, c) evaluate the potential uptake of contaminants from sediment and water through

the food web by key organisms and by humans through the consumption of fish and invertebrates. This Work will take into consideration procedures described by EPA and US Army Corps of Engineers (USACE) for conducting an ecological investigation. As described in greater detail below, the investigation will be divided into five parts. The first part (Part I) is a characterization of the ecological community; the second part (Part II) will identify the chemical and water quality stressors; and the third part (Part III) will be to conduct a screening-level human and ecological risk assessment. Performance of the first three parts will be mandatory, while performance of the last two parts will be dependent of the results of the first three parts.

If in EPA's opinion, sufficient information on uptake and ecotoxicological effects of contaminants on key organisms, the structure of the food web and urban angler consumption levels is unavailable, field sampling will be performed to determine ecological and human health effects. Accordingly, an Ecological Sampling plan (ESP) will be generated that sets out further biological, sediment, and water sampling and toxicity testing (Part IV)[1]; and, subsequent to the implementation of this additional sampling the field sampling results will be incorporated into a revised risk assessment (Part V).

(2) The evaluation of human and ecological exposure to contamination will characterize contaminants in sediment, water quality conditions, species, aquatic habitats, and trophic groups that are representative of the major functional and structural components of the lower Passaic River ecosystem. This evaluation will rely upon a review of the available literature, historical reconnaissance surveys of the study area, and an evaluation of available chemical data in sediment and water.

(a) Part I, Characterization of Ecological Community will describe the techniques for identification and compilation of the available information from historical reconnaissance surveys on fish, invertebrate, and fish-eating bird species that inhabit the Passaic River Study Area. The available information will be reviewed to assess species abundance and diversity, numbers of individuals, and biomass of all species that inhabit the Passaic River Study Area. The results from this review will be used to characterize the structure and composition of the food web that describes the various habitats, distribution of species, and trophic groups.

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[1] The Respondent shall prepare the ESP. If EPA cannot reach agreement with the Respondent with respect to the content of the ESP, then EPA will conduct Parts IV and V of the investigation in a manner acceptable to EPA.

(b) Part II, Identification of Chemical and Water Quality Stressors, will specify the techniques for the identification and compilation of available information from scientific literature, public documents and databases regarding contaminants in sediment and water quality parameters within the Passaic River Study Area. The available information will be reviewed to determine historical contaminant concentrations in sediment and water, as well as water quality conditions. Contaminant sediment concentrations and water quality parameters will be compared to available sediment and water quality guidelines (e.g., NOAA's ER-M/ER-L, Washington State's AET, EPA ambient water quality guidelines, etc.,) to determine contaminants of concern and water quality stressors. The available information on ecotoxicological endpoints for the key organisms in the food web will be compiled for each contaminant of concern and water quality stressor. The ecotoxicological endpoints to be considered will include, but not be limited to, increased mortality, impaired growth and development, and impaired reproductive success. The available information on the bioaccumulation potential of each contaminant of concern will be compiled for key species, or ecologically similar species. A justification for description as a key species or ecological similar species will also be provided. The results from this review will identify those contaminants in sediment and water quality parameters that contribute to the relevant ecotoxicological endpoints, as well as contaminants that bioaccumulate in the key organisms in the food web.

(c) Part III, Screening-Level Human and Ecological Risk Assessment, will specify the data analysis and hazard assessment techniques for performing screening-level assessments of the effects of contaminant exposures on key ecological receptors and humans. This Work will take into consideration EPA risk assessment guidelines for evaluating human health risk and conducting an ecological assessment. The IWP will identify exposure models, describing their strengths and weaknesses with relation to validation and calibration, and all inherent assumptions to predict the potential direct uptake of contaminants in sediment and water by organisms and the potential indirect uptake of contaminants through the food web, as well as predict the potential uptake by humans through the consumption of fish and invertebrates caught within the Passaic River Study Area.

(d) Following the completion of Parts I, II, and III of the evaluation, EPA will determine the appropriateness of proceeding with a field sampling investigation to provide data for the conduct of a risk assessment and FS for the Passaic River Study Area. EPA's determination will include the following:

(i) A review of the results of Part I to determine whether additional site-specific information is necessary to characterize invertebrate and vertebrate communities which comprise the trophic structure (fish, benthic invertebrate, or fish-eating bird communities) in the Passaic River Study Area.

(ii) A review of the results of the screening-level human risk assessment performed in Part III to determine whether additional site-specific data is necessary to characterize the various exposure assumptions used in the screening-level human risk model. This review will take into consideration assumptions regarding: a) local fishing habits; b) fish and invertebrate consumption rates; c) accessibility to the Passaic River Study Area; and, d) the presence and abundance of desirable fish and invertebrates.

(iii) A review of the results of the screening-level ecological risk assessment performed in Part III to determine whether additional site-specific data are necessary to verify the various assumptions used in the screening-level ecological risk model. In conformance with the Administrative Order on Consent, the Respondent shall submit to EPA for review and approval a draft screening level human and ecological risk assessment report detailing the results of the first three parts of the HERA and Respondent's recommendations for further sampling, if appropriate. This review will take into consideration assumptions regarding: a) extrapolation of chemical dose-response information from other species to upper trophic level key species; b) reliance on bioaccumulation factors (sediment and food chain transfer rates) or bioconcentration factors (water) for contaminants of concern that are derived from data for other contaminants or species not present in the Passaic River Study Area; and c) reliance on data on the bioavailability and toxicity of contaminants in sediment and water that may not be appropriate to the site-specific chemical and physical conditions.

(iv) If a review of the results of Part I and Part III indicate that field sampling is not needed, then the Respondent will prepare and submit, as a separate deliverable the HERA to the EPA, in accordance with the schedule contained in the approved RIWP and in conformance with process as described in the Administrative Order on Consent. However, if EPA concludes that the available information is not adequate to conduct a risk assessment and FS for the Study Area, then the HERA will be prepared and submitted for EPA approval following the collection of additional field data.

iii. A third section of the IWP will describe the implementation of the Work for the goal concerning evaluation of the mobility of Passaic River Study Area sediments. The TABS-2

sediment transport model STUDH will be used for modelling sediment transport in the Passaic River Study Area.

iv. The IWP will provide for the evaluation of the useability of historic bathymetric survey data for the Passaic River Study Area in meeting the chemical sampling and sediment mobility model requirements. Factors that will be considered in this evaluation will include readability of the available bathymetric charts, definition of vertical and horizontal datums used in the survey, depth readings outside the USACE Federal Project Limit, density of survey line (i.e., perpendicular transects across the river) spacing and depth readings on survey lines, and availability of other bathymetric surveys within the same time frame containing more useable data.

b. 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 methods, analytical and testing methods, and sampling locations; a discussion of how the sampling, analysis, and testing will produce data useful for implementation of the Work; and estimated milestones for implementation of the Work.

c. 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 "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.

d. 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.

D. 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.

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

- Introduction including purpose and site background
- Description of the Passaic River Study Area investigation
- Description of Passaic River Study Area physical characteristics
- Presentation of the chemical characteristics of sediment and biota
- Description of sediment mobility modelling and results
- Summary and conclusions
- Appendices including technical memoranda on field activities, analytical data and QA/QC evaluation results, and sediment mobility modeling methods.

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

E. Preliminary Remedial Technologies Evaluation

Either during or following the site investigations, but prior to the initiation of the FS report, the Respondent will assess the investigation results and recommend preliminary remedial technologies likely to apply to the site problem. The work during the RI will generally be limited to the following:

1. Recommending types of remedial technologies appropriate to the site conditions.

2. Recommending whether or not to remove some or all of the waste for off-site treatment, storage, or disposal.

3. Determining the compatibility of groups of wastes with other wastes and with materials considered as part of potential

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remedial action. Recommending alternatives for treatment, storage, or disposal for each category of compatible waste.

FEASIBILITY STUDY

A remedial action FS will be developed to evaluate remedial alternatives for the Passaic River Study Area.

G. 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 NJDEPE (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 six tasks:

Task 1 - Description of Current Situation and Proposed Response
Task 2 - Development of Alternatives
Task 3 - Initial Screening of Alternatives
Task 4 - Treatability Studies
Task 5 - Evaluation of the Alternatives
Task 6 - Reports

TASK 1 - 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 and HERA, should be presented. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by remedial alternatives.

TASK 2 - DEVELOPMENT OF ALTERNATIVES

Based on the results of the RI, HERA and consideration of preliminary remedial technologies (see section E), the Respondent shall develop a limited number of alternatives for source control of contaminated river sediments and/or off-site remedial actions

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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 Response Objectives
Site-specific objectives for the response action will be established. These objectives will be based on public health and environmental concerns, 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.

b. 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. Alternatives are to be developed to include the following:

1. Treatment alternatives for source control of contaminated river sediments that would eliminate the need for long-term management (including monitoring).

2. Alternatives involving treatment as 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.

4. A no action alternative.

TASK 3 - INITIAL SCREENING OF ALTERNATIVES

a. Alternatives

The alternatives developed in Task 2 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 their 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.

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b. Alternatives Array Document

Upon completion of Task 3A, the Respondent will develop a table of applicable or relevant and appropriate requirements (ARARs) related to the remaining remedial alternatives. To facilitate this, an alternatives array document will be prepared by Respondent to summarize site description, technology identification and screening, and alternatives development and screening. The document will be submitted to EPA, who will in turn distribute it to appropriate sections and/or agencies for review and identification of ARARs. This document will be submitted by the Respondent and reviewed by EPA in conformance with Section VIII of the Administrative Order on Consent. As appropriate, EPA will update the identified ARARs throughout the FS process.

TASK 4 - TREATABILITY STUDIES

a. 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.

b. 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

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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, 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.

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 5 - EVALUATION OF THE ALTERNATIVES

a. Evaluation of the Alternatives

Action-specific Federal and State ARARs and other criteria, advisories and guidance to be used in the analysis and selection of a remedy will be identified. 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.

Information necessary to evaluate each alternative will be developed. The alternatives will be evaluated against the broad factors of effectiveness, implementability, and cost, using

appropriate and more specific component measures such as protectiveness, compliance with ARARs, reliability, and technical feasibility. The detailed analysis of each alternative shall include both short-term and long-term considerations for effectiveness, implementability and cost.

b. 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 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 Passaic River 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.

TASK 6 - DRAFT FEASIBILITY STUDY REPORT

A draft FS presenting the results of Task 1 through 5 will be prepared.

4. The Respondent will generate the FS 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 to EPA for review and comment. The Respondent will revise the draft FS per EPA's comments. The FS may require further revision depending upon public comment. EPA will approve the final FS.

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