UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

149972

AUG 2 9 2001

REPLY TO THE ATTENTION OF

MEMORANDUM

SUBJECT: ACTION MEMORANDUM - Request for a Change of Project Scope at the Sauget Area 1 Dead Creek Superfund Site in Sauget and Cahokia, St. Clair County, Illinois (Site ID # 054V)

FROM: Kevin Turner, On-Scene Coordinator
Emergency Response Branch - Section 2

TO: William E. Muno, Director
Superfund Division

THRU: Richard C. Karl, Chief R. Karl
Emergency Response Branch

I. PURPOSE

The purpose of this memorandum is to document a change in the scope of response for the Sauget Area 1 Site, Sauget and Cahokia, St. Clair County, Illinois. This document supplements the original signed Action Memo, dated May 31, 2000, which included proposed actions including the excavation and subsequent disposal of sediments from Dead Creek Segments B, C, D, E and Site M. This work is currently on-going.

The original Action Memorandum determined that an imminent and substantial threat to public health and the environment exists at the Site due to contaminated sediments along Dead Creek and Site M.. Dead Creek sediments and soils are the major potential source of contamination in Dead Creek flood waters. Contaminated creek sediments and soils were to be removed as soon as possible to eliminate the imminent and substantial threat of exposure to the contamination via direct contact by nearby residents and via flooding from Dead Creek. Preliminary ecological assessment data also indicated significant damage to aquatic organisms in Dead Creek. The change in the scope of response for the Site will include the excavation and subsequent disposal in the on-site containment cell of sediments in Dead Creek Segment F. Segment F was not originally included in the Action Memorandum because most of this creek segment was located in

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a non-residential area and therefore assumed not to pose the same level of risk as the upstream creek segments. However, recent data collected during a Remedial Investigation from Segment F indicate that the ecological risks posed by the levels of contamination within Creek Segment F warrant the immediate removal of these sediments. It will also be more efficient and cost-effective to remove these sediments along with the sediments in the upstream portions of the creek. This additional sediment to be excavated in Segment F more specifically includes the area of Dead Creek from the Terminal Railroad Association embankment to the eastern edge of the Borrow Pit Lake. It will also include the basin area located at the lift station adjacent to the levee along Old Prairie DuPont Creek. Current estimates on sediment volume from this portion of Segment F is approximately 15,000 cubic yards. All non-native creek sediments will be removed from this stretch of the creek using the same sediment identification criteria as found in the May 31, 2000, Unilateral Order. Also, data and ecological risk evaluations of the area of the Site known as the Borrow Pit Lake which is located west of Creek Segment F, also indicate that some risks to the environment may exist as a result of elevated levels of contaminants. At the present time it appears that the risks may be due to localized "hot spots" of contamination within the Borrow Pit Lake and therefore further delineation of these hot spots may be warranted at a later date. This investigation should be included as part of the Mitigation Plan, found in Section V of the Unilateral Administrative Order issued by U.S. EPA on May 31, 2000, for the Dead Creek Removal Action.

The actions proposed herein will mitigate the potential threats to public health, welfare, and the environment posed by the presence of uncontrolled hazardous substances located in Dead Creek and Site M sediments and surface waters at the site. Excavated sediments and water pumped from the creek will be, as necessary, treated and disposed of in accordance with Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Toxic Substance Control Act (TSCA) requirements. These requirements include excavation and on-site containment in a RCRA and TSCA-compliant containment cell. These actions are being performed by the PRP pursuant to the May 31, 2000, UAO, to be amended to include to include Creek Segment F . The total time projected to complete all sediment removal work, including Segment F, is estimated at 8 months.

The Sauget Area 1 Site is not on the National Priorities List (NPL), however, it is currently being proposed for inclusion on the NPL.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID # ILD980792006

For a description of site conditions and background information see the attached Action Memo dated May 31, 2000.

To date, work on the sediment removal action at Sauget Area 1 has included the clearing of brush from the creek bed areas and the installation of dewatering lines and pumps to keep the sediments

dry before excavation and placement in the on-site containment cell. In May of 2001, removal of topsoil began at the area of the site next to Creek Segment B where the RCRA/TSCA containment cell will be constructed. Construction of the cell is expected to continue through the summer of 2001 and the excavation of sediments will begin shortly thereafter.

III. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions at Sauget Area 1, Dead Creek and Site M present an imminent and substantial threat to the public health, or welfare, and the environment and meet the criteria for a removal action provided for in the National Contingency Plan (NCP), Section 300.415, Paragraph (b)(2). 40 C.F.R. § 300.415(b)(2)(I), (iii), (iv), and (v), respectively, specifically allows removal actions for:

A) Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain.

This condition exists at the Site due to the high levels of organic and inorganic contaminants found in the sediments of Dead Creek and Site M which is located in close proximity to local populations and could potentially be released into residential areas via flood waters caused by the shallow water table in the area and the presence of blocked or inadequately sized culverts. Local residents, particularly children, may also be exposed to these contaminants if they enter the creek and come into direct skin contact with the sediments. Some of the contaminants in Dead Creek are known carcinogens or suspect carcinogens.

Ecological receptors are also at risk given the high levels of a variety of contaminants found in the sediments of the creek. This also applies to Creek Segment F where these levels are in excess of several ecological benchmarks and the data show there are potential risks. For example, in Segment F copper levels are as high as 5,400 ppm, zinc up to 10,000 ppm, and PCB levels in excess of 6 ppm. The ecological evaluation also showed that fish body burdens for mercury exceed toxic benchmarks, something not seen in the reference areas, indicating that there is some potential for adverse effects on fish in the this area. Food chain modeling indicates potential risk to great blue heron eating mercury contaminated fish at the Site. In Creek Segment F, Probable Effects Concentrations (PEC) or Severe Effects Levels (SEL) were exceeded for six metals: cadmium, copper, lead, mercury, nickel and zinc. Threshold Effects Concentrations (TEL) were exceeded for these metals and for arsenic, iron, manganese, total PCBs, seven pesticides and fluoranthene, this indicates a potential for adverse effects on biota. In the Borrow Pit Lake, PEC and SEL guidelines were exceeded by manganese and nickel and these metals plus arsenic, cadmium, copper, iron, lead, zinc, DDE, total DDT, gamma-BHC, and hepatchlor epoxide exceeded the TEC and LEL values. In the Acute Toxicity Test for Hyallela Azteca, the growth of this amphipod was statistically lower in stations 1 and 3 in the Borrow Pit Lake. In the Chronic Toxicity Test for C. tentans, survival, emergence, and reproduction in stations BP-1 and BP-3 in

the Borrow Pit Lake were significantly lower than the laboratory controls. Hazard Indices exceeded 1 for the river otter and herons under certain Borrow Pit Lake foraging scenarios.

B) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.

This factor is present at the Site due to the fact high levels of organic and inorganic contaminants are located within the sediments and surface water of Dead Creek and Site M. Blocked and/or inadequately sized culverts on Dead Creek often cause flood waters to back up behind these culverts and then overflow into nearby residential areas. This area of St. Clair County is particularly prone to flooding due to a very shallow groundwater table. Storm water backing up behind culverts exasperates the flooding conditions in this area.

C) Availability of other appropriate federal or state response mechanisms to respond to the release.

The Illinois EPA currently does not have the available funds to respond to this time-critical situation. In addition, the U.S. EPA is the lead agency for enforcement actions related to the Sauget sites.

IV. ENDANGERMENT DETERMINATION

Given the site conditions, the nature of the suspected hazardous substances on site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in the original May 31, 2000, Action Memorandum, and this amended Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS

The change of project scope requested by the OSC will include the additional excavation of contaminated sediments from Dead Creek Segment F with subsequent disposal of these sediments in the on-site containment cell. Also, the OSC proposes the further evaluation of potential hot spots and their subsequent remediation as part of the Mitigation Plan under the Dead Creek Removal Project.

The estimated volume of additional sediment from Creek Segment F is 15,000 cubic yards. The current design of the RCRA/TSCA compliant containment cell being constructed on-site includes an estimated capacity of 50,000 cubic yards. However, the cell design includes enough flexibility via changes in the slope of the cap which will thereby allow for a maximum capacity of at least 65,000 cubic yards. Therefore, based on current sediment volumes in Creek Segment F and the rest of the upstream creek segments, no significant change to the design of the containment cell is

required. If during the excavation phase of the removal it becomes evident that the volume of sediments will exceed the maximum capacity for the containment cell, then additional options for disposal will be evaluated. These options, to be decided by U.S. EPA, may include the redesigning of the cell to add capacity, the construction of an additional containment cell, or the off-site disposal of the excess sediments.

If the project later involves the off-site disposal of contaminated sediments and/or creek water, these media must be properly disposed of at a RCRA and TSCA approved disposal facility in accordance with EPA off-site disposal rule found at 40 C.F.R. § 300.440, 58 Federal Register 49215 (September 22, 1993). In addition, if the project involves the construction of another on-site containment cell for disposal purposes, the containment cell must meet both Illinois EPA and U.S. EPA TSCA and RCRA design criteria to the maximum extent practicable.

The response actions described in this memorandum directly address actual or threatened releases of hazardous substances, or pollutants, or contaminants at the Site which pose an imminent and substantial endangerment to public health and safety. These response actions do not impose a burden on affected property disproportionate to the extent to which that property contributes to the conditions being addressed.

Post Removal Site Control:

Completion of removal activities listed above at the Sauget Area 1 Site will address risks posed by the contaminated sediments in Dead Creek. As stated in Exhibit 2, Section 2 of the UAO for the Sauget Area 1 Dead Creek Removal, Closure and Post -Closure requirements of the containment cell are required of the PRP to assure the integrity of the cell and to assure that no contaminants placed within the cell enter the surrounding environment.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Refer to the attached previous Action Memorandum.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this site.

VIII. ENFORCEMENT

Information concerning the enforcement strategy for this site is contained in the Enforcement Confidential Addendum to the attached Action Memorandum.

IX. RECOMMENDATION

This decision document (in conjunction with the previous Action Memorandum) represents the selected removal action for Dead Creek Segment F of the Sauget Area 1 Site developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for the site. Conditions at the site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed amended removal action. You may indicate your decision by signing below.

APPROVE: Wm. E. Muno DATE: 8/29/01
William E. Muno, Director
Superfund Division

DISAPPROVE: _____ DATE: _____
William E. Muno, Director
Superfund Division

Attachment:

Action Memorandum dated May 31, 2000

cc: K. Mould, U.S. EPA, 5202-G
S. Bron, Illinois EPA, **w/o Enf. Addendum**
K. de la Bruere, USFWS, **w/o Enf. Addendum**
S. Davis, Illinois DNR **w/o Enf. Addendum**

BCC PAGE

SAUGET AREA 1 DEAD CREEK SITE

HAS BEEN REDACTED
(1 PAGE)

ATTACHMENT

MAY 31, 2000 ACTION MEMORANDUM

Mike

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

MAY 31 2000

REPLY TO THE ATTENTION OF

MEMORANDUM

SUBJECT: ACTION MEMORANDUM - Determination of Threat to Public Health, Welfare, or the Environment at the Sauget Area 1 Dead Creek Superfund Site in Sauget and Cahokia, St. Clair County, Illinois (Site ID # 054V)

FROM: Kevin Turner, On-Scene Coordinator
Emergency Response Branch - Section 2

TO: William E. Muno, Director
Superfund Division

THRU: Richard C. Karl, Chief R. Karl
Emergency Response Branch

I. PURPOSE

The purpose of this memorandum is to document the determination of an imminent and substantial threat to public health and the environment due to contaminated sediments along Dead Creek and Site M. Dead Creek sediments and soils are the major potential source of contamination in Dead Creek flood waters. Contaminated creek sediments and soils must be removed as soon as possible to eliminate the imminent and substantial threat of exposure to the contamination via direct contact by nearby residents and via flooding from Dead Creek. Preliminary ecological assessment data also indicates significant damage to aquatic organisms in Dead Creek.

The actions proposed herein will mitigate the potential threats to public health, welfare, and the environment posed by the presence of uncontrolled hazardous wastes substances located in Dead Creek and Site M sediments and surface waters at the site. Proposed removal actions include but are not limited to preparing a Time Critical Removal Action Work Plan (also referred to herein as "Work Plan") and implement the Removal Action in accordance with the Work Plan to mitigate the threats posed by presence of contamination in Dead Creek sediments and certain adjacent soils and their potential migration via overflow and flood waters from the Site.

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Excavated sediments and water pumped from the creek will be, as necessary treated and disposed of in accordance with Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Toxic Substance Control Act (TSCA) requirements These requirements may include excavation and off-site disposal or excavation and on-site containment. Any off-site disposal must be properly disposed of in accordance with EPA off-site disposal rule. Any on-site containment must comply with RCRA and/or TSCA-compliant containment cell. It is anticipated that these actions will be performed by the PRP pursuant to an Unilateral Administrative Order (UAO). This project will require an estimated 6 months of on-site work to complete.

The Sauget Area 1 Site is not on the National Priorities List (NPL), however, it has been proposed for inclusion on the NPL.

II. SITE CONDITIONS AND BACKGROUND

CERCLIS ID # ILD980792006

A. Physical Location and Description

Dead Creek stretches from the Alton & Southern Railroad at its northern end and flows south through Sauget and Cahokia for approximately 3.5 miles before emptying into the Old Prairie du Pont Creek, which flows approximately 2,000 feet west into a branch of the Mississippi River known as the Cahokia Chute. For sampling purposes, Dead Creek is subdivided into six separate segments labeled CS-A through CS-F. The segments are further described as follows:

CS-A is the northernmost segment of the creek and it is approximately 1,800 feet long and 100 feet wide running from the Alton & Southern Railroad to Queeny Avenue. This segment of the creek originally consisted of two holding ponds which were periodically dredged. For several years, CS-A and available downstream creek segments (e.g., ones that were not blocked off) received direct wastewater discharges from industrial sources and served as a surcharge basin for the Village of Sauget (formerly Village of Monsanto) municipal sewer collection system. When the system became backed up or overflowed, untreated wastes from industrial users of the sewer system were discharged directly into CS-A. On several occasions, CS-A was dredged and contaminated sediments were disposed of onto adjacent property (Site I of Sauget Area One Site). In 1968, the Queeny Avenue culvert, which allowed creek water to pass from CS-A to CS-B, was permanently blocked by the Village of Sauget. Remediation work was conducted by Cerro Copper in CS-A in 1990. Approximately 27,500 tons of contaminated sediments were excavated and sent to RCRA and TSCA permitted facilities. CS-A is now filled and covered with crushed gravel and is not subject of this Order. Land use surround CS-A is industrial.

CS-B extends for approximately 1,800 feet from Queeny Avenue south to Judith Lane. Sites G, L, and M of the Sauget Area One Site border this creek segment. Land use surrounding CS-B is primarily commercial with a small residential area near the southern end of this segment.

Agricultural land lies to the west of the creek and south of Site G. At some point after 1943, the Judith Lane culvert, which allowed creek water to pass from CS-B to CS-C, was blocked

CS-C extends for approximately 1,300 feet from Judith Lane south to Cahokia Street. Land use is primarily residential along both sides of CS-C.

CS-D extends for approximately 1,100 feet from Cahokia Street to Jerome Lane. Land use is primarily residential along both sides of CS-D.

CS-E extends approximately 4,300 feet from Jerome Lane to the intersection of Illinois Route 3 and Route 157. Land use surrounding CS-E is predominantly commercial with some mixed residential use. Dead Creek temporarily passes through corrugated pipe at the southern end of CS-E.

CS-F is approximately 6,500 feet along and extends from Route 157 to the Old Prairie du Pont Creek. CS-F is the widest segment of Dead Creek and a large wetland area extends several hundred feet out from the both sides of the creek.

Site M: Located along the eastern side of Dead Creek CS-B (south of Site L) at the western end of Walnut Street in the Village of Cahokia. Site M was originally used as a sand borrow pit (dimensions = 220 feet by 320 feet) in the mid to late 1940's. The pit is hydraulically connected to Dead Creek through an eight-foot opening at the southwest portion of the pit. On information and belief, wastes from CS-B have in the past and potentially continue to migrate into Site M via this connection. The site is currently fenced

According to the Region 5 Superfund Environmental Justice Analysis, there are 4 Block Groups covering the distance of Dead Creek. Three of the Block Groups do not meet the demographic conditions for an environmental justice (EJ) priority. However, residents in census tract 502601, Block Group 2 do meet Region 5 EJ criteria. This block group has a total population of 1829. Of the 1829, 82% are classified as white and 18% are classified as minority. Approximately 60% of the families residing in this block group have an income of less than 2 times the established state low-income level. .

B. Site Background

Dead Creek has historically been a repository for local area wastes. On December 21, 1928, an easement agreement between local property owners and representatives of local business, municipal and property interests was executed to "improve the drainage in that District (Dead Creek) by improving Dead Creek so as to make it suitable for the disposal of wastewater, industrial waste, seepage and storm water." Thereafter, Dead Creek systematically received direct and indirect discharges from local businesses and the municipality for many years.

Sediment and surface water samples collected by U S EPA and Illinois EPA have detected a wide variety of organic and inorganic contaminants in each of the remaining creek segments

CS-B Elevated levels of volatile organic compounds ("VOCs") and semi-volatile organic compounds ("SVOCs") were detected in sediments samples collected from CS-B such as benzene (87 parts per billion ("ppb")), toluene (810 ppb), chlorobenzene (5,200 ppb), ethylbenzene (3,600 ppb), trichlorobenzene (3,700 parts per million ("ppm")), dichlorobenzene (12,000 ppm), chloronitrobenzene (240 ppm), xylenes (540 ppm), 1,4-dichlorobenzene (220,000 ppb), 1,2-dichlorobenzene (17,000 ppb), phenanthrene (15,000 ppb), fluoranthene (11,000 ppb), pyrene (13,000 ppb). Elevated levels of PCBs exist within CS-B at levels as high as 10,000 ppm. Elevated levels of metals were also detected in sediments in CS-B including arsenic (6,000 ppm), cadmium (400 ppm), copper (44,800 ppm), lead (24,000 ppm), mercury (30 ppm), nickel (3,500 ppm), silver (100 ppm), and zinc (71,000 ppm).

Surface water samples collected from CS-B revealed elevated concentrations of VOCs such as chloroform (27 ppm), 1,1-dichloroethene (3.ppb), toluene (20 ppb), and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 1,4-dichlorobenzene, 2-methylphenol (4 ppb), 4-methylphenol (35 ppb), 2,4-dichlorophenol (150 ppb), naphthalene (8 ppb), 3-nitroaniline (9 ppb), and pentachlorophenol (120 ppb). Pesticides were also detected in surface water samples including dieldrin (.18 ppb), 4,4-DDT (.24 ppb), 2,4-D (47 ppb) and silvex (3.4 ppb). An elevated level of PCBs (aroclor 1260) was also detected in the surface water of CS-B at a level of 44 ppb. Elevated levels of metals were detected in surface water such as aluminum (9,080 ppb), barium (7,130 ppb), arsenic (31 ppb), cadmium (25 ppb), chromium (99 ppb), copper (17,900 ppb), lead (1,300 ppb), mercury (8.6 ppb), nickel (1,500 ppb), and zinc (10,300 ppb).

CS-C: Elevated levels of VOCs and SVOCs were detected in sediments in this segment of Dead Creek including fluoranthene (4,600 ppb), pyrene (4,500 ppb), benzo(a)anthracene (3,300 ppb), chrysene (4,400 ppb), benzo(b)fluoranthene (7,500 ppb), benzo(a)pyrene (4,500 ppb), indeno(1,2,3-cd pyrene (4,300 ppb), benzo(g,h,l) perylene (1,500 ppb), dibenzo(a,h)anthracene (4,000 ppb), and 4-methyl-2-pentanone (1,200 ppb). PCBs (total) were also detected in sediments from CS-C at a maximum concentration of 27,500 ppb. Sediment samples also revealed elevated levels of metals such as copper (17,200 ppm), lead (1,300 ppm), nickel (2,300 ppm), zinc (21,000 ppm) and mercury (2.81 ppm)

Surface water samples collected from creek segment CS-C revealed elevated levels of metals such as lead (710 ppb), mercury (1.9 ppb), and nickel (83 ppb).

CS-D: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-D including 4-methyl-2-pentanone (1,200 ppb), benzo(b)fluoranthene (500 ppb), indeno(1,2,3-cd)pyrene (310 ppb), and dibenzo(a,h)anthracene (360 ppb). PCBs (total) were detected in sediments at a maximum concentration of 2,000 ppb. Elevated concentrations of

metals were also detected such as cadmium (42 ppm), copper (1,630 ppm), lead (480 ppm), mercury (1 ppm), and zinc (6,590 ppm).

Surface water samples collected from CS-D revealed elevated concentrations of metals such as cadmium (8.1 ppb), lead (89 ppb), and nickel (189 ppb).

CS-E: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-E including chlorobenzene (120 ppb), pyrene (5,300 ppb), benzo(b)fluoranthene (2,400 ppb), and chrysene (2,800 ppb). Elevated levels of PCBs (total) were also detected at a maximum concentration of 59,926 ppb. Elevated levels of metals were also detected in the sediments of CS-E including cadmium (23.1 ppm), copper (8,540 ppm), lead (1,270 ppm), mercury (1.53 ppm), nickel (2,130 ppm), and zinc (9,970 ppm).

CS-F: Elevated concentrations of VOCs and SVOCs were detected in the sediments of CS-F such as toluene (29 ppb), 4-methylphenol (1,100 ppb), fluoranthene (310 ppb), and pyrene (340 ppb). Pesticides were also detected in the sediments such as 4,4-DDE (97 ppb), endrin (66 ppb), endosulfan II (203 ppb), and methoxychlor (8 ppb). PCBs (total) were also detected in sediments at a maximum concentration of 5,348 ppb. Elevated levels of metals were also detected in the sediments such as arsenic (276 ppm), lead (199 ppm), mercury (.55 ppm), cadmium (23.5 ppm), copper (520 ppm) nickel (772 ppm) and zinc (4,520 ppm). Elevated concentrations of dioxins were also detected in sediments in CS-F at a maximum concentration of 211 picograms per gram.

Site M: Originally constructed as a sand borrow pit in the mid to late 1940's, this pit is approximately 59,200 square feet in size and previous investigations indicate that approximately 3,600 cubic yards of contaminated sediments are contained within the pit. It is estimated that the pit is approximately 14 feet deep and it is probable that there is a hydraulic connection between this pit water and the underlying groundwater. Surface water samples collected from Site M revealed elevated levels of VOCs such as chloroform (27 ppb), toluene (19 ppb) and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 2,4-dimethyl phenol (13 ppb), 2,4-dichlorophenol (150 ppb), and pentachlorophenol (120 ppb). Pesticides detected in surface water include dieldrin (0.18 ppb), endosulfan II (.06 ppb), 4,4-DDT (0.24 ppb), 2,4-D (47 ppb) and 2,4,5-TP (Silvex) (3.4 ppb). PCBs were also detected in surface water at a maximum level of 0.0044 ppb.

Sediment samples collected from Site M revealed elevated levels of VOCs such as 2-butanone (14,000 ppb), chlorobenzene (10 ppb) and ethyl benzene (0.82 ppb). SVOCs detected in sediments included 1,4-dichlorobenzene (40 ppm), 1,2-dichlorobenzene (26 ppm), 1,2,4-trichlorobenzene (14 ppm), pyrene (27 ppm), fluoranthene (21 ppm), chrysene (12 ppm), and benzo(b)fluoranthene (15 ppm). Total PCB levels were detected as high as 1,100 ppm. Elevated levels of metals were also detected in sediments at Site M, including antimony (41.2 ppm), barium (9,060 ppm), cadmium (47.2 ppm), copper (21,000 ppm), nickel (2,490 ppm), silver (26 ppm), zinc (31,600 ppm), lead (1,910 ppm), arsenic (94 ppm) and cyanide (1.3 ppm).

The table below compares concentrations of a few compounds present in Dead Creek with the U S EPA's Ecotox Thresholds Criteria as depicted in OSWER Directive 9345 0-12FSI Dated January 1996.

Compound	Max Concentration	Media	Segment	Ecotox Threshold
Chlorobenzene	5.2 ppm	Sediment	B	0.82 ppm
1,4 dichlorobenzene	220. ppm	Sediment	B	0.35 ppm
1,2 dichlorobenzene	17. ppm	Sediment	B	0.34 ppm
pyrene	13 ppm	Sediment	B	0.66 ppm
PCBs	10,000 ppm	Sediment	B	0.023 ppm
4,4-DDT	0.24 ppb	SW	B	0.013 ppb
Benzo (a) pyrene	4.5 ppm	Sediment	C	0.43ppm
Arsenic	6,000 ppm	Sediment	B	8.2ppm
Lead	24,000 ppm	Sediment	B	47.ppm

III. THREATS TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

The conditions at Sauget Area 1, Dead Creek and Site M present an imminent and substantial threat to the public health, or welfare, and the environment and meet the criteria for a removal action provided for in the National Contingency Plan (NCP), Section 300.415, Paragraph (b)(2). 40 C.F.R. § 300.415(b)(2)(I), (iii), (iv), and (v), respectively, specifically allows removal actions for:

A) Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain.

This condition exists at the Site due to the high levels of organic and inorganic contaminants found in the sediments and surface water of Dead Creek and Site M which is located in close proximity to local populations and could potentially be released into residential areas via flood waters caused by the shallow water table in the area and the presence of blocked or inadequately sized culverts. Some of the contaminants in Dead Creek are known carcinogens or suspect carcinogens. Contaminants are present in Dead Creek and potentially migrating from Dead Creek via overflow and flood waters to nearby residential areas are accessible to humans, specifically the residents and children who live and play on these potentially affected properties. These

individuals could potentially be exposed to the contamination by direct skin contact with the sediments, soils and surface water in or released from Dead Creek

B) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released

This factor is present at the Site due to the fact high levels of organic and inorganic contaminants are located within the sediments and surface water of Dead Creek and Site M. Blocked and/or inadequately sized culverts on Dead Creek often cause flood waters to back up behind these culverts and then overflow into nearby residential areas. This area of St. Clair County is particularly prone to flooding due to a very shallow groundwater table. Storm water backing up behind culverts exasperates the flooding conditions in this area.

C) Availability of other appropriate federal or state response mechanisms to respond to the release.

The Illinois EPA currently does not have the available funds to respond to this time-critical situation. In addition, the U.S. EPA is the lead agency for enforcement actions related to the Sauget sites.

IV. ENDANGERMENT DETERMINATION

Given the site conditions, the nature of the suspected hazardous substances on site, and the potential exposure pathways described in Sections II and III above, actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS

The OSC proposes that the following actions be taken to mitigate threats posed by the presence of hazardous substances at the Sauget Area 1 Site 1 (Dead Creek):

1) Prepare a Time Critical Removal Action Plan and implement the Removal Action to assess and mitigate the threats posed by the migration of contaminants via overflow and flood waters from the Site, as described in sections II and III above. This Time Critical Removal Action Work Plan ("Work Plan") shall describe the plan for 1) the removal of materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, and E (non-native creek sediments only); and Site M (pond sediments and pond bottom soils) in Sauget Area One, while minimizing adverse impacts to area wetlands and habitat; 2) the proper handling, dewatering, off-site disposal or on-site containment of such materials; 3) a plan for management of Dead Creek storm water; 4) the sampling and analysis of areas where materials has been removed, for the purpose of defining remaining contamination; 5) the placement of membrane liner material over CS-B and in all other

excavated areas where, based on post removal sample results, such liner is determined to be necessary, and 6) a Health and Safety Plan

The estimated volume of sediment and/or soil in CS-B and Site M is 25,500 cubic yards and CS-C, D and E contain an estimated volume of 24,400 cubic yards of sediment, a total of 49,900 cubic yards impacted sediment and soil. The above volumetric estimate for CS-B includes removal of one foot of creek bed soils and flood plain soils in addition to the sediments in CS-B. The estimate for Site M includes one foot of pond bottom soils in addition to the sediments. Only sediments are to be removed from CS-C, D, and E.

The proposed actions in this Action Memorandum are consistent with and supplements an Action Memorandum dated June 9, 1999 and a Unilateral Administrative Order issued on June 21, 1999, to Monsanto and Solutia requiring investigation and repair of Dead Creek culverts in the Cahokia and Sauget areas.

If the project involves the off-site disposal of contaminated sediments and/or creek water, these media must be properly disposed of at a RCRA and TSCA approved disposal facility in accordance with EPA off-site disposal rule found at 40 C.F.R. § 300.440, 58 Federal Register 49215 (September 22, 1993). In addition, if the project involves the construction of an on-site containment cell for disposal purposes, the containment cell must meet both Illinois EPA and U.S. EPA TSCA and RCRA design criteria to the maximum extent practicable.

Applicable or Relevant and Appropriate Requirements (ARAR)

If the remedy involves the construction of an on-site containment cell, Illinois EPA has identified the following ARARs, as set out in 35 Illinois Administrative Code (IAC), to be complied with; 35 IAC 724.401, 35 IAC 724.414, 35 IAC 724.119, 35 IAC 724, Subpart F, 35 IAC 724.410, and 35 IAC 724 Subpart G. Any other State or Federal ARAR will also be complied with to the maximum extent practicable. EPA has determined that creek segments B, C, D, E and Site M along with the proposed TSCA cell are within the same Area of Concern (AOC) and therefore the consolidation of waste material within the cell, as described in this Order, does not invoke any of the Land Disposal Restrictions (LDRs) under RCRA.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Continued risk to public health and the environment will result if no action or delayed action ensues.

VII. OUTSTANDING POLICY ISSUES

There are no outstanding policy issues associated with this site.

VIII ENFORCEMENT

For administrative purposes, information concerning the enforcement strategy for this site is contained in the Enforcement Confidential Addendum

IX RECOMMENDATION

This decision document represents the selected removal action for Dead Creek and Site M in Sauget Area 1 developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based upon the Administrative Record for the site. Conditions at the site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval of the proposed removal action. You may indicate your decision by signing below.

APPROVE: _____ DATE: May 31, 2000
for William E. Muno, Director
Superfund Division

DISAPPROVE: _____ DATE: _____
William E. Muno, Director
Superfund Division

Attachment 1 - Region 5 Superfund EJ Analysis

cc: K. Mould, U.S. EPA, 5202-G
M. Chezik, U.S. Department of the Interior, **w/o Enf. Addendum**
T. Skinner, Illinois EPA, **w/o Enf. Addendum**
C. Morin, Illinois EPA, **w/o Enf. Addendum**
J. Morgan, Illinois Dept. of Attorney General, **w/o Enf. Addendum**
S. Davis, Illinois DNR **w/o Enf. Addendum**

BCC PAGE

SAUGET AREA 1 DEAD CREEK SITE

HAS BEEN REDACTED
(1 PAGE)

ENFORCEMENT ADDENDUM

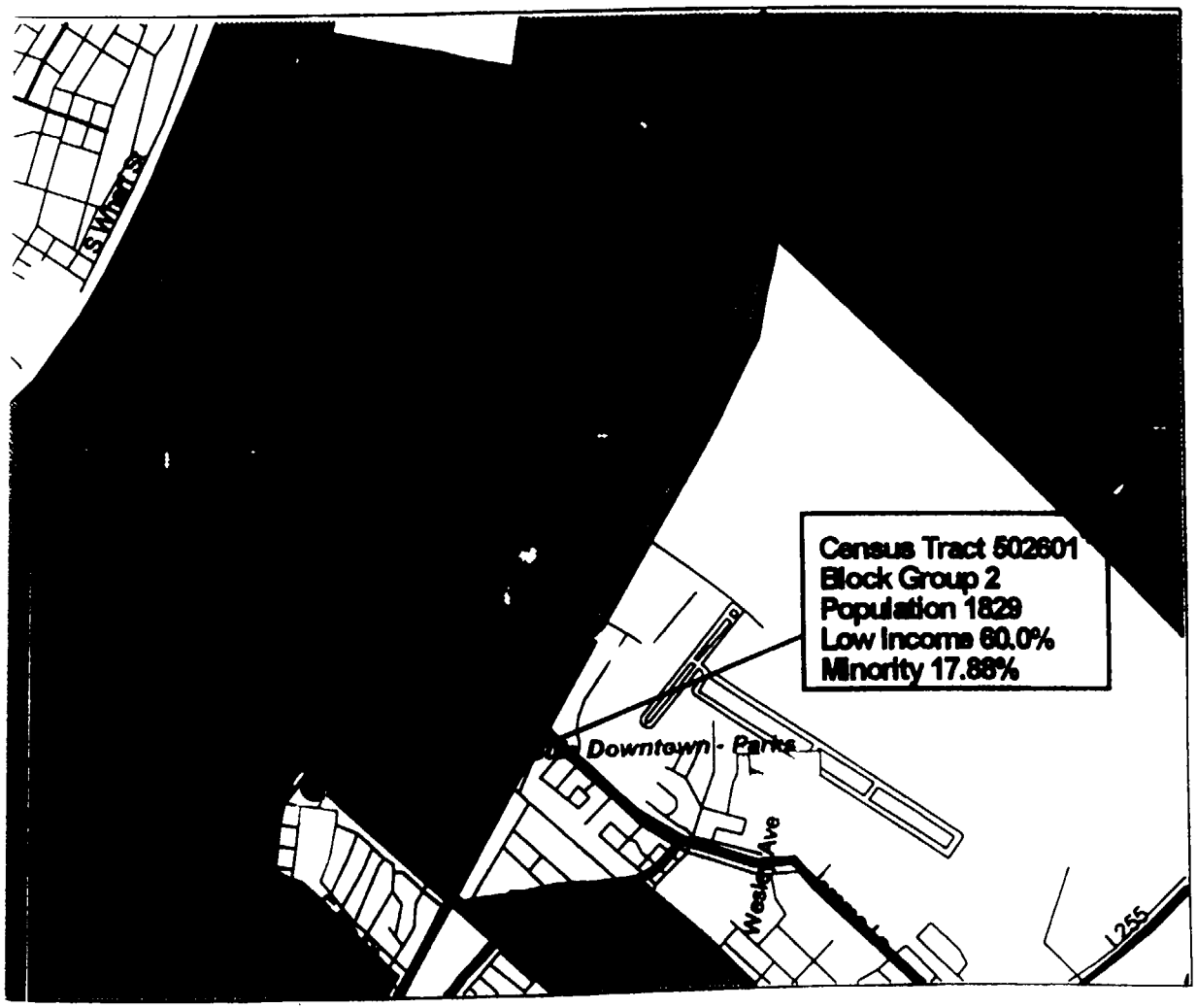
Sauget Area 1 Dead Creek Site
May 1999

HAS BEEN REDACTED
(1 PAGE)

NOT RELEVANT TO THE SELECTION OF THE REMOVAL ACTION

Region 5 Superfund EJ Analysis

Sauget Area 1, Dead Creek Site, Cahokia, IL

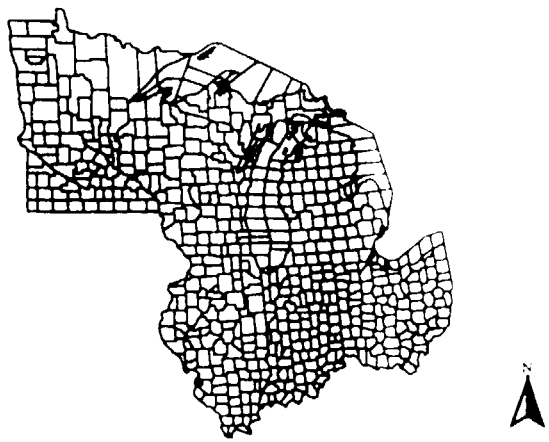


0 0.2 0.4 0.6 0.8 1 Miles

EJ Identification

- Low Income and Minority Less than State Average
- Low Income or Minority at or Greater than State Average
- Low Income or Minority 2 Times or Greater than State Average (meets Region 5 EJ Case criteria)
- Site Location
- Block Group Boundary

Region 5 EJ Case Criteria for Illinois
Minority: 50% or greater
Low Income: 54% or greater



Date of Map 5/26/99

Source of Map 1990 Census Database

ATTACHMENT 2

U.S. ENVIRONMENTAL PROTECTION AGENCY
REMOVAL ACTION

ADMINISTRATIVE RECORD
FOR
SAUGET AREA 1
DEAD CREEK SEDIMENT REMOVAL SITE
CAHOKIA AND SAUGET, ILLINOIS

ORIGINAL
MAY 25, 2000

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	00/00/00	Illinois EPA	U.S. EPA	Area 1 Screening Site Inspection Report	306
2	00/00/87	Weston-SPER	U.S. EPA	Removal Action Plan for the Dead Creek Sites	15
3	00/00/88	Ecology and Environment, Inc.	U.S. EPA	Expanded Site Investigation Report for the Dead Creek Project Sites	1019
4	00/00/92	Geraghty & Miller,	U.S. EPA	Site Investigations Report for Dead Creek Segment B and Sites L and M	498
5	08/24/94	USDHHS/USPHS/ Agency for Toxic Substances and Disease Registry	U.S. EPA	ATSDR Health Report	22
6	00/00/98	Ecology and Environment, Inc.	U.S. EPA	Data Tables/Maps for the Sauget Area 1 and 2 Sites	759
7	00/00/99	URS Greiner/ Woodward Cycle	U.S. EPA	Hydrologic and Hydraulic Analysis of Dead Creek	212
8	06/09/99	Turner, K., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health, Welfare, or the Environment at the Sauget Area 1 Dead Creek Superfund Site [Culvert Replacement] (PORTIONS OF THIS DOCUMENT HAVE BEEN REDACTED)	11
9	11/08/99		U.S. EPA	Alternatives Analysis for Dead Creek Sediment Removal	27
10	01/05/00		U.S. EPA	Supplement to the Alternatives Analysis for Dead Creek Sediment Removal	23

NO.	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
11	02/24/0[illegible]		U.S. EPA	Letter re: Substantial Compliance with Toxic Substances Control Act	
12	00/00/00	Turner, K., U.S. EPA	Muno, W., U.S. EPA	Action Memorandum: Determination of Threat to Public Health, Welfare, or the Environment at the Sauget Area 1 Dead Creek Superfund Site **(PENDING)**	

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:	)	Docket No.: V-W-99-C-554
	)	
Sauget Area 1 Superfund Site	)	
Sauget and Cahokia, Illinois	)	AMENDED ADMINISTRATIVE ORDER
	)	PURSUANT TO SECTION 106(a)
	)	OF THE COMPREHENSIVE
	)	ENVIRONMENTAL RESPONSE,
Respondents:	)	COMPENSATION, AND
	)	LIABILITY ACT OF 1980,
Monsanto Company and	)	AS AMENDED, 42 U.S.C.
Solutia, Inc.	)	SECTION 9606(a)
	)	

I. JURISDICTION AND GENERAL PROVISIONS

This Order is issued pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. § 9606(a), and delegated to the Administrator of the United States Environmental Protection Agency ("EPA") by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923, and further delegated to the Regional Administrators by EPA Delegation Nos. 14-14-A and 14-14-B, and to the Director, Superfund Division, Region 5, by Regional Delegation Nos. 14-14-A and 14-14-B.

This Order pertains to segments of Dead Creek and Site M, which are parts of a larger Superfund Site known as Sauget Area One. The Sauget Area One Site is currently the subject of a separate Administrative Order by Consent (AOC) signed by EPA and Solutia, Inc. and Monsanto Company on January 21, 1999, requiring a detailed Remedial Investigation and Feasibility Study (RI/FS) and Engineering Evaluation/Cost Assessment (EE/CA) of the Site. Dead Creek is approximately 3.5 miles long and flows southward through Sauget and Cahokia and empties into the Old Prairie du Pont Creek, which flows approximately 2,000 feet west into a branch of the Mississippi River known as the Cahokia Chute. Specifically, this Order pertains to Sauget Area One Dead Creek Segments (CS) B, C, D, E, the portion of F from Route 157 to the Terminal Railroad Association embankment to the eastern edge of the Borrow Pit Lake as depicted in Exhibit 3 attached hereto (hereinafter referred to as a "portion of F"), and the basin area located at the lift station adjacent to the levee as well as to site M, located within Sauget and Cahokia, St. Clair County, Illinois (the "Site"(see map attached as Exhibit 1)). It requires the emergency removal of contaminated sediments and soils from certain locations in and around Dead Creek. The Order also requires installation of a 40 millimeter (mil) high density polyethylene (HDPE) liner in CS-B and post removal sampling in all excavated areas. The post removal sampling results will be used in the Area One EE/CA and RI/FS processes to determine what, if any, excavated areas in addition to CS-B may require further remediation under the EE/CA process. Sediments and soils to be removed under this Order are required to be properly disposed of in a Resource Conservation and Recovery Act (RCRA)-compliant Containment Cell ("Containment Cell") located adjacent to CS-B. In addition to the requirements set forth in this Order concerning the construction, operation and maintenance of the containment cell, any necessary additional requirements associated with the long term operation and maintenance of the cell will

be considered and addressed in the EE/CA and/or RI/FS processes for the Site. This Order supplements the Unilateral Administrative Order issued on June 21, 1999, to Monsanto and Solutia requiring investigation and repair of Dead Creek culverts in the Cahokia and Sauget areas. Dead Creek segments B (and the area adjacent to CS-B upon which the Containment Cell is to be located), C, D E, a portion of F, and the basin area located at the lift station, as well as Site M comprise the "Site" for the purposes of this Order. This Order requires the Respondents to conduct removal activities described herein to abate a potential imminent and substantial endangerment to the public health, welfare or the environment that may be presented by the actual or threatened release of hazardous substances at or from the Site.

EPA has notified the State of Illinois of this action pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

This Order applies to and is binding upon Respondents and Respondents' heirs, receivers, trustees, successors and assigns. Any change in ownership or corporate status of Respondents including, but not limited to, any transfer of assets or real or personal property shall not alter such Respondents' responsibilities under this Order. Respondents are jointly and severally liable for carrying out all activities required by this Order. Compliance or noncompliance by one or more Respondent with any provision of this Order shall not excuse or justify noncompliance by any other Respondent.

Respondents shall ensure that their contractors, subcontractors, and representatives comply with this Order. Respondents shall be responsible for any noncompliance.

III. FINDINGS OF FACT

Based on available information, including the Administrative Record in this matter, EPA hereby finds that:

1. Dead Creek has historically been a repository for local area wastes. On December 21, 1928, an easement agreement between local property owners and representatives of local business, municipal and property interests was executed to "improve the drainage in that District (Dead Creek) by improving Dead Creek so as to make it suitable for the disposal of wastewater, industrial waste, seepage and storm water." Thereafter, Dead Creek systematically received direct and indirect discharges from local businesses and the municipality for many years.

2. Information on the types of wastes disposed of and the types and levels of contamination found at the Sauget Area One Site, including wastes and contamination found in Dead Creek, have been provided to EPA from various sources including, but not exclusively

from: 1) CERCLA 103 (c) Submittals; 2) CERCLA 104(e) Responses; 3) Expanded Site Investigation Dead Creek Project Sites (E&E, 1988); 4) Removal Action Plan for Dead Creek Sites (Weston-SPER, 1987); 5) Description of Current Situation at the Dead Creek Project Sites (E&E, 1986); 6) Site Investigations for Dead CS-B and Sites L and M (Geraghty & Miller, Inc. 1992); 7) Site Investigation/Feasibility Study for Creek Segment A (Advent Group, 1990); 8) Preliminary Ecological Risk Assessment for Sauget Area 1, Creek Segment F (E&E 1997); 9) EPA Removal Action Report for Site G (E&E 1994); 10) Area One Screening Site Inspection Report; and 11) Site Investigation Feasibility Study for CS-A (Avendt Group 1990).

3. Dead Creek stretches from the Alton & Southern Railroad at its northern end and flows south through Sauget and Cahokia for approximately 3.5 miles before emptying into the Old Prairie du Pont Creek, which flows approximately 2,000 feet west into a branch of the Mississippi River known as the Cahokia Chute. For sampling purposes, Dead Creek is subdivided into six separate segments labeled CS-A through CS-F. The segments are further described as follows:

CS-A is the northernmost segment of the creek and it is approximately 1,800 feet long and 100 feet wide running from the Alton & Southern Railroad to Queeny Avenue. This segment of the creek originally consisted of two holding ponds which were periodically dredged. For several years, CS-A and available downstream creek segments (e.g., ones that were not blocked off) received direct wastewater discharges from industrial sources and served as a surcharge basin for the Village of Sauget (formerly Village of Monsanto) municipal sewer collection system. When the system became backed up or overflowed, untreated wastes from industrial users of the sewer system were discharged directly into CS-A. On several occasions, CS-A was dredged and contaminated sediments were disposed of onto adjacent property (Site I of Sauget Area One Site). In 1968, the Queeny Avenue culvert, which allowed creek water to pass from CS-A to CS-B, was permanently blocked by the Village of Sauget. Remediation work was conducted by Cerro Copper in CS-A in 1990. Approximately 27,500 tons of contaminated sediments were excavated and sent to Resource Conservation and Recovery Act ("RCRA") and Toxic Substances Control Act ("TSCA") permitted facilities. CS-A is now filled and covered with crushed gravel and is not subject of this Order. Land use surround CS-A is industrial.

CS-B extends for approximately 1,800 feet from Queeny Avenue south to Judith Lane. Sites G, L, and M of the Sauget Area One Site border this creek segment. Land use surrounding CS-B is primarily commercial with a small residential area near the southern end of this segment. Agricultural land lies to the west of the creek and south of Site G. At some point after 1943, the Judith Lane culvert, which allowed creek water to pass from CS-B to CS-C, was blocked.

CS-C extends for approximately 1,300 feet from Judith Lane south to Cahokia Street. Land use is primarily residential along both sides of CS-C.

CS-D extends for approximately 1,100 feet from Cahokia Street to Jerome Lane. Land use is primarily residential along both sides of CS-D.

CS-E extends approximately 4,300 feet from Jerome Lane to the intersection of Illinois Route 3 and Route 157. Land use surrounding CS-E is predominantly commercial with some mixed residential use. Dead Creek temporarily passes through corrugated pipe at the southern end of CS-E.

CS-F is approximately 6,500 feet along and extends from Route 157 to the Old Prairie du Pont Creek. CS-F is the widest segment of Dead Creek and a large wetland area extends several hundred feet out from the both sides of the creek.

Site M: Located along the eastern side of Dead Creek CS-B (south of Site L) at the western end of Walnut Street in the Village of Cahokia. Site M was originally used as a sand borrow pit (dimensions = 220 feet by 320 feet) in the mid to late 1940's. The pit is hydraulically connected to Dead Creek through an eight-foot opening at the southwest portion of the pit. On information and belief, wastes from CS-B have in the past and potentially continue to migrate into Site M via this connection. The site is currently fenced.

4. Sediment and surface water samples collected by EPA and the Illinois Environmental Protection Agency (Illinois EPA) have detected a wide variety of organic and inorganic contaminants in each of the creek segments:

CS-B: Elevated levels of volatile organic compounds ("VOCs") and semi-volatile organic compounds ("SVOCs") were detected in sediments samples collected from CS-B such as benzene (87 parts per billion ("ppb")), toluene (810 ppb), chlorobenzene (5,200 ppb), ethylbenzene (3,600 ppb), trichlorobenzene (3,700 parts per million ("ppm")), dichlorobenzene (12,000 ppm), chloronitrobenzene (240 ppm), xylenes (540 ppm), 1,4-dichlorobenzene (220,000 ppb), 1,2-dichlorobenzene (17,000 ppb), phenanthrene (15,000 ppb), fluoranthene (11,000 ppb), pyrene (13,000 ppb). Elevated levels of PCBs exist within CS-B at levels as high as 10,000 ppm. Elevated levels of metals were also detected in sediments in CS-B including arsenic (6,000 ppm), cadmium (400 ppm), copper (44,800 ppm), lead (24,000 ppm), mercury (30 ppm), nickel (3,500 ppm), silver (100 ppm), and zinc (71,000 ppm).

Surface water samples collected from CS-B revealed elevated concentrations of VOCs such as chloroform (27 ppm), 1,1-dichloroethene (3 ppb), toluene (20 ppb), and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 1,4-dichlorobenzene, 2-methylphenol (4 ppb), 4-methylphenol (35 ppb), 2,4-dichlorophenol (150 ppb), naphthalene (8 ppb), 3-nitroaniline (9 ppb), and pentachlorophenol (120 ppb). Pesticides were also detected in surface water samples including dieldrin (.18 ppb), 4,4-DDT (.24 ppb), 2,4-D (47 ppb) and silvex (3.4 ppb). An elevated level of PCBs (aroclor 1260) was also detected in the surface water of CS-B at a level of 44 ppb. Elevated levels of metals were detected in surface water such as

aluminum (9,080 ppb), barium (7,130 ppb), arsenic (31 ppb), cadmium (25 ppb), chromium (99 ppb), copper (17,900 ppb), lead (1,300 ppb), mercury (8.6 ppb), nickel (1,500 ppb), and zinc (10,300 ppb).

CS-C: Elevated levels of VOCs and SVOCs were detected in sediments in this segment of Dead Creek including fluoranthene (4,600 ppb), pyrene (4,500 ppb), benzo(a)anthracene (3,300 ppb), chrysene (4,400 ppb), benzo(b)fluoranthene (7,500 ppb), benzo(a)pyrene (4,500 ppb), indeno(1,2,3-cd pyrene (4,300 ppb), benzo(g,h,l) perylene (1,500 ppb), dibenzo(a,h)anthracene (4,000 ppb), and 4-methyl-2-pentanone (1,200 ppb). PCBs (total) were also detected in sediments from CS-C at a maximum concentration of 27,500 ppb. Sediment samples also revealed elevated levels of metals such as copper (17,200 ppm), lead (1,300 ppm), nickel (2,300 ppm), zinc (21,000 ppm) and mercury (2.81 ppm)

Surface water samples collected from creek segment CS-C revealed elevated levels of metals such as lead (710 ppb), mercury (1.9 ppb), and nickel (83 ppb).

CS-D: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-D including 4-methyl-2-pentanone (1,200 ppb), benzo(b)fluoranthene (500 ppb), indeno(1,2,3-cd)pyrene (310 ppb), and dibenzo(a,h)anthracene (360 ppb). PCBs (total) were detected in sediments at a maximum concentration of 2,000 ppb. Elevated concentrations of metals were also detected such as cadmium (42 ppm), copper (1,630 ppm), lead (480 ppm), mercury (1 ppm), and zinc (6,590 ppm).

Surface water samples collected from CS-D revealed elevated concentrations of metals such as cadmium (8.1 ppb), lead (89 ppb), and nickel (189 ppb).

CS-E: Elevated concentrations of VOCs and SVOCs were detected in sediment samples collected from CS-E including chlorobenzene (120 ppb), pyrene (5,300 ppb), benzo(b)fluoranthene (2,400 ppb), and chrysene (2,800 ppb). Elevated levels of PCBs (total) were also detected at a maximum concentration of 59,926 ppb. Elevated levels of metals were also detected in the sediments of CS-E including cadmium (23.1 ppm), copper (8,540 ppm), lead (1,270 ppm), mercury (1.53 ppm), nickel (2,130 ppm), and zinc (9,970 ppm).

CS-F: Elevated concentrations of VOCs and SVOCs were detected in the sediments of CS-F such as toluene (29 ppb), 4-methylphenol (1,100 ppb), fluoranthene (310 ppb), and pyrene (340 ppb). Pesticides were also detected in the sediments such as 4,4-DDE (97 ppb), endrin (66 ppb), endosulfan II (203 ppb), and methoxychlor (8 ppb). PCBs (total) were also detected in sediments at a maximum concentration of 5,348 ppb. Elevated levels of metals were also detected in the sediments such as arsenic (276 ppm), lead (199 ppm), mercury (.55 ppm), cadmium (23.5 ppm), copper (520 ppm) nickel (772 ppm) and zinc (4,520 ppm). Elevated concentrations of dioxins were also detected in sediments in CS-F at a maximum concentration of 211 picograms per gram.

Site M: Originally constructed as a sand borrow pit in the mid to late 1940's, this pit is approximately 59,200 square feet in size and previous investigations indicate that approximately 3,600 cubic yards of contaminated sediments are contained within the pit. It is estimated that the pit is approximately 14 feet deep and it is probable that there is a hydraulic connection between this pit water and the underlying groundwater. Surface water samples collected from Site M revealed elevated levels of VOCs such as chloroform (27 ppb), toluene (19 ppb) and chlorobenzene (33 ppb). SVOCs detected in surface water included phenol (28 ppb), 2-chlorophenol (14 ppb), 2,4-dimethyl phenol (13 ppb), 2,4-dichlorophenol (150 ppb), and pentachlorophenol (120 ppb). Pesticides detected in surface water include dieldrin (0.18 ppb), endosulfan II (.06 ppb), 4,4-DDT (0.24 ppb), 2,4-D (47 ppb) and 2,4,5-TP (Silvex) (3.4 ppb). PCBs were also detected in surface water at a maximum level of 0.0044 ppb.

Sediment samples collected from Site M revealed elevated levels of VOCs such as 2-butanone (14,000 ppb), chlorobenzene (10 ppb) and ethyl benzene (0.82 ppb). SVOCs detected in sediments included 1,4-dichlorobenzene (40 ppm), 1,2-dichlorobenzene (26 ppm), 1,2,4-trichlorobenzene (14 ppm), pyrene (27 ppm), fluoranthene (21 ppm), chrysene (12 ppm), and benzo(b)fluoranthene (15 ppm). Total PCB levels were detected as high as 1,100 ppm. Elevated levels of metals were also detected in sediments at Site M, including antimony (41.2 ppm), barium (9,060 ppm), cadmium (47.2 ppm), copper (21,000 ppm), nickel (2,490 ppm), silver (26 ppm), zinc (31,600 ppm), lead (1,910 ppm), arsenic (94 ppm) and cyanide (1.3 ppm).

5. On information and belief, parties which generated wastes which were disposed of, released into and/or transported wastes to the Sauget Area One Site (including parties whose wastes migrated from various disposal areas into other Sites or segments of Dead Creek) include but are not limited to the following:

CS-A: Monsanto Company/Solutia, Incorporated; Cerro Copper Products Company; Amax Zinc Corporation; Mobil Oil Corporation; Ethyl Petroleum; Rogers Cartage; Sterling Steel Casting Co.; Darling Fertilizer, the Village of Sauget; Cardinal Construction Company; and Olin Corporation. CS-B: Monsanto Company/Solutia, Incorporated; Midwest Rubber Reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman; Cerro Copper Products Company; Mobil Oil Corporation; Rogers Cartage Co.; Sterling Steel Casting Co.; Darling Fertilizer; Ruan Transportation Corporation; and Waggoner & Company; Industrial Salvage Disposal, Inc.; Sauget and Company; Paul Sauget; and Olin Corporation.

CS-C, D, E, OR F: Monsanto Company/Solutia, Incorporated; Cerro Copper Products Company; Mobil Oil Company; Amax Zinc Corporation; Midwest Rubber reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman; Ruan Transportation Corporation; Rogers Cartage Co.; Sterling Steel Casting Co.; Darling Fertilizer; and Waggoner & Company; Industrial Disposal, Inc.; Sauget and Company; and Paul Sauget.

Site M: Monsanto Corporation/Solutia, Incorporated; Waggoner & Company; and Ruan Transportation; Mobil Oil Corporation; Cerro Copper Products, Inc.; Midwest Rubber Reclaiming (Division of Empire Chemical Incorporated) and Midwest Rubber Trustees Stanley Keitman, Richard M. Cohen, and Morris Weissman.

6. On January 21, 1999, EPA, Solutia and Monsanto entered into to an AOC pursuant to CERCLA Sections 104, 107 and 122 to conduct an RI/FS and EE/CA to investigate the nature and extent of contamination at the Sauget Area One site and develop and evaluate potential remedial alternatives. Work under that AOC is currently on-going.

7. Several of the culverts on Dead Creek are inadequately sized, blocked or partially blocked with debris and thereby cause storm water in Dead Creek to back up behind these culverts and, at times, overflow into surrounding residential areas.

8. Dead Creek and the areas surrounding the Creek are located within an area known as the American Bottoms which is the flood plain for the Mississippi River. The water table in this area is very close to the ground surface and during storm events the soils quickly become saturated. During these same storm events, water backing up behind blocked or inadequately sized culverts in Dead Creek overflows and increases the severity of flooding conditions for nearby residents in Sauget and Cahokia. Contaminants, including hazardous substances, in surface water, sediments, and surrounding soils may migrate via the overflow and flood waters onto the properties of neighboring residents.

9. In the summer of 1999, Solutia undertook a hydraulic study of the flooding problems related to Dead Creek. That study concluded that removal of sediments and debris from blocked and inadequately sized culverts would not provide a long term reduction of Dead Creek's flooding of residential areas and the associated risks from the migration of contaminated sediments.

10. Dead Creek sediments and soils are the major potential source of contamination in Dead Creek flood waters. Contaminated creek sediments and soils must be removed as soon as possible to eliminate the imminent and substantial threat of exposure to the contamination via direct contact by nearby residents and via flooding from Dead Creek. Preliminary ecological assessment data also indicates significant damage to aquatic organisms in Dead Creek.

11. The removal action required under this Order is consistent with the remedial action to be taken pursuant to the January 21, 1999, RI/FS AOC.

IV. CONCLUSIONS OF LAW AND DETERMINATIONS

Based on the Findings of Fact set forth above, and the Administrative Record supporting these removal actions, EPA determines that:

1. Dead Creek and the impacted areas adjacent to Dead Creek is a "facility" as defined by Section 101(9) Of CERCLA, 42 U.S.C. § 9601(9).

2. The substances described in Section III, paragraph 4 are "hazardous substances" as defined by Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

3. Each Respondent is a "person" as defined by Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

4. A title search conducted by Solutia, Inc. in February, 1999, found no records indicating that title to Dead Creek had ever been deeded.

5. The conditions described in the Findings of Fact above constitute an actual or threatened "release" of a hazardous substance from the facility into the "environment" as defined by Sections 101(8) and (22) of CERCLA, 42 U.S.C. §§ 9601(8) and (22).

6. The conditions present at the Site constitute an imminent and substantial threat to public health, welfare, or the environment based upon the factors set forth in Section 300.415(b)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan, as amended ("NCP"), 40 C.F.R. § 300.415(b)(2). These factors include, but are not limited to, the following:

   A) Actual or potential exposure to hazardous substances or pollutants or contaminants by nearby populations or the food chain.

   This condition exists at the Site due to the high levels of organic and inorganic contaminants found in the sediments and surface water of Dead Creek which is located in close proximity to local populations and could potentially be released into residential areas via flood waters caused by the shallow water table in the area and the presence of blocked or inadequately sized culverts. Some of the contaminants in Dead Creek are known carcinogens or suspect carcinogens. Contaminants present in Dead Creek and potentially migrating from Dead Creek via overflow and flood waters to nearby residential areas are accessible to humans, specifically the residents and children who live and play on these potentially affected properties. These individuals could potentially be exposed to the contamination by direct skin contact with the sediments, soils and surface water in or released from Dead Creek.

   B) Weather conditions that may cause hazardous substances or pollutants to migrate or be released.

   This factor is present at the Site due to the fact that high levels of organic and inorganic contaminants are located within the sediments, certain adjacent soils and surface waters of Dead Creek. This area of St. Clair County is particularly prone to flooding due to a very shallow groundwater table. Storm water backing up behind culverts exacerbates the flooding conditions in this area.

C) Availability of other appropriate federal or state response mechanisms to respond to the release.

The Illinois EPA currently does not have the available funds to respond to this time-critical situation. In addition, EPA is in the lead agency for enforcement actions related to the Sauget Area One Site.

7. The actual or threatened release of hazardous substances from the Site may present an imminent and substantial endangerment to the public health, welfare, or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

8. The removal actions required by this Order are necessary to protect the public health, welfare, or the environment, and are not inconsistent with the NCP and CERCLA.

V. ORDER

Based upon the foregoing Findings of Fact, Conclusions of Law, Determinations, and the Administrative Record for this Site, EPA hereby orders that Respondents perform the following actions:

1. Notice of Intent to Comply

Respondents shall notify in writing within three (3) business days after the effective date of this Order of Respondents' irrevocable intent to comply with this Order. Failure of each Respondent to provide such notification within this time period shall be a violation of this Order.

2. Designation of Contractor, Project Coordinator, and On-Scene Coordinator

Respondents shall perform the removal actions themselves or retain contractors to implement the removal actions. Respondents shall notify EPA of Respondents' qualifications or the name and qualifications of such contractors, whichever is applicable, within five (5) business days of the effective date of this Order. Respondents shall also notify EPA of the name and qualifications of any other contractors or subcontractors retained to perform work under this Order at least five (5) business days prior to commencement of such work. EPA retains the right to disapprove of the Respondents or any of the contractors and/or subcontractors retained by the Respondents. If EPA disapproves a selected contractor, Respondents shall retain a different contractor within two (2) business days following EPA's disapproval and shall notify EPA of that contractor's name and qualifications within three (3) business days of EPA's disapproval.

Within five (5) business days after the effective date of this Order, the Respondents shall designate a Project Coordinator who shall be responsible for administration of all the Respondents' actions required by the Order and submit the designated coordinator's name, address, telephone number, and qualifications to EPA. To the greatest extent possible, the Project Coordinator shall be present on-site or readily available during site work. EPA retains the right to disapprove of any Project Coordinator named by the Respondents. If EPA disapproves a selected Project Coordinator, Respondents shall retain a different Project Coordinator within three (3) business days following EPA's disapproval and shall notify EPA of that person's name and qualifications within four (4) business days of EPA's disapproval. Receipt by Respondents' Project Coordinator of any notice or communication from EPA relating to this Order shall constitute receipt by all Respondents.

The EPA has designated Kevin Turner of the Emergency Response Branch, Region 5, as its On-Scene Coordinator ("OSC"). Respondents shall direct all submissions required by this Order to the OSC at 8588 Rt. 148, Marion, Illinois 62959, by certified or express mail. Respondents shall also send a copy of all submissions to Thomas Martin, Associate Regional Counsel, 77 West Jackson Boulevard (C-14J), Chicago, Illinois 60604-3590. All Respondents are encouraged to make their submissions to EPA on recycled paper (which includes significant post-consumer waste paper content where possible) and using two-sided copies.

3. Work to be Performed

Respondents shall perform, at a minimum, the following response activities:

A) Prepare a Time Critical Removal Action Work Plan (also referred to herein as "Work Plan") and implement the Removal Action in accordance with the Work Plan to mitigate the threats posed by presence of contamination in Dead Creek sediments and certain adjacent soils and their potential migration via overflow and flood waters from the Site, as described in Section III, "Findings of Fact" of this Order. As more specifically described below, this Work Plan shall provide for: 1) the removal of materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, E, a portion of F (non-native creek sediments only); the basin area at the lift station; and Site M (pond sediments and pond bottom soils) in Sauget Area One, while minimizing adverse impacts to area wetlands and habitat; 2) the proper handling, dewatering, treatment and placement of such materials in the on-site Containment Cell; 3) a plan for management of Dead Creek storm water; 4) the sampling and analysis of areas where materials has been removed, for the purpose of defining remaining contamination; 5) the placement of membrane liner material over CS-B and in all other excavated areas where, based on post removal sample results, such liner is determined to be necessary; and 6) a design for the Containment Cell which will provide adequate protection to human health and the environment.

B) Respondents' Work Plan shall describe the implementation of the following actions, including associated implementation schedules:

1. Sediment and Soils Removal Requirements

Respondents shall remove materials from CS-B (creek sediments, creek bed soils and flood plain soils); CS-C, D, E, a portion of F (creek sediments only); the basin area located at the lift station; and Site M (pond sediments and pond bottom pond soils) in Sauget Area One from Dead Creek and adjacent areas (collectively referred to as "materials") for disposal in the on-site Containment Cell. Such removal shall begin as soon as possible but no later than six months after the date of this Order. For the purposes of this Order, the approximate volumes of materials (both sediments and soils) to be removed and disposed of in the Cell are as follows:

CS-B and Site M contain an estimated volume of 25,500 cubic yards (cy) of metals and organic-containing sediment and soil:

CS-B sediment	2000ft L x 50 ft W x 2 ft D = 7,400 cy
CS-B creek bed soil	2000 ft L x 50 ft W x 1 ft D = 3,700 cy
CS-B flood plain soil	2000ft L x 100 ft W x 1 ft D = 7,400 cy
Site M sediment	64,000 sq ft x 1.6 ft = 3,500 cy
Site M pond bottom soil	64,000 sq ft x 1 ft = 3,500 cy
	Total = 25,500 cy

CS-C, D, E, a portion of F, and the basin area located at the lift station contain an estimated volume of 29,400 cubic yards of metal and organic-containing sediment:

CS-C sediment	1400ft L x 50 ft W x 2 ft D = 5,200 cy
CS-D sediment	1200ft L x 50 ft W x 2 ft D = 4,400 cy
CS-E sediment	4000ft L x 50 ft W x 2 ft D = 14,800 cy
Portion of CS-F sediment, and basin area at lift station	=5,000 cy
	Total = 29,400cy

The estimated volume of sediment and/or soil in CS-B and Site M is 25,500 cubic yards and CS-C, D, E, a portion of F, and the basin area located at the lift station contain an estimated volume of 29,400 cubic yards of sediment, a total of 54,900 cubic yards impacted sediment and soil. The above volumetric estimate for CS-B includes removal of one foot of creek bed soils and flood plain soils in addition to the sediments in CS-B. The estimate for Site M includes one foot of pond bottom soils in addition to the sediments. Only sediments are to be removed from CS-C, D, E, a portion of F, and the basin area located at the lift station. In implementing such removal in CS-C, D, E, a portion of F, and the basin area located at the lift station, "sediments" shall be defined in accordance with the following criteria and procedure:

a. Four objective criteria shall be used to identify "sediment" subject to removal, as follows: criteria (i)-(iii) shall be employed to make the determination in the first instance; if application of these criteria are not determinant, then criteria (iv) shall be used. The OSC shall have the authority to require the use of criteria (iv) at any time during the project. However, in any case, criteria (iv) shall be employed every 200 feet as a control on the application of criteria (i)-(iii).

b. The four criteria:

(i) Origin – non-native vs. native sediments

(ii) Stratigraphy – sediments/soil boundary

(iii) Color – sediment color versus creek bottom soil color

(iv) Physical Characteristics

* Unconfined compressive strength less than 500 pounds per square foot (psf)
* Torvane shear strength less than 200 pounds psf
* Moisture content greater than the liquid limit.
* Moisture content greater than 60 percent

2. Materials Handling, Dewatering, And Treatment Requirements

Once materials are removed from in and around CS-B, and from in CS-C, D, E, a portion of F, the basin area located at the lift station and Site M, Respondents shall, as necessary, dewater such materials, using one or more of the following dewatering methods:

* In-Situ Gravity Dewatering
* In-Situ Solidification
* On-Site Gravity Dewatering
* On-Site Solidification

At a minimum, dewatered materials shall pass the Paint Filter Test (as set out in 35 Illinois Administrative Code (IAC) § 724.414(c)) in the Containment Cell. A solidifying agent (meeting the requirements of 35 IAC § 724.414(e)) shall be added, if necessary, during compaction of the sediments in the Containment Cell in order to pass the Paint Filter Test.

3. Storm Water Management Requirements

During the project, Respondents shall divert storm water around CS-B work areas using temporary berms, sheet piling or similar diversion structures, or storm water may be pumped around these

work areas and discharged downstream. Runoff from disturbed work areas shall be routed to a gravel and sand filter dam at the downstream end of CS-B and then discharged downstream.

During the project, Respondents shall hydraulically isolate Site M from Dead Creek by closing the opening between CS-B and the southwestern corner of Site M using compacted soil, sheet pile or other suitable method. Impounded water shall be routed to a gravel and sand filter dam at the downstream end of CS-B and then discharged downstream.

4. Excavated Area Soil Sampling

After the sediment and soils removal has taken place, Respondents shall collect soil samples from, at a minimum, all excavated areas of CS-B, C, D, E, a portion of F, and the basin area located at the lift station at 100 ft. intervals (to be referred to as "transects"), starting at the upstream end of the channel at Queeny Road and terminating near the downstream end of the channel at Route 3. Each creek transect, and sample location, shall be identified and numbered for reference purposes. Sampling at each creek transect shall occur at a frequency of no less than 3 samples per transect. Of the 3 samples, one shall be located at the transect center line and the other two shall be located equidistant to the center and the edge of the excavation area. Due to the fact that soils leaching to groundwater is the primary concern, bottom soil samples shall be extracted using TCLP and analyzed for Total Compound List/Total Analyte List (TCL/TAL) parameters and dioxin/furans.

Soil samples shall be collected from the bottom of Site M at 100 ft. grid intervals covering the entire excavated area. Pond bottom soils will be extracted using the TCLP and analyzed for TCL/TAL parameters and dioxin/furans.

5. Excavated Areas Bottom Liner Requirements

After excavation and sampling, Respondents shall properly install and maintain a 40 mil, HDPE liner in CS-B of Dead Creek. A liner shall be installed in other excavated areas of Site M and CS-C, D, E, a portion of F, and the basin area located at the lift station, as determined to be necessary based on post-excavation sampling to isolate impacted soils from surface water. An overflow structure shall be installed to allow accumulated rainwater to discharge into CS-B.

6. Containment Cell Design Report Requirement

Respondents' Work Plan shall include a Containment Cell Design Report for the on-site cell. Such Design Report, upon approval, shall become an enforceable part of this Order. The Design Report shall address applicable requirements of 35 IAC § 724.401, including, at a minimum, the following:

* Above grade construction
* Construction on a 3 ft. thick, permeable capillary barrier drain sloped to a collection sump
* Water from the capillary barrier drain collection sump shall be discharged to the American Bottoms Publicly Owned Treatment Works (POTW)

* Installation of a Bentomat layer on top of the capillary barrier drain
* Double-lined cell
* 60 mil HDPE primary membrane
* 60 mil HDPE secondary membrane
* Sand and/or gravel leachate collection system above primary liner
* Leachate shall be treated, if necessary, and discharged to the American Bottoms POTW
* Geosynthetic leak detection system above secondary liner
* Groundwater monitoring program in compliance with the requirements set forth at 35 IAC § 724, Subpart F and 40 C.F.R. Part 264, Subpart F. Such program shall also monitor to establish background levels and detect potential leachate migration for, at a minimum, TCL/TAL parameters
* Storm water downchutes off cap designed to handle 25 year, 24 hour storm
* Slopes designed to resist failure and erosion as flood waters recede
* Gravel or equivalent armoring of potentially flooded slopes
* Gravel or equivalent cover to resist floating and erosion during flooding
* Air venting to prevent cell floating during flooding
* Cell design and air venting to prevent polychlorinated biphenol (PCB) releases into the air by way of dust, fumes or via hot weather vapors
* Construction in accordance with the Construction Quality Assurance Program requirements found at 35 IAC § 724.119, to the extent practicable.

In addition to including the requirements listed above, the Design Report shall, at a minimum, address the RCRA minimum technology requirements set forth in Exhibit 2, attached to this Order.

C) Mitigation Plan

Sixty days after the completion of the sediment and soils removal activities required by this Order, Respondents shall submit to EPA a Mitigation Plan which contains a detailed statement describing the steps Respondents have taken and are taking to ensure that the actions required by this Order are implemented in such a way as to avoid and/or minimize adverse impacts to area wetlands and habitat. Respondents' Mitigation Plan shall also provide for the replacement of all habitat and wetlands unavoidably lost in the implementation of the project. Specifically, Respondents' Mitigation Plan shall provide an accounting of all wetlands and habitat adversely affected by the project and the specific actions Respondents will take, and an associated schedule, to provide replacement of the value and function associated with such lost wetlands and habitat. The Mitigation Plan shall also include a plan for investigating any potential "hot spots" of contamination found in the Borrow Pit Lake located directly west of Creek Segment F. This "hot spot" investigation plan shall also provide for the remediation of those sediments in the Borrow Pit Lake that are found to be acting as a source to further risk to human health and the environment.

D) Operations and Maintenance Plan

Sixty days after the completion of the construction of the on-site Containment Cell, Respondents shall submit to EPA an Operation and Maintenance Plan for the Cell complying with the requirements set forth in 40 C.F.R. § 761.75(b)(8) and 40 C.F.R. § 264.303. In addition, such operation plan shall specify the following minimum Containment Cell waste acceptance criteria:

* Metal and organic containing sediments, creek bottom soil and flood plain soil from Area One only shall be placed in the Containment Cell.

* No liquids or incompatible wastes shall be placed in the Containment Cell.

* Material placed in the Containment Cell shall pass the Paint Filter Test.

* One sample shall be collected for every 5,000 cubic yards of material place in the Cell and analyzed for TCL/TAL parameters and dioxin/furans to characterize the material placed in the Containment Cell.

Respondents' Containment Cell Operation and Maintenance Plan shall include provisions for record keeping and closure/post-closure procedures for the Cell complying with the requirements set forth at 40 C.F.R. § 264.309 and § 264.310.

Respondents' Containment Cell Operation and Maintenance Plan shall include Groundwater Monitoring and Corrective Action Program Plans for the cell that comply with the requirements of 35 IAC § 724, Subpart F, and 40 C.F.R. Part 264, Subpart F.

3.1 Work Plan and Implementation

Within fifteen (15) business days after the effective date of this Order, the Respondents shall submit to EPA for approval a draft Time Critical Removal Action Work Plan for performing the removal activities set forth in Subsections V.3.B) 1., 2., 3., 4., 5. and 6. above. The draft Work Plan shall provide a description of, and an expeditious schedule for, the activities required by the above subsections.

EPA may approve, disapprove, require revisions to, or modify the draft Work Plan. If EPA requires revisions, Respondents shall submit a revised draft Work Plan within seven (7) business days of notification. Respondents shall implement the Work Plan as finally approved in writing by EPA in accordance with the schedule approved by EPA. Once approved, or approved with modifications, the Work Plan, the schedule, and any subsequent modifications shall be fully enforceable under this Order. Respondents shall notify EPA at least 48 hours prior to performing any on-site work pursuant to the EPA approved Work Plan.

Respondents shall not commence or undertake any removal actions at the Site without prior EPA approval.

3.2 Health and Safety Plan

Within fifteen (15) calendar days after approval of the Work Plan required by Section V.3.B) of this Order, the Respondents shall submit a Health and Safety Plan for EPA review and comment that ensures the protection of the public health and safety during performance of on-site work under this Order. This Plan shall comply with applicable Occupational Safety and Health Administration regulations found at 29 C.F.R. Part 1910. This Plan shall also include a description of Department of Transportation (DOT) requirements to be used for the disruption of vehicular traffic as a result of this action. If EPA determines it is appropriate, the Plan shall also include contingency planning. Respondents shall incorporate all changes to the plan recommended by EPA, and implement the Plan during the pendency of the removal action.

3.3 Quality Assurance and Sampling

All sampling and analyses performed pursuant to this Order shall conform to EPA direction, approval, and guidance regarding sampling, quality assurance/quality control ("QA/QC"), data validation, and chain of custody procedures. Respondents shall ensure that the laboratory used to perform the analyses participates in a QA/QC program that complies with EPA guidance. Upon request by EPA, Respondents shall have such a laboratory analyze samples submitted by EPA for quality assurance monitoring. Respondents shall provide to EPA the quality assurance/quality control procedures followed by all sampling teams and laboratories performing data collection and/or analysis.

Upon request by EPA, Respondents shall allow EPA or its authorized representatives to take split and/or duplicate samples of any samples collected by Respondents or their contractors or agents while performing work under this Order. Respondents shall notify EPA not less than three (3) business days in advance of any sample collection activity. EPA shall have the right to take any additional samples that it deems necessary.

3.4 Reporting

Respondents shall submit a monthly written progress report to EPA concerning activities undertaken pursuant to this Order, beginning thirty (30) calendar days after the date of EPA's approval of the Work Plan, until termination of this Order, unless otherwise directed by the OSC. These reports shall describe all significant developments during the preceding period, including the work performed and any problems encountered, analytical data received during the reporting period, and developments anticipated during the next reporting period, including a schedule of work to be performed, anticipated problems, and planned resolutions of past or anticipated problems.

Any Respondent that owns any portion of the Site, and any successor in title shall, at least thirty (30) days prior to the conveyance of any interest in real property at the Site, give written notice of this Order to the transferee and written notice of the proposed conveyance to EPA and the State.

The notice to EPA and the State shall include the name and address of the transferee. The party conveying such an interest shall require that the transferee will provide access as described in Section V.4. (Access to Property and Information).

3.5 Final Report

Within sixty (60) calendar days after completion of all removal actions required under this Order, including completion of the Containment Cell and the disposal of the materials subject to this Order in the Cell, the Respondents shall submit for EPA review a Final Report summarizing the actions taken to comply with this Order. The Final Report shall conform to the requirements set forth in Section 40 C.F.R. § 300.165. The Final Report shall also include a good faith estimate of total costs incurred in complying with the Order, a listing of quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits).

The Final Report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

Under penalty of law, I certify that, to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of this report, the information submitted is true, accurate, and complete.

4. Access to Property and Information

Respondents shall provide or obtain access as necessary to the Site and all appropriate off-site areas, and shall provide access to all records and documentation related to the conditions at the Site and the activities conducted pursuant to this Order. Such access shall be provided to EPA employees, contractors, agents, consultants, designees, representatives, and State of Illinois representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct activities which EPA determines to be necessary. Respondents shall submit to EPA, upon request, the results of all sampling or tests and all other data generated by Respondents or their contractors, or on the Respondents' behalf during implementation of this Order. Respondents shall make all required notifications and obtain all necessary permits from the State and local DOT offices for conducting working within public roadways.

Where work under this Order is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall obtain all necessary access agreements within fourteen (14) calendar days after the effective date of this Order, or as otherwise specified in writing by the OSC. Respondents shall immediately notify EPA if, after using their best efforts, they are unable to obtain such agreements. Respondents shall describe in writing their efforts to obtain access. EPA may then assist Respondents in gaining access, to the extent necessary to effectuate the response activities described herein, using such means as EPA deems appropriate.

5. Record Retention, Documentation, Availability of Information

Respondents shall preserve all documents and information, in their possession or in the possession of their contractors, subcontractors or representatives, relating to the work performed under this Order, or relating to the hazardous substances found on or released from the Site, for six years following completion of the removal actions required by this Order. At the end of this six year period and at least sixty (60) days before any document or information is destroyed, Respondents shall notify EPA that such documents and information are available to EPA for inspection, and upon request, shall provide the originals or copies of such documents and information to EPA. In addition, Respondents shall provide document and information retained under this Section at any time before expiration of the six year period at the written request of EPA.

6. Off-Site Shipments

All hazardous substances, pollutants or contaminants removed off-site pursuant to this Order for treatment, storage or disposal shall be treated, stored, or disposed of at a facility in compliance as determined by EPA, with the EPA Off-Site Rule, 40 C.F.R. § 300.440.

7. Compliance With Other Laws

All actions required pursuant to this Order shall be performed in accordance with all applicable local, state, and federal laws and regulations except as provided in CERCLA Section 121(e) and 40 C.F.R. § 300.415(I). In accordance with 40 C.F.R. § 300.415(I), all on-site actions required pursuant to this Order shall, to the extent practicable, as determined by EPA, considering the exigencies of the situation, attain applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws. EPA has determined that creek segments B, C, D, E, a portion of F, the basin area located at the lift station, and Site M along with the proposed TSCA cell are within the same Area of Concern (AOC) and therefore the consolidation of waste material within the cell, as described in this Order, does not invoke any of the Land Disposal Restrictions (LDRs) under RCRA.

8. Emergency Response and Notification of Releases

If any incident, or change in Site conditions, during the activities conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Site (including the Containment Cell) or an endangerment to the public health, welfare, or the environment, the Respondents shall immediately take all appropriate action to prevent, abate or minimize such release, or endangerment caused or threatened by the release. Respondents shall also immediately notify the OSC or, in the event of his/her unavailability, shall notify the Regional Duty Officer, Emergency Response Branch, Region 5 at (312) 353-2318, of the incident or Site conditions.

Respondents shall submit a written report to EPA within seven (7) business days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release

or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. Respondents shall also comply with any other notification requirements, including those in CERCLA Section 103, 42 U.S.C. § 9603, and Section 304 of the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. § 11004.

VI. AUTHORITY OF THE EPA ON-SCENE COORDINATOR

The OSC shall be responsible for overseeing the implementation of this Order. The OSC shall have the authority vested in an OSC by the NCP, including the authority to halt, conduct, or direct any work required by this Order, or to direct any other response action undertaken by EPA or Respondents at the Site. Absence of the OSC from the Site shall not be cause for stoppage of work unless specifically directed by the OSC.

EPA and Respondents shall have the right to change their designated OSC or Project Coordinator. EPA shall notify the Respondents, and Respondents shall notify EPA, as early as possible before such a change is made, but in no case less than 24 hours before such a change. Notification may initially be made orally, but shall be followed promptly by written notice.

VII. PENALTIES FOR NONCOMPLIANCE

Violation of any provision of this Order may subject Respondents to civil penalties of up to $27,500 per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1). Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such violation, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Should Respondents violate this Order or any portion hereof, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

VIII. REIMBURSEMENT OF COSTS

Respondents shall reimburse EPA, upon written demand, for all response costs incurred by the United States in overseeing Respondents' implementation of the requirements of this Order.

EPA may submit to Respondents on a periodic basis a bill for all response costs incurred by the United States with respect to this Order. EPA's Itemized Cost Summary, or such other summary as certified by EPA, shall serve as the basis for payment.

Respondents shall, within (30) days of receipt of the bill, remit a cashier's or certified check for the amount of those costs made payable to the "Hazardous Substance Superfund," to the following address:

U.S. Environmental Protection Agency
Superfund Accounting
P.O. Box 70753
Chicago, IL 60673

Respondents shall simultaneously transmit a copy of the check to the Director, Superfund Division, U.S. EPA Region 5, 77 West Jackson Blvd., Chicago, Illinois 60604-3590. Payments shall be designated as "Response Costs – Sauget Area One Dead Creek Sediment Removal" and shall reference the payers' names and addresses, the EPA Site Identification Number (054V), and the docket number of this Order. Interest at a rate established by the Department of the Treasury pursuant to 31 U.S.C. § 3717 and 40 C.F.R. § 102.13 shall begin to accrue on the unpaid balance from the day after the expiration of the 30 day period notwithstanding any dispute or an objection to any portion of the costs.

IX. RESERVATION OF RIGHTS

Nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Order. EPA also reserves the right to take any other legal or equitable action as it deems appropriate and necessary, or to require the Respondents in the future to perform additional activities pursuant to CERCLA or any other applicable law.

X. OTHER CLAIMS

By issuance of this Order, the United States and EPA assume no liability for injuries or damages to persons or property resulting from any acts or omissions of Respondents. The United States or EPA shall not be a party or be held out as a party to any contract entered into by the Respondents or their directors, officers, employees, agents, successors, representatives, assigns, contractors, or consultants in carrying out activities pursuant to this Order.

This Order does not constitute a pre-authorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

Nothing in this Order constitutes a satisfaction of or release from any claim or cause of action against the Respondents or any person not a party to this Order, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106(a) or 107(a) of CERCLA, 42 U.S.C. §§ 9606(a) or 9607(a).

XI. MODIFICATIONS

Modifications to any plan or schedule may be made in writing by the OSC or at the OSC's oral direction. If the OSC makes an oral modification, it will be memorialized in writing within seven (7) business days; however, the effective date of the modification shall be the date of the OSC's oral direction. The rest of the Order, or any other portion of the Order, may only be modified in writing by signature of the Director, Superfund Division, Region 5.

If Respondents seek permission to deviate from any approved plan or schedule, Respondents' Project Coordinator shall submit a written request to EPA for approval outlining the proposed modification and its basis.

No information advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve Respondents or their obligations to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XII. NOTICE OF COMPLETION

After submission of the Final Report, Respondents may request that EPA provide a Notice of Completion of the work required by this Order. If EPA determines, after EPA's review of the Final Report, that all work has been fully performed in accordance with this Order, except for certain continuing obligations required by this Order (e.g., record retention), EPA will provide written notice to the Respondents. If EPA determines that any removal activities have not been completed in accordance with this Order, EPA will notify the Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan to correct such deficiencies. The Respondents shall implement the modified and approved Work Plan and shall submit a modified Final Report in accordance with the EPA notice. Failure to implement the approved modified Work Plan shall be a violation of this Order.

XIII. ACCESS TO ADMINISTRATIVE RECORD

The Administrative Record supporting these removal actions is available for review during normal business hours in the EPA Record Center, Region 5, 77 W. Jackson Blvd., Seventh Floor, Chicago, Illinois. Respondents may contact Thomas Martin, Associate Regional Counsel, at (312) 886-4273 to arrange to review the Administrative Record. An index of the Administrative Record is attached to this Order as Exhibit 3.

XIV. OPPORTUNITY TO CONFER

Within three (3) business days after issuance of this Order, Respondents may request a conference with EPA. Any such conference shall be held within five (5) business days from the date of the

request, unless extended by agreement of the parties. At any conference held pursuant to the request, Respondents may appear in person or be represented by an attorney or other representative.

If a conference is held, Respondents may present any information, arguments or comments regarding this Order. Regardless of whether a conference is held, Respondents may submit any information, arguments or comments (including justifications for any assertions that the Order should be withdrawn against a Respondent), in writing to EPA within two (2) business days following the conference, or within seven (7) business days of issuance of the Order if no conference is requested. This conference is not an evidentiary hearing, does not constitute a proceeding to challenge this Order, and does not give Respondents a right to seek review of this Order. Requests for a conference shall be directed to Thomas Martin, Associate Regional Counsel, at (312) 886-4273. Written submittals shall be directed as specified in Section V.2 of this Order.

XV. SEVERABILITY

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

XVI. EFFECTIVE DATE

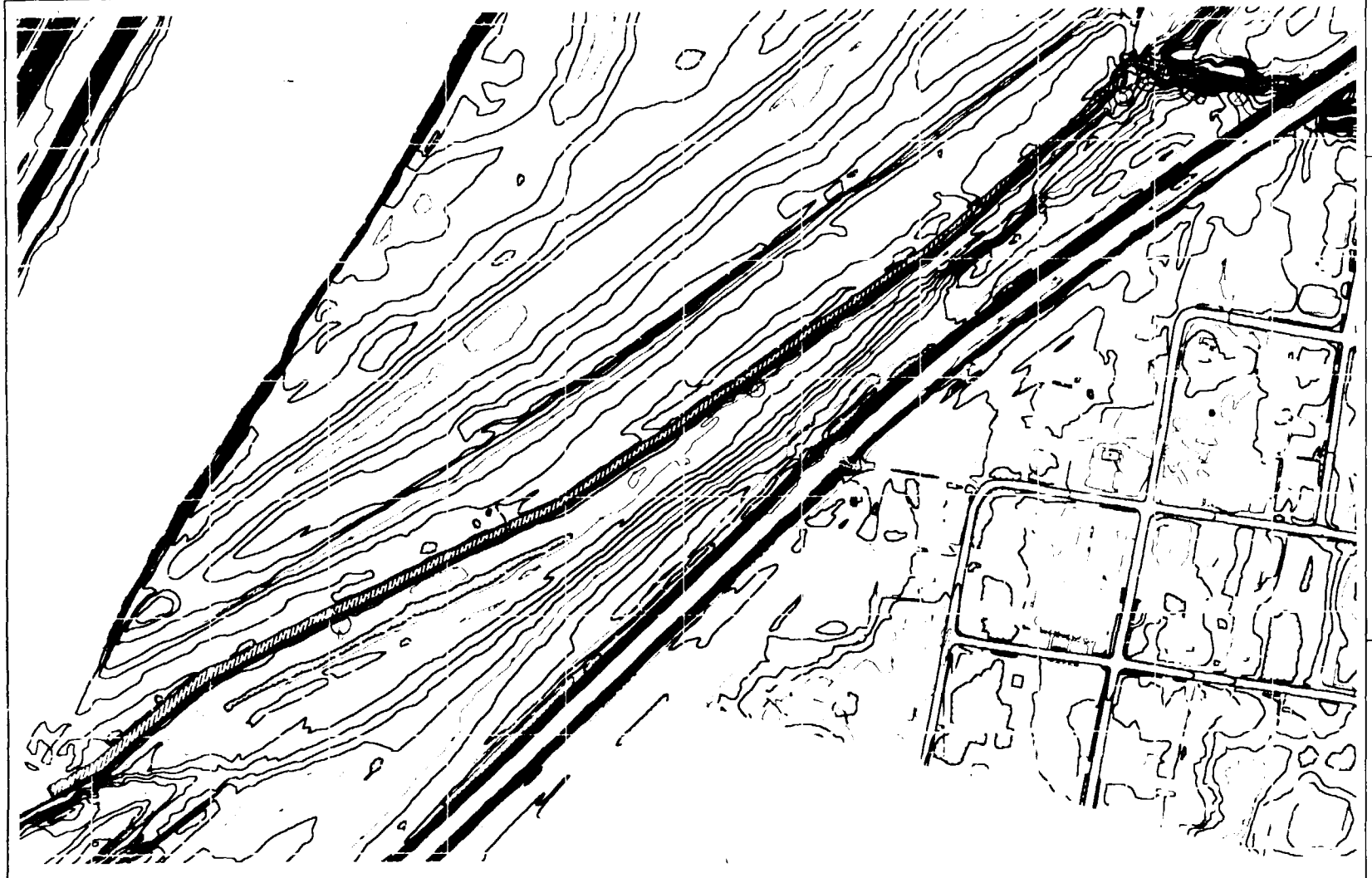
This Order shall be effective ten (10) business days following issuance unless a conference is requested as provided herein. If a conference is requested, this Order shall be effective five (5) business days after the day of the conference.

IT IS SO ORDERED

BY: Wm. E. Muno

DATE: 8/29/01

William Muno, Director
Superfund Division
United States Environmental Protection Agency
Region 5



Cross Section	Approximate Distance between Sections (ft)	Cross Section Width (ft)	Excavation Volume per 0.5' cut (cy)	Excavation Volume per 1.0' cut (cy)	Excavation Volume per 1.5' cut (cy)	Excavation Volume per 2.0' cut (cy)	Excavation Volume per 2.5' cut (cy)	Excavation Volume per 3.0' cut (cy)
1 - 2	100.0	12.1	22.4	44.8	67.2	89.6	112.0	134.4
2 - 3	100.0	13.8	25.6	51.1	76.7	102.2	127.8	153.3
3 - 4	100.0	21.6	40.0	80.0	120.0	160.0	200.0	240.0
4 - 5	100.0	29.0	53.7	107.4	161.1	214.8	268.5	322.2
5 - 6	992.0	18.0	330.7	661.3	992.0	1322.7	1653.3	1984.0
6 - 7	997.0	15.0	276.9	553.9	830.8	1107.8	1384.7	1661.7
7 - 8	705.0	20.0	261.1	522.2	783.3	1044.4	1305.6	1566.7
APPROXIMATE TOTAL VOLUMES =			1010.4	2020.8	3031.2	4041.6	5051.9	6062.3

Approx. Total Length = 3094.0

NOTES:

1.) INITIAL BASE MAP SURVEY PERFORMED BY OTHERS.
2.) CREEK SECTION F WIDTHS ESTIMATED USING VISUAL OBERSVATIONS AND EXISTING TOPOGRAPHY MAP. CREEK IS CURRENTLY UNDER FLOOD CONDITIONS.

LEGEND

PROPOSED EXCAVATION AREA

CROSS SECTIONS

MAVERICK
Construction Management Services, Inc.

SECTION F CROSS SECTIONS

SAUGET AREA 1

CAHOKIA, ILLINOIS

June 8, 2001

SCALE: 1" = NTS

DESIGNED BY: JAF
DRAFTED BY: AKT
CHECKED BY:
FILE: Section_F.Dwg

1
SHEET NO.

PROJECT: SAUGET

SHEET 1 OF 1

Exhibit 2

1. DESIGN, CONSTRUCTION, AND OPERATION REQUIREMENTS FOR CONTAINMENT CELL

a. SEDIMENT DESCRIPTION:

Provide a list of all constituents found in CS-B, C, D, E, a portion of F, the basin area located at the lift station, and Site M sediments and soils placed or to be placed in the Containment Cell.

b. LINER SYSTEM:

Provide a discussion of the following items which apply to the liner system as a whole.

Liner System Description:

Provide a description of the liner system, demonstrating (by description and drawings) that any flow of liquids into and through the liner(s) will be prevented. For each liner within the system (defined as a minimum of one synthetic liner and one soil liner) describe the type of liner, its material and its thickness. The liner system includes the liner foundation, bottom soil or composite liner, leachate detection system, top synthetic liner, leachate collection system and any protective layer placed to protect the leachate collection system from damage and clogging.

Liner System Location Relative to High Water Table:

Provide data showing seasonal fluctuations in the depth of the water table and the location of the seasonal high water table in relation to the base of the liner system. Groundwater levels and liner foundation elevations should be shown on geological cross sections.

Loads on Liner System:

Provide the results of calculations defining the minimum loads or stresses which will be placed on the liner system considering:

* Internal and external pressure gradients;
* Stresses resulting from settlement, compression or uplift;
* Both static and dynamic loads;
* Stresses due to installation or construction operations;
* Stresses resulting from operating equipment; and
* Stresses due to the maximum quantity of waste, cover, and proposed post-closure land use.

Liner System Coverage:

Demonstrate that the liner system will be installed to cover all surrounding earth likely to be in contact with the waste or leachate (i.e., construction, as built, or detailed drawings).

Liner System Exposure Prevention:

Demonstrate that the liner system will not be exposed to wind or sunlight or, if exposure of any part of the system is to be permitted, that such exposure will not result in unacceptable degradation of that portion of the system (i.e., drawings and/or liner specifications as appropriate). If the liner system will be exposed, provide calculations defining the stresses on the liner system due to thermal expansion and contraction.

c. FOUNDATION:

Foundation Description:

Describe the foundation for the liner system, including the foundation materials and indicate bearing elevations on geological and construction drawings. Indicate any load bearing embankments placed to support the liner system.

Subsurface Exploration Data:

The engineering characteristics of the liner system foundation materials, including subsurface soil, bedrock and hydrogeologic conditions, should be verified through subsurface explorations. These efforts should be fully described by including location plans and cross sections for test borings, test pits, etc., and explanations or references for the procedures used, and may include:

* Historical data;
* Test borings;
* Test pits or trenches;
* In situ tests; and/or
* Geophysical exploration.

Laboratory Testing Data:

Results from sufficient index testing must be provided to classify the site materials. Other lab test data should be provided to evaluate the engineering properties of the foundation materials, particularly for strength, hydraulic conductivity, compressibility (consolidation), and other important design parameters. Provide copies of the test methods used to test the material or provide

references, as appropriate and with any revisions, to standard test procedures. ASTM, EPA or other appropriate standard methods should be used when available. Contact Illinois EPA Division of Land Pollution Control for Agency approved hydraulic conductivity testing methods.

d. **ENGINEERING ANALYSES:**

Engineering analyses should be provided which are based on the data gathered through subsurface exploration and laboratory testing programs. Include a discussion of the methods used, assumptions, copies of calculations and appropriate references. This discussion may include:

* Settlement potential;
* Bearing capacity;
* Stability of the landfill slopes (cut or constructed);
* Potential for excess hydrostatic or gas pressure;
* Seismic conditions;
* Subsidence potential; and
* Sinkhole potential.

Settlement Potential:

Provide estimates of the total and differential settlement of the liner system foundation, including immediate settlement, primary consolidation and secondary consolidation. When performing the analyses, consider the stresses imposed by liners and the applicable stresses computed in the "Loads on Liner System" in subsection 1.b., above.

Bearing Capacity:

Provide an analysis of the allowable bearing capacity of the liner system foundation. Compare the allowable bearing capacity to the required bearing capacity based on the loads imposed by the liner system and the applicable loads computed loads on liner system.

Stability of Landfill Slopes:

Provide, as appropriate, analyses of the stability of:

* Excavated slopes for units or portions of units constructed below grade;
* Embankment slopes for units constructed with earthen dikes or berms to support the liner system or contain the waste; and
* Cell slopes consisting of the liner system or cover system placed on the waste.

Include in the analyses both static and dynamic cases.

Potential for Excess Hydrostatic or Gas Pressure:

Provide estimates of the potential for bottom heave or blow-out of the liner system due to unequal hydrostatic or gas pressure.

e. SYNTHETIC LINERS:

For each synthetic liner in the system provide the following general information:

* Thickness;
* Type;
* Material;
* Brand name; and
* Manufacturer.

Provide data for all synthetic liners under consideration.

Provide detailed synthetic liner material specifications.

Synthetic Liner Compatibility Data:

Provide information demonstrating liner compatibility with constituents found in CS-B, C, D, and E, and Site M.

Synthetic Liner Strength:

Provide data showing that the synthetic liners have sufficient strength to support the loads/stresses including tensile stresses resulting from settlement. Also demonstrate that the liner seams will have sufficient strength.

Synthetic Liner Bedding:

Demonstrate that sufficient bedding will be provided above and below the synthetic liners to prevent rupture of the synthetic liner during installation and operation (i.e., thickness and gradation). Note: The synthetic membrane of a bottom composite liner should be placed directly on the soil portion.

f. GEOCOMPOSITE LINER (GCL):

Provide a description of the liner.

Material Testing Data:

Provide information on the permeability, strength and shrink swell properties of the liner material.

GCL Liner Compatibility Data:

Provide information that demonstrates compatibility of GCL liners with constituents found in CS-B, C, D and E and Site M.

GCL Liner Strength:

Demonstrate that the GCL liner has sufficient strength to support the computed loads/stresses.

g. LINER SYSTEM, LEACHATE COLLECTION AND DETECTION SYSTEM:

Note: The leachate collection system is located above the top synthetic liner in the liner system and the leachate detection system is located between the liners in the liner system.
Provide the following information about the leachate collection/detection systems (also provide detailed material specifications):

System Operation and Design:

Describe the design features of the leachate collection and removal system and how the system will function to remove collected leachate in a timely manner. Describe the design features of the leachate detection system and how the system will function to detect any leakage through either liner in a timely manner. Describe how liquid can be removed from the leachate detection system. Describe any protective layer placed over the leachate collection system to protect it from damage caused by the sediment or placement operations.

Equivalent Capacity:

For leachate collection/detection systems which use synthetic drainage material to replace the granular drainage material, demonstrate that the proposed system has a drainage capacity (transmissivity), both in speed and volume, that is equal to or better than a 12-inch thick granular drainage layer that has a hydraulic conductivity of 1 x 10-2 cm/sec.

Grading and Drainage:

Indicate the slopes of the leachate collection/detection systems and provide a contour plan for the system along with a plan showing the layout and spacing of the piping system. For systems with slopes of less than 2%, demonstrate that the proposed system will drain as well as one with a minimum of 2% slopes (i.e., through the use of an alternative design). Provide complete details of the piping system along with any sumps, pumps, etc., used to collect, hold, and transport the leachate. Indicate the fate of the collected leachate. Demonstrate that the leak detection system (located between the liners) is appropriately graded to assure that leakage at any point in the liner system is detected in a timely manner.

Demonstrate that the pipe and pipe perforations are sized sufficiently to handle the expected flow of leachate. For design of the leachate detection system (located between the liners) provide sufficient piping to provide for rapid and timely detection of any leakage. The leachate detection system sumps must be separate from the leachate collection system sumps and provided with provisions for measuring the quantity of collected leachate or leakage.

Maximum Leachate Head:

Describe and demonstrate that the design and operating features will prevent the leachate depth over the top of the primary liner from exceeding one foot (i.e., one foot above the uppermost liner). Provide copies of calculations along with a justification of the assumed parameters and of the numerical technique used.

System Compatibility:

Provide information on the compatibility of the leachate collection/detection systems with the constituents found in CS-B, C, D and E, and Site M waste managed in the Containment Cell and the leachate expected to be generated.

Stability of Drainage Layers:

Demonstrate that the drainage layers of the leachate collection/detection systems have sufficient strength to support the computed loads and stresses (i.e., sufficient soil bearing capacity to support loads). Demonstrate by providing calculations that the drainage layer to be placed on sloped surfaces of the Cell or foundation will be stable during construction.

Strength of Piping:

Demonstrate that the pipe used in the piping systems has sufficient strength (crushing or deflection, as appropriate) to support the computed loads.

Prevention of Clogging:

Demonstrate that the leachate collection/detection systems are designed and operated to prevent clogging (due to piping) of the drainage layer material or the pipes throughout the active life of the Containment Cell. Consideration must be given to physical, chemical, and/or biological clogging. As an alternative, describe how clogging would be detected and what cleanup procedures would be used to restore the capacity of the systems. Include calculations demonstrating the effectiveness of the protection material or system.

h. LINER SYSTEM, CONSTRUCTION AND MAINTENANCE:

1. Material Specifications

Synthetic Liner Specifications:

Provide detailed material specifications for the specific synthetic liner or liners to be used.

GCL Liner Specifications:

Provide detailed material specifications for the GCL to be used.

Leachate Collection/Detection System:

Provide material specifications for:

* Drainage layer material;
* Filter fabric or filter layer;
* Piping; and
* Sumps.

2. Construction Specifications

Liner System Foundation:

For installed foundations, provide construction specifications of the foundation installation procedures. For units which use in-place material for the liner system foundation, provide construction specifications for preparation of the liner system foundation.

GCL Liner:

Describe the procedures for installing the GCL liner.

* Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
* Placement procedures;
* Techniques to be utilized to bond the liner seams; and
* Procedures for protection of the liner before and during placements of material on top of the liner.

Synthetic Liners:

Provide construction specifications for placement of the synthetic liners which include:

* Inspection of the synthetic liner bed for material which could puncture the liner (and removal of that material);
* Placement procedures;
* Techniques to be utilized to bond the liner seams; and
* Procedures for protection of the liner before and during placement of material on top of the liner.

Leachate Collection/Detection System:

Provide construction specifications for placement of all components of the leachate collection/detection system, including:

* Drainage layers;
* Piping;
* Sumps, pumps, etc.;
* Filter layers; and
* Any protective layer placed to protect the system during construction or operation.

i. CONSTRUCTION QUALITY CONTROL PROGRAM:

Provide complete details of the quality control program to be used during construction of the liner system to assure that it is built as designed. Include a description of all testing procedures such as testing of the synthetic liner seams. Indicate if the owner or the contractor will perform the testing and inspection and indicate the necessary qualifications of the testing and inspection personnel. The applicant should refer to the U.S. EPA Technical Guidance Document entitled "Construction Quality Assurance for Hazardous Waste Land Disposal Facilities", EPA/530-SW-031 and to the Construction Quality Assurance Program found in 724.119.

j MAINTENANCE PROCEDURES FOR LEACHATE COLLECTION/DETECTION SYSTEM:

Describe the anticipated maintenance activities that will be used to assure proper operation of the leachate collection/detection systems throughout the Containment Cell's expected life.

k. LINER REPAIRS DURING OPERATION:

Describe the methods that will be used to repair any damage to the liner which occurs while the Cell is in operation during placement of the waste (e.g., a bulldozer ripping the liner).

l. RUN-OFF CONTROL SYSTEMS:

Describe the run-off control system to be used to collect and control run-off from active portions of the Cell.

Design and Performance:

Describe the run-off collection and control system design. Provide calculations demonstrating that the system has sufficient capacity to collect and hold the total run-off volume. Provide a plan view showing the locations of the run-off control system components, along with sufficient drawing details and cross sections. Indicate the fate of the collected run-off.

Calculation of Peak Flow:

Identify the total run-off volume expected to result from at least a 24-hour, 25-year storm. Describe data sources and methods used to make the peak flow calculation. Provide copies of the calculations and data, including appropriate references.

Management of Collection and Holding Units:

Describe how collection and holding facilities associated with run-on and run-off control systems will be emptied or otherwise managed expeditiously after storms to maintain system design capacity. Describe the fate of liquids discharged from these systems.

Construction:

Provide detailed construction and material specifications for the run-off control systems. Include descriptions of the construction quality control program that will be utilized to assure that construction is in accordance with design requirements.

Maintenance:

Describe any maintenance activities required to assure continued proper operation of the run-off control systems throughout the active life of the unit.

Control of Wind Dispersal:

If the Containment Cell contains any particulate matter which may be subject to wind dispersal, describe how the Cell is covered or otherwise managed to control wind dispersal.

2. CLOSURE AND POST-CLOSURE REQUIREMENTS

a. CLOSURE REQUIREMENTS:

1. Closure Plans:

Include a written closure plan including a description of the final cover to be established and its expected performance. Describe how the closure plan provided minimizes the need for post-closure maintenance and minimizes releases of wastes and hazardous constituents.

2. Closure Performance Standard:

Describe how the closure plan provided minimizes the need for post-closure maintenance and minimizes releases of wastes and hazardous constituents.

3. Cover Design:

The cover design and installation procedures should be thoroughly described. This submission should include:

* Drawings showing cover layers, thicknesses, slopes and overall dimensions;
* The common name, species and variety of the proposed cover crop;
* Descriptions of synthetic liners to be used, including chemical properties, strength, thickness and manufacturer's specifications;
* Description of rationale for cover selection;
* Descriptions of and specifications for protective materials placed above and below synthetic liners; and,
* GCL liner characteristics.

4. Minimization of Liquid Migration

For all cover designs provide engineering calculations showing that the proposed cover will provide long-term minimization of liquid migration through the cover.

5. Maintenance Needs:

Demonstrate that the cover system will function effectively with minimum maintenance needs.

6. Drainage and Erosion:

Provide the following information:

* Data demonstrating that the proposed final slopes will not cause significant cover erosion;
* Descriptions of drainage materials and their hydraulic conductivities;
* Engineering calculations demonstrating free drainage of precipitation off of and out of the cover; and
* Estimation of the potential for drainage-layer clogging.

7. Settlement and Subsidence:

Describe potential cover settlement and subsidence, considering immediate settlement, primary consolidation, secondary consolidation, and creep and liquefaction. Include the following information:

* Potential foundation compression;
* Potential soil liner compression; and
* Potential waste consolidation and compression resulting from waste dewatering, biological oxidation and chemical conversion of solids to liquids.

Describe the effects of potential subsidence/settlement on the ability of the final cover to minimize infiltration.

8. Freeze/Thaw Effects:

Identify the average depth of frost penetration and describe the potential effects of freeze/thaw cycles on the cover.

b. POST-CLOSURE REQUIREMENTS:

1. Post-Closure Plan:

Submit a copy of the post-closure plan.

2. Inspection Plan:

Describe the inspections to be conducted during the post-closure care period, their frequency, the inspection procedure, and the logs to be kept. The following items, as applicable, should be included in the inspection plan:

* Security control devices;
* Erosion damage;
* Cover settlement, subsidence and displacement;
* Vegetative cover condition;
* Integrity of run-on and run-off control measures;
* Cover drainage system functioning;
* Leak detection system;
* Leachate collection and removal system;
* Gas venting system;
* Well condition; and
* Benchmark integrity.

Provide the rationale for determining the length of time between inspections.

3. Post-Closure Monitoring Plan:

Describe the monitoring to be conducted during the post-closure care period, including, as applicable, the procedures for conducting and evaluating the data gathered from:

* Groundwater monitoring;
* Leachate collection and removal; and
* Leak detection between liners.

4. Post-Closure Maintenance Plan:

Describe the preventive and corrective maintenance procedures, equipment requirements and material needs. Include the following items in the maintenance plan, as applicable:

* Repair of security control devices;
* Erosion damage repair;