

**Second Five-Year Review Report  
for  
Dixie Oil Processors Site  
Harris County, Texas**

**August 2003**

**PREPARED BY:**

**United States Environmental Protection Agency  
Region 6  
Dallas, Texas**

## List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CAMU	Corrective Action Management Unit
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
ESD	Explanation of Significant Difference
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PRP	Potentially Responsible Party
PSD	Performing Settling Defendant
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SDWA	Safe Drinking Water Act
VOC	Volatile Organic Compound

## Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name <i>(from WasteLAN)</i> : Dixie Oil Processors Site		
EPA ID <i>(from WasteLAN)</i> : TXD089793046		
Region: 6	State: TX	City/County: Harris County
SITE STATUS		
NPL status: : Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input type="checkbox"/> Operating : Complete		
Multiple OUs?: <input type="checkbox"/> YES : NO	Construction completion date: <u>6 / 9 / 1993</u>	
Has site been put into reuse? <input type="checkbox"/> YES : NO		
REVIEW STATUS		
Lead agency: : EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: John Meyer		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA, Region 6	
Review period:** <u>3 / 1 / 2003</u> to <u>7 / 18 / 2003</u>		
Date(s) of site inspection: <u>7 / 17 / 2003</u>		
Type of review: : Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion)		
Review number: <input type="checkbox"/> 1 (first) : 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA On-site Construction at OU #__ : Actual RA Start at OU# <u>NA</u> <input type="checkbox"/> Construction Completion : Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date <i>(from WasteLAN)</i> : <u>9 / 24 / 1998</u>		
Due date <i>(five years after triggering action date)</i> : <u>9 / 24 / 2003</u>		

## Five-Year Review Summary Form, cont'd.

### Issues:

Fencing needs to be completed alongside Mud Gully on DOP-North. Institutional controls have not been completed by the landowner.

### Recommendations and Follow-up Actions:

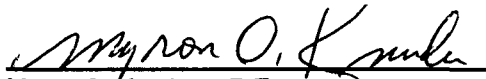
The fence is scheduled to be repaired in August 2003. Department of Justice is pursuing the implementation of the institutional controls through an existing consent decree with the landowner.

### Protectiveness Statement(s):

The remedy at the DOP site is currently protective of human health and the environment. However, in order for the remedy to be protective in the long-term, full implementation of the institutional controls is required.

Approved by:

Date:

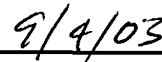


Myron O. Knudson, P.E.

Director

Superfund Division

U.S. EPA, Region 6



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**Dixie Oil Processors Superfund Site  
Houston, Texas  
Second Five-Year Review Report**

**I. Introduction**

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA), Region 6, conducted the five-year review of the remedy implemented at the Dixie Oil Processors (DOP) site in Houston, Texas. This review was conducted by the Remedial Project Manager (RPM) for the site from May 2003 through August 2003. This report documents the results of the review.

This is the second five-year review for the DOP site. The triggering action for this statutory review is the completion of the first five-year review on September 24, 1998. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

## II. Site Chronology

**Table 1 - Chronology of Site Events**

<b>Event</b>	<b>Date</b>
Copper recovery and hydrocarbon washing activities began at the site	1969
Final listing on EPA National Priorities List	10/04/1989
ROD selecting the remedy is signed	03/31/1988
Unilateral Order issued for RD/RA	07/10/1991
PRP Remedial Design approved by EPA	03/25/1992
Start of on-site construction	03/25/1992
Preliminary Close Out Report signed	06/09/1993
1st Five Year Review	09/24/1998

### **III. Background**

#### **Physical Characteristics**

The Dixie Oil Processors (DOP) site is a former industrial site located approximately 20 miles southeast of Houston, Texas, in Harris County. The site occupies approximately 26.6 acres and is positioned both north and south of Dixie Farm Road designated as DOP North and DOP South. DOP North covers 19.0 acres and DOP South covers 7.6 acres. Attachment 1 shows the layout of the DOP site. Mud Gully, a flood control ditch and local tributary of Clear Creek, runs along the eastern boundary of DOP North and the western boundary of DOP South. The Brio Refinery site (Brio) borders DOP to the northeast and a former athletic field borders DOP North to the Southwest. Due north of DOP North is the former Southbend residential subdivision. The Friendswood Oil Field borders the remaining areas.

#### **History of Contamination**

DOP North was operated as a copper recovery and hydrocarbon washing facility from 1969 through 1978. A total of six surface impoundments (pits) were used to store and treat wastewater containing copper prior to recovery and discharge. The pits were closed and decommissioned during 1975 and 1977. Several operations occurred at DOP South from 1978 through 1986. These include:

- regeneration of cuprous chloride catalyst;
- hydrocarbon washing to produce ethylbenzene, toluene, aromatic solvents, and styrene pitch;
- oil recovery; and
- blending and distilling residues from local chemical plants and refineries (mainly phenolic tank bottom tars and glycol cutter stock) to produce various petroleum products including fuel oil, creosote extender, and a molybdenum concentrate catalyst.

Active operations at the site stopped in 1986. Previously closed surface impoundments located on DOP North were not utilized during DOP operations. Approximately 6,000 cubic yards of contaminated soils were excavated in 1984 and disposed off-site. The historic land use of the site has involved some petroleum- or solvent-related industry since at least 1900. From at least 1974 until operations ceased in 1986, activities at the site included waste oil and solvent recovery and disposal.

#### **Initial Response**

In 1985, the DOP site was referred to the EPA by the Texas Water Commission for inclusion on the National Priorities List. Due to its proximity to the Brio site, its past history, and because many of the same potentially responsible parties at Brio were potentially involved at DOP, the Brio Administrative Order on Consent was amended on April 23, 1986, to include the DOP site.

Woodward-Clyde Consultants (WCC) completed a Supplemental Remedial Investigation (SRI) at the Brio and DOP sites in March 1987. The purpose of the SRI was to conduct additional activities identified by the EPA, Resource Engineering, Inc., and the Brio site

Task Force (BSTF) following the completion of the Remedial Investigation (RI).

### **Basis for Taking Action**

There are approximately 107,351 cubic yards of contaminated soils and subsoils on the site, associated with six different pits.

For the pit samples, ethylbenzene had the highest concentration (6.40 mg/kg) of volatile organic compounds; hexachlorobenzene had the highest concentration (674 mg/kg) of base neutral organic compounds; and copper had the highest concentration (72,860 mg/kg) of inorganic compounds. No organic compounds were found in any subsoil samples.

The EPA concluded that the site potentially poses four major risks to human health and the environment. These risks would result from:

- ingestion of on-site soils;
- direct contact with on-site soils;
- inhalation of dust from the site; and,
- ingestion of shallow ground water from the site.

Many of the chemicals found on the site are carcinogens (1,1,2 trichloroethane and methylene chloride) or toxic to the central nervous system, liver, or respiratory system (toluene and chlorobenzene).

## **IV. Remedial Actions**

### **Remedy Selection**

A Record of Decision (ROD) was issued for the DOP site by the EPA on March 31, 1988 selecting limited action and monitoring, including fluids stabilization and a site cover with institutional controls. In accordance with the requirements of the Unilateral Administrative Order, Docket Number 6-23-91, signed by the EPA on July 10, 1991, the DOP Task Force was directed to design and implement the remedial action as specified in the ROD.

### Summary of Record of Decision

- a) Affected Materials and Soils



The DOP Endangerment Assessment identified target cleanup levels based on human exposure to site contaminants. However, the site investigation did not identify any contaminated soils on the DOP site that exceeded the action levels discussed in the endangerment assessment.

b) Mud Gully

The ROD calls for widening the flood control ditch to remove the "bottle neck" that exists as it passes the DOP site.

c) Storage Tanks and Drums

Any remaining surface tanks or vessels shall be demolished and their contents disposed of.

d) Site Management

Regrade and vegetate the entire DOP site to promote drainage and minimize surface runoff. Cover all regraded areas with six inches of top-soil, if necessary, to promote vegetative growth.

e) Site Control

Use permanent site control, impose necessary deed notices and restrictions (if possible), and restrict access to the site by use of a fence or similar barrier.

### **Remedy Implementation**

A Record of Decision (ROD) was issued for the DOP site by the EPA on March 31, 1988, selecting limited action and monitoring including fluids stabilization and a site cover with institutional controls. In accordance with the requirements of the Unilateral Administrative Order, Docket Number 6-23-91, signed by the EPA on July 10, 1991, the DOP Task Force was directed to design and implement the remedial action as specified in the ROD.

The EPA issued the Unilateral Administrative Order (UAO) to 12 respondents in July 1991. The UAO contained a detailed Scope of Work for the implementation of the RD/RA. Monsanto Corporation assumed the lead for implementation of the remedial action by settling with the other respondents and managing the DOP Task Force.

The DOP Task Force prepared an RD/RA workplan for the implementation of the UAO and Scope of Work. The EPA approved the Phase I workplan on March 25, 1992. The Phase I activities included:

- Removal of surface contamination;
- Improvement of surface water controls;

- Reconstruction of Mud Gully;
- Revegetation and installation of security fencing.

The Phase II workplan was approved by EPA on August 17, 1992. Phase II activities included:

- Removal and off-site disposal of tank residuals;
- Dismantlement of the process tanks and drums;
- Disposal of process equipment.

The DOP Task Force notified EPA that Phase I and Phase II activities were completed on March 27, 1993. A pre-certification inspection was conducted by EPA on April 20, 1993. The EPA noted minor items that required additional work. The DOP Task Force corrected these items and in a letter dated April 27, 1993, certified that the Remedial Action was complete. The EPA completed the Preliminary Closeout Report on June 9, 1993.

The DOP Task Force prepared a Remedial Action Report that contained a certification by a Texas Professional Engineer that all the requirements of the Remedial Design were met. The EPA approved the report on August 6, 1993 and issued a Final Closeout Report on January 18, 1996.

### **Institutional Controls**

A Consent Decree was entered into by the United States and the current landowner of the site, Mr. Ralph Lowe. The Consent Decree (Civil Action No. H-91-830) contains a provision that site controls will be enforced and access will be restricted to the site.

### **System Operation/Operation and Maintenance**

In July 1993, the DOP Task Force submitted a Monitoring, Operation and Maintenance (M&OM) Plan for the DOP site. The Plan was revised in January 1999. The purpose of the MO&M Plan is to document procedures to be used to assess the long-term success of the site remedy while minimizing adverse natural or man-made impacts on the DOP site. The Plan requires (i) monthly inspections and maintenance, (ii) a five-year review as required by the EPA, and (iii) semi-annual monitoring of the environmental media (soil, ground water, and air).

#### Monthly Site Inspections

The DOP Task Force conducts monthly site inspections to identify any damage, to the site facilities, and monitors the general health and integrity of the soil cover, vegetation, etc. In general, the Task Force conducts the following actions at the site:

- inspect the site cover for potentially detrimental, localized settlements, presence of burrowing animals, erosion, and evidence of cover failures such as discolored soil or debris,
- maintain healthy vegetation in the capped areas,

- clear obstructions from the drainage swales and surface discharge structures to promote free drainage,
- inspect the banks of Mud Gully for incipient erosion,
- landscape for trees,
- monitor integrity of the fenceline for any damages,
- monitor erosion of the DOP South pond bank slopes,
- maintain a designated water elevation in the DOP South Pond,
- trim trees, as required,
- clear vines out of fenceline fabric, as required,
- monitor any trespassing at the property,
- clear trash/debris that accumulates with time,
- fix missing and/or unreadable signs,
- inspect well protective casings and protective pipes for rust,
- straighten pipeline markers as required, etc.

Monthly inspections include monitoring upstream erosion of Mud Gully which has the potential to impact the water quality at the site. The Task Force also monitors the tar seep area and the localized settlement zone at DOP North.

Since monitoring began in May 1993, the DOP Task Force has kept records of site activities and submitted them to the EPA on an annual basis. The reports include specific maintenance activities completed during the past year, dates that maintenance activities were performed, names of people and companies performing the maintenance activities, and any replacements or redesigns of deficient materials or equipment.

## **V. Progress Since the Last Five-Year Review**

Since the last five-year review in 1998, the DOP Task Force has continued implementation of the M&OM Plan. Semi-annual monitoring reports were issued up through December 2001 when the EPA approved the transition to annual ground water sampling and reporting. Reports are now submitted on an annual basis. Minor modifications were made to the sampling plan including the deletion of well DMW-52A and the incorporation of passive diffusion bag sampling.

## **VI. Five-Year Review Process**

### **Administrative Components**

The DOP Site Task Force and the Texas Commission of Environmental Quality (TCEQ) were notified of the initiation of the five-year review on December 5, 2002. The DOP Five-Year Review team was led by John Meyer of EPA, Remedial Project Manager (RPM) for the DOP site, and Alan Etheridge of the Texas Commission on Environmental Quality (TCEQ) assisted in the review as the representative for the support agency.

### **Community Involvement**

A notice was sent to local newspapers on February 5, 2003, stating that a five-year review was to be conducted for both the Dixie Oil Processors site and the Brio Refining site. On December 5, 2002, the EPA project manager notified the local emergency responders that the five-year review process was going to start and solicited their input on the process.

### **Document Review**

This five-year review consisted of a review of relevant documents including the final closeout report, the 1988 Record of Decision, the M&OM Plan, and the semi-annual monitoring reports. (See Attachment 2)

### **Data Review**

The data review focused on an evaluation of the current ground water monitoring data collected as part of the M&OM operations. The latest ground water monitoring report was issued in November 2002 and provides recent groundwater data along with a summary of the last sixteen monitoring events.

The ground water data shows that the levels of chemicals detected have remained stable and in some cases slightly improved over the monitoring period. The impacted wells on DOP South reflect the ground water contamination originating from the Brio site and do not provide a reliable indicator of the success of the remedial action at the DOP site.

### **Site Inspection**

A site visit was conducted by the EPA RPM on July 18, 2003, to verify the status of the site. The site inspection report is included as Attachment 3. Conditions at the site have not significantly changed since the last review. The site is no longer mowed at the request of the natural resource trustee and the pond on DOP-south was filled in as part of the Brio remedy.

### **Interviews**

Interviews were conducted with key citizens who have had long-term association with the site. Mrs. Marie Flickenger is an area resident, the publisher of the local newspaper and sits on the Board of Regents for the nearby community college. Mr. Dan Martin is the administrator of the adjacent hospital. The EPA RPM interviewed both parties on March 26, 2003. No significant problems regarding the site were identified during the interviews, however, both parties did express some concern over the long-term control of the site and the fact that legal deed notifications had not been implemented by the landowner.

## **VII. Technical Assessment**

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD. The cover system has achieved the remedial objectives to minimize direct contact with, or ingestion of, contaminants in the soil.

Operation and maintenance of the cap and drainage structures has, on the whole, been effective. The DOP Task Force conducts routine inspections of the site and has maintained the site effectively.

The institutional controls called for in the ROD have only been partially implemented. The current landowner for the site entered into a consent decree that included provisions for property restrictions. Although the landowner has complied with the provisions, the filing of deed notices has not been accomplished.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

Since the development of the exposure assumptions, the area surrounding the DOP site has changed dramatically. At the time of the RI, the Southbend Subdivision was located immediately adjacent to the north portion of the site. The subdivision has since been abandoned and demolished, substantially reducing the potential receptors. The cleanup levels used to establish the extent of the remedy are still valid, however, since they were based predominantly on a trespasser scenario.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. Most ARARs for soil contamination cited in the ROD have been met. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

**VIII. Issues**

**Table 2 - Issues**

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Temporary removal of the fence on DOP-North	N	N
Recording of deed restrictions	N	Y

**IX. Recommendations and Follow-Up Actions**

**Table 3 - Recommendations and Follow-Up Actions**

Issue	Recommendations / Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Temporary removal of fence	Replace fence	DOP Task Force	EPA	8/30/2003	N	N
Recording of deed restrictions	Enforce existing Consent Decree with the landowner	DOJ	EPA	12/30/2003	N	Y

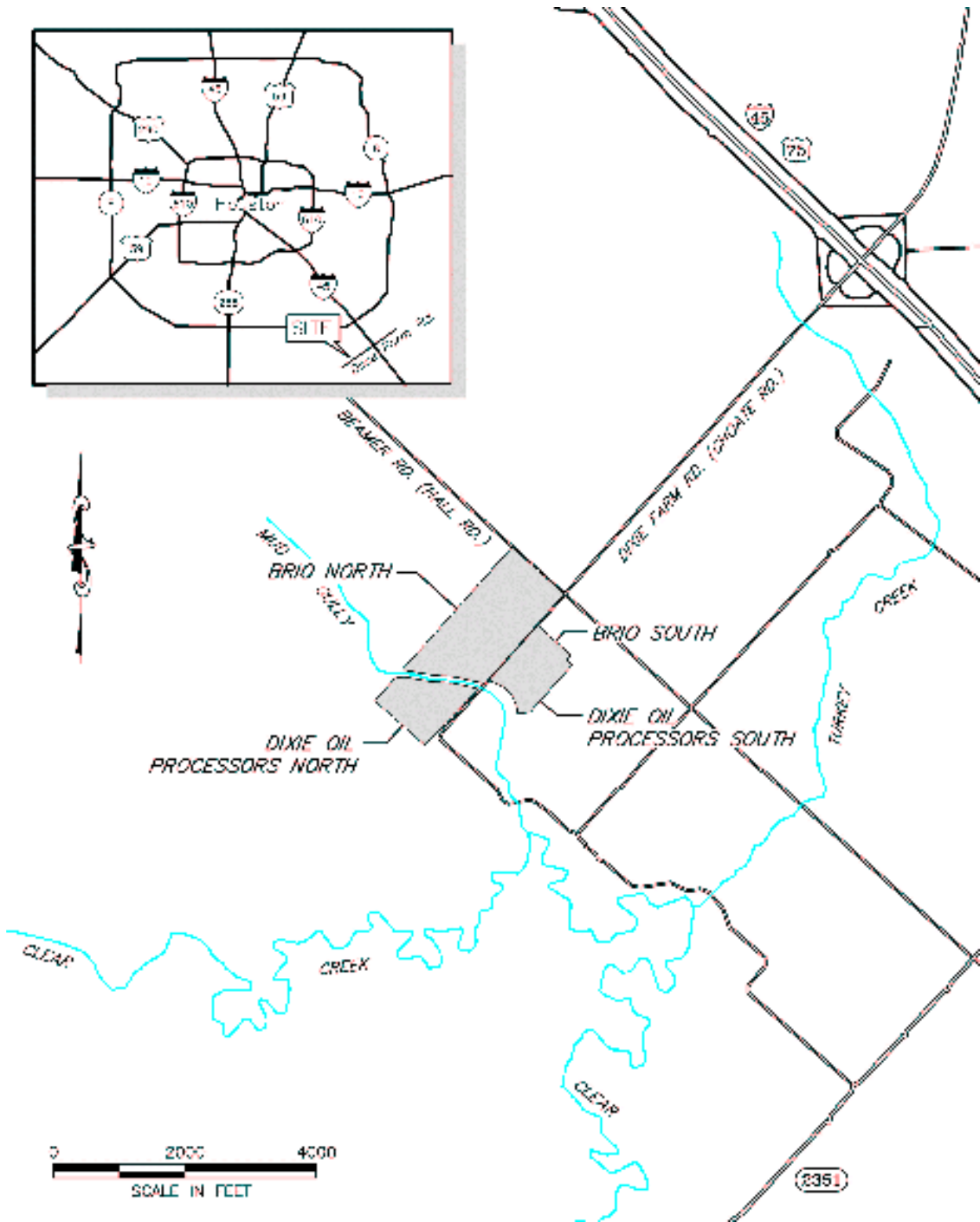
**X. Protectiveness Statement**

The remedy at the DOP site is currently protective of human health and the environment. However, in order for the remedy to be protective in the long-term, full implementation of the institutional controls is required.

**XI. Next Review**

The next five-year review for the DOP site is required by August 2008, five years from the date of this review.

## **ATTACHMENTS**



**Attachment 1**



## **Attachment 2**

### **List of Documents Reviewed**

DOP Site, 17th Groundwater Sampling Event, November 2002

DOP Site, Post Closure Monitoring, Operations and Maintenance Plan, January 1999

DOP Site, Five Year Review, September 1998

DOP Site, Final Closeout Report, January 1996

DOP Site, Record of Decision, March 1988

**Attachment 3**  
**Site Inspection Form**

DOP Site  
Site Inspection  
July 17, 2003

Acceptable    Not Acceptable

1.    **Drainage Swales and Discharge Structures**

Pathways free of obstructions	<u>  X  </u>	<u>          </u>
Structural Integrity	<u>  X  </u>	<u>          </u>

Comments: Berm on DOP-N that runs parallel to Mud Gully was improved following the gully work performed as part of the Brio construction. The berm was slightly raised, and near the road was moved to inside the fence to allow for better access by Harris County to maintain the gully.

2.    **Mud Gully**

Banks and inlets free of erosion	<u>  X  </u>	<u>          </u>
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Comments: Mud Gully adjacent to DOP-N was lined with articulated concrete block as part of the Brio construction. Banks on DOP-N and DOP-S were vegetated and in good shape.

3.    **Closure Cover**

Settlement of cover	<u>  X  </u>	<u>          </u>
Ponding of water	<u>  X  </u>	<u>          </u>
Debris, animal burrows	<u>  X  </u>	<u>          </u>
Surface tars visible	<u>  X  </u>	<u>          </u>

Comments: No signs of tars or cover settlement. The site cover was saturated due to recent heavy rains, but no standing water was observed.

4.    **Pond**

Erosion of slopes	<u>  NA  </u>	<u>          </u>
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Comments: The pond was filled in as part of the construction on the Brio-S cover system. DOP-S now lies within the containment system implemented for the Brio remedy in 2000.

Acceptable      Not Acceptable

5.      **Ground Cover and Trees**

Adequacy of ground cover        X        \_\_\_\_\_  
Soil erosion        X        \_\_\_\_\_

Comments: No trees observed on the cover system. The ground cover is well established and consists of bermuda grass and native plants. Soil erosion was minimal.

6.      **Fences and gates**

Condition of fence        X        \_\_\_\_\_  
Condition of gates        X        \_\_\_\_\_  
Locks        X        \_\_\_\_\_

Comments: The fence on DOP-N alongside Mud Gully was removed in order to implement the Brio construction. The replacement of the fence is expected to occur within a few weeks as ground conditions permit.

7.      **Signs**

Signs present every 150 feet        X        \_\_\_\_\_  
Sign legible        X        \_\_\_\_\_

Comments:

8.      **Monitor Wells**

Well Integrity        X        \_\_\_\_\_

Comments: All wells were locked and in good condition. Wells on DOP-N had locator poles installed to assist in locating for annual sampling .

Inspected by: John C. Meyer

7/17/03  
Date



DOP-North as north corner. Fence along Mud Gully removed as part of reconstruction work on Brio.



DOP-N interceptor trench



DOP-North center swale



DOP-North center swale drain



DOP-North monitor well with locator pole.



DOP-South cover



DOP-South fenceline along Dixie Farm Road



DOP-South monitor well