UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

February 10, 2005

Mr. Glenn Shankle
Executive Director
Texas Commission on Environmental Quality
P. O. Box 13087
Austin, TX 78711-3087

Dear Mr. Shankle:

Enclosed for your information is a copy of the Unilateral Administrative Order for a Remedial Investigation and Feasibility Study that the U. S. Environmental Protection Agency ("EPA") intends to issue to Dow Chemical Company, Sequa Corporation, Parker Drilling, LDL Coastal LP, Ron Hudson, and Jack Palmer, pursuant to Section 106(a) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, 42 U.S.C. § 9606(a). This action is expected to occur within a matter of days, but no earlier than five (5) days from the date of this letter. The Order proposes and will require that certain activities be taken at the Gulfco Marine Maintenance Superfund Site in Brazoria County, Texas.

Please refer to the enclosed copy of the Order for the specific actions required and the timeframe within which such actions must be taken.

If you have any comments or questions concerning this Order, please contact me or have your staff contact Barbara Nann at (214) 655-8063.

Sincerely yours,

Pamela Phillips Acting

Samuel Coleman, P.E.
Director
Superfund Division

Enclosure

IN THE MATTER OF:	)	**UNILATERAL ADMINISTRATIVE ORDER FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY**
Gulfco Marine Maintenance	)	
Superfund Site	)	
Freeport, Texas	)	
	)	U.S. EPA REGION 6
Dow Chemical Company		CERCLA Docket No. 06-05-05
LDL Coastal Limited L.P.	)	
Parker Drilling	)	
Sequa Corporation	)	
Jack Palmer	)	Proceeding under Sections 106 (a)
Ron Hudson	)	of the Comprehensive Environmental Response, Compensation, and Liability Act,
	)	as amended, 42 U.S.C. § 9606(a).
RESPONDENTS	)	

UNILATERAL ADMINISTRATIVE ORDER
FOR REMEDIAL INVESTIGATION/FEASIBILITY STUDY

I. INTRODUCTION

1. This Administrative Order ("Order") is being issued by the United States Environmental Protection Agency ("EPA") to the above-captioned Respondents (hereinafter, the "Respondents"). The Order concerns the preparation and performance of a Remedial Investigation and Feasibility Study (hereinafter, the "RI/FS") concerning the Gulfco Marine Maintenance Superfund Site (hereinafter, the "Site") in Freeport, Brazoria County, Texas.

II. JURISDICTION

2. This Order is issued to Respondents by EPA under the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended ("CERCLA"), 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of EPA on January 23, 1987, by Executive Order 12580 (52 Fed. Reg. 2923, January 23, 1987), and was further delegated to EPA Regional Administrators on September 13, 1987 by EPA Delegation Nos. 14-14-A and

14-14-B, and to the Director, Superfund Division, EPA Region 6, by EPA Delegations R6-14-14-A and R6-14-14-B.

III. PARTIES BOUND

3. This Order shall apply to and be binding upon the Respondents and their successors and assigns. Respondents are jointly and severally responsible for carrying out all actions required of them under this Order. No change in the ownership or corporate status of any Respondent or of its facilities or the Site shall alter any Respondent's responsibilities under this Order.

4. Respondents shall provide a copy of this Order to any subsequent owners or successors before a controlling interest in ownership rights or stock or assets in a corporation are transferred. Respondents shall provide a copy of this Order to all contractors, subcontractors, laboratories, and consultants which are retained to conduct any work performed under this Order, within fourteen (14) days after the EFFECTIVE DATE of this Order or the date of retaining their services, whichever is later. Respondents shall condition any such contracts upon satisfactory compliance with this Order. Notwithstanding the terms of any contract, Respondents are responsible for compliance with this Order and for ensuring that their employees, contractors, consultants, subcontractors and agents comply with this Order.

5. The activities conducted under this Order are subject to approval by EPA and shall provide all appropriate information for the RI/FS and for a Record of Decision that is consistent with CERCLA and the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. The activities conducted by or on behalf of Respondents under this Order shall be conducted in compliance with all applicable EPA guidance, policies, and procedures and any amendments thereto.

IV. FINDINGS OF FACT

6. The Site, as indicated in Attachment A, is an inactive barge cleaning facility where waste disposal occurred. The Site consists of approximately 40 acres located one mile east of Highway 332 at 906 Marlin Avenue in Freeport, Brazoria County, Texas. The geographic coordinates are 28°58'07" north latitude, and 95°17'26" west longitude.

7. The Site borders 2170 feet of the north shore of the Intracoastal Waterway between Oyster Creek on the east and the Old Brazos River Channel and the Dow Barge Canal on the west. The Site is within an area of 100-year coastal flood with velocity (wave action). The southern part of the Site, south of Marlin Avenue, drains toward the south where it enters into the Intracoastal Waterway. Drainage from the Site area north of Marlin Avenue is to the northeast into adjacent wetlands. These wetlands extend approximately 0.48 miles to Oyster Creek.

8. A residential development exists approximately 500 feet southwest of the Site on the Intracoastal Waterway. According to U.S. Census data from 2000, there are 56 housing units and 61 residents within one-half mile of the Site. The nearest industrial facility to the Site, Offshore Services, Inc., is located adjacent to the Site on the east. This facility is a docking and staging area for supplying fuel, drilling mud, chemical additives, and cement to offshore drilling rigs.

9. According to the National Wetlands Inventory map for the Freeport Quadrangle, the wetlands north of the Site are estuarine, intertidal, emergent, persistent, and irregularly flooded.

10. The Site was operated by Gulfco Marine Maintenance, Inc., from 1971 through 1979. Fish Engineering and Construction, Inc., owned the Site from 1979 until 1989, when the majority of the Site, including Lots 21 through 25, and Lots 55, 57, and 58 (approximately 35 acres), was sold to Hercules Offshore Corporation (later Hercules Marine Services Corporation). LDL Coastal Limited LP acquired Hercules Marine Services' interest in the Site in a bankruptcy sale in 1999. The remaining lot, Lot 56 (approximately five acres), was sold to Jack Palmer and Ron Hudson in 1999.

11. The primary Site operations consisted of draining, cleaning, servicing, and repair of various chemical barges. The barge repair work included welding, sandblasting, and painting. The Site also included three surface impoundments, which were earthen pits with natural clay liners located on Lot 56. Beginning in 1971, the impoundments were used for storage of waste oils, caustics, various organic chemicals, and waste wash waters generated during barge cleaning activities. The impoundments were deactivated in October 1981, and later operations used floating barges and above ground storage tanks to store the barge wash waters.

12. According to a letter from Fish Engineering & Construction, Inc., to the Texas Air Control Board, dated April 14, 1982, between June 1980 and August 1981, the barge cargoes for washing at the Site included: fuel oil, crude oil, diesel, oil residues, gas oil, benzene, xylene, toluene, cyclo-hexane, cumene, ethyl benzene, styrene, hydrochloric acid, glycols, methanol, butanol, chloroform, perchloroethylene, vinyl chloride, acetone, methyl ethyl keytone, and vinyl acetate among other barge cargoes.

13. According to the "Site Inspection Report", dated July 15, 1980, prepared by EPA, discharges occurred from the waste impoundments in July 1974 and August 1979.

14. According to the "Screening Site Inspection Report", dated July 2000 ("SSI Report"), prepared by the Texas Natural Resource Conservation Commission (TNRCC), and the "HRS Documentation Record, Gulfco Marine Maintenance Site", dated February 2002 ("HRS Report"), prepared by TNRCC, the site included two barge slips, a dry dock area,

and various above ground tanks used for storage of product drained from the barges prior to cleaning.

15. According to the "Site Characterization Report", dated June 1999, prepared by LT Environmental, Inc. ("LTE"), for LDL Coastal, Inc. ("LTE Report"), the tank farm area at the Site originally consisted of 12 product above ground storage tanks and four wash water above ground storage tanks. The tank farm area had no levees or containment dikes in 1989 during the EPA Site visit. The tank farm currently is contained in a concrete berm. LTE conducted sampling of the tanks in March 1999 and identified the following hazardous substances: acetone; benzene; 2-butonone, chloroform; 1,1-dichloroethane; 1,2-dichloroethane; carbon tetrachloride; ethylbenzene; 4-methyl-2-pentanone; methylene chloride; naphthalene; styrene; tetrachloroethylene; toluene; 1,1,1-trichloroethane; trichloroethylene; Arochlor 1254; and xylenes.

16. According to the SSI Report, in January 2000, the Texas Natural Resource Conservation Commission (now known as the Texas Commission on Environmental Quality) conducted sampling activities at the Site. The sampling results documented hazardous substances above background concentrations and above the sample quantitation limit in the soil at the Site as follows:

Hazardous Substance	**Maximum Soil Concentration, mg/kg**	
	Site	**Background**
methylene chloride	0.025J	0.006
phenanthrene	2.5	ND (0.44)
fluoranthene	5.1	ND (0.44)
pyrene	4.4	ND (0.44)
benzo(a)anthracene	2.4	ND (0.44)
benzo(b)fluoranthene	2.7	ND (0.44)
benzo(k)fluoranthene	2.5	ND (0.44)
benzo(a)pyrene	2.6	ND (0.44)
benzo(g,h,i)perylene	2.4J	ND (0.44)
chrysene	2.8	ND (0.44)
ideno(1,2,3-cd)pyrene	2.2	ND (0.44)
alpha-chlordane	0.0084 ^	ND (0.0022)

Hazardous Substance	Maximum Soil Concentration, mg/kg	
	Site	Background
gamma-chlordane	0.020	ND (0.0022)
dieldrin	0.015J	ND (0.0043)
4,4'-DDT	0.015J	ND (0.0043)
endrin aldehyde	0.018J^	ND (0.0043)
Arochlor-1254 (PCB)	0.150	ND (0.043)
lead	221^	14.3
zinc	1150	50.1

ND = Not detected at the reported sample quantitation limit (SQL)
J, J^, Jv = sample results are estimated and/or biased high/low due to a quality control problem
^ = High biased. Actual concentration may be lower than the concentration reported.

17. According to the SSI Report, in January 2000, the Texas Natural Resource Conservation Commission (now known as the Texas Commission on Environmental Quality) conducted sampling activities in the Intracoastal Waterway. The sampling results documented releases of hazardous substances from the Site to the sediment in the Intracoastal Waterway as follows:

Hazardous Substance	Maximum Sediment Concentration, mg/kg	
	Adjacent to Site	Background
phenanthrene	1.2	ND (0.490)
fluoranthene	2.0	ND (0.490)
pyrene	2.0	ND (0.490)
bis(2-ethylhexyl)phthalate	1.2	0.150
gamma-chlordane	0.0055	ND (0.0026)
heptachlor-epoxide	0.0038	ND (0.0026)

Hazardous Substance	Maximum Sediment Concentration, mg/kg	
	Adjacent to Site	Background
lead	46.8	12.6
zinc	314	54.4

ND = Not detected at the reported sample quantitation limit (SQL)

18. According to the HRS Report, the Intracoastal Waterway is considered a fishery. Photographs taken during the January 2000 SSI sampling event documented the Intracoastal Waterway as being a fishery.

19. According to the HRS Report, a hazardous substance with a bio-accumulation potential factor (measure that reflects the tendency for a substance to accumulate in the tissue of an aquatic organism) of 500 or greater that is present in the sediment of a fishery is a potential threat to contamination of the human food chain. The hazardous substances present in Intracoastal Waterway sediment that are identified as releases from the Site having bio-accumulation potential factors greater than 500 are as follows:

Hazardous Substance	Bio-Accumulation Potential Factor
fluoranthene	5,000
pyrene	5,000
bis(2-ethylhexyl)phthalate	50,000
gamma-chlordane	50,000
lead	5,000
zinc	50,000

20. According to the HRS Report, in January 2001, the Texas Natural Resource Conservation Commission (now known as the Texas Commission on Environmental Quality) conducted sampling of the shallow ground water at the Site. The ground water samples were collected from temporary monitor wells screened between depths of 10 feet and 24 feet. The sampling results documented releases of hazardous substances from the Site to the ground water as follows:

Hazardous Substance	Maximum Ground Water Concentration, mg/L	
	Site	Background
benzene	18LJ	ND (0.010)
carbon disulfide	0.048J	ND (0.010)
chloroform	1.2LJ	ND (0.010)
1,1-dichloroethane	12	ND (0.010)
1,2-dichloroethane	2,800Jv	ND (0.010)
1,1-dichloroethene	30	ND (0.010)
1,2-dichloropropane	2.1J	ND (0.010)
ethyl benzene	0.040	ND (0.010)
methylene chloride	750Jv	ND (0.010)
4-methyl-2-pentanone	0.30J	ND (0.010)
tetrachloroethene	29LJ	ND (0.010)
toluene	0.78LJ	ND (0.010)
1,1,1-trichloroethane	93	ND (0.010)
1,1,2-trichloroethane	0.046	ND (0.010)
trichloroethene	92	ND (0.010)
vinyl chloride	17	ND (0.010)
xylenes	0.130	ND (0.010)
acetophenone	0.120	ND (0.010)
phenol	0.051	ND (0.010)
naphthalene	0.230	ND (0.010)
aldrin	0.000099J	ND (0.00005)
alpha-BHC	0.00048J	ND (0.00005)
beta-BHC	0.00075J	ND (0.00005)
delta-BHC	0.000092J	ND (0.00005)

Hazardous Substance	Maximum Ground Water Concentration, mg/L	
	Site	Background
gamma-BHC (lindane)	0.00059J	ND (0.00005)
endrin	0.00032J	ND (0.0001)
endosulfan II	0.00042J	ND (0.0001)
4,4'-DDT	0.0014J	ND (0.0001)
arsenic	0.0777	0.00102
cobalt	0.0669	0.0174
copper	0.273	0.0364
lead	0.0947	0.0244
manganese	14.1	2.81
nickel	0.217	0.0468
vanadium	0.196	0.0649

ND = Not detected at the reported sample quantitation limit (SQL)
J, J^, Jv = sample results are estimated and/or biased high/low due to a quality control problem.
L = Reported concentration is below the CRQL.

21. According to the "Screening Site Inspection of Fish Engineering and Construction, Inc." Report, undated, prepared by Ecology and Environment, Inc., for EPA, ground water at the Site flows to the southeast. The closest water supply well (Well BH8106-303) was on the west adjacent property to the Site, and was used for a public marina until 1984. The well was 199 feet deep and was screened from a depth of 188 feet to 198 feet.

22. According to the memorandum "Environmental Priority Initiative (EPI) Preliminary Assessment of Fish Engineering Construction, Inc.", dated August 2, 1989, from Jairo Guevara to Ed Sierra, the City of Freeport was previously supplied by ground water from seven wells at depths of 200 feet. These wells were used until 1989 when they were replaced by surface water reservoirs, and subsequently the wells were used as a backup system.

23 The hazardous substances identified above, under certain conditions of dose, duration, or extent of exposure, may produce adverse health and environmental effects. A number of these hazardous substances have been identified as probable carcinogens.

24 The Site was proposed for listing on the National Priorities List ("NPL") on September 5, 2002 (67 FR 56794), and was placed on the NPL effective May 30, 2003, in a final rulemaking published on April 30, 2003 (68 FR 23077).

Respondent LDL Coastal Limited L.P. is a domestic limited partnership incorporated in the state of Texas. LDL Coastal Limited L.P. is the current owner of certain parts of the Site, including Track numbers 21, 21A, 21B, 22, 23, 24, 25, 55, 57, and 58 of Subdivision Number 8, Brazos Coast Investment Company Subdivision.

26. Respondent Ron Hudson, as an individual, is the current owner of Lot 56.

27. Respondent Jack Palmer, as an individual, is the current owner of Lot 56.

28. Respondent Parker Drilling Company is a corporation incorporated in the state of Delaware. Parker Drilling Company acquired Hercules Offshore Corporation, who is a past owner of the Site.

Respondent Sequa Corporation is a corporation incorporated in the state of Delaware. Sequa Corporation is the parent company to Chromalloy American Corporation, who is a past owner of the Site.

30. Respondent Dow Chemical Company is a corporation incorporated in the state of Delaware. Dow Chemical Company arranged for disposal or treatment of hazardous substances, which were owned or possessed by said company, at the Site.

V. CONCLUSIONS OF LAW AND DETERMINATIONS

31 The Site constitutes a "facility" within the meaning of Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

32 Each of the Respondents is a "person" within the meaning of Section 101(21) of CERCLA, 42 U.S.C. § 9601(21). Respondent LDL Coastal Limited L.P. is the current owner of certain parts of the Site, including Track numbers 21, 21A, 21B, 22, 23, 24, 25, 55, 57, and 58 of Subdivision Number 8, Brazos Coast Investment Company Subdivision formerly utilized for cleaning of barges containing hazardous substances and is thus a responsible party within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1). Respondent Ron Hudson is the current owner of certain parts of the Site, specifically Lot 56 of Subdivision Number 8, Brazos Coast Investment Company Subdivision, formerly utilized for cleaning barges containing hazardous substances and is

thus a responsible party within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1). Respondent Jack Palmer is the current owner of certain parts of the Site, specifically Lot 56 of Subdivision Number 8, Brazos Coast Investment Company Subdivision, formerly utilized for cleaning barges containing hazardous substances and is thus a responsible party within the meaning of Section 107(a)(1) of CERCLA, 42 U.S.C. § 9607(a)(1). Respondent Parker Drilling Company is the successor to Hercules Offshore Corporation, who is a past owner of the Site at the time of disposal of hazardous substances at the Site and is thus a responsible party within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2). Respondent Sequa Corporation is the parent company to Chromalloy American Corporation, who is a past owner of the Site at the time of disposal of hazardous substances at the Site and is thus a responsible party within the meaning of Section 107(a)(2) of CERCLA, 42 U.S.C. § 9607(a)(2). Respondent Dow Chemical Company arranged for the disposal or treatment of materials containing hazardous substances which came to be disposed of at the Site, and is accordingly a responsible party within the meaning of Section 107(a)(3) of CERCLA, 42 U.S.C. § 9607(a)(3).

33 Among the contaminants found at the Site are contaminants, as identified in Section IV of this Order, which are "hazardous substances" as defined by Section 101 (14) of CERCLA, 42 U.S.C. §9601 (14).

34. The conditions described in Section IV of this Order, constitute an actual "release" of hazardous substances from the facility, as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22). In addition, there is a threat of further releases of hazardous substances at and from the Site.

35. The actual or threatened release of one or more hazardous substances from the Site presents an imminent and substantial endangerment to the public health or welfare or the environment.

36. The Remedial Investigation/ Feasibility Study ("RI/FS") required by this Order are necessary to abate an imminent and substantial endangerment to the public health or welfare or the environment because of an actual or threatened release of hazardous substances at or from the Site, and are not inconsistent with the NCP or CERCLA.

37. EPA gave Respondents an opportunity to enter into an Administrative Order on Consent ("AOC") covering the performance of an RI/FS of the Site. However, EPA and Respondents were not able to reach agreement on the terms of such an AOC.

VI. NOTICE

38. By providing a copy of this Order to the Texas Commission on Environmental Quality ("TCEQ"), EPA is notifying the State of Texas (the "State") that this Order is being

issued and that EPA is the lead agency for coordinating, overseeing, and enforcing the response action required by this Order.

VII. DETERMINATION

39. Based on the FINDINGS OF FACT and CONCLUSIONS OF LAW set forth above and the entirety of the administrative record, the Superfund Division Director has determined that the release or threatened release of hazardous substances at the Site may present an imminent and substantial endangerment to the public health or welfare or the environment.

VIII. ORDER

40. Based on the foregoing, Respondents are hereby ordered, jointly and severally, to comply with the following provisions, all documents incorporated by reference into this Order, and all schedules and deadlines in this Order, attached to this Order, or incorporated by reference into this Order.

IX. DEFINITIONS

Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meaning assigned to them in the statute or its implementing regulations. Whenever terms listed below are used in this Order or in the documents attached to this Order or incorporated by reference into this Order, the following definitions shall apply:

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

b. "Day" shall mean a calender day unless otherwise specified. In computing any period of time under this Order, in the event that a submission would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the end of the next business day.

c. "EPA" shall mean the United States Environmental Protection Agency.

d. "Interest" shall mean interest at the rate specified for interest on investments of the EPA Hazardous Substance Superfund established by 26 U.S.C. § 9507, compounded annually on October 1 of each year, in accordance with 42 U.S.C. § 9607(a). The applicable rate of interest shall be the rate in effect at the time the interest accrues. The rate of interest is subject to change on October 1 of each year.

e "National Contingency Plan" or "NCP" shall mean the National Contingency Plan promulgated pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, codified at 40 C.F.R. Part 300, including any amendments thereto.

f. "Order" shall mean this Unilateral Administrative Order and all appendices attached hereto. In the event of conflict between this Order and any attachments, this Order shall control.

g. "Paragraph" shall mean a portion of this Order identified by an Arabic numeral.

h. "Parties" shall mean EPA and Respondent.

i. "Performance Standards" shall mean those substantive requirements, criteria or limitations, identified in the Statement of Work, that the Work required by this Order must attain and maintain.

j. "RCRA" shall mean the Solid Waste Disposal Act, as amended, 42 U.S.C. §§ 6901, *et seq.* (also known as the Resource Conservation and Recovery Act).

k. "Respondents", are parties listed in Appendix A.

l. "Section" shall mean a portion of this Order identified by a roman numeral and includes one or more paragraphs.

m. "State" shall mean the State of Texas.

n. "Statement of Work" or "SOW" shall mean the statement of work for implementation as set forth in Attachment 1 to this Order. The Statement of Work is incorporated into this Order and is an enforceable part of this Order.

o. "Site" shall mean the Gulfco Marine Maintenance Superfund Site located in Freeport, Brazoria County, Texas, encompassing approximately 40 acres on the north shore of the Intracoastal Waterway and depicted generally on the map attached as Appendix B.

p. "TCEQ" shall mean the Texas Commission on Environmental Quality and any successor departments or agencies of the State of Texas.

q. "United States" shall mean the United States of America.

t. "Work" shall mean all activities Respondent is required to perform under this Order, including any activities described in the SOW.

X. NOTICE OF INTENT TO COMPLY

41 Respondents shall provide, not later than fourteen (14) days after the EFFECTIVE DATE of this Order, written notice to EPA stating whether they will comply with the terms of this Order. If Respondents do not unequivocally commit to perform the Work as provided by this Order, they shall be deemed to have violated this Order and to have failed or refused to comply with this Order. Respondents' written notice shall describe, using facts that exist on or prior to the EFFECTIVE DATE of this Order, any "sufficient cause" defenses asserted by Respondents under Sections 106(b) and 107(c)(3) of CERCLA, 42 U.S.C. §§ 9606(b) and 9607(c)(3). The absence of a response by EPA to the notice required by this paragraph shall not be deemed to be an acceptance of Respondents' assertions.

XI. WORK TO BE PERFORMED

42. All Work performed under this Order shall be under the direction and supervision of qualified personnel. Within thirty (30) calendar days of the EFFECTIVE DATE of this Order, and before the Work outlined below begins, Respondents shall notify EPA in writing of the names, titles, and qualifications of the personnel, including contractors, subcontractors, consultants and laboratories to be used in carrying out such Work. With respect to any proposed contractor, Respondents shall demonstrate that the proposed contractor has a quality system which complies with ANSI/ASQC E4-1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995, or most recent version), by submitting a copy of the proposed contractor's Quality Management Plan ("QMP"). The QMP should be prepared in accordance with "EPA Requirements for Quality Management Plans (QA/R-2)," (EPA/240/B-01/002, March 2001 or subsequently issued guidance) or equivalent documentation as determined by EPA. The qualifications of the persons undertaking the Work for Respondents shall be subject to EPA's review, for verification that such persons meet minimum technical background and experience requirements. EPA will review Respondent's selection of a project manager according to the terms of Section IX Paragraph 2 of this Order. If EPA disapproves of the selection of the project manager, Respondent shall submit to EPA within five (5) days after receipt of EPA's disapproval of the project manager previously selected, a list of project managers, 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 project managers that are acceptable to EPA. Respondent may then select any approved project manager from that list and shall notify EPA of the name of the project manager selected within twenty-one (21) days of EPA's designation of approved project managers. During the course of the RI/FS, Respondents shall notify EPA in writing of any changes or additions in the personnel used to carry out such Work, providing their names, titles, and qualifications. EPA shall have the same right to disapprove changes and additions to personnel as it has hereunder regarding the initial notification.

43. Respondents shall conduct the RI/FS in accordance with the provisions of this Order, the attached SOW, CERCLA, the NCP and EPA guidance, including, but not limited to the "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" (OSWER Directive # 9355.3-01, October 1988 or subsequently issued guidance), "Guidance for Data Useability in Risk Assessment" (OSWER Directive #9285.7-05, October 1990 or subsequently issued guidance), and guidance referenced therein, and guidances referenced in the SOW, as may be amended or modified by EPA. The Remedial Investigation ("RI") shall consist of collecting data to characterize site conditions, determining the nature and extent of the contamination at or from the Site, assessing risk to human health and the environment and conducting treatability testing as necessary to evaluate the potential performance and cost of the treatment technologies that are being considered. The Feasibility Study ("FS") shall determine and evaluate (based on treatability testing, where appropriate) alternatives for remedial action to prevent, mitigate or otherwise respond to or remedy the release or threatened release of hazardous substances, pollutants, or contaminants at or from the Site. The alternatives evaluated must include, but shall not be limited to, the range of alternatives described in the NCP, and shall include remedial actions that utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In evaluating the alternatives, Respondents shall address the factors required to be taken into account by Section 121 of CERCLA, 42 U.S.C. § 9621, and Section 300.430(e) of the NCP, 40 C.F.R. § 300.430(e). Upon request by EPA, Respondents shall submit in electronic form all portions of any plan, report or other deliverable Respondents are required to submit pursuant to provisions of this Order. All work performed under this Order shall be in accordance with the schedules herein, and in full accordance with the schedules, standards, specifications, and other requirements of the Work Plans, as initially approved by EPA, and as they may be amended or modified by EPA. For purposes of this Order, day means calendar day unless otherwise noted in this Order.

44. EPA reserves the right to comment on, modify and direct changes for all deliverables. Respondents must fully correct all deficiencies and incorporate and integrate all information and comments supplied by EPA either in subsequent or resubmitted deliverables.

45. Respondents shall not proceed further with any subsequent activities or tasks until receiving EPA approval for the RI/FS Work Plans. While awaiting EPA approval of these deliverables, Respondents shall proceed with all other tasks and activities which may be conducted independently of these deliverables, in accordance with the schedule set forth in this Order.

46. For all remaining deliverables not enumerated above in the previous paragraph, Respondents shall proceed with all subsequent tasks, activities and deliverables without awaiting EPA approval on the submitted deliverable. EPA reserves the right to stop

Respondents from proceeding further, either temporarily or permanently, on any task, activity or deliverable at any point during the RI/FS.

47. In the event that Respondents amend or revise a report, plan or other submittal upon receipt of EPA comments, if EPA in its discretion subsequently disapproves of the revised submittal or any portion thereof, or if subsequent submittals do not fully reflect EPA's directions for changes related to performance of the RI/FS , EPA retains the right, in its sole discretion, to seek statutory penalties, perform its own studies, complete the RI/FS (or any portion of the RI/FS) under CERCLA and the NCP, and seek reimbursement from the Respondents and/or other potentially responsible parties for its costs; and/or seek any other appropriate relief.

48. In the event that EPA takes over some of the tasks, but not the preparation of the RI and FS reports, Respondents shall incorporate and integrate information supplied by EPA into the final RI and FS reports.

49. The failure of EPA to either expressly approve, disapprove, or comment upon Respondents' submissions within a specified time period(s) shall not be construed as approval by EPA.

50. Respondents shall assure that all work performed, samples taken and analyses conducted conform to the requirements of the RI/FS Work Plans, the EPA-approved QAPP and guidances identified therein. Respondents shall assure that field personnel used by Respondents are properly trained in the use of field equipment and in chain of custody procedures.

51. Respondents shall, prior to any off-Site shipment of hazardous substances from the Site to an out-of-State waste management facility, provide written notification to the appropriate state environmental official in the receiving state and to EPA's Project Coordinator of such shipment of hazardous substances. However, the notification of shipments shall not apply to any such off-Site shipments when the total volume of such shipments will not exceed 10 cubic yards.

a. The notification shall be in writing, and shall include the following information, where available: (1) the name and location of the facility to which the hazardous substances are to be shipped; (2) the type and quantity of the hazardous substances to be shipped; (3) the expected schedule for the shipment of the hazardous substances; and (4) the method of transportation. Respondents shall notify the receiving state of major changes in the shipment plan, such as a decision to ship the hazardous substances to another facility within the same state, or to a facility in another state.

b. The identity of the receiving facility and state to which any hazardous substances from the Site will be shipped will be determined by Respondents following the award of the

contract for the RI/FS. Respondents shall provide all relevant information, including information under the categories noted in subparagraph a., above, on the off-Site shipments, as soon as practical after the award of the contract and before the hazardous substances are actually shipped.

XII. NOTIFICATION AND REPORTING REQUIREMENTS

All reports and other documents submitted by Respondents to EPA (other than the monthly progress reports referred to below) which purport to document Respondents' compliance with the terms of this Order shall be signed by a responsible corporate official of one or more of the Respondents; or by the Project Coordinator who has been delegated this responsibility by the Respondents, whose qualifications have been found by EPA to be acceptable pursuant to paragraph 65 of this Order, and who will certify that he/she has been fully authorized by Respondents to submit such a document and to legally bind all Respondents thereto. Notwithstanding such a delegation of responsibility, Respondents shall remain liable for the proper performance of the work required by this Order. For purposes of this Order, a responsible corporate official is an official who is in charge of a principal business function.

Until the termination of this Order, Respondents shall prepare and provide EPA with written monthly progress reports which: (1) describe the actions which have been taken toward achieving compliance with this Order during the previous month; (2) include all results of sampling, tests, modeling and all other data (including raw data) received or generated by or on behalf of Respondents during the previous month in the implementation of the work required hereunder; (3) describe all actions, data and plans which are scheduled for the next two months and provide other information relating to the progress of work as is customary in the industry; (4) include information regarding percentage of completion, all delays encountered or anticipated that may affect the future schedule for completion of the work required hereunder, and a description of all efforts made to mitigate those delays or anticipated delays. These progress reports shall be submitted to EPA by Respondents by the fifteenth (15) day of every month following the EFFECTIVE DATE of this Order.

54. All work plans, reports, notices and other documents required to be submitted to EPA under this Order shall be sent by certified mail, return receipt requested, by overnight delivery or by courier to the following addressees:

Mr. M. Gary Miller, Remedial Project Manager
U.S. Environmental Protection Agency, Region 6
Superfund Division (6SF-AP)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

Ms. Barbara A. Nann, Assistant Regional Counsel
United States Environmental Protection Agency, Region 6
Superfund Division (6RC-S)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733

55 Respondents shall give EPA at least fourteen (14) days advanced notice of all field work or field activities to be performed by Respondents pursuant to this Order.

XIII. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

56. Upon the occurrence of any event during performance of the work required hereunder which, pursuant to Section 103 of CERCLA, requires reporting to the National Response Center, Respondents shall immediately orally notify the EPA Project Coordinator (or, in the event of the unavailability of the EPA Project Coordinator, the Branch Chief of the Response and Prevention Branch of EPA Region VI), in addition to the reporting required by Section 103. Within fourteen (14) days of the onset of such an event, Respondents shall also furnish EPA with a written report setting forth the events which occurred and the measures taken, and to be taken, in response thereto. The reporting requirements of this paragraph are in addition to, not in lieu of, reporting under Section 103 of CERCLA, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004.

57. In the event of any action or occurrence during Respondents' performance of the requirements of this Order which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate, or minimize the threat and shall immediately notify EPA as provided in the preceding paragraph. Respondents shall take such action in accordance with applicable provisions of this Order including, but not limited to, the Health and Safety Plan. In the event that EPA determines that (a) the activities performed pursuant to this Order, (b) significant changes in conditions at the Site, or (c) emergency circumstances occurring at the Site pose a threat to human health or the environment, EPA may direct Respondents to stop further implementation of any actions pursuant to this Order or to take other and further actions reasonably necessary to abate the threat.

58. Nothing in the preceding paragraph shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

XIV. MODIFICATION OF THE WORK PLANS

59. If at any time during the RI/FS process, Respondents identify a need for additional data, a memorandum documenting the need for additional data shall be submitted to the EPA Project Coordinator within twenty (20) days of identification. EPA in its discretion will determine whether the additional data will be collected by Respondents and whether it will be incorporated into reports and deliverables.

60. In addition to the authorities in the NCP, in the event that EPA determines that unanticipated or changed circumstances at the Site, or conditions posing an immediate threat to human health or welfare or the environment, warrant changes in the RI/FS Work Plans, EPA will modify or amend, or direct Respondents to modify or amend, the RI/FS Work Plans accordingly. Respondents shall implement the RI/FS Work Plans as modified or amended.

61 EPA may determine that in addition to tasks defined in the approved RI/FS Work Plans, other additional work may be necessary to accomplish the objectives of the RI/FS. EPA may require, pursuant to this Order, that the Respondents perform these response actions in addition to those required by the RI/FS Work Plans, including any approved modifications, if EPA determines that such actions are necessary for a complete RI/FS. Respondents 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 written modifications to the RI/FS Work Plans or written Work Plan supplements. EPA reserves the right to conduct the work itself at any point, to seek reimbursement for the costs associated with the work from Respondents, and/or to seek any other appropriate relief.

XV. FINAL RI/FS, PROPOSED PLAN, PUBLIC COMMENT, RECORD OF DECISION, ADMINISTRATIVE RECORD

62. EPA retains the responsibility for the release to the public of the RI and FS reports. EPA retains responsibility for the preparation and release to the public of the proposed remedial action plan and record of decision in accordance with CERCLA and the NCP.

63. EPA will provide Respondents with the final RI and FS reports (to the extent that Respondents do not already have these reports), proposed remedial action plan, and record of decision.

64. EPA will assemble the administrative record file for selection of the remedial action. Respondents shall submit to EPA documents developed during the course of the RI/FS upon which selection of the remedial action may be based. Respondents shall provide copies of plans, task memoranda including documentation of field modifications, recommendations for further action, quality assurance memoranda and audits, raw data, field notes, laboratory analytical reports, and other reports. Respondents shall additionally submit any records of communications between Respondents and state, local

or other federal authorities concerning the implementation of this Order or selection of the response action.

XVI. PROJECT COORDINATORS, OTHER PERSONNEL

65. EPA has designated the following individual as its Project Coordinator with respect to the Site:

Mr. M. Gary Miller, Remedial Project Manager
U.S. Environmental Protection Agency, Region 6
Superfund Division (6SF-AP)
1445 Ross Avenue, Suite 1200
Dallas, Texas 75202-2733
(214) 665-8318, FAX (214) 665-6660

Not later than seven (7) days after the EFFECTIVE DATE of this Order, Respondents shall select their own Project Coordinator and shall notify EPA in writing of the name, address, qualifications, job title and telephone number of that Project Coordinator. He or she shall have technical expertise sufficient to adequately oversee all aspects of the work contemplated by this Order. To the greatest extent possible, the Project Coordinator shall be present on Site or readily available during Site Work. EPA retains the right to disapprove of any designated Project Coordinator. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number and qualifications within ten (10) calendar days following EPA's disapproval. Respondents' and EPA's Project Coordinators shall be responsible for overseeing the implementation of this Order and shall coordinate communications between EPA and Respondents. Receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Order shall constitute receipt by Respondents. EPA and Respondents may change their respective Project Coordinators. Such a change shall be accomplished by notifying the other parties in writing at least ten (10) days prior to the change where possible, and concurrently with the change or as soon thereafter as possible in the event that advance notification is not possible.

66. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager and On-Scene Coordinator by the NCP. In addition, EPA's Project Coordinator shall have the authority, consistent with the NCP, to halt any work required by this Order, and to take any necessary response action when he/she determines that conditions at the Site may present an immediate endangerment to public health or welfare or the environment. The absence of the EPA Project Coordinator from the area under study pursuant to this Order shall not be cause for the stoppage or delay of work.

67. All activities required of Respondents under the terms of this Order shall be performed only by qualified persons possessing all necessary permits, licenses, and other authorizations required by applicable law.

XVII. OVERSIGHT

68. During the implementation of the requirements of this Order, Respondents and their contractors and subcontractors shall be available for such conferences and inspections with EPA as EPA may determine are necessary for EPA to adequately oversee the work being carried out and/or to be carried out.

69. Respondents and their employees, agents, contractors, representatives and consultants shall cooperate with EPA in its efforts to oversee Respondents' implementation of this Order.

XVIII. SAMPLING, ACCESS AND DATA AVAILABILITY/ADMISSIBILITY

70. All sampling and analyses performed pursuant to this Order shall conform to EPA direction and approval regarding sampling, quality assurance/quality control (QA/QC), data validation, and chain of custody procedures. Respondent shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with the appropriate EPA guidance. Respondent shall follow the following documents as appropriate as guidance for QA/QC and sampling: "Quality Assurance/Quality Control Guidance for Removal Activities: Sampling QA/QC Plan and Data Validation Procedures," OSWER Directive Number 9360.4-01; "Environmental Response Team Standard Operating Procedures," OSWER Directive Numbers 9360.4-02 through 9360.4-08.

71. Upon request by EPA, Respondent shall have such a laboratory analyze samples submitted by EPA for quality-assurance monitoring. Respondent shall provide to EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis. Respondent shall only use laboratories that have a documented quality system which complies with ANSI/ASQC E-4 1994, "Specifications and Guidelines for Quality Systems for Environmental Data Collection and Environmental Technology Programs," (American National Standard, January 5, 1995) and "EPA Requirements for Quality Management Plans (QA/R-2)" (EPA/240/B-01/002, March 2001) or equivalent documentation as determined by EPA. EPA may consider laboratories accredited under the National Environmental Laboratory Accreditations Program (NELAP) as meeting the quality system requirements.

72. If any area to which access is necessary to perform work under this Order is owned in whole or in part by parties other than Respondents, Respondents shall obtain, or use their best efforts to obtain, access agreements from the present owner(s) within thirty (30) days

of the EFFECTIVE DATE of this Order. Such agreements shall provide access for EPA and their contractors and oversight officials, and the Respondents or their authorized representatives, and agreements for such access shall specify that Respondents are not EPA's representatives with respect to liability associated with Site activities. Copies of such agreements shall be provided to EPA upon request prior to Respondents' initiation of field activities. If access agreements are not obtained within the time referenced above, Respondents shall immediately notify EPA of their failure to obtain access. EPA may, in its sole discretion, obtain access for Respondents, perform those tasks or activities with EPA contractors, or terminate this Order in the event that Respondents cannot obtain access agreements. In the event that EPA performs those tasks or activities with EPA contractors and does not terminate this Order, Respondents shall perform all other activities not requiring access to the given property. Respondents additionally shall integrate the results of any such tasks undertaken by EPA into their reports and deliverables.

73 At all reasonable times, EPA and its authorized representatives shall have the authority to enter and freely move about all property at the Site and off-Site areas where work, if any, is being performed, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to the Site or Respondents and their contractor pursuant to this Order; reviewing the progress of the Respondents in carrying out the terms of this Order; conducting tests as EPA or its authorized representatives deem necessary; using a camera, sound recording device or other documentary type equipment; and verifying the data submitted to EPA by Respondents. All parties with access to the Site under this paragraph shall comply with all approved health and safety plans.

74 All data, records, photographs and other information created, maintained or received by Respondents or theirs agents, contractors or consultants in connection with implementation of the work under this Order, including but not limited to contractual documents, quality assurance memoranda, raw data, field notes, laboratory analytical reports, invoices, receipts, work orders and disposal records, shall, without delay, be made available to EPA on request. EPA shall be permitted to copy all such documents and other items.

75 Upon request by EPA or its designated representatives, Respondents shall provide EPA or its designated representatives with duplicate and/or split samples of any material sampled in connection with the implementation of this Order, or allow EPA or its designated representatives to take such duplicate or split samples.

76. Respondents may assert a claim of business confidentiality under 40 C.F.R. § 2.203, covering part or all of the information submitted to EPA pursuant to the terms of this Order, provided such claim is allowed by section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7). This claim shall be asserted in the manner described by 40 C.F.R. § 2.203(b)

and substantiated at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to Respondents.

77 Notwithstanding any other provision of this Order, EPA hereby retains all of its information gathering, access and inspection authority under CERCLA, the Solid Waste Disposal Act, 42 U.S.C. §§ 6901-6991, and any other applicable statute or regulation.

XIX. OTHER APPLICABLE LAWS

78. Respondents shall comply with all laws that are applicable when performing the RI/FS. No local, state, or federal permit shall be required for any portion of the work, including studies, required hereunder which is conducted entirely on-Site, where such work is carried out in compliance with Section 121 of CERCLA; however, Respondents must comply with the substantive requirements that would otherwise be included in such permits. For any work performed pursuant to this Order which is not "on-site", as defined in Sections 300.5 and 300.400(e) of the NCP, Respondents shall obtain all permits necessary under applicable laws and shall submit timely applications and requests for any such permits. This Order is not, nor shall it act as, a permit issued pursuant to any federal or state statute or regulation.

XX. RECORD PRESERVATION

79. All records and documents in Respondents' possession that relate in any way to the Site shall be preserved during the conduct of this Order and for a minimum of ten (10) years after commencement of construction of any remedial action which is selected following the completion of the RI/FS. Respondents shall acquire and retain copies of all documents that relate to the Site and are in the possession of its employees, agents, accountants, contractors, or attorneys. After this 10-year period, Respondents shall notify EPA at least ninety (90) days before the documents are scheduled to be destroyed. If EPA requests that the documents be saved, Respondents shall, at no cost to EPA, give the documents or copies of the documents to EPA.

XXI. COMMUNITY RELATIONS

80. Respondents shall cooperate with EPA in providing information relating to the work required hereunder to the public. To the extent requested by EPA, Respondents shall participate in the preparation of all appropriate information disseminated to the public and make presentations at, and participate in, public meetings which may be held or sponsored by EPA to explain activities at or concerning the Site.

XXII. DELAY IN PERFORMANCE

81 Any delay in performance of this Order that, in EPA's judgment, is not properly justified by Respondents under the terms of this Section shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondents' obligations to perform all obligations fully under the terms and conditions of this Order.

82 Respondents shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone to EPA's Project Coordinator within forty-eight (48) hours after Respondents first knew or should have known that a delay might occur. Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within five (5) business days after notifying EPA by telephone, Respondents shall provide written notification fully describing the nature of the delay, any justification for the delay, any reason why Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that have been or will be taken to mitigate the effect of the delay. Increased costs or expenses associated with implementation of the activities called for in this Order are not a justification for any delay in performance.

XXIII. ASSURANCE OF ABILITY TO COMPLETE WORK

83 Respondents shall demonstrate their ability to complete the Work required by this Order and to pay all claims that arise from the performance of the Work by obtaining and presenting to EPA within ninety (90) days of the EFFECTIVE DATE of this Order, one of the following; (1) a performance bond; (2) a letter of credit; (3) a guarantee by a third party; or (4) internal financial information to allow EPA to determine that Respondents have sufficient assets available to perform the Work. Respondents shall demonstrate financial assurance in an amount no less than the estimate of cost for the RI/FS for the Site. If Respondents seek to demonstrate ability to complete the RI/FS by means of internal financial information, or by a guarantee of a third party, they shall resubmit such information annually, on the anniversary of the EFFECTIVE DATE of this Order. If EPA determines that such financial information is inadequate, Respondents shall, within thirty (30) days after receipt of EPA's notice of determination, obtain and present to EPA for approval additional financial assurances consistent with this paragraph.

84. At least seven (7) days prior to commencing any work at the Site pursuant to this Order, Respondents shall submit to EPA a certification that Respondents or their contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondents pursuant to this Order. Respondents shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

XXIV. UNITED STATES NOT LIABLE

85 The United States, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or their directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. Neither EPA nor the United States may be deemed to be a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

XXV. ENFORCEMENT AND RESERVATIONS

86. EPA reserves the right to bring an action against Respondents under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States in connection with the Site. This reservation shall include but not be limited to past costs, future costs, direct costs, indirect costs, the costs of oversight, as well as accrued interest as provided in Section 107(a) of CERCLA.

87. Notwithstanding any other provision of this Order, at any time during the RI/FS, EPA may perform its own studies, complete the RI/FS (or any portion of the RI/FS) as provided in CERCLA and the NCP, and seek reimbursement from Respondents for its costs, or seek any other appropriate relief.

88. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional orders, and/or additional remedial or removal actions as EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA, or any other applicable law.

89. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA, RCRA and any other applicable statutes or regulations.

90. Respondents shall be subject to civil penalties under Section 106(b) of CERCLA, 42 U.S.C. § 9606(b), of not more than $32,500 for each day in which they willfully violate, or fail or refuse to comply with this Order without sufficient cause. This penalty amount is subject to possible further adjustments consistent with the Debt Collection and Improvement Act of 1996, Pub. L. No. 104-134, 110 Stat. 1321 (1996), and the regulations promulgated thereunder, including the Civil Monetary Penalty Inflation Adjustment Rule, 69 Fed. Reg. 7121 (February 13, 2004), 40 C.F.R. Part 19.4. In addition, failure to properly carry out response actions under this Order, or any portion hereof, without sufficient cause, may result in liability under Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3), for punitive damages in an amount at least equal to, and not more than three times the amount of, any costs incurred by EPA as a result of such failure to take proper action.

91 Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person for any liability it may have arising out of or relating in any way to the Site. Nothing herein shall constitute a finding that Respondents are the only responsible parties with respect to the release and threatened release of hazardous substances at or from the Site.

92. If a court issues an order that invalidates any provision of this Order or finds that Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

XXVI. EFFECTIVE DATE AND COMPUTATION OF TIME

93 This Order shall be effective upon the date of receipt by Respondents.

XXVII. OPPORTUNITY TO CONFER

94. Respondents may, within seven (7) days after receipt of this Order, request a conference with EPA to discuss this Order. If requested, the conference shall occur within seven (7) days of Respondents' request for a conference.

95 The purpose and scope of the conference shall be limited to issues involving the implementation of the Work required by this Order and the extent to which Respondents intend to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondents a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to Respondents' request, Respondents may appear in person or by an attorney or other representative.

96. Requests for a conference must be by telephone to Barbara A. Nann, Assistant Regional Counsel, EPA Region VI, telephone (214) 665-2157, followed by written confirmation mailed that day to Ms. Nann and the EPA Project Coordinator at the addresses set forth in Paragraph 54 of this Order.

XXVIII. TERMINATION AND SATISFACTION

97. This Order will be terminated by EPA if Respondents demonstrate in writing and certify to the satisfaction of EPA that all Work and activities required under this Order have been performed fully in accordance with this Order and EPA has approved the certification in writing. Such an approval by EPA, however, shall not relieve Respondents of any remaining obligations under the Order, including those requirements set forth in Section

XX regarding record preservation. Respondents' written submission under this paragraph shall include a sworn statement by a responsible official(s) of the Respondents which states the following: "I certify that the information contained in or accompanying this submission is true, accurate and complete."

U.S. ENVIRONMENTAL PROTECTION AGENCY

IT IS SO ORDERED

U.S. Environmental Protection Agency

BY: _____ DATE:

Sam Coleman, P.E.
Director
Superfund Division, Region 6

APPENDIX A

LIST OF RESPONDENTS
GULFCO MARINE MAINTENANCE
SUPERFUND SITE

Dow Chemical Company

CT Corporation System
Registered Agent for
Dow Chemical Company
350 N. St. Paul St., Suite 2400
Dallas, TX 75201

Dow Chemical Company
3020 Dow Center
Midland, MI 48674

2. **Mr. Ronald W. Hudson**
34 Green Slope Place
The Woodlands, TX 77381

3. **LDL Coastal Limited L.P.**

LDL Coastal Limited L.P.
906 Marlin Dr., CR 756
Freeport, TX 77541

LDL Management, LLC
906 Marlin Dr., CR 756
Freeport, TX 77541

4. **Mr. Jack Palmer**
1509 Alta Vista
Alvin, TX 77511

5. **Parker Drilling Company**

Corporation Service Company, Registered Agent
for Hercules Offshore Corporation
c/o Parker Drilling Company
800 Brazos
Austin, TX 78701

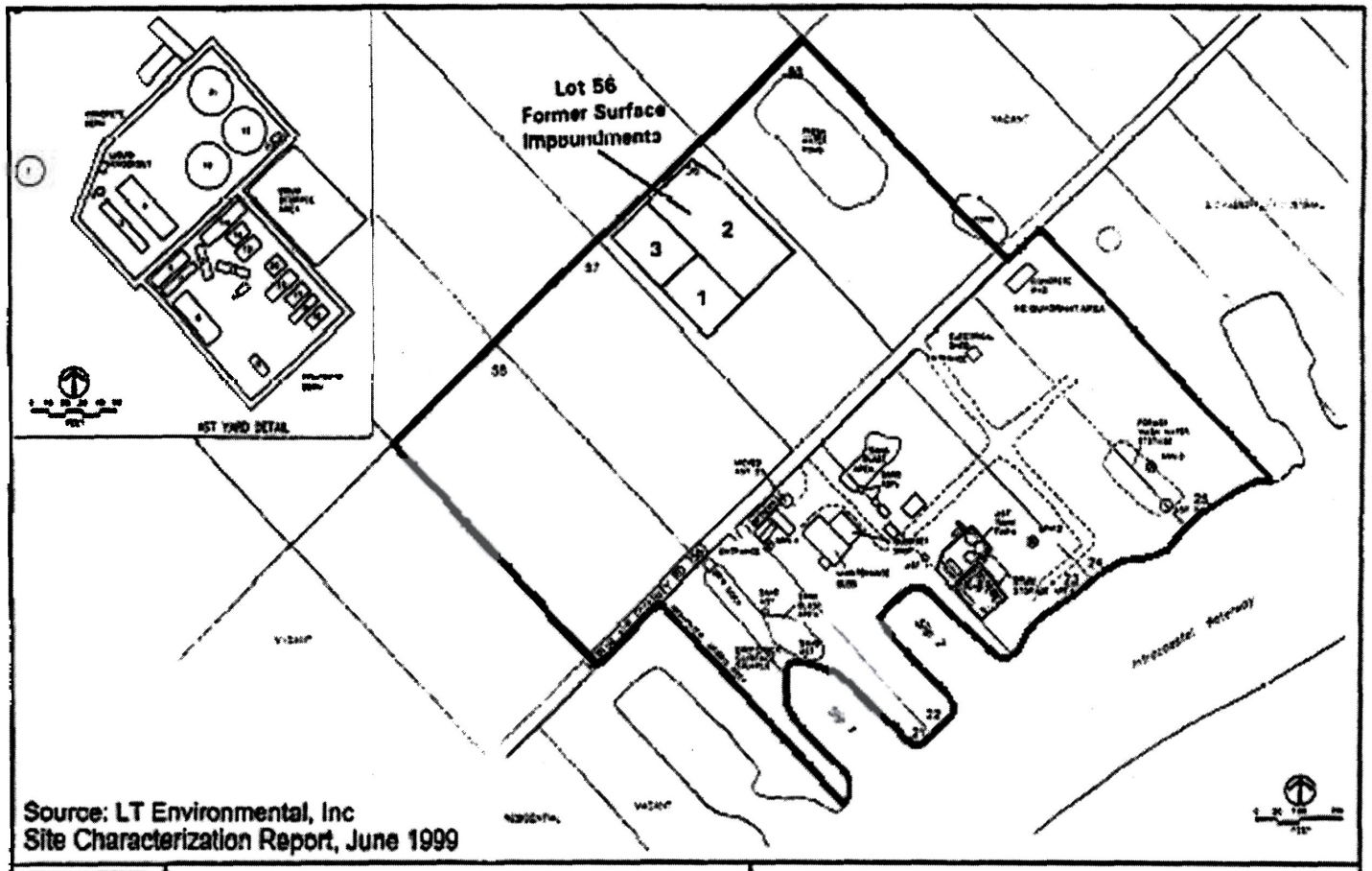
6. **Sequa Corporation**

Chromalloy American Corporation
c/o Sequa Corporation
111 Eighth Avenue
New York, NY 10019

CT Corp. System, Registered Agent
for Sequa Corporation
350 No. St. Paul St.
Dallas, TX 752011

APPENDIX B

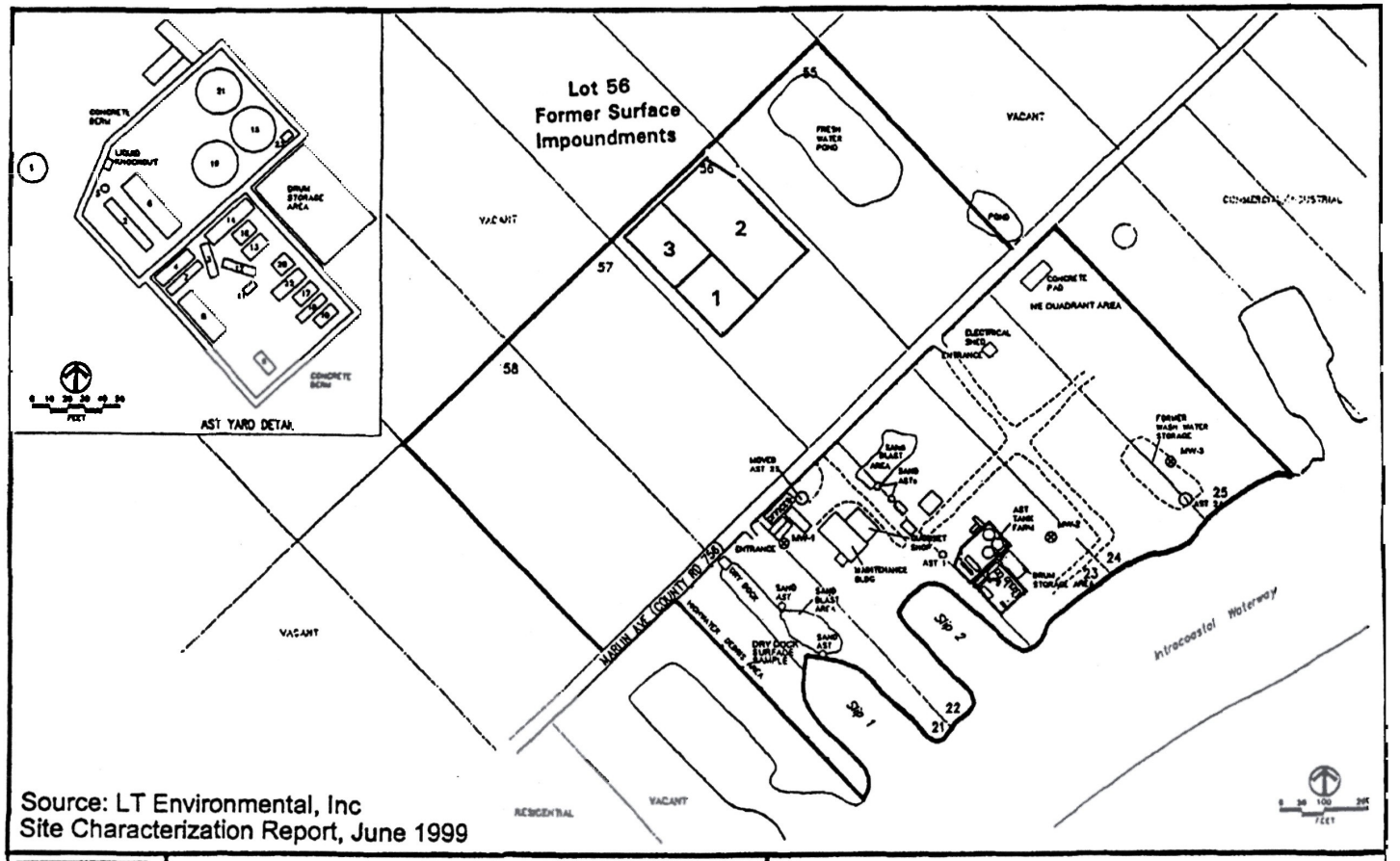
GULFCO MARINE MAINTENANCE
SUPERFUND SITE
MAP



Source: LT Environmental, Inc
Site Characterization Report, June 1999

TNRCC

Gulfco Site
Freeport, Brazoria County, Texas
EPA ID. No. TXD055144539



Source: LT Environmental, Inc
Site Characterization Report, June 1999

TNRCC

Gulfco Marine Maintenance
Freeport, Brazoria County, Texas
EPA ID. No. TXD055144539

STATEMENT OF WORK (SOW)

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STATEMENT OF WORK (SOW)
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

I. INTRODUCTION

1. This Statement of Work (SOW) provides an overview of work that will be carried out by Respondents as they implement a Remedial Investigation and Feasibility Study (RI/FS) for the Gulfco Marine Maintenance Superfund Site (Site). This RI/FS SOW is attached to the Unilateral Administrative Order (UAO) for the Site and is a supporting document for the UAO. Technical work described in the SOW is intended to provide more information to Respondents for purposes of implementing the UAO and is not intended to change the meaning of any UAO language. This SOW is also consistent with both the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and the National Contingency Plan (NCP). Any discrepancies between the UAO and SOW are unintended, and whenever necessary, the UAO will control in any interpretive disputes.

2. The purpose of the RI/FS is to investigate the nature and extent of contamination for the Site, to assess the potential risk to human health and the environment, and to develop and evaluate potential remedial alternatives. The RI and FS are interactive and will be conducted concurrently, to the extent practicable, in a manner that allows information and data collected during the RI to influence the development of remedial alternatives during the FS, which in turn affect additional information and data needs and the scope of any necessary treatability studies and risk assessments.

3. Respondents will conduct the RI/FS and will produce draft RI and FS reports that are in accordance with the UAO. The RI/FS will be consistent with the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (U.S. EPA, Office of Emergency and Remedial Response, October 1988), Guidance for the Data Quality Objectives Process (EPA QA/G-4, August 2000), Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997), and other guidance that EPA uses in conducting an RI/FS (a list of the primary guidance is attached). EPA is aware that not all guidance used for the RI/FS purposes may be applicable to the Site. EPA Project Managers for sites have the authority under the NCP to determine when application of any guidance would be inappropriate. Respondents may raise such guidance issues they consider appropriate during the implementation of the UAO. EPA's decisions regarding guidance applicability will be incorporated into document approval correspondence or in other written correspondence as appropriate.

4. The RI/FS Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA describes the report format and the required report content for the draft RI and FS reports. Respondents will furnish all necessary personnel, materials, and

services needed for, or incidental to, performing the RI/FS, except as otherwise specified in the UAO.

5. At the completion of the RI/FS, EPA will be responsible for the selection of a site remedy and will document this selection in one or more Records of Decision (ROD). The remedial action alternatives selected by EPA will meet the cleanup standards specified in Section 121 of CERCLA, 42 U.S.C. § 9621; the selected remedy will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs), 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, as appropriate under the NCP. The final RI/FS report, as approved by EPA, will, with the administrative record, form the basis for the selection of the Site's remedy and will provide the information necessary to support development of one or more RODs.

Purpose of the Statement of Work

6. This SOW sets forth certain requirements of the UAO for implementation of the Work pertaining to a RI/FS for the Site. The Respondents shall undertake the RI/FS according to the UAO, including, but not limited to, this SOW.

Objectives of the Remedial Investigation/Feasibility Study

7 The objectives of the RI/FS are to investigate the nature and extent of contamination at the Site and to develop and evaluate potential remedial alternatives, in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA, 42 U.S.C. § 9601, et seq.), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan). Specifically, these objectives are to determine the presence or absence, types, and quantities (concentrations) of contaminants; mechanism of contaminant release to pathway(s); direction of pathway(s) transport; boundaries of source(s) and pathway(s); and environmental/public health receptors.

Scope of the Remedial Investigation and Feasibility Study

8. The general scope of the RI/FS shall be to address all contamination at the Site resulting from the hazardous substances present at the Site.

II. PERFORMANCE STANDARDS

9. The Performance Standards for this RI/FS shall include substantive requirements, criteria, or limitations which are specified in the UAO, including, but not limited to, this SOW. Submissions approved by the EPA are an enforceable part of the UAO; consequently, cleanup goals and other substantive requirements, criteria, or limitations which are specified in EPA-approved submissions are Performance Standards. The EPA will use the Performance Standards to determine if the work, including, but not limited to, the RI/FS, has been completed. The Respondents shall ensure that the RI/FS is consistent with the EPA's "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b, hereinafter "the RI/FS Guidance") and other EPA guidance cited herein. If the EPA approves a schedule for any work pursuant to the UAO, the schedule shall supersede any timing requirements established in the RI/FS guidance or other guidance. Likewise, if the EPA, pursuant to the UAO, requires the Respondents to perform certain work at a point in time which is not consistent with the RI/FS guidance or other guidance, the Respondents shall perform the work as specified by the UAO. For example, on page B-2, the RI/FS guidance says that the Field Investigation is complete when the contractors or subcontractors are demobilized from the field; however, if the EPA, pursuant to the UAO, requires the Respondents to perform additional field investigation activities once the contractors or subcontractors have demobilized, the Respondents shall remobilize the contractors or subcontractors and perform the additional work. Except where it is inconsistent with this UAO, as determined by the EPA, the RI/FS guidance and the other EPA guidance cited herein are Performance Standards.

III. ROLE OF THE EPA

10. The EPA's approval of deliverables, including, but not limited to, submissions, is administrative in nature and allows the Respondents to proceed to the next steps in implementing the work of the RI/FS. The EPA's approval does not imply any warranty of performance, that the RI/FS, when completed, will meet Performance Standards, or that the RI/FS will function properly and be ultimately accepted by the EPA. The EPA retains the right to disapprove submissions during the RI/FS. The EPA may disapprove deliverables including, but not limited to, submissions concerning such matters as the contractor selection, plans and specifications, work plans, processes, sampling, analysis and any other deliverables within the context of the UAO. If a submission is unacceptable to the EPA, the EPA may require the Respondents to make modifications in the submission, and the EPA may require the Respondents to do additional work to support those modifications. That is, if a submission reports certain work that is unacceptable to the EPA, the EPA may require the Respondents to modify the submission text and to perform the work until it is acceptable to the EPA. The Respondents shall modify the submission and perform the work as required by the EPA.

IV. RESPONDENTS' KEY PERSONNEL

Respondents' Project Coordinator

1 When necessary, as determined by the EPA, the EPA will meet with the Respondents and discuss the performance and capabilities of the Respondents' Project Coordinator. When the Project Coordinator's performance is not satisfactory, as determined by the EPA, the Respondents shall take action, as requested by the EPA, to correct the deficiency. If, at any time, the EPA determines that the Project Coordinator is unacceptable for any reason, the Respondents, at the EPA's request, shall bar the Project Coordinator from any work under the UAO and give notice of the Respondents' selected new Project Coordinator to the EPA.

V. TASKS TO BE PERFORMED AND DELIVERABLES

Conduct of the Remedial Investigation/Feasibility Study

12. This SOW specifies the Work to be performed and the deliverables which shall be produced by the Respondent. The Respondent shall conduct the RI/FS in accordance with this SOW, UAO, and all applicable guidance that the EPA uses in conducting RI/FS projects under CERCLA, as well as any additional requirements in the UAO. The Respondents shall furnish all personnel, materials, and services necessary for, and incidental to, performance of the RI/FS, except as otherwise specified in the UAO or SOW.

Submittal of Deliverables

13. All draft and final deliverables specified in this SOW shall be provided in hard copy, by the Respondents, to the EPA (three copies), EPA's RI/FS Oversight Contractor (one copy), Texas Commission on Environmental Quality (TCEQ, one copy), and the Natural Resource Trustees[1] (one copy each). Draft and Final deliverables shall be provided in electronic format (specifically, WordPerfect® Version 9.0 [or higher] for Windows™ and Adobe® PDF format [only final deliverables]) to the EPA. Final deliverables shall be provided in hard copy and electronic format (specifically, Adobe® PDF format) to the Information Repository(ies) established for the Site. Additionally, all deliverables specified in this SOW shall be submitted by the Respondent according to the requirements of this SOW and Appendix 1 (Schedule of Deliverables/Meetings).

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[1]The Natural Resource Trustees for the Site have been preliminarily identified as the U.S. Department of the Interior, U.S. Fish and Wildlife Service, United States Geological Survey, National Oceanic and Atmospheric Administration, Texas Commission on Environmental Quality, Texas Parks and Wildlife Department, and Texas General Land Office.

14. All deliverables shall be developed in accordance with the guidance documents listed in Appendix 2[2] (Guidance Documents) to this SOW. If the EPA disapproves of or requires revisions to any of these deliverables, in whole or in part, the Respondents shall submit to the EPA revised plans which are responsive to such directions or comments.

Tasks to be Performed by the Respondents

15. The Respondents shall perform each of the following Tasks (Tasks 1-10) as specified in this SOW. These Tasks shall be developed in accordance with the guidance documents listed in Appendix 2 (Guidance Documents) to this SOW and any additional guidance applicable to the RI/FS process.

Task 1: Project Planning

16. The purpose of Task 1 (Project Planning) is to determine how the RI/FS will be managed and controlled. The following activities shall be performed by the Respondents as part of Task 1:

a. Attend Scoping Phase Meeting - The Respondents shall contact the EPA's Remedial Project Manager after the EFFECTIVE DATE of the UAO to schedule a scoping phase meeting. The ***Scoping Phase Meeting*** shall occur within **fifteen (15) calendar days** after the EFFECTIVE DATE of the UAO. The scoping phase meeting may include, but not be limited to, a discussion of the following:

(i) The proposed scope of the project and the specific investigative and analytical activities that will be required;
Whether there is a need to conduct limited sampling to adequately scope the project and develop project plans;
(iii) Preliminary remedial action objectives;
(iv) Potential remedial technologies and the need for or usefulness of treatability studies;
Potential ARARs associated with the location and contaminants of the Site and the potential response actions being contemplated; and
Whether a temporary Site office should be set up to support Site work.

b. Evaluate Existing Information - The Respondents shall compile and review all existing Site data. The Respondents shall refer to Table 2-1 (Data Collection Information Sources) of the RI/FS Guidance for a list of data collection

[2]Appendix 2 of this SOW does not include all guidance documents that are applicable to the RI/FS for the Site. The Respondent should consult with EPA's Remedial Project Manager for additional guidance and to ensure that these guidance documents have not been superseded.

information sources, and the Respondents shall exhaust all of those sources in compiling the data.

(i) The Respondents shall compile all existing information describing hazardous substance sources, migration pathways, and potential human and environmental receptors. The Respondents shall compile all existing data relating to the varieties and quantities of hazardous substances released on and near the Site. The Respondents shall compile and review all available data relating to past disposal practices of any kind on and near the Site. The Respondents shall compile existing data concerning the physical and chemical characteristics of the hazardous substances, and their distribution among the environmental media (ground water, soil, surface water, sediments, sludges, and air) on and near the Site.

(ii) The Respondents shall compile existing data which resulted from any previous sampling events that may have been conducted on and near the Site. The Respondents shall gather existing data which describe previous responses that have been conducted on and near the Site by local, state, federal, or private parties.

The Respondents shall gather existing information regarding physiography, geology, hydrogeology, hydrology, meteorology, and ecology of the Site.

The Respondents shall gather existing data regarding background ground water, background soil, background surface water, background sediments, and background air characteristics.

The Respondents shall gather existing data regarding demographics and land use.

The Respondents shall gather existing data which identify and locate residential, municipal, or industrial wells on and near the Site. The Respondents shall gather existing data which identify surface water uses for areas surrounding the Site including, but not limited to, downstream of the Site.

The Respondents shall gather existing information describing the flora and fauna of the Site. The Respondents shall gather existing data regarding threatened, endangered, or rare species, sensitive environmental areas, or critical habitats on and near the Site. The Respondent shall compile existing results from any previous biological testing to document any known ecological effect such as acute or chronic toxicity or bioaccumulation in the food chain.

The Respondents shall use data compiled and reviewed to describe additional data needed to characterize the Site, to better define potential applicable or relevant and appropriate requirements (ARARs), and to develop a range of preliminarily identified remedial alternatives.

Task 2: <u>Remedial Investigation and Feasibility Study Work Plan</u>

17 The Respondents shall prepare and submit a ***Draft RI/FS Work Plan*** within **sixty (60) calender days** after the EFFECTIVE DATE of the UAO.

18. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Work Plan*** within **twenty (20) calendar days** after the receipt of the EPA's comments on the Draft Work Plan that is responsive to the directions in EPA's comments.

19. The Respondents shall use information from appropriate EPA guidance and technical direction provided by the EPA's Remedial Project Manager as the basis for preparing the RI/FS Work Plan.

20. The Respondents shall develop the Draft RI/FS Work Plan (WP) in conjunction with the Draft RI/FS Sampling and Analysis Plan (Task 3, RI/FS Sampling and Analysis Plan) and the Draft RI/FS Site Health and Safety Plan (Task 4, RI/FS Site Health and Safety Plan), although each plan may be submitted to the EPA under separate cover. The Draft RI/FS WP shall include a comprehensive description of the Work to be performed, the methodologies to be utilized, and a corresponding schedule for completion. In addition, the Draft RI/FS WP shall include the rationale for performing the required activities.

21 Specifically, the Draft RI/FS WP shall present a statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RI/FS. Furthermore, the Draft RI/FS WP shall include a Site background summary setting forth the Site description which includes the geographic location of the Site, and to the extent possible, a description of the Site's physiography, hydrology, geology, and demographics; the Site's ecological, cultural and natural resource features; a synopsis of the Site history and a description of previous responses that have been conducted at the Site by local, state, federal, or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Site. In addition, the Draft RI/FS WP shall include a description of the site management strategy developed during scoping, and a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. The Draft RI/FS WP shall reflect coordination with treatability study requirements (Task 8, Treatability Studies) and will show a process for and manner of identifying Federal and State chemical, location, and action-specific ARARs.

22. The Draft RI/FS WP shall include a Preliminary Conceptual Site Model (CSM). The CSM is a representation of the site that documents current site conditions. The intent of the CSM is to provide input into the Sampling and Analysis Plans. It identifies possible source areas and affected media, characterizes the distribution of contaminant concentrations across the site, and identifies all potential exposure pathways, migration routes, and potential receptors. The CSM identifies the anticipated future land use,

potential ground water use, and is initially developed from existing site data. The CSM is a key component of the RI/FS and shall be revised as new Site investigations produce updated or more accurate information. Specifically, the CSM will be used to: (1) identify data needs that will be targeted during the RI/FS; (2) identify exposure pathways or contaminates for which current data is useable in terms of quality and quantity, to quantify exposures and assess risk; and (3) develop a preliminary list of potential contaminants of concern.

23. Finally, the major part of the Draft RI/FS WP shall be a detailed description of the Tasks (Tasks 1-10) to be performed, information needed for each Task and for the Baseline Risk Assessments, information to be produced during and at the conclusion of each Task, and a description of the Work products and deliverables that the Respondents will submit to the EPA. This includes the deliverables set forth in the remainder of this SOW; a schedule for each of the required activities which is consistent with this SOW; a project management plan, including a data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management) and reports to the EPA; and meetings and presentations to the EPA at the conclusion of each major phase of the RI/FS. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the RI/FS WP format and the required content.

24. The Respondents are responsible for fulfilling additional data and analysis needs identified by the EPA consistent with the general scope and objectives of this RI/FS. Because of the nature of the Site and the iterative nature of the RI/FS, additional data requirements and analyses may be identified throughout the process. If any significant additional Work is required to meet the objectives stated in the RI/FS WP, based upon new information obtained during the RI/FS, the Respondents shall submit a Draft RI/FS WP Amendment to the EPA for review and approval prior to any additional Work being conducted in accordance with the UAO and SOW. The EPA may, at its discretion, give verbal approval for Work to be conducted prior to providing written approval of the Draft RI/FS WP Amendment.

Task 3: <u>RI/FS Sampling and Analysis Plan</u>

25. The Respondents shall prepare a ***Draft RI/FS Sampling and Analysis Plan (SAP)*** within **sixty (60) calendar days** after the EFFECTIVE DATE of the UAO.

26. The Respondents shall prepare and submit to the EPA a ***Final RI/FS Sampling and Analysis Plan (SAP)*** within **twenty (20) calendar days** after the receipt of the EPA's comments on the draft plan that is responsive to the directions in EPA's comments.

27 The Draft RI/FS SAP shall provide a mechanism for planning field activities and shall consist of an RI/FS Field Sampling Plan and Quality Assurance Project Plan as follows:

a. RI/FS Field Sampling Plan (FSP)- The RI/FS FSP shall define in detail the sampling and data gathering methods that will be used for the project to define the nature and extent of contamination and ecological risk assessment-related studies (Task 7, Risk Assessments). It shall include, but not be limited to, sampling objectives, sample rational, location and frequency, sampling equipment and procedures, and sample handling and analysis. The RI/FS FSP shall contain a completed Sample Design Collection Worksheet and a Method Selection Worksheet. These worksheet templates can be found in the EPA's guidance document titled "Guidance for Data Useability in Risk Assessment" (EPA 1992a). In addition, the FSP shall include a comprehensive description of the Site including geology, location, and physiographic, hydrological, ecological, cultural, and natural resource features of the Site, a brief synopses of the history of the Site, summary of existing data, and information on fate and transport and effects of chemicals. As such, the Respondents shall provide a strategy that includes both biased sampling and random sampling. The human health and ecological risk assessments require that the sampling be conducted to demonstrate that the data are statistically representative of the Site. The Respondents shall also confirm that the detection limits for all laboratories are in accordance within the goals stated in the EPA's risk assessment guidance. The FSP shall consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective. The FSP shall be written so that a field sampling team unfamiliar with the Site would be able to gather the samples and field information required. The Respondents shall refer to EPA's guidance documents titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the RI/FS FSP format and the required content.

b. RI/FS Quality Assurance Project Plan (QAPP) - The RI/FS QAPP shall describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall at a minimum reflect use of analytical methods for identifying contamination and remediating contamination consistent with the levels for remedial action objectives identified in the NCP. In addition, the RI/FS QAPP shall address sampling procedures, sample custody, analytical procedures, data reduction, data validation, data reporting, and personnel qualifications. The Respondents shall refer to EPA's guidance documents titled "EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5" (EPA 1998b) and "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5" (EPA 2001), which describes the RI/FS QAPP format and the required content.

28. The Respondents shall demonstrate in advance, to the EPA's satisfaction, that each analytical laboratory it may use is qualified to conduct the proposed Work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and the DQOs approved in the RI/FS QAPP for the Site by the EPA. The laboratory must have, and follow, an approved QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods shall be used where appropriate. Any methods not consistent with CLP methods shall be approved by EPA prior to their use. Furthermore, if a laboratory not in the CLP program is selected, a laboratory QA program must be submitted to the EPA for review and approval. The EPA may require the Respondents to submit detailed information to demonstrate that the laboratory is qualified to conduct the Work, including information on personnel and qualifications, equipment, and material specifications.

Task 4: <u>RI/FS Site Health and Safety Plan</u>

29. The Respondents shall prepare and submit to the EPA an ***RI/FS Site Health and Safety Plan (HSP)*** within **twenty (20) calendar days** after the EFFECTIVE DATE of this UAO.

30. A HSP that is in compliance with Occupational Safety and Health Administration and EPA requirements must be in place prior to any onsite activities. The EPA will review, but not approve, the RI/FS Site HSP. In addition, EPA may require a revised RI/FS Site HSP to be submitted for review in the event that the RI/FS WP is changed or amended (e.g., such as in the performance of pilot studies which may result in the airborne emissions of hazardous substances from the Site). The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) which describes the RI/FS Site HSP format and the required content.

Task 5: <u>Community Relations Plan</u>

31 The development and implementation of community relations activities, including conducting community interviews and developing a community relations plan, are the responsibilities of EPA. Respondents must assist as required by EPA by providing information regarding the Site's history, preparing meeting visual aids as required, participating in public meetings, dissemination of news releases, and/or by preparing fact sheets for distribution to the general public. In addition, EPA may require that Respondents establish a community information repository at or near the Site to house one copy of the administrative record. The extent of Respondents' involvement in community relations activities is left to the discretion of EPA. Respondents' community

relations responsibilities, if any, are specified in the community relations plan. All community relations activities will be subject to oversight by EPA.

32. The Respondents shall make arrangements for public meetings and workshops as directed by EPA, including, but not limited to, the selection and reservation of a meeting space, and providing the necessary audio-visual equipment including screens, overhead projectors, and computer projectors.

33. The Respondents shall reserve a court reporter for public meetings regarding the Proposed Plan. A full page original and a 3.5 inch computer disk in Word Perfect format, or a CD, of the transcripts shall be provided to EPA (three copies), with additional copies provided to the State and the Site information repository.

Task 6: <u>Site Characterization</u>

34. As part of the Remedial Investigation (RI), the Respondents shall perform the activities described in this Task, including the preparation of a Preliminary Site Characterization Report and a RI Report (Task 9, Remedial Investigation Report). The overall objective of the Site's characterization will be to describe areas of the Site that may pose a threat to human health or the environment. This will be accomplished by first determining the Site's physiography, geology, and hydrology. Surface and subsurface pathways of migration shall be defined by the Respondents. The Respondents shall identify the sources of contamination and define the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents. The Respondents shall also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, Respondents will then determine and project the contaminant fate and transport.

35. The Respondents shall implement the Final RI/FS WP, and SAP during this phase of the RI/FS. Field data will be collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondents shall notify the EPA at least **fourteen (14) calendar days** in advance of the field work regarding the planned dates for field activities, including, but not limited to, ecological field surveys, field layout of the sampling grid, installation of wells, initiating sampling (air, surface water, ground water, sediments, soils, sludges, and biota), installation and calibration of equipment, aquifer tests, and initiation of analysis and other field investigation activities (including geophysical surveys and borehole geophysics). The Respondents shall demonstrate that the laboratory and type of laboratory analyses that will be utilized during the Site's characterization meets the specific QA/QC requirements and the DQOs of the investigation of the Site as specified in the Final RI/FS SAP. Activities are often

iterative, and to satisfy the objectives of the RI/FS, it may be necessary for the Respondents to supplement the Work specified in the Final RI/FS WP.

36. The Respondents shall perform the following activities as part of Task 6 (Site Characterization):

a. Field Investigation - The field investigation shall include the gathering of data to define the Site's physical and biological characteristics, sources of contamination, and the nature, extent, fate, and transport of contamination at the Site. These activities shall be performed by the Respondents in accordance with the Final RI/FS WP and SAP. At a minimum, this field investigation shall address the following:

(i) Implementation and Documentation of Field Support Activities - The Respondents shall initiate field support activities following the Final RI/FS WP and SAP approval by the EPA. Field support activities may include obtaining access to the Site, scheduling, and procurement of equipment, office space, laboratory services, and/or contractors.
Investigation and Definition of Site Physical and Biological Characteristics - The Respondents shall collect data on the physical and biological characteristics of the Site and its surrounding areas including the physiography, geology, hydrology, and specific physical characteristics. This information shall be ascertained through a combination of physical measurements, observations, and sampling efforts, and will be utilized to define potential transport pathways and human and ecological receptor populations (including risks to endangered or threatened species). In defining the Site's physical characteristics, the Respondents shall also obtain sufficient engineering data for the projection of contaminant fate and transport and development and screening of remedial action alternatives, including information to assess treatment technologies.
Surveying and Mapping of the Site - The Respondents shall develop a map of the Site that includes topographic information and physical features on and near the Site. If no detailed topographic map for the Site exists, a survey of the Site shall be conducted.

(iv) Existing Well Inventory and Survey - The Respondents shall inventory and survey existing monitoring, residential, water supply, and industrial wells located within one mile of the Site. At a minimum the well information provided shall include the location, elevation, construction details including total depth and screened interval, aquifer name, use, and lithology (as determined from available well drilling records).

(v) Waste Characterization - The Respondents shall determine the location, type, and quantities as well as the physical or chemical characteristics of any waste remaining at the Site. If hazardous substances are held in

containment vessels, the integrity of the containment structure and the characteristics of the contents shall be determined.

(vi) Definition of Sources of Contamination - The Respondents shall locate each source of contamination. For each location, the areal extent and depth of contamination will be determined by sampling at incremental depths on a sampling grid. The physical characteristics and chemical constituents and their concentrations will be determined for all known and discovered sources of contamination. The Respondents shall conduct sufficient sampling to define the boundaries of the contaminant sources to the level established in the Final RI/FS QAPP and DQOs. Defining the source of contamination shall include analyzing the potential for contaminant release (e.g., long-term leaching from soil), contaminant mobility and persistence, and characteristics important for evaluating remedial actions, including information to assess treatment technologies.
Description of the Nature and Extent of Contamination - The Respondent shall gather information to describe the nature and extent of contamination as a final step during the field investigation. This information shall also include soil contaminant retention capacity and mechanisms, ground water recharge and discharge areas, and ground water flow direction and rate at the Site. To describe the nature and extent of contamination, the Respondents shall implement an iterative sampling and monitoring program, and any study program identified in the Final RI/FS WP or SAP, such that by using analytical techniques sufficient to detect and quantify the horizontal and vertical concentration profiles of any potential contaminants, including any degradation or daughter contaminants, the migration of contaminants through the various media at the Site can be determined.
In addition, the Respondents shall gather data for calculations of contaminant fate and transport.
This process shall be continued until the area and depth of contamination are known, based on validated data, to the level of contamination established in the Final RI/FS QAPP and DQOs. The Respondents shall describe the factors influencing contaminant movement and prepare an extrapolation of future contaminant movement. The information on the nature and extent of contamination will be used to determine the level of risk presented by the Site and to help determine aspects of the appropriate remedial action alternatives to be evaluated.

b. Data Analyses - The Respondents shall analyze the data collected and refine the Conceptual Site Model by presenting and analyzing validated data on source characteristics, the nature and extent of contamination, the transport pathways and

fate of the contaminants present at the Site, and the effects on human health and the environment:

(i) Evaluation of Site Characteristics - The Respondent shall analyze and evaluate the data to describe the Site's physical and biological characteristics, contaminant source characteristics, nature and extent of contamination, and contaminant fate and transport. Results of the Site's physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The evaluation will include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as the mobility and persistence of the contaminants. Where modeling is appropriate, such models shall be identified by the Respondents to the EPA in a ***Technical Memorandum on Modeling of Site Characteristics*** prior to their use. If EPA disapproves of or requires revisions to the technical memorandum, in whole or in part, Respondents shall amend and submit to EPA a revised technical memorandum on modeling which is responsive to directions and EPA comments within **fifteen (15) calendar days** of receipt of EPA's comments. All data and programming, including any proprietary programs, shall be made available to the EPA together with a sensitivity analysis. The RI data shall be presented in a format to facilitate the Respondents' preparation of the Baseline Human Health and Ecological Risk Assessments (Task 7, Risk Assessments). All data shall be archived in a database in a such a format that would be accessible to investigators as needed.

The Respondents shall agree to discuss and then collect information as necessary to address any data gaps identified by the EPA that are needed to complete the risk assessments. Also, this evaluation shall provide any information relevant to the Site's characteristics necessary for evaluation of the need for remedial action in the risk assessments and for the development and evaluation of remedial alternatives. Analyses of data collected for the Site's characterization shall meet the DQOs developed in the Final RI/FS QAPP and stated in the Final RI/FS SAP (or revised during the RI).

c. Data Management Procedures - The Respondents shall consistently document the quality and validity of field and laboratory data compiled during the RI as follows:

(i) Documentation of Field Activities - Information gathered during the Site's characterization shall be consistently documented and adequately recorded by the Respondents in well maintained field logs and laboratory reports. The method(s) of documentation shall be specified in the Final RI/FS WP

and/or the SAP. Field logs shall be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports shall document sample custody, analytical responsibility and results, adherence to prescribed protocols, non-conformity events, corrective measures, and data deficiencies.

(ii) Sample Management and Tracking - The Respondents shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the risk assessments and the development and evaluation of remedial alternatives. Analytical results developed under the Final RI/FS WP shall not be included in any characterization reports of the Site unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent shall establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

d. Site Characterization Deliverables - The Respondent shall prepare the Preliminary Site Characterization Summary Report as follows:

(i) The Respondents shall submit a ***Draft Preliminary Site Characterization (PSC) Report*** to EPA for review and approval within **thirty (30) calendar days** following receipt of all validated sample analytical results from the laboratory.

The Respondents shall submit to the EPA the ***Final Preliminary Site Characterization (PSC) Report*** that is responsive to the directions in EPA's comments within **twenty (20) calendar days** from the receipt of the EPA's comments on the draft report.

The PSC Report shall describe the investigative activities that have taken place, and describe and display the Site's data documenting the location and characteristics of surface and subsurface features and contamination at the Site including the affected medium, location, types, physical state, and concentration and quantity of contaminants. In addition, the location, dimensions, physical condition, and varying concentrations of each contaminant throughout each source, and the extent of contaminant migration through each of the affected media shall be documented. The Draft PSC Report shall provide the EPA and the Respondent with a preliminary reference for developing the Baseline Human Health and Ecological Risk Assessments, evaluating the development and screening of remedial alternatives, and the refinement and identification of ARARs.

Task 7: Risk Assessments

37. The Respondents shall perform a Baseline Human Health Risk Assessment (BHHRA), Screening Level Ecological Risk Assessment, and a Baseline Ecological Risk Assessment (if necessary) for the Site. The Respondent will prepare one section of the Final RI/FS WP (Task 2) which discusses the risk assessment process and outlines the steps necessary for coordinating with the EPA at key decision points within the process. Submittal of deliverables, meetings and/or conference calls, and presentations to the EPA will be reflected in the project schedule in the Final RI/FS WP to demonstrate the progress made on the risk assessments. The DQOs listed within the Final RI/FS QAPP will include DQOs specific to risk assessment needs, and critical samples needed for the risk assessments will be so identified within the Final RI/FS SAP. These risk assessments shall consist of both Human Health and Ecological Risk Assessments as follows:

a. Baseline Human Health Risk Assessment - The Respondents shall perform a BHHRA to evaluate and assess the risk to human health posed by the contaminants present at the Site. The Respondent shall refer to the appropriate EPA guidance documents (EPA 1989b, 1991a, 1991b, 1991c, 1992a, and 1998a) in conducting the BHHRA. The Respondents shall address the following in the BHHRA:

(i) Hazard Identification (sources)/Dose-Response Assessment - After completion of the Preliminary Site Characterization Report, the Respondents shall review available information on the hazardous substances present at the Site and identify the major contaminants of concern. The Respondents, with concurrence from the EPA, shall select contaminants of concern based on their intrinsic toxicological properties. No later than **twenty (20) calendar days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit to EPA for review and approval a ***Draft Potential Chemicals of Concern (PCOC) Memorandum*** listing hazardous substances present at the Site (i.e., chemicals of concern as described in the Risk Assessment Guidance for Superfund).
The Respondents shall submit to the EPA the ***Final Potential Chemicals of Concern (PCOC) Memorandum*** that is responsive to the directions in EPA's comments within **seven (7) calendar days** from the receipt of the EPA's comments on the draft memorandum.
Conceptual Exposure/Pathway Analysis - The Respondents shall identify and analyze actual and potential exposure pathways. The proximity of contaminants to exposure pathways and their potential to migrate into critical exposure pathways shall be assessed.
Characterization of Site and Potential Receptors - The Respondents shall identify and characterize human populations in the exposure pathways.

No later than **thirty (30) calendar days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit a ***Draft Exposure Assessment Memorandum*** to EPA for review and approval.

(vii) The Respondents shall submit a ***Final Exposure Assessment Memorandum*** that is responsive to the directions in EPA's comments within **fifteen (15) calendar days** of receipt of the EPA's comments on the draft memorandum.

During the exposure assessment, the Respondents shall identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for the development of acceptable exposure levels. In developing the exposure assessment, the Respondents shall develop reasonable maximum estimates of exposure for both current land use conditions and potential future land use conditions at the Site. The Exposure Assessment memorandum shall describe the exposure scenarios, assumptions, fate and transport models, and data.

Risk Characterization - During risk characterization, the Respondents shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the Site are affecting or could potentially affect human health. For chemicals lacking an EPA toxicity value, Respondents shall submit to EPA for review and approval a ***Draft Toxicological and Epidemiological Studies Memorandum*** which will list of the toxicological and epidemiological studies that will be used to perform the toxicity assessment. If EPA disapproves of or requires revisions to the toxicological and epidemiological studies memorandum, in whole or in part, Respondents shall amend and submit to EPA a ***Final Toxicological and Epidemiological Studies Memorandum*** which is responsive to the directions in all EPA comments **within fifteen (15) calendar days** of receiving EPA's comments.

Identification of Limitations/Uncertainties - The Respondents shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the BHHRA.

Conceptual Site Model - Based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization, the Respondents shall update the Conceptual Site Model for the Site.

b. No later than **thirty (30) calender days** following receipt of EPA approval of the Final Exposure Assessment Memorandum, the Respondents shall prepare and submit to the EPA for review and approval a ***Draft Baseline Human Health Risk Assessment (BHHRA) Report***.

c. The Respondents shall submit a ***Final Baseline Human Health Risk Assessment (BHHRA) Report*** that is responsive to the directions in EPA's comments within **twenty (20) calendar days** of receipt of the EPA's comments on the draft report.

d. The Respondents shall prepare and submit an Ecological Risk Assessment (ERA) Report that conforms to Ecological Risk Assessment Guidance for Superfund: Process for Designing & Conducting Ecological Risk Assessments, (U.S. EPA, OSWER Directive, No. 9285.7-25, February 1997) and other current EPA guidance, including but not limited to EPA 1989b, EPA 1992a, EPA 1992b, and EPA 1993. The scoping of all phases of the ERA shall follow the general approach provided in EPA 1992b and shall include discussions between the Respondents' and the EPA's risk assessors and risk managers. The eight steps in the Baseline Ecological Risk Assessment (BERA) process include: Step 1 - Screening-Level Problem Formulation and Ecological Effects Evaluation, Step 2 - Screening-Level Preliminary Exposure Estimate and Risk Calculation, and submittal of a Screening Level Ecological Risk Assessment (SLERA) Report, and continues with, if necessary, Step 3 - Baseline Risk Assessment Problem Formulation, Step 4 - Study Design and Data Quality Objectives, and submittal of a ecological risk assessment work plan included with the RI/FS Sampling and Analysis Plan, Step 5 - Field Verification and Sampling Design, Step 6 - Site Investigation and Analysis of Exposure and Effects, Step 7 - Risk Characterization and submittal of the Baseline Ecological Risk Assessment (BERA) Report, and Step 8 - Risk Management. The Respondents shall perform the BERA in accordance with the appropriate EPA's guidance documents (EPA 1992a, 1997, and 1998a). The Respondents shall interact closely with the EPA's Remedial Project Manager and risk assessment staff assigned to the Site to ensure that draft deliverables are acceptable and major rework is avoided on subsequent submittals. The scope of the BERA will be determined via a phased approach as outlined in the EPA's guidance documents and documented in the following deliverables:

(i) Step 1, Screening Level Problem Formulation and Ecological Effects Evaluation - The "Screening Level Problem Formulation and Ecological Effects Evaluation" step is part of the initial ecological risk screening assessment. For this initial step, it is likely that site-specific information for determining the nature and extent of contamination and for characterizing ecological receptors at the Site is limited. This step includes all the functions of problem formulation (Steps 3 and 4) and

ecological effects analysis, but on a screening level. The results of this step will be used in conjunction with exposure estimates during the preliminary risk calculation in Step 2 (Screening-Level Preliminary Exposure Estimate and Risk Calculation).

For the screening level problem formulation, the Respondents shall develop a Conceptual Site Model that addresses these five issues: 1) environmental setting and contaminants known or suspected to exist at the Site, 2) contaminant fate and transport mechanisms that might exist at the Site, 3) the mechanisms of ecotoxicity associated with contaminants and likely categories of receptors that could be affected, 4) the complete exposure pathways that might exist at the Site, and 5) selection of endpoints to screen for ecological risk.

The next step in the initial ecological risk screening assessment will be the preliminary ecological effects evaluation and the establishment of contaminant exposure levels that represent conservative thresholds for adverse ecological effects. Screening ecotoxicity values shall represent a no-observed-adverse-effect-level for long-term exposures to a contaminant. Ecological effects of most concern are those that can impact populations (or higher levels of biological organizations) and include adverse effects on development, reproduction, and survivorship. For some of the data reported in the literature, conversions may be necessary to allow the data to be used for measures of exposure other than those reported. The Respondents shall consult with the EPA's Remedial Project Manager and risk assessors concerning any extrapolations used in developing screening ecotoxicity values.

Step 2, Screening-Level Exposure Estimate and Risk Calculation - The "Screening-Level Exposure Estimate and Risk Calculation" comprises the second step in the ecological risk screening assessment for the Site. Risk is estimated by comparing maximum documented exposure concentrations with the ecotoxicity screening values from Step 1. At the conclusion of Step 2, the Respondents shall decide, with concurrence from the EPA, that either the screening-level ecological risk assessment is adequate to determine that ecological threats are negligible, or the process should continue to a more detailed ecological risk assessment (Steps 3 through 7). If the process continues, the screening-level assessment serves to identify exposure pathways and preliminary contaminants of concern for the BERA by eliminating those contaminants and exposure pathways that pose negligible risks.

(v) To estimate exposures for the screening-level ecological risk calculation, on-site contaminant levels and general information on the types of biological receptors that might be exposed should be known from Step 1. Only complete exposure pathways should be evaluated and the highest measured or estimated on-site contaminant concentration for each

environmental medium should be used to estimate exposures, thereby ensuring that potential ecological threats are not missed.

The Respondents will estimate a quantitative screening-level risk using the exposure estimates developed according to Step 2 and the screening ecotoxicity values developed according to Step 1. For the screening-level risk calculation, the hazard quotient approach, which compares point estimates of screening ecotoxicity values and exposure values, is adequate to estimate risk.

At the end of Step 2, the Respondents shall decide, with concurrence from the EPA, whether the information available is adequate to support a risk management decision. The three possible decisions at this point will be: (1) there is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risk; (2) the information is not adequate to make a decision at this point, and the ecological risk assessment process will continue to Step 3; or (3) the information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted.

(viii) The Respondent shall document the decision and the basis for it in a ***Draft Screening Level Ecological Risk Assessment (SLERA) Report*** and submit it to the EPA for review and approval within **thirty (30) calendar days** after the EFFECTIVE DATE of this UAO.

(ix) The SLERA Report shall identify any bio-accumulative contaminants present at the Site. The list of potentially bio-accumulative contaminants is included in Table 3-1 of Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas (TCEQ), December 2001. Any bio-accumulative contaminants present at the Site shall be carried forward to the BERA if a BERA is necessary.

(x) The Respondents shall submit a ***Final Screening Level Ecological Risk Assessment (SLERA) Report*** that is responsive to the directions in EPA's comments within **fifteen (15) calendar days** of receipt of the EPA's comments on the draft report.

Step 3, Baseline Risk Assessment Problem Formulation - The "Baseline Risk Assessment Problem Formulation" step of the BERA, if necessary, will refine the screening-level problem formulation and expands on the ecological issues that are of concern at the Site. In the screening-level assessment, conservative assumptions are used where site-specific information is lacking. In Step 3, the results of the screening assessment and additional site-specific information are used to determine the scope and goals of the BERA. Steps 3 through 7 will be required only if the screening-level assessment, in Steps 1 and 2, indicated a need for further ecological risk evaluation.

Problem formulation at Step 3 will include the following activities: (a) refining preliminary contaminants of ecological concern; (b) further

characterizing ecological effects of contaminants; (c) reviewing and refining information on contaminant fate and transport, complete exposure pathways, and ecosystems potentially at risk; (d) selecting assessment endpoints; and (e) developing a Conceptual Site Model (CSM) with working hypotheses or questions that the Site investigation will address.
Step 4, Study Design and Data Quality Objective Process - The "Study Design and Data Quality Objective Process" step of the BERA will establish the measurement endpoints which complete the CSM in Step 3. The CSM will then be used to develop the study design and DQOs. The deliverable of Step 4 will be an ecological risk assessment work plan included in the RI/FS Sampling and Analysis Plan (Task 3), which shall describe the CSM, assessment endpoints, exposure pathways, questions and testable hypotheses, measurement endpoints and their relation to assessment endpoints, and uncertainties and assumptions. The ecological work plan shall also include a sampling and analysis plan that describes data needs; scientifically valid and sufficient study design and data analysis procedures; study methodology and protocols, including sampling techniques; data reduction and interpretation techniques, including statistical analyses; and quality assurance procedures and quality control techniques including validation of sample results.
Step 5, Field Verification of Sampling Design - The "Field Verification of Sampling Design" step of the BERA process will ensure that the DQOs for the Site can be met. This step verifies that the selected assessment endpoints, testable hypotheses, exposure pathway model, measurement endpoints, and study design from Steps 3 and 4 are appropriate and implementable at the Site. Step 6 of the BERA process cannot begin until the Final RI/FS Sampling and Analysis Plan is approved by the EPA.
Step 6, Site Investigation and Analysis Phase - The "Site Investigation and Analysis Phase" of the BERA process shall follow the ecological work plan in the Final RI/FS Sampling and Analysis Plan developed in Step 4 and verified in Step 5. The Step 6 results are then used to characterize ecological risks in Step 7.
The ecological work plan, included in the RI/FS Sampling and Analysis Plan, will be based on the CSM and will specify the assessment endpoints, risk questions, and testable hypotheses. During the site investigation, the Respondents shall adhere to the DQOs and to any requirements for co-located sampling. The analysis phase of the BERA process will consist of the technical evaluation of data on existing and potential exposures and ecological effects at the Site. Existing and potential exposure concentrations shall be calculated based on the 95% upper confidence level (UCL) of the mean media concentration, and not the average values. This analysis will be based on the information collected during Steps 1 through 5 and will include additional assumptions or models to interpret

the data in the context of the CSM. Changing field conditions and new information on the nature and extent of contamination may require a change to the RI/FS Sampling and analysis Plan.

(xvii) Step 7 - Risk Characterization - The "Risk Characterization" step is considered the final phase of the BERA process and will include two major components: risk estimation and risk description. Risk estimation is based on the Site investigation results and will consist of integrating the exposure profiles with the exposure-effects information and summarizing the associated uncertainties. The risk description will provide information important for interpreting the risk results and will identify a threshold for adverse effects on the assessment endpoints.

(xviii) No later than **sixty (60) calender days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit to EPA for review and approval a ***Draft Baseline Ecological Risk Assessment (BERA) Report.***

(xix) The Respondents shall submit a Final ***Baseline Ecological Risk Assessment (BERA) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.

(xx) Step 8 - Risk Management - "Risk Management" at the Site will be the responsibility of the EPA's Remedial Project Manager, who must balance risk reductions associated with cleanup of contaminants with potential impacts of the remedial actions themselves. In Step 7, a threshold for effects on the assessment endpoint as a range between contamination levels identified as posing no ecological risk and the lowest contamination levels identified as likely to produce adverse ecological effects will be identified. In Step 8, the EPA's Remedial Project Manager will evaluate several factors in deciding whether or not to clean up to within that range. This risk management decision will be finalized by the EPA in the Record of Decision for the Site.

Task 8: <u>Treatability Studies</u>

38. Treatability testing shall be performed, if required by EPA, by the Respondents to assist in the detailed analysis of alternatives. In addition, if applicable, testing results and operating conditions shall be used in the detailed design of the selected remedial technology. The following activities shall be performed by the Respondents:

a. Determination of Candidate Technologies and of the Need for Testing - The Respondents shall identify the candidate technologies for a treatability studies program. Treatability studies may consist of laboratory screening, bench-scale testing, and/or pilot-scale testing. The listing of candidate technologies will cover the range of technologies required for alternatives analysis. The specific data

requirements for the testing program will be determined and refined during the characterization of the Site and the development and screening of remedial alternatives. The Respondent shall perform the following activities:

(i) Conduct of Literature Survey and Determination of the Need for Treatability Testing - The Respondents shall conduct a literature survey to gather information on performance, relative costs, applicability, removal efficiencies, operation and maintenance requirements, and implementability of candidate technologies. If practical technologies have not been sufficiently demonstrated or cannot be adequately evaluated for this Site on the basis of available information, treatability testing may need to be conducted. Where it is determined by the EPA that treatability testing is required, and unless the Respondents can demonstrate to the EPA's satisfaction that they are not needed, the Respondents shall be required to submit a Treatability Study Work Plan to the EPA proposing the type(s) of treatability study to be conducted (i.e., laboratory screening, bench-scale testing, and/or pilot-scale testing), and outlining the steps and data necessary to initiate and evaluate the treatability testing program.
The Respondents shall submit a ***Draft Treatability Study (TS) Work Plan***, which includes a Sampling and Analysis Plan (SAP) and Health and Safety Plan, within **thirty (30) calendar days** after the receipt of the notice from the EPA that treatability studies are required.
The Respondents shall submit a ***Final Treatability Study (TS) Work Plan*** that is responsive to the directions in EPA's comments within **twenty (20) calendar days** of the receipt of the EPA's comments on the draft work plan.

(iv) The Respondents shall submit a ***Draft Treatability Study (TS) Report*** to the EPA for review and approval according to the project schedule in the Final Treatability Study Work Plan.

(v) The Respondents shall submit a ***Final Treatability Study (TS) Report*** that is responsive to the directions in EPA's comments within **twenty (20) calendar days** of the receipt of the EPA's comments on the draft report. This Report shall evaluate the technology's effectiveness and implementability in relation to the Preliminary Remediation Goals established for the Site. Actual results must be compared with predicted results to justify effectiveness and implementability discussions.

Task 9: <u>Remedial Investigation Report</u>

39. No later than **sixty (60) calendar days** following receipt of EPA approval of the PSC Report, the Respondents shall prepare and submit a ***Draft Remedial Investigation (RI) Report***.

40. The Respondents shall submit a ***Final Remedial Investigation (RI) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.

4 The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) and shall specifically follow Table 3-13 (Suggested RI Report Format) for the RI Report format and the required content. The information shall include a summary of the results of the field activities to characterize the Site, classification of ground water beneath the Site, nature and extent of contamination, and appropriate site-specific discussions for fate and transport of contaminants.

42. The Respondents shall conduct a presentation to the EPA within **fifteen (15) calendar days** following submission of the Final RI Report. At this presentation, the Respondents shall present and discuss the findings of the RI, Remedial Action Objectives, candidate technologies and remedy alternatives envisioned for the FS, and the comparative analysis.

Task 10: <u>Feasibility Study</u>

43. The Respondents shall perform a Feasibility Study (FS) as specified in this SOW. The FS shall include, but not be limited to, the development and screening of alternatives for remedial action, a detailed analysis of alternatives for remedial action, submittal of Draft and Final FS Reports, and other reports/memoranda as follows:

44. No later than **thirty (30) calendar days** following receipt of EPA approval of the Final PSC Report, the Respondents shall submit a ***Draft Remedial Alternatives Memorandum*** to the EPA for review and approval.

45. The Respondents shall submit a ***Final Remedial Alternatives Memorandum*** that is responsive to the directions in EPA's comments within **fifteen (15) calendar days** of the receipt of the EPA's comments on the draft memorandum.

a. The Respondents shall develop an appropriate range of remedial alternatives that will be evaluated through development and screening. The Remedial Alternatives Memorandum shall summarize the assembled alternatives for each affected medium and the chemical, location, and action-specific ARARs for each of the considered alternatives. The reasons for eliminating alternatives during the preliminary screening process shall be specified.

b. The Remedial Alternatives Memorandum shall summarize the results of the screening process in relation to the Remedial Action Objectives and the more specific Preliminary Remediation Goals for the Site.

46. No later than **forty five (45) calendar days** after receipt of EPA approval of the Final RI Report, the Respondents shall submit to EPA for review and approval a ***Draft Feasibility Study (FS) Report.***

47. The Respondents shall submit a ***Interim-Final Feasibility Study (FS) Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of the EPA's comments on the draft report.

48. The Respondents shall refer to the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b), specifically Table 6-5 (Suggested FS Report Format) for FS Report content and format.

49. The FS Report shall include a detailed analysis of remedial alternatives for the candidate remedies identified during the screening process. This detailed analysis shall follow the EPA's guidance document titled "Interim Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (EPA 1988b) and other appropriate guidance documents. The major components of the analysis of alternatives for remedial action shall consist of an analysis of each option against a set of evaluation criteria and a separate discussion for the comparative analysis of all options with respect to each other in a manner consistent with the NCP. The Respondents shall not consider state and community acceptance during the analysis of alternatives. The EPA will perform the analysis of these two criteria.

    The nine evaluation criteria used to evaluate the different remediation alternatives individually and against each other in order to select a remedy include the following:

    a. Overall protection of human health and the environment;
    b. Compliance with ARARs;
    c. Long-term effectiveness and permanence;
    d. Reduction of toxicity, mobility, or volume;
    e. Short-term effectiveness;
    f. Implementability;
    g. Cost;
    h. State acceptance; and
    i. Community acceptance.

    The FS Report shall provide the basis for the Proposed Plan developed by the EPA under CERCLA and shall document the development and analysis of remedial alternatives. The Interim-Final FS Report may be subject to change following comments received during the public comment period on the EPA's Proposed Plan. The EPA will forward any comments pertinent to the content of the Interim-Final FS Report to the Respondents.

The Respondents shall submit a ***Final FS Report*** that is responsive to the directions in EPA's comments within **thirty (30) calendar days** of the receipt of these comments.

APPENDIX 1

SCHEDULE OF DELIVERABLES/MEETINGS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
1. Scoping Phase Meeting	Meeting to occur within fifteen (15) days after the EFFECTIVE DATE of the UAO.
2. RI/FS Site Health and Safety Plan	Plan due within twenty (20) days after the EFFECTIVE DATE of the UAO. Plan must be in place prior to any onsite activities.
3. Screening Level Ecological Risk Assessment (SLERA) Report	Draft due within thirty (30) days after the EFFECTIVE DATE of the UAO. Final due within fifteen (15) days of the receipt of the EPA's comments.
4. RI/FS Work Plan	Draft due within sixty (60) days after the EFFECTIVE DATE of the UAO. Final due within twenty (20) days after the receipt of the EPA's comments.
5. RI/FS Sampling and Analysis Plan	Draft due within sixty (60) days after the EFFECTIVE DATE of the UAO. Final due within twenty (20) days after the receipt of the EPA's comments.
6. Technical Memorandum on Modeling of Site Characteristics.	Draft due when Respondents propose that modeling is appropriate. Final due within fifteen (15) days after receipt of the EPA's comments.
7. Preliminary Site Characterization (PSC) Report	Draft due within thirty (30) days after receipt of all validated laboratory data. Final due within twenty (20) days of the receipt of the EPA's comments.
8. Potential Chemicals of Concern (PCOC) Memorandum	Draft due within twenty (20) days after receipt of EPA approval of Final PSC Report. Final due within seven (7) days of the receipt of the EPA's comments.
9. Exposure Assessment Memorandum	Draft due within thirty (30) days after receipt of EPA approval of Final PSC Report. Final due within fifteen (15) days of the receipt of the EPA's comments.
10. Toxicological and Epidemiological Studies Memorandum.	Draft due as specified in the Final RI/FS Work Plan. Final due within fifteen (15) days of the receipt of the EPA's comments.

DELIVERABLES/MEETINGS	DUE DATES (CALENDAR DAYS)
11. Baseline Human Health Risk Assessment Report	Draft due within thirty (30) days after receipt of EPA approval of Final Exposure Assessment memorandum. Final due within twenty (20) days of the receipt of the EPA's comments.
12. Baseline Ecological Risk Assessment Report	Draft due within sixty (60) days after receipt of EPA approval of Final PSC Report. Final due within thirty (30) days of the receipt of the EPA's comments.
13. Treatability Study Work Plan	Draft due within thirty (30) days of the receipt of EPA's notice that treatability studies are required. Final due within twenty (20) days of the receipt of the EPA's comments.
14. Treatability Study Report	Draft due as specified in the Final Treatability Study Work Plan. Final due within twenty (20) days of the receipt of the EPA's comments.
15. Remedial Investigation (RI) Report	Draft due within sixty (60) days after receipt of EPA approval of Final PSC Report. Final due within thirty (30) days of the receipt of the EPA's comments.
16. Presentation to the EPA	Within fifteen (15) days after submission of the Final RI Report.
17. Remedial Alternatives Memorandum	Draft due within thirty (30) days after receipt of EPA approval of Final PSC Report. Final due within fifteen (15) days of the receipt of the EPA's comments.
18. Draft and Interim-Final Feasibility Study (FS) Report	Draft due within forty five (45) days after receipt of EPA approval of Final RI Report. Interim-Final due within thirty (30) days of the receipt of the EPA's comments.
19. Final Feasibility Study Report	Due thirty (30) days after receipt of EPA comments following public comment period.
20. Monthly Progress Reports	Initially due as specified in the RI/FS Work Plan. Thereafter, due by the tenth day of the following month.

APPENDIX 2

GUIDANCE DOCUMENTS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

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

1. The (revised) National Contingency Plan

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

3. "Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies," U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

4. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume I" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.31(c).

5. "Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies, Volume II" U.S. EPA, Office of Waste Programs Enforcement, July 1, 1991, OSWER Directive No. 9835.1(d).

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

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

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

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

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

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

"Guidance for Quality Assurance Project Plans (QA/G-5)" (EPA 600/R-98/018, Febraruy1998).

13. "User's Guide to the EPA Contract Laboratory," U.S. EPA, Sample Management Office, January 1991, OSWER Directive No. 9240.0-01D

14. "CERCLA Compliance with Other Laws Manual," Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234.1-01 and -02.

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

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

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

18. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B), Development of Risk-Based Preliminary Remediating Goals." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01B. December 1991.

19. "Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part C), Risk Evaluation of Remedial Alternatives." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-01C. 1991.

20. "Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors." Office of Emergency and Remedial Response. OSWER Directive No. 9235.6-03, March 1991.

21. "Guidance for Data Useability in Risk Assessment." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-09A. April 1992 (and Memorandum from Henry L. Longest dated June 2, 1992).

"Supplemental Guidance to RAGS: Calculating the Concentration Term." Office of Emergency and Remedial Response. OSWER Directive No. 9285.7-081. May 1992.

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

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

25. "Performance of Risk Assessments in Remedial Investigation/Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs),"August 28, 1990, OSWER Directive No.9835.15.

"Supplemental Guidance on Performing Risk Assessments in Remedial Investigation Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)," July2, 1991, OSWER Directive No. 9835.15(a).

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

28. "Health and Safety Requirements of Employed in Field Activities," U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December19, 1986).

30. "Interim Guidance on Administrative Records for Selection of CERCLA Response Actions," U.S. EPA, Office of Waste Programs Enforcement, March1,1989, OSWER Directive No. 9833.3A.

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

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

"Guidance for Conducting Ecological Risk Assessments at Remediation Sites in Texas," TCEQ, December 2001.

APPENDIX 3

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
GULFCO MARINE MAINTENANCE SUPERFUND SITE

A preliminary list of probable Applicable or Relevant and Appropriate Requirements (ARARs) will be generated by the Respondents during the Remedial Investigation and Feasibility Study process. This list will be compiled according to established EPA guidance, research of existing regulations, and collection of site-specific information and data. Three types of ARARs will be identified:

1 Chemical-Specific ARARs: These ARARs are usually health or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment (e.g., maximum contaminant levels that establish safe levels in drinking water).

2. Location-Specific ARARs: These ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various Federal laws include flood plains, wetlands, and locations where endangered species or historically significant cultural resources are present.

3. Action-Specific ARARs: These ARARs are usually technology or activity-based requirements or limitations on actions or conditions involving specific substances.

Chemical and location-specific ARARs are identified early in the process, generally during the site investigation, while action-specific ARARs are usually identified during the Feasibility Study in the detailed analysis of alternatives.