UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

JUN 19 1991

Mr. Robert H. Malott
Chief Executive Officer
FMC Corp.
200 E. Randolph Dr.
Chicago, Illinois 60601

Re: FMC Corporation
RCRA Section 3008(h) Order on Consent
EPA ID No. NYD002126845

Dear Mr. Malott:

Enclosed is your copy of the Final Administrative Order on Consent ("Order") being issued to FMC Corp. by the U.S. Environmental Protection Agency ("EPA"), Region II, pursuant to Section 3008(h) of RCRA, as amended, and by the New York State Department of Environmental Conservation ("NYSDEC"), pursuant to Section 71-2727(3) of the Environmental Conservation Law (ECL).

I am pleased that we have been able to arrive at an agreement that will enable us to identify and address environmental problems at the FMC Middleport Facility. The finalization of this Consent Order will allow us to proceed forward, in a unified effort between EPA, NYSDEC, and FMC, without the inefficient expenditure of time and resources which would have been necessary if the unilateral order had remained.

Should you have any question concerning this Order or its requirements, please contact Mr. Philip Flax of my staff at (212)264-5974.

Sincerely yours,

Conrad Simon, Director
Air and Waste Management Division

Enclosure

cc: Mark Diamond
Health, Safety, and Environmental Affairs Manager
FMC Corp. (w/encl.)

George C. Meyer, Chief
Hazardous Waste Compliance Branch
EPA, Region II (w/encl.)

Andrew Bellina, Chief
Hazardous Waste Facilities Branch
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Christopher Allen, Environmental Engineer II
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Andrew Carlson
New York State Department of
Health (w/encl.)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION II;
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

IN THE MATTER OF:	
FMC Corporation 100 Niagara Street Middleport, N.Y. 14105	ADMINISTRATIVE ORDER ON CONSENT
EPA I.D. No. NYD002126845	DOCKET No.II RCRA-90-3008(h)-0209
RESPONDENT.	Proceeding under Section 3008(h), of the Resource Conservation and Recovery Act, as amended, and Section 71-2727(3) of the New York State Environmental Conservation Law.

Table of Contents

Table of Contents cont...

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION II;
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

IN THE MATTER OF: FMC Corporation 100 Niagara Street Middleport, N.Y. 14105	ADMINISTRATIVE ORDER ON CONSENT
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RESPONDENT.	Proceeding under Section 3008(h), of the Resource Conservation and Recovery Act, as amended, and Section 71-2727(3) of the New York State Environmental Conservation Law.

I. Preliminary Statement

This Administrative Order on Consent ("Order") is being issued to FMC Corporation, 100 Niagara Street, Middleport, N.Y. ("Respondent") pursuant to the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984, codified at 42 U.S.C. § 6901 et seq. ("the Act"), and pursuant to Section 71-2727(3) of the New York State Environmental Conservation Law (the "ECL").

Section 3008(h) of the Act, 42 U.S.C. § 6928(h), authorizes the Administrator of the United States Environmental Protection Agency ("EPA") to issue an order requiring corrective action, or

such other response which he deems necessary to protect human health or the environment, if, on the basis of any information, he determines that there is or has been a release of hazardous waste or hazardous constituents into the environment from a facility that is or was authorized to operate under Section 3005(e) of the Act, 42 U.S.C. § 6925(e). The authority vested in the Administrator has been delegated to the Regional Administrators by EPA Delegation Number 8-31 dated April 16, 1985. This authority has been further delegated by the Regional Administrator of EPA, Region II, to the Director of the Air and Waste Management Division of EPA, Region II, by Region II Delegation Number 8-32, effective July 1, 1987.

Section 71-2727 of the ECL authorizes the Commissioner of the New York State Department of Environmental Conservation ("NYSDEC" or "DEC") to issue orders requiring corrective action. Such orders may require corrective action beyond the facility boundary when necessary to protect human health and the environment. Such orders may be issued for all releases of hazardous waste or hazardous constituents from any solid waste management unit at any treatment, storage, or disposal facility which has interim status regardless of the time at which the waste was placed in the unit.

II. Parties Bound

1. This Order, and the responsibilities and obligations it imposes, shall apply to and bind the Respondent and its agents, trustees, receivers, successors, assigns, and all other legal entities including, but not limited to, firms, corporations, subsidiaries, contractors, subcontractors, or consultants who act for, are owned by, or are in an agency relationship with the Respondent and who conduct, monitor, or perform any work pursuant to this Order. Respondent's agents will, however, only be responsible for those specific terms of this Order which the agent has been engaged, authorized, or directed by Respondent to perform.

2. Except as provided in Section II, ¶5 of this Order, regardless of Respondent's employ of, or contractual agreement with, any person or legal entity, the Respondent remains ultimately liable for failure to carry out, or comply with, any term or condition imposed by this Order. Nothing in this paragraph or Order shall impair Respondent's right to indemnity, insurance, or contribution from a third party for the cost of complying with this Order.

3. All contractual agreements entered into by Respondent aimed at satisfying its responsibilities or obligations under this Order shall strictly comply with the terms and conditions of this

Order. In addition, Respondent shall, within one week of the effective date of this Order and immediately upon hiring, whichever is later, provide a copy of this Order and any relevant attachments, to all contractors, subcontractors, laboratories, consultants, or any entity directly retained by Respondent to conduct, monitor or perform any work pursuant to this Order.

4. Respondent shall give notice, and a copy of this Order, to any successor in interest prior to any transfer of ownership or operation of the Facility (as defined in Section IV below) and shall notify EPA's designated contact thirty (30) days prior to any such transfer. (Days are meant to be calendar days for purposes of this Order unless otherwise expressly specified in this Order.)

5. No change in the Respondent's corporate form or in the ownership of the "Facility" (as defined in Section IV below) shall in any way alter or abrogate Respondent's responsibility and obligation to carry out all the terms and conditions of this Order. However, Respondent may transfer the obligations of this Order to a new owner/operator of the Facility, if the new owner/operator demonstrates to EPA's satisfaction that the new owner/operator is capable of undertaking these obligations and has expressly agreed to do so in writing, and EPA approves such transfer.

III. Statement of Purpose

This Order is being issued to protect human health and the environment from releases of hazardous waste, as defined by Section 1004(5) of the Act, 42 U.S.C. § 6903(5), 40 C.F.R. Part 261.3, ECL § 27-0901(3), and 6 NYCRR Part 371, and hazardous constituents, as listed in 40 C.F.R. Part 261 Appendix VIII, and 6 NYCRR Part 371, Appendix 23, at or from Respondent's Facility. The Order requires, at a minimum, Interim Corrective Measures, and the performance by Respondent of a RCRA Facility Investigation ("RFI"), to determine fully the nature and extent of any release(s) of hazardous waste and/or hazardous constituents from the Facility into the environment and to gather necessary data to support the Corrective Measures Study, if one is deemed necessary.

If, as a result of the RFI, EPA determines that additional work is necessary to protect human health or the environment, the Respondent shall conduct a Corrective Measures Study ("CMS") to develop and evaluate a corrective measure alternative or alternatives and to recommend the final corrective measure or measures. EPA's determinations concerning the need to perform additional work and/or to perform a CMS are subject to the dispute resolution provisions of Section XXIX of this Order.

The Order also requires the development and implementation of a groundwater monitoring program for the Facility in compliance with federal and state requirements. It also provides for the use of the western surface impoundment as an interim corrective measure subject to certain conditions and postpones closure of the eastern and western surface impoundments pending completion of the RFI and, if EPA determines that one is necessary, the CMS.

IV. EPA/NYSDEC Findings of Fact

1. Respondent is a Corporation:

Respondent is a corporation doing business in the State of New York.

2. Respondent is a Generator and an Owner/Operator of a Hazardous Waste Storage Facility:

Respondent is a "generator" of "hazardous waste" and the "owner" and "operator" of an interim status hazardous waste "storage" "facility", as those terms are defined at 40 C.F.R. § 260.10 and 6 NYCRR § 370.2, located at 100 Niagara Street, Middleport, New York 14105, hereinafter "the Facility" or "Respondent's Facility". "Facility", as defined in 40 C.F.R. 260.10 and 6 NYCRR § 370.2, means all contiguous land, and structures, other appurtenances, and improvements on the land, used for treating, storing, or disposing of hazardous waste. A Facility

may consist of several treatment, storage, or disposal operational units (e.g., one or more landfills, surface impoundments, container storage areas, or any combination thereof).

3. Respondent is a "Person":

Respondent is a "person" as defined by Section 1004(15) of the Act, 42 U.S.C. § 6903(15) and 6 NYCRR § 370.2(b)(122).

4. Notification:

Pursuant to Section 3010 of the Act, 42 U.S.C. § 6930, on August 18, 1980, Respondent notified EPA that it managed "hazardous waste", as that term is defined by Section 1004(5) of the Act, 42 U.S.C. § 6903(5), at the Facility located at 100 Niagara Street, Middleport, New York 14105. In this notification Respondent identified itself as a generator of hazardous wastes and an owner and operator of a hazardous waste storage (TSD) Facility.

5. Part A Permit Application:

Pursuant to Section 3005(e) of the Act, 42 U.S.C. §6925(e), Respondent submitted on November 19, 1980 to EPA Part A of its Hazardous Waste Permit Application. On November 8, 1985, Respondent submitted a revised Part A Hazardous Waste Permit

Application. On the revised Part A application, Respondent stated that it managed the following hazardous wastes at the Facility:

a) Ignitable waste (D001).

b) Corrosive waste (D002).

c) Reactive waste (D003).

d) Arsenic (D004).

e) Chromium (D007).

f) Lead (D008).

g) Lindane (1,2,3,4,5,6- hexa-chlorocyclohexane, gamma isomer) (D013).

h) Spent halogenated solvents containing tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, orthodichlorobenzene, trichlorofluoromethane, or 1,1,2-trichloroethane (F002).

i) Spent non-halogenated solvents containing xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone or methanol (F003).

j) Spent non-halogenated solvents containing toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyetnanol or 2-nitropropane

(F005).

k) Arsenic (III) oxide (P012)

l) Thiophenol (P014)

m) Carbon disulfide (P022)

n) Disulfoton (P039)

o) Endosulfan (P050).

p) Heptachlor (P059).

q) Methyl isocyanate (P064)

r) Methyl Parathion (P071)

s) Parathion (P089)

t) Acetone (U002)

u) Acetonitrile (U003)

v) Benzene (U019)

w) Chlordane (U036)

x) Chloroform (U044)

y) Cyclohexane (U056)

z) Dichloro-diphenyl-dichloroethane (DDD) (U060)

aa) Dichloro-diphenyl-trichloroethane (DDT)(U061)

bb) Dibutyl phthalate (U069)

cc) Methylene Chloride (U080).

dd) Ethyl acetate (U112)

ee) Carbamodithioic acid, 1,2-ethanediylbis-, salts and-esters (U114).

ff) Ethylene thiourea (U116)

gg) Formic acid (U123)

hh) Lindane (U129)

ii) Lead acetate (U144)

jj) Mercury (U151)

kk) Methanol (U154)

ll) Naphthalene (U165)

mm) Phenol (U188)

nn) Pyridine (U196)

oo) Resorcinol (U201)

pp) Carbon tetrachloride (U211)

qq) Toluene (U220)

rr) 1,1,1-Trichloroethane (U226)

ss) Xylene (U239)

tt) Bis(dimethylthiocarbamyl) disulfide (U244)

The revised Part A application indicated that these wastes were variously being handled in three (3) surface impoundments (Process Code S04) and five (5) container storage areas (Process Code S01). The Respondent has informed EPA that the substances identified in paragraphs c, k, l, m, n, r, u, v, x, y, bb, dd, ee, ff, gg, ii, jj, ll, mm, nn, oo, pp, qq, and tt were not produced by plant processes; they were handled at the Facility only as part of laboratory packages.

6. Interim Status:

Pursuant to Section 3005(e) of the Act, 42 U.S.C. and 40 C.F.R. §§ 270.1(b) and 270.70(a), Respondent received "interim status" due to timely submission of its:

a) Section 3010 notification; and

b) Part A of the Permit Application.

Interim status facilities are subject to the regulations promulgated pursuant to Sections 3004 and 3005 of the Act, 42 U.S.C. §§ 6924 and 6925, which were codified in 40 C.F.R. Parts 265, 268 and 270, and similar regulations promulgated by New York State.

On August 2, 1985, EPA determined that three collection and retention basins located at the Middleport Facility were surface impoundments as defined at 40 C.F.R. 260.10, and that arsenic contaminated run-off was a solid waste as defined at 40 C.F.R. 261.2(a)(1) and became a hazardous waste due to EP toxic levels of arsenic pursuant to 40 C.F.R. 261.3, once it was collected in one of FMC's surface impoundments. Therefore, FMC's collection of the arsenic contaminated runoff was a hazardous waste management activity subject to regulation under RCRA.

In its November 8, 1985, revised Part A Hazardous Waste Permit application, Respondent indicated that in addition to the hazardous waste described in Respondent's November 19, 1980 Part A application the Facility annually generated 43,000,000 gallons of D004 waste. The Part A application identified this hazardous waste stream as being stored at the Facility in the three surface impoundments (Process Code S04).

7. Facility Description:

Respondent's Facility encompasses approximately 104 acres within the village of Middleport and is proximate to two schools of the Royalton-Hartland School District to the north and northeast and to residential properties which border the Facility to the west. Respondent's Facility consists of the real property depicted on the map which is attached to this Order as Appendix A. Respondent has owned and operated the Middleport Facility since 1943 when FMC obtained controlling interest of the Facility from Niagara Sprayer and Chemical Company. Plant production of dry insecticides containing calcium arsenate and lead arsenate began in 1921. By 1928 the Facility manufactured a variety of inorganic based insecticides in both wet and dry forms. In 1944 or 1945, the plant began producing organic based insecticides, pesticides and fungicides. Two of the major organic product types produced in the 1960s and 1970s were dithiocarbamates and carbofuran.

A RCRA Facility Assessment (RFA), conducted by the New York State Department of Environmental Conservation in 1988, identified a total of fifty-three (53) Solid Waste Management Units (SWMUs) at the Facility. Eight (8) of these SWMUs are Hazardous Waste Management Units (HWMUs) which operate or operated under RCRA. These eight units include or included five (5) container storage areas and three (3) surface impoundments. These surface impoundments are referred to as the Eastern Surface Impoundment ("ESI"), the Central Surface Impoundment ("CSI") and the Western Surface Impoundment ("WSI"). The ESI and WSI have undergone temporary closure steps under NYSDEC's direction. Respondent has certified the closure of the CSI pursuant to New York State regulations.

In addition, at the Facility there were two large above-ground storage tanks which had been previously used for the storage of methylene chloride. These tanks were located approximately fifty (50) feet east of Building # 70 in the east-central area of the Facility, and were used until 1985 to store methylene chloride product which was utilized in the Facility processes. According to the Respondent, the tanks have been removed from service, rinsed, and are no longer in use at the Facility.

8. Description of Hydrogeologic Setting:

The Facility is located in an area whose topography is characterized as generally gently rolling relief in the southeastern corner of the Village of Middleport. A surface water drainage divide runs east to west on the Facility. The Facility is underlain by a geological sequence consisting of a thin layer of glacial deposits overlying a sedimentary bedrock sequence. The glacial sediments range in thickness from three (3) to fifteen (15) feet and consist mainly of clay and sandy silts interbedded with sandy lenses. The bedrock consists of a Silurian sequence of limestones, shales, and sandstones. The limestone forms the uppermost portion of the sequence and ranges in thickness from four (4) to twenty three (23) feet. This limestone unit is underlain by a thin shale layer which is discontinuous throughout the Facility. Underlying this sequence is a thick sandstone unit which is at least eighty (80) feet thick. These bedrock units are highly fractured and contain both horizontal bedding plane and vertical fractures. The predominant vertical fracture sets trend in a northeast to southwest direction and in a northwest to southeast direction conforming with the regional strike and dip. The hydraulic conductivity of the glacial deposits is relatively low in comparison to that of the highly fractured bedrock.

The fracture system is the main control on the flow of groundwater. The general direction of groundwater flow is to the north-northwest at the Facility. However, groundwater level data from the eastern portion of the Facility suggest that mounding may be occurring in this area resulting in a reversal of groundwater flow there. Hydraulic conductivities which have been measured for these units range from 1×10^{-5} to 1×10^{-3} centimeters per second (cm/sec) and may be even higher in areas of concentrations of large bedrock fractures.

The region's climate is classified as humid continental, consisting of cool-wet winters and hot-wet summers. The mean annual precipitation measures 35.71 inches and the mean annual temperature is 47.8°F.

9. Documentation of Release:

An extensive examination of documents submitted by Respondent and/or pertaining to Respondent's Facility reveals that releases of hazardous wastes and/or hazardous constituents have occurred at the Facility. These releases have occurred from either RCRA-regulated hazardous waste management units or other solid waste management units (SWMUs) located throughout the Facility or both. The effect of these releases has been contamination of the groundwater and soil.

(A) GROUNDWATER CONTAMINATION

Between 1979 and 1986 a total of 79 monitoring wells were installed at and around the Facility for the purpose of determining the presence of groundwater contamination and for the investigation of contamination. The extraction of groundwater samples for chemical analyses has been conducted using these monitoring wells on a number of occasions. The analyses of these samples from the groundwater monitoring wells have revealed the presence of the following constituents: 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichloroethane, 1,4-dichlorobenzene, benzene, chlorobenzene, ethylbenzene, m-xylene, o-xylene, p-xylene, methylene chloride, trans-1,2-dichloroethene, 1,1,1-trichloroethane, 1,1-dichloroethane, tetrachloroethylene, chloroform, toluene, trichloroethene, 1,1-dichloroethene, 2-butanone, 4-methyl-2-pentanone, trichlorofluoromethane, 2-methylphenol, isophorone, phenol, acetone, bis(2-chloroisopropyl)ether, 2,4-dimethylphenol, 2,4-dichlorophenol, 1,2,4-trichlorobenzene, naphthalene, diethylphthalate, 2-methylnaphthalene, fluorene, 7-hydroxybenzofuran, carbofuran, alpha-BHC, beta-BHC, delta-BHC, lindane, endosulfan II, aldrin, 4,4-DDT, 4,4-DDE, 4,4-DDD, arsenic, lead, 2,4-D, barium, mercury, selenium, chromium, cadmium, boron, cyanide, 2,4,5-TP(Silvex), 2,4,5-T, ammonia, heptachlor, heptachlor epoxide, trifluralin,

dichlorodifluoromethane, 1,1,2,2-tetrachloroethane, vinyl chloride, and bis(2-ethylhexyl)phthalate.

A library search analysis was performed on groundwater samples collected by NYSDEC staff in March, 1987. The analysis revealed the presence of several tentatively identified compounds in addition to those listed above.

The concentration levels of the contaminants identified through sampling and analysis of the groundwater at the Facility ("sampling events"), from 1979 to 1987, have been compared to several standard levels which have been established to be protective of human health and the environment. These standards included the Maximum Contaminant Levels (MCLs), which were promulgated under the Federal Safe Drinking Water Act (SDWA), which established the highest concentrations of contaminants which can be present in water used as a drinking water supply; MCLs promulgated by New York State in Title 10 of New York Code of Rules and Regulations (NYCRR), Part 5, Chapter I - State Sanitary Code, Drinking Water Supplies, which defines the maximum permissible level of a contaminant which is present in water delivered to the end-user of an outlet from a public water supply system; contaminant regulatory levels promulgated in Title 6 NYCRR, Chapter X, Part 703, Groundwater Classifications, Quality Standards, and Effluent Standards and/or Limitations, which were

established to prevent pollution of groundwater and to protect groundwaters for use as a potable water supply; and Drinking Water Standards established by the New York State Department of Health (NYSDOH) and found at 10 NYCRR, Part 170.

Concentration levels of constituents identified in the groundwater at the Facility by analyses of samples taken between 1979 and 1987 are listed below. These constituents include known carcinogens, systemic toxicants (those substances which cause adverse health effects in humans, other than cancer) and listed hazardous wastes or hazardous constituents as defined in 40 C.F.R., Part 261. The concentration levels are expressed as micrograms per liter (ug/l) which is equivalent to parts per billion (ppb). Sampling was conducted at various numbered monitoring wells ("MW") at the Facility. The standards used for comparison with the levels of contamination found in groundwater at the Facility are either the most stringent standard, state or federal, established for the protection of either potable water or groundwater, or the only established standard.

Methylene Chloride has been detected in several monitoring wells at concentrations substantially above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 6,100,000 ug/l, was detected in well R-542 (March 1987).

Arsenic, a toxin and carcinogen, has been detected in several monitoring wells at concentrations above the 6 NYCRR Part 703.5 standard of 25 ug/l. A maximum concentration of 680,000 ug/l was detected in well 12 (May, 1980).

Lead has been detected in several monitoring wells at concentrations above the 6 NYCRR Part 703.5 standard of 25 ug/l. A maximum concentration of 660 ug/l, was detected in well R-549 (December, 1985).

Carbofuran has been detected in several monitoring wells at concentrations above the Maximum Concentration Limit (draft) standard of 40 ug/l. A maximum concentration of 680,000 ug/l was detected in well 12 (May, 1980).

Xylene, a systemic toxicant, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l (5 ug/l is the standard for each of the m-, o- and p- isomers of xylene). A maximum concentration of 2500 ug/l (o-and p- isomers) was detected in well 4 (February, 1986).

Ethylbenzene, a systemic toxicant, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 710 ug/l was detected in Extraction Well 752 (July, 1988).

Trichloroethylene or Trichloroethene, a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 7000 ug/l was detected in well 12 (March, 1986).

Lindane, a known carcinogen, has been detected in several monitoring wells at concentrations above the EPA Maximum Concentration Limit (MCL) standard of 4 ug/l. A maximum concentration of 1200 ug/l was detected in well 12 (July, 1980).

Alpha-Hexachlorocyclohexane (Alpha-BHC), a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 510 ug/l was detected in well 12 (June, 1986).

Beta-Hexachlorocyclohexane (Beta-BHC), a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 110 ug/l was detected in well 12 (June, 1986).

Delta-Hexachlorocyclohexane (Delta-BHC), a listed hazardous waste, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 1700 ug/l was detected in well 12 (June, 1986).

Benzene, a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 2000 ug/l was detected in well 12 (March, 1986).

Chlorobenzene, a systemic toxicant, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 2400 ug/l was detected in Extraction Well 752 (July, 1988).

1,2-dichlorobenzene, a hazardous constituent, has been detected in several monitoring wells at concentrations above the 6 NYCRR Part 703.5 standard of 4.7 ug/l. A maximum concentration of 50 ug/l was detected in well R-5 (June, 1986).

1,3-dichlorobenzene, a hazardous constituent, has been detected above the 6 NYCRR Part 703.5 standard of 5 ug/l. A concentration of 27 ug/l was detected in Extraction Well 752 (July, 1988).

1,4-dichlorobenzene, a hazardous constituent, has been detected in several monitoring wells at concentrations above the 6 NYCRR Part 703.5 standard of 4.7 ug/l. A maximum concentration of 260 ug/l was detected in well 12 (June, 1986).

1,2-dichloroethane, a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 180 ug/l was detected in well R-5 (June, 1986).

Trans-1,2-Dichloroethene, a hazardous constituent, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 250 ug/l was detected in well 11 (February, 1986).

1,1,1-Trichloroethane, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 18 ug/l was detected in Extraction Well 752 (July, 1988).

1,1-Dichloroethane, a listed hazardous waste, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 8 ug/l was detected in well 9 (June, 1986).

Tetrachloroethylene, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 16 ug/l was detected in Extraction Well 752 (July, 1988).

Chloroform, a known carcinogen, has been detected in several monitoring wells at concentrations above the 6 NYCRR Part 703.5 standard of 100 ug/l. A maximum concentration of 11,000 ug/l was detected in well R-535 (June, 1986).

Toluene, a systemic toxicant, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 390 ug/l was detected in well 11 (June, 1986).

1,1-Dichloroethene, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 330 ug/l was detected in well 11 (June, 1986).

2-Butanone (MEK), a listed hazardous waste, has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 62 ug/l was detected in well 13 (March, 1986).

4-Methyl-2-Pentanone (MIBK), a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 84 ug/l was detected in well 13 (March, 1986).

Trichlorofluoromethane, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 36 ug/l was detected in well 13 (March, 1986).

Phenol, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 78 ug/l was detected in well R-542 (March, 1987).

Acetone, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 400 ug/l was detected in well R-5 (February, 1986).

2,4-Dimethylphenol, a hazardous constituent, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 61 ug/l was detected in well R-542 (March, 1987).

2,4-Dichlorophenol, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 11 ug/l was detected in Extraction Well 752 (March, 1987).

1,2,4-Trichlorobenzene, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 55 ug/l was detected in Extraction Well 752 (March, 1987).

2-Methylnaphthalene has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 160 ug/l was detected in well R-545 (March, 1987).

Aldrin, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 26 ug/l was detected in well 4 (May, 1980).

4,4-Dichlorodiphenyltrichloroethane (4,4-DDT), a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 5 ug/l. A maximum concentration of 410 ug/l was detected in Extraction Well 752 (July, 1988).

4,4-Dichlorodiphenyldichloroethylene (4,4-DDE), a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 7.7 ug/l was detected in well 4 (May, 1980).

4,4-Dichlorodiphenyldicloroethane (4,4-DDD), a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 270 ug/l was detected in Extraction Well 752 (July 1988).

2,4-Dichlorophenoxy Acetic Acid (2,4-D), a systemic toxicant, has been detected above the 6 NYCRR Part 703.5 standard of 4.4 ug/l. A concentration of 54 ug/l was detected in well R-542 (January, 1986).

Barium, a systemic toxicant, has been detected above the 10 NYCRR Part 5 standard of 1000 ug/l. A concentration of 1500 ug/l was detected in well R-549 (December, 1985).

Mercury, a hazardous constituent, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 2 ug/l. A maximum concentration of 150 ug/l was detected in well R-543 (June, 1986).

Selenium, a hazardous constituent, has been detected above the 10 NYCRR Part 5 standard of 10 ug/l. A concentration of 150 ug/l was detected in well R-543 (June, 1986).

Chromium, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 50 ug/l. A concentration of 410 ug/l was detected in well R-543 (December, 1985).

Cadmium, a known carcinogen, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 5 standard of 10 ug/l. A maximum concentration of 940 ug/l was detected in Extraction Well 755 (July, 1988).

Boron has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 170 standard of 1000 ug/l. A maximum concentration of 3840 ug/l was detected in Extraction Well 754 (July, 1988).

Cyanide, a systemic toxicant, has been detected in several monitoring wells at concentrations above the 10 NYCRR Part 170 standard of 100 ug/l. A maximum concentration of 41,000 ug/l was detected in well R-545 (March, 1987).

2,4,5-Trichlorophenoxy Acetic Acid (2,4,5-T), a systemic toxicant, has been detected at a concentration of 19 ug/l in Extraction Well 752 (July, 1988) which is below the 6 NYCRR 703.5 standard of 35 ug/l.

2,4,5-Trichlorophenoxy Propionic Acid (2,4,5-TP) (Silvex), a systemic toxicant, has been detected above the 6 NYCRR Part 703.5 standard of .26 ug/l. A concentration of 1 ug/l was detected in well R-549 (June, 1986).

Heptachlor, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 39 ug/l was detected in well 4 (May, 1980).

Ammonia has been detected in several minotoring wells at concentrations substantially above the 10 NYCRR Part 170 standard of 2000 ug/l. A maximum concentration of 5,810,000 ug/l was detected in well 8 (May, 1980).

1,1,2,2-Tetrachloroethane, a known carcinogen, has been detected above the 10 NYCRR Part 5 standard of 5 ug/l. A concentration of 16 ug/l was detected in Extraction Well 752 (July, 1988).

(B) SOIL CONTAMINATION

In addition to the presence of hazardous waste and hazardous constituents identified in the groundwater, soil contamination has also been discovered during several previous sampling and investigative activities. The results of the major investigative activities are summarized below. These results are expressed in milligrams per kilogram (mg/kg).

(i) On-site Contamination

a) "1973 Site Boring Survey - Middleport Plant Site", May 1973. During this investigation, soil borings were taken in a total of 316 locations across the entire Facility

property. Locations were selected on a 200 ft. by 200 ft. grid basis. Several samples were taken from each boring at one foot depth intervals and all samples were analyzed for arsenic. Of these 316 locations, 150 locations indicated arsenic concentrations which exceeded EPA's Health Based Criteria for Soil Ingestion of 80 mg/kg which is identified in Chapter 8 of the "RCRA Facility Investigation (RFI) Guidance" manual, EPA 530/SW-87-001, OSWER Directive 9502.00-6C. Fifty-one of the locations which exceeded the criteria had concentrations in excess of 1000 mg/kg.

b) "Middleport Site Investigation - Final Report - FMC Corporation - Middleport, New York" May 1987. As part of this investigation, soil borings were taken at a total of 24 locations in areas of former waste activities. The following constituents were detected as indicated:

Total Arsenic, a systemic toxicant, exceeded EPA's Health Based Criteria for Soil Ingestion of 80 mg/kg at 18 locations with a maximum concentration of 8900 mg/kg.

Benzene, a known carcinogen, exceeded EPA's Health Based Criteria for Soil Ingestion of 24 mg/kg at one location with a concentration of 26 mg/kg.

Carbofuran was detected in 9 locations with a maximum concentration of 374 mg/kg.

7-Hydroxybenzofuran was detected in 9 locations with a maximum concentration of 36 mg/kg.

(ii) Off-site Contamination

a) "Surface and Subsurface Soil/Sediment Investigations at Royalton-Hartland School Yard, Jeddo Creek, Culvert 105 Extension", November, 1986. During this investigation, 2 samples were collected from each of 19 locations in order to investigate the presence of off-site soil contamination in areas that have been potentially affected by the FMC Facility. The following constituents were detected as indicated:

Arsenic, a toxin and carcinogen, exceeded EPA's Health Based Criteria for Soil Ingestion of 80 mg/kg at 6 locations with a maximum concentration of 432 mg/kg.

Dichlorodiphenyldichloroethylene (DDE), a known carcinogen, exceeded EPA's Health Based Criteria for Soil Ingestion of 2.1 mg/kg at 5 locations with a maximum concentration of 6.3 mg/kg.

Dichlorodiphenyltrichloroethylene (DDT), a known carcinogen, exceeded EPA's Health Based Criteria for Soil Ingestion of 2.1 mg/kg at 5 locations with a maximum concentration of 38 mg/kg.

b) Sampling of the North and South ditches. These drainage ditches are located off-site, just north of the FMC northern property boundary on property owned by the Consolidated Rail Corporation. These ditches run parallel on each side of the railroad tracks in an east-west direction. These ditch areas have been susceptible to flooding from the FMC property.

In a letter dated May 1, 1987, FMC submitted to the NYSDEC, a compilation of results from surface sediment/soils sampling performed at the above referenced ditches prior to implementation of removal activities. Samples were analyzed for arsenic and lead for total concentrations and for EP toxicity values. When concentrations in soil samples, subjected to EP Toxicity testing exceed 5 mg/l for arsenic or lead, this soil is then a "characteristic hazardous waste".

Arsenic (total) - Out of 28 samples collected, all 28 samples exceeded EPA's Health Based Criteria for Soil Ingestion of 80 mg/kg with a maximum concentration of 16,200 mg/kg.

Arsenic (EP Toxicity) - Out of 28 samples collected, 7 samples exceeded the 5 mg/l value characteristic of hazardous waste. The maximum concentration was 22.8 mg/l.

Lead (total) - Out of 28 samples collected, 11 samples exceeded the upper limit of EPA's Interim Soil Cleanup Level of 500-1000 mg/kg (see EPA document issued by the Office of Solid Waste and Emergency Response (OSWER), Directive # 9355.4-02), with a maximum concentration of 3880 mg/kg.

Lead (EP Toxicity) - Out of 28 samples collected, 1 sample exceeded the 5 mg/l value characteristic of hazardous waste. The concentration was 18 mg/l.

In the spring of 1988, FMC completed implementation of an interim plan for removal of sediment/soils from the North and South ditches under the terms of a Consent Order issued by the NYSDEC pursuant to New York State Title 13. Removed sediment/soils were placed in a temporary storage unit located at the Facility. FMC placed clean fill material in the ditches. In an attempt to restrict public access to contaminated materials, the Royalton Hartland School District had previously erected a snow fence.

Following the removal of sediment/soils from the ditches, FMC submitted to the Department a report entitled "Northern Ditches Restoration Construction Report - FMC Corporation - Middleport, New York" (June, 1988). The report included analytical results of sediment/soil samples that were collected from the bottom of the ditches after the surficial sediments/soils had been removed, but prior to emplacement of the clean fill. These results illustrated levels of contamination remaining in the soil in the ditches after completion of the removal program. Samples were analyzed for total arsenic and lead.

Arsenic - Out of 14 samples collected, 12 samples exceeded EPA's Health Based Criteria for Soil Ingestion of 80 mg/kg, with a maximum concentration of 12,767 mg/kg.

Lead - Out of 14 samples collected, 1 sample exceeded the upper limit of EPA's Interim Soil Cleanup Level of 500-1000 mg/kg (see OSWER Directive # 9355.4-02), with a concentration of 2783 mg/kg.

Samples were collected by NYSDEC personnel during the sediment/soil removal program. These split samples were collected when FMC collected sediment/soil samples from the bottom of the ditches after surficial sediment/soils were removed. In addition to analyzing for arsenic and lead,

these samples were also analyzed for four BHC isomers, cyanide, DDT, DDE, and DDD. Maximum concentrations obtained were as follows: Beta-BHC (10,100 ppb); delta-BHC (4600 ppb); gamma-BHC (4400 ppb); cyanide (3300 ppb); DDT (44,000 ppb); DDE (16,600 ppb); and DDD (62,000 ppb).

10. Exposure Pathways:

Hazardous wastes and/or hazardous constituents may migrate from units at the Facility into the environment via the following pathways:

a) Groundwater

Based upon the analyses of data obtained from groundwater monitoring wells at the FMC Facility, numerous hazardous wastes and/or hazardous constituents have been released to the uppermost aquifer, which consists mainly of glacial sediments and sedimentary bedrock. Of particular concern is a methylene chloride plume of high concentration which has migrated off-site and is in danger of migrating further off-site. FMC has identified a number of wells both upgradient and downgradient of the Facility which have the potential to be used for both potable and non-potable, private and commercial water supplies. Information collected thus far indicates that none of the wells in the

immediate vicinity of the FMC Facility are known to be used presently as a potable water supply. Thus, no action has been taken by NYSDOH or NYSDEC to close the wells.

b) Soils:

Soils containing hazardous wastes and/or hazardous constituents are present throughout the FMC Facility and have migrated off-site into the North and South ditches, onto property owned by the Royalton-Hartland School District, and private residences to the west of the FMC Facility. Arsenic and lead soil contamination has resulted in the removal of approximately the top six inches of soil lining several ditches north of the property (as described on pages 30-33 above). Arsenic concentration levels measured in these ditches following removal but prior to the addition of clean fill material still measured a maximum level of 12,767 mg/kg. This means that a source of arsenic contamination to groundwater and surface water still exists beneath the clean fill placed in the ditches. The excavated material is presently stored in a polyethylene liner on the location of a former surface impoundment (closed in 1977) on the eastern portion of the Facility.

Wastes in soils may be directly and/or indirectly ingested, leached into groundwater, transported by runoff, or blown by wind.

c) Surface Water and Sediment:

Surface waters at the Facility which may contain arsenic are collected in a surface impoundment. Treated water is presently released into Tributary One of Jeddo Creek under a SPDES Permit. Historic surface water drainage patterns and management practices resulted in contaminated runoff being channeled off-site.

d) Air:

Wind action may have caused migration of contaminated materials from this Facility as evidenced by soil arsenic levels in the area surrounding the Facility. These winds can suspend fine, silt-sized particles along with hazardous wastes and/or hazardous constituents in the air and transport them either to other areas within the Facility or off-site.

11. Need to Protect Human Health and Environment:

Many hazardous wastes and/or hazardous constituents have been detected in the groundwater, soils, and surface water at Respondent's Facility. Two of these hazardous wastes and/or hazardous constituents are specifically set forth below, along with information on their toxicological effects. (This information can be found in the "NIOSH Pocket Guide to Chemical Hazards" (1985), published by the U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health (NIOSH).)

Arsenic - A toxin and carcinogen, attacks the liver, kidneys, skin, lungs, and lymphatic system. Exposure to arsenic can cause ulceration of the nasal septum, dermatitis, gastrointestinal disorders, respiratory irritation, hyperpigmentation of the skin, and cancer.

Methylene chloride - This chemical attacks the skin, cardiovascular system, eyes, and the central nervous system. Exposure to methylene chloride may cause fatigue, weakness, sleepiness, lightheadedness, tingling sensation, numbing of the limbs, nausea, eye and skin irritation, vertigo, exacerbation of pre-existing angina, and cancer.

V. EPA/NYSDEC Conclusions of Law

Based on the Findings of Fact set out above, and the Administrative Record, the Director of the Air and Waste Management Division, EPA Region II, and the Commissioner of the NYSDEC have determined as a matter of Law, that:

1. Respondent is a "person" as defined in Section 1004(15) of the Act, 42 U.S.C. § 6903(15).

2. Respondent owns and operates a "Facility" in Middleport, New York that "generates" and "stores" "hazardous waste".

3. Respondent's Facility has been authorized to operate under 42 U.S.C. § 6925(e).

4. There is or has been a release of hazardous wastes and/or hazardous constituents into the environment from the Respondent's Facility; and

5. The actions required to be taken pursuant to this Order are deemed to be necessary to protect human health and/or the environment.

VI. Order: Work To Be Performed

Pursuant to Section 3008(h) of the Act, 42 U.S.C. § 6928(h), the Director of the Air and Waste Management Division, EPA, Region II, and pursuant to Section 71-2727(3) of the ECL, the Commissioner of the NYSDEC, hereby issue the following Order to the Respondent. Subject to the terms of the dispute resolution provision of this Order (Section XXVIII), all work undertaken pursuant to this Order shall be performed in a manner consistent with the plans, reports, and schedules approved by EPA. The Respondent shall perform the following, in the manner and by the dates, specified below:

1. RCRA Facility Investigation ("RFI")

a) Respondent shall undertake and complete the RCRA Facility Investigation program ("RFI"), set forth in Attachment I, in accordance with the terms, procedures and schedules approved by EPA. This RFI program shall be implemented in accordance with the Act, its implementing regulations and relevant EPA guidance documents. The RFI program in Attachment I is hereby incorporated by reference as if fully set forth in this Order.

b) The Respondent shall submit an RFI Workplan for EPA approval within sixty (60) days following the effective date of this Order. Following receipt of EPA approval in writing of the RFI Workplan, Respondent shall implement the RFI Workplan according to the schedule in the approved Workplan. Respondent shall submit a draft RFI Report to EPA in accordance with an approved schedule to be included in the RFI Workplan. EPA will notify the Respondent whether the draft RFI Report has been completely or partially approved, disapproved, or modified. Upon EPA disapproval or request for modification, the Respondent shall act in accordance with the procedures set forth in Section XI. The Respondent shall submit to EPA an RFI Report in accordance with the following schedule:

1) If a notice of dispute is submitted pursuant to Section XI, such report shall be submitted within sixty (60) days of the date Respondent receives written notification of the decision issued pursuant to the dispute resolution procedures set forth in Section XXIX of this Order, or by a date set by EPA.

2) If no notice of dispute is submitted pursuant to Section XI, such report shall be submitted no later than sixty (60) days following receipt in writing of

EPA's disapproval or request for modification of the Draft RFI Report, or by a date set by EPA.

3) If the Draft RFI Report is approved by EPA without revisions, the Draft RFI Report will serve as the Final Report required by the Order.

2. Corrective Measures Study ("CMS")

EPA will review the Final RFI Report(s) and notify the Respondent whether further investigative actions and/or corrective measures are necessary. If EPA determines that a CMS is necessary, EPA will establish a schedule for submission of a CMS Workplan, the reports identified in XI B and XI C of Attachment II, and for the performance of the other tasks in Attachment II which Attachment is incorporated herein by reference. Respondent shall perform the CMS in accordance with the requirements of Attachment II to this Order.

3. Scope of Work

a) The RFI and CMS shall, at a minimum, address the requirements of the Scopes of Work included as Attachments I and II respectively, to this Order.

b) The Respondent shall provide written justification for any omissions or deviations from the minimum requirements of Attachments I and II. Any omissions or deviations are subject to EPA's approval as set forth in Section XI of this Order.

c) The Respondent may combine units that are adjacent to each other, manage similar wastes, or share the same critical remedial action issue (e.g., groundwater contaminated with the same constituents) into groups for the purposes of the investigation.

d) The Respondent may conduct the RFI and/or the CMS in a phased approach (e.g., conducting soils investigation separately from groundwater investigation) provided that the entire investigation is completed in accordance with the schedules established pursuant to this Order and Attachments I and II.

e) The results of all plans and reports shall be submitted in accordance with the approved schedule. Extensions of the due date for submittals may be granted by EPA, pursuant to the modification provision of this Order, based on the Respondent's demonstration that sufficient justification for the extension exists.

f) If any items required by this Order or by the attached Scopes of Work have previously been submitted or completed, it shall be so stated in the RFI Workplan and/or the Draft CMS Report. For these items, the respective Workplan shall include the following information:

i. a description of the items previously submitted and/or a summary of the previously completed investigations;

ii. the date(s) of submission and/or completion; and

iii. any known changes or new information developed since the previous submission and/or completion.

g) EPA will determine the extent to which prior submissions and/or completions satisfy specific items required by this Order and reserves the right to require the delivery of additional copies of prior submissions.

4. Surface Impoundments

FMC shall perform the following activities with regard to the Eastern Surface Impoundment (ESI), and the Western Surface Impoundment (WSI).

a) Maintain the inactive status of the ESI pending the results of the RFI and, if one is undertaken, the CMS required under the terms of this Order, which pertain to the ESI and SWMU Group C as identified by NYSDEC in the RFA dated October 14, 1988. Respondent may submit a closure plan modification for the ESI to NYSDEC for its review and approval pursuant to 6 NYCRR § 373-3.7 following evaluation of the results of the studies to be performed pursuant to this Order. Respondent shall implement the approved closure plan.

b) Maintain the current status of the WSI, as an Interim Corrective Measure, required by this Order in Section VI 6.j, and subject to the conditions set forth therein, pending the results of the RFI and, if one is undertaken, the CMS required under the terms of this Order. Respondent may submit a closure plan modification for the WSI to NYSDEC for its review and approval pursuant to 6 NYCRR § 373-3.7 following evaluation of the results of the studies to be performed pursuant to this Order. Respondent shall implement the approved closure plan.

5. Interim Status Groundwater Monitoring Requirements Under 40 CFR Part 265, Subpart F, and 6 NYCRR Part 373.

The Respondent shall submit a plan for a quarterly groundwater monitoring program (GMP) at the Facility. The Plan shall be submitted for EPA approval within 60 days following the issuance of this Order. Following receipt of EPA approval of the GMP, in accordance with Section XI of this Order, the Respondent shall implement the GMP according to the schedule approved by EPA. Until such time as Respondent implements the new GMP, Respondent shall continue monitoring groundwater on a quarterly basis for the Site Specific Parameter List (SSPL) in accordance with the monitoring program submitted to DEC on September 1, 1989, as amended and submitted by Respondent dated February 28, 1990 and October 15, 1990.

The Plan must include a list of wells that will be used to monitor the Facility, and a corresponding schedule which indicates the frequency at which each well will be monitored. The selected wells and frequencies must be capable of characterizing groundwater contamination as described below:

- the horizontal and vertical extent of immiscible or dissolved plume(s), selected by EPA, representative of Facility conditions;
- the horizontal and vertical direction of contaminant movement;
- the velocity of contaminant movement;

- the horizontal and vertical concentration profiles of contaminants, selected by EPA, in the plume(s) representative of Facility conditions.

If the groundwater monitoring network established pursuant to the Plan is not capable of such characterization, the network must be upgraded until such characterization is complete.

On-going monitoring must include:

- monitoring, at least quarterly, at wells which define the horizontal and vertical extent of contamination; and

- monitoring, at least quarterly, at a sufficient number of wells within the plume so as to be representative of contaminant behavior.

The GMP must include the following information:

Presampling Procedures that Describe:

(1) procurement, inspection, and calibration of equipment;
(2) procurement and preparation of sample bottles;
(3) storage and handling of sampling gear between uses;
(4) personal protective equipment needed for sampling;
(5) well purging techniques;
(6) water level measuring techniques; and
(7) laboratory notification/verification.

Sampling Procedures that Describe:

(1) use of sampling equipment;
(2) field measurements and calibration techniques;
(3) sampling parameters/sample handling technique including:

    (i) sample containers to be used;
    (ii) sample preservation techniques;
    (iii) sample filtration techniques;
    (iv) order of sample collection;
    (v) sample labels;
    (vi) sample storage;

(4) field QA/QC...cleaning, blanks, duplicate measurements;
(5) sample shipping and chain of custody procedures;

(6) health and safety/personal protection measures; and
(7) provisions for adequate disposal of purge water.

Laboratory Handling and Analytical Protocols

(1) documentation of laboratory processing steps;
(2) analytical methodologies for each parameter of interest;
(3) QA/QC protocols; and
(4) reporting format.

Background Information for each Monitoring Well/Piezometer:

(1) well log;
(2) water level recovery rate of wells;
(3) measuring point elevation;
(4) normal purge volume of the wells;
(5) background water quality values; and
(6) development/redevelopment history of the wells.

Well Record

A well record for each well/piezometer that is updated at least quarterly. The well record must contain the following information:

(1) well I.D. number and designation as up or downgradient;
(2) depth of well as installed and as measured;
(3) measuring point elevation;
(4) depth to water;
(5) water level elevation;
(6) purge volume;
(7) purge time (start/stop);
(8) recharge time;
(9) sampling time;
(10) field parameters (temp., pH, S.C.);
(11) physical condition of the well;
(12) important field observations related to sample integrity;
(13) names of sampling personnel;
(14) weather conditions (present and 48 hour history);
(15) purge/sample date;
(16) concentration of required monitoring parameters;
(17) concentration of any other parameters analyzed; and
(18) pertinent laboratory information (QA/QC problems, etc.).

Well Maintenance Plan

6. Interim Corrective Measures ("ICM")

a) Within thirty (30) days of the effective date of this Order, Respondent shall submit to EPA an Interim Corrective Measures ("ICM") Workplan to contain the methylene chloride plume which is known to exist beneath Respondent's Facility and to control the off-site migration of the plume. This ICM Workplan must be developed in a manner which is consistent with parts e) and f) of this section and allows for integration of this interim corrective measure into any long term remedial actions to be undertaken at Respondent's Facility. In addition to maintaining consistency with parts e) and f) of this section, this ICM Workplan must specify the manner in which the extent, both vertical and horizontal, of the methylene chloride plume will be determined, a description of the types of aquifer tests to be employed to determine aquifer characteristics, and the rationale for the design and technical specifications of any system to be employed to remove, capture, and/or prevent possible further migration of the methylene chloride plume. Within thirty (30) days following receipt of written approval from EPA, Respondent shall implement the ICM Workplan in accordance with the approved schedule contained

therein. Until an acceptable ICM Workplan is received and approved by EPA, Respondent shall continue using the present extraction well pumping system. Respondent shall submit quarterly progress reports concerning the extraction well pumping system in accordance with the requirements of Section VI.7. of this Order.

b) Except for information covered by the attorney-client privilege and/or the attorney work product doctrine, Respondent shall submit to EPA copies of all information, including studies and reports, concerning known off-site contamination, which information Respondent determines in good faith is relevant to the purposes of this Order. Notwithstanding the foregoing sentence, all information generated during the course of the off-site contamination study being undertaken in accordance with the Administrative Order Number B9-0221-88-04 issued by the NYSDEC on July 30, 1990 will be submitted to EPA. Based upon EPA's evaluation of this information, EPA will determine if any interim corrective measures, other than those listed in a) above, are necessary to mitigate potential threats to human health or the environment caused by this off-site contamination. If EPA determines that interim corrective measures (beyond the ones set forth in Section VI.5.a. are necessary to address a release of a hazardous waste and/or hazardous

constituent(s) into the environment from the Facility, it will so notify Respondent in writing. Unless Respondent, within thirty (30) calendar days of receiving notification from EPA that interim corrective measures are required, clearly demonstrates that the condition requiring interim corrective measures was not created, in whole or in part, by a release or releases of hazardous waste and/or hazardous constituent(s) from the Facility, or Respondent demonstrates that its contribution to the condition was de minimis, Respondent shall submit to EPA for approval an ICM Workplan that identifies the interim corrective measures which will be taken to prevent or mitigate this threat or potential threat to human health and/or the environment, which measures are consistent with, and can be integrated into, to the extent possible, any long term remediation at the Facility.

c) In the event Respondent becomes aware of existing information or identifies new or additional information which Respondent determines in good faith evidences an actual threat or potential threat to human health or the environment at or near the Facility, Respondent shall immediately notify EPA orally and, within ten (10) calendar days, in writing, summarizing the information on the threat or potential threat to human health or the environment.

Unless Respondent clearly demonstrates that the actual or potential threat to human health or the environment, was not created, in whole or in part, by a release or releases of hazardous and/or hazardous waste constituent(s) from the Facility, or clearly demonstrates that its contribution to the condition was de minimis, Respondent shall, within twenty (20) calendar days of notifying EPA, submit to EPA for approval an ICM Workplan that identifies the interim corrective measures which will be taken to prevent or mitigate the threat or potential threat to human health and/or the environment, which measures are consistent with, and can be integrated into, to the extent possible, any long term remediation at the Facility.

d) Respondent shall submit to EPA copies of all information required to be submitted to federal, state and local authorities under CERCLA, as amended, TSCA, and/or their state equivalents, which information Respondent determines in good faith is relevant to the purposes of this Order.

e) If EPA determines that additional interim corrective measures are necessary, other than those already described in this section, it will notify Respondent in writing specifying the basis and reason for EPA's determination and

the interim corrective measures deemed necessary. Thereafter, the Respondent shall perform any such interim corrective measures in accordance with the standards, specifications, and schedules deemed necessary and approved by EPA.

f) Any ICM Workplan shall be developed in a manner consistent with the Scope of Work and the QA/QC procedures within Attachment I of this Order. The ICM Workplan shall document the procedures to be implemented by Respondent.

g) Any ICM Workplan shall include, but not be limited to: 1) "ICM" Objectives (including ICM performance criteria); 2) a Health and Safety Plan; 3) Community Relations Plan; 4) a Data Collection Quality Assurance Plan; 5) a Data Management Plan; 6) Design Plans and Specification; 7) an Operation and Maintenance Plan; 8) a Project Schedule; 9) an "ICM" Construction Quality Assurance Plan; and 10) Reporting Requirements (including an ICM Completion Report).

h) Upon receipt of written approval from EPA, Respondent shall implement any ICM Workplan in accordance with the requirements and schedules approved by EPA. ICM implementation shall not unreasonably interfere with the implementation or scheduling of the RFI.

i) Environmental emergency situations (as defined in Section XIII of this Order) may arise which require the Respondent to immediately implement necessary actions to mitigate the emergency. All such emergencies and any situations arising from such emergencies must be dealt with pursuant to Section XIII of this Order. Any action taken by Respondent in response to such emergencies shall in no way abrogate any other obligation or activity required by this Order.

j) Unless otherwise instructed by EPA, the use of WSI is authorized as an Interim Corrective Measure (ICM) for the control, containment and collection for treatment of contaminated runoff. Continued use of the WSI for this purpose is contingent upon the following conditions:

1) The current underdrain system shall continue to be pumped in order to maintain an inward groundwater flow at the WSI.

2) The contents of the WSI, both water and sediment/sludge, shall be monitored in accordance with a WSI Monitoring Workplan, including a monitoring schedule. The WSI Monitoring Plan shall be submitted to EPA for approval concurrent with submittal of the RFI Workplan pursuant to Section VI.1.b. of this Order.

The contents of the WSI shall be monitored for the hazardous wastes and/or hazardous constituents, including TC constituents found at 40 C.F.R. § 261.24, specified in the WSI Monitoring Plan as approved by EPA, or subsequently determined to be necessary by EPA. The influent stream to the WSI shall be monitored for the purpose of evaluating corrective measures. The existing NYSDEC-approved monitoring program shall be continued until approval of the WSI Monitoring Workplan is granted.

3) Within sixty (60) days following the effective date of this Order, Respondent shall submit to EPA a contingency plan which details a) the program to be implemented in the event that the WSI is found to contain hazardous waste; b) activities to be implemented to return the WSI to compliance; and c) alternative methods for managing contaminated runoff and the contents of the WSI. EPA shall review the contingency plan and either approve, disapprove, or require modifications in it. This contingency plan shall ensure compliance with all applicable federal, state, and local environmental laws and regulations.

4) If, at any time during its operation as an ICM, the WSI is found by Respondent, EPA, or NYSDEC to contain hazardous wastes, as defined by RCRA or the regulations promulgated pursuant to RCRA at 40 C.F.R. Part 261, the approved contingency plan, as described above, shall be implemented within seven (7) days. Additional modifications to the contingency plan may be required by EPA during implementation. Failure by Respondent to implement the approved contingency plan within seven (7) days shall constitute a violation of this Order.

7. Progress Reports and Extensions of Time

a) The Respondent shall submit quarterly progress reports to EPA until termination of this Order. These reports shall include, but not be limited to, all information collected pursuant to Section VI, paragraph 5 (GMP). The quarterly reports will be due to EPA within forty-five (45) days following the end of a quarter. For the purposes of this Order, quarterly reporting periods are defined as follows:

October 1 to December 31 - First (1st) Quarter
January 1 to March 31 - Second (2nd) Quarter
April 1 to June 30 - Third (3rd) Quarter
July 1 to September 30 - Fourth (4th) Quarter

Unless otherwise agreed to by the EPA Project Coordinator (PC), the quarterly reports must include, at a minimum, the information listed in Task VII B of Attachment I or Task XI A of Attachment II, as appropriate, and the following information:

1) A summary of all activities performed pursuant to this Order during the previous quarter.

2) A summary of all analytical results that have become available during the previous quarter.

3) Supporting QA/QC documentation, in accordance with the approved "Quality Assurance Project Plan", for quarterly analytical results.

4) All information recorded in the well record during the previous quarter.

5) Quarterly groundwater elevation data, expressed in both tabulated form and as potentiometric surface contour maps. These maps must include a delineation of the zone of capture, and indicate flow rate and direction.

6) An evaluation of contaminant migration. This must include maps for all significant contaminants (to be specified in the approved workplan(s) formulated pursuant to this Order and its Attachments) showing concentrations for each of the program monitoring wells.

7) Well maintenance activities planned or performed.

8) A summary of plans for installation of additional wells. Existing approved workplans may be referenced.

9) Pumping well rates and volumes, if applicable.

10) Contaminant recovery levels, if applicable.

11) Treatment efficiency data, if applicable.

12) A description and discussion of any problems encountered during the previous quarter and the course(s) of action taken to overcome these problems.

13) A summary of the activities planned for the following quarter.

14) On an annual basis, in the fourth (4th) quarter report, a summary progress report of the activities being undertaken pursuant to this Order.

b). If the Respondent determines that all investigations required under this Order cannot be completed within the specified period, a request for an extension period, not to exceed one-hundred and eighty (180) days, must be submitted in writing to EPA for approval. This request shall be submitted no later than ninety (90) days prior to the originally scheduled completion date. The request must be accompanied by a Project Progress Summary Report which describes all of the investigative work completed to date, describes the work which still must be accomplished, details the factors which have prevented adherence to the specified schedules, and justifies the duration of the specific extension period requested. Before the originally scheduled completion date, EPA will notify the Respondent whether the request has been completely or partially approved, disapproved, or requires modification.

VII. Additional Investigative Work

Subject to the terms of the dispute resolution provision of this Order (Section XXIX), EPA may determine that investigations and studies, in addition to those detailed in this Order and its Attachments, are necessary to protect human health and/or the environment. If EPA determines that any such additional work is necessary it shall notify the Respondent in writing specifying

the basis and reason for EPA's determination and the additional work deemed necessary. Thereafter, the Respondent shall perform any such additional work, including the submission of a workplan, in accordance with the standards, specifications, and schedules deemed necessary and approved by EPA. All approved additional work performed by the Respondent pursuant to this Paragraph shall be performed subject to, and in a manner consistent with, the terms and conditions of this Order. Any requirements for additional work shall be incorporated into this Order as if fully set forth herein.

VIII. Minimum Qualifications for Directors and Supervisors

All work performed by the Respondent pursuant to this Order shall be under the direction and supervision of an individual(s) who has demonstrated expertise in hazardous waste site investigations and remediation. Before any work is performed, Respondent shall notify EPA in writing of the name, title, and qualifications of the supervisory personnel, contractors or subcontractors, and professional or technical personnel to be used in carrying out the terms of this Order. In addition, the Respondent shall ensure that when a necessary license is required, only licensed individuals shall be used to perform any work required by this Order.

IX. Project Coordinator/Information

1. On or before the effective date of this Order, EPA, NYSDEC and Respondent shall each designate a Project Coordinator ("PC") and the name of at least one alternate who may function in the absence of the designated PC. The PCs shall be responsible for overseeing the implementation of this Order. The EPA and NYSDEC PCs, or their designees, will be EPA's and NYSDEC's designated representatives at the Facility.

2. All communications between Respondent, EPA, and NYSDEC, and all documents, reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order, shall be directed to and through the respective PCs. Respondent shall promptly provide copies of all submittals that it makes to the EPA and/or NYSDEC PC to all persons identified by the EPA and/or NYSDEC PC. The EPA and/or NYSDEC PC shall initially provide Respondent with a list of such persons within thirty (30) days of the effective date of this Order, and shall notify Respondent of necessary changes as appropriate.

3. Each party shall provide at least five (5) days written notice prior to changing the PC(s) and shall identify the new PC.

X. Quality Assurance/Quality Control

1. All sampling, monitoring, analytical, and chain-of-custody plans shall be developed in accordance with the standard and recommended procedures contained in SW-846 "Test Methods for the Chemical and Physical Analysis of Solid Waste, Third Edition", as amended, and the EPA Region II Quality Assurance Manual. Any deviations from these two documents must be accompanied by an appropriate justification and a demonstration of the effectiveness and applicability of the proposed alternative. EPA must approve the use of such alternatives.

2. Respondent shall inform the EPA PC in advance which laboratories will be used by Respondent and ensure that EPA personnel and EPA authorized representatives have access, at reasonable times and upon reasonable notice, to the laboratories and personnel performing the analyses.

3. Respondent shall consult with EPA in planning for field sampling and laboratory analysis, including a description of the chain of custody procedures to be followed.

XI. EPA Approvals, Directives and Determinations

1. Unless otherwise specified, EPA shall review any plan, report, specification or schedule submitted pursuant to, or required by this Order, and promptly provide its written

approval/disapproval, determinations, comments, modifications and/or directives to the Respondent. Within fifteen (15) days of Respondent's receipt of EPA's approval/disapproval, determinations, comments, modifications and/or directives, Respondent may request a meeting with EPA to discuss the approval/disapproval, determinations, comments modifications, and/or directives. Within fifteen (15) days of such meeting, or if no meeting is requested, or if EPA denies Respondent's request, within fifteen (15) days of receipt of EPA's approval/disapproval, determinations, comments, modifications, and/or directives, or EPA's denial of a request for a meeting, whichever is later, Respondent shall either: (1) notify EPA in writing of its intention to comply with EPA's directives or determinations or to amend or modify the submission to incorporate all EPA comments and proposed modifications and submit the amended submission to EPA within thirty (30) days thereafter or according to a mutually agreed schedule; or (2) provide EPA with a written notice of dispute, setting forth Respondent's position, any actions which Respondent considers necessary to resolve the dispute, and the basis for Respondent's position. Any such written notice of dispute shall be subject to the dispute resolution procedures as set forth in Section XXIX of this Order.

2. Any directives, determinations, reports, plans, specifications, or schedules, submitted pursuant to, or required by this Order, are hereby incorporated by reference into this Order on the date of issuance or approval in writing, as appropriate, by EPA or the date a decision has been issued pursuant to the dispute resolution procedures set forth in Section XXIX of this Order, whichever date is later. Prior to the issuance/approval or dispute resolution determination, no plan, directive, determination, report, specification or schedule shall be construed as final or approved. Verbal advice, suggestions, or comments given by EPA representatives shall not constitute an official approval, nor shall any verbal approval or verbal assurance of approval be considered binding.

3. Any noncompliance with an approved EPA document or determination under the dispute resolution provision of this Order constitutes noncompliance with this Order.

XII. On-Site and Off-Site Access

1. Until this Order is terminated pursuant to Section XXI, EPA representatives, authorized designees, employees, agents, contractors, subcontractors, and consultants are hereby authorized to enter and move about the Facility property pursuant to Section 3007 of RCRA. Any person entering Respondent's Facility pursuant to this subparagraph shall fully comply with all health and safety plans incorporated into this Order.

2. To the extent that work required by this Order must be performed on property not owned or controlled by the Respondent, the Respondent shall use its best efforts to obtain "Site Access Agreements" to perform such work within thirty (30) days of the date Respondent becomes aware or should be aware of need to perform such work. Any such access agreement shall provide for reasonable access by EPA, and its employees, representatives, contractors, and sub-contractors. In the event that Site Access Agreements are not obtained within the thirty (30) day period, the Respondent shall notify EPA, in writing, documenting its best efforts to obtain such agreements. Best efforts, as used in this paragraph, shall include, at a minimum:

a) a certified letter from the Respondent to the present owner of such property requesting permission to allow the Respondent, EPA and any of their authorized representative(s) access to such property; and

b) the property owner's response, if any.

Best efforts, as that term is used in this paragraph, shall not include a promise to pay a commercially unreasonable sum to obtain the Access Agreement or to accept other unreasonable terms and conditions.

3. Nothing in this section shall be construed to limit or otherwise affect EPA's right of access and entry pursuant to any applicable laws and regulations, including the Act and the Comprehensive Environmental Response Compensation and Liability Act of 1980 ("CERCLA"), as amended, 42 U.S.C. § 9601 et seq., during the period this Order is in effect or following its termination.

4. Nothing in this section shall be construed to limit or otherwise affect the Respondent's liability, if any, and obligation to perform corrective action, including corrective action beyond the Facility boundary, if any, notwithstanding the lack of access. EPA may determine that additional on-site measures must be taken to address releases beyond the Facility boundary if access to off-site areas cannot be obtained.

XIII. Emergency Provisions

1. In the event the Respondent identifies a condition created in whole or in part by Respondent which threatens immediate harm to public health or the environment, the Respondent shall notify EPA orally within twenty-four (24) hours and notify EPA in writing within five (5) days summarizing the immediacy and magnitude of the threat. The Respondent shall submit to EPA, within ten (10) days, a plan for approval which mitigates this threat. EPA will approve or modify this plan, and the Respondent

shall implement this plan as approved or modified within ten (10) days of receipt in writing of EPA's approval or modification. If EPA determines that quicker action is required, then the Director of the Air and Waste Management Division, Region II, may orally authorize Respondent to act prior to making any written submission to EPA. In the case of an extreme emergency, Respondent may act as it deems appropriate at its own risk.

2. If EPA determines that activities in compliance or non-compliance with this Order have caused or may cause a release of a hazardous waste or hazardous constituent, or may pose a threat to human health or the environment, EPA may direct Respondent to stop further implementation of this Order, or a portion of this Order, for such period of time as may be needed to abate any such release or threat and/or undertake any action which EPA determines to be necessary. To the extent that this cessation affects any requirement in any approved plan or schedule, such action by EPA shall be considered a modification under Section XXIII of this Order.

XIV. Availability of Information/Notification

1. Respondent shall give the EPA PC fourteen (14) days advance oral notice of the following activities undertaken pursuant to this Order: all well monitoring activities, including, but not limited to, drilling, installation and testing; the installation

of equipment; soil, sediment, groundwater or surface water sampling events; geophysical studies; and soil gas monitoring. The fourteen (14) day notice requirement may be waived orally or in writing by the EPA PC. Any oral waiver under this section shall be promptly confirmed in writing by the EPA PC or his designee upon request by the Respondent. At the request of EPA, Respondent shall provide or allow EPA or its authorized representatives to take split samples of any or all samples collected by the Respondent pursuant to this Order. EPA will, to the extent possible, give Respondent reasonable notice in advance of its intentions to take samples and allow Respondent to take split or duplicate samples of all samples collected by EPA under this Order.

2. All data, information, and records concerning, created for or maintained by the Respondent pursuant to this Order, except attorney-client privilege or work product protection doctrine material, shall be made available to EPA upon request. Respondent shall use its best efforts to insure that all employees of the Respondent and all persons, including contractors and subcontractors who engage in activities under this Order, are made reasonably available to and cooperate with EPA if information, whether written or oral, is sought.

3. Except for information which Respondent has identified as business confidential, all information, data, or records submitted to EPA by the Respondent may be made available to the public, including plans submitted by the Respondent pursuant to this Order and its Attachments. Respondent may assert a business confidentiality claim covering all or part of any information submitted to EPA except analytical data. Any assertion of confidentiality shall be accompanied by response to the points listed at 40 C.F.R. § 2.204(e)(4). Information determined to be confidential by EPA shall be disclosed only to the extent permitted by 40 C.F.R. Part 2. Respondent consents to the disclosure of confidential business information to NYSDEC personnel responsible for the administration of this Order in accordance with 40 C.F.R. § 2.209(f). NYSDEC may disclose such information only in accordance with 6 NYCRR § 616.7.

4. Respondent shall not assert any confidentiality claim with regard to any analytical data.

XV. Record Preservation

1. Respondent shall preserve or make arrangements for the preservation of, during the pendency of this Order and for a minimum of six (6) years after its termination, as specified in Section XXI of this Order, all data, records and documents in its possession or in the possession of its officers, directors,

employees, agents, consultants, contractors (including subcontractors and independent contractors) or successors and assigns which relate in any way to this Order, or to its implementation. During this period, the Respondent shall make such records, except attorney-client privilege or work product protection doctrine material, available to EPA and/or shall provide copies of any such documents that EPA requests. Written notification shall be provided to EPA, ninety (90) days prior to the destruction of any or all such documents. Such written notification shall reference the date, caption, and docket number of this Order and shall be addressed to the Regional Administrator of EPA Region II.

2. All documents pertaining to this Order shall be stored in a centralized location at the Respondent's Facility to afford ease of access.

XVI. Reservation of Rights

1. Except as otherwise expressly provided in this Order, EPA and DEC expressly reserve, without limitation, all of their statutory and regulatory powers, authorities, rights, remedies and defenses, both legal and equitable, including the right to seek injunctive relief, cost recovery, monetary penalties, or punitive damages.

2. Except as otherwise expressly provided in this Order, this Order shall not be construed as a covenant not to sue, or as a release, waiver or limitation of any rights, remedies, defenses, powers and or authorities which EPA or DEC have under RCRA, CERCLA, or any other statutory, regulatory or common law authority of the United States or any New York State equivalent.

3. Except as otherwise expressly provided in this Order, this Order shall not limit or otherwise preclude EPA or DEC from taking any additional legal action against the Respondent should EPA or DEC determine that any such additional legal action is necessary or warranted.

4. This Order shall not relieve the Respondent of its obligation to obtain and comply with any federal, state, county or local permit; nor is this Order intended to be, nor shall it be construed to be, a ruling or determination on, or of, any issue related to any federal, state, county, or local permit. This Order does not preclude Respondent from seeking variances or exceptions to federal, state, or local permit requirements.

5. Subject to applicable lawful constraints, EPA and DEC reserve the right to perform any portion of the work required by this Order including, but not limited to, any additional site characterization, feasibility study, interim corrective measure, and/or response or corrective action necessary to protect human

health or the environment. EPA and/or DEC may exercise its authority to undertake removal or remedial actions at any time, subject to the applicable lawful constraints on their authority.

6. Notwithstanding compliance with the terms of this Order, Respondent is not released from liability for the costs of any response actions taken by EPA and/or DEC. EPA and DEC reserve the right to seek reimbursement from Respondent for any costs incurred by the United States or the State of New York, where such reimbursement is authorized by law, and subject to any and all legal conditions, qualifications, and limitations on that right.

7. If Respondent fails to comply with any terms or any provisions of this Order, EPA and DEC reserve the right to commence a subsequent action to require compliance and/or to assess a civil penalty not to exceed $25,000 for each day of non-compliance and/or to take any other action authorized by law and subject to any and all legal conditions, qualifications, and limitations on that right.

8. Except as otherwise provided by this Order, Respondent reserves all rights it may have to oppose and defend claims made and actions taken by EPA or DEC in the future and to assert any and all claims it may have. Except as otherwise provided by this Order, Respondent further reserves the right to contest and

challenge in any future actions by EPA or DEC any factual and legal allegations, findings, determinations, or conclusions set forth in this Order. However, Respondent shall have no right to contest EPA's and/or DEC's jurisdiction to enforce this Order or the terms and conditions of this Order.

9. All reviews, approvals, modifications, directives or other determinations or actions by EPA pursuant to this Order shall: not be arbitrary or capricious; be necessary to protect human health or the environment; and be otherwise in accordance with State and Federal Law.

10. In any dispute resolution proceeding, Respondent reserves the right to contend that it complied with the Order, or that EPA's determination was arbitrary or capricious, not necessary to protect human health and the environment, or not otherwise in accordance with State or Federal Law.

11. Except as provided in the Termination and Satisfaction provision of this Order (Section XXI), Respondent has no right of judicial review under this Order prior to initiation of a judicial enforcement action by EPA or DEC.

12. In the event Respondent initiates a judicial action to challenge EPA's determination or action pertaining to Termination and Satisfaction under Section XXI of this Order, Respondent

reserves the right to contend that EPA's determination or action was arbitrary or capricious, not necessary to protect human health or the environment, or not otherwise in accordance with State or Federal Law. In such a proceeding, Respondent shall not be precluded from rearguing a position it advanced in the dispute resolution process set forth in Section XXIX of this Order solely because Respondent did not prevail on its position in the dispute resolution process.

13. In the event that EPA or DEC initiates a judicial action to enforce this Order or to collect penalties based on any alleged failure by Respondent to comply with any requirement of this Order, Respondent reserves the right to contend that it complied with the Order, or that EPA's determination was arbitrary or capricious, not necessary to protect human health or the environment, or not otherwise in accordance with State or Federal Law, and that penalties or other sanctions should not be imposed under Federal or State Law or this Order for an alleged failure to comply with any modification, directive, or determination by EPA which is based on a good faith objection to EPA's modification, directive, or determination. In such a proceeding, Respondent shall not be precluded from rearguing a position it advanced in the dispute resolution process set forth in Section XXIX of this Order solely because Respondent did not prevail on its position in the dispute resolution process.

XVII. Non-Release of Other Claims and Parties

Nothing in this Order shall constitute, or be construed to constitute, a release from any claim, cause of action or demand in law or equity against any person, firm, partnership, or corporation for any liability it may have arising out of, or relating in any way to, the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous constituent, hazardous substance, hazardous waste, pollutant, or contaminant found at, taken to, taken from, or emanating from the Facility.

XVIII. Public Participation

Following final written approval of the RCRA Facility Investigation Final Report and the Corrective Measures Final Report, and any summaries of these reports, EPA shall make these documents available for public review and comment.

XIX. Indemnification of the United States and the State of New York

To the extent permitted by law, Respondent shall indemnify, save and hold harmless the United States and the State of New York, their agencies, departments, agents, and/or employees, from any and all claims or causes of action arising from or on account of acts or omissions of Respondent or its agents, independent contractors, receivers, trustees, subcontractors, or successors

and/or assigns in carrying out activities required by this Order, but Respondent shall not indemnify the United States, the State of New York, or their agencies, departments, agents, and/or employees for their own negligence, gross negligence, or wilful misconduct. This indemnification shall not be construed as in any way affecting or limiting the rights or obligations of the Respondent or the United States or the State of New York under their various contracts or statutes.

XX. Other Applicable Laws

Respondent shall undertake all actions required by this Order in accordance with the requirements of all applicable local, state and federal laws and regulations. Respondent shall obtain all permits or approvals necessary to perform the work required by this Order. This Order does not preclude Respondent from seeking variances or exceptions to federal, state, county, or local permit requirements.

XXI. Termination and Satisfaction

The provisions of this Order shall be deemed satisfied and the obligations of the Respondent under this Order shall terminate upon Respondent's receipt of a written statement from EPA that Respondent has completed, to EPA's satisfaction, all the terms and conditions of this Consent Order, including any additional

investigatory work which EPA may determine to be necessary pursuant to this Order. At any time after Respondent completes all of the tasks required by this Order, including submitting its RFI Final Report pursuant to Section VI.1.b of this Order, submitting and implementing its ICM Workplan pursuant to Section VI.5.a and h., and submitting and receiving approval by EPA for a corrective measure study, if required by EPA, Respondent may request in writing that EPA provide Respondent with this statement of completion. Within ninety (90) days after any such request by Respondent, EPA will use its best efforts to provide Respondent with this statement of completion, or a written statement as to the basis for a refusal to provide Respondent with such statement of completion. At any time after Respondent's receipt of a written statement of refusal to provide Respondent with a statement of completion, Respondent may submit a notice of dispute and trigger the dispute resolution procedures provided in Section XXIX of this Order. If Respondent disagrees with the decision issued under the dispute resolution procedures of this Order, Respondent may then seek judicial review of the EPA determination concerning Termination and Satisfaction. EPA and Respondent agree that the determination of the dispute resolution proceeding concerning Termination and Satisfaction (i.e., whether Respondent has completed all of the tasks required by this Order) shall be deemed final agency action and subject to judicial review.

XXII. Survivability/Permit Integration

After the effective date of this Order, a RCRA/HSWA Permit may be issued to the Facility incorporating the requirements of this Order by reference into the permit. Any requirements of this Order shall not terminate upon the issuance of a permit unless the requirement(s) are expressly replaced by equivalent or more stringent requirements in the permit and EPA approves such termination.

XXIII. Modification

1. This Order may be amended by mutual agreement of Respondent and EPA and NYSDEC. Each such amendment shall be in writing, shall be signed by the Respondent first, and shall be effective ten (10) business days after it is signed by the Director of the Air and Waste Management Division, Region II, EPA, and the NYSDEC Commissioner or his designee. EPA will use its best efforts to determine when a modification has been signed and promptly give actual notice of such signing to Respondent.

2. Notwithstanding the above, the EPA Project Coordinator and the Respondent may agree to changes in the scheduling of events. Any such changes must be requested in writing by the Respondent and be approved in writing by the EPA PC.

3. No informal advice, guidance, suggestions, or comments by EPA regarding reports, plans, specifications, schedules, and any other writing submitted by the Respondent will be construed as an amendment or modification to this Order.

XXIV. Final Agency Action

1. Notwithstanding any other provision of this Order except Section XXI, no action or decision by EPA pursuant to this Order, including without limitation, decisions of the Regional Administrator, the Director of the Air and Waste Management Division for Region II, or any authorized representative of EPA, shall constitute final agency action giving rise to any rights of judicial review prior to EPA's initiation of a judicial action for a violation of this Order, including an action for penalties or an action to compel Respondent's compliance with the terms and conditions of this Order.

2. In any action brought by EPA for a violation of this Order, Respondent shall bear the burden of proving that EPA's determinations have been arbitrary and capricious, not necessary to protect human health or the environment and/or not in accordance with the law, or this Order.

XXV. Severability

If any provision or authority of this Order or the application of this Order to any party or circumstance is found to be invalid, or is temporarily stayed, the remainder of this Order shall remain in force and shall not be affected thereby.

XXVI. Force Majeure and Excusable Delay

1. Respondent shall perform all the requirements of this Order within the time limits set forth, approved, or established herein, unless the performance is prevented or delayed solely by events which constitute a force majeure. A force majeure is defined as any event arising from causes not reasonably foreseeable and beyond the control of the Respondent which could not be overcome by due diligence and which delays or prevents performance by a date required by this Order. Such events do not include unanticipated or increased costs of performance, changed economic circumstances, normal precipitation events, or failure to obtain federal, state, or local permits.

2. The Respondent shall notify the EPA PC within forty-eight (48) hours after it becomes aware of an event, which it knows or should have known, constitutes a force majeure. Within fourteen (14) days after it becomes aware of events which it knows or should know constitute a force majeure, the Respondent shall

submit to EPA a report detailing the estimated length of delay, including necessary demobilization and remobilization, its causes, measures taken or to be taken to minimize the delay, and an estimated timetable for implementation of these measures. Respondent must adopt all reasonable measures to avoid and minimize the delay. Failure to comply with the notice provision of this section shall constitute a waiver of Respondent's right to assert a force majeure and shall be grounds for EPA to deny Respondent an extension of time for performance.

3. If a force majeure has occurred, the time for performance may be extended, upon EPA approval, for a period equal to the delay resulting from such circumstances. This shall be accomplished through the procedures set forth in Section XXIII. Such an extension does not alter the schedule for performance or completion of any other tasks required by this Order unless these are also specifically altered.

XXVII. Effective Date

The effective date of the Order, and/or any modification of it, shall be the date ten (10) business days after the Director of the Air and Waste Management Division for Region II, and the Commissioner of the NYSDEC, have signed the Order and/or modification. EPA will use its best efforts to determine when the Order and/or modification has been signed and promptly give actual notice of such signing to Respondent.

XXVIII. Admissions and Denials

Respondent neither admits nor denies the EPA/NYSDEC Findings of Fact (Section IV) and the EPA/NYSDEC Conclusions of Law (Section V). However, Respondent shall have no right to contest EPA's and DEC's jurisdiction to enforce this Order or its terms and conditions.

XXIX. Dispute Resolution

1. Both parties will use their best efforts to informally and in good faith resolve all disputes and differences of opinion concerning the terms and conditions of this Order and the tasks required pursuant to it. Notwithstanding the above, if Respondent disagrees, in whole or in part, with any disapproval or modification or other decision, determination, or directive made by EPA pursuant to this Order, Respondent shall notify EPA of its objections and the basis (bases) therefore in accordance with Section XI of the Order. Said notice shall set forth the specific points of the dispute, the position Respondent is maintaining, the basis (bases) for Respondent's position, and any matters Repondent considers necessary for a resolution of the dispute. Within thirty (30) calendar days of EPA's receipt of such written notice, or as soon thereafter as possible, EPA will provide to Respondent its decision on the pending dispute, which decision shall be binding on both parties to this Order.

Decisions on major disputes will be made by the Director of the Air and Waste Management Division, or his equivalent, of the EPA, Region II. Such decisions shall not be made by the EPA PC.

2. The existence of a dispute as defined herein, and EPA's consideration of such matters as placed into dispute, shall excuse, toll and/or suspend during the pendency of the dispute resolution process the compliance obligation or deadline which is in dispute and any other obligation or deadline which is demonstrably dependent on the matters in dispute. No obligation or deadline shall be excused, tolled, or suspended, unless Respondent exercises due diligence to resolve the dispute.

XXX. Stipulated Penalties to EPA and NYSDEC

1. Unless this Order has been modified pursuant to Section XXIII, or unless the Respondent is excused under the "Force Majeure and Excusable Delay" provision of Section XXVI of this Order, if the Respondent fails to comply with any requirement, term or condition set forth in this Order, it shall pay a stipulated penalty to EPA and NYSDEC for each non-complying act as follows:

Period of Non-Compliance	Stipulated Penalty for Each Non-Complying Act Per Day
1st through 10th day	$500.00 per agency
11th through 60th day	$1,000.00 per agency
61st day and beyond	$5,000.00 per agency

2. Except as provided in paragraph seven (7) below, all penalties shall begin to accrue on the date that complete performance is scheduled to be due or a violation occurs, and shall continue to accrue through the final day or complete correction of the non-compliance. Nothing herein shall prevent the simultaneous accrual of separate penalties for separate violations of this Order, or the simultaneous accrual of stipulated penalties payable to both EPA and NYSDEC.

3. Except as provided in paragraph seven (7) below, all penalties owed to EPA and NYSDEC under this Section shall be immediately due and owing. Interest shall begin to accrue at the rate established by the Secretary of the Treasury pursuant to 31 U.S.C. §3717. Similarly, all penalties owed to NYSDEC shall be immediately due and owing. Interest shall begin to accrue at the rate set forth in Section 5004 of the Civil Practice Law and Rules.

4. Except as provided in paragraph seven (7) below, the stipulated penalty described above shall be paid within ten (10) days of each date on which the Respondent fails to comply with the terms and conditions of this Order. Stipulated penalties due and owing to EPA shall be paid by cashier's check or certified

check made payable to "Treasurer of the United States" and be mailed to:

Treasurer of the United States
Regional Hearing Clerk, EPA Region II
U.S. Environmental Protection Agency
P.O. Box 360188M
Pittsburgh, Pennsylvania 15251

unless another entity or official is designated by EPA. Stipulated penalties due and owing to NYSDEC shall be paid by cashier's check or certified check made payable to "Department of Environmental Conservation" and be mailed to:

Director, Division of Environmental Enforcement
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

unless another entity or official is designated by NYSDEC. The checks shall reference the complete name and address of the Respondent, the name of this Order and the docket number of this Order. A copy of the checks and letters forwarding the checks shall also be submitted to the EPA and NYSDEC Project Coordinators.

5. The stipulated penalties set forth above shall not in any way alter or relieve the Respondent from any obligation or responsibility imposed under the terms of this Order. Moreover, nothing in this subparagraph or Section shall be construed as prohibiting, altering, or in any way limiting the ability of

either EPA or NYSDEC to seek any other remedy, sanction or penalty for an alleged violation of the Order as an alternative to the stipulated penalty.

6. No payments made under this Section shall be used as a tax deduction by Respondent.

7. No stipulated penalty shall accrue during:

(a) the periods provided for in Section XI.1 of this Order in which Respondent is responding to EPA approvals/disapprovals, determinations, comments, modifications, and/or directives;

(b) the pendency of any dispute resolution proceeding under Section XXIX of this Order; and/or

(c) the period of time necessary to cure defects in compliance as determined by the Director of the Air and Waste Management Division in his/her decision on the dispute;

but only with respect to a compliance obligation which is under consideration by Respondent in accordance with Section XI.1, the subject of a dispute resolution proceeding, or demonstrably dependent on the matter(s) under consideration or in dispute.

XXXI. Coordination with NYSDEC and NYSDOH

EPA will use its best efforts to coordinate its approvals/disapprovals, comments, determinations, directives, and modifications under this Order with the New York State Departments of Environmental Conservation and Health (NYSDEC and NYSDOH). EPA's response to Respondent's RFI Workplan proposal, RFI Draft Report, RFI Final Report, CMS Workplan, draft CMS Report, Final CMS Report, ICM Workplan proposal for ICMs identified in this Order, and ICM Completion Report, as well as any determinations by EPA requiring additional investigative work, shall, at Respondent's request, contain a statement that EPA has made a reasonable effort to give NYSDEC and NYSDOH an adequate opportunity to consider and comment on Respondent's submission(s) and EPA's response and/or determination. The preceding sentence is not applicable to any emergency situation.

XXXII. Consent to/Authority for Issuance

Each undersigned signatory to this Order certifies that he/she is fully authorized to enter into the terms and conditions of this Order. Respondent further consents to the issuance of this Order, to its terms, and to the entry of this Order without a hearing as an Order entered pursuant to Section 3008(h) of the Act and Section 71-2727(3) of the ECL, and will not contest the jurisdiction of EPA or the DEC to issue this Order, jurisdiction

to compel compliance in any subsequent enforcement proceedings, either administrative or judicial, jurisdiction to require Respondent's full or interim compliance with the terms of the Order, or jurisdiction to seek sanctions for violations of this Order.

Donald E. Bissing — 4.25.91

Signature for FMC Corporation — Date

Donald E. Bissing

Signatory's Name (print)

Director of Operations
Agricultural Chemical Group

Signatory's Title (print)

It is so Ordered:

6/18/91

Conrad Simon, Director — Date
Air and Waste Management Division
U.S.E.P.A., Region II

5/9/91

Thomas Jorling, Commissioner — Date
New York State Department
of Environmental Conservation

ATTACHMENT I

ATTACHMENT I

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION

FMC CORP., MIDDLEPORT, NEW YORK

RCRA FACILITY INVESTIGATION

Task I: Description of Current Conditions

Task II: Pre-Investigation Evaluation of Corrective Measure Technologies

Task III: RFI Workplan Requirements

Task IV: Facility Investigation

Task V: Investigation Analysis

Task VI: Laboratory and Bench-Scale Studies

Task VII: Reports

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI)

AT

FMC CORP., MIDDLEPORT, NEW YORK

PURPOSE

The purpose of this RCRA Facility Investigation is to determine the nature and extent of releases of hazardous waste or hazardous constituents from regulated units, solid waste management units, and other source areas at the facility and to gather all necessary data to support the Corrective Measures Study, if one is determined to be necessary. The Respondent shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RCRA remedial investigation.

SCOPE

The RCRA Facility Investigation consists of seven tasks:

Task I: Description of Current Conditions

- A. Facility Background
- B. Nature and Extent of Contamination
- C. Implementation of Interim Measures

Task II: Pre-Investigation Evaluation of Corrective Measure Technologies

Task III: RFI Workplan Requirements

- A. Project Management Plan
- B. Data Collection Quality Assurance Plan
- C. Data Management Plan
- D. Health and Safety Plan
- E. Community Relations Plan

Task IV: Facility Investigation

- A. Environmental Setting
- B. Source Characterization
- C. Contamination Characterization
- D. Potential Receptor Identification

Task V: Investigation Analysis

- A. Data Analysis
- B. Protection Standards

Task VI: Laboratory and Bench-Scale Studies

Task VII: Reports

A. Preliminary and Workplan
B. Progress
C. Draft and Final

TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Respondent shall submit for U.S. EPA approval, a report providing the background information pertinent to the facility, contamination, and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

A. Facility Background

The Respondent's report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The Respondent's report shall include:

1. Map(s) depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage (with a contour interval of two (2) feet and a scale of 1 inch = 100 feet) depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface water containment areas;

   d. All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980;

   f. All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on November 19, 1980;

   g. All known past and present product and waste underground tanks or piping;

   h. Surrounding land uses (residential, commercial, agricultural, recreational); and

   i. The location of all production and ground water monitoring wells. These wells shall be clearly labeled and ground elevations and top of casing elevations and construction details included (these elevations and details may be included as an attachment).

All maps shall be consistent with the requirements set forth in 40 CFR § 270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site.

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility;

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, state, or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

4. A summary of past permits requested and/or received, any enforcement actions and their subsequent responses, and a list of documents and studies prepared for the facility.

B. Nature and Extent of Contamination

The Respondent shall prepare and submit for U.S. EPA approval, a preliminary report describing the existing information on the nature and extent of contamination.

1. The Respondent's report shall summarize all possible source areas of contamination. This, at a minimum, should include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Respondent shall identify the following:

   a. Location of unit/area (which shall be depicted on a facility map);

   b. Quantities of solid and hazardous wastes;

   c. Hazardous waste or constituents, to the extent known; and

   d. Identification of areas where additional information is necessary.

2. The Respondent shall prepare an assessment and description of the existing degree and extent of contamination. This should include:

   a. Available monitoring data and qualitative information on locations and levels of

contamination at the facility;

b. All potential migration pathways including information on geology, petrology, hydrogeology, physiography, hydrology, water quality, meteorology, and air quality; and

c. The potential impact(s) on human health and the environment, including demography, ground water and surface water use, and land use.

C. Implementation of Interim Measures

The Respondent's report shall document interim measures which were or are being undertaken at the facility. This shall include:

1. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;

2. Design, construction, operation, and maintenance requirements;

3. Schedules for design, construction and monitoring; and

4. Schedule for progress reports.

TASK II: PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURE TECHNOLOGIES

Prior to starting the facility investigation, the Respondent shall submit to EPA a report that identifies the potential corrective measure technologies that may be used on-site or off-site for the containment, treatment, remediation, and/or disposal of contamination. This report shall also identify any field data that needs to be collected in the facility investigation to facilitate the evaluation and selection of the final corrective measure or measures (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

TASK III: RFI WORKPLAN REQUIREMENTS

The Respondent shall prepare a RCRA Facility Investigation (RFI) Workplan. This RFI Workplan shall include the development of several plans which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accommodate the facility specific situation. The RFI Workplan includes the following:

A. Project Management Plan

The Respondent shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan will also include a description of the qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

B. Data Collection Quality Assurance Plan

The Respondent shall prepare a plan to document all monitoring procedures: sampling, field measurements, and sample analysis performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:

a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;

b. Description of methods and procedures to be used to assess the precision, accuracy, and completeness of the measurement data;

c. Description of the rationale used to assure that the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Examples of factors which shall be considered and discussed include:

i) Environmental conditions at the time of sampling;

ii) Number of sampling points;

iii) Representativeness of selected media; and

iv) Representativeness of selected analytical parameters.

d. Description of the measures to be taken to assure that the following data sets can be compared to each other:

i) RFI data generated by the Respondent over some time period;

ii) RFI data generated by an outside laboratory or consultant versus data generated by the Respondent;

iii) Data generated by separate consultants or laboratories; and

iv) Data generated by an outside consultant or laboratory over some time period.

e. Details relating to the schedule and information to be provided in quality assurance reports. The reports should include but not be limited to:

i) Periodic assessment of measurement data accuracy, precision, and completeness;

ii) Results of performance audits;

iii) Results of system audits;

iv) Significant quality assurance problems and recommended solutions; and

v) Resolutions of previously stated problems.

2. Sampling

The Sampling section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate sampling locations, depths, etc.;

b. Providing a statistically sufficient number of

sampling sites;

c. Measuring all necessary ancillary data;

d. Determining conditions under which sampling should be conducted;

e. Determining which media are to be sampled (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of sampling and length of sampling period;

h. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;

i. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

j. Documenting field sampling operations and procedures, including;

i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g.,filters, and adsorbing reagents);

ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Documentation of specific sample preservation method;

iv) Calibration of field devices;

v) Collection of replicate samples;

vi) Submission of field-biased blanks, where appropriate;

vii) Potential interferences present at the facility;

viii) Construction materials and techniques, associated with monitoring wells and piezometers;

ix) Field equipment listing and sample containers;

x) Sampling order; and

xi) Decontamination procedures.

k. Selecting appropriate sample containers;

l. Sample preservation; and

m. Chain-of-custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Field Measurements

The Field Measurements section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate field measurement locations, depths, etc.;

b. Providing a statistically sufficient number of field measurements;

c. Measuring all necessary ancillary data;

d. Determining conditions under which field measurements should be conducted;

e. Determining which media are to be addressed by appropriate field measurements (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of field measurement and length of field measurements period; and

h. Documenting field measurement operations and procedures, including:

i) Procedures and forms for recording raw data and the exact location, time, and

facility-specific considerations associated with the data acquisition;

ii) Calibration of field devices;

iii) Collection of replicate measurements;

iv) Submission of field-biased blanks, where appropriate;

v) Potential interferences present at the facility;

vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;

vii) Field equipment listing;

viii) Order in which field measurements were made; and

ix) Decontamination procedures.

4. Sample Analysis

The Sample Analysis section of the Data Collection Quality Assurance Plan shall specify the following:

a. Chain-of-custody procedures, including:

i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.

b. Sample storage procedures and storage times;

c. Sample preparation methods;

d. Analytical procedures, including:

i) Scope and application of the procedure;

ii) Sample matrix;

iii) Potential interferences;

iv) Precision and accuracy of the methodology; and

v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

i) Method blank(s);

ii) Laboratory control sample(s);

iii) Calibration check sample(s);

iv) Replicate sample(s);

v) Matrix-spiked sample(s);

vi) "Blind" quality control sample(s);

vii) Control charts;

viii) Surrogate samples;

ix) Zero and span gases; and

x) Reagent quality control checks.

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

C. <u>Data Management Plan</u>

The Respondent shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents.

The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. Data Record

The data record shall include the following:

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measured; and

f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each constituent monitored;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

a. Display sampling location and sampling grid;

b. Indicate boundaries of sampling area, and areas where more data are required;

c. Display levels of contamination at each sampling location;

d. Display geographical extent of contamination;

e. Display contamination levels, averages, and maxima;

f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

D. Health and Safety Plan

The Respondent shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include:

a. Facility description, including availability of resources such as roads, water supply, electricity and telephone service;

b. Describe the known hazards and evaluate the risks associated with the incident and with each activity conducted;

c. List key personnel and alternates responsible for site safety, response operations, and for protection of public health;

d. Delineate work areas;

e. Describe levels of protection to be worn by personnel in work areas;

f. Establish procedures to control site access;

g. Describe decontamination procedures for personnel and equipment;

h. Establish site emergency procedures;

i. Address emergency medical care for injuries and toxicological problems;

j. Describe requirements for an environmental surveillance program;

k. Specify any routine and special training required for responders; and

1. Establish procedures for protecting workers from weather-related problems.

2. The Facility Health and Safety Plan shall be consistent with:

   a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

   b. EPA Order 1440.1 - Respiratory Protection;

   c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

   d. Facility Contingency Plan;

   e. EPA Standard Operating Safety Guide (1984);

   f. OSHA regulations particularly in 29 CFR §§ 1910 and 1926;

   g. State, local, and other federal agency (e.g., DOD, DOE) regulations; and

   h. Other EPA guidance as provided.

E. Community Relations Plan

The Respondent shall prepare a plan, for the dissemination of information to the public regarding investigation activities and results.

TASK IV: FACILITY INVESTIGATION

The Respondent shall conduct those investigations necessary to: characterize the facility (Environmental Setting); define the source (Source Characterization); define the degree and extent of contamination (Contamination Characterization); and identify actual or potential receptors (Potential Receptors).

The investigations should result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study, if one is determined to be necessary.

The site investigation activities shall follow the plans set forth in Task III. All sampling and analyses shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Respondent shall collect information to supplement and verify existing information on the environmental setting at the facility. The Respondent shall characterize the following:

1. Hydrogeology

The Respondent shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground water flow beneath the facility, including:

i) Regional and facility specific stratigraphy: description of strata including strike and dip, identification of stratigraphic contacts;

ii) Structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);

iii) Depositional history;

iv) Identification and characterization of areas and amounts of recharge and discharge;

v) Regional and facility specific ground water

flow patterns; and

vi) Characterize seasonal variations in the ground water flow regime.

b. An analysis of any topographic features that might influence the ground water flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis.)

c. Based on field data, test, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:

i) Hydraulic conductivity and porosity (total and effective);

ii) Lithology, grain size, sorting, degree of cementation;

iii) An interpretation of hydraulic interconnections between saturated zones; and

iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral content etc.).

d. Based on field studies and cores, structural geology, and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

i) Sand and gravel deposits in unconsolidated deposits;

ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

iii) Zones of higher permeability or lower permeability that might direct and restrict the flow of contaminants;

iv) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs; and

v) Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

e. Based on data obtained from ground water monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:

i) Water-level contour and/or potentiometric maps;

ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system, including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences.

f. A description of manmade influences that may affect the hydrogeology of the site, identifying:

i) Active and inactive local water-supply and production wells with an approximate schedule of pumping; and

ii) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

2. Soils

The Respondent shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include but not be limited to, the following information:

a. SCS soil classification;

b. Surface soil distribution;

c. Soil profile, including ASTM classification of soils;

d. Transects of soil stratigraphy;

e. Hydraulic conductivity (saturated and unsaturated);

f. Relative permeability;

g. Bulk density;

h. Porosity;

i. Soil sorptive capacity;

j. Cation exchange capacity (CEC);

k. Soil organic content;

l. Soil pH;

m. Particle size distribution;

n. Depth of water table;

o. Moisture content;

p. Effect of stratification on unsaturated flow;

q. Infiltration

r. Evapotranspiration;

s. Storage capacity;

t. Vertical flow rate; and

u. Mineral content.

3. Surface Water and Sediment

The Respondent shall conduct a program to characterize the surface water bodies in the vicinity of the facility. Such characterization shall include, but not be limited to, the following activities and information:

a. Description of the temporal and permanent surface water bodies including:

i) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

ii) For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;

iii) For streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100 year event);

iv) Drainage patterns; and

v) Evapotranspiration.

b. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3, NO_3^-/NO_2^-, PO_4^{-3}), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

c. Description of sediment characteristics including:

i) Deposition area;

ii) Thickness profile; and

iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

4. Air

The Respondent shall provide information characterizing the climate in the vicinity of the facility. Such information shall include, but not be limited to:

a. A description of the following parameters:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

b. A description of topographic and manmade features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface water bodies (e.g., rivers, lakes, bays, etc.);

iv) Wind breaks and forests; and

v) Buildings.

B. Source Characterization

The Respondent shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, collected, or removed, including: type; quantity; physical form; disposition (containment or nature of deposits); and facility characteristics affecting release (e.g., facility security, and engineered barriers). This shall include quantification of the following specific characteristics at each source area:

1. Unit/Disposal Area characteristics:

a. Location of unit/disposal area;

b. Type of unit/disposal area;

c. Design features;

d. Operating practices (past and present);

e. Period of operation;

f. Age of unit/disposal area;

g. General physical conditions; and

h. Method used to close the unit/disposal area.

2. Waste Characteristics:

a. Type of waste placed in the unit;

i) Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing, or reducing agent);

ii) Quantity; and

iii) Chemical composition.

b. Physical and chemical characteristics;

i) Physical form (solid, liquid, gas);

ii) Physical description (e.g., powder, oily sludge);

iii) Temperature;

iv) pH;

v) General chemical class (e.g., acid, base, solvent);

vi) Molecular weight;

vii) Density;

viii) Boiling point;

ix) Viscosity;

x) Solubility in water;

xi) Cohesiveness of the waste;

xii) Vapor pressure.

xiii) Flash point

c. Migration and dispersal characteristics of the waste;

i) Sorption;

ii) Biodegradability, bioconcentration, biotransformation;

iii) Photodegradation rates;

iv) Hydrolysis rates; and

v) Chemical transformations.

The Respondent shall document the procedures used in making the above determinations.

C. Contamination Characterization

The Respondent shall collect analytical data on ground water, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, conditions during sampling, and the identity of the individuals performing the sampling and analysis. The Respondent shall address the following types of contamination at the facility:

1. Ground Water Contamination

The Respondent shall conduct a Ground Water Investigation to characterize any plumes of contamination at the facility. This investigation shall, at a minimum, provide the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of Appendix IX constituents in the plume(s);

e. An evaluation of factors influencing the plume movement; and

f. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

The Respondent shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include

the following information:

a. A description of the vertical and horizontal extent of contamination.

b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation, and other factors that might affect contaminant migration and transformation.

c. Specific contaminant concentrations.

d. The velocity and direction of contaminant movement.

e. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations.

3. Surface Water and Sediment Contamination

The Respondent shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the facility. The investigation shall include, but not be limited to, the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant movement;

c. The contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.;

The Respondent shall document the procedures used in making the above determinations.

4. Air Contamination

The Respondent shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminants(s) released, including horizontal and vertical concentration profiles. The Respondent shall document the procedures used in making the above determinations.

5. Subsurface Gas Contamination

The Respondent shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous constituents in the ground water. This investigation shall include the following information:

a. A description of the horizontal and vertical extent of subsurface gas mitigation;

b. The chemical composition of the gases being emitted;

c. The rate, amount, and density of the gases being emitted; and

d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Respondent shall document the procedures used in making the above determinations.

D. <u>Potential Receptors</u>

The Respondent shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

1. Local uses and possible future uses of ground water:

   a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

   b. Location of ground water users including wells and discharge areas.

2. Local uses and possible future uses of surface waters draining the facility:

   a. Domestic and municipal (e.g., potable and lawn/garden watering);

   b. Recreational (e.g., swimming, fishing);

   c. Agricultural;

   d. Industrial; and

   e. Environmental (e.g., fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including but not limited to:

   a. Recreation;

   b. Hunting;

   c. Residential;

   d. Commercial;

   e. Zoning; and

   f. Relationship between population locations and prevailing wind direction.

4. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A description of the ecology overlying and adjacent to the facility.

6. A demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to: age, sex, and sensitive subgroups.

7. A description of any endangered or threatened species near the facility.

TASK V: INVESTIGATION ANALYSIS

The Respondent shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study, if one is determined to be necessary.

A. Data Analysis

The Respondent shall analyze all facility investigation data outlined in Task IV and prepare a report on the type and extent of contamination at the facility including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area.

B. Protection Standards

1. Ground Water Protection Standards

For regulated units, the Respondent shall provide information to support the Agency's selection/development of Ground Water Protection Standards for all of the Appendix IX constituents found in the ground water during the Facility Investigation (Task IV).

a. The Ground Water Protection Standards shall consist of:

i) for any constituents listed in Table 1 of 40 CFR § 264.94, the respective value given in that table (MCL) if the background level of the constituent is below the value given in Table 1; or

ii) the background level of that constituent in the ground water; or

iii) a U.S. EPA approved Alternate Concentration Limit (ACL).

b. Information to support the Agency's subsequent selection of Alternate Concentration Limits (ACLs) shall be developed by the Respondent in accordance with U.S. EPA guidance. For any proposed ACLs, the Respondent shall include a justification based upon the criteria set forth in 40 CFR § 264.94(b).

c. After receipt and review of any proposed ACLs, the U.S. EPA shall notify the Respondent in writing of approval, disapproval or modifications. The U.S. EPA shall specify, in writing, the reason(s) for any disapproval or modification.

d. Within sixty (60) days of receipt of the U.S. EPA's notification or disapproval of any proposed ACL, the Respondent shall withdraw the application or amend and submit revisions to the U.S. EPA.

2. For all other units or areas of contamination, the Respondent shall propose a ground water protection standard for each Appendix IX constituent found in the ground water and provide adequate information to support this proposal, including a justification based upon the criteria set forth in 40 CFR § 264.94(b)..

a. The proposed ground water protection standard will be reviewed by EPA in accordance with U.S. EPA guidance for ACLs.

b. After receipt and review of any proposed ground water protection standards, the U.S. EPA shall notify the Respondent in writing of approval, disapproval or modifications. The U.S. EPA shall specify in writing the reason(s) for any disapproval or modification.

c. Within sixty (60) days of receipt of the U.S. EPA's notification or disapproval of any proposed ACL, the Respondent shall withdraw the proposal or amend and submit revisions to the U.S. EPA.

3. Other Relevant Protection Standards

The Respondent shall identify all relevant and applicable standards for the protection of human health and the environment (e.g., National Ambient Air Quality Standards, Federally-approved State water quality standards, etc.).

TASK VI: LABORATORY AND BENCH-SCALE STUDIES

The Respondent shall conduct laboratory and/or bench scale studies to determine the applicability of a corrective measure technology or technologies to facility conditions. The Respondent shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Respondent shall develop a testing plan identifying the type(s) and goal(s) of the study(s), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Respondent shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Respondent shall prepare a report summarizing the testing program and its results, both positive and negative.

TASK VII: REPORTS

A. Preliminary and Workplan

The Respondent shall submit to the EPA reports on Tasks I and II when it submits the RCRA Facility Investigation Workplan (Task III).

B. Progress

The Respondent shall at a minimum provide the EPA with signed, quarterly progress reports containing:

1. A description and estimate of the percentage of the RFI completed;
2. Summaries of all findings;
3. Summaries of all changes made in the RFI during the reporting period;
4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during the reporting period;
8. Projected work for the next reporting data, etc.

C. Draft and Final

Upon completion by Respondent of Tasks IV and V and receipt of EPA's approval, the Respondent shall prepare a RCRA Facility Investigation Report to present the results of Tasks IV-V. The RCRA Facility investigation Report shall be developed in draft form for U.S. EPA review. The RCRA Facility Investigation Report shall be developed in final format incorporating comments received on the Draft RCRA Facility Investigation Report. Task VI shall be submitted as a separate report when the Final RCRA Facility Investigation Report is submitted.

ATTACHMENT II

ATTACHMENT II

SCOPE OF WORK FOR CORRECTIVE MEASURES STUDY

FMC CORP., MIDDLEPORT, NEW YORK

CORRECTIVE MEASURE STUDY

Task VIII: Identification and Development of the Corrective Measure Alternative or Alternatives

Task IX: Evaluation of the Corrective Measure Alternative or Alternatives

Task X: Justification and Recommendation of the Corrective Measure or Measures

Task XI: Reports

SCOPE OF WORK FOR A CORRECTIVE MEASURE STUDY

AT

FMC CORPORATION, MIDDLEPORT, NEW YORK

PURPOSE

The purpose of this Corrective Measure Study (CMS) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measure or measures to be taken at FMC Corporation. The Respondent will furnish the personnel, materials, and services necessary to prepare the corrective measure study, except as otherwise specified.

SCOPE

The Corrective Measure Study consists of four tasks:

Task VIII: Identification and Development of the Corrective Measure Alternative or Alternatives

- A. Description of Current Situation
- B. Establishment of Corrective Action Objectives
- C. Screening of Corrective Measures Technologies
- D. Identification of the Corrective Measure Alternative or Alternatives

Task IX: Evaluation of the Corrective Measure Alternative or Alternatives

- A. Technical/Environmental/Human Health/Institutional
- B. Cost Estimate

Task X: Justification and Recommendation of the Corrective Measure or Measures

- A. Technical
- B. Environmental
- C. Human Health

Task XI: Reports

- A. Progress
- B. Draft
- C. Final

TASK VIII: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the RCRA Facility Investigation and consideration of the identified Preliminary Corrective Measure Technologies (Task II), the Respondent shall identify, screen, and develop the alternative or alternatives for removal, containment, treatment, and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Respondent shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Report. The Respondent shall provide an update to information presented in Task I of the RFI to the Agency regarding previous response activities and any interim measures which have or are being implemented at the facility. The Respondent shall also make a facility-specific statement of the purpose for the response, based on the results of the RCRA Facility Investigation. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

After consultation with Respondent, EPA will establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable Federal statutes. At a minimum, all corrective actions concerning ground water releases from regulated units must be consistent with, and as stringent as, those required under 40 CFR § 264.100.

C. Screening of Corrective Measure Technologies

The Respondent shall review the results of the RCRA Facility Investigation and reassess the technologies specified in Task II and identify additional technologies which are applicable at the facility. The Respondent shall screen the preliminary corrective measure technologies identified in Task II of the RCRA Facility Investigation and any supplemental technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable

time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations. Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

   Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration;

2. Waste Characteristics

   Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site); and

3. Technology Limitations

   During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. <u>Identification of the Corrective Measure Alternative or Alternatives</u>

The Respondent shall develop the Corrective measure alternative or alternatives based on the corrective action objectives and analysis of Preliminary Corrective Measure Technologies, as presented in Task II of the RCRA Facility investigation and as supplemented following the preparation of the RFI Report. The Respondent shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective

action alternative or alternatives. The alternative or alternatives developed should represent a workable number of option(s) that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Respondent shall document the reasons for excluding technologies, identified in Task II, as supplemented in the development of the alternative or alternatives.

TASK IX: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVE OR ALTERNATIVES

The Respondent shall describe each corrective measure alternative that passes through the Initial Screening in Task VIII and evaluate each corrective measure alternative and its components. The evaluation shall be based on technical, environmental, human health, and institutional concerns. The Respondent shall also develop cost estimates of each corrective measure.

A. Technical/Environmental/Human Health/Institutional

The Respondent shall provide a description of each corrective measure alternative which includes, but is not limited to, the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. The Respondent shall evaluate each alternative in the four following areas:

1. Technical;

The Respondent shall evaluate each corrective measure alternative based on performance, reliability, implementability and safety.

a. The Respondent shall evaluate performance based on the effectiveness and useful life of the corrective measure:

i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies; and

ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the

projected service lives of its component technologies. Resource availability in the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. The Respondent shall provide information on the reliability of each corrective measure including its operation and maintenance requirements and its demonstrated reliability:

i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Respondent should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

c. The Respondent shall describe the implementability of each corrective measure including the relative ease of installation (constructability) and the time required to achieve a given level of response:

i) Constructability is determined by conditions both internal and external to the facility conditions and include such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Respondent shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which

affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and

ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Respondent shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental;

The Respondent shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of: the short and long term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

3. Human Health; and

The Respondent shall assess each alternative in terms of the extent to which it mitigates short and long term potential exposure to any residual contamination and protects human health both during and after implementation the corrective measure. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected populations. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to EPA.

4. Institutional.

The Respondent shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, State and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. Cost Estimate

The Respondent shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (non-construction and overhead) costs.

a. Direct capital costs include:

i) Construction costs: Costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure.

ii) Equipment costs: Costs of treatment, containment, disposal, and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;

iii) Land and site-development costs: Expenses associated with purchase of land and development of existing property; and

iv) Buildings and services costs: Costs of process and non-process buildings, utility connections, purchased services, and disposal costs.

b. Indirect capital costs include:

i) Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;

ii) Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;

iii) Start-up and shakedown costs: Costs incurred during corrective measure start-up; and

iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Respondent shall consider the following operation and maintenance cost components:

a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxiliary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;

f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs: Items that do not fit any of the above categories.

TASK X: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES

The Respondent shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The U.S. EPA will select the corrective measure alternative or alternatives to be implemented based on the results of Tasks IX and X. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measure or measures which can be constructed and operated to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure or measures must comply with existing U.S. EPA criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment will be favored.

TASK XI: REPORTS

The Respondent shall prepare a Corrective Measure Study Report presenting the results of Task VIII through X and recommending a corrective measure alternative.

A. Progress Reports

The Respondent shall, at a minimum, provide the U.S. EPA with signed, quarterly progress reports containing:

1. A description and estimate of the percentage of the CMS completed;
2. Summaries of all findings;
3. Summaries of all changes made in the CMS during the reporting period;
4. Summaries of all contacts with representatives of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

B. Draft Corrective Measures Study Report

The Report shall at a minimum include:

1. A description of the facility;
   a. Site topographic map & preliminary layouts.
2. A summary of the corrective measure or measures;
   a. Description of the corrective measure or measures and rationale for selection;
   b. Performance expectations;
   c. Preliminary design criteria and rationale;

d. General operation and maintenance requirements; and

e. Long term monitoring requirements.

3. A summary of the RCRA Facility Investigation and impact on the selected corrective measure or measures;

a. Field studies (ground water, surface water, soil, air); and

b. Laboratory studies (bench scale, pick scale).

4. Design and Implementation Precautions;

a. Special technical problems;

b. Additional engineering data required;

c. Permits and regulatory requirements;

d. Access, easements, right-of-way;

e. Health and safety requirements; and

f. Community relations activities.

5. Cost Estimates and Schedules;

a. Capital cost estimate;

b. Operation and maintenance cost estimate; and

c. Project schedule (design, construction, operation).

C. <u>Final Corrective Measures Study Report</u>

The Respondent shall finalize the Corrective Measure Study Report incorporating comments received from EPA on the Draft Corrective Measure Study Report.