

**FINAL DECISION AND
RESPONSE TO COMMENTS**

for

**Solutia Inc.
Sauget, Illinois**

U.S. EPA I.D. No. ILD 000 802 702



February 2008

FINAL DECISION

***Solutia Inc.
Sauget, Illinois
ILD 000 802 702***

Introduction

This Final Decision and Response to Comments is presented by the United States Environmental Protection Agency (U.S. EPA) for the Solutia Inc., W.G. Krummrich Plant (Solutia) facility located in Sauget, Illinois. It consists of the Final Decision, U.S. EPA Response to Comments (Attachment I), Index to Administrative Record (Attachment II), Statement of Basis (Attachment III), and Final Remedy Implementation Schedule (Attachment IV).

The Final Decision selects the final remedy to be implemented to address contaminated groundwater, soil, surface water, sediment, and indoor air at and from the Solutia facility pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984 (HSWA). The Final Decision is based on the Administrative Record and public comments. The Statement of Basis provides U.S. EPA's proposed remedy which was available for public review and comment from August 24 to October 9, 2007. A public meeting was held at the Sauget Village Hall on September 6, 2007, to present the proposed remedy and take oral comments. U.S. EPA Response to Comments addresses substantive comments received during the 45 day public comment period.

Assessment of the Facility

The response action documented in this Final Decision is necessary to protect human health and the environment.

Final Remedy

U.S. EPA selects the following remedial components as the final remedy to address contaminated groundwater, soil, surface water, sediment, and indoor air at the Solutia facility. The remedy selected in this Final Decision has been modified from the proposed remedy to address public comments. Specifically it ensures that Illinois water quality standards are met, adds flexibility to the technologies used to remediate contaminated soil, reflects the work performed in the Solutia Tiered Approach to Corrective Action Objectives (TACO) Tier III human health risk assessment, and addresses concerns regarding the integrity of the American Bottom levee system.

Contaminated Groundwater Source Control

- Submit a field pilot-scale test workplan to U.S. EPA for review and approval within 30 days of this Final Decision for in-situ thermal desorption (ISTD) treatment of source areas above the water table and in the shallow hydrogeologic unit at the Former Chlorobenzene Process Area. The objectives of the field pilot-scale test are to: 1) evaluate the effectiveness of ISTD under field conditions; 2) verify or correct the assumptions made about the ideal operating temperature for remediating chlorobenzene and dichlorobenzenes; 3) evaluate the relative contributions of steam stripping in contrast to other mechanisms (e.g., volatilization); 4) evaluate parameters for scaling up ISTD technology to remediate the entire Former Chlorobenzene Process Area; 5) determine dewatering practices or hydraulic controls required to maintain optimal temperatures in the SHU; and 6) collect data to prepare a final remedy cost estimate. The workplan consists of the objectives and location of the pilot test, engineering designs and plans, monitoring program for evaluating the effectiveness of ISTD treatment, permitting requirements, waste disposal requirements, project schedule, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved ISTD workplan, incorporating U.S. EPA comments. Upon completion of the pilot test, submit a report that contains, at a minimum, the methods, procedures, and results of the pilot test, a discussion of the results, conclusions regarding the effectiveness and implementability of ISTD to treat source areas at the Former Chlorobenzene Process Area, remediation objectives to be met, designs for full-scale implementation, and project schedule. Initiate treatment using ISTD, as approved by U.S. EPA.

Remedy construction must be completed within three years of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy at the Former Chlorobenzene Process Area has been conducted in accordance with the U.S. EPA-approved final design and specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as necessary, as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Unacceptable potential risks and hazards from polychlorinated biphenyls (PCBs) are identified in soil and groundwater down to 14-feet for the utility worker, construction worker, and redevelopment worker at the Former PCB Manufacturing Area (see Figures 5-2 and 5-3, *TACO III Tier Human Health Risk Assessment*, Solutia – 272). This “high-risk” area also appears to be the main source of PCB contamination found in groundwater migrating in the American Bottom aquifer at least 1600-feet downgradient of the Former PCB Manufacturing Area. Submit a corrective measures design for the excavation and off-site treatment/disposal of PCB-contaminated soil and groundwater at the identified “high-risk” area in the Former PCB Manufacturing Area to U.S. EPA for review and approval within 90 days of this Final Decision. (In the alternative, Solutia may submit a design to remediate PCB-contaminated soil at the Former PCB Manufacturing Area using ISTD which was the recommended technology in the U.S. EPA *Technology Selection*

Report, January 15, 2007). The design work consists of the design plans and specifications, proposed remediation objectives, construction cost estimate, construction quality assurance objectives, waste disposal requirements, project schedule, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved final design, incorporating U.S. EPA comments.

Remedy construction must be completed within one year of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy for PCB-contaminated soil at the identified “high-risk” area in the Former PCB Manufacturing Area has been conducted in accordance with the U.S. EPA-approved final design and specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Submit a workplan to U.S. EPA for review and approval within 180 days of this Final Decision to implement soil vapor extraction (SVE) in unsaturated soil at the Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area contaminated with chlorobenzene, benzene, and other volatile organic compounds (VOCs) contributing to groundwater contamination and/or presenting a potential risk to workers. The workplan shall propose soil sample locations in the vicinity of historical and RFI sample locations S0506 and S0516 (“Little Mo”); S0413 and S0428 (Former Benzene Pipeline to “Big Mo”); S0610 (Former Chlorobenzene Storage Area); S0601, S0607, B-58, and DNAPL K-8 (“Big Mo”); S05-SMP277, B-45, and B-64 (Former Steamer Overhead Tank); and S0502, B-75, B-76, B-77, B-74, B-73, B-28, B-29, B-30, B-33, B-36, B-38, B-39, and B-40 (North Tank Farm) to adequately delineate the areas requiring remediation. The workplan consists of the objectives and location of any pilot tests (e.g., determining radius of influence), preliminary engineering designs and plans, O&M plan, monitoring for evaluating the effectiveness of SVE treatment, permitting requirements, waste disposal requirements, project schedule, reporting requirements, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved workplan, incorporating U.S. EPA comments. Within 90 days of completion of the sampling and analysis program and any pilot tests, submit a report that presents and discusses the sampling results, defines the full extent of VOC contamination in areas requiring remediation, provides the remediation objectives to be met, presents the results of the pilot tests, provides the final design, and includes a project schedule and cost estimate. Initiate treatment using SVE, as approved by U.S. EPA.

Remedy construction must be completed within three years of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy for VOC-contaminated soil has been conducted in accordance with the U.S. EPA-approved final design and

specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as necessary, as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Submit a draft O&M Plan for the Route 3 Drum Site landfill to U.S. EPA for review and approval within 60 days of the Final Decision. Implement the approved final O&M Plan, incorporating U.S. EPA comments.

Contaminated Groundwater Migration Control

- The groundwater migration control system (GMCS) located at the Mississippi River, just west of Site R (Sauget Area 2 Sites) was installed pursuant to CERCLA authority in 2004 to capture off-site contaminated groundwater in the American Bottom aquifer before discharge to the Mississippi River. The GMCS captures a portion of the contaminant plume originating from the Solutia facility in the area of the Former Chlorobenzene and Benzene Storage Area. Solutia must operate and maintain the GMCS in a manner that effectively intercepts and captures contaminated groundwater in the American Bottom aquifer impacted by source areas from the Solutia facility.

Provide a copy of the final Operation and Maintenance (O&M) Plan for the GMCS within 30 days of approval of the final O&M Plan by the U.S. EPA CERCLA program. The final O&M Plan should consider the historical performance of the GCMS, including problems encountered and capture zone information provided in CERCLA progress reports.

- A major portion of the contaminant plume originating from the Solutia facility is not captured by the GCMS and discharges to the Mississippi River. Evaluate surface water, sediment, and groundwater data obtained at and near the Mississippi River, north of the GCMS where the groundwater contaminant plume from the Solutia facility discharges to the river. Submit an assessment report, including potential ecological risks, of the contaminated groundwater discharge to the Mississippi River to U.S. EPA for review and approval within 90 days of this Final Decision. The assessment report shall include, but is not limited to: 1) an estimate of the total annual mass of each contaminant being discharged to the Mississippi River; 2) analysis of whether the contaminant mass is increasing, decreasing, or stable; 3) a determination of whether the concentration of groundwater contaminants discharging to the river meet applicable water quality standards under 35 Ill. Adm. Code, Part 302; and 4) an evaluation of whether the current discharge of groundwater contaminants to the Mississippi River is adequately protective of surface water, sediment, and ecological receptors. If the discharge of groundwater contaminants to the Mississippi River is found not to be protective of surface water, sediment, and/or ecological receptors, or is found to exceed applicable water quality standards, submit design plans and specifications to U.S. EPA for review and approval to remove, treat, and/or contain the contaminated groundwater that is adversely impacting

the Mississippi River environment. Implement the approved final design, incorporating U.S. EPA comments.

Remedy construction must be completed within three years of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy to protect the Mississippi River environment has been conducted in accordance with the U.S. EPA-approved final design and specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as necessary, as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Submit a groundwater quality assessment program, including a project schedule, to U.S. EPA for review and approval within 45 days of this Final Decision to determine the full extent of PCBs in groundwater exceeding the cleanup level of 0.5 µg/l downgradient of the Former PCB Manufacturing Area. The assessment program must be capable of monitoring the plume boundary in the shallow, middle, and deep hydrogeologic units and determining if the plume is stable. Implement the approved groundwater quality assessment program, incorporating U.S. EPA comments. If the PCB plume is determined not to be stable, submit design plans and specifications to U.S. EPA for approval to remove, treat, and/or contain the contaminated groundwater to stabilize the plume. Implement the approved final design, incorporating U.S. EPA comments. The design may be prepared and implemented concurrently with the removal, treatment, and/or containment of residual PCB contamination to control risks at the Former PCB Manufacturing Area.

Remedy construction must be completed within three years of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy to stabilize the PCB plume has been conducted in accordance with the U.S. EPA-approved final design and specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

Soil Cleanup

- Submit a workplan to U.S. EPA for review and approval within 60 days of U.S. EPA approval of the Former PCB Manufacturing Area Construction Completion Report to control risks to human health and the environment posed by PCBs in soil with concentrations greater than 1 ppm remaining in place at the Former PCB Manufacturing Area. The workplan consists of the objectives of the human health risk assessment, updated site conceptual exposure model, data to be used, project schedule, reporting

requirements, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved workplan, incorporating U.S. EPA comments. Submit design plans and specifications, including proposed remediation objectives, to U.S. EPA for review and approval to remove, treat, and/or contain residual PCB contamination to acceptable risk levels. Implement the approved final design, incorporating U.S. EPA comments.

Remedy construction must be completed within three years of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, a registered professional engineer and the Solutia Project Manager shall certify that the remedy for PCB-contaminated soil at the Former PCB Manufacturing Area has been conducted in accordance with the U.S. EPA-approved final design and specifications, to the best of their knowledge, and that remediation objectives have been attained. The report shall include as-built drawings signed and stamped by a registered professional engineer. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Submit a workplan to U.S. EPA for review and approval within 30 days of this Final Decision to remediate PCB contamination greater than 1 ppm in soil in the vicinity of historical and RFI sample locations B-24, B-26, B-60, B-61, and B-63 (Former PCB Warehouse); B-39 and B-40 (North Tank Farm); B-67 and B-70 (Former Spent Carbon Tank); S0715 (Parcel 8); and S0607, S0608, S0609, and CT-1-2 (Former Chlorobenzene and Benzene Storage Area). The workplan consists of proposed remediation objectives, further sampling to delineate the full extent of PCB contamination in soil, construction quality assurance objectives, a project schedule, reporting requirements, waste disposal requirements, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved workplan, incorporating U.S. EPA comments.

Remedy construction must be completed within one year of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, the Solutia Project manager shall certify that remediation objectives have been attained. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Submit a workplan to U.S. EPA for review and approval within 30 days of this Final Decision to remediate lead contamination in surface soil (0 to 2-feet) that exceeds the soil remediation objective of 700 mg/kg. The workplan shall propose grid sample locations in the vicinity of RFI sample locations S0720, S0716, S0707, S0717, S0715, S0703, and S0610 located adjacent to one another in Parcels 2, 7, and 8 to adequately delineate the area requiring remediation. The workplan consists of construction quality assurance objectives, a project schedule, reporting requirements, waste disposal requirements, quality assurance project plan, sampling and analysis plan, and health and safety plan. Implement the approved workplan, incorporating U.S. EPA comments.

Remedy construction must be completed within one year of this Final Decision and a Construction Completion Report and O&M Plan must be submitted to U.S. EPA for review and approval at that time. In the report, the Solutia Project Manager shall certify that remediation objectives have been attained. Implement any approved final O&M Plan, incorporating U.S. EPA comments.

- Excavate the soil contaminated with mercury above cleanup levels at the Former Chlor-Alkali Production Area and submit a Construction Completion Report to U.S. EPA for review and approval within one year of this Final Decision. The soil cleanup level for mercury is 3.3 ppm (assuming a soil pH between 6.9 and 7.24). In the alternative, the soil cleanup level for mercury may be 61 ppm provided that Solutia can demonstrate (and U.S. EPA approves the demonstration) that mercury has not migrated to groundwater in the SHU in excess of a concentration of 0.002 ppm in the area immediately downgradient of the excavation. In the report, the Solutia Project Manager shall certify that the appropriate soil cleanup level has been attained.

Reports and Monitoring

- Submit a Final Remedy Construction Completion Report, as required in the Administrative Order on Consent, within one year of this Final Decision. The Final Remedy Construction Completion Report shall consist of: 1) the Construction Completion Report for PCB excavation and off-site treatment/disposal at the Former PCB Manufacturing Area; 2) the Construction Completion Report for “hotspot” PCB excavation and/or capping at various areas; 3) the Construction Completion Report for lead excavation and/or capping at various areas; and 4) the Construction Completion Report for mercury excavation at the Former Chlor-Alkali Production Area.

Submit an Addendum to the Final Remedy Construction Completion Report, as required in the Administrative Order on Consent, within three years of this Final Decision. The Addendum shall consist of: 1) the Construction Completion Report for ISTD treatment at the Former Chlorobenzene Process Area; 2) the Construction Completion Report for SVE treatment at the Former Chlorobenzene and Benzene Storage Area, and Central Plant Process Area; 3) any construction to address unacceptable discharges of contaminated groundwater to the Mississippi River; 4) any construction to stabilize the PCB plume; and 5) any additional construction at the Former PCB Manufacturing Area to control risks.

- Submit a long-term groundwater, surface water, sediment, and air monitoring program to U.S. EPA for review and approval within 45 days of the Final Decision. The long-term groundwater monitoring program must be capable of evaluating the effectiveness of monitored natural attenuation (see Section 3.11.7 of *Technology Selection Report*, January 15, 2007), including: 1) a clear and meaningful trend of decreasing contaminant mass; 2) data that indirectly demonstrates the types and rates of natural attenuation processes active at the site; and 3) data that directly demonstrates the occurrence of

biodegradation processes at the site. The surface water and sediment monitoring program must be capable of assessing the impact of contaminated groundwater discharge to the Mississippi River north of the GMCS. The air monitoring program must be capable of assessing ambient air, indoor air, and soil vapor during remediation activities. Implement the approved long-term monitoring program, incorporating U.S. EPA comments.

- Conduct periodic technical reviews of data from the long-term monitoring program to evaluate site conditions. Assess any potential unacceptable risk posed to on-site and off-site receptors. Assess whether alternative technologies are necessary to expedite groundwater cleanup in the American Bottom aquifer. Submit the periodic technical review as an assessment report to U.S. EPA for review and comment every three years, starting from the U.S. EPA approval date of the long-term monitoring program.
- Submit semi-annual progress reports to U.S. EPA detailing work performed to date, data collected, problems encountered, project schedule, and percent project completed. Include trend analyses for benzene, chlorobenzene, dichlorobenzenes, PCBs, 4-chloroaniline, and 2-chlorophenol concentrations detected in wells that monitor the American Bottom aquifer as part of the long-term groundwater monitoring program. Progress reports are due by the 15th day of the month following each six month period after the Final Decision.

Institutional Controls

- Municipal ordinances are in place within the Village of Sauget and City of East St. Louis boundaries that prohibit the use of groundwater as a potable water supply by the installation or drilling of wells or use of potable water supply wells or by any other method. Potable water is any water for human or domestic consumption, including but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods. During the lifetime of the remedy, Solutia must notify U.S. EPA on an annual basis (beginning with the second semi-annual progress report) that the municipal ordinances remain in place. Solutia must also use due diligence to detect any current and/or future off-site groundwater pumping activities that may (i) impact Solutia's ability to effectively operate the GMCS, and (ii) impact the groundwater gradient within the defined plume in the American Bottom aquifer, and promptly notify U.S. EPA and appropriate state and local governments if it becomes aware of such activities. Due diligence shall include, but is not limited to, publicizing that groundwater use restrictions exist in the local area, conducting a semi-annual review of available state and local records pertaining to groundwater well installation permits and construction de-watering permits, documenting the presence of any wells within a 0.5-mile radius of the known contaminant plume boundary originating from the Solutia facility, and determining the pumping activities at these wells. The results of due diligence activities (provided prompt notification is not required) may be submitted as part of the semi-annual progress reports (beginning with the second semi-annual progress report).

- Solutia must restrict the use of the facility from any activities that may interfere with implementation of the final remedy, operation and maintenance, monitoring, or other measures necessary to assure the effectiveness and integrity of the remedy implemented pursuant to this Final Decision. Such restrictions shall be in the form of an Environmental Land Use Control (ELUC) as detailed in 35 Ill. Adm. Code Section 742.1010 to restrict on-site groundwater use, limit on-site use to industrial/commercial activities, limit on-site use in the area of PCB-contaminated soil as necessary, to “low occupancy” as defined at 40 C.F.R. §§ 761.3 and 761.61, provide for operation and maintenance of engineered barriers, and impose controls on excavation procedures for construction workers and future redevelopment workers at the Solutia facility. Submit an ELUC to U.S. EPA for review and approval within 60 days of the Final Decision. The U.S. EPA-approved ELUC must be recorded on the facility deed within six months of the Final Decision. Provide record documentation to U.S. EPA that the ELUC is recorded on the facility deed.

Financial Assurance

- Obtain financial assurance for completion of the final remedy, including operation and maintenance (O&M), within 90 days of this Final Decision. The current estimated cost of the final remedy is \$7,489,000 (plus costs to remediate PCB-contaminated soil at the high-risk area in the Former PCB Manufacturing Area) over the expected lifetime of 40 years. Provide financial assurance of \$7,489,000 plus costs to be determined for remediating PCB-contaminated soil at the “high-risk” area in the Former PCB Manufacturing Area, in one of the forms permitted under 40 C.F.R. § 264.145 (modified to replace the terms “post-closure” and “closure” with “corrective action” and referencing the Administrative Order on Consent, as approved by U.S. EPA).

For full-scale implementation of ISTD at the Former Chlorobenzene Process Area, Solutia must provide additional financial assurance of \$4,204,000 (or other amount as approved by U.S. EPA) within 90 days of completion and reporting on the ISTD field pilot-scale test. If Solutia is required to remove, treat, and/or contain residual PCB contamination and/or address groundwater contamination in the American Bottom aquifer, the work plan or design plans must provide for the development and presentation of costs for the remedy. Within 30 days of U.S. EPA approval of any final design, Solutia must obtain financial assurance for completing, operating, and maintaining the remedy.

- At each three year period (coinciding with the technical review assessment report), Solutia must provide an updated cost estimate for completing the final remedy to U.S. EPA for review and approval. Upon U.S. EPA approval of the updated cost estimate, Solutia may modify the financial assurance if the updated cost estimate is less than initial financial assurance provided within 90 days of the Final Decision. Solutia must modify and obtain the required financial assurance within 30 days of U.S. EPA approval of the updated cost estimate if greater than the initial financial assurance provided within 90

days of the Final Decision.

The final remedy selected by U.S. EPA provides the best balance among the alternatives with respect to the evaluation criteria described in the Statement of Basis, including:

- Overall Protection of Human Health;
- Overall Protection of the Environment;
- Attainment of Media Cleanup Standards;
- Source Control;
- Compliance with Applicable Waste Management Standards;
- Long-term Reliability;
- Short-term and Long-term Effectiveness;
- Reduction in Waste Toxicity, Mobility, and Volume;
- Implementability; and
- Cost.

Public Participation Activities and Comments

A public comment period was held from August 24 to October 9, 2007. Comments were provided by five parties:

- Mr. Timothy Szewczyk, Biologist, University of Notre Dame
- Ms. Kathy Andria, President, American Bottom Conservancy
- Mr. Robert Johnson, Johnson Consulting
- Illinois Environmental Protection Agency, Bureau of Land (Rob Watson, Permit Section and Sandra Bron, Federal Site Remediation Section)
- Mr. Craig Branchfield, Solutia Project Manager.

U.S. EPA gathered a total of 40 comments from the five parties. They are presented and responded to in Attachment I.

Administrative Record

The Administrative Record for the final remedy is available at the Cahokia Public Library, 140

Cahokia Park Drive, Cahokia, Illinois and the 7th Floor Records Center at U.S. EPA Region 5, 77 W. Jackson Blvd., Chicago, IL. Attachment II identifies the documents contained within the Administrative Record.

Future Actions

The Administrative Order on Consent requires Solutia to implement the final remedy according to the schedule in this Final Decision. Attachment IV provides the implementation schedule for the final remedy. U.S. EPA will update the Administrative Record with new information (e.g., correspondence, plans, reports) during implementation of the final remedy.

Declarations

Based on the Administrative Record compiled for this corrective action, U.S. EPA has determined that the final remedy selected for the Solutia facility is appropriate and protective of human health and the environment.

Margaret M. Guerriero, Director
Land and Chemicals Division
U.S. EPA Region 5

Date

Attachments (4)

IN THE MATTER OF:

Solutia Inc.

Sauget, Illinois
U.S. EPA I.D. No. ILD 000 802 702