



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

ATLANTA FEDERAL CENTER  
61 FORSYTH STREET  
ATLANTA, GEORGIA 30303-8960

MEMORANDUM

SUBJECT: Ciba-Geigy Superfund Site – Operable Unit 3 (The Floodplain)  
Explanation of Significant Differences

FROM: Charles L. King Jr, RPM  
R4/SD/SRB-C

THRU: David Keefer, Chief  
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Carol J. Monell, Chief  
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TO: Franklin E. Hill, Director  
Waste Management Division

The purpose of this memorandum is to present an Explanation of Significant Differences (ESD) for Operable Unit 3 (OU3) at the Ciba-Geigy Superfund Site located in McIntosh, Washington County, Alabama. The Record of Decision (ROD), addressing contamination in the floodplain area (OU3), was issued in 1995. The selected remedy was excavation of soils with concentrations above 15 ppm DDT and/or the sum of its metabolites (DDTr) in order to mitigate residual risks to fish-eating birds feeding in the floodplain. The initial cleanup of OU3 was completed in 1998. The Second Five Review Year conducted in 2006 indicated that while substantial progress had been made towards reaching the performance goals, additional remediation would be required to achieve the remedial goals in acceptable period of time.

The initial phase of remediation completed in 1998 consisted of excavation of the top 12 inches of contaminated sediments in the cypress swamp and the ditch followed by application of 12 inches of clean sand fill or sand cover to prevent exposure to contamination remaining. **The clean sand cover is the essential component of the remedy both for the sensitive areas and areas addressed in the initial phase of the remediation. In both areas the cover serves as the barrier to prevent or minimize the exposure pathway to human health and the environment.** In 1998, when the OU3 remedy was being implemented, the cover application technology was not available (or certainly not widely used by EPA) to apply soil/sediment as a cover in the ecologically sensitive areas without destroying the habitats.

Pursuant to current EPA sediment guidance, a conceptual site model (CSM) was developed by Ciba and presented to EPA in the June 2007 Preliminary Basis of Design Report. The results of the CSM were confirmed by additional sampling and characterization in OU3. The



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findings of the CSM were as follows: The DDTr footprint in the sediments is stable and consistent with past investigations; natural recovery is occurring; sediment transport to the Tombigbee River is not occurring, and transport is minimal and localized within the ecologically sensitive areas that were not remediated in the initial cleanup phase conducted in 1998 (the Focused Area – Figure 1) to the south of the former effluent ditch and north of the Olin berm. Because of these characteristics, the Basis of Design concluded the low-energy nature of the system makes it appropriate to consider a cover remedy to eliminate or minimize exposure risk within the focused area. Covers consisting of various thicknesses of sand for all sediments exceeding 15 ppm DDTr will be placed within the focused area. The general components of the additional remediation consist of a 12'' sand cover over areas with DDTr concentrations greater than 50 ppm, 9'' sand cover over areas with DDTr concentrations between 15-50 ppm, and monitoring with natural recovery in areas with DDTr concentrations less than 15 ppm. Evaluations discussed in the December 2007 Final Basis of Design Report concludes that the application of the sand cover in the focused area is protective and appropriate. In summary, the Final Basis of Design Report indicates that the cover application in the focused area accomplishes the following: reduces surface weighted average of DDTr concentrations by 95% resulting in similar reduction in Gambusia body burdens; is protective in the long term, as conservative modeling demonstrates that breakthrough of DDTr would take hundreds of years; is appropriate as the site meets all of EPA's recommendations for considering a cover remedy; and, protects and maintains existing habitats as much as possible.

The application and projected effectiveness of the sand cover was thoroughly evaluated by representatives from the Alabama Department of Environmental Management, State and Federal Natural Resource Trustees, regional and national sediment and ecological experts within EPA and was determined to be suitable for this site. Using new technologies, including pneumatic application and low ground pressure rubber track mini-trucks, allows placement of the sand cover in the ecologically sensitive areas of the floodplain with minimal negative impacts to the habitat and ecosystem.

**Applying a cover as a barrier to prevent the exposure is not a fundamental change in the treatment method from the original remedy. In the original OU3 remedy, EPA indicated that excavation in the ecologically sensitive could destroy the habitats. The process for applying the sand cover (with 3% wood mulch amendment) is the change from the original remedy that is discussed in this ESD.**

**Project Status:** The Ciba OU3 additional remediation is currently underway and scheduled for completion in October 2008. The cost to implement this additional remediation in the focused area of the floodplain is approximately \$ 3.4 million. The annual monitoring cost associated with this remedy is expected to be approximately \$ 250,000.00.

**Support Agency Comments:** The Alabama Department of Environmental Management has been involved in development of this remedy modification and concurs with this ESD.

**Statutory Determination: The Modified Remedy Continues to Satisfy the Requirements of CERCLA Section 121.** Considering the new information that has been developed and the changes that are being made to the selected remedy, the EPA and the Alabama Department of Environmental Management believe that the remedy will be protective of human health and the environment, complies with federal and state requirements that were identified in this ESD as applicable or relevant and appropriate to this remedial action at the time this ESD is signed, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

Attached is a copy of the fact sheet that will be distributed to the public. I recommend that you concur with this ESD so that it may be added to the Administrative Record.

Attachment (1)

Concurrence:



Date:

10-6-05

Franklin E. Hill, Director  
Waste Management Division



# U. S. Environmental Protection Agency – Region 4

## Explanation of Significant Differences (ESD) – Additional Remediation for the Ciba-Geigy Corporation Superfund Site - Operable Unit 3

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McIntosh, Washington County, Alabama

October 2008

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### Introduction and Purpose

Ciba Corporation (Ciba), the successor to Ciba-Geigy Corporation, will undertake additional remediation to address sediments containing residual dichlorodiphenyl-trichloroethane (DDT) and its metabolites in the floodplain (Operable Unit 3 [OU3]) of its facility in McIntosh, Alabama under the direction and oversight of the United States Environmental Protection Agency (EPA). EPA's 5-Year Review Report issued in September 2006 recommended that additional remediation be performed in the floodplain in order to achieve the post remediation performance goals for OU3. The purpose of this Explanation of Significant Differences (ESD) is to provide a rationale for the changes from the original remedy, to explain the nature of the additional remediation, and establish the basis for its compliance with CERCLA Section 117 (c) and NCP Section 300.825 (a)(2). This ESD will become a part of the Administrative Record for the site.

### Summary of Site History, Selected Remedy, and Basis for the ESD

The site is located on the Tombigbee River two miles northeast of McIntosh, Alabama and 50 miles north of Mobile, Alabama. The entire Ciba-Geigy site is approximately 1500 acres, of which 1130 consists of the developed plant site and 370 acres consists of undeveloped

swamp and bottomland located in the Tombigbee floodplain. This former Ciba-Geigy site is owned and operated by Ciba, formerly known as Ciba Specialty Chemicals Corporation, which was spun off from Novartis Corporation in 1997.

Originally, the Geigy Corporation built the facility in the 1950's and began operations in October 1952 with the manufacture of one product, DDT, for which production was discontinued in the 1960s. Through 1970, Geigy Corporation expanded its products by adding the production of fluorescent brighteners, herbicides, insecticides, agricultural chelating agents, and sequestering agents for industry. In 1971, Geigy Chemical Corporation merged with Ciba Corporation to create Ciba-Geigy Corporation. The product line was expanded to include the manufacture of resins and additives used in the plastics industry, anti-oxidants, and small volume specialty chemical products. In 1999, agricultural chelating and sequestering agent production was phased out and closed. In 2003, herbicide and insecticide production was closed.

The EPA began environmental investigation at the site in 1982 with identification of soil and groundwater contamination on the site resulting from past waste management operations. The site was placed on the National Priorities

List (NPL) in 1983. Due to the size and complexity of the site, EPA identified four operable units (OUs):

OU-1 Shallow alluvial ground water aquifer

OU-2 Soils at ten of eleven former waste management units;

OU-3 Floodplain, including the effluent ditch and areas in the Tombigbee floodplain within close proximity to the site; and

OU-4 Former waste management area designated as Site 8 (or bluff line site) and the upland portion of the dilute ditch.

Remedial actions under EPA oversight have been completed for all four OUs and each OU is monitored annually to measure remedy effectiveness. Two Five Year Reviews have been conducted to evaluate the effectiveness of the remedies for each OU. The remedies for OU1, OU2, and OU4 continue to function as intended and remain protective of human health and the environment. The OU3 remedy will require additional action to achieve performance goals, and is the subject of this ESD.

The Record of Decision (ROD), addressing contamination in the floodplain area (OU3), was issued in 1995. The selected remedy was excavation of soils with concentrations above 15 ppm DDT and/or the sum of its metabolites (DDTr) in order to mitigate residual risks to fish-eating birds feeding in the floodplain. The initial cleanup of OU3 was completed in 1998 (Figure 1 – Previously Remediated Areas). OU3 wasn't included in the First Five Year Review (2001) as there was insufficient monitoring data on which to base a

protectiveness determination. The Second Five Year Review conducted in 2006 indicated that while substantial progress had been made towards reaching the performance goals, additional remediation would be required to achieve the remedial goals in an acceptable period of time.

### **Description of the Significant Differences**

The OU3 ROD provided flexibility to modify cleanup goals in ecologically sensitive areas during remedial design to avoid unnecessary destruction of habitat (Section 6.4 and Section 11.0). The remedial design concluded that seasonal pools in the floodplain, which were the primary feeding areas for wading birds, posed the highest risk of exposure and could be remediated with minimal ecological damage. However, the areas surrounding the seasonal pools were determined to be ecologically sensitive because they contain bottomland forest. The primary focus of the additional remediation is on further reducing ecological exposure to those sediments while avoiding destruction of the floodplain habitat, which is consistent with the original intent of the ROD. Application of a sand cover can be performed in ecologically sensitive areas without destroying the habitat and will function as a barrier preventing or minimizing exposure to potential ecological receptors. Annual monitoring will be continued to confirm the effectiveness of the additional remediation and to document the overall progress toward achieving performance standards. The initial phase of remediation completed in 1998 consisted of excavation of the top 12 inches of contaminated sediments in the cypress

swamp and the ditch, followed by application of 12 inches of clean sand fill or sand cover to prevent exposure to contamination remaining. The clean sand cover is the essential component of the remedy both for the sensitive areas and areas addressed in the initial phase of the remediation. In both areas, the cover serves as the barrier to prevent or minimize the exposure pathway to human health and the environment. In 1998, when the OU3 remedy was being implemented, the technology was not available (or certainly not widely used by EPA) to apply soil/sediment as a cover in the ecologically sensitive areas without destroying the habitats.

Pursuant to current EPA sediment guidance, a conceptual site model (CSM) was developed by Ciba and presented to EPA in the June 2007 Preliminary Basis of Design Report. The results of the CSM were confirmed by additional sampling and characterization in OU3. The findings of the CSM were as follows: The DDT<sub>r</sub> footprint in the sediments is stable and consistent with past investigations; Natural recovery is occurring; Sediment transport to the Tombigbee River is not occurring, and transport is minimal and localized within the ecologically sensitive areas that were not remediated in the initial cleanup phase conducted in 1998 (the Focused Area – Figure 1), to the south of the former effluent ditch and north of the Olin berm. Because of these characteristics, the Basis of Design concluded the low-energy nature of the system makes it appropriate to consider a cover remedy to eliminate or minimize exposure risk within the focused area. Covers consisting of various thicknesses of sand for all sediments exceeding 15 ppm DDT<sub>r</sub> will be placed within the

focused area. The general components of the additional remediation consist of a 12'' sand cover over areas with DDT<sub>r</sub> concentrations greater than 50 ppm, 9'' sand cover over areas with DDT<sub>r</sub> concentrations between 15-50 ppm, and monitoring with natural recovery in areas with DDT<sub>r</sub> concentrations less than 15 ppm. Evaluations included and discussed in the December 2007 Final Basis of Design Report conclude that the application of the sand cover in the focused area is protective and appropriate. In summary, the Final Basis of Design Report indicated that the cover application in the focused area: will reduce surface weighted average of DDT<sub>r</sub> concentrations by 95% within the focused area resulting in similar reduction in Gambusia body burdens; is protective in the long term, as conservative modeling demonstrates that breakthrough of DDT<sub>r</sub> would take hundreds of years; is appropriate as the site meets all of EPA's recommendations for considering a cover remedy; and, protects and maintains existing habitats as much as possible.

The application and projected effectiveness of the sand cover was thoroughly evaluated by representatives from the Alabama Department of Environmental Management (ADEM), State and Federal Natural Resource Trustees, regional and national sediment and ecological experts within EPA, and was determined to be suitable for this site. Using new technologies including pneumatic applications blowing and low ground pressure rubber track mini-trucks, placement of the sand cover in the ecologically sensitive areas of the floodplain can be accomplished with

minimal negative impacts to the habitat and ecosystem is now possible.

Applying a cover as a barrier to prevent the exposure is not a fundamental change in the treatment method from the original remedy. In the original OU3 remedy, EPA indicated that excavation in the ecologically sensitive could destroy the habitats. The process for

applying the sand cover (with 3% wood mulch amendment) is the change from the original remedy that has been discussed in this ESD.

Table 1 provides a side-by-side comparison of key components of the original remedy for OU3 with the modifications presented in this ESD.

**Table 1**

<u>Original Remedy</u>	<u>Modified Remedy</u>
Excavate soil and sediment to 15 ppm DDTr (sum of DDT and its metabolites) clean up goal in the majority of floodplain. Flexibility to modify cleanup goals in ecologically sensitive areas during remedial design to avoid unnecessary destruction of habitat	No change
Backfill excavated areas with clean soil or sediment	No change
No initial action in ecologically sensitive areas where excavation would destroy habitat.	Using new methods and technology, application of a clean sand cover as an exposure barrier to DDTr left in place in areas where excavation would unnecessarily destroy habitat
Post remediation monitoring of Gambusia and Lumbriculus worms to evaluate effectiveness of the remedy. The goal for the Gambusia is to reduce the DDTR body burden below 1.5 ppm	Post remediation monitoring of Gambusia and a combination of Lumbriculus and/or DDTr in sediment transported within the site to evaluate the effectiveness of the remedy. No change in the performance goal for the Gambusia. The design and implementation of the post remediation monitoring will be subject to EPA approval.
The cost of the original remedy was approximately \$3.9 million and \$200,000 in annual monitoring costs.	The additional cost of the proposed remedy is approximately \$3.4 million and \$250,000 annual monitoring costs.

**Project Status:** The Ciba OU3 additional remediation is currently underway and scheduled for completion in October 2008.

**Support Agency Comments:** The Alabama Department of Environmental Management has been involved in development of this remedy modification and concurs with this ESD.

**Statutory Determination: The Modified Remedy Continues to Satisfy the Requirements of CERCLA Section 121**

Considering the new information that has been developed and the changes that are being made to the selected remedy, the EPA and the Alabama Department of Environmental Management believe that the remedy will be protective of human health and the environment, complies

with federal and state requirements that were identified in this ESD as applicable or relevant and appropriate to this remedial action at the time this ESD was signed, and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

**Public Participation Activities:**

A public notice of availability will be published in the Mobile Press-Register in mid-October 2008. This ESD has been distributed to the site mailing list, placed in the Administrative Record Files at the EPA Region 4 Record Center in Atlanta Georgia, and copies are available at the McIntosh Town Hall on Highway 43 in McIntosh, Alabama for review.



**Figure 1**

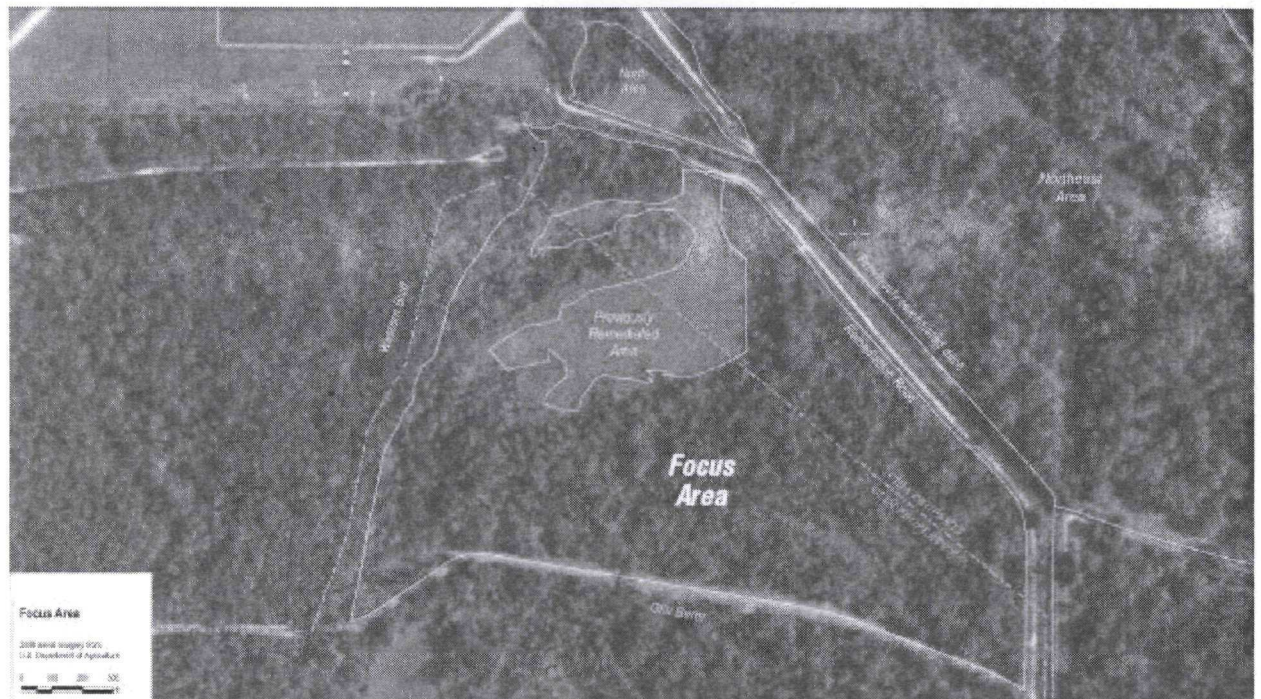
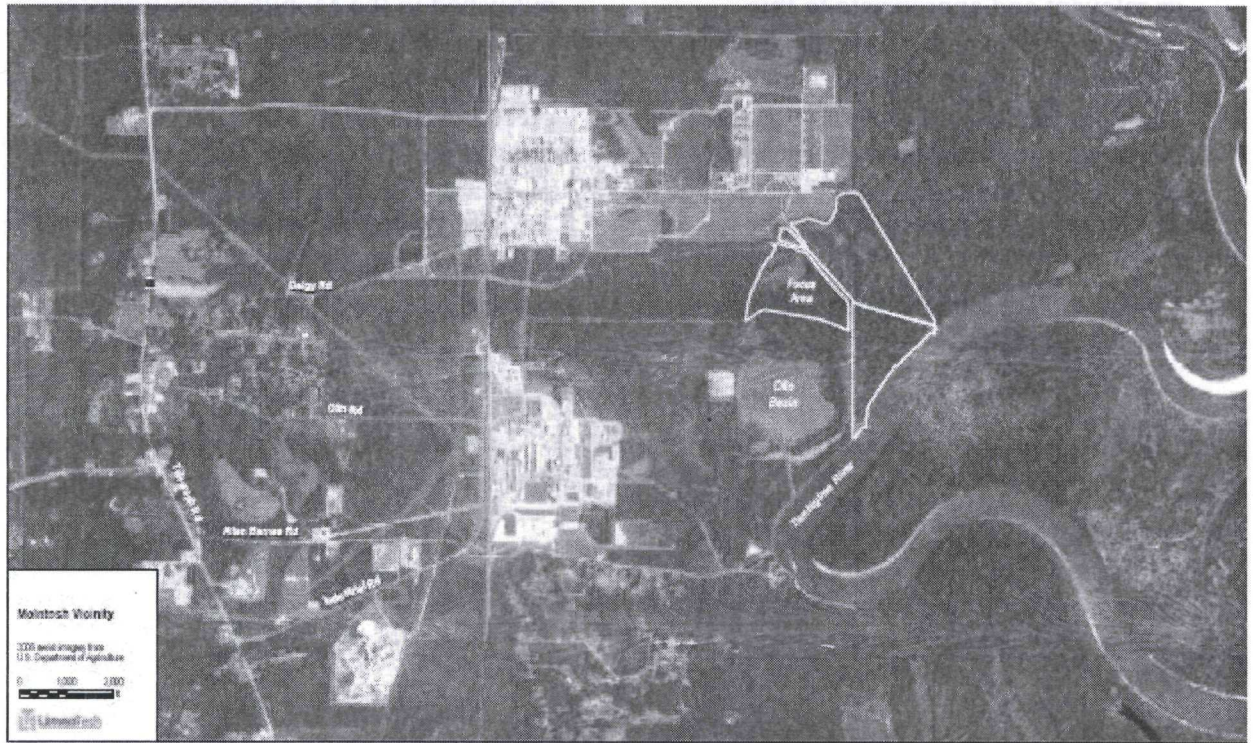
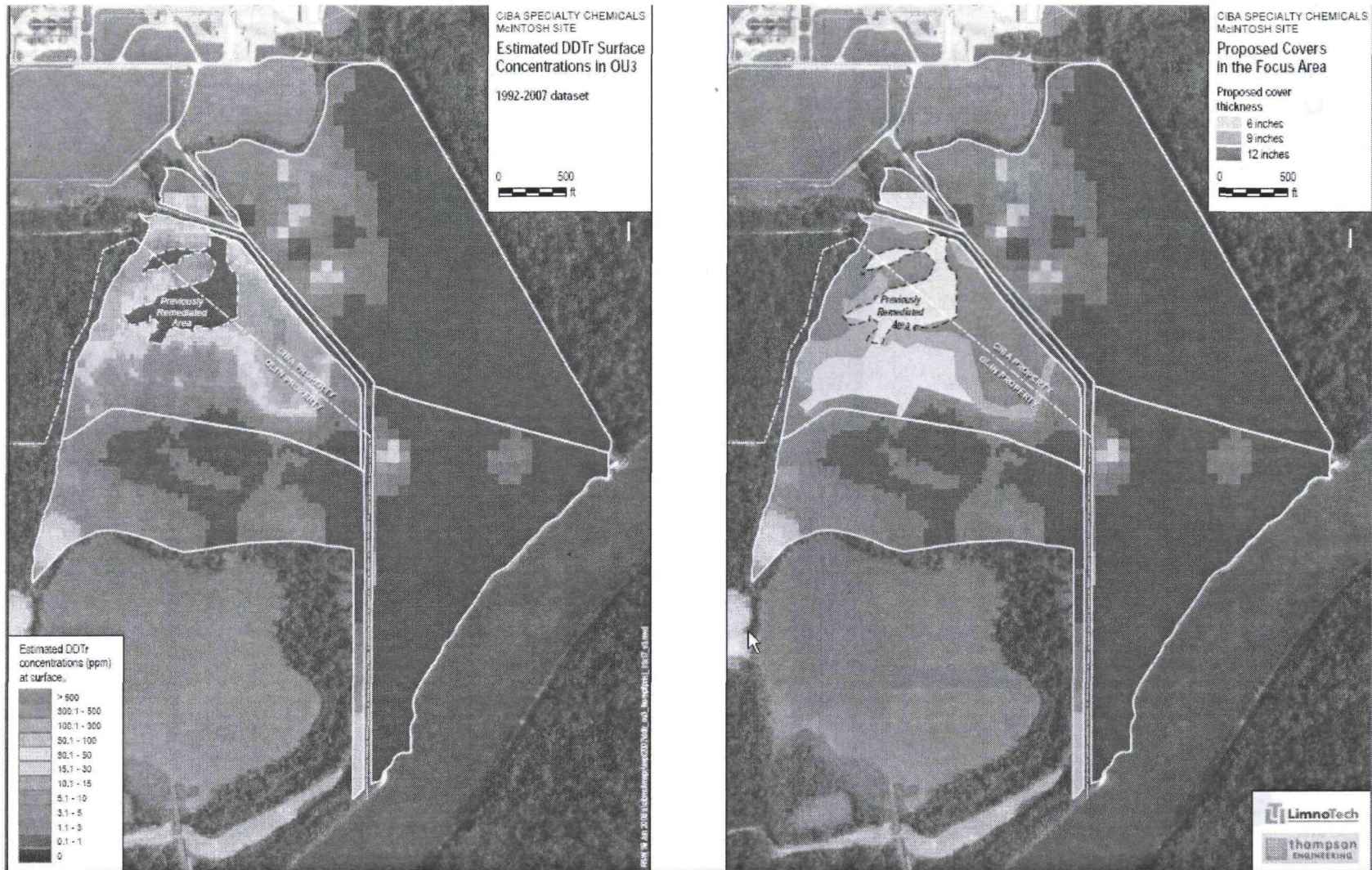


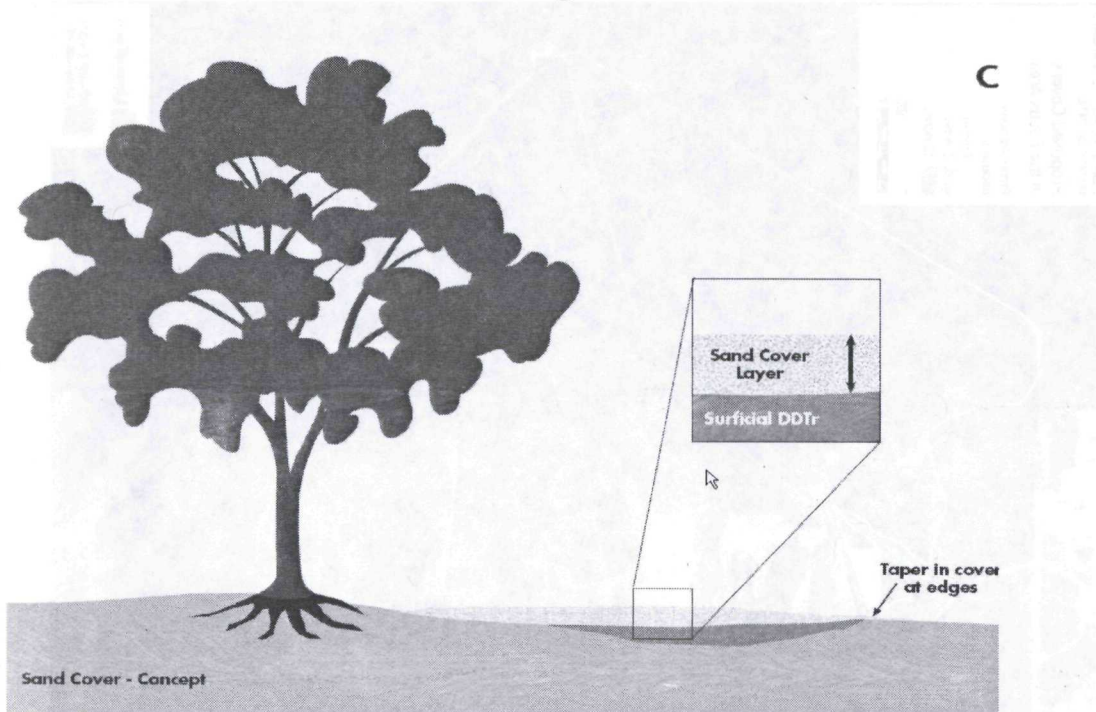


Figure 2





**Figure 3**



**Contact Information**

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