ENVIRONMENTAL CONSULTING & MANAGEMENT
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March 31, 2009

Mr. John R. Strang
New York State Department of Environmental Conservation
1130 North Westcott Road
Schenectady, New York 12306-2014

Re: PCBs in Hudson River Sediment
Rensselaer, New York

Dear Mr. Strang:

As you are aware, it has recently come to BASF Corporation's (BASF) attention that PCBs have been discovered in Hudson River sediment in an area in the vicinity of BASF's Rensselaer facility. On behalf of BASF, I am providing a brief summary of its historic factual and scientific investigation of PCBs at its Rensselaer facility (Facility or Site). That investigation concluded with the concurrence of the New York State Department of Environmental Conservation (NYSDEC) that PCBs were not a site chemical of concern. As such, there is no evidence that the Rensselaer Facility is a source of the recently identified PCBs.

BASF has been provided with Hudson River sediment data recently collected in support of the ongoing FirstLight/Empire Generating Project (FirstLight/Empire) diffuser pipe installation project. That data suggests that elevated levels of particular PCB mixtures (Aroclors) are present in the river sediment in the vicinity of BASF's Rensselaer facility. We understand that, as part of the FirstLight/Empire geotechnical sampling program conducted in support of the diffuser pipe engineering, nine sediment samples were collected by FirstLight/Empire in June 2008. These samples were collected from three cores located immediately to the south of the proposed diffuser pipe and submitted for PCB Aroclor analysis (Exhibit A). PCBs in the FirstLight/Empire data set were detected at depths ranging from surficial sediment to 10 to 12 feet. The sole PCB mixture detected in these nine samples was Aroclor 1242.[1]

As a follow-up to this recent finding, historical sediment data collected in 2001 by FirstLight/Empire's predecessor-in-interest, Besicorp, were obtained and also reviewed (Exhibit B). That data indicated that Aroclors 1242 and 1248 were detected in a general area near the BASF site[2] (Exhibit C). These results were consistent with the Aroclor 1242 concentration range observed in the United States Environmental Protection Agency

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[1] Concentrations of Aroclor 1242 in these samples ranged from at or near detection limit to 220 parts per million (ppm) (mean = 40.4 ppm).

[2] Aroclor 1242 was present in sediment at concentrations ranging from 1.8 to 62 ppm near the facility. The maximum concentration of Aroclor 1262 (62 ppm) was located 100 feet north of known VOC impacts from the Facility. Aroclor 1248 was detected in two samples, at concentrations of 2.7 and 40 ppm.

(USEPA) dataset. Given the new information, BASF undertook a review to determine whether these PCB Aroclors are related to the BASF Rensselaer facility. This review again confirmed that there is no evidence that the Rensselaer facility is the source of PCB Aroclors detected in the river sediment.

Historical Fact Investigation

BASF has been investigating and remediating its Rensselaer facility for a number of years. In conjunction with this work it has undertaken a comprehensive examination of historical operations. It has found no history of PCBs in operational use at the Site, nor of delivery of PCB-containing materials to the Site. A review of operational records by BASF has determined that PCBs were not employed as part of any process, technology, or treatment system used at the facility. However, there was limited use of PCBs in transformers and capacitors. There is no history of releases associated with this equipment and BASF has confirmed that this equipment was properly disposed of (Exhibit D).

Historical Sampling Investigation of BASF'S Facility

The remedial investigation of the Rensselaer facility consisted of investigations of the Main Plant and Lagoon areas, the Closed Landfill, and the South 40 parcel[3]. PCBs were included in the analyte list for the initial investigations of all of the parcels at the Facility. However, based on lack of significant detections, with the knowledge and agreement of the NYSDEC, PCBs were removed from the analyte list for all subsequent investigation phases[4].

A review of the historical soil data set collected during the 1999, 2000, and 2002 upland Remedial Investigation indicated that PCBs were not detected in the majority of samples (75% of the soil samples had no PCBs detected). When PCBs were detected, they were present at ultra low concentrations (average total PCB concentrations were well below 0.5 ppm; maximum total PCB concentrations were 3.90 ppm). Significantly, Aroclor 1242 was detected only once at 0.026 ppm[5] (Exhibit E). Based on this information,

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[3] Remedial Investigation and Supplemental Remedial Investigation Report (Roux Associates, November 13, 2000); Site Investigation Report, South 40 Parcel (Roux Associates, May 3, 2001); and Voluntary Cleanup Program Site Investigation Report, BASF Corporation Closed Landfill (Roux Associates, September 5, 2002).

[4] Pesticides were also removed from the analyte list because of a lack of significant detections during the initial remedial investigations.

[5] PCBs were analyzed in 71 samples from 52 locations that included source Areas of Concern in the Main Plant, Closed Landfill and South 40 parcels.

- Arocor 1254 was detected in 13 samples from 11 locations:
    - 12 of the 13 detections were in the range 0.013 – 0.2 parts per million (ppm), with an average detection of 0.13 ppm.
    - 3.2 ppm was detected in MP-SB-107 from the Main Plant. This was the only detection above 1 ppm during the RI.
- Aroclor 1260 was detected in eight samples from seven locations:
- The range detected was 0.006 – 0.12 ppm, with an average detection of 0.05 ppm.
- Aroclor 1232 was detected in one sample at 0.25 ppm.
- Aroclor 1242 was detected only once; in a background soil sample at 0.026 ppm.
- Aroclor 1248 was not detected.

BASF and the NYSDEC concluded that the Rensselaer facility was not a potential source of PCBs to the Hudson River (Exhibit F at page 7).

PCB Aroclors Detected Throughout the Hudson River.
Riverwide data from the USEPA Hudson River database indicates that PCB Aroclor 1242 is present upstream and downstream of BASF's facility at similar concentrations to those found in the immediate vicinity of the Site. Upward of 130 ppm, Aroclor 1242 was found several miles upstream of the Site (Exhibit G). Moreover, a February 2002 USEPA Record Of Decision calls for targeted environmental dredging and removal of approximately 2.65 million cubic yards of PCB-contaminated sediment from a 40-mile stretch of the Upper Hudson River (Hudson River PCBs Site Record of Decision - USEPA Identification Number NYD980763841).

In summary, the PCB detections in the sediment in the vicinity of the coffer dam were all Aroclor 1242 at concentrations up to 220 ppm. These sediment detections are not consistent with the limited, low concentration detections at the BASF facility both in terms of concentration range and Aroclor, but are consistent with ubiquitous PCB detections in Hudson River sediment. Based on USEPA data from cores upstream and downstream of the BASF Rensselaer facility, detections of Aroclor 1242 as high as 131 ppm were observed. Thus, it is clear that the PCBs recently detected in the Hudson River sediment are not related to the BASF Rensselaer facility.

If you have any questions, or require additional information, please do not hesitate to call.

Sincerely,

ROUX ASSOCIATES, INC.

Nathan Epler

Nathan Epler, Ph.D.
Principal Hydrogeologist

Attachments

cc: Maureen Schuck, New York State Department of Health
Chris O'Neill, New York State Department of Environmental Conservation
Corbin Gosier, New York State Department of Environmental Conservation
Doug Reid-Green, BASF Corporation
Wayne St. Claire, BASF Corporation
Nan Bernardo, BASF Corporation
Maureen Paukert, BASF Corporation
Hank Martin, Environmental Liability Management
John Bleiler, AECOM Environment
Charlie McGuckin, Roux Associates, Inc.

John Strang - Transmittal of Letter Re: PCBs in Hudson River sediment

From: Nathan Epler <nepler@rouxinc.com>
To: "John Strang" <jrstrang@gw.dec.state.ny.us>
Date: 3/31/2009 11:45 AM
Subject: Transmittal of Letter Re: PCBs in Hudson River sediment
CC: "Christopher O'neill" <cxoneill@gw.dec.state.ny.us>, "Corbin Gosier" <cjgosier@gw.dec.state.ny.us>, <hmartin@ehminc.com>, <douglas.reid-green@basf.com>, "John Bleiler" <John.Bleiler@aecom.com>, "Maureen Schuck" <mer10@health.State.ny.us>, <nan.bernardo@basf.com>, "J Wayne St. Clair" <wayne.stclair@basf.com>, "Charlie McGuckin" <cmcguckin@rouxinc.com>, "Gilbert Molkentin" <gmolkentin@rouxinc.com>
Attachments: bf0251.0011y517.lr.pdf

Dear Mr. Strang:

Attached is the electronic version of the letter regarding PCBs in the Hudson river sediment at the BASF Site in Rensselaer, NY.

You should have received the exhibits that go with this letter via FEDEX this morning.

If you have any questions, do not hesitate to call.

Nathan Epler, Ph.D.
Principal Hydrogeologist

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Roux 3/30/09 letter Exhibits

EXHIBIT A	FIRST LIGHT/EMPIRE CORING DATA
EXHIBIT B	BESICORP DATA
EXHIBIT C	FIGURE OF SAMPLING LOCATIONS
EXHIBIT D	NYS INDUSTRIAL HAZARDOUS WASTE MANAGEMENT FORMS
EXHIBIT E	PCB RESULTS FROM SOIL SAMPLES COLLECTED DURING UPLAND REMEDIAL INVESTIGATIONS
EXHIBIT F	NYSDEC PROPOSED REMEDIAL ACTION PLAN --- BASF MANUFACTURING PLANT ---OU 1
EXHIBIT G	FIGURE – EPA DATA SET

EXHIBIT A

FIRSTLIGHT/EMPIRE CORING DATA

LG CONSTRUCTORS
HUDSON RIVER DRILLING - BASF
SEDIMENT SAMPLE LAB RESULTS

Sample ID	OFB-1, S-1	OFB-1, S-2	OFB-1, S-3	OFB-1, S-4	OFB-2, S-1	OFB-2, S-3	OFB-2, S-4	OFB-3, S-1	OFB-3, S-2	OFB-3, S-3	Sediment Criteria	Part 375 Restricted	TCLP Limits (3)
Sample Depth	0-2'	2-4'	5-7'	10-12'	0-2'	5-7'	10-12'	0-2'	5-7'	10-12'	Human Health	Industrial Stds (2)	
Test Parameter											Bioaccumulation(1)		
VOCs (all ppb)	ND	NA											
Methylene chloride			23		11						NS	1,000,000	
Chlorobenzene				730,000		470,000	48,000	1,100,000	250,000	830	NS	1,000,000	
Acetone						66,000					NS	1,000,000	
Toluene								25,000			NS	1,000,000	
Benzene										150	600	89,000	
Total VOCs			23	730,000	11	536,000	48,000	1,125,000	250,000	980	NS	1,000,000	
SVOCs (all ppb)	NA		ND										
Di-n-butyl phthalate		550									NS	NS	
Bis(2-ethylhexyl)phthalate		910									NS	NS	
1,2-Dichlorobenzene				61,000			130,000	29,000	1,100,000		NS	1,000,000	
1,3-Dichlorobenzene							20,000				NS	560,000	
1,4-Dichlorobenzene							19,000		260,000	850	NS	250,000	
4-Methylphenol				18,000			15,000	20,000			NS	NS	
1,2,4-Trichlorobenzene				27,000		44,000	68,000		3,200,000		NS	NS	
Naphthalene				49,000						1600	NS	1,000,000	
2-Chloronaphthalene				110,000							NS	NS	
Carbazole				18,000							NS	NS	
Phenanthrene					1900					530	NS	1,000,000	
Anthracene					1000		14,000				NS	1,000,000	
Fluoranthene					1900					1200	NS	1,000,000	
Pyrene					1500					1100	NS	1,000,000	
Benz(a)anthracene					1000					540	1,300	11,000	
Chrysene					800					530	1,300	110,000	
Benzo(b)fluoranthene					650						1,300	11,000	
Benzo(k)fluoranthene					780						1,300	110,000	
Benzo(a)pyrene					650						1,300	1,100	
N-Nitrosodiphenylamine							11,000		1,200,000	5800	NS	NS	
4-Chloroaniline										880	NS	NS	
Total SVOCs		A 1500		C 283,000	B 10,180	C 44,000	C 277,000	C 49,000	5,760,000	A 13,530	NS	1,000,000	
Pesticides (all ppb)	NA	ND		ND	ND					ND			
4,4'-DDT			66						160		10	94,000	
beta-BHC			ND			1000		1900			NS	14,000	
alpha-Chlordane							330				1.0	47,000	
delta-BHC							610				NS	1,000,000	
4,4'-DDE									6.2		10	120,000	
gamma-Chlordane								1500			1.0	NS	
Endrin aldehyde									6.4		NS	NS	
Heptachlor epoxide									5.7		0.8	NS	
Total Pesticides	0	0	66	0	0	1000	940	3400	178.3	0	NS	1,000,000	
PCBs (all ppb)	NA								ND	ND			
Aroclor-1242		470	6300	68,000	440	220,000	16,000	91,000			0.8	25,000	
Metals (all ppm)	NA												
Aluminum		5130	6340	15,700	8810	18,700	8210	17,500	5880	10,800	NS	NS	
Antimony		ND	ND	7.81	ND	17.2	ND	9.68	ND	ND	2 (L) 25 (S)	NS	
Arsenic		ND	ND	A 2.12	ND	ND	A 0.538	ND	A 0.548	A 2.89	6 (L), 33 (S)	16	
Barium		39.1	50.2	286	58.7	298	81.7	196	39.5	152	NS	10,000	
Beryllium		ND	ND	0.669	ND	0.633	ND	0.787	ND	0.527	NS	2,700	
Cadmium		ND	ND	18	ND	68.4	2.87	23.3	ND	1.45	0.6 (L) 9 (S)	60	
Calcium		2760	13,800	8840	2010	7970	3180	8880	2700	5570	NS	NS	

US CONSTRUCTORS
HUDSON RIVER DRILLING - BASF
SEDIMENT SAMPLE LAB RESULTS

Sample ID	OFB-1, S-1	OFB-1, S-2	OFB-1, S-3	OFB-1, S-4	OFB-2, S-1	OFB-2, S-3	OFB-2, S-4	OFB-3, S-1	OFB-3, S-2	OFB-3, S-3	Sediment Criteria	Part 375 Restricted	TCLP Limits (3)
Sample Depth	0'-2'	2'-4'	5'-7'	10'-12'	0'-2'	5'-7'	10'-12'	0'-2'	5'-7'	10'-12'	Human Health	Industrial Sites (2)	
Test Parameter											(Bioaccumulation(1))		
Chromium		10.4	22	380	12.8	815	182	452	67.7	520	26 (L); 110 (S)	6800	
Cobalt		4.34	5.45	11.1	5.84	7.93	6.91	12.5	3.02	8.83	NS	NS	
Copper		7.35	13.2	180	9.2	189	67.2	190	35.8	93.7	16 (L); 110 (S)	10,000	
Iron		10,900	14,800	16,800	11,300	18,800	15,800	25,800	12,900	18,200	20,000 (L); 40,000 (S)	NS	
Lead		11	23.7	280	14.3	754	143	382	76.4	152	31 (L); 110 (S)	3,900	
Magnesium		2890	3480	6630	3880	5850	3730	6810	2060	4860	NS	NS	
Manganese		207	206	326	272	578	285	886	333	578	460 (L); 1100 (S)	10,000	
Mercury		ND	ND	0.488	0.026	2.14	0.42	0.436	0.864	2.92	0.15 (L); 1.3 (S)	5.7	
Nickel		8.91	14.6	32.4	13.1	23.6	18	30.8	19.2	18.6	16 (L); 50 (S)	10,000	
Potassium		309	981	1440	458	1330	740	1370	406	1020	NS	NS	
Sodium		150	211	411	101	372	256	278	320	285	NS	NS	
Vanadium		8.19	11.8	47.2	13.3	126	21.61	59.2	12.2	22.5	NS	NS	
Zinc		56.1	91.3	452	72.9	798	340	483	98.7	229	120 (L); 270 (S)	10,000	
Total metals		22,568.39	35,492.75	52,090.80	24,851.37	54,472.87	22,670.14	63,222.53	25,420.72	41,837.82	NS	10,000,000	
Hazardous Waste Characteristics	NA												
TCLP													
Arsenic (ppm)		ND	ND	0.07	ND	ND	ND	0.05	ND	ND			5.0
Barium (ppm)		0.34	0.49	0.93	0.57	1.07	0.50	0.78	0.49	0.78			100
Cadmium (ppm)		ND	ND	0.28	ND	0.26	ND	0.06	ND	ND			1.0
Chromium (ppm)		ND	ND	N	ND	0.06	ND	ND	ND	ND			5.0
Lead (ppm)		0.06	0.09	0.71	ND	0.84	0.16	0.52	0.44	0.29			5.0
Cresols - total (ppb)		ND	ND	430			320	520	240	ND			200,000
1,4-Dichlorobenzene (ppb)		ND	ND	150		200	960	100	890	ND			7500
Benzene (ppb)		ND	ND	120		130	ND	520	580	ND			500
Chlorobenzene (ppb)		ND	ND	20,000		12,000	8500	34,000	11,000	28			100,000
Ignitability		Not ignitable	Not ignitable	Not ignitable	Not ignitable	Not ignitable	Not ignitable	Not ignitable	Not ignitable	Not ignitable			
Corrosivity		Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive	Non-corrosive			
Reactivity		Not reactive	Not reactive	Not reactive	Not reactive	Not reactive	Not reactive	Not reactive	Not reactive	Not reactive			

NOTES:

(1) NYSDEC Technical Guidance for Screening Contaminated Sediments, January 1999. Two levels of risk have been established for metals contamination in sediments. These are the Lowest Effect Level (signified as L) and the Severe Effect Level (signified as S). A sediment is considered contaminated if either criterion is exceeded.

(2) Restricted Use Soil Cleanup Objectives for Industrial Properties as outlined in New York Codes, Rules, and Regulations (NYCRR) Title 6 Part 375, Subpart 6, Section 8(b).

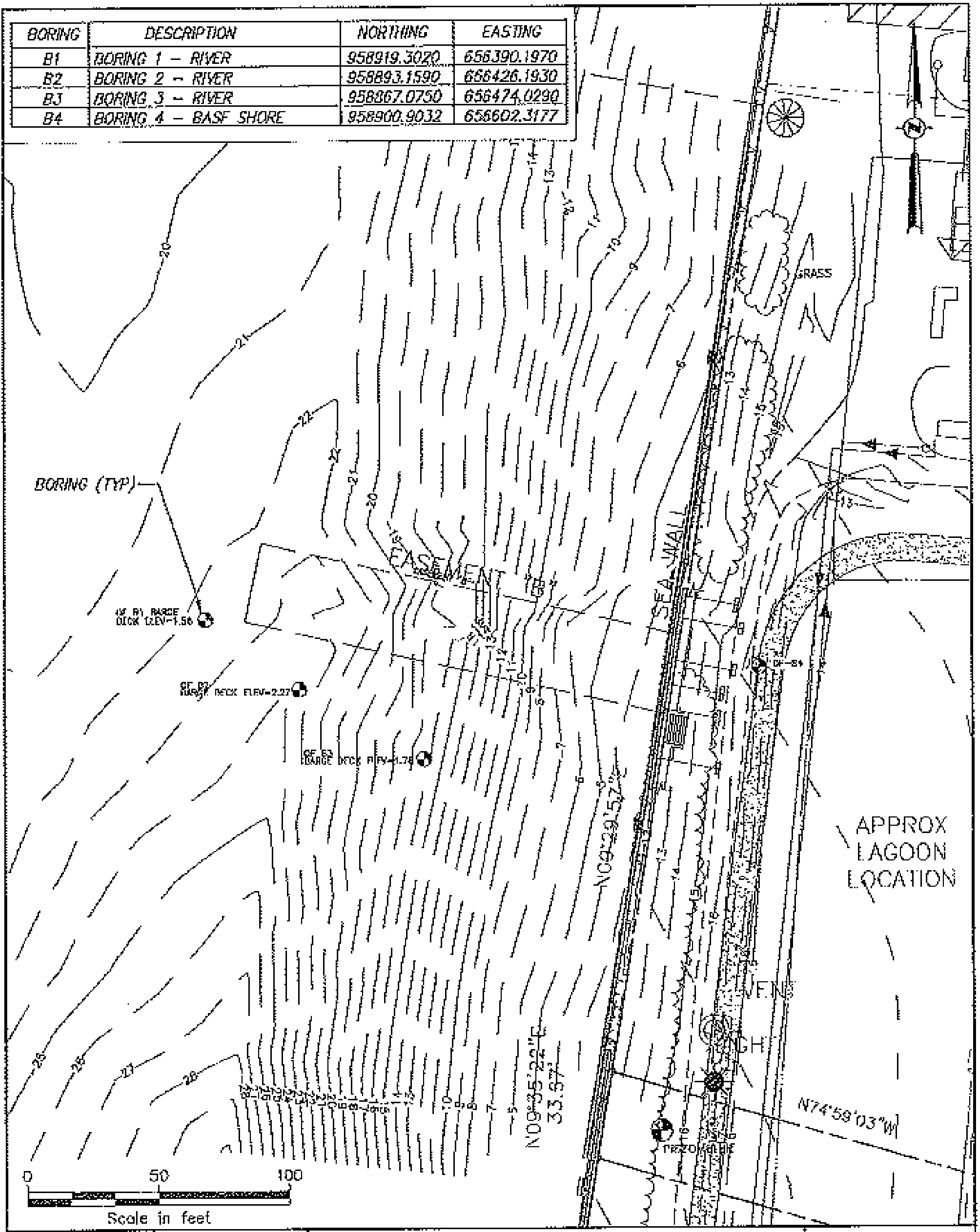
(3) Toxicity Characteristic Limits as outlined in 40 CFR Part 261.24.

ND = not detected

NS = no applicable standard

Shaded values represent exceedance of the regulatory standard

BORING	DESCRIPTION	NORTHING	EASTING
B1	BORING 1 – RIVER	958919.3020	656390.1970
B2	BORING 2 – RIVER	958893.1590	656426.1930
B3	BORING 3 – RIVER	958867.0750	656474.0290
B4	BORING 4 – BASF SHORE	958900.9032	656602.3177



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CHA

III Winners Circle, PO Box 5269, Albany, NY 12205-0269
Main (518) 453-4500 · www.chacompanies.com

LG CONSTRUCTORS PROCESS OUTFALL
BORING LOCATION MAP

PROJECT NO.
18082

DATE: 1/21/09

FIGURE 1

File: K:\18082\CADD\ACAD\ENVIRONMENTAL\OUTFALL_DESIGN\BORINGS\BORINGMAP.DWG Saved: 1/21/2009 11:11:31 AM Plotted: 1/21/2009 11:12:58 AM User: Gaudio, Angelo

EXHIBIT B

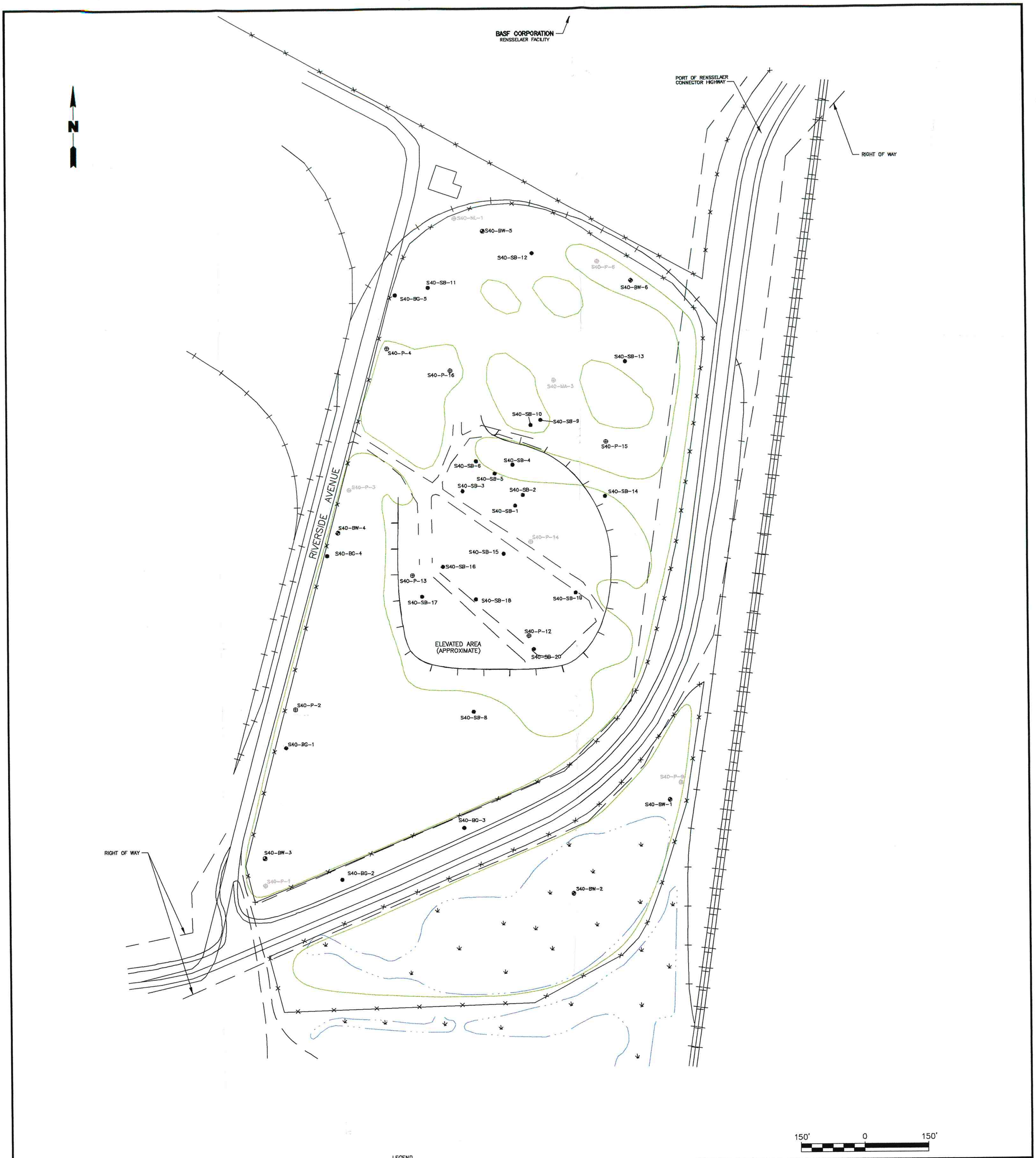
BESICORP DATA

③

ColoR OS

All PlAtE

1



LEGEND

S40-SB-1 ●	LOCATION AND DESIGNATION OF SOIL BORING AND GROUNDWATER SCREENING SAMPLE
S40-BG-1 ●	LOCATION AND DESIGNATION OF BACKGROUND SOIL SAMPLE
S40-P-2 ⊕	EXISTING PIEZOMETER
S40-P-8 ⊕	EXISTING PIEZOMETER (NOT SAMPLED DURING REMEDIAL INVESTIGATION)
S40-BW-1 ⊗	EXISTING MONITORING WELL
☐	EXISTING BUILDING
—×—×—	FENCELINE
—+—+—	RAILROAD TRACKS
— — —	PROPERTY LINE
⸸	MARSHLAND
〰	DENSELY WOODED AREA
S40	SOUTH 40 LOCATION PREFIX

NOTES
THIS MAP COMPILED FROM:
CLOUGH HARBOUR & ASSOC. MAP NUMBER GP-1 (JULY 1988) AND MAP NUMBER B-1 (AUGUST 1985) AND DUNN GEOSCIENCE CORP FIGURE 3 AND FIGURE 6 (DUNN, 1990).

Title:

SITE INVESTIGATION
SAMPLING LOCATIONS

SOUTH 40 PARCEL, RENSSELAER, NEW YORK

Prepared For:

BASF CORPORATION
MOUNT OLIVE, NEW JERSEY

ROUX
ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: M..R.	Date: 20MAR01	PLATE
Prepared by:	Scale: AS SHOWN	1
Project Mgr: M.R.	Office: NY	
File No: BF1110801	Project: 25111Y02	

N:\PROJECTS\BF2511\BF111\10B\BF1110801.DWG

LEGEND

LOCATION PREFIXES
LG – LAGOON
MP – MAIN PLANT
LF – LANDFILL
ST – ORGANICHEM PROPERTY (FORMERLY STERLING ORGANICS)

▭	EXISTING BUILDING
▨	FORMER BUILDING
■	FORMER OR EXISTING ALLEGED UNDERGROUND TANK OR PIT
C① E① O① U① D①	DESIGNATES POTENTIAL AREA OF INTEREST, TABLE 3–1 "REMEDIAL INVESTIGATION WORKPLAN" MALCOM PIRNIE, INC., 1998
■	STORM SEWER GRATE
─┼──┼─	OVERHEAD UTILITY SUPPORTS
─o─o─o─	BARBED WIRE FENCE
─×─×─×─	CHAINLINK FENCE
LG–MH–7 ●	LOCATION AND DESIGNATION OF SEWER BEDDING GROUNDWATER SAMPLING POINT
●	LOCATION OF SOIL GAS SAMPLING POINT
MP–SB–114 ●	LOCATION AND DESIGNATION OF SOIL BORING
MP–MW–101 ●	LOCATION AND DESIGNATION WHERE SOIL SAMPLES WERE OBTAINED FROM A PILOT BOREHOLE AND A MONITORING WELL WAS COMPLETED DURING THE RI
LG–MW–1 ●	LOCATION AND DESIGNATION OF MONITORING WELL COMPLETED PRIOR TO 10/99 AND SAMPLED DURING THE RI
MP–PP–5 ●	LOCATION AND DESIGNATION OF PERFORATED PIPE SAMPLING POINT (NOT SAMPLED DURING THE RI)
LF–PZ–5 ⊕	LOCATION AND DESIGNATION OF PIEZOMETER (NOT SAMPLED DURING THE RI)
ST–MW–6A ●	LOCATION AND DESIGNATION OF MONITORING WELL (NOT SAMPLED DURING THE RI)

100' 0 100'

NOTES:

(1) BASE MAP ADAPTED FROM PLATE 1, "REMEDIAL INVESTIGATION WORKPLAN" (MALCOLM PIRNIE, INC., 1998)

(2) THE LOCATIONS SHOWN IN HALFTONE WERE NOT SAMPLES DURING THE RI.

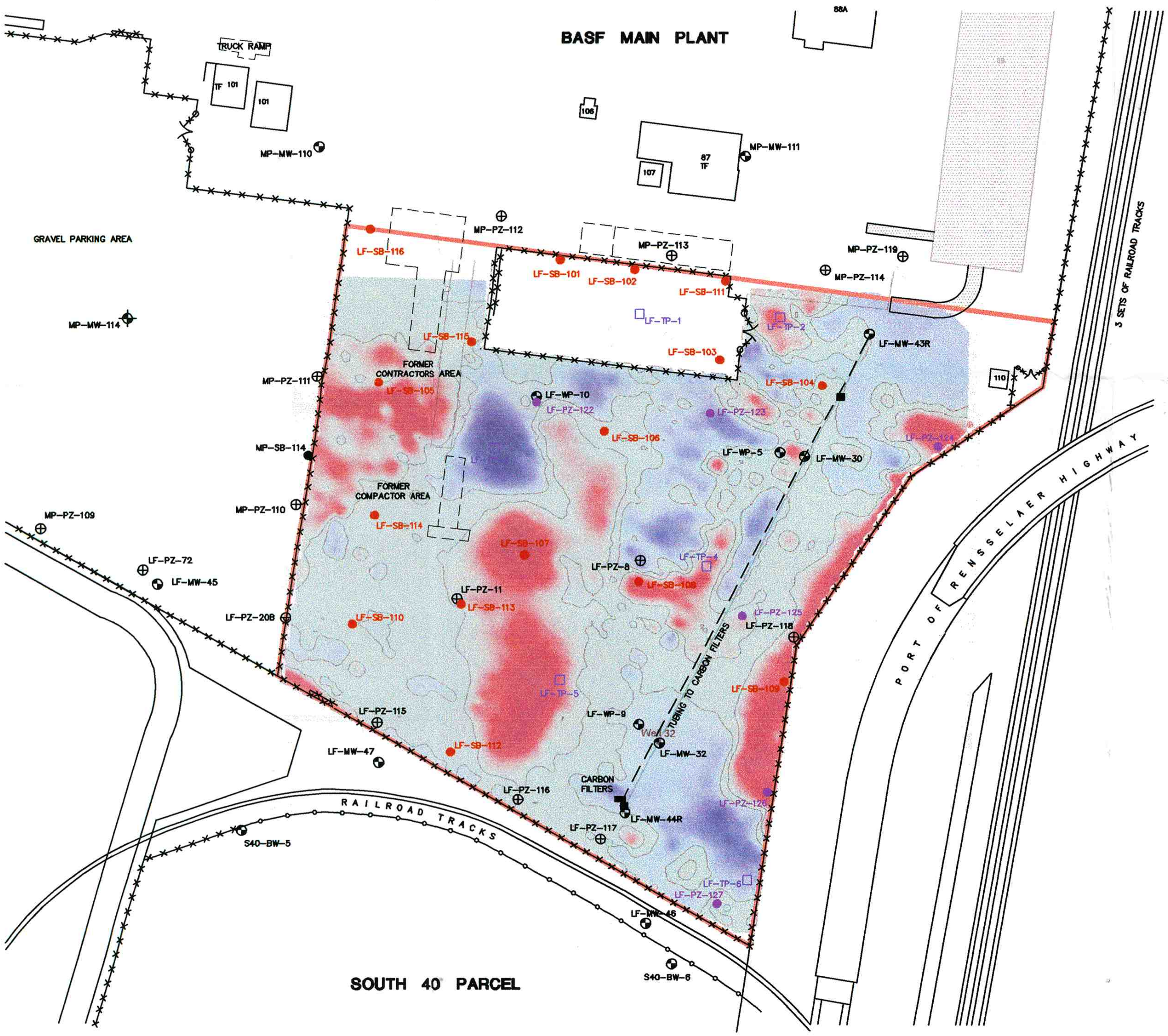
Title:

REMEDIAL SAMPLING LOCATIONS

Prepared For:

ROUX ROUX ASSOCIATES, INC. *Environmental Consulting & Management*	Compiled by:	Date:	PLATE
	Prepared by:	Scale:	1
	Project Mgr:	Office:	
	File No: 907	Project:	

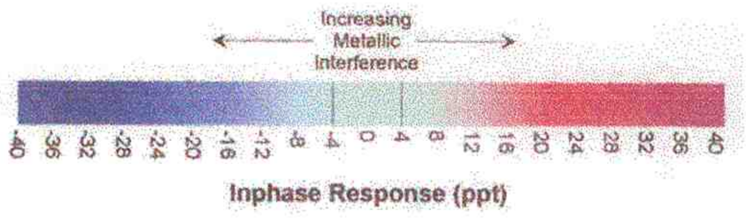
N:\PROJECTS\BF2511Y\BF11Y\109\BF1110907.DWG



LEGEND

LOCATION PREFIXES
LF – LANDFILL
MP – MAIN PLANT
S40 – SOUTH 40

▭	EXISTING BUILDING
▨	FORMER BUILDING
⬚	CONCRETE PAD
■	STORM SEWER GRATE
—○—○—○—	BARBED WIRE FENCE
—×—×—×—×—	CHAINLINK FENCE
LF-MW-30 ◍	LOCATION AND DESIGNATION OF EXISTING MONITORING WELL
MP-PZ-110 ⊕	LOCATION AND DESIGNATION OF EXISTING PIEZOMETER
MP-MW-114 ⊕	LOCATION AND DESIGNATION OF DOUBLE CASED MONITORING WELL SCREENED IN LOWER SAND AND GRAVEL UNIT
MP-SB-114 ●	LOCATION AND DESIGNATION OF SOIL BORING ADVANCED DURING REMEDIAL INVESTIGATION
LF-PZ-124 ●	LOCATION AND DESIGNATION OF PIEZOMETER INSTALLED DURING CLOSED LANDFILL INVESTIGATION
LF-SB-104 ●	LOCATION AND DESIGNATION OF SOIL BORING ADVANCED DURING CLOSED LANDFILL INVESTIGATION
LF-TP-6 ☐	LOCATION AND DESIGNATION OF PROPOSED TEST PIT
▬	BOUNDARY OF CLOSED LANDFILL



NOTES

1. EM-31 INPHASE RESPONSE DATA CONTOUR FIGURE FROM FIGURE 2 OF ENVIROSCAN REPORT (2001)
2. DATA FROM GEONICS, LTD., EM-31 INSTRUMENT, VERTICAL DIPOLE MODE.

100' 0 100'

Title:

SOIL AND GROUNDWATER SAMPLING LOCATIONS

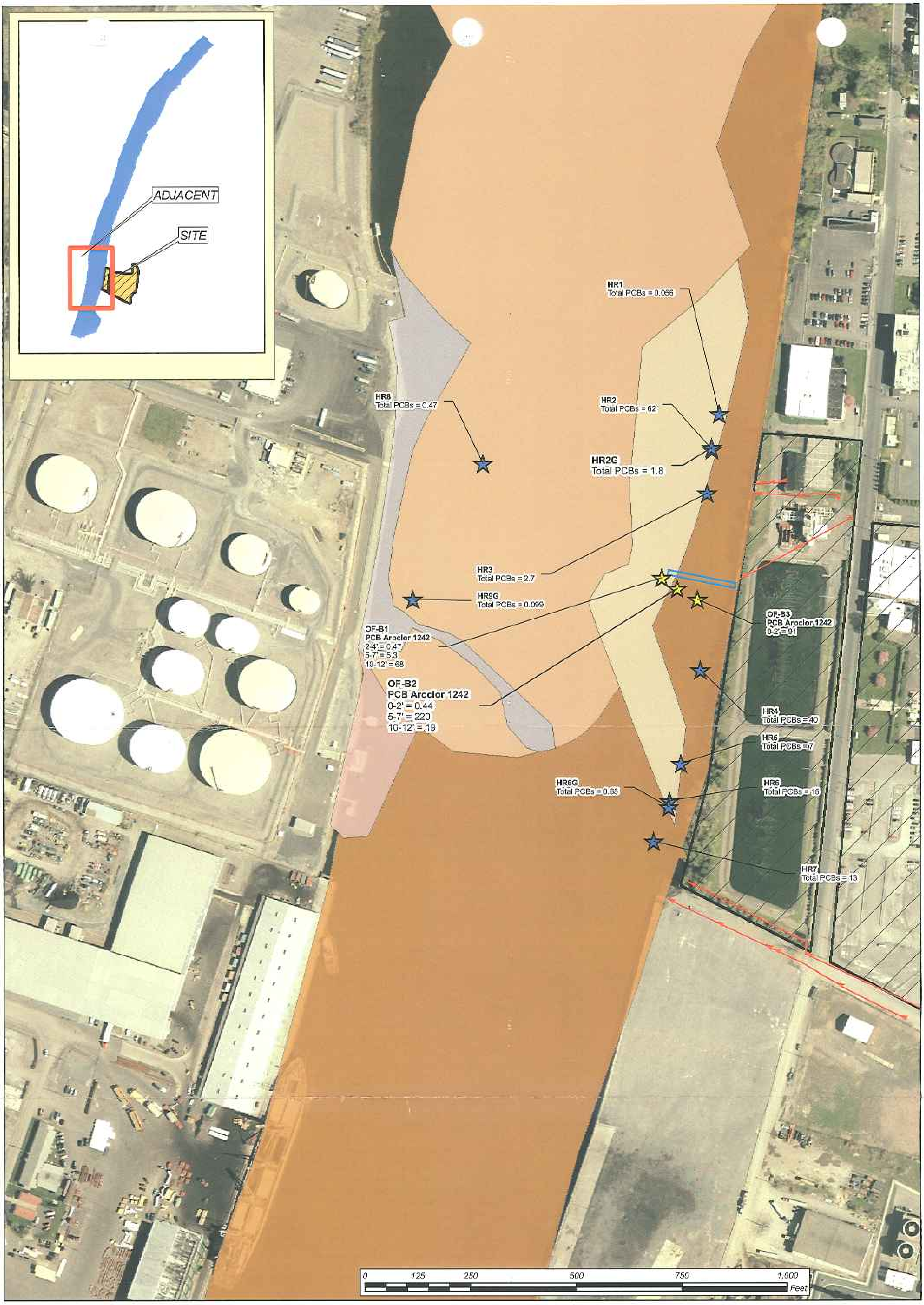
CLOSED LANDFILL INVESTIGATION
RENSSELAER, NEW YORK FACILITY

Prepared For:
BASF CORPORATION
MOUNT OLIVE, NEW JERSEY

ROUX ROUX ASSOCIATES, INC. *Environmental Consulting & Management*	Compiled by: M.R.	Date: 02JUL02	PLATE
	Prepared by: [redacted]	Scale: AS SHOWN	1
	Project Mgr: N.E.	Office: NY	
	File No: BF1124102	Project: 25111Y09	

EXHIBIT C

FIGURE OF SAMPLING LOCATIONS



2005 GEOPHYSICAL DATA

▨	Cobble	▨	Muddy Sand
▨	Gravelly Sand	▨	Sandy Mud
▨	Mud	▨	Sand

★ ENSR Cores 3/01

★ First Light Cores 6/08

☐ 12_ft swath

* PCB data expressed as ppm.

PCB Data In
Husdon River Sediments
BASF Corporation
Hudson River OU-2 Investigation
Rensselaer, New York

SCALE	DATE	PROJECT NO.
See Inset	01/09	0C760-171

AECOM

Figure Number
1-1

EXHIBIT D

NYS INDUSTRIAL HAZARDOUS WASTE MANAGEMENT FORMS

Major: ____
Major TSDF: ____
Non-Major: X
Substitution: ____

INSPECTION FORM

NEW YORK STATE INDUSTRIAL HAZARDOUS WASTE MANAGEMENT ACT

Chapter 639, Laws of 1978

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Henry G. Williams, Commissioner

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, Director

Send to: Compliance Inspection Section
50 Wolf Road - Room 209/415
Albany, New York 12233-0001

EPA I.D. NUMBER: NYD093249688
*HANDLER'S NAME (Corporate): BASF
(Division):
*HANDLER'S MAILING ADDRESS: 36 Riverside Ave
City, State & Zip Code Rensselaer NY 12144
*HANDLER'S LOCATION ADDRESS: (if different than mailing)
City, State & Zip Code
*HANDLER'S TELEPHONE NUMBER: (518) 465-4511 Extension: 220
*FULL NAME OF HANDLER'S CONTACT: (Mr.) ~~(Ms.)~~ Robert Drzymala
*SIGNATURE OF HANDLER'S CONTACT: (This signature is not an admittance to any violations cited herein. It merely acknowledges that an inspection took place.)
*TITLE OF HANDLER'S CONTACT: Environmental Coordinator
INSPECTION DATE: 08/05/1987 TIME OF INSPECTION: 1:30 ~~(a.m.)~~ (p.m.)
INSPECTOR'S SIGNATURE: Gary A Johnston
COUNTY: Rensselaer E/A NUMBER: ___
INSPECTOR'S NAME: Gary A Johnston
TITLE: Senior Sanit Eng
NAME:
TITLE:

CHECK ONE: Copy of THIS report (___ has) (___ has not) been given to the Handler. DATE: 8/19/87
REPORT PREPARED BY: Gary A Johnston DATE: 8/20/87
REPORT APPROVED BY:

INSPECTION FORM

COMMERCIAL TSDF ___
OTHER TSDF ___
LDR GENERATOR ___
OTHER GENERATOR X
SUBSTITUTION ___

NEW YORK STATE INDUSTRIAL HAZARDOUS WASTE MANAGEMENT ACT
(Chapter 639, Laws of 1978)

Prepared for:

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Thomas C. Jorling, Commissioner

Send to: Division of Hazardous Substances Regulation
Compliance Inspection Section
50 Wolf Road - Room 208
Albany, New York 12233-7252

EPA I.D. NUMBER: NYD093249688

*HANDLER'S NAME (Corporate): BASF Wyandotte Corp
(Division): ______

*HANDLER'S MAILING ADDRESS: 36 Riverside Ave

City & State Rensselaer, NY Zip Code 12144

*HANDLER'S LOCATION ADDRESS: ______

(if different than mailing) ______

City & State ______, NY Zip Code ______

*HANDLER'S TELEPHONE NUMBER: (518) 472 8220 Extension ______

*FULL NAME OF HANDLER'S CONTACT: (Mr.) ~~(Ms.)~~ Robert Drzymala

*TITLE OF HANDLER'S CONTACT: Environmental Coordinator

INSPECTION DATE: 9/27/1989 TIME OF INSPECTION: ~~(a.m.)~~ 2:00 (p.m.)
COUNTY: Rensselaer

INSPECTOR'S NAME: Gary Johnston
TITLE: Senior Engineer
NAME: ______
TITLE: ______

CHECK ONE: Copy of THIS report (__ has) (__ has not) been given to the Handler.

REPORT PREPARED BY: Gary A Johnston DATE: 10/6/89
REPORT APPROVED BY: ______ DATE: 10/13/89

INSPECTION FORM

CESQG (Cat. 1) ☐
SQG (Cat. 2) ☐
SQG (Cat. 3) ☐
GENERATOR (Cat. 4) ☒
TSDF ☐
OTHER ☐
UNANNOUNCED ☐
ANNOUNCED ☒

NEW YORK STATE INDUSTRIAL HAZARDOUS WASTE MANAGEMENT ACT
(Chapter 639, Laws of 1978)

Prepared for: Commissioner
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Send to: NYSDEC
Division of Hazardous Substances Regulation
Compliance Inspection Section
50 Wolf Road - Room 436
Albany, New York 12233-7253

RECEIVED
APR 06 1994
HW COMPLIANCE UNIT
DIVISION OF HAZARDOUS
SUBSTANCES REGULATION

EPA I.D. NUMBER: NYD093249688

COMPANY NAME (Corporate): BASF Corp

(Division): ____

COMPANY MAILING ADDRESS: 33 Riverside Ave

City & State Rensselaer, NY Zip Code 12144

COMPANY LOCATION ADDRESS: ____

(if different than mailing) ____

City & State ____, NY Zip Code ____

COMPANY TELEPHONE NUMBER: (518) 472 8220 Extension ____

FULL NAME OF COMPANY CONTACT: Robert Drzymala

TITLE OF COMPANY CONTACT: ____

INSPECTION DATE: 3/24/1994 TIME OF INSPECTION: 9:30 (a.m.) ____ ~~(p.m.)~~

INSPECTOR'S NAME: Gary Johnston

NAME: ____

REPORT PREPARED BY: Gary A Johnston DATE: 3/31/94

REPORT APPROVED BY: ____ DATE: 4/13/94

TTACH SITE IDENTIFICATION LABEL OR ENTER BELOW. FOR ADDITIONAL SPACE
E COMMENTS BOX. DO NOT COPY FORM, CALL 518/457-3273 FOR COPIES.

SITE NAME BASF CORPORATION

RENSSELAER, NEW YORK

EPA ID No. N Y D 0 9 3 2 4 9 6 8 8

FORM
GM

U.S. ENVIRONMENTAL
PROTECTION AGENCY

1991 Hazardous Waste Report

WASTE GENERATION AND MANAGEMENT

INSTRUCTIONS: Read the detailed instructions beginning on page 13 of the 1991 Hazardous Waste Report booklet before completing this form.

Sec. I

A. Waste description Instruction Page 15 PCL OILS - GENERATED AS A RESULT OF DRAINING AND REFILLING A PCB CONTAMINATED TRANSFORMER. 90.8 PPM PCB

B. EPA hazardous waste code Page 16 N A

C. State hazardous waste code. Page 16 B 0 0 1

D. SIC code Page 16 2 8 6 5

E. Origin code Page 16 System type M N A

F. Source code Page 17 A 5 4

G. Point of measurement Page 17 1

H. Form code. Page 17 B 2 0 6

I. RCRA-radioactive mixed Page 17 2

J. Reported TRI constituent Page 18 2

K. CAS numbers. Page 18

1.
2.
3.
4.
5.

Sec. II

A. Quantity generated in 1990. Page 18 0

B. Quantity generated in 1991. Page 19 1 5 8 6

C. Page 19 1

D. Did this site do any of the following to this waste: treat on site, dispose on site, recycle on site, or discharge to a sewer/POTW? Page 18 1 YES (continue to system 1) X 2 NO (skip to SEC. III)

ON-SITE SYSTEM 1

On-site system type M

Quantity treated, disposed or recycled on site in 1991

ON-SITE SYSTEM 2

On-site system type M

Quantity treated, disposed or recycled on site in 1991

Sec. III

A. Was any of this waste shipped off site in 1991? Instruction Page 20 YES (continue to box B) NO (skip to SEC. IV)

Site 1

B. EPA ID No. of facility waste was shipped to Page 20 M A D 0 5 3 4 5 2 6 3 7

C. System type shipped to M 0 4 1

D. Off-site availability code Page 21 1

E. Total quantity shipped in 1991 Page 21 1 5 8 6

Site 2

B. EPA ID No. of facility waste was shipped to Page 20

C. System type shipped to M

D. Off-site availability code Page 21

E. Total quantity shipped in 1991 Page 21

Sec. IV

A. Did new activities in 1991 result in minimization of this waste? Instruction Page 22 YES (continue to box B) NO (this form is complete)

B. Activity, Page 22

C. Other Effects Page 22

D. Quantity recycled in 1991 due to new activities Page 23

E. Activity/production index Page 23

F. 1991 Source reduction quantity Page 24

W W

W W

omments: YES

SITE NAME BASF Corporation
36 Riverside Ave
Rensselaer, N.Y. 12144

EPA ID NO. NYD 093 249 688

FORM GM

N.Y.S. DEPARTMENT OF ENVIRONMENTAL CONSERVATION

1992 HAZARDOUS WASTE REPORT

WASTE GENERATION AND MANAGEMENT

INSTRUCTIONS: Read the detailed instructions beginning on page 13 of the Hazardous Waste Report booklet before completing this form.

Sec I

A. Waste description - Instructions, Page 15
PCB "contaminated" Transformer and PCB articles.

B. EPA hazardous waste code Instructions, Page 15

C. State hazardous waste code Instructions, Page 16: B004 B007

D. SIC code Page 16: 2865

E. Origin Code Page 16: 1
System type: M

F. Source code Page 17: A99

G. Point of measurement Page 17: 1

H. Form code Page 18: B407

I. RCRA Radioactive-mixed Page 18: 2

J. Reported TRI constituent Page 18: 2

K. CAS numbers Page 18: 1. - - 2. - - 3. - - 4. - - 5. - -

Sec II

A. Quantity generated in 1991 Instructions on Page 19: 1586.

B. Quantity generated in 1992 Instructions on Page 19: 6515.

C. UOM Instr Page 19: 1 Density: .
☐ 1. lbs/gal, ☐ 2. sg

D. Did this site treat on site, dispose of on site, recycle on site or discharge to a sewer/POTW? Instr. Page 19
☐ 1. Yes (continue to system I)
☒ 2. No (Skip to Sec. III)

ON-SITE SYSTEM 1
On-site system type Instr., Page 20: M
Quantity treated, disposed of, or recycled on site in 1992: .

ON-SITE SYSTEM 2
On-site system type Instr., Page 20: M
Quantity treated, disposed of, or recycled on site in 1992: .

Sec III

A. Was any of this waste shipped off site in 1992? Instructions on Page 20
☒ 1. Yes (continue to Box "B")
☐ 2. No (Skip to Sec. IV)

	B. EPA ID Number of facility to which waste was shipped: Instr., Page 21	C. System type shipped to Instr., Page 21	D. Off-site availability code Instr., Page 21	E. Total quantity shipped in 1992 Instr., Page 21
Site 1	MAD 053 452 637	M129	1	6515.
Site 2		M		

Sec IV

A. Did new activities in 1992 result in minimization of this waste? Instructions on Page 21
☐ 1. Yes (continue to Box "B")
☒ 2. No (This form is now complete)

B. Activity - Instr., Page 22	C. Other effects? Instr., Page 22	D. Quantity recycled in 1992 due to new activities Instr., Page 23	E. Activity/production index Instr., page 23	F. 1992 source reduction quantity Instr., page 24
W W W W	☐ 1. Yes ☐ 2. No	.	.	.

Comments:

Sec. I, Box H; PCB "contaminated" transformer and other PCB "contaminated" articles.
Sec. I, Box F; PCB "contaminated" transformer and other PCB "contaminated" articles.

EXHIBIT E

PCB RESULTS FROM SOIL SAMPLES COLLECTED DURING UPLAND REMEDIAL INVESTIGATIONS

Table 9 mary of Polychlorinated Biphenyls Detected in Soil, BASF Corporati nsselaer, New York.

	Sample Designation:	MP-SB-101	MP-SB-102	MP-SB-103	MP-SB-104	MP-SB-104 FD	MP-SB-105
	Sample Date:	10/20/1999	10/19/1999	10/20/1999	10/18/1999	10/18/1999	10/18/1999
	Sample Depth (ft bls):	0-2	0-2	0-2	0-4	0-4	0-2
Analyte	NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (ug/Kg)						
Aroclor-1016	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1221	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1232	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1242	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1248	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1254	10000	17 U	18 U	20 U	20 U	20 U	19 U
Aroclor-1260	10000	17 U	18 U	20 U	20 U	20 U	19 U

Notes:

ug/kg - Micrograms per kilogram

NYSDEC - New York State Department of Environmental Conservation

U - Indicates compound was analyzed for but not detected

ft bls - Feet below land surface

Table [illegible]nary of Polychlorinated Biphenyls Detected in Soil, BASF Corporat[illegible]sselaer, New York.

		Sample Designation:	MP-SB-106	MP-SB-107	MP-SB-107A	MP-SB-108	MP-SB-109	MP-SB-110
		Sample Date:	10/15/1999	10/13/1999	10/15/1999	10/13/1999	10/12/1999	10/15/1999
		Sample Depth (ft bls):	0-2	2-4	4-6	0-2	4-6	2-4
Analyte	NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (ug/Kg)							
Aroclor-1016	10000		19 U	18 U	18 U	19 U	18 U	18 U
Aroclor-1221	10000		19 U	18 U	18 U	19 U	18 U	18 U
Aroclor-1232	10000		19 U	18 U	18 U	19 U	18 U	18 U
Aroclor-1242	10000		19 U	18 U	18 U	19 U	18 U	18 U
Aroclor-1248	10000		19 U	18 U	18 U	19 U	18 U	18 U
Aroclor-1254	10000		19 U	3190	203	180	18 U	18 U
Aroclor-1260	10000		19 U	18 U	18 U	19 U	18 U	18 U

Notes:

ug/kg - Micrograms per kilogram
NYSDEC - New York State Department of Environmental Conservation
U - Indicates compound was analyzed for but not detected
ft bls - Feet below land surface

Table umary of Polychlorinated Biphenyls Detected in Soil, BASF Corporat ensselaer, New York.

Analyte	NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (ug/Kg)				
		Sample Designation:	MP-SB-111	MP-SB-112	MP-SB-113A	MP-SB-114
		Sample Date:	10/13/1999	10/18/1999	10/19/1999	10/12/1999
		Sample Depth (ft bls):	4-6	2-4	0-2	0-2
Aroclor-1016	10000		1000 U	18 U	18 U	19 U
Aroclor-1221	10000		1000 U	18 U	18 U	19 U
Aroclor-1232	10000		1000 U	18 U	18 U	19 U
Aroclor-1242	10000		1000 U	18 U	18 U	19 U
Aroclor-1248	10000		1000 U	18 U	18 U	19 U
Aroclor-1254	10000		1000 U	18 U	18 U	140
Aroclor-1260	10000		1000 U	18 U	18 U	19 U

Notes:

ug/kg - Micrograms per kilogram
NYSDEC - New York State Department of Environmental Conservation
U - Indicates compound was analyzed for but not detected
ft bls - Feet below land surface

Table 8. Summary of Polychlorinated Biphenyl Compounds Detected in Soil, Closed Landfill Investigation, BASF Corporation, Rensselaer, New York

Analyte (Concentrations in µg/kg)	NYSDEC RSCOs [1] (µg/kg)	Sample Designation:	LF-SB-101	LF-SB-101	LF-SB-102	LF-SB-102	LF-SB-102	LF-SB-103	LF-SB-103
		Field Sample ID:	B7-46-13	B7-46-16	B7-48-11	B7-48-17	B7-48-14	B7-51-25	B7-52-02
		Sample Date:	3/13/02	3/13/02	3/13/02	3/13/02	3/13/02	3/13/02	3/13/02
		Sample Depth (ft bls):	1-3	3-5	3-5	3-5	5-7	3-5	5-7
		Sample Type:	N	N	N	FD	N	N	N
Aroclor-1016	10,000		1.7 U	2 U	1.7 U	1.7 U	1.8 U	2.7 U	6 U
Aroclor-1221	10,000		1.6 U	1.8 U	1.5 U	1.5 U	1.7 U	2.5 U	5.5 U
Aroclor-1232	10,000		1.8 U	2 U	1.7 U	1.7 U	1.9 U	2.8 U	6.2 U
Aroclor-1242	10,000		1.8 U	2.1 U	1.8 U	1.8 U	2 U	2.9 U	6.4 U
Aroclor-1248	10,000		1.2 U	1.4 U	1.2 U	1.2 U	1.3 U	1.9 U	4.3 U
Aroclor-1254	10,000		83	2.3 U	1.9 U	1.9 U	2.1 U	3.1 U	6.9 U
Aroclor-1260	10,000		1.8 U	2 U	1.7 U	1.7 U	1.9 U	2.8 U	6.2 U
Total Aroclors	10,000		83	ND	ND	ND	ND	ND	ND

Notes:

1 - Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994

FD - Field duplicate

ft bls - Feet below land surface

J - Result is an estimated value below the reporting limit

M - Manually intergrated

N - Normal sample

ND - Not detected

NYSDEC - New York State Department of Environmental Conservation

RSCO - Recommeded Soil Cleanup Objective

U - Not detected, method detection limit shown

µg/kg - Micrograms per kilogram

Table 8. Summary of Polychlorinated Biphenyl Compounds Detected in Soil, Closed Landfill Investigation, BASF Corporation, Rensselaer, New York

Analyte (Concentrations in µg/kg)	NYSDEC RSCOs (1) (µg/kg)	Sample Designation:	LF-SB-104	LF-SB-104	LF-SB-104	LF-SB-105	LF-SB-105	LF-SB-106	LF-SB-106
		Field Sample ID:	B7-58-08	B7-58-17	B7-58-14	B7-53-07	B7-53-10	B7-63-02	B7-63-05
		Sample Date:	3/14/02	3/14/02	3/14/02	3/13/02	3/13/02	3/14/02	3/14/02
		Sample Depth (ft bls):	1-3	1-3	5-7	1-3	3-5	2-4	4-6
		Sample Type:	N	FD.	N	N	N	N	N
Aroclor-1016	10,000		1.9 U	1.9 U	1.6 U	1.5 U	1.8 U	1.6 U	16 U
Aroclor-1221	10,000		1.8 U	1.8 U	1.5 U	1.4 U	1.6 U	1.5 U	15 U
Aroclor-1232	10,000		2 U	2 U	1.7 U	1.5 U	1.9 U	1.7 U	17 U
Aroclor-1242	10,000		2.1 U	2.1 U	1.7 U	1.6 U	1.9 U	1.7 U	18 U
Aroclor-1248	10,000		1.4 U	1.4 U	1.2 U	1.1 U	1.3 U	1.2 U	12 U
Aroclor-1254	10,000		2.2 U	2.2 U	1.8 U	13 J	48 M	190	19 U
Aroclor-1260	10,000		2 U	2 U	1.6 U	13 J	23	1.7 U	17 U
Total Aroclors	10,000		ND	ND	ND	26 J	71 M	190	ND

Notes:

1 - Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994

FD - Field duplicate

ft bls - Feet below land surface

J - Result is an estimated value below the reporting limit

M - Manually intergrated

N - Normal sample

ND - Not detected

NYSDEC - New York State Department of Environmental Conservation

RSCO - Recommeded Soil Cleanup Objective

U - Not detected, method detection limit shown

µg/kg - Micrograms per kilogram

Table 8. Summary of Polychlorinated Biphenyl Compounds Detected in Soil, Closed Landfill Investigation, BASF Corporation, Rensselaer, New York

Analyte (Concentrations in µg/kg)	NYSDEC RSCOs [1] (µg/kg)	Sample Designation:	LF-SB-107	LF-SB-107	LF-SB-108	LF-SB-108	LF-SB-109	LF-SB-109	LF-SB-110
		Field Sample ID:	B7-61-16	B7-61-19	B7-59-17	B7-59-20	B7-57-02	B7-57-05	B7-54-16
		Sample Date:	3/14/02	3/14/02	3/14/02	3/14/02	3/14/02	3/14/02	3/13/02
		Sample Depth (ft bls):	1-3	3-5	1-3	3-5	2-4	4-6	1-3
		Sample Type:	N	N	N	N	N	N	N
Aroclor-1016	10,000		1.6 U	1.9 U	1.9 U	1.8 U	1.9 U	1.8 U	1.7 U
Aroclor-1221	10,000		1.4 U	1.7 U	1.7 U	1.7 U	1.7 U	1.6 U	1.5 U
Aroclor-1232	10,000		1.6 U	250 M	1.9 U	1.9 U	1.9 U	1.8 U	1.7 U
Aroclor-1242	10,000		1.7 U	2 U	2 U	2 U	2 U	1.9 U	1.8 U
Aroclor-1248	10,000		1.1 U	1.4 U	1.4 U	1.3 U	1.3 U	1.3 U	1.2 U
Aroclor-1254	10,000		46 M	190 M	2.1 U	2.1 U	2.1 U	2 U	100
Aroclor-1260	10,000		1.6 U	84 M	6.3 J	1.9 U	1.9 U	1.8 U	120
Total Aroclors	10,000		46 M	524 M	6.3 J	ND	ND	ND	220

Notes:

1 - Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994

FD - Field duplicate

ft bls - Feet below land surface

J - Result is an estimated value below the reporting limit

M - Manually intergrated

N - Normal sample

ND - Not detected

NYSDEC - New York State Department of Environmental Conservation

RSCO - Recommended Soil Cleanup Objective

U - Not detected, method detection limit shown

µg/kg - Micrograms per kilogram

Table 8. Summary of Polychlorinated Biphenyl Compounds Detected in Soil, Closed Landfill Investigation, BASF Corporation, Rensselaer, New York

Analyte (Concentrations in µg/kg)	NYSDEC RSCOs [1] (µg/kg)	**Sample Designation:**	LF-SB-110	LF-SB-111	LF-SB-111	LF-SB-113	LF-SB-116
		Field Sample ID:	B7-54-19	B7-50-08	B7-50-11	B7-69-16	B7-71-22
		Sample Date:	3/13/02	3/13/02	3/13/02	3/13/02	3/13/02
		Sample Depth (ft bls):	3-5	1-3	3-5	3.5-5.5	2-4
		Sample Type:	N	N	N	N	N
Aroclor-1016	10,000		36 U	1.6 U	2.1 U	1.9 U	2 U
Aroclor-1221	10,000		33 U	1.4 U	1.9 U	1.8 U	1.8 U
Aroclor-1232	10,000		37 U	1.6 U	2.2 U	2 U	2 U
Aroclor-1242	10,000		38 U	1.7 U	2.3 U	2.1 U	2.1 U
Aroclor-1248	10,000		26 U	1.1 U	1.5 U	1.4 U	1.4 U
Aroclor-1254	10,000		41 U	1.8 U	2.4 U	2.2 U	2.3 U
Aroclor-1260	10,000		37 U	1.6 U	2.2 U	2 U	2 U
Total Aroclors	10,000		ND	ND	ND	ND	ND

Notes:

1 - Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, January 1994

FD - Field duplicate

ft bls - Feet below land surface

J - Result is an estimated value below the reporting limit

M - Manually intergrated

N - Normal sample

ND - Not detected

NYSDEC - New York State Department of Environmental Conservation

RSCO - Recommeded Soil Cleanup Objective

U - Not detected, method detection limit shown

µg/kg - Micrograms per kilogram

Table 8. Summary of Polychlorinated Biphenyl Compounds in Soil, South 40 Parcel, BASF Corporation, Rensselaer, New York.

		Field Location ID:	S40-BG-1	S40-BG-2	S40-BG-3	S40-BG-4	S40-BG-5	S40-SB-1	S40-SB-1	S40-SB-2	S40-SB-3
		Sample ID:	02-56-24	02-58-06	02-57-11	02-31-22	02-31-02	02-40-02	02-41-02	02-39-01	02-43-16
	NYSDEC Recommended	**Sample Date:**	06/01/2000	06/01/2000	06/01/2000	05/17/2000	05/17/2000	05/24/2000	05/24/2000	05/24/2000	05/25/2000
Analyte (in ug/kg)	Soil Cleanup Objectives (RSCOs) (ug/kg)	**Sample Depth (ft bls):**	0-2	0-2	0-2	0-2	0-2	0-2	2-4	0-2	0-2
Aroclor 1016	10,000		21 U	24 U	23 U	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1221	10,000		21 U	24 U	23 U	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1232	10,000		21 U	24 U	23 U	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1242	10,000		21 U	24 U	26.4	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1248	10,000		21 U	24 U	23 U	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1254	10,000		21 U	24 U	23 U	20 U	21 U	24 U	20 U	23 U	21 U
Aroclor 1260	10,000		21 U	24 U	23 U	20 U	79.9	24 U	20 U	23 U	21 U

Notes:

ug/kg - Micrograms per kilogram
NYSDEC - New York State Department of Environmental Conservation
U - Not detected, detection limit is shown
-- - No NYSDEC RSCO available
bold - Data highlighted in bold represents detections that exceed the NYSDEC RSCO
ft bls - Feet below land surface

Table 8. Summary of Polychlorinated Biphenyl Compounds in Soil, South 40 Parcel, BASF Corporation, Rensselaer, New York.

Analyte (in ug/kg)	NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (ug/kg)	**Field Location ID:**	S40-SB-4	S40-SB-4	S40-SB-5	S40-SB-5	S40-SB-6	S40-SB-8	S40-SB-9	S40-SB-10	S40-SB-11
		Sample ID:	02-37-20	02-37-22	02-35-03	02-35-05	02-44-17	02-60-06	02-54-19	02-54-10	02-55-05
		Sample Date:	05/24/2000	05/24/2000	05/24/2000	05/24/2000	05/25/2000	06/02/2000	05/31/2000	05/31/2000	05/31/2000
		Sample Depth (ft bls):	0-2	2-4	0-2	2.2-4.2	0-2	0-2	0-2	0-1	0-2
Aroclor 1016	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1221	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1232	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1242	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1248	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1254	10,000		32.2	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U
Aroclor 1260	10,000		21 U	22 U	23 U	22 U	22 U	34 U	22 U	47 U	20 U

Notes:

ug/kg - Micrograms per kilogram

NYSDEC - New York State Department of Environmental Conservation

U - Not detected, detection limit is shown

-- - No NYSDEC RSCO available

bold - Data highlighted in bold represents detections that exceed the NYSDEC RSCO

ft bls - Feet below land surface

Table 8. Summary of Polychlorinated Biphenyl Compounds in Soil, South 40 Parcel, BASF Corporation, Rensselaer, New York.

Analyte (in ug/kg)	NYSDEC Recommended Soil Cleanup Objectives (RSCOs) (ug/kg)	**Field Location ID:**	S40-SB-12	S40-SB-13	S40-SB-14	S40-SB-15	S40-SB-15	S40-SB-16	S40-SB-17	S40-SB-18	S40-SB-19
		Sample ID:	02-59-04	02-58-16	02-53-15	02-51-25	02-51-20	02-48-05	02-52-10	02-47-03	02-49-13
		Sample Date:	06/01/2000	06/01/2000	05/31/2000	05/30/2000	05/30/2000	05/25/2000	05/30/2000	05/25/2000	05/26/2000
		Sample Depth (ft bls):	0-2	0-2	0-2	0-2	6-8	0-2	0-2	0-2	0-2
Aroclor 1016	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1221	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1232	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1242	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1248	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1254	10,000		22 U	22 U	26 U	21 U	21 U	21 U	20 U	21 U	21 U
Aroclor 1260	10,000		22 U	22 U	26 U	39.8	21 U	21 U	20 U	21 U	21 U

Notes:

ug/kg - Micrograms per kilogram
NYSDEC - New York State Department of Environmental Conservation
U - Not detected, detection limit is shown
-- - No NYSDEC RSCO available
bold - Data highlighted in bold represents detections that exceed the NYSDEC RSCO
ft bls - Feet below land surface

Table 8. Summary of Polychlorinated Biphenyl Compounds in Soil, South 40 Parcel, BASF Corporation, Rensselaer, New York.

		Field Location ID:	S40-SB-19	S40-SB-19	S40-SB-20	S40-SB-20
		Sample ID:	02-49-18	02-50-12	02-45-10	02-46-07
	NYSDEC Recommended	**Sample Date:**	05/26/2000	05/26/2000	05/25/2000	05/25/2000
	Soil Cleanup Objectives	**Sample Depth (ft bls):**	0-2	8-10	0-2	5-7
Analyte	(RSCOs)					
(in ug/kg)	(ug/kg)		Duplicate			
Aroclor 1016	10,000		20 U	19 U	20 U	20 U
Aroclor 1221	10,000		20 U	19 U	20 U	20 U
Aroclor 1232	10,000		20 U	19 U	20 U	20 U
Aroclor 1242	10,000		20 U	19 U	20 U	20 U
Aroclor 1248	10,000		20 U	19 U	20 U	20 U
Aroclor 1254	10,000		20 U	19 U	172	20 U
Aroclor 1260	10,000		20 U	19 U	55.2	20 U

Notes:

ug/kg - Micrograms per kilogram
NYSDEC - New York State Department of Environmental Conservation
U - Not detected, detection limit is shown
-- - No NYSDEC RSCO available
bold - Data highlighted in bold represents detections that exceed the NYSDEC RSCO
ft bls - Feet below land surface

EXHIBIT F

NYSDEC PROPOSED REMEDIAL ACTION PLAN, BASF MANUFACTURING PLANT, OU-1

PROPOSED REMEDIAL ACTION PLAN

BASF MANUFACTURING PLANT
Operable Unit No. 1
On Site Contamination

Rensselaer (C), Rensselaer County, New York
Site No. 4-42-027

February 2003

Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

BASF MANUFACTURING PLANT
OPERABLE UNIT #1 - ON SITE CONTAMINATION

City of Rensselaer, Rensselaer County, New York
Site No. 4-42-027
February 2003

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for Operable Unit #1 (OU1) of the BASF Manufacturing Plant, a Class 2 inactive hazardous waste disposal site. The presence of hazardous waste has created significant threats to human health and/or the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, 125 years of improper waste disposal, poor housekeeping, the disposal of residues from many operational processes (some being mixed into a sludge), and/or disposal of off-specification products during operations at the site have resulted in the disposal of hazardous wastes. These hazardous wastes contain constituents such as arsenic, benzene and chlorobenzene. These wastes have contaminated the subsurface soils and groundwater at the site. These disposal activities have resulted in:

- a significant threat to human health associated with the potential for exposure to contaminated soil; and
- a significant environmental threat associated with potential impacts from contaminants in the groundwater, arsenic and volatile organic compounds (VOCs), by migrating off-site.

To eliminate or mitigate these threats, the NYSDEC proposes the following remedy:

- Develop a remedial design program to provide the details of the remedy;
- Install a low permeability cap, utilizing asphalt and existing concrete, over those areas with residual soil contamination not currently covered by competent pavement or buildings;
- Excavate the remaining source of contamination in soils near the lagoon (Area 4A) and dispose of these excavated soils off-site;
- Excavate and dispose off-site waste sludge and underlying contaminated soils from three process building basements (considered one source area, see Figure 3) at an off-site location;
- Excavate the lagoon sludge and dispose off-site at an approved facility;
- Develop a soils/dust management plan to address residual contaminated soils;
- Implement institutional controls (including deed restrictions) to prevent the use of groundwater and restrict future use of the site;
- Construct a groundwater containment system (GCS) to extract and treat impacted groundwater on-site, and re-inject a portion of the treated groundwater

into residual soils to further assist in remediating the site;

- Develop a soil gas monitoring program to evaluate the need for gas venting and gas control due to the possible build up of vapors under the cap which may impact indoor air quality from soil vapors migrating into buildings; and
- Long-term groundwater monitoring.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for OU1 in Section 6. The remedy must conform with applicable (or relevant and appropriate) standards and criteria with consideration given to guidance, as appropriate. This term is hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The NYSDEC will select a final remedy for OU1 only after careful consideration of all comments received during the public comment period.

The NYSDEC has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the two remedial investigation (RI) reports entitled "Remedial Investigation and Supplemental Remedial Investigation Report" (dated 11/13/00) and "Additional Remedial Investigation Activities" (dated 08/03/01), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

The Rensselaer Public Library
810 Broadway
Rensselaer, NY 12144
phone #: (518) 462 - 1193
hours: M-F: 10am to 5pm
M-W: 6pm to 9pm
Sat: 9am to 12 noon

NYSDEC Region 4 Headquarters
1150 North Westcott Road
Schenectady, NY 12306
518-357-2374
hours: M-F: 9am to 4pm
Daniel Lightsey, Project Manager

The NYSDEC seeks input from the community on all PRAPs. A public comment period has been set from **February 14th to March 17th** to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for **March 4, 2003 at City Hall** in the Council Chambers (2nd floor) beginning at **5:00 p.m.**

At the meeting; there will be an **availability session from 5:00 pm to 7:00 pm**, then the results of the RI will be presented along with a summary of the proposed remedy. After the presentation, verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Lightsey at the above address through **March 17, 2003**.

The NYSDEC may modify the preferred alternative or select another of the alternatives presented in this PRAP, based on new information from public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the NYSDEC's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The BASF Manufacturing Plant (#442027), which includes the lagoon area as part of the site, is located in the City of Rensselaer, Rensselaer County, and is 35 acres in size. The manufacturing plant and lagoon area is zoned heavy industrial, and is physically located next to the Hudson River. The manufacturing plant and lagoon area is bordered by Organichem (formerly Sterling Organics) to the north, by a Coastal power plant to the south-west, by the two other BASF sites (the five acre landfill, #442004, and the 40 acre South 40 Disposal Site, #442022) to the southeast, by railroad tracks to the east, and the Hudson River to the west (see Figures 1 & 2).

The site will be separated into two operable units. An operable unit represents a portion of the site remedy that for technical or administrative reasons can be addressed separately to eliminate or mitigate a release, threat of release, or exposure pathway resulting from the site contamination.

OU1 includes on site contamination in the manufacturing plant and lagoon area (as described above). The second operable unit (OU2) will include off site contamination in those areas outside OU1 with potential impacts resulting from the: 1) migration of contaminated groundwater off-site to the west via the storm sewer bedding and/or through the shallow water bearing unit; 2) discharges directly from the site or through the groundwater which may have impacted sediments in the Hudson River; and 3) migration of site related contaminants to soils adjacent to the lagoon area along Riverside Avenue. The scope of the off-site investigative activities will be determined after completing the ROD for OU1.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

In 1881 the Hudson River Aniline and Color Works began use of the facility that is currently the BASF manufacturing plant in Rensselaer.

In 1905 the Hudson River Aniline and Color Works facility began to supplement its dyestuffs In April 1998, a RI Work Plan for the site was developed. The scope of the RI Work Plan was with pharmaceuticals and aspirin. In 1913 the official name was changed to the Bayer Company. The facility was seized by the United States government during both world wars, and functioned as part of the war economy. In 1968 the official name was changed to the GAF Corporation, and in 1978 BASF purchased the manufacturing plant from the GAF Corporation. The facility ceased all operations and closed in December 2000.

Routine disposal of off-specification product(s) at the southeast corner of the site (during operations at the site) resulted in the disposal of a number of hazardous wastes. Burial of arsenic-containing waste prior to lagoon construction resulted in arsenic-contaminated soil and groundwater in the north-west quarter of the site and adjacent to the waste water treatment lagoons. Poor housekeeping led to the accumulation of sludge in three process building basements and a plume of VOC contaminated groundwater in the north-west quarter of the site.

3.2: Remedial History

In 1992, the NYSDEC listed the site as a Class 2 site in the Registry of Inactive Hazardous Waste Disposal Sites in New York. A Class 2 site is a site where hazardous waste presents a significant threat to the public health or the environment and action is required.

In June 1994, a baseline environmental assessment of the wastewater lagoons was performed. This assessment included the installation of monitoring wells to determine if groundwater had been impacted by site operations and historical disposal practices. It concluded that VOCs and soluble arsenic were detected in groundwater exceeding New York State Class GA Standards. This groundwater contamination was primarily located on the manufacturing plant, up gradient of the lagoons.

BASF entered into a Consent Order (described in Section 4) on February 24, 1998.

agreed upon by the NYSDEC and BASF in a Scope of Work (SOW) and modified by subsequent letters of understanding.

Two additional phases of investigation for the site were performed to further define the extent of the contamination. These two phases were identified as the supplemental RI (SRI) and the additional RI activities.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The NYSDEC and BASF entered into a Consent Order on February 24, 1998. The Order (#A4-0345-96-07) obligates the responsible parties to implement a RI/FS remedial program. Upon issuance of the ROD the NYSDEC will approach the PRPs to implement the selected remedy under an Order on Consent.

SECTION 5: SITE CONTAMINATION

An RI/FS has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between April 1999 and May 2000, and the second phase between December 2000 and May 2001. The "Remedial Investigation and Supplemental Remedial Investigation Report" (dated 11/13/00) and the "Additional Remedial Activities Report" (dated 08/03/01) describe the field activities and findings of the RI in detail.

- Background samples taken from five locations at 0 to 2 feet below the ground surface. These locations were upgradient of the site, and were unaffected by historic or current site operations. The samples

The following activities were conducted during the RI:

- Research of historical information;
- A soil gas survey to locate VOC contaminated soils, possible vapor exposure pathways, and areas of concern for further delineation of contamination;
- Installation of 120 soil borings and 12 monitoring wells for analysis of soils and groundwater as well as physical properties of soil and hydrogeologic conditions;
- Sampling of 39 new and existing monitoring wells;
- Collection of 10 discrete groundwater samples from the installation of piezometers along the sewer lines and storm water pipes to locate the gravel bedding that has been contaminated by migrating groundwater; and
- A survey of public and private water supply wells in the area around the site.

To determine whether the soil and groundwater contained contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water and surface water SCGs based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code;
- Soil SCGs based on the NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046; Determination of Soil Cleanup Objectives and Cleanup Levels; and

were analyzed for VOCs, semivolatile organic compounds (SVOCs), and inorganics (metals). The results of the analysis were compared to data from the

RI (Table 1) to determine appropriate site remediation goals.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI reports.

5.1.1: Site Geology and Hydrogeology

The regional flow of groundwater is to the west (toward the Hudson River). Utilities, sewers and storm water pipes have caused anomalies to this westerly flow.

The depth to the shallow water bearing unit averages from 5 feet (along the eastern boundary) to 15 feet (near the Hudson River) below the ground surface. A clay layer separates this shallow groundwater from a deeper water bearing unit. The clay layer is approximately 18 feet below the ground surface at the treatment lagoons (where it is 40 feet thick), and approximately 5 feet below the ground surface at the eastern boundary (where it is 10 feet thick). The deep water bearing unit is a 10 feet thick layer of sand just above a layer of glacial till, which is just above the shale bedrock.

Only the shallow groundwater was found to have contamination. The transmissivity (or movement) of water on-site is minimal and this fact is evident in two on-site areas that were found to have no water within the shallow water bearing unit.

5.1.2: Nature of Contamination

As described in the RI reports, many soil, groundwater, waste process residue, and lagoon sludge samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are VOCs, SVOCs, and metals.

Table 1 summarizes the degree of contamination for the COCs in subsurface soil, groundwater, sludge, and process waste residue and compares the data with the SCGs for the site. Tables 2 - 5 summarize the degree of subsurface soil contamination for COCs in the areas of concern which were addressed by the Soil Excavation interim remedial measure (IRM) described in

The VOC contaminants of concern (COCs) in soil, groundwater, and waste sludge are:

Acetone
Benzene
Ethylbenzene
Toluene
Xylenes
Chlorobenzene
1,2-Dichloroethane
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene

The SVOC COCs in soil, groundwater, and waste sludge are:

Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)anthracene
Benzo(k)anthracene
Chrysene
4-Chloroaniline
Dibenzo(a,h)anthracene
Ideno(1,2,3-c,d)anthracene
2-Methylnaphthalene
4-Nitroaniline
4-Nitrophenol
Phenol

The metal COCs in soil, groundwater, and waste sludge are:

Arsenic
Chromium
Lead
Mercury
Zinc

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media investigated.

Chemical concentrations are reported in parts per million (ppm) for water, ppm for soil, and ppm for waste sludge samples.

Section 5.2. The following are the media which were investigated and a summary of the findings of the RI.

The concentration included in the parentheses after the COC is the highest concentration detected in the media for that area of the site.

Basement Process Waste Residues and Underlying Contaminated Soils

The residues from operational processes were mixed and co-mingled via overflows and leaks from building sewer systems into three separate basements located in Buildings 84, 87, and 93 as depicted on Figure 4. The waste material varied in thickness from being not present to 18 inches thick in some locations. The process residues were sampled at 16 locations (see Figure 5), each sample was analyzed for VOCs, SVOCs, and metals. Table 1 summarizes the range of concentrations of the COCs in the process waste residue and underlying soils.

The following results are for the process waste residue found in the building basements. The VOCs detected include benzene(2.2 ppm), chlorobenzene(40.1 ppm), 1,2-dichlorobenzene(48.5 ppm), 1,2-dichloroethane(11 ppm), 1,2,4-trichlorobenzene(514 ppm), toluene(11 ppm), and xylenes(11 ppm); SVOCs detected include phenol(80 ppm), and the following poly-aromatic hydrocarbons(PAHs): benzo(a)anthracene(41.7 ppm), benzo(a)pyrene(26.6 ppm), and dibenzo[a,h] anthracene(6.58 ppm); and metals detected include arsenic(73.9 ppm), chromium(27,500 ppm), lead(3,280 ppm), mercury(10.6 ppm), and zinc(1,560 ppm).

The soils below the process waste residues were also sampled at 12 locations(see Figure 6) to a depth of 1.5 feet below the process residues. Each sample was analyzed for VOCs, SVOCs, and metals. The same contaminants found in the process residues were detected in the underlying soil. The VOCs reported above Recommended Soil Cleanup Objectives (RSCOs) include benzene(6.4 ppm), toluene(6.4 ppm), xylenes(6.4 ppm) chlorobenzene(200 ppm), 1,2 dichlorobenzene(120 ppm), 1,2-dichloroethane(6.4 ppm),and 1,2,4-trichlorobenzene(81 ppm); SVOCs detected above RSCOs include phenol(2.7 ppm) and the following PAHs: benzo(a)anthracene(2.2 ppm) benzo(a)pyrene(2.4 ppm), and dibenzo(a,h)anthracene(4 ppm); and metals detected above RSCOs include arsenic(57.6 ppm), chromium(1,590 ppm), lead(1,510 ppm), mercury(1.5 ppm), and zinc(815 ppm).

The NYSDEC has determined the process waste residue and underlying soils contain listed hazardous wastes.

Lagoon Sludge

The two lagoons located on the west side of Riverside Avenue contain sludge which has accumulated over the years of operation of the wastewater treatment system. The sludge has been investigated on several occasions with the most recent work in 2002. During these investigations it was determined that the sludge in the lagoons was approximately 3 to 6 feet thick with an estimated volume that ranges from 12,570 to 18,600 cubic yards. Samples of the sludge were collected from various locations and depths throughout the lagoons on two different occasions. Samples were analyzed for VOCs, SVOCs, and metals (see Table 1). The VOCs detected include acetone(77 ppm), benzene(22 ppm), chlorobenzene(590 ppm), 1,2-dichlorobenzene(86 ppm), ethylbenzene(24 ppm), toluene(660 ppm), 1,2,4 trichlorobenzene(17 ppm) and xylenes(130 ppm); SVOCs detected include benzoic acid(120 ppm), bis(2-ethylhexyl)phthalate(82 ppm), 4-chloroaniline(160 ppm), 2-methylnaphthalene(23 ppm), 4-nitroaniline(30 ppm), 4-nitrophenol(39 ppm), and phenol(140 ppm); and metals detected include arsenic(197 ppm), chromium(4,830 ppm), mercury(19 ppm), and zinc(987 ppm).

The NYSDEC has determined that the sludge in the lagoons contains listed hazardous wastes that were generated and discarded from various plant operations. The NYSDEC considers the sludge to be a source area that will require remediation.

Subsurface Soil

Over 90 percent of the site is covered with buildings or pavement. Soils collected from the borings are therefore considered subsurface soils. The RI identified areas of concern which contained the highest concentrations of several contaminants detected throughout the Main Plant property (See Figure 3). These areas of concern are being addressed by the Soil Excavation IRM described in Section 5.2.

Outside the areas of concern, COCs were detected in the subsurface soils at lower levels and more dispersed locations. Subsurface soil samples were analyzed for VOCs, SVOCs, metals, pesticides and PCBs (see Table 1). Pesticides and PCBs were not detected at elevated levels during initial investigations and were not included in the subsequent investigations. The VOCs detected above RSCOs include benzene(0.9 ppm), chlorobenzene(19 ppm), xylene(3 ppm), 1,2 dichlorobenzene (44 ppm), 1,2-dichloroethane(5 ppm) and 1,2,4 trichlorobenzene(19 ppm); SVOCs detected above RSCOs include phenol(3 ppm) and the following PAHs: benzo(a)anthracenee(11 ppm),benzo(a)pyrene(9 ppm), benzo(b)fluoranthene(9ppm), benzo(k)fluoranthene(3ppm), chrysene(10 ppm), dibenzo[a,h] anthracene(3 ppm), and ideno(1,2,3 -c,d) pyrene(6 ppm)); and metals detected above RSCOs in subsurface soils outside the areas of concern include arsenic(623 ppm), chromium(833 ppm),lead(660 ppm), mercury(52.5 ppm) and zinc(602 ppm).

Background soil samples were taken, at a depth of 0 to 2 feet below the ground surface, along the eastern boundary (MP-SB-19 and MP-SB-20) and at the far south-west corner of the site (MP-SB-48, MP-SB-49, and MP-SB-50) where no potential areas of concern were identified. TAGM 4046 RSCO values or the background values (which ever is higher) were used as the guidance values for individual COCs.

Based upon the RI it is believed that PAHs are ubiquitous in the Main Plant and that the concentrations of these compounds were not indicative of waste disposal.

Soil samples which were visibly contaminated within the boring, or had relatively high photoionization detector readings, were selected for laboratory analysis. The following paragraphs describe the sample results for several areas of the site.

Area 1

This area is located in the southeastern part of the Main Plant (See Figure 3) adjacent to the nine acre landfill (# 442004). The work conducted during the RI included the collection of 26 soil samples from various intervals to a depth of 6 feet where the water table was encountered. The samples were analyzed for VOCs, SVOCs, and metals (see Table 2). The VOCs of concern detected above RSCOs include benzene(34 ppm), chlorobenzene(8,440 ppm), ethylbenzene(123 ppm), xylene(841 ppm), 1,2 dichlorobenzene(1,990 ppm), and 1,2,4 trichlorobenzene(630 ppm). The following SVOCs were reported as undetected at elevated detection limits in most sample locations due to the presence of high levels of some VOCs. The SVOCs of concern that were not detected at detection limits above RSCOs include phenol(26 ppm) and the following PAHs: benzo(a)anthracene(26 ppm), benzo (a)pyrene(86 ppm), and dibenzo[a,h]anthracene(86 ppm). The metals of concern detected above RSCOs include arsenic (1,260 ppm), chromium(239,000 ppm), and lead(19,200 ppm).

The VOCs and some SVOCs detected in Area 1 soils are contributing to groundwater contamination in this area. An IRM, discussed in Section 5.2, was completed in 2002 and addressed these contaminants.

Area 2

This area is located in the western part of the Main Plant area adjacent to Building 81(see Figure 3). The work conducted during the RI included the collection of seven samples from various intervals to a depth of approximately 6 feet where the water table was encountered. The samples were analyzed for VOCs, SVOCs, and metals (see Table 3). The VOCs detected above RSCOs include chlorobenzene(455 ppm), 1,2 dichloroethane(296 ppm), ethylbenzene(93 ppm), toluene(46 ppm), and xylenes(634 ppm); SVOCs detected above RSCOs include phenol(0.5 ppm) and the following PAHS: benzo(a)anthracene(11 ppm), benzo(a)pyrene(9 ppm), and dibenzo[a,h]anthracene(3 ppm). The metals detected at low concentrations (slightly above RSCOs) include arsenic(48 ppm) and chromium(20- ppm).

The VOCs detected in Area 2 soils were contributing to groundwater contamination in this area. An IRM, completed in 2002, addressed these contaminants.

Area 4B

This area is located in the western part of the Main Plant north of Building 81 (See Figure 3). The work conducted during the RI included the collection of five samples from various intervals to a depth of approximately 6 feet where the water table was encountered. The samples were analyzed for VOCs, SVOCs, and metals (see Table 4). The VOCs including benzene(0.07 ppm), chlorobenzene(20 ppm), and 1,2-dichloroethane(5 ppm) were detected at concentrations above RSCOs in one location. The SVOCs detected above RSCOs include phenol(1.2 ppm) and the following PAHs: benzo[a]anthracene(31 ppm), benzo(a)pyrene(4 ppm), dibenzo[a,h]anthracene(4 ppm). The predominant COC in this area was arsenic which was detected at a concentration of 1,560 ppm. Other metals of concern, including chromium(30.9 ppm), lead(491 ppm), mercury(1 ppm), and zinc(243 ppm) were detected at concentrations slightly above RSCOs.

The arsenic detected in this area was contributing to groundwater contamination in this area. An IRM, completed in 2002, addressed these contaminants.

Area 4A

This area is located across Riverside Ave in the lagoon area (See Figure 3). The work conducted during the RI included the collection of samples from various intervals to a depth of approximately 14 feet where the water table was encountered. The samples were analyzed for arsenic only based upon previous investigatory work (see Table 5). Arsenic (127,000 ppm) was detected at high concentrations along the northeastern portion of the lagoon property along Riverside Ave.

The arsenic detected in this area was contributing to groundwater contamination in this area along the Hudson River. An IRM, completed in 2002, addressed a large portion of these contaminants. This PRAP will establish the final remedy for the remaining contaminated soils in Area 4A.

Groundwater

The groundwater on the Main Plant, east of Riverside Avenue and including the landfill, has been significantly impacted by VOCs (see Figure 7). Table 1 summarizes the groundwater data and compares it to the appropriate groundwater standard. VOCs detected in groundwater include: benzene(15 ppm), ethylbenzene(1.8 ppm), toluene(0.14 ppm), xylene(3 ppm), chlorobenzene(170 ppm), 1,2-dichloroethane(20 ppm), 1,2-dichlorobenzene(0.12 ppm), and 1,2,4-trichlorobenzene(1.5 ppm).

SVOCs and metals other than arsenic have been detected sporadically on the Main Plant property. The SVOC of concern include: benzo(a)anthracene(0.003 ppm), and phenol(0.58 ppm); and the metals of concern include: chromium (164 ppm) and lead (.0472 ppm).

Hexavalent chromium was included in the second round of sampling and was reported as undetected in 40 unfiltered groundwater samples and 16 filtered groundwater samples; 8 unfiltered groundwater samples with elevated detection limits, and 3 filtered groundwater samples with elevated detection limits. Hexavalent chromium was only detected in one unfiltered groundwater sample at a concentration of 60 ppb compared to a standard of 50 ppb.

Arsenic has been detected in monitoring wells on the western side of the Main Plant, and in the lagoon area west of Riverside Avenue. It has been detected at concentrations up to 24.3 ppm in the lagoon area and 2.16 ppm in the Main Plant area.

Site related contaminants have also been detected in the sewer bedding that borders the property along the southern and western boundaries of the Main Plant. Most notably, water samples taken from location LG-MH-7 contain benzene and chlorobenzene at 0.130 ppm and 2.6 ppm, respectively. These two compounds have also been detected in the groundwater in the landfill property which is most likely the source for the contamination.

5.2: Interim Remedial Measures

An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

The RI identified distinct areas of contamination which warrant remediation as an IRM. In the Spring 2002 the NYSDEC approved two IRM work plans, for the Soil Excavation IRM and Process Buildings IRM. The nature of the wastes lend themselves to removal by straight-froward excavation/removal as opposed to in-situ or ex-situ treatment. The Soil Excavation IRM involved the removal of 23,000 tons of contaminated soil from four areas (see Figure 3), and has an estimated cost of $4,700,000. The four areas which have been addressed are: the former drum storage area (Area 1), contaminated soils adjacent to Building 81 (Area 2), arsenic contaminated soils adjacent to Building 73 (Area 4B), and arsenic contamination on the east side of the North Lagoon (Area 4A).

The approved work plan for the Process Buildings IRM was not started by BASF. The Process Buildings IRM would have involved the removal and off-site disposal of process waste and associated contaminated soils in the earthen basements of process buildings 84, 87, and 93 (see Figure 4). This task is being incorporated into the proposed remedy presented in this document.

Highlights of the completed IRM include:

- Excavation of the sources, during which all excavated soils (from the areas described above) were properly managed at an off-site facility. During implementation of the IRM, BASF proposed to pre-treat some of the soils (on-site) prior to off-site disposal. The NYSDEC agreed to this proposal and notified the public prior to initiating the pre-treatment process. However, the pre-treatment was ineffective and the soils were disposed off-site at an approved facility without being pre-treated;
- Implementation of a Community Air Monitoring Program, as required by the NYSDOH; and
- Backfilling of the soil excavations at Area 1, Area 2, Area 4A and Area 4B with clean fill material.

The residual contaminated soil that remains on-site at concentrations above the NYSDEC RSCOs, will be addressed as part of this PRAP.

Goals and results for the IRMs for each of the areas are:

Area 1

The goal of the IRM in this area was to remove soils with VOC concentrations above RSCOs. The higher concentrations of commingled (blended) metals (namely arsenic, chromium and lead) were also removed. Table 2 summarizes the RSCOs and the Pre- and Post- IRM range of concentrations. There were 87 post excavation samples taken from the bottom and side walls of the excavation. Of those samples, two contained benzene and xylene slightly above their respective RSCO. It should be noted that there were several locations where soils were removed to 1 foot below the groundwater table and no post excavation samples were taken. While metals of concern were not the primary driver for cleanup in this area, samples were taken at the excavation limits to establish their residual levels. The sample results for metals indicated that high levels of chromium(up to 230,000 ppm) and lead (up to 214,000 ppm) remained after the initial (VOC) cleanup levels were achieved. Based upon these results additional excavation was performed which removed these soils (contaminated with metals) to one foot below the groundwater table. No post excavation samples were taken since the excavation went below the groundwater table.

Area 2

The goal of the IRM in this area was to remove soils with VOC concentrations above RSCOs. Table 2 summarizes the RSCOs and the Pre- and Post - IRM range of concentrations. Since the soils were removed to one foot below the water table, no samples were collected from the bottom of the excavation. Four post excavation samples were taken from side walls of the excavation. Of those, no samples had detections above the RSCOs for the VOCs. Since metals and PAHs were not prevalent in this area, they were not used for establishing cleanup objectives.

Area 4B

The goal of the IRM in this area was to remove soils with arsenic contamination within the predefined limits described in the soil IRM work plan. At the lateral limits of the excavation, soils which exhibit the hazardous toxicity characteristic for arsenic were excavated and disposed of properly. Arsenic was detected throughout the plant site at levels above the RSCO of 7.5 ppm. Therefore, removal to achieve that clean up objective was not feasible. The goal was to address arsenic contaminated soils currently impacting groundwater. Table 2 summarizes the RSCOs and the Pre- and Post- IRM range of concentrations. The soils in this area were removed to one foot below the water table, The remedial goals of the Soil Excavation IRM were achieved in all areas except Area 4A. As indicated above, this PRAP will establish the final remedy for the remaining contaminated soils, including Area 4A. therefore post excavation samples were only taken from side walls of the excavation. Of those post excavation samples; no VOCs were detected above RSCOs and one failed the hazardous toxicity characteristic for arsenic. After additional soil was excavated where the soils failed the toxicity characteristic test, another sample was taken which did not fail the test.

Area 4A

The goal of the IRM conducted in this area was to remove soils contaminated with arsenic within the limits defined in the IRM work plan. Because arsenic was detected throughout the lagoon area soils, removal to the RSCO of 7.5 ppm was not feasible. Again, the goal was to address contaminated subsurface soils impacting groundwater. The focus of the remediation was to remove soils down to one foot below the water table in the area along the northeast side of the north lagoon (see Figure 3). The excavation continued north and south to predefined locations based upon results from the RI, which indicated a significant drop in arsenic concentrations. At the north and south end of the excavation, soils which exhibit the hazardous characteristic were excavated and disposed of properly. Table 2 summarizes the RSCOs for arsenic and summarizes the Pre- and Post - IRM range of concentrations. The soils in this area were removed to one foot below the water table so no samples were collected from the bottom of the excavation. Therefore, post excavation samples were only taken from the walls of the excavation. The post excavation samples indicate that cleanup goals were not achieved along the lagoon side of the trench and along Riverside Avenue (the east side of the trench). Additional removal to achieve the cleanup goals will be necessary, and will be included as part of the final remedy being proposed in this document.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6 of the RI/Supplemental RI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Under the current land use conditions at the site, two groups of potential receptors could be exposed to site contamination in soil and groundwater:

- Trespassers.
- Construction workers.

These receptors could come in direct contact with contaminated soil. In the case of a construction worker, dermal exposure to contaminated groundwater during excavation is also a possibility. Both groups may also be exposed to The Fish and Wildlife Impact Analysis, which is included in the RI/SRI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and ecological risks have been identified:

contaminants via inhalation of soil particles or vapors released from groundwater. With the completion of the Soil Excavation IRM, the potential for exposure to contaminated soil is significantly reduced.

Depending on future land use conditions at the site two groups of potential receptors could be exposed to contamination present in site soil and groundwater:

- Future residents.
- Site workers / construction workers.

Both of these groups may be directly exposed to contaminants remaining in site soils. The future resident may ingest contaminants in groundwater if a private well is installed on site. As above, a site worker may also be directly exposed to contaminants in groundwater during an excavation. Both groups may also be exposed to contaminants via inhalation of soil particles or vapors released from groundwater. Inhalation of soil vapors released into a future home or workplace from contaminated groundwater is another potential route of exposure.

5.4: <u>Summary of Environmental Impacts</u>

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

Only the shallow groundwater (water bearing unit) was found to have contamination. The transmissivity (or movement) of water on-site is minimal and this fact is evident in two on-site areas that were found to have no water in the shallow water bearing unit.

- via groundwater, containing benzene and chlorobenzene, migrating away from the site along the southern border of the main plant parking lot and closed landfill, where three municipal storm water sewers are buried. These storm water sewers are believed to discharge to the Hudson River.

Site contamination has impacted the groundwater in the shallow water bearing unit.

- via groundwater west of Riverside Avenue and around the lagoons, containing high levels of arsenic, migrating toward (and potentially impacting) the Hudson River.

The determination of whether or not the Hudson River is being impacted by the plumes described above, and to what extent, will be addressed during the OU2 activities.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- Infiltration of surface water into the soils and/or the release of contaminants from the soils into on-site groundwater that may create exceedances of groundwater quality standards;
- Exposure of persons and wildlife at or around the site to contaminated surface soils on-site;
- Exposure of persons at or around the site to contaminated sub-surface soils during any future intrusive activity;
- Migration of the contaminated groundwater off-site, causing exceedances of water quality standards off-site;
- Exposure of flora or fauna to off-site contaminated groundwater migration that does not meet NYSDEC Class GA Ambient Water Quality Criteria; and
- Impact upon indoor air quality from soil vapors migrating into buildings.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, and comply with other statutory requirements; then utilize permanent solutions, alternative technologies, or resource recovery technologies to the maximum extent practicable. Potential remedial alternatives for the BASF Manufacturing Plant site were identified, screened and evaluated in the November 26, 2001, FS report entitled "Feasibility Study Report - BASF Rensselaer" which is available at the document repositories mentioned previously.

The NYSDEC accepts the FS for its technical information, but does not agree with the FS Report regarding the results of the evaluations presented. Also, the completed Soil Excavation IRM was not reflected in the FS. Therefore, the NYSDEC has included its own evaluations in this PRAP.

In this PRAP, Alternative 7 was assembled for evaluation by combining the groundwater re-injection system in Alternative 5 with the groundwater collection and treatment system of Alternative 6. There are four alternatives which address contaminated groundwater (Alternatives 4, 5, 6 and 7). These groundwater alternatives will be evaluated against the criteria together. There are two soil alternatives (Alternatives 2 and 3) addressing the soil contamination that remains on-site, and will be evaluated against the criteria together.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The potential remedies are intended to address the contaminated soils, groundwater, and waste sludge at the site. Alternatives were developed to address contaminated soils (Alternatives 2 and 3) and contaminated groundwater (Alternatives 4, 5, 6, and 7) on the manufacturing plant itself.

The following activities were determined to be basic elements that would be performed as part of the final remedy in order to meet SCGs and be protective of human health and the environment, regardless of which of the six (of seven) alternatives requiring remedial action is chosen:

- To be protective of groundwater, complete the approved contaminated soil source area IRM described in Section 5.2 by excavating the remaining source of contamination in the soils near the lagoon (Area 4A), and disposal of these excavated soils off-site (at an approved facility);
- To be protective of groundwater and to eliminate a major source of listed hazardous waste, implement the approved process building IRM work plan described in Section 5.2 by removing, stabilizing as necessary, and disposing of off-site (at an approved facility) the process building basement sludge and underlying contaminated soils;
- To eliminate a major source of listed hazardous waste; excavate, stabilize (dewater), pre-treat as necessary for VOCs and dispose of (at an approved facility) the sludge from the wastewater treatment lagoons off-site;
- To be protective of worker safety and the health of the adjacent community, develop a soils/dust management plan to address residual contaminated soils that may be excavated from the site during future redevelopment, or disturbed during building demolition/raising;
- To be protective of public health, implement institutional controls (including deed restrictions) to prevent the use of groundwater and restrict future use of the site;
- To be protective of public health, develop a soil gas monitoring program to evaluate the need for gas venting and gas control due to the possible build up of vapors under the cap which may impact indoor air quality from soil vapors migrating into buildings; and
- To ensure the effectiveness of the proposed remedy for OU1, institute a long-term groundwater monitoring program.

Capital costs included in the following remedial alternative descriptions do not include the $1,770,000 cost of the basement sludge and underlying contaminated soil removal; the $5,400,000 cost of lagoon sludge removal; storm water system modification; nor the gas venting, control of vapor migration, and monitoring. These are common items to all the alternatives being considered and their costs will be added to the total capital cost of the proposed remedy in Section 8 of the PRAP.

Alternative 1: No Further Action

The No Further Action alternative recognizes remediation of the site conducted under previously completed IRMs. To evaluate the effectiveness of the remediation completed under the IRM, only continued monitoring is necessary.

This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment. The annual O&M cost for monitoring the groundwater would be $12,500 for 30 years. The total present worth cost for monitoring the groundwater would be $397,000.

SOIL REMEDIATION ALTERNATIVES

Alternative 2: Excavation and Off-Site Disposal of Unsaturated Soils Greater than NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives (RSCOs)

Present Worth:	$ 42,323,200
Capital Cost:	$ 41,926,200
Annual O&M:	$ 12,500
Time to Implement	18 months - 2 years

This alternative includes excavation and off-site disposal of the unsaturated soils which are greater than the NYSDEC RSCOs in TAGM 4046. This alternative would remove the accessible soils to a depth one foot below the water table. Saturated soils deeper than one foot below the water table would not be accessible, due to the technical difficulty of the construction requirements for sheeting and dewatering the areas to be excavated, and would remain on-site. After excavating to one foot below the water table, these areas would be back-filled with clean off-site material.

The total areal extent is approximately twenty acres, and the depth to the water table varies from five to fifteen feet below the land surface. About 187,840 cubic yards of non-hazardous waste and about 9,870 cubic yards of hazardous waste (a total of 197,710 cubic yards of material) would be excavated. Accessibility requires that the majority of the on-site buildings be demolished prior to excavation activities. Waste characterization samples would be taken for every 1000 cubic yards of material excavated.

Annual O&M:	$ 12,500
Time to Implement	6 months - 9 months

This alternative includes in-situ (in place and below the ground surface) chemical oxidation within the groundwater (or in the vicinity of the selected groundwater source area) on-site. The area that would be treated is located in the north-west quarter of the main plant (includes Area 2 and Area 4B), is approximately 191,000 square

Alternative 3: Asphalt and Concrete Pavement Cap

Present Worth:	$ 2,014,800
Capital Cost:	$ 1,309,800
Annual O&M:	$32,500
Time to Implement	1 year

This alternative would include a low permeability asphalt and concrete cap over all areas with residual soil contamination. The cap would be a combination of new asphalt, competent existing asphalt, buildings and parking/loading areas. This alternative would minimize the potential of human and/or animal direct contact with the underlying soils and greatly reduce the rate of infiltration of surface water. It is presumed that the existing buildings would remain in place and function as part of the cap (see Figure 8).

The total area to be capped would be approximately 27 acres, with an approximate thickness of twelve inches. The asphalted areas would consist of eight inches of subbase and four inches of asphaltic pavement. Once completed, the inspection and annual certification, maintenance, and repair of the cap would be required.

GROUNDWATER REMEDIATION ALTERNATIVES

Alternative 4: In-situ Chemical Oxidation of VOC Source Areas

Present Worth:	$ 5,356,500
Capital Cost:	$ 4,959,500

feet, and contains a large plume of VOC and SVOC contamination.

This alternative would destroy organic contamination within the subsurface (in-situ) by using a blend of catalysts, oxidizers and viscosity enhancers (called an agent). The agent would be injected through a delivery system designed specifically for this site. The success of this type of remediation would be limited by the even distribution of the agent, therefore it is estimated that 1,330 injection points would be required to treat 191,000 square feet. The potential for mobilizing metals would be considered when proposing chemical oxidation.

Alternative 5: Extraction, Treatment and Re-injection into VOC Source Areas

Present Worth:	$ 3,573,000
Capital Cost:	$ 1,634,400
Annual O&M:	$112,800
Time to Implement	9 months - 1 year

This alternative includes the construction, operation, and maintenance of a groundwater extraction, treatment and re-injection system. This would only address a VOC contaminated groundwater plume in the north-west quarter of the site (see Figure 9) would be captured (and collected) by a system of collection trenches and extraction wells, treated on-site, then re-injected. The re-injection phase addresses the residual soils acting as a source to this plume in the north-west quarter of the site. Treated groundwater (along with surfactant and biological amendments) would be re-injected into the source area (where the mobilization of metals is not a risk) to expedite the remediation of those residual soils. The proposed system would be located in the north-west quarter of the site and consist of a network of piping, extraction wells, interceptor trenches, and approximately 30 re-injection wells.

The treatment phase would potentially include equalization (which prevents the collection system from being overwhelmed by a slug of higher contamination), metals removal, and VOC/SVOC removal. The individual components may be modified, removed and/or replaced during the design phase. All of the treated water would be re-injected and the system would operate at an estimated optimal flow rate of 20 - 30 gallons per minute (gpm) to contain the plume. The treated water would meet all applicable discharge limits.

Alternative 6: Containment, Collection and On-site Treatment of Groundwater

Present Worth:	$ 3,949,900
Capital Cost:	$ 1,547,400
Annual O&M:	$ 142,900
Time to Implement	9 months - 1 year

This alternative includes the construction, operation, and maintenance of a groundwater extraction and treatment system. All the contaminated groundwater on-site would be captured on-site (and collected) by a system of collection trenches and extraction wells (see Figure 7); treated on-site, then discharged to the Rensselaer County Sewage Treatment Plant (also known as a publicly owned treatment works (POTW)) or the Hudson River. The proposed collection system would consist of an extensive network of piping, extraction wells, interceptor trenches, and a groundwater treatment system that would operate at an estimated 80 - 100 gpm.

The treatment phase would potentially include equalization, metals removal, and VOC/SVOC removal. The individual components may be modified, removed and/or replaced during the pre-design phase. All the treated water would meet all appropriate discharge limits.

Alternative 7: Combination of Alternative 5 and Alternative 6

Present Worth:	$ 4,328,600
Capital Cost:	$ 1,926,600
Annual O&M:	$142,900
Time to Implement	9 months - 1 year

This alternative combines the groundwater re-injection system in Alternative 5 with the comprehensive (on-site) groundwater collection and treatment system of Alternative 6. Contaminated groundwater would be contained on-site (and collected) by a system of collection trenches and extraction wells and treated on-site using a water treatment system. After being treated, a portion of the treated water (estimated to be 20 - 30 gpm) would be re-injected into the VOC contaminated residual soils to assist in cleansing these soils (see Figure 9). The remainder of the treated groundwater would be discharged to either a POTW or the Hudson River.

If re-injection becomes no longer viable at some future date, all the treated groundwater would be discharged to either a POTW or the Hudson River for the remainder of the life of the groundwater containment, collection and on-site treatment system.

The treatment phase would include the same equalization, metals removal, and VOC/SVOC removal as proposed for Alternatives 6. The individual components may be modified, removed and/or replaced during the pre-design phase. All treated water would meet all appropriate discharge limits.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York State. The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

Groundwater Alternatives 6 and 7 would require treatment of the groundwater on-site, with each of these alternatives providing a similar level of protection for human health and the environment. Alternatives 6 and 7 would eliminate plume migration off-site. Groundwater Alternatives 4 and 5 would significantly reduce the concentration of the organic contaminants on-site, but would not stop the contaminated groundwater from migrating off-site. It would also not address the arsenic groundwater contamination in the main plant and lagoon areas. Therefore, Alternative 4 or Alternative 5 (by itself) would not protect human health and the environment off-site.

Soils Alternatives 2 and 3 would be protective of human health from exposure to contaminated soils. Alternative 3 would not remove any contaminated soils, however it would reduce the potential for direct contact and migration of contaminants into groundwater through the construction of a cap. Alternative 2 would provide the greatest level of protection to human health and the environment (by itself) since the largest volume of contaminated soils would be removed from the main plant, eliminating the potential for direct contact and the migration of contaminants into groundwater.

The no further action alternative (Alternative 1) would not be protective, and will not be considered for the remaining evaluation criteria.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether or not a remedy would meet applicable environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The most significant SCGs for OU1 are:
* New York State Ambient Water Quality Standards and Guidance Values.
* Determination of Soil Cleanup Objectives and Cleanup Levels (Technical and Administrative Guidance Memorandum HWR-94-4046, hereafter referred to as TAGM).

Groundwater Alternatives 6 and 7 would not satisfy groundwater standards on-site in a reasonable time frame, however, groundwater standards would be met off-site (over time), as they would control off-site migration of contaminated groundwater. Groundwater Alternative 4 and 5 would significantly reduce the concentration of most of the organic contaminants on-site, but would not achieve their respective groundwater standards. Alternative 4 and 5 would also not address the arsenic related groundwater contamination. A groundwater monitoring program would remain in place for as long as needed to confirm compliance with groundwater quality standards off-site.

Soils Alternative 3 would prevent surface exposure and direct contact, but would not meet the TAGM objectives for the COCs since contaminated soils would be capped in place. Soils Alternative 2 would meet the TAGM objectives for the contaminants present in the unsaturated soils. However, the saturated soils would not meet the TAGM objectives since they would not be excavated.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. <u>Short-term Effectiveness</u>. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.
Groundwater Alternatives 5, 6 and 7 would require approximately 12 months for construction to be completed and involve intrusive activity to install the trenches, pipes or recovery wells for groundwater collection. Therefore, they would have a short-term adverse impact upon the community. Groundwater Alternative 4 would require 6 to 9 months to complete construction, not require intrusive activities, and therefore would have less of a short-term adverse impact Groundwater Alternatives 6 and 7 would offer good long-term effectiveness if the pumping of groundwater and the treatment of groundwater are constantly maintained. Alternatives 7 would have the added benefit of re-injecting the treated groundwater back into the contaminated residual soils (where the mobilization of metals is not a risk) in order to help flush contamination from these soils. The effectiveness of the containment, collection and treatment systems would be continually evaluated through a groundwater monitoring program. Alternative 4 would present

upon the workers, the community, and the environment.

Soils Alternative 2 would require up to 2 years to complete, involves excavation of the contaminated soils, and if not designed correctly would have the greatest potential for a short-term adverse impact. A significant amount of truck traffic would be expected for Alternative 2, hauling fill to the site and contaminated material from the site. Noise would be generated from operating the construction equipment. These impacts would be mitigated through conventional and remedial construction practices approved by the NYSDEC and the NYSDOH. Soils Alternative 3 would require approximately 12 months to complete, does not require intrusive activities, and therefore would have less of a short-term adverse impact upon the workers. Materials would have to be hauled in, in order to construct a cap over the remainder of the unpaved areas, which would have less of an impact on the community than Alternative 2.

4. <u>Long-term Effectiveness and Permanence</u>. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

the highest long-term risk since it would leave contaminants above standards, both treated (organic contaminants) and untreated (metals).

Soils Alternative 2 would be the most effective and permanent in the long-term(for soils contamination) because it would remove all unsaturated soils containing hazardous constituents above TAGM objectives. Contamination would remain in the saturated soils after implementation of Alternative 2. Soils Alternative 3 would not remove contaminated soils and therefore poses a greater potential for long-term risk. Alternatives 2 and 3 would include deed restrictions to provide long-term human health protection.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

Groundwater Alternatives 6 and 7 would contain the contaminant plume on-site thereby greatly reducing the mobility of the contamination. Groundwater Alternative 4 would treat the organic contaminants in-situ thereby reducing their mobility, however it would not address the arsenic contamination downgradient of the main plant in the vicinity of the lagoons. All of the groundwater alternatives also reduce the volume and toxicity of contaminants in the groundwater via treatment. Alternatives 5 and 7 have the added benefit of re-injecting the treated groundwater back into the contaminated residual soils (in the north-west quarter of the site) in order to help flush contamination from these soils. However, re-injecting the treated groundwater may only be viable if there is sufficient recharge to the shallow water bearing unit. The effectiveness of the containment, collection and treatment system must be continually evaluated through a groundwater monitoring program and annual certification.

Soils Alternative 3 would reduce the mobility of the contamination, without treatment, by placing a

The soils alternatives also can be implemented. Qualified contractors with the necessary personnel, equipment, and material would be available for each of these alternatives. Alternative 2 would be the most difficult to implement, from both a technical and administrative viewpoint, since it involves the removal, storage, and off-site transport of 197,710 cubic yards of impacted soils (above the water table). Alternative 3 would not involve the removal of contaminated soils, but materials would have to be brought on-site to construct the asphalt cap.

low permeability asphalt cap over the site. The cap would reduce surface water infiltration thereby reducing the potential for contaminant migration. Soils Alternative 2 would provide the greatest reduction in volume of contaminated soils present at the site by removing all of the unsaturated soils contaminated above the TAGM objectives. It should be noted that there would be no reduction in volume of contaminated soils since they would be sent off-site for disposal at an approved facility.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, and institutional controls.

All four of the groundwater alternatives can be implemented. Qualified contractors with the necessary personnel, equipment, and material would be available for each of these alternatives. Alternatives 5, 6 and 7 would require BASF to meet the substantive technical requirements of a water discharge permit. Since there is no water discharge associated with Alternative 4, this administrative requirement would not be necessary.

7. Cost-Effectiveness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 3.

The present worth costs for the groundwater alternatives range from $3,573,000 to $5,356,500.

Alternative 5 would be the least expensive and Alternative 4 the most expensive. Soils Alternative 3 would cost $2,014,800. Alternative 2 would be the most expensive alternative at $42,323,200.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the NYSDEC will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The NYSDEC is proposing a combination of Alternatives 3 and 7 as the remedy for OU1. Alternative 3, an asphalt cap, would consist of a low permeability asphalt cap over those areas not currently covered by competent pavement or buildings. Alternative 7, a combination of

The soils alternatives are similar with respect to the majority of the balancing criteria. With the highly contaminated soils in the source areas (except for the east and west sides of Area 4A) removed during the Soil Excavation IRM, the impact upon groundwater has been greatly reduced. Alternative 3 would not actively remove the remaining residual contaminated soils from the source areas, but instead would place a low permeability cap over all these areas. Alternatives 2 and 3 both have short-term impacts which can be controlled, but the difficulty in handling a great volume of material in a limited space (as proposed

Alternatives 5 and 6, would involve constructing a groundwater containment system (GCS) so that groundwater would be contained on-site by a system of collection trenches and extraction wells, treating the groundwater on-site (to remove metals, VOCs and SVOCs), then re-injecting a portion of the treated groundwater (along with surfactant and biological amendments) to expedite the remediation of the residual water-saturated soils. If re-injection is no longer viable at some future date, all the treated groundwater would be discharged to either a POTW or directly to the Hudson River in conformance with NYSDEC discharge limitations.

This selection is based on the evaluation of the seven alternatives developed for this site. With the exception of the No Further Action alternative, each of the alternatives would comply with the threshold criteria.

Because Alternatives 2-7 are comparable regarding the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for OU1. Alternatives 3 and 7 best achieve the primary balancing criteria described in Section 7.2. They would achieve the remediation goals for the site by capping the residual soils that create the potential threat to public health and the environment, greatly reduce the source of contamination to groundwater, and restore groundwater quality to the extent practicable.

in Alternative 2) greatly increases the potential for impact upon the community. The time needed to implement Alternative 3 would be shorter than for Alternative 2. Alternative 2 involves a major increase in cost (many times the expense of Alternative 3) for similar benefits (as described above).

The groundwater alternatives are similar with respect to the majority of the balancing criteria and cost. The equipment needed for removing VOCs, SVOCs, and metals from the groundwater is the same for Alternatives 6, and 7. Alternative

7 combines the benefits from Alternatives 5 and 6 by re-injecting the treated groundwater into the water-saturated soils where the mobilization of metals is not a risk. The remaining volume of treated groundwater would be discharged to a POTW or the Hudson River in conformance with NYSDEC discharge limitations for the remainder of the life of the remedial system.

The estimated present worth cost to implement the comprehensive remedy (including excavation of the building basements sludge and lagoon sludge) is $13,187,400. The cost to construct the remedy is estimated to be $10,406,400. The annual operation and maintenance cost for years 0 to 30 is estimated to be $164,600. The total present worth for (a minimum of) 30 years of annual operation and maintenance is estimated to be $2,781,000.

The elements of the proposed remedy are as follows:

1. A remedial design program to verify the components of the conceptual design and provide the details necessary for the construction, operation and maintenance, and monitoring of the remedial program. Any uncertainties identified during the RI/FS would be resolved;

2. A low permeability asphalt and concrete cap over those areas with residual soils contamination not currently covered by competent pavement or buildings;

3. Completion of the removal of the source of contamination in the soils near the lagoon on the west side of Area 4A, and disposal of these excavated soils off-site (at an approved facility). The soils on the east side of Area 4A will be address as part of OU2;

4. Removal of the process building basement sludge and underlying contaminated soils and disposal (which may require stabilization) of these excavated materials off-site (at an approved facility);

5. Excavation, stabilization (dewatering), pretreatment as necessary for VOCs, and off-site disposal (at an approved facility) of the sludge from the treatment lagoons;

6. Development of a soils/dust management plan to address residual contaminated soils that may be excavated from the site during future redevelopment, or disturbed during building demolition. The plan would require soils characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations;

7. Imposition of an institutional control in such form as the NYSDEC may approve that would require compliance with the approved soils management plan;

   Imposition of an institutional control in such form as the NYSDEC may approve that would prevent future residential and inappropriate commercial/institutional use of the site, and the use of groundwater as a source of potable or process water without necessary water quality treatment as determined by the Rensselaer County Department of Health and NYSDOH.

   The property owner would complete and submit to the NYSDEC an annual certification until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal would contain certification that the institutional controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective;

8. Construction of a groundwater containment system (GCS), which would extract impacted groundwater, treat the groundwater on-site, and inject the treated groundwater into the residual soils of the source areas. If re-injection is no longer viable at some future date, all the treated groundwater would be discharged to

either the Rensselaer POTW or the Hudson River;

9. A soil gas monitoring program to evaluate the need for gas venting and gas control due to the possible build up of vapors under the cap which may impact indoor air quality from soil vapors migrating into buildings; and

10. Since the remedy results in untreated hazardous waste remaining at the site, a long term monitoring program would be instituted. Off-site monitoring wells would be sampled along the western and southern boundaries to assure that the contamination levels in the groundwater continue to decrease by eliminating the sources. This program would allow the effectiveness of the asphalt cap and groundwater collection system to be monitored and would be a component of the operation and maintenance for the site.

TABLE 1

Nature And Extent of Contamination

Range of sampling dates; April 1999- June 2002

Waste Process Residue in Buildings 84, 87, 93	Contaminants of Concern	Concentration Range (ppm)[a,d,e]	SCG[b] (ppm)[d,e]	Frequency of Exceeding SCG
Volatile Organic Compounds	Benzene	ND to 2.2 (U)	NA	NA
	Toluene	ND to 11.3	NA	NA
	Xylene	ND to 11(U)	NA	NA
	Chlorobenzene	ND to 40.1	NA	NA
	1,2-Dichloroethane	ND to 11(U)	NA	NA
	1,2-Dichlorobenzene	ND to 48.5	NA	NA
	1,2,4-Trichlorobenzene	ND to 514	NA	NA
Semivolatile Organic Compounds	Benzo(a)anthracene	ND to 41.7	NA	NA
	Benzo(a)pyrene	ND to 26.6	NA	NA
	Dibenzo(a,h)anthracene	ND to 6.58	NA	NA
	Phenol	ND to 80	NA	NA
Metals	Arsenic	ND to 73.9	NA	NA
	Chromium	18.2 to 27,500	NA	NA
	Lead	39.7 to 3,280	NA	NA
	Mercury	ND to 10.6	NA	NA
	Zinc	ND to 1,560	NA	NA

TABLE 1 (cont'd)
Nature And Extent of Contamination
Range of sampling dates; April 1999- May 2001

Underlying Soils in Buildings 84, 87, 93	Contaminants of Concern	Concen'tion Range (ppm)[a,d,e]	SCG[b] (ppm)[a,c]	Frequency of Exceeding SCG
Volatile Organic Compounds	Benzene	ND to 6.4 (U)	0.06	6 of 12
	Toluene	ND to 6.4(U)	5.5	3 of 12
	Xylene	ND to 6.4(U)	1.2	2 of 12
	Chlorobenzene	ND to 200	1.7	7 of 12
	1,2-Dichloroethane	ND to 6.4(U)	0.1	9 of 12
	1,2-Dichlorobenzene	ND to 120	7.9	3 of 12
	1,2,4-Trichlorobenzene	ND to 81	3.4	6 of 12
Semivolatile Organic Compounds	Benzo(a)anthracene	ND to 2.2	0.224	9 of 12
	Benzo(a)pyrene	ND to 2.4(U)	0.061	12 of 12
	Dibenzo(a,h)anthracene	ND to 4(U)	0.014	12 of 12
	Phenol	ND to 2.7	0.03	12 of 12
Metals	Arsenic	ND to 57.6	7.5	6 of 12
	Chromium	24.2 to 1,590	10	12 of 12
	Lead	ND to 1,510	400	3 of 12
	Mercury	ND to 1.5	0.1	8 of 12
	Zinc	ND to 815	87*	6 of 12

* As per TAGM 4046 this represents a background value established for the site

TABLE 1 (cont'd)
Nature and Extent of Contamination
Range of sampling dates: April 1999- May 2001

Lagoon Sludge	Contaminants of Concern	Range of Concentrations ppm[d]	SCG[b] (ppm)[a,c]	Frequency of Exceeding SCG
Volatile Organic Compounds	Acetone	ND - 77	NA	NA
	Benzene	ND - 22	NA	NA
	Chlorobenzene	ND - 590	NA	NA
	1,2-Dichlorobenzene	ND - 86	NA	NA
	Ethylbenzene	ND - 24	NA	NA
	1,2,4-Trichlorobenzene	ND - 17	NA	NA
	Toluene	1.8 - 660	NA	NA
	Xylenes	1.4 - 130	NA	NA
Semi-volatile Organic Compounds	Benzoic Acid	ND - 120	NA	NA
	Bis (2-ethylhexyl)phthalate	ND - 82	NA	NA
	4-Chloroaniline	ND - 160	NA	NA
	2-Methylnaphthalene	ND - 23	NA	NA
	4-Nitroaniline	ND - 30	NA	NA
	4-Nitrophenol	ND - 39	NA	NA
	Phenol	ND - 140	NA	NA
Metals	Arsenic	20.7 - 197	NA	NA
	Chromium	467 - 4,830	NA	NA
	Mercury	0.557 - 19	NA	NA
	Zinc	227 - 987	NA	NA

TABLE 1 (cont'd)
Nature And Extent of Contamination
Range of sampling dates; April 1999- May 2001

Subsurface Soil Outside the Areas	Contaminants of Concern	Concentration Range (ppm)^{a,d,e}	SCG^{b} (ppm)^{a}	Frequency of Exceeding SCG^{c}
Volatile Organic Compounds	Benzene	ND to 0.9	0.06	23 of 150
	Xylene	ND to 3	1.20	10 of 150
	Chlorobenzene	ND to 19	1.70	17 of 150
	1,2- Dichloroethane	ND to 5	0.10	26 of 150
	1,2-Dichlorobenzene	ND to 44	7.90	10 of 70
	1,2,4-Trichlorobenzene	ND to 19	3.40	17 of 70
Semi-volatile Organic Compounds	Benzo(a)anthracene	ND to 11	0.224	15 of 70
	Benzo(a)pyrene	ND to 9	0.061	30 of 70
	Benzo(b)fluoranthene	ND to 9	1.1	5 of 70
	Benzo(k)fluoranthene	ND to 3	1.1	5 of 70
	Chrysene	ND to 10	0.4	8 of 70
	Dibenzo(a,h)anthracene	ND to 3	0.014	20 of 70
	Ideno(1,2,3-c,d)pyrene	ND to 6	3.2	1 of 70
	Phenol	ND to 3	0.030	14 of 70
Metals	Arsenic	ND to 623	7.50	233 of 290
	Chromium	ND to 833	10.0	62 of 70
	Lead	ND to 660	400	12 of 70
	Mercury	ND to 52.5	0.1	42 of 70
	Zinc	ND to 602	87.0*	42 of 70

* As per TAGM 4046 this represents a background value established for the site

TABLE 1 (cont'd)
Nature And Extent of Contamination
Sampling date May 2001

GROUNDWATER	Contaminants of Concern	Concentration Range (ppm)^{a,d,e}	SCG^{b} (ppm)^{a}	Frequency of Exceeding SCG^{c,f}
Volatile Organic Compounds	Benzene	ND to 15	0.001	24 of 78
	Ethylbenzene	ND to 1.8	0.005	15 of 78
	Toluene	ND to 0.14	0.005	15 of 78
	Xylene	ND to 3	0.005	15 of 78
	Chlorobenzene	ND to 170	0.005	24 of 78
	1,2-Dichloroethane	ND to 20	0.0006	45 of 78
	1,2-Dichlorobenzene	ND to 0.12	0.003	39 of 77
	1,2,4-Trichlorobenzene	ND to 1.5	0.005	6 of 77
Semi-volatile Organic Compounds	Benzo(a)anthracene	ND to .003	.00002	1 of 67
	Phenol	ND to 0.58	0.0001	39 of 67
Metals	Arsenic	ND to 24.3	0.025	19 of 77
	Chromium	ND to 164	0.050	9 of 77
	Hexavalent Chromium	ND to 550(U)	0.050	9 of 50
	Lead	ND to 0.0472	0.025	1 of 77

TABLE 2
Summary of Subsurface Soil Sampling Results for Area 1
Pre- and Post-IRM sampling

	Contaminants of Concern	NYSDEC RSCOs ppm	Pre - IRM Range of Concentrations ppm[d]	Post - IRM Range of Concentrations ppm[d]
Volatile Organic Compounds	Benzene	.06	.210 - 34	.067 - .083
	Chlorobenzene	1.7	4.0 - 8,440	ND - < 1.7
	1,2-Dichlorobenzene	7.9	ND- 1,990	ND - < 7.9
	1,2,4-Trichlorobenzene	3.4	17.7 - 630	ND - < 3.4
	Ethylbenzene	5.5	14 - 123	ND - < 5.5
	Xylenes	1.2	6.8 - 841	2.0 - 3.7
Semi-Volatile Organic Compounds	Benzo(a)anthracene	0.224	ND- 26	Not analyzed
	Benzo(a)pyrene	.061	ND - 86	Not analyzed
	Dibenzo (a,h)anthracene	.014	ND - 86	Not analyzed
	Phenol	.030	ND - 26	Not analyzed
Metals	Arsenic	7.5	11 - 1260	10 - 917
	Chromium	10	13.5 - 239,000	67 - 8,761
	Lead	400	655 - 19,200	ND - 586

TABLE 3
Summary of Subsurface Soil Sampling Results for Area 2
Pre- and Post-IRM sampling

	Contaminants Of Concern	NYSDEC RSCOs ppm	Pre - IRM Range of Concentrations ppm[d]	Post - IRM Range of Concentrations ppm[d]
Volatile Organic Compounds	Chlorobenzene	1.7	ND - 455	ND - < 1.7
	1,2-Dichloroethane	.100	ND - 296	ND - < 0.1
	1,2- Dichlorobenzene	7.9	ND- 4	ND- < 7.9
	Ethylbenzene	3.4	ND - 93	ND - < 5.5
	Toluene	5.5	ND - 46	ND - < 1.5
	Xylenes	1.2	ND - 634	ND - < 1.2
Semi-volatile Organic Compounds	Benzo (a)anthracene	0.224	0.372 - 11	Not analyzed
	Benzo (a) pyrene	0.061	0.123 - 9	Not analyzed
	Dibenzo (a,h) anthracene	0.014	0.400 - 3	Not analyzed
	Phenol	0.030	0.200 - 0.5	Not analyzed
Metals	Arsenic	7.5	19.5 - 48	Not analyzed
	Chromium	10	13.1 - 20	Not analyzed

TABLE 4
Summary of Subsurface Soil Sampling Results for Area 4B
Pre- and Post-IRM sampling

	Constituent	NYSDEC RSCOs ppm	Pre - IRM Range of Concentrations ppm^d	Post - IRM Range of Concentrations ppm^d
Volatile Organic Compounds	Chlorobenzene	1.7	ND - 20	ND - < 1.7
	1,2-Dichloroethane	0.1	ND - 5	ND - < 0.1
	Benzene	.06	ND - .07	ND - < .06
	1,2,4-Trichlorobenzene	3.4	ND- 4	ND - < 3.4
Semi-volatile Organic Compounds	Benzo(a)anthracene	.224	.372 - 31	Not analyzed
	Benzo (a) pyrene	0.061	0.130 - 4	Not analyzed
	Dibenzo(a,h)anthracene	0.014	0.380 - 4	Not analyzed
	Phenol	0.030	0.12 - 1.2	Not analyzed
Metals	Arsenic	7.5	1,120 - 1,560	29 - 1,880*
	Chromium	10	15.7 - 30.9	10.7 - 309
	Lead	400	33 - 491	13.3 - 508
	Mercury	0.1	ND - 1	ND - 0.348
	Zinc	87**	ND - 243	ND - 208

* Soils did not exhibit hazardous toxicity characteristics and therefore did not require further excavation per the approved Soils Excavation IRM work plan. See Section 5.2: Interim Remedial Measures for further details.

** As per TAGM 4046 this represents a background value established for the site

TABLE 5
Summary of Subsurface Soil Sampling Results for Area 4A
Pre- and Post-IRM sampling

	Constituent	NYSDEC RSCOs ppm	Pre - IRM Range of Concentrations ppm[d]	Post - IRM Range of Concentrations ppm[d]
Metals	Arsenic	7.5	13 - 127,000	3.9 - 61,500

Footnotes for Tables 1- 5

a ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;

b SCG = standards, criteria, and guidance values;

c NA - Not applicable - There are no recommended cleanup objectives for contaminants in waste material.

d ND - Not detected

e Includes exceedances for sampling results which reported detection limits at or above the applicable SCG denoted by (U) adjacent to concentration

f Includes sampling results for samples taken from monitoring wells, sewer bedding and piezometers.

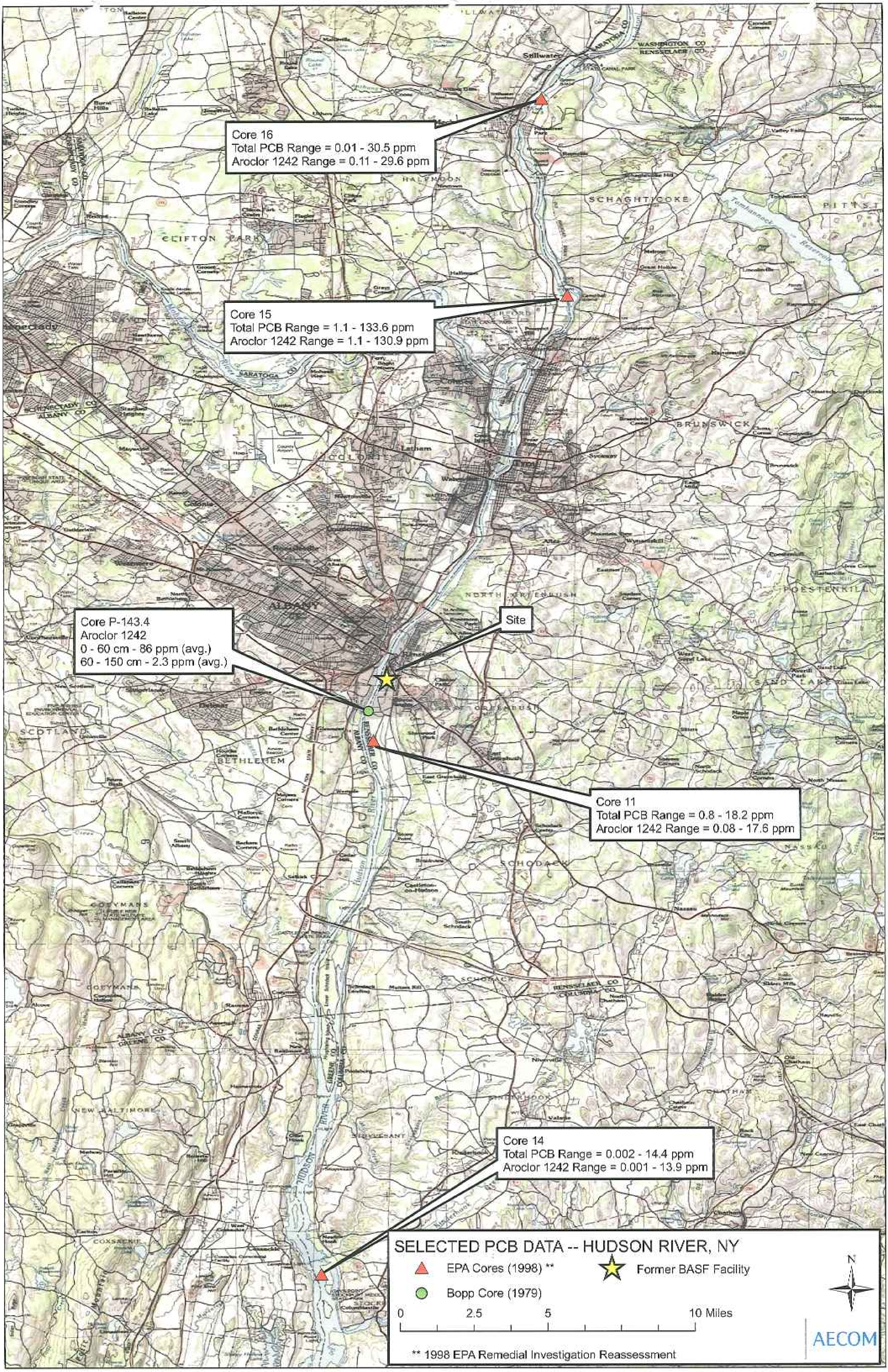
Table 6
Remedial Alternative Costs

	Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
1	No Further Action	$0	$12,500 - 30yrs	$397,000
2	Excavation and Off-Site Disposal of Unsaturated Soils Greater than NYSDEC RSCOs	$41,926,200	$12,500 - 30yrs	$42,323,200
3	Asphalt and Concrete Pavement Cap	$1,309,800	$32,500 - 30yrs	$2,014,800
4	In-situ Chemical Oxidation of VOC Source Areas	$4,959,500	$12,500 - 30yrs	$5,356,500
5	Extraction, Treatment and Re-injection into VOC Source Areas	$1,634,400	$112,800 - 30yrs	$3,573,000
6	Containment, Collection and On-Site Treatment of Groundwater	$1,547,400	$142,900 -30yrs	$3,949,400
7	Combination of Alternative 5 and Alternative 6	$1,926,600	$142,900 - 30yrs	$4,328,600
	Proposed Remedy (Alternatives 3 and 7) Costs	$3,236,400	$164,600	$6,343,400
	Common Element (lagoon sludge removal, storm water system modification, gas controls, and building basement sludge removal) Costs*	$7,170,000	N/A	$7,170,000
	Total Present Work Costs of Proposed Remedy	$10,406,400	$164,600	$13,187,400

*These costs do not include the estimated $4,700,000 for the Soil Excavation IRM.

EXHIBIT G

FIGURE – EPA DATA SET



SELECTED PCB DATA -- HUDSON RIVER, NY

▲ EPA Cores (1998) **

★ Former BASF Facility

● Bopp Core (1979)

** 1998 EPA Remedial Investigation Reassessment

Core 16
Total PCB Range = 0.01 - 30.5 ppm
Aroclor 1242 Range = 0.11 - 29.6 ppm

Core 15
Total PCB Range = 1.1 - 133.6 ppm
Aroclor 1242 Range = 1.1 - 130.9 ppm

Core P-143.4
Aroclor 1242
0 - 60 cm - 86 ppm (avg.)
60 - 150 cm - 2.3 ppm (avg.)

Core 11
Total PCB Range = 0.8 - 18.2 ppm
Aroclor 1242 Range = 0.08 - 17.6 ppm

Core 14
Total PCB Range = 0.002 - 14.4 ppm
Aroclor 1242 Range = 0.001 - 13.9 ppm

J:\Indl_Service\Project Files\BASF-0760\Rensselaer NY\PCBs\EPA_PCBs_data.mxd