STATEMENT OF BASIS

for

Solutia Inc.
Sauget, Illinois

EPA I.D. No. ILD 000 802 702

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List of Acronyms

AO	- Administrative Order
AOC	- Administrative Order on Consent
CERCLA	- Comprehensive Environmental Response, Compensation, and Liability Act
CMS	- Corrective Measures Study
DCBs	- Dichlorobenzenes
DHU	- Deep hydrogeologic unit
DNAPL	- Dense non-aqueous phase liquid
GMCS	- Groundwater migration control system
HVAC	- Heating, ventilation, and air conditioning
IEPA	- Illinois Environmental Protection Agency
ISTD	- In-situ thermal desorption
MCB	- Monochlorobenzene
MCL	- Maximum contaminant level
MHU	- Middle hydrogeologic unit
MNA	- Monitored natural attenuation
O&M	- Operation and maintenance
PCB	- Polychlorinated biphenyl
ppb	- Part per billion
ppm	- Part per million
RCRA	- Resource Conservation and Recovery Act
RFI	- RCRA Facility Investigation
SB	- Statement of Basis
SHU	- Shallow hydrogeologic unit
SVE	- Soil vapor extraction
SVOC	- Semi-volatile organic compound
TACO	- Tiered Approach to Corrective Action Objectives
U.S. EPA	- United States Environmental Protection Agency
VOC	- Volatile organic compound

Statement of Basis for Solutia Inc. Located in Sauget, Illinois

INTRODUCTION

This Statement of Basis (SB) presents the proposed remedy to address contaminated groundwater, soil, surface water, sediment, and indoor air at and from the Solutia Inc. (Solutia) facility located in Sauget, Illinois. It includes summaries of potential remedy alternatives evaluated by Solutia and the United States Environmental Protection Agency (U.S. EPA). U.S. EPA will select a final remedy after a 45-day public comment period and consideration of substantive public comments.

This SB is being issued by U.S. EPA as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA). It summarizes information that can be found in greater detail in the final RCRA Facility Investigation (RFI), Corrective Measures Study (CMS), and other pertinent documents contained in the Administrative Record. An Index to the Administrative Record is attached. U.S. EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the RCRA corrective action activities to be conducted at the Solutia facility.

U.S. EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on the SB. All documents supporting this SB are contained in the Administrative Record located at the Cahokia Public Library, 140 Cahokia Park Drive, Cahokia, Illinois, and the U.S. EPA, Region 5 Record Center (7th Floor), 77 W. Jackson Boulevard, Chicago, Illinois.

PROPOSED REMEDY

U.S. EPA proposes the following remedy to address all contaminated groundwater, soil, surface water, sediment, and indoor air at and from the Solutia facility:

- Continue to operate the Solutia groundwater migration control system (GMCS) that intercepts and captures contaminants in the American Bottoms aquifer before they can discharge to the Mississippi River. Contaminated groundwater is treated at the American Bottoms Regional Treatment Facility and treated groundwater is discharged by permit to the Mississippi River.

- Excavate and dispose of approximately 12,500 cubic yards of on-site soils contaminated with polychlorinated biphenyls (PCBs). The bulk of the contaminated soil will be excavated from the Former PCB Manufacturing Area. Spot removal of contaminated soil will occur at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, Central Plant Process Area, and the Former PCB Warehouse.

- Re-evaluate the risk posed by PCB contamination remaining in place at the Former PCB Manufacturing Area after excavation of approximately 12,500 cubic yards of on-site soils contaminated with PCBs. If necessary, remove or treat residual contamination to eliminate unacceptable risks. Design and install an appropriate cap for areas where PCB contamination greater than 10 ppm remains in place.

- Identify the extent of PCBs migrating in groundwater from the Former PCB Manufacturing Area. Design and install a groundwater monitoring system capable of determining whether the contaminant plume is stable and remains within the facility boundary. If necessary, evaluate and implement technologies capable of stabilizing the contaminant plume.

- Implement an in-situ thermal desorption (ISTD) field pilot test at the Former Chlorobenzene Process Area. ISTD involves heating the soil to remove contaminants. The field pilot test will evaluate the effectiveness of ISTD to remediate monochlorobenzene (MCB) and dichlorobenzenes (DCBs) in soil. ISTD technology will be tested on soils above and below the water table (approx. 35-feet deep). Upon completion of the field pilot tests, ISTD technology will be implemented at the Former Chlorobenzene Process Area if feasible, or an alternative remedy proposed.

- Conduct additional characterization and remediation of shallow soils contaminated with lead at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area. Large contiguous areas of shallow soil contaminated with lead exceeding appropriate soil cleanup levels will be excavated and sent off-site for proper treatment/disposal to protect industrial, construction, and redevelopment workers.

- Conduct additional characterization of unsaturated soils at the Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area. Large contiguous areas of unsaturated soils contaminated with MCB and benzene at the

former storage areas, tanks, and pipelines will be remediated. Soil vapor extraction (SVE) technology will be used to remediate soils contaminated with MCB and benzene exceeding appropriate soil cleanup levels to protect industrial, construction, and redevelopment workers, and to protect groundwater.

- Conduct additional characterization of unsaturated soils at the ketone residue tank, former benzyl chloride residue tank, and former steamer overhead tank and sump 277 within the Central Plant Process Area. Defined areas contaminated with volatile organic compounds (VOCs) such as MCB, toluene, ethylbenzene, xylenes, 2-hexanone, vinyl chloride, exceeding appropriate soil cleanup levels will be remediated using SVE technology and/or excavation and off-site treatment/disposal to protect industrial, construction, and redevelopment workers, and to protect groundwater.

- Excavate soil contaminated with mercury at the Former Chlor-Alkali Production Area. Contaminated soil exceeding appropriate soil cleanup levels will be excavated and sent off-site for proper treatment/disposal to protect industrial, construction, and redevelopment workers, and to protect groundwater.

- Continue to operate the heating, ventilation, and air conditioning (HVAC) systems in on-site buildings as necessary to protect workers from unacceptable risks posed by the migration of soil vapor contaminated with VOCs to indoor air.

- Conduct monitored natural attenuation (MNA) of groundwater in the American Bottoms aquifer contaminated with various VOCs and semi-volatile organic compounds (SVOCs). If MNA is unsuccessful in remediating groundwater within an acceptable time-frame or protecting the Mississippi River, enhanced bioremediation is the recommended contingent technology.

- Implement long-term operation and maintenance (O&M) of the GMCS, HVAC systems, and caps at the Former PCB Manufacturing Area and Route 3 Drum Site to ensure that the remedy remains protective of human health and the environment.

- Implement a long-term groundwater, surface water, sediment, and indoor air monitoring program to ensure the integrity of the proposed remedy and to protect human health and the environment. A portion of the groundwater contaminant plume from the Solutia facility discharges to the Mississippi River north of the GMCS. Conduct investigations to determine if the discharge of contaminants north of the GMCS pose an unacceptable risk to the river environment. If

necessary, evaluate and implement technologies capable of stabilizing the contaminant plume and eliminating unacceptable risk.

- Conduct periodic technical reviews that evaluate current site conditions using available data from the long-term monitoring program. Assess whether alternative technologies are necessary and available to expedite groundwater cleanup in the American Bottoms aquifer.

- Ensure compliance with municipal ordinances established to restrict current and future groundwater use. Provide periodic public advisories that notify the public of local groundwater restriction ordinances.

- Implement environmental covenants that run with the land to restrict on-site groundwater use, limit site use to industrial/commercial activities, and impose controls on excavation procedures for construction workers and redevelopment workers at on-site areas with unacceptable risk.

FACILITY BACKGROUND

The Solutia facility (also known as the W.G. Krummrich Plant) is located at 500 Monsanto Avenue in Sauget, Illinois. Mississippi Avenue (Illinois Route 3) cuts through the western portion of the facility. The facility is bound on the east by Falling Springs Road and the City of East St. Louis. The Mississippi River is located approximately one-half mile to the west (see Figure 1).

Land use surrounding the Solutia facility is mainly heavy industry. Commercial businesses are located to the northwest along the north side of Monsanto Avenue. Residential neighborhoods are located approximately 3,000-feet to the southeast and northeast of the Solutia facility in the Village of Sauget and City of East St. Louis. Groundwater is not used as a drinking water source in the Village of Sauget or in the nearby communities of East St. Louis and Cahokia. Potable water is supplied to area industry and residents by the Illinois American Water Company which obtains water from the Mississippi River approximately three miles upstream of the Solutia facility. Ordinances passed in the Village of Sauget and City of East St. Louis prohibit the use of groundwater as a potable water supply.

The Solutia facility began operations in 1917 as Monsanto Company (Monsanto). Monsanto manufactured industrial chemicals, chemical intermediates, agricultural intermediates, and rubber chemicals. Monsanto spun off its chemical business on

September 1, 1997, and the W.G. Krummrich Plant in Sauget, Illinois became known as Solutia.

On May 3, 2000, U.S. EPA issued a RCRA Administrative Order on Consent (AOC) to Solutia. The AOC requires Solutia to complete specific corrective action activities by a certain date, including stabilizing the migration of contaminated groundwater, controlling exposures that could potentially impact human health, and implementing final corrective measures.

Additional investigations and remediation in the immediate vicinity of the Solutia facility are being performed by the CERCLA (Superfund) program (see Figure 1). The Sauget Area 1 Sites involve the cleanup of Dead Creek and landfills located due south of the W.G. Krummrich Plant. The Sauget Area 2 Sites involve the cleanup of landfills located due west of the Solutia facility along the Mississippi River. Extensive groundwater contamination identified in the local area originates from a combination of source areas at the Solutia facility, Sauget Area 1 Sites, and Sauget Area 2 Sites. Groundwater contaminant plumes from the three different source areas merge and can not be easily segregated. A cooperative approach between the RCRA and CERCLA programs of U.S. EPA, Solutia, and other potentially responsible parties for the Sauget Area 1 and 2 Sites has been used in an effort to wholly address area-wide groundwater contamination.

RCRA Facility Investigation (RFI) Results

The purpose of the RFI is to identify and define the nature and extent of releases of hazardous waste at or from the Solutia facility. Significant releases of hazardous waste identified during the RFI are discussed below by area. Facility study areas are presented in Figure 2.

Mississippi River - Investigations initially began in the Mississippi River in October and November of 2000. Monitoring wells installed beginning in the early-1980s identified an extensive area of groundwater contamination at and in the vicinity of the W.G. Krummrich Plant. Groundwater flow was to the Mississippi River so Solutia undertook a study to determine the impacts on the Mississippi River from the discharge of contaminated groundwater.

Solutia and U.S. EPA collected surface water and sediment samples in the Mississippi River due west of the Solutia facility. Many samples were found to have concentrations of contaminants exceeding ecological screening levels and water quality protection standards and some samples exhibited toxicity to minnows and aquatic organisms. The main contaminants of concern noted in the Mississippi River were benzene, chlorinated

benzenes, aniline, 4-chloroaniline, phenol, chlorinated phenols, and toluene. Fish were found to be bioaccumulating a herbicide called MCPP (methyl-chlorophenoxy-propionic acid). Solutia's ecological risk assessment concluded that there was an unacceptable risk posed to the river environment from the discharge of contaminated groundwater.

U.S. EPA issued a CERCLA Administrative Order (AO) on September 30, 2002, to address the unacceptable risk posed to the Mississippi River from the discharge of contaminated groundwater. Solutia and other potentially responsible parties initiated a remedial design for a groundwater migration control system (GMCS) to cut-off groundwater contaminants discharging to the Mississippi River. A three well extraction system was installed in the summer of 2003. Construction of a slurry wall barrier began in September 2003 and was completed in November 2004. The GMCS maintains hydraulic control of groundwater, effectively capturing the contaminant plume before it discharges to the Mississippi River. Captured groundwater is routed to and treated at the American Bottoms Regional Treatment Facility, then discharged pursuant to a permit to the Mississippi River.

Current impacts to the Mississippi River from the potential discharge of contaminated groundwater are monitored semiannually as part of the CERCLA AO. Some site-related constituents such as chlorinated benzenes, 4-chloroaniline, and an herbicide (2,4-D) are present but contaminant concentrations in the river appear to be decreasing. U.S. EPA also conducted sediment sampling in the river downstream of the Solutia facility in October 2005. Depositional areas (typically sandbars) occur along the Illinois-side near dikes installed by the United States Army Corps of Engineers. The depositional areas are most apparent south of Arsenal Island and near the Jefferson Barracks Bridge (Interstate 255). Most sediment samples were found to be clean. Two sample locations (approx. 8 and 10.5 miles south of Solutia) had PCBs and pesticides present in concentrations exceeding ecological screening levels. Ecological impacts in the Mississippi River are being assessed under the CERCLA AO and as part of the CERCLA Sauget Area 2 Sites investigations.

Former PCB Manufacturing Area - Monsanto historically produced PCBs at the eastern portion of the W.G. Krummrich Plant. Operations ceased in the 1970s. A large four-acre area of soil is contaminated with PCB concentrations greater than 25 parts per million (ppm).

PCB contamination in soil is present down to 15-feet where groundwater is typically encountered. Solutia estimates that approximately 60,000 pounds of PCBs are present in the upper 15-feet of soil in the four-acre area. In groundwater, PCBs were found to be present as a dense, non-aqueous phase liquid (DNAPL) as deep as 60-feet. PCBs in

groundwater exceeding cleanup goals have migrated at least 1600-feet west of the Former PCB Manufacturing Area.

Former Chlorobenzene Process Area - Monsanto and Solutia historically produced monochlorobenzene (MCB) and dichlorobenzenes (DCBs) at the eastern portion of the W.G. Krummrich Plant. Operations ceased in 2004.

MCB and DCB contamination in soil is present down to the water table in three primary areas within the Former Chlorobenzene Process Area. One of the areas is associated with an MCB spill of approximately 6,000 gallons in January 2001. MCB and DCB product was found to occur as DNAPL in groundwater down to bedrock (approximately 115-feet deep). An extensive MCB plume extends and discharges to the Mississippi River. At the river, the MCB plume is approximately 6000-feet wide. The DCB plume is not as extensive but also discharges to the river.

Other significant contaminants detected in soil down to the water table at the Former Chlorobenzene Process Area include PCBs, 1,2,4-trichlorobenzene, nitrochlorobenzenes, 4-chloroaniline, chlorinated phenols, and tetrachloroethylene.

At and near the southern portion of the Former Chlorobenzene Process Area, lead concentrations averaging over 2,000 ppm are found in shallow soil (0-3 feet) in an area approximately two acres in size, and at 5,600 ppm in subsurface soil at one distinct location.

Former Chlorobenzene and Benzene Storage Area - Monsanto and Solutia historically stored MCB and benzene at the southwest corner of the W.G. Krummrich Plant near Mississippi Avenue (Illinois Route 3). Benzene was piped from the Mississippi River terminal and stored in a large aboveground storage tank.

Benzene is found in the area of the former large aboveground benzene storage tank in soil down to the water table. A benzene plume originates in this area that extends and discharges to the Mississippi River. MCB is found throughout the former chlorobenzene storage area in soil down to the water table. This area is likely a local source of MCB that merges with major source areas originating at the Former Chlorobenzene Process Area located to the northeast.

Other significant contaminants detected in soil at the former chlorobenzene storage area include PCBs and chlorinated phenols. Lead concentrations averaging over 1,000 ppm were detected in shallow soil (0-3 feet) at two locations along the southern boundary near railroad tracks.

Central Plant Process Area - Various operations were conducted in this area located along Mississippi Avenue (Illinois Route 3). There are some active operations. An abandoned pipeline leading to the former large aboveground benzene storage tank runs along Mississippi Avenue (Illinois Route 3). A smaller aboveground benzene storage tank that replaced the large tank is located at the east edge of this area.

Benzene and MCB are found in soil down to the water table at the benzene pipeline located along Mississippi Avenue (Illinois Route 3). A benzene plume originates in this area that extends and discharges to the Mississippi River. Benzene is found in soil down to the water table at the smaller aboveground benzene storage tank and has likely migrated to groundwater. MCB is found in soil at least 8-feet deep at the ketone residue tank and former benzyl chloride residue tank area.

Other significant contaminants detected in soil include xylenes and 2-hexanone at the former steamer overhead tank and sump 277 area. Lead concentrations averaging 1,500 ppm were detected in surface soil at two distinct locations.

Former North Plant Process Area - Tanks farms were historically located in this area along Monsanto Avenue. 2-hexanone was found in soil down to the water table in the area of a former tank farm. No groundwater monitoring has been performed in the immediate area of the contaminated soil.

Former Chlor-Alkali Production Area - Monsanto historically produced chlorine using the mercury cell process at the eastern portion of the W.G. Krummrich Plant. Operations ceased in 1985. This process generated listed hazardous wastes such as brine purification muds and wastewater treatment sludge. The basis for listing these hazardous wastes is the presence of significant amounts of mercury.

A 50-foot diameter circular area of soil (approximately 2,000 square feet) at the Former Chlor-Alkali Production Area is contaminated with mercury. Mercury contamination is present down to the water table. No groundwater monitoring has been performed in the immediate area of the mercury-contaminated soil.

Former PCB Warehouse Area - PCB wastes were stored in this area during the late 1970s and early 1980s. PCBs, DCBs and 1,2,4-trichlorobenzene are found in soil at least four-feet deep along the east side of the former warehouse.

Route 3 Drum Site - Lot F of the Solutia facility is a grass field located west of Mississippi Avenue (Illinois Route 3). An ethanol plant is being constructed over the

north half of Lot F. Disposal of drums occurred in the southwest corner of Lot F prior to 1946. Partial removal of waste drums consisting mainly of nitrochlorobenzenes, dinitrochlorobenzenes, and nitrobiphenyl began in 1985 but was discontinued due to the drums being badly decomposed. A high density polyethylene liner and clay cap were installed in 1987 over the remaining waste and the landfill was fenced.

Groundwater monitoring performed at the Route 3 Drum Site found releases of 2,4,6-trichlorophenol, nitrobenzene, nitrochlorobenzenes, and pentachlorophenol from the landfill. The extent of these contaminants in groundwater has not been fully defined. However, if the groundwater contaminants were to migrate to the Mississippi River, they are expected to be captured by the GMCS.

Area Groundwater – A grid of 20 monitoring wells is used to assess groundwater conditions beneath the Solutia facility and westward to the Mississippi River. The monitoring wells are sampled quarterly for VOCs, SVOCs, PCBs, pesticides, herbicides, and metals.

The major contaminants found migrating in groundwater from the Solutia facility are benzene, MCB, DCBs, 4-chloroaniline, PCBs, 2-chlorophenol, and phenol. The MCB plume is the largest, underlying approximately 1,000 acres. Four of the contaminants, benzene, MCB, DCB, and 2-chlorophenol are found in groundwater discharging to the Mississippi River north of the GMCS. Potential impacts to the Mississippi River in the discharge area north of the GMCS have not been determined.

Source areas at the Solutia facility contributing contaminants to area groundwater are the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, Central Plant Process Area, and Route 3 Drum Site.

Facility Indoor Air and Soil Vapor – Soil vapor sampled at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, and Central Plant Process Area has benzene, MCB, and/or DCB concentrations above U.S. EPA target concentration levels set to protect indoor air for current use and redevelopment. Target concentrations for tetrachloroethylene were also exceeded in soil vapor at the Former Chlorobenzene Process Area, Former Chlor-Alkali Production Area, and Former Chlorobenzene and Benzene Storage Area.

MCB was above the U.S. EPA target concentration level in indoor air at Building BBZ (storeroom) in the Central Plant Process Area. However MCB was also present in the air intake vent and outside ambient air. MCB is no longer produced at the Solutia facility.

SUMMARY OF FACILITY RISKS

Groundwater

Contaminated groundwater in the American Bottoms aquifer poses a potentially unacceptable risk to human health because concentrations of VOCs, SVOCs, and PCBs exceed their respective Federal maximum contaminant levels (MCLs) and/or groundwater remediation objectives under the Illinois Environmental Protection Agency (IEPA) Tiered Approach to Corrective Action Objectives (TACO). However, groundwater is not used as a source of drinking water in the area. There are specific municipal ordinances in place that prohibit the use of groundwater as a potable water supply. These ordinances minimize potential exposure to contaminated groundwater.

The potential risk from contaminated groundwater does warrant a corrective measure to protect human health, protect the Mississippi River, and make progress toward U.S. EPA's ultimate goal of returning contaminated groundwater to its maximum beneficial use. The goal of the proposed corrective measure is to eliminate the source areas contributing to groundwater contamination, restrict groundwater use in the area, operate the GMCS to capture contaminated groundwater before it migrates into the Mississippi River, and monitor the contaminant plume and river to ensure that human health and the environment is protected.

Groundwater cleanup objectives for the Solutia facility include three components: groundwater cleanup levels, point of compliance, and remediation time-frames. Groundwater cleanup levels represent the specific concentrations of chemicals designed to be protective of groundwater use and other possible routes of exposure, such as discharges to the Mississippi River. Point of compliance represents the locations where groundwater cleanup levels will be achieved. Remediation time-frames typically include both the time it would take to implement the remedy and the estimated time to achieve the groundwater cleanup levels at the point of compliance. Solutia has estimated that without an active remedy, groundwater cleanup levels in the American Bottoms aquifer would not be achieved for at least 670 years.

The groundwater cleanup levels at the Solutia facility are derived from MCLs developed under the Safe Drinking Water Act and groundwater remediation objectives developed under IEPA TACO. These are risk-based goals such that attaining the given concentration will not result in adverse health effects or an excess cancer rate.

The point of compliance for groundwater represents where groundwater cleanup levels should be achieved within a contaminated aquifer. The groundwater point of compliance

at the Solutia facility is throughout the area where groundwater is contaminated above the cleanup levels. U.S. EPA typically refers to this point of compliance as the "throughout-the-plume" point of compliance.

IEPA considers the American Bottoms aquifer to be a high quality Class I potable resource groundwater subject to the highest protection standards. At the Solutia facility, the aquifer is divided into three units; the shallow hydrogeologic unit (SHU), the middle hydrogeologic unit (MHU), and the deep hydrogeologic unit (DHU). A groundwater characteristic at the Solutia facility is that with increasing distance from a major source area, contaminant concentrations decrease in the SHU and MHU, but increase in the DHU. The long-term groundwater cleanup levels for groundwater contaminants identified in the table below would achieve U.S. EPA's ultimate goal of returning contaminated groundwater to its maximum beneficial use. The cleanup levels are exceeded throughout-the-plume at the following locations:

- Benzene and MCB site-wide and off-site to the Mississippi River. With increasing distance from source areas such as the Former Chlorobenzene Process Area, and the Former Chlorobenzene and Benzene Storage Area, benzene and MCB are typically present in only the DHU, especially at the river.

- DCBs site-wide, with some migration off-site and discharge to the Mississippi River. DCBs are not as extensive as benzene and MCB. Near the river, DCBs from other source areas at the Sauget Area 2 Sites complicate defining contributions from the Solutia facility.

- 4-chloroaniline at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former North Plant Process Area, Lot F, and off-site but not reaching the river.

- PCBs at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former North Plant Process Area, and Central Plant Process Area.

- 2-chlorophenol at the Central Plant Process Area, Lot F, and off-site to the Mississippi River.

- Phenol at the Former PCB Manufacturing Area, Former Chlorobenzene and Benzene Storage Area, Lot F, and off-site but not reaching the river.

- 1,2,4-trichlorobenzene at the Former PCB Manufacturing Area, and Former Chlorobenzene Process Area.

- 2,4,6-trichlorophenol, pentachlorophenol, nitrochlorobenzenes, and nitrobenzene at the Route 3 Drum Site, and off-site but not reaching the river.
- Pentachlorophenol and tetrachloroethylene at the Former Chlorobenzene Process Area.
- Ethylbenzene and naphthalene at the east edge of the Solutia facility. These contaminants may be from an off-site source.

GROUNDWATER CONTAMINANT	GROUNDWATER CLEANUP LEVEL (ppb)
Benzene	5
MCB	100
1,2-DCB	600
1,3-DCB	6.3
1,4-DCB	75
1,2,4-trichlorobenzene	70
Nitrobenzene	3.5
2-nitrochlorobenzene	0.15
4-nitrochlorobenzene	1.2
2-chlorophenol	35
2,4,6-trichlorophenol	10
Pentachlorophenol	1
Phenol	100
4-chloroaniline	28
PCBs	0.5
Ethylbenzene	700
Naphthalene	140
Tetrachloroethylene	5

Soil

Concentrations of contaminants found in soil in some areas at the Solutia facility may pose an unacceptable risk to workers from incidental ingestion and inhalation. Soil contaminant concentrations were compared to baseline remediation objectives developed under IEPA TACO. Baseline remediation objectives can be used as a screening tool and

can be used as final soil cleanup levels to protect workers. In the alternative, a site-specific risk assessment subject to U.S. EPA approval, may be performed to derive final soil cleanup levels. Soil remediation objectives identified in the table below are exceeded at the following areas:

- PCBs at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, Central Plant Process Area, and Former PCB Warehouse.

- MCB at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, Central Plant Process Area, Former North Plant Process Area, and Former Chlor-Alkali Production Area.

- Benzene at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area.

- DCBs at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area (BBU drum storage warehouse), Former PCB Warehouse, and possibly at the Former PCB Manufacturing Area.

- 1,2,4-trichlorobenzene at the Former Chlorobenzene and Benzene Storage Area (BBU drum storage warehouse), Former PCB Warehouse, and possibly at the Former PCB Manufacturing Area.

- Nitrobenzene at the Former Chlorobenzene and Benzene Storage Area (BBU drum storage warehouse).

- Pentachlorophenol at the Former Chlorobenzene Process Area, and Former Chlorobenzene and Benzene Storage Area.

- Nitrochlorobenzenes, nitrobenzene, tetrachloroethylene, ethylbenzene, and xylenes at the Former Chlorobenzene Process Area.

- Ethylbenzene, xylenes, and vinyl chloride at the Central Plant Process Area (former steamer overhead tank).

- MCB, toluene, and xylenes at the Central Plant Process Area (ketone residue tank and former benzyl chloride residue tank).

- Xylenes at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, and Former North Plant Process Area.
- Carbon tetrachloride and 1,2-dibromoethane at the Former Chlorobenzene Process Area (spent carbon surge tank).
- 3,3'-dichlorobenzidine at the Former PCB Manufacturing Area, and Former Chlorobenzene and Benzene Storage Area.
- 2-hexanone at the Central Plant Process Area, and Former North Plant Process Area.
- Cis- and trans-1,3-dichloropropene at the Former North Plant Process Area.
- Lead at the Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area.
- Mercury at the Former Chlor-Alkali Production Area.

SOIL CONTAMINANT	SOIL REMEDIATION OBJECTIVE* (ppm)
Benzene	16
MCB	1.3
1,2-DCB	310
1,4-DCB	340
1,2,4-trichlorobenzene	920
Nitrobenzene	9.4
2-nitrochlorobenzene	4.5
4-nitrochlorobenzene	37
Pentachlorophenol	240
PCBs	1, 10, or 25**
Ethylbenzene	58
Toluene	42
Xylenes	5.6
Tetrachloroethylene	200
Vinyl chloride	1.1
Carbon tetrachloride	6.4

1,2-dibromoethane	0.7
3,3'-dichlorobenzidine	130
2-hexanone	0.72
Cis/trans-1,3-dichloropropene	2.3
Lead	400
Mercury	61

* Lowest value for ingestion and inhalation exposure routes for the Industrial/Commercial Worker or Construction Worker. Calculated values for carcinogens correspond to a cancer risk level of 1 in 100,000.
** 1 = preliminary remediation goal, 10 = unrestricted area with cap, and 25 = restricted area with cap.

Concentrations of contaminants found in soil in some areas at the Solutia facility are also significant enough to continue to migrate or potentially migrate to groundwater. Long-term soil cleanup levels for site contaminants that protect groundwater, expedite groundwater cleanup time-frames, and protect the Mississippi River environment are:

SOIL CONTAMINANT	SOIL CLEANUP LEVEL TO PROTECT GROUNDWATER (ppm)
Benzene	0.03
MCB	1
1,2-DCB	17
1,3-DCB	NA
1,4-DCB	2
1,2,4-trichlorobenzene	5
Nitrobenzene	0.1
2-nitrochlorobenzene	NA
4-nitrochlorobenzene	NA
2-chlorophenol	4*
2,4,6-trichlorophenol	0.2*
Pentachlorophenol	0.03*
Phenol	0.3
4-chloroaniline	0.7
PCBs	NA
Ethylbenzene	13

Toluene	12
Xylenes	150
Naphthalene	12
Tetrachloroethylene	0.06
Vinyl chloride	0.01
Carbon tetrachloride	0.07
1,2-dibromoethane	0.0004
3,3'-dichlorobenzidine	0.007
2-hexanone	1.3
Cis/trans-1,3-dichloropropene	0.004
Lead	107*
Mercury	3.3*

NA = Not Available.

* pH dependent, assumes soil pH of 6.8.

Surface Water and Sediment

Surface water bodies located in the vicinity of the Solutia facility are Dead Creek and the Mississippi River. Dead Creek originally flowed through the Solutia facility at the Former Chlorobenzene Process Area. This segment of Dead Creek was filled in completely by the 1950s. Dead Creek now originates at a culvert at Queeny Avenue, approximately 2000-feet south of the Solutia facility.

Dead Creek was investigated and remediated as part of the CERCLA Sauget Area 1 Sites. Sediment removal was conducted to eliminate unacceptable risk posed to human health and the environment. All work has been completed and final reports have been prepared, subject to U.S. EPA approval, detailing the remediation and elimination of unacceptable risks.

The Mississippi River is located approximately one-half mile west of the Solutia facility. The CERCLA Sauget Area 2 Sites are located between the Solutia facility and the Mississippi River. Significant ecological risks were found in the river from the discharge of contaminated groundwater. The GMCS, consisting of three extraction wells and a slurry wall barrier, was installed and completed in November 2004, for the purpose of eliminating unacceptable ecological risks.

The Mississippi River is monitored and ecological risks may still be present. In the river at the GMCS, monitoring data shows improvements but some sediment and surface water toxicity is still noted at the southern end of Site R of the Sauget Area 2 Sites. As residual contamination is flushed, conditions are expected to improve and unacceptable risks eliminated. An updated ecological risk assessment is being prepared for the Sauget Area 2 Sites that will assess current ecological risks in the river.

A portion of the groundwater contaminant plume originating from the Solutia facility discharges north of the GMCS. Concentrations of benzene, MCB, and DCB in groundwater are significant enough to pose a potential risk to the river environment. Additional sampling will be performed by Solutia during low river flow in late-summer or early-fall 2007. Surface water and sediment will be assessed for unacceptable ecological risk. Based on these results, additional investigations and/or remediation may be required to address unacceptable risks found in the river.

During U.S. EPA's October 2005 river sediment sampling event, recreational activities were noted downstream near Arsenal Island. The Illinois-side shoreline and sandbars are used by people for fishing and driving ATVs. Sampling of sediment and soil in this area found no contamination present and there are no unacceptable risks posed to human health. The State of Illinois has also issued a fish advisory for channel catfish, carp, and sturgeon in the Mississippi River due to the presence of PCBs and chlordane in fish tissue. Further downstream near the Jefferson Barracks Bridge and in the Jefferson Barracks Chute, finer sediments were found to contain PCBs and pesticides. Potential ecological risks from site-related contaminants are being addressed by the CERCLA Sauget Area 2 Sites.

Indoor Air and Soil Vapor

Potential risk posed to industrial workers and construction workers is driven by the inhalation exposure route for site contaminants detected in soil vapor such as benzene, MCB, DCB, and tetrachloroethylene. Concentrations of these VOCs found in soil at the Former PCB Manufacturing Area, Former Chlorobenzene Process Area, Former Chlorobenzene and Benzene Storage Area, Central Plant Process Area, and Former Chlor-Alkali Production Area may pose an unacceptable risk to construction and redevelopment workers via inhalation. Soil vapor intrusion to indoor air poses a potential risk to industrial workers if buildings are not properly constructed with adequate HVAC systems that maintain positive air pressure.

SCOPE OF CORRECTIVE ACTION

Corrective measures are necessary to address contamination present in groundwater, soil, surface water, sediment, and indoor air at and in the vicinity of the Solutia facility.

Contaminated groundwater is a threat because of the long-term potential for contact/inhalation by construction and redevelopment workers, and possible future public use. The immediate cleanup objectives are to prevent contact and use, and protect the Mississippi River environment. The long-term cleanup objective is to reduce the contaminant concentrations throughout-the-plume to achieve protective groundwater cleanup levels in a reasonable time.

Areas of contaminated soil pose a risk due to the long-term potential for contact/inhalation by workers and impacts on indoor air, and act as source areas for contaminants migrating to groundwater. The immediate cleanup objective is to remediate soil contaminant sources to protect workers. This objective requires environmental covenants to manage site use. The long-term cleanup objective is to reduce soil contaminant concentrations at the facility to eliminate releases to groundwater and surface water, and expedite the time to return the American Bottoms aquifer to its maximum beneficial use.

SUMMARY OF POTENTIAL REMEDY ALTERNATIVES

A potential remedy alternative was evaluated and proposed by Solutia to address site contamination. The remedy alternative is discussed in detail in Solutia's CMS Report dated August 27, 2004, and is provided below.

° **Permeable Covers:** Use asphalt, concrete, buildings, and a minimum 12-inch layer of gravel to minimize contact with contaminated soil.

° **Sauget Area 2 Sites GMCS:** Use a GMCS designed and operated to capture contaminated groundwater and prevent its discharge to the Mississippi River. The GMCS consists of a 3,300-foot long U-shaped barrier wall extending to bedrock between Site R and the river, and three extraction wells located between the barrier wall and Site R.

° **In-Situ Bioremediation:** Use naturally occurring aerobic direct oxidation and anaerobic reductive dechlorination to degrade contaminants in groundwater discharging to the river north of the GMCS.

° **Institutional Controls:** Use existing local ordinances to prohibit groundwater use. Require permits before conducting on-site excavation activities.

° **Monitoring:** Inspect permeable covers, perform groundwater monitoring to verify that the contaminant plume is stable and monitor the effectiveness of in-situ bioremediation, and monitor surface water and sediment in the Mississippi River.

Solutia's estimate for the capital cost, annual operation and maintenance (O&M) cost, and total cost for the potential remedy alternative is:

Corrective Action	Construction Cost	O&M Cost[a]	Total Cost
Permeable Covers	$ 0[b]	$ 559,000	$ 559,000
GMCS	$ 0[b]	$ 0	$ 0
In-situ Bioremediation	$ 95,000	$ 731,000	$ 826,000
Total Cost	$ 95,000	$ 1,290,000	$ 1,385,000

[a] O&M costs included in total estimated cost are for 30 years.
[b] Already fully constructed.

U.S. EPA reviewed Solutia's CMS Report and concluded that the proposed remedy and supporting information did not provide an adequate basis for U.S. EPA to select final corrective measures. U.S. EPA requested further investigations, additional characterization of source areas, investigation of additional technologies, and more complete risk assessments in a November 18, 2004 letter.

U.S. EPA subsequently prepared a Technology Selection Report on January 15, 2007, that evaluated possible remedial technologies consistent with U.S. EPA corrective measures objectives. The possible technologies proposed to address site contaminants by area and estimated costs are:

Facility Area	Suggested Technology	Average Cost Estimate	Maximum Cost Estimate
Former PCB Manufacturing Area	ISTD	$ 17,491,000	$ 34,084,000
Former Chlorobenzene Process Area	ISTD	$ 4,404,000	$ 5,845,000
Former Chlor-Alkali Production Area	Excavation	$ 176,000	$ 291,000
Route 3 Drum Site	RCRA Cap and MNA	$ 404,000	$ 914,000
Central Plant Process Area	SVE and Excavation	$ 985,000	$ 2,393,000
Former Chlorobenzene and Benzene Storage Area	SVE and Excavation	$ 884,000	$ 2,266,000
North Plant Process Area	SVE	$ 214,000	$ 506,000
Former PCB Warehouse Area	Excavation	$ 42,000	$ 71,000
MHU and DHU (without GMCS costs)	GMCS and MNA	$ 4,551,000	$ 8,622,000
Total (without GMCS costs)		$ 29,151,000	$ 54,992,000

EVALUATION OF PROPOSED REMEDY

Based on U.S. EPA's Technology Selection Report, subsequent information provided by Solutia, and the Administrative Record, U.S. EPA's proposed remedy to address contaminated groundwater, soil, surface water, sediment, and indoor air at and from the Solutia facility is:

- *Groundwater* - Remove contaminants in source areas using ISTD, SVE, and excavation; conduct MNA to reduce the concentration or mobility of contaminant migration; and conduct monitoring. Periodic technical reviews will be conducted and possible contingent remedies (e.g., enhanced bioremediation) implemented if site conditions change or groundwater cleanup levels are not met in a reasonable period of time.

• *Soil* – Soil contaminated with VOCs will be remediated using SVE and/or excavation and off-site disposal. Soil contaminated with PCBs and mercury will be excavated and disposed off-site in accordance with all local, state, and federal requirements.

• *Surface Water and Sediment* – Continue to operate the GMCS to capture contaminants before they discharge to the Mississippi River; conduct MNA (or if necessary, enhanced bioremediation) to reduce the amount of groundwater contaminants discharging to the Mississippi River north of the GMCS; conduct monitoring; and perform an ecological risk assessment and possible cleanup under the CERCLA AO for the Sauget Area 2 Sites.

• *Indoor Air* - Operate HVAC systems in on-site buildings and monitor indoor air to protect on-site workers.

• *Institutional Controls and Monitoring* - Implement environmental covenants that appropriately limit land and groundwater use; restrict on-site excavations to protect construction workers and future redevelopment workers; and monitor groundwater, surface water, sediment, and indoor air to assess the effectiveness of the remedy.

The proposed remedy and range of estimated costs for technologies to clean up site contamination are presented below. The costs do not include O&M for the GMCS which will be addressed in the CERCLA final remedy for the Sauget Area 1 and 2 Sites.

Facility Area	Proposed Technology	Average Cost Estimate	Maximum Cost Estimate
Former PCB Manufacturing Area	PCB Excavation[a]	$ 100,000	$ 187,500
	Cap	$ 400,000	$ 600,000
Former Chlorobenzene Process Area	ISTD Pilot Test[b]	$ 200,000	$ 350,000
	PCB Excavation[a]	$ 22,000	$ 33,000
	Lead Excavation	$ 80,000	$ 120,000
Former Chlor-Alkali Production Area	Mercury Excavation	$ 55,000	$ 82,000
Route 3 Drum Site	RCRA Cap	$ 181,000	$ 430,000
	MNA	$ 205,000	$ 446,000
Central Plant Process Area	SVE	$ 788,000	$ 2,133,000
	PCB Excavation[a]	$ 1,000	$ 1,500
	Lead Excavation	$ 20,000	$ 30,000
Former Chlorobenzene and Benzene Storage Area	SVE	$ 789,000	$ 2,156,000
	PCB Excavation[a]	$ 13,000	$ 20,000
	Lead Excavation	$ 20,000	$ 30,000

Facility Area	Proposed Technology	Average Cost Estimate	Maximum Cost Estimate
North Plant Process Area	Institutional Controls (IC)	(See facility IC costs)	(See facility IC costs)
Former PCB Warehouse Area	PCB Excavation[a]	$ 2,000	$ 3,000
MHU and DHU	GMCS and MNA	$ 3,488,000	$ 6,181,000
Surface Water and Sediment	GMCS and Monitoring	$ 988,000	$ 2,778,000
Facility-Wide	Institutional Controls	$ 137,000	$ 224,000
Total		$ 7,489,000	$ 15,805,000

[a] PCB disposal costs not included. Costs to be determined later based on PCB concentrations in soil and appropriate disposal site.

[b] If successful, full-scale ISTD will be implemented as the final remedy at an estimated average cost of $4,204,000 or maximum cost of $5,495,000.

Costs are derived from calculations performed in U.S. EPA's Technology Selection Report. The average estimated cost of the U.S. EPA proposed remedy for the Solutia facility is $7,489,000. Additional costs for ISTD implementation at the Former Chlorobenzene Process Area, and a contingent remedy for groundwater may be incurred in the future. Solutia is required to provide financial assurance to ensure that the proposed remedy can be implemented over its lifetime (estimated minimum of 40 years). The AOC requires Solutia to implement as much of the initial construction work as practicable within the first year and complete all remedial activities (except for O&M and monitoring) within a reasonable period of time.

The following discussion profiles the performance of the proposed remedy against technical standards and other factors for evaluating a remedy.

1. Protect Human Health and the Environment. Protection of human health and the environment is addressed effectively for groundwater by source area removal, a migration control system, monitoring, and institutional controls. Source removal of DNAPL and high contaminant concentrations in subsurface soil and the water table expedite groundwater cleanup; groundwater migration controls at the river minimize the discharge of contaminated groundwater; monitoring protects the Mississippi River; and institutional controls restrict groundwater usage throughout the contaminant plume. Monitoring wells within and at the perimeter of the groundwater contaminant plume will be used to demonstrate that the plume is not expanding, that any discharge to the river is

acceptable, and that the GMCS is effective. In the alternative, a contingent remedy such as enhanced bioremediation will be used to clean up groundwater if the proposed remedy does not result in the timely cleanup of groundwater.

Institutional controls to restrict land use are effective methods to protect human health when combined with the proposed engineered controls. Long-term maintenance of the HVAC system and on-site excavation controls will protect human health by minimizing exposure to contaminants.

2. Attain Media Cleanup Standards. Source areas of contamination are addressed by excavation of contaminated soil; the recovery of product using SVE; and the treatment of soil and highly contaminated shallow groundwater and DNAPL by ISTD. The GMCS has significantly reduced the amount of contaminants discharging to the Mississippi River. Removal of the sources, DNAPL, and contaminant mass is a quick and effective corrective measure to expedite cleanup of soil and groundwater to protect workers and the Mississippi River.

Groundwater will be monitored to assess trends in groundwater contamination and ensure the attainment of groundwater cleanup goals within a reasonable period of time.

3. Control the Sources of Releases. The removal of residual product (especially PCBs, benzene, and MCB) and contaminated soil on-site provides an effective source control program to ensure the long-term effectiveness and protectiveness of the remedy.

4. Comply with Any Applicable Standards for Management of Wastes. Waste generated during implementation of the remedy (i.e., contaminated groundwater, soil, and DNAPL) will be properly characterized and treated/disposed in accordance with all applicable regulations and permits.

5. Long-term Reliability and Effectiveness. Reliability of the proposed remedy is evaluated through O&M requirements, demonstrated effectiveness of the GMCS, and achievement of soil cleanup levels protective of workers and groundwater. The GMCS has operated for nearly three years. Maintenance problems have been worked out and the GMCS has been shown to be effective in capturing and removing contaminant mass. The groundwater remedy will be monitored to ensure reliability. In the alternative, a contingent remedy will be used to clean up groundwater if groundwater cleanup levels are not achieved within a reasonable time-frame.

6. Reduction in the Toxicity, Mobility, or Volume of Wastes. Removal of contaminant mass from on-site source areas will prevent further off-site migration of contaminants.

Removal of contaminant mass from off-site groundwater at the GMCS prevents the discharge of groundwater contaminants to the Mississippi River. Monitoring will assess the reduction in toxicity of contaminants in groundwater.

7. Short-term Effectiveness. An O&M manual has been developed for the GMCS to ensure safety of the remedy through proper maintenance. Corrective measure activities associated with contaminated groundwater and soil must follow a health and safety plan to protect workers.

8. Implementability. Necessary permits have already been obtained for the GMCS and the GMCS has operated for nearly three years. A local groundwater ordinance has been passed by the Village of Sauget and City of East St. Louis to restrict groundwater use. Institutional controls in the form of environmental covenants will be implemented to restrict land use, groundwater use, and excavation activities.

9. Cost. The total estimated average cost of the various remedial alternatives to address site contamination varies from $1,385,000 to $29,151,000. The total estimated average cost of the proposed remedy is $7,489,000. This cost does not include a possible alternative remedy for groundwater if cleanup levels are not achieved within a reasonable time-frame, full-scale implementation of ISTD at the Former Chlorobenzene Process Area, PCB disposal, and O&M for the GMCS. This less costly remedial alternative is expected to be as protective of human health and the environment as the most costly alternative. PCB contaminated soil will be more easily managed by excavation and off-site disposal rather than being treated on-site using more costly, energy intensive, and harder to implement ISTD technology.

Based on information currently available, the proposed remedy provides the best balance with respect to the standards described above. U.S. EPA believes that the proposed remedy is protective of human health and the environment, and will effectively control exposure to contaminants in groundwater, soil, surface water, sediment, and indoor air. In the alternative, a contingent remedy will be used if the long-term groundwater cleanup levels are not achieved within a reasonable time-frame. All applicable standards regarding groundwater protection, worker protection, and on-site/off-site waste management will be addressed and complied with during implementation of the remedy.

PUBLIC PARTICIPATION

U.S. EPA would like to hear from the local community on the proposed remedy to address contamination at and from the Solutia facility. There will be a 45-day public comment period for the local community to participate in the final remedy selection.

The Administrative Record for the Solutia facility is available at the following locations:

Cahokia Public Library
140 Cahokia Park Drive
Cahokia, Illinois 62206
(618) 332-1491

U.S. EPA, Region 5
RCRA Records Center
77 West Jackson Boulevard, 7th Floor
Chicago, Illinois 60604-3590
(312) 886-0902
Hours: Mon-Fri, 8:00 a.m. - 4:00 p.m.

After consideration of public comments on the proposed remedy, U.S. EPA will select a final remedy and document its selection in the Final Decision and Response to Comments. In addition, public comments will be summarized and responses provided. The Final Decision and Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the Administrative Record.
To send written comments or request technical information on the Solutia facility, please contact:

Mr. Kenneth Bardo
U.S. EPA Project Manager
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Corrective Action Section, DE-9J
Chicago, Illinois 60604-3590
(312) 886-7566
E-mail: bardo.kenneth@epa.gov

To request information on the public meeting for the proposed remedy at the Solutia facility, please contact:

Ms. Terri Rancher
Community Relations Coordinator
U.S. Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Internal Services Section, DM-7J
Chicago, Illinois 60604-3590
(312) 886-4188

E-mail: rancher.terri@epa.gov

LEGEND

- W.G. KRUMMRICH FACILITY
- SAUGET AREA #1
- SAUGET AREA #2

PLUME STABILITY MONITORING PROGRAM 1ST QUARTER 2006 DATA REPORT W.G. KRUMMRICH FACILITY SAUGET, ILLINOIS	PROJECT NO. 21561618.00000
URS	
DRN. BY: dja 9/22/05 DSGN. BY: tja CHKD. BY:	SITE LOCATION MAP — FIG. NO. 1

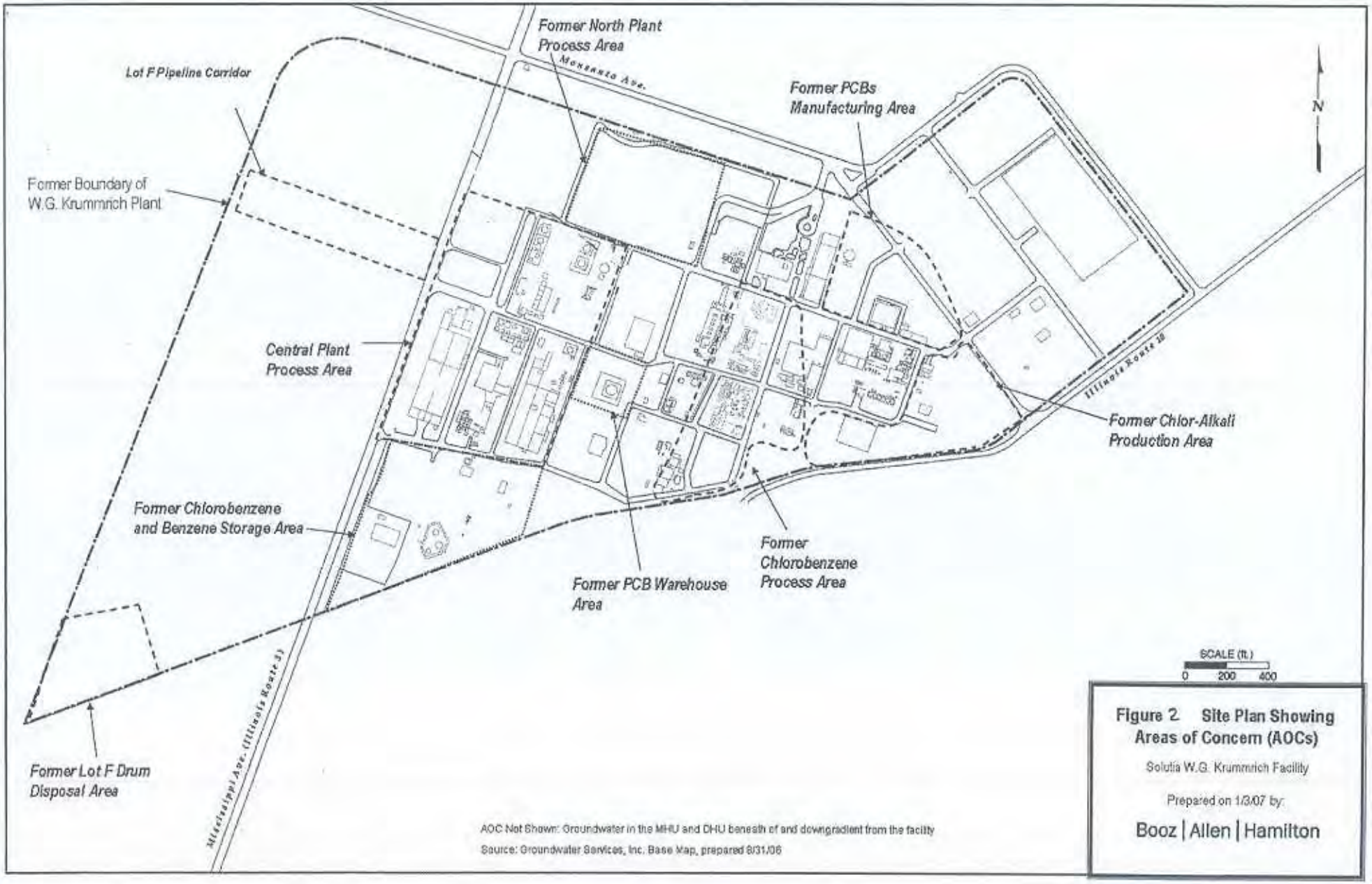

Figure 2 Site Plan Showing Areas of Concern (AOCs)

Solutia W.G. Krummrich Facility

Prepared on 1/3/07 by:

Booz | Allen | Hamilton