ENVIRONMENTAL INDICATOR DETERMINATION REPORT

MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL (CA750)
DUPONT EAST CHICAGO
EAST CHICAGO, INDIANA

Date: February 2005

Project No.: 507427
18983456.00001

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

US EPA RECORDS CENTER REGION 5
1003363

FINAL

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
Interim Final 2/5/99
RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name: DuPont East Chicago Indiana Facility
Facility Address: 5215 Kennedy Avenue in East Chicago, Indiana
Facility EPA ID #: IND005174254

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   _____ If no - re-evaluate existing data, or

   _____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[1] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   X If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

   _____ If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   _____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

The site groundwater analytical data from December 1997 through March 2004 were reviewed. The analytical constituents monitored included the following: antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, and zinc. The groundwater analytical results associated with Pool A (groundwater north of the divide) were compared to EPA Maximum Contaminant Levels (MCLs). The groundwater analytical results associated with Pool B (groundwater south of the divide) were compared to the Indiana Ambient Water Quality Standard (IAWQS) for either Human Health or Chronic Aquatic Life, whichever value was lower.

In Pool A arsenic, nickel, and zinc were the only groundwater constituents to exceed the MCLs. The arsenic concentrations in Pool A ranged from below MCL (0.01 mg/l) to a concentration high of 2.43 mg/l. Nickel concentrations ranged from below MCL (0.073 mg/l) to a concentration high of 0.146 mg/l. Zinc concentrations ranged from below Secondary MCL (5 mg/l) to a concentration high of 48.9 mg/l; see Section 5.3 for more detail).

In Pool B four constituents exceeded the IAWQS within a limited number of monitor wells. In monitor well MW-13, the following three constituents exceeded the IAWQS: chromium, lead, and vanadium. Exceedences of these three constituents were limited to MW-13. In all other Pool B wells, these three constituents were well below the IAWQS.

The only other constituent to exceed the IAWQS was arsenic. The IAWQS Chronic Aquatic value for arsenic is 0.1479 mg/l. This level was consistently exceeded in wells MW-03 (with a concentration high of 17.9 in June 1999) and MW-15 (with a concentration high of 0.561 mg/l in November 1999.

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[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) – skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown – skip to #8 and enter "IN" status code.

Rationale and Reference(s):

YES	Western Half Pool A	The groundwater contaminants associated with the western half of Pool A is prevented from migrating off-site by a permeable reactive barrier (PRB). See Section 5.2 for more detail.
YES	Eastern Half Pool A	The constituents associated with the eastern half of Pool A groundwater is prevented from further migration by the presence of a groundwater depression that is associated with the sewer system underlying Riley Park. See Section 5.2 for more detail.
YES	Pool B	The groundwater contaminants associated with Pool B are prevented from further migration by the presence of the Grand Calumet River; the groundwater in Pool B discharges to the Grand Calumet River.

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

__X__ If yes - continue after identifying potentially affected surface water bodies.

_____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

NO	Western Half Pool A	The groundwater associated with the western half of Pool A is treated by a PRB.
NO	Eastern Half Pool A	The groundwater east of the PRB contains constituent concentrations that exceed MCLs for arsenic, nickel, and zinc. However, this plume discharges to the downgradient sewer system associated with Riley Park. From the sewer system the water is sent to the City of East Chicago Treatment Facility. The groundwater constituent concentrations associated with Riley Park were sampled in November of 2004 and were below current drinking water standards for metals.
YES	Pool B	The groundwater associated with Pool B discharges to the Grand Calumet River.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

__X__ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Constituent concentrations in well MW-13 (chromium, lead, and vanadium) are less than 10 times the IAWQS. However, the arsenic concentrations detected in well MW-03 are greater than 10 times the IAWQS.

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

__X__ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be **"currently acceptable"**) - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s):

A groundwater to surface water interface dilution factor was applied to the IAWQS values to account for the interaction of groundwater to surface water. Comparing the groundwater constituent concentrations to the adjusted IAWQS value determined that no constituents were in exceedence. Sampling of surface water in the Grand Calumet River in June of 2005 by EPA staff both upstream and downstream of the DuPont facility yielded concentrations of lead, arsenic and zinc below current drinking water maximum contaminant limits (MCLs).

DuPont will select and implement a remedy in the CMS/CMI phase of this project, to remove source metals contaminants from groundwater before entering the Grand Calumet River

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[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

__X__ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no - enter "NO" status code in #8.

_____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Perimeter monitoring wells and PRB specific wells will be monitored by DuPont on a regular basis to ensure that plume concentrations and plume widths remain stabilize. A copy of the current site groundwater monitoring program which is being performed voluntarily, can be found in Appendix A of the Environmental Indicator Report submitted by DuPont. The USEPA acknowledges that dissolved metal ground-water loads will be sorbed onto existing fine-grained organic rich soils in the Grand Calumet River, therefore we anticipate that additional remediation and monitoring will be needed to prevent recontamination of sediments after the anticipated dredging of the river is complete.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

X YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **DuPont East Chicago Indiana Facility**, EPA ID# **IND005174254**, located **5215 Kennedy Avenue in East Chicago, Indiana**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

____ IN - More information is needed to make a determination.

Completed by (signature) Brian P. Freeman Date 6/15/05

(print) Brian P. Freeman

(title) Sr. Chemist, Corrective Action Project Manager.

Supervisor (signature) George Hamper Date 6-29-05

(print) George Hamper

(title) Chief, WPTD/ECAB Corrective Action Section

(EPA Region or State) Region 5

Locations where References may be found:

DuPont East Chicago Corrective Action Files
Federal Records Center
US EPA Region 5
77 W Jackson, 7th Floor
Chicago, IL 60604

Contact telephone and e-mail numbers

(name) BRIAN P. FREEMAN
(phone #) 312-353-2720
(e-mail) freeman.brian@epa.gov

DuPont Engineering
Barley Mill Plaza - Bldg. 27
Lancaster Pike & Rte. 141
Wilmington, DE 19805

DuPont Engineering

February 18, 2005

Mr. Brian P. Freeman
Corrective Action Project Manager
U.S. Environmental Protection Agency – Region V
77 W. Jackson Blvd., DE-9J
Chicago, IL 60604-3590

Environmental Indicator Determination Report
Migration of Contaminated Groundwater Under Control (CA750)

Dear Mr. Freeman:

We previously informed you that DuPont would be submitting an evaluation of the environmental indicator "migration of contaminated groundwater under control" (EI CA 750). We understand that the responsibility for EI determinations resides with the U.S. EPA and do not presume to usurp EPA authority or role. However, we believe that pulling together relevant data and using the EPA guidance and score sheet facilitates an appropriate and timely determination. As a result, we have enclosed two copies of this EI Determination Report for your review.

Our report concludes that "migration of contaminated groundwater (is) under control". As a result DuPont has reached a positive EI determination for EI CA 750.

If you have any questions or comments, please call Alan Egler at (302) 892-1296.

Sincerely,

Hugh J. Campbell, Jr.
DuPont Corporate Remediation Group
Business Team Manager

cc: Kevin Garon, DuPont
Bernie Reilly, DuPont
Alan Egler, URS Diamond
Dana McCue, URS Diamond
Phillip Chen, URS Diamond

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1.0 INTRODUCTION

1.1 Environmental Indicator Background

The DuPont East Chicago facility has been designated by the United States Environmental Protection Agency (USEPA) as one of the Corrective Action (CA) Baseline facilities that will comply with the 1993 Government Performance Results Act (GPRA). Compliance with the GPRA for the Resource Conservation and Recovery Act (RCRA) CA Program is measured by achieving a positive determination with two environmental indicators (EIs): migration of contaminated groundwater under control (EI RCRIS Code CA750) and current human exposures under control (EI RCRIS Code CA725). As a "Baseline" facility, it is desired that compliance with the two relevant EIs be achieved in 2005.

1.2 Report Purpose and Contents

This document provides the results of the EI CA750 determination completed for the DuPont East Chicago facility. This report includes the following information:

- Site History and Background
- Overview of EI CA750 process
- Review of EI CA750 form and associated response
- EI CA750 Supporting Information
- Summary
- References

The EI CA725 determination (Current Human Exposure Under Control) has been completed in a separate report.

2.0 SITE HISTORY AND BACKGROUND

The following sections include a brief summary of the DuPont East Chicago facility history. Information contained in these sections is summarized from the *Phase I RCRA Facility Investigation (RFI) Work Plan* and *Phase I RFI Report*, submitted to the USEPA in May 1999 and September 2000, respectively.

2.1 Facility Location and Setting

The DuPont East Chicago facility (site or facility) is located at 5215 Kennedy Avenue, East Chicago, in Lake County, Indiana (see Figure 1). Of the 440 acres at this address roughly 430 acres are contiguous and constitute the "Facility." The site is bounded on the north by the Riley Park residential area and various commercial properties, the south by the East Branch of the Grand Calumet River, the east by commercial properties (including the City of East Chicago Solid Waste Transfer Station), and the west by Kennedy Avenue and the former USS Lead Refinery.

In 1892 the Grasselli Corporation constructed an inorganic chemical manufacturing facility at this site. Development occurred primarily within the western part of the property. The southern part of this developed area was used mainly for manufacturing purposes and is sometimes referred to as the primary manufacturing area (see Figure 2). The northwest quadrant of the developed area, and the eastern edge of the developed area, were used for waste management purposes. The eastern-most part of the site, sometimes referred to as the "natural area," is not developed.

The land surface within the developed area consists predominantly of fill material. One area in the southwestern part of the "natural area" is included as part of the waste management area model because of the presence of fill along the Grand Calumet River bank associated with stream channel relocation. The natural area consists primarily of natural sand, and its surface exhibits the dune and swale topography present in the region prior to development.

Vegetative cover is well developed in the natural area and is becoming established throughout the waste management areas. Little habitat exists within the manufacturing areas, where roads, paved areas, and rubble cover the land surface. Precipitation readily infiltrates the permeable fill and sand deposits present at the site. Storms generate little runoff because of infiltration and the nearly flat topography.

2.2 Facility History

The Grasselli Corporation began manufacturing at the East Chicago facility in 1893. DuPont operated the facility for Grasselli from 1927 through 1936. Grasselli formally deeded the entire property to DuPont on October 31, 1936, and the facility has since been owned and operated by DuPont. Operations peaked around 1945 and began to decline after World War II. Between 1950 and 1970, the facility employed 700 workers. In 1990, it employed 52 workers to manufacture two products – sodium silicate and colloidal silica. Manufacturing operations, including support activities, now cover 28

acres in the southwest corner of the site. The work force consisted of about 40 employees in early 2000 when the business was sold to W.R. Grace Company.

2.3 Production History

Over its 105-year lifetime, the DuPont East Chicago facility produced more than 100 products, primarily inorganic acids and chemicals; various chloride, ammonia, and zinc products; and inorganic agricultural chemicals. Organic chemical manufacturing began in 1948, after more than 50 years of plant operation, and ended in 1986. Organic chemical manufacturing consisted primarily of trichlorofluoromethane (TCFM) or Freon® products. Freon production by DuPont was initiated at the Federal government's request. In addition, several organic herbicides and insecticides were also manufactured. The facility now manufactures a colloidal silica product (Ludox®) and a sodium silicate solution. These products are used in x-ray film; photographic paper; pigments; nonslip coatings; low phosphate detergents; and metal castings for aerospace, medical, and recreational products. A more detailed summary of the various raw materials, products, and waste streams at each manufacturing area is contained in Volume 2 of the *Current Conditions Report* (CCR) (CH2M HILL, 1997).

2.4 Hydrogeology

Groundwater is present at the site approximately 0 to 10 feet below ground in the Calumet Sand underlying the facility. The aquifer material consists of sand and, in some instances, fill or peat overlying the sand. The base of the sand is about 35 feet beneath the land surface. The sand lies upon a relatively flat impermeable clay till.

Groundwater flows away from an east-west trending groundwater divide that runs through the developed part of the facility. The groundwater system underlying the site has been subdivided into pools which have been identified as groundwater Pools-A (located north of the groundwater divide) and Pool B (located south of the groundwater divide). On the south side of the divide (Pool B), groundwater flows south and discharges to the Grand Calumet River. On the north side of the divide (Pool A), groundwater flows to the north toward Riley Park, a salvage yard, and trucking operations. Water level data showed the presence of a local groundwater depression in Riley Park (see Figure 2-9 of CH2M HILL, 1997). The groundwater depression at Riley Park is caused by the infiltration of groundwater into sewers and basement sumps. Based on hydrologic studies performed in the area by Greeman (1995), Kay, et.al. (1996, 2002) and others, DuPont concludes that the groundwater depression associated with the Riley Park sewers captures (i.e., controls) groundwater that is migrating northward from the DuPont facility.

3.0 OVERVIEW OF EI CA750 PROCESS

In 1999, the USEPA developed guidance to assist in the EI determination process (USEPA, 1999). The guidance document provides the EI evaluator with a scoresheet to document EI determinations. This scoresheet is completed by addressing the following stepped approach:

- Step 1 – *Has all available relevant/significant information on known and reasonably suspected releases... subject to RCRA Corrective Action... been considered in this EI determination?*
- Step 2 – *Is groundwater known or reasonably suspected to be "contaminated" above appropriately protective "levels"...from releases subject to RCRA Corrective Action?*
- Step 3 – *Has migration of contaminated groundwater stabilized...as defined by the monitoring locations designated at the time of this determination?*
- Step 4 – *Does "contaminated" groundwater discharge into surface water bodies?*
- Step 5 – *Is the discharge of "contaminated" groundwater likely to be insignificant?*
- Step 6 – *Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable?"*
- Step 7 – *Will groundwater monitoring/measurement data ...be collected in the future to verify that contaminated groundwater has remained within the ... dimensions of the "existing area of contaminated groundwater?"*
- Step 8 – EI Determination Conclusion

4.0 EI CA750 FORM

4.1 Item #1

Has all available relevant/significant information on known and reasonable suspected releases to the groundwater media, subject to RCRA Corrective Action been considered in this EI determination?

Applicable investigations and groundwater monitoring results were reviewed for this EI determination. The environmental studies conducted at the DuPont East Chicago include the following:

- ❑ 1990 Phase II Environmental Site Assessment (CH2M HILL)
  - Groundwater
  - Riley Park sumps and sewers
- ❑ 1991 – 1992 Spring Water Quality Assessment (CH2M HILL)
  - Seep water
- ❑ 1992 Phase III Environmental Site Assessment (CH2M HILL)
  - Groundwater
  - In-situ groundwater
  - Soil (two surface soil, 55 subsurface soil)
- ❑ 1998-1999 Sediment Characterization Study (Exponent)
  - Surface water (Grand Calumet River 1998 and 1999; and Wetlands Sampling 1998)
  - Sediment (Wetlands Sampling 1998)
- ❑ 1999 –2001 Phase I RFI (URS Diamond)
  - Groundwater (installation of seven new wells)
  - Five rounds of groundwater monitoring from 29 wells
  - Soil (180 soil samples from 137 locations – both surface soil and subsurface soil)
- ❑ 2000 Environmental Baseline Assessment (URS Diamond)
  - Groundwater (sampled five wells located within active manufacturing area)
  - Surface soil from 30 locations within active manufacturing area
- ❑ 2003 Phase II RFI (URS Diamond)
  - Groundwater (sampled perimeter wells located within active and former manufacturing area)

- 44 surficial soil samples collected from nine solid waste management units (SWMUs) and one area of concern (AOC)
- Continuous soil samples collected from five SWMUs and two AOCs to assist in determining the potential for migration of constituents to groundwater.

❑ 2004 Riley Park Sump Sampling (URS Diamond, USEPA)

- Groundwater (sampled four sumps located within the southern most blocks of Riley Park)

Since the EI CA750 addresses current groundwater conditions, not all of the above documents were applicable. To determine the current condition of the groundwater underlying the DuPont East Chicago facility the available groundwater monitoring data from 1997 through 2004 was reviewed to determine groundwater conditions and trends. In addition, sump water samples and sewer system samples collected in 1990, and sump water samples collected in 2004, from the Riley Park residential area were reviewed for this EI determination.

The following environmental quality data were considered but were not included in the EI determination data set because they are not applicable, sample locations in relation to SWMUs and AOCs are not known, or more recent and complete data sets were available:

❑ Groundwater data that were collected prior to the Phase I RFI were not included.

❑ Surface water sample that was collected from an upgradient location within the East Branch of the Grand Calumet System is not representative of potential site impact and, therefore, is not appropriate for the EI determination.

❑ Sediment along and within the East Branch of the Grand Calumet System was not evaluated as part of EI analysis because it is being managed under the Natural Resource Damage Assessment (NRDA) settlement; therefore, data collected during the Exponent investigation were not utilized.

❑ Historical data that were collected by others prior to Phase II Environmental Site Assessments were not included.

4.2 Item #2

Is groundwater known or reasonably expected to be "contaminated" above appropriately protective levels? If yes – continue after identifying key contaminants, citing appropriate "levels" and referencing support documentation.

The site groundwater analytical data from December 1997 through March 2004 was reviewed. The analytical constituents monitored included the following: antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, and zinc. The groundwater analytical results associated with Pool A (groundwater north of the divide) were compared to EPA Maximum Contaminant Levels (MCLs). The groundwater analytical results associated with Pool B (groundwater south of the divide) were compared to the Indiana Ambient Water Quality Standard (IAWQS) for either Human Health or Chronic Aquatic Life, whichever value was lower.

In Pool A arsenic, nickel, and zinc were the only groundwater constituents to exceed the MCLs. The arsenic concentrations in Pool A ranged from below MCL (0.01 mg/l) to a concentration high of 2.43 mg/l. Nickel concentrations ranged from below MCL (0.073 mg/l) to a concentration high of 0.146 mg/l. Zinc concentrations ranged from below MCL (5 mg/l) to a concentration high of 48.9 mg/l; see Section 5.3 for more detail).

In Pool B four constituents exceeded the IAWQS within a limited number of monitor wells. In monitor well MW-13, the following three constituents exceeded the IAWQS: chromium, lead, and vanadium. Exceedences of these three constituents were limited to MW-13. In all other Pool B wells, these three constituents were well below the IAWQS.

The only other constituent to exceed the IAWQS was arsenic. The IAWQS Chronic Aquatic value for arsenic is 0.1479 mg/l. This level was consistently exceeded in wells MW-03 (with a concentration high of 17.9 in June 1999) and MW-15 (with a concentration high of 0.561 mg/l in November 1999); see Section 5.5 for more detail.

4.3 Item #3

Has the migration of contaminated groundwater stabilitzed (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater" as defined by monitoring locations designated at the time of this determination?

If Yes – continue after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain with the (horizontal or vertical) dimensions of the "existing area of groundwater contamination

YES	Western Half Pool A	The groundwater contaminants associated with the western half of Pool A is prevented from migrating off-site by a permeable reactive barrier (PRB). See Section 5.2 for more detail.
YES	Eastern Half Pool A	The constituents associated with the eastern half of Pool A groundwater is prevented from further migration by the presence of a groundwater depression that is associated with the sewer system underlying Riley Park. See Section 5.2 for more detail.
YES	Pool B	The groundwater contaminants associated with Pool B are prevented from further migration by the presence of the Grand Calumet River; the groundwater in Pool B discharges to the Grand Calumet River. See Section 5.4 for more detail.

4.4 Item #4

Does "contaminated" groundwater discharge into surface water bodies?

NO	Western Half Pool A	The groundwater associated with the western half of Pool A is treated by a PRB.
NO	Eastern Half Pool A	The groundwater east of the PRB contains constituent concentrations that exceed MCLs for arsenic, nickel, and zinc. However, this plume discharges to the downgradient sewer system associated with Riley Park. From the sewer system the water is sent to the City of East Chicago Treatment Facility. The groundwater constituent concentrations associated with Riley Park were assessed and deemed not a concern (see Section 5.2 and 5.3 for more details).
YES	Pool B	The groundwater associated with Pool B discharges to the Grand Calumet River. See Section 5.4 for more details.

4.5 Item #5

Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level", and there are no other conditions [e.g., the nature, and number, of discharging contaminants, or environmental setting], which significantly increase the potential for unacceptable impacts to the surface water, sediments, or eco-systems at this concentrations)?

N/A	Western Half Pool A	The arsenic concentrations are being treated by a PRB prior to leaving the site. The treated groundwater is then controlled by the downgradient groundwater depression associated with Riley Park (EI CA750 states if "Yes – skip to #7").
N/A	Eastern Half Pool A	As stated under item #4, the groundwater associated with the eastern half of Pool discharges to the downgradient sewer system associated with Riley Park. From the sewer system the water is sent to the City of East Chicago Treatment Facility. The groundwater constituent concentrations associated with Riley Park were assessed and deemed not a concern (see Section 5.2 and 5.3 for more details). (EI CA750 states if "Yes – skip to #7").
NO	Pool B	Constituent concentrations in well MW-13 (chromium, lead, and vanadium) are less than 10 times the IAWQS. However, the arsenic concentrations detected in well MW-03 are greater than 10 times the IAWQS (see Section 5.5 for more details).

4.6 Item #6

Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments, or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented.

YES	Pool B	Groundwater does not contain the organisms that the IAWQS is designed to protect. Therefore, a direct comparison of groundwater concentration values to this surface water standard (the IAWQS) may be inappropriate. To compensate, a site specific dilution factor was applied to the IAWQS values to account for the interaction of groundwater to surface water. Comparing the groundwater constituent concentrations to the adjusted IAWQS value determined that no constituents were in exceedence. See Section 5.5 for more details.

4.7 Item #7

Will Groundwater monitoring/measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary)dimensions of the "existing area of contaminated groundwater?"

YES	Pool A and Pool B	Perimeter monitoring wells and PRB specific wells will be monitored on a regular basis to ensure that plume concentrations and plume widths remain stabilize. A copy of the current site groundwater monitoring program which is being performed voluntarily, can be found in Appendix A.

4.8 Item #8

Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the **DuPont East Chicago Indiana Facility**, EPA ID# **IND005174254**, located **5215 Kennedy Avenue in East Chicago, Indiana**. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

5.0 EI CA750 SUPPORTING INFORMATION

5.1 General Groundwater Flow

Groundwater in the Calumet Sand, which underlies the DuPont East Chicago facility, flows away from an east-west trending groundwater divide that runs through the center of the site. Groundwater on the north side of the divide (referred to as Pool A) flows to the north toward the northern site boundary. Groundwater on the south side of the divide (referred to as Pool B) flows to the south toward the Grand Calumet River where it discharges.

5.2 Pool A – Groundwater Flow

This section, and associated subsections, will discuss groundwater flow associated with Pool A groundwater. For ease of discussion the Pool A groundwater has been divided into Pool A-West and Pool A-East.

DuPont has defined Pool A groundwater as the groundwater on the north side of the groundwater divide. The groundwater on the north side of the divide exits the northern site boundary flowing in a northward direction.

In general, once off-site, the groundwater associated with Pool A discharges into a groundwater sink created by the sewer system and residential sumps that underly the neighboring Riley Park residential area. From the sewer system the groundwater travels to the City of East Chicago treatment system, where treated water is discharged to Lake Michigan.

Groundwater in the area is not used as a source of drinking water. However, in some situations, limited and short-term human contact may occur if groundwater collects in basement sumps associated with Riley Park homes. Human exposure to groundwater in the sumps was assessed as part of the USEPA EI725. This assessment concluded that the presence of groundwater in residential sumps is not a concern.

5.2.1 Pool A-West: Groundwater Flow

Based on a study by CH2M HILL (1991), it was concluded that the groundwater associated with the western half of Pool A flows due north towards the Riley Park residential development (see Figure 3). A study by CH2M HILL (1991) determined that the sewer system and sumps underlying Riley Park act as a sink to capture the groundwater from the DuPont facility. Additional detail pertaining to sewer system groundwater sinks can be found Section 5.2.2.

For precautionary purposes, a PRB was installed within this area of Pool A to treat the groundwater in the western half of Pool A prior to exiting the site. The location of the PRB is noted in Figure 4. Specifics regarding the PRB have previously been delivered to the EPA for their review.

5.2.2 Pool A-East: Groundwater Flow

The groundwater flow pattern associated with the eastern half of Pool A has been deduced based on multiple assessments of on-site groundwater by DuPont, and by multiple assessments of groundwater in the East Chicago Area by various organizations (USGS, CH2M HILL). Within the DuPont facility, groundwater in the eastern half of Pool A (Pool A-East) flows north towards the site's northern boundary. North of the DuPont site, the groundwater flow direction shifts to the west where it is controlled by a groundwater sink created by subsurface sewer systems. Details pertaining to the groundwater flow associated with the DuPont facility, both on and off-site, are as follows:

- Multiple groundwater flow analyses were performed on-site by DuPont to determine the groundwater flow pattern underlying the site. This analysis concluded that groundwater within Pool A-East exits the site traveling in a northerly direction. The groundwater potentiometric surface maps produced for the site can be found in Appendix B.
- Multiple groundwater studies published with the USGS were performed by Fenelon and Watson (1993), Greeman (1995), Kay, et. al. (1996, 2002), Watson (1989), and Willoughby and Siddeeq (2001). Groundwater flow figures associated with these six studies identified the following two items of interest in the East Chicago Area: 1) a large groundwater depression/sink exists north of the DuPont East Chicago site; and 2) due to the presence of the groundwater drepression/sink and the Indiana Harbor Canal, a westerly groundwater flow component exists from the area of the Gary Municipal Airport towards the groundwater sink/Harbor Canal (see Figure 1 for airport location, and Appendix C for USGS document title pages and associated groundwater flow figures). The presence of large groundwater depressions/sinks influencing groundwater flow in the area is common. Due to the age of the sewer systems, groundwater is able to leak into the sewer piping where it is transported to the local sewer treatment system. The ability for the old sewer systems in this area to influence groundwater and create a large groundwater depression/sink is a well known effect [Greeman 1995, and personnel telephone discussion between Philip Chen (URS Diamond/DuPont CRG) and Theodore Greeman (USGS IDEM) in April, 2003].
- The effect of sewer systems on groundwater flow is substantiated by a study performed by CH2M HILL (1991). CH2M HILL determined that the sewer system underlying Riley Park acts as a large groundwater sink, removing groundwater from the Calumet Sand aquifer system. The combined effects of sump pumps associated with Riley Park basements, and leaking sewers underlying Riley Park, have created a depression in the water table that runs east-west within the center of the 4800 block in Riley Park. The groundwater potentiometric surface map produced by CH2M HILL (see Figure 3) indicates that this Riley Park groundwater depression extends throughout the Riley Park area. The existence of the groundwater depression at Riley Park substantiates the presence of a groundwater sink north of the DuPont East Chicago Site

Based on the above studies by DuPont, the USGS, and CH2M HILL, it can be concluded that groundwater within Pool A-East flows north towards the DuPont site's northern boundary. North of the DuPont site, groundwater flow, which is influenced by the nearby groundwater depression, shifts to the west where it is controlled by the Riley Park groundwater sink.

5.2.3 Summary Pool A Groundwater Flow

Figure 5 "Area Wide Groundwater Flow Schematic" combines the groundwater studies performed by DuPont, CH2M HILL, and the USGS. This figure indicates that groundwater exiting the western half of Pool A, will travel north and discharge into the sewer-related groundwater sink that underlies Riley Park.

The groundwater associated with Pool A-East initially exits the site traveling in a northward direction. Due to the influence of the Riley Park groundwater depression, the Pool A-East groundwater exiting the DuPont facility shifts to the west and is controlled by the Riley Park groundwater depression/sink.

5.3 Pool A – Analytical Data

This section, and associated subsections, will discuss groundwater analytical results associated with Pool A groundwater. For ease of discussion, the Pool A groundwater has been divided into Pool A-West, Pool A-East, and Riley Park.

Riley Park sump-water analytical results and the Pool A groundwater analytical data associated with the site perimeter wells were assessed. The Riley Park sump-water results were selected for assessment since, for Pool A groundwater, it is the furthest downgradient exposure point before discharging to the sewer system. The perimeter wells, as opposed to wells located at the center of the site, were selected because the perimeter wells would be the most representative of the groundwater flowing off site (see Figure 6 for the location of the perimeter monitor wells, and Figure 5 for the location of Riley Park). The groundwater analytical data from December 1997 through March 2004 were reviewed. The excel spreadsheet containing this analytical data and well IDs can be found in Appendix D and Appendix E. The analytical constituents monitored included the following: Antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, and zinc. As stated above, the groundwater constituent concentrations were compared to the EPA Federal MCLs.

5.3.1 Pool A-West: Analytical Data

Groundwater analytical data from 1997 through 2004, associated with the Pool A West perimeter wells MW-11, MW-12, MW-21, MW-22, MW-23, MW-24, and MW-25, were assessed. This assessment determined that arsenic is the only constituent within the western half of Pool A to exceed the associated MCLs. The groundwater in the western half of Pool A contained concentrations of arsenic that range from non-detect to 2.43 mg/l; the proposed MCL for arsenic is 0.01 mg/l. The Pool A West groundwater concentration data can be found in Appendix D.

As stated previously, the arsenic concentrations associated with the western half of Pool A are being addressed by a PRB. This PRB was installed in 2002 and was designed specifically to treat arsenic contamination in groundwater. Assessment of the effectiveness of the PRB is currently under study by DuPont. Site-specific pilot studies performed prior to installation indicate that the PRB is capable of treating the arsenic associated with the East Chicago facility. Documents pertaining to the site-specific pilot study, as well as other PRB related documents, have previously been delivered to the EPA for their review.

Any arsenic impacted groundwater situated downgradient of the PRB will be controlled by the Riley Park sewer and residential sumps. The 2004 Riley Park residential sump sampling performed by DuPont and the USEPA determined that the groundwater within the Riley Park residential sumps is not a concern and concentrations were found to be similar to the 1992 sampling event, indicating plume equilibrium.

5.3.2 Pool A-East: Analytical Data

Groundwater analytical data from 1997 through 2004, associated with the Pool A East perimeter wells MW-02, MW-09, and MW-10, were assessed. This assessment determined that the constituents nickel, zinc and arsenic were the only constituents to consistently exceed their respective MCL (see table in Appendix E for analytical results). The constituents nickel and zinc only exceed the MCL within monitor well MW-09; in wells MW-02 and MW-10 these constituents were below MCL concentrations. Arsenic was the only constituent to consistently exceed the MCL in all three monitor wells.

Based on the 1997 through 2004 data associated with perimeter wells MW-02, MW-09, and MW-10, DuPont concludes that the arsenic concentrations associated with all three perimeter wells and the nickel and zinc exceedences associated with well MW-09 have stabilized, showing only minor fluctuations in concentration. Graphs depicting the concentrations detected over time in perimeter wells MW-02, MW-09, and MW-10 can be found as Figures 7a, 7b, and 7c.

Based on the groundwater flow information presented in Section 5.2, it can be concluded that the groundwater constituents associated with Pool A East will be controlled by the groundwater depression created by the Riley Park basement sumps and the underlying city sewer system.

5.3.3 Pool A – Riley Park Analytical Data

As stated in Section 5.2, groundwater flow data indicate that groundwater from the DuPont East Chicago Facility is migrating toward the Riley Park area where flow is controlled by sewers and residential sumps associated with Riley Park. Potential for contact with basement sump water exists for Riley Park residents.

Table 1 lists a summary of the constituents of potential concern associated with the Riley Park Sumps. The groundwater quality in Pool A migrating toward the Riley Park area has been relatively stable with respect to metals concentrations for several years (see Figures 7a, 7b, and 7c). As a result, significant changes were not observed between sump concentrations measured in 1990 and 2004. Arsenic concentrations exceeded the MCL

for this constituent, and iron, sulfate, and zinc exceeded USEPA Secondary MCLs in sump water samples collected. Possible sources of inorganics in groundwater include iron slag that was reportedly used as fill in the area or releases from materials in the northern portion of the site. Concentrations below or near screening levels suggest that intermittent physical contact with water seeping into basements would not likely present an unacceptable health hazard. Even though arsenic has been detected in sump water approximately four times the MCL, the incidental ingestion of this water due to accidental splashing or hand to face contact would be approximately 20 times less than would occur if the sump water were to be used as a source of drinking water [i.e., 50 milliliters (mL)/hour times 2 hours/day = 100 mL/day; versus 2,000 mL/day]; and this potential exposure is therefore insignificant.

Additional information pertaining to the Riley Park Sump sampling and associated results can be found in the DuPont East Chicago USEPA EI 725 document (December 2004).

5.4 Pool B: Groundwater Flow

This section will discuss groundwater flow associated with Pool B groundwater. As stated previously, Pool B consists of the groundwater situated south of the site's groundwater divide between the groundwater divide and the Grand Calumet River. Groundwater on the south side of the groundwater flow divide (Pool B) flows to the south toward the Grand Calumet River where, based on on-site groundwater measurements and various USGS studies, it discharges.

Several USGS documents state that the Grand Calumet River, the Indiana Harbor Canal, and Lake Michigan are the primary groundwater discharge water-bodies in the area (Fenelon and Watson, 1993; Greeman, 1995; Kay, et. al., 1996 and 2002). Groundwater measurements from the DuPont Pool B aquifer consistently indicate a groundwater flow pattern in which groundwater in Pool B travels towards, and discharges into, the Grand Calumet River. Because the Grand Calumet River is a primary groundwater discharge point for the area (Fenelon and Watson, 1993; Greeman, 1995; Kay, et. al., 1996 and 2002), it is highly unlikely that any groundwater associated with Pool B is not captured by the Grand Calumet River. Localized, temporary, groundwater reversals may occur along the Grand Calumet River due to evapotranspiration in highly vegetated areas and a lack of precipitation (Fenlon and Watson, 1993; Greeman, 1995). The localized and temporary groundwater reversal forms a groundwater trough that runs adjacent, and parallel, to the Grand Calumet River (Fenlon and Watson, 1993; Greeman, 1995). Because the groundwater reversal and subsequent trough are temporary, and limited in extent, it is concluded that river water that enters these temporary groundwater troughs will travel along the troughs for eventual discharge back into the river at a downgradient point.

Based on the above it can be concluded that any groundwater associated with Pool B is discharging into the Grand Calumet River. Therefore, the presence of the Grand Calumet River is preventing any further migration of the Pool B groundwater constituents.

5.5 Pool B: Analytical Data

This section will discuss groundwater analytical results associated with Pool B groundwater. Because the Pool B groundwater flows to a surface-water body (Grand Calumet River), the groundwater constituent concentrations associated with Pool B were compared to the IAWQS for Human Health and Chronic Aquatic Life; and the lower regulatory standard of the two was selected. Groundwater in the area is not a source of drinking water; therefore, regulatory values such as MCL were deemed not applicable.

The groundwater data assessed were from the Pool B groundwater site perimeter wells. The perimeter wells, as opposed to wells located at the center of the site, were selected because the perimeter wells would be the most representative of the groundwater flowing off site. The groundwater analytical data from December 1997 through March 2004 were reviewed; the excel spreadsheet containing this analytical data and well IDs can be found in Appendix F. The analytical constituents monitored included the following: antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, and zinc. As stated above, the groundwater constituent concentrations were compared to the IAWQS for either Human Health or Chronic Aquatic Life, whichever value was lower

In monitor well MW-13 the following three constituents exceeded the IAWQS: chromium, lead, and vanadium. Exceedences of these three constituents were limited to MW-13. In all other Pool B monitor wells, these three constituents were well below the IAWQS.

The only other constituent to exceed the IAWQS was arsenic. The IAWQS Chronic Aquatic value for arsenic is 0.1479 mg/l. This level was consistently exceeded in wells MW-03 (with a concentration high of 17.9 in June 1999) and MW-15 (with a concentration high of 0.561 mg/l in November 1999).

However, because groundwater does not contain the organisms that the IAWQS is designed to protect, a direct comparison of groundwater concentration values to the surface water standard (the IAWQS) may be inappropriate. To compensate, a site-specific dilution factor of 5,000 was applied to account for the interaction of groundwater to surface water (see Appendix F for data). A detailed discussion of the dilution factor, and its associated calculation, can be found in the Phase I RFI Report (DuPont, 2002). The results of this site-specific factor when compared to the IAWQS values is as follows:

- IAWQS for Human Health with an applied conservative site-specific dilution factor to account for interaction of groundwater with surface water: The surface water quality criteria are based on the protection of human health (drinking water and fish consumption). The dilution factor was calculated using conservative assumptions and site-specific hydraulic information. The use of a conservative dilution factor is consistent with current USEPA RCRA EI guidance. No constituents exceeded the adjusted AWQ.
- IAWQS for Chronic and Acute Aquatic Life with an applied conservative site-specific dilution factor to account for interaction of groundwater with surface water: The surface water quality criteria is based on the protection of human health (drinking water and fish consumption). The dilution factor was calculated using conservative assumptions and site-specific hydraulic information. The use

of a conservative dilution factor is consistent with current USEPA RCRA EI guidance. No constituents exceeded the adjusted aquatic water quality.

6.0 SUMMARY

Based on the following, DuPont concludes that the "migration of contaminated groundwater" is under control:

- Pool A-West: The arsenic constituent within Pool A-West groundwater is being treated prior to exiting the site by a downgradient PRB. Therefore, the Pool A groundwater is not a concern.
- Pool A-East: Based on the 1997 through 2004 data associated with perimeter wells MW-02, MW-09, and MW-10, it was determined that the constituents nickel, zinc, and arsenic were the only constituents to consistently exceed their respective MCL. However, the arsenic concentrations associated with all three wells, and the nickel and zinc concentrations associated with well MW-09, have stabilized showing only minor fluctuations in concentration. Based on the groundwater flow information for this area, it can be concluded that the groundwater constituents associated with Pool A-East will be controlled by the groundwater depression created by the Riley Park basement sumps and associated city sewer system.
- Riley Park Groundwater: A groundwater assessment of the Riley Park sumps indicates that the groundwater associated with the sumps is not a concern.
- Pool B: The groundwater constituents associated with Pool B are prevented from further migration by the presence of the Grand Calumet River.
- Pool B: As stated in Section 5.5, a site-specific dilution factor of 5,000 was applied to the IAWQS value to account for the interaction of groundwater to surface water associated with Pool B. Once this factor was taken into consideration, no constituents associated with the Pool B groundwater were found to exceed the IAWQS.

7.0 REFERENCES

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____. 1991. Phase II Groundwater Assessment, East Chicago Plant, East Chicago Indiana.

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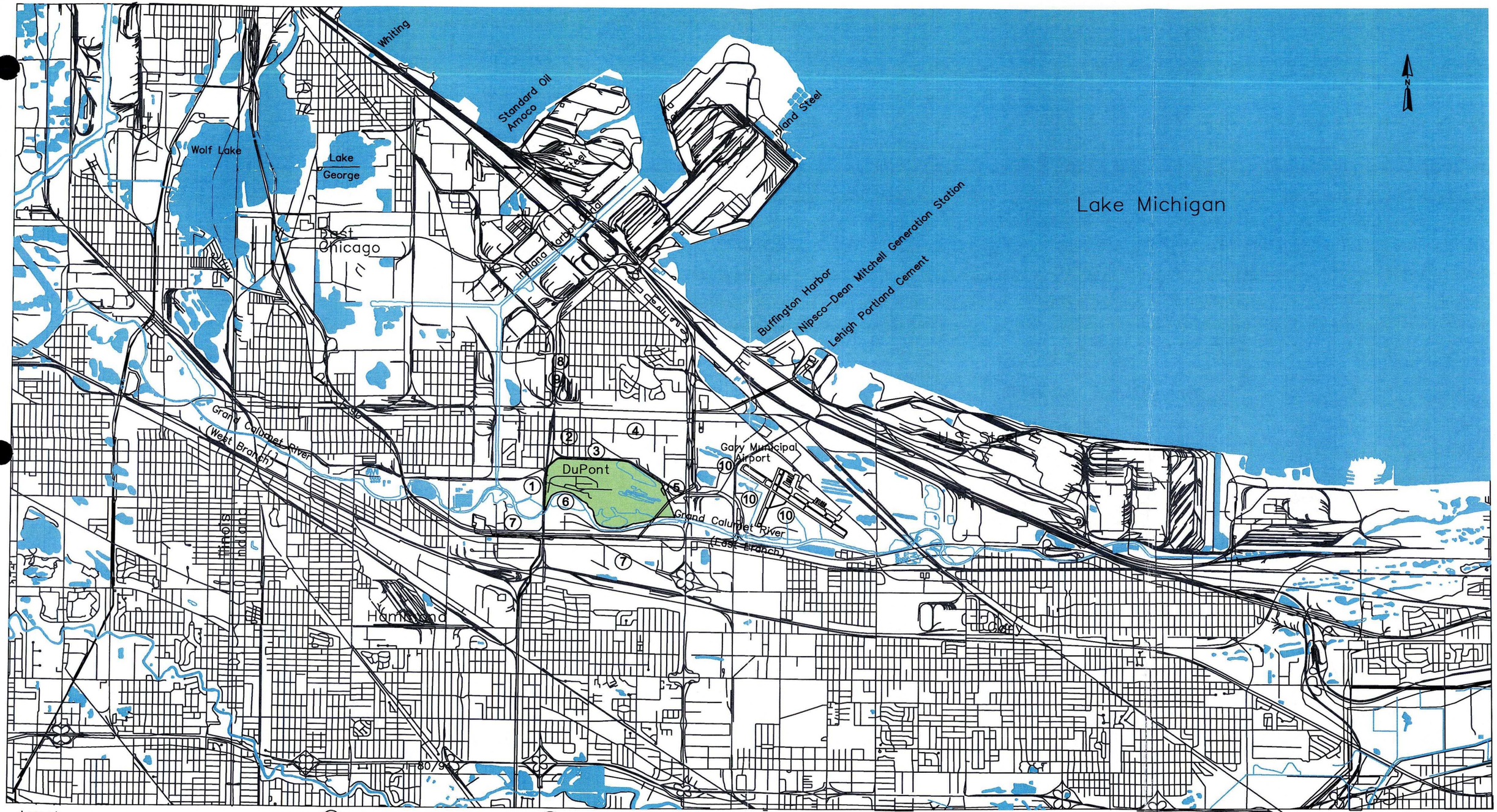
TABLE

Table 1
COPCs in Riley Park Sumps
DuPont East Chicago Facility
East Chicago, Indiana

Analyte[1]	Units	Average Detection	Maximum Detection	Screening Level (SL)	Source[2]	Exceeds?
ARSENIC	ug/L	1.80E+01	3.90E+01	1.00E+01	FED_MCL	**Yes**
CHLORIDE	ug/L	3.00E+04	1.00E+05	2.50E+05	FED_SEC	No
COPPER	ug/L	<10	2.00E+01	1.30E+03	FED_MCL	No
FLUORIDE	ug/L	2.20E+03	3.50E+03	4.00E+03	FED_MCL	No
IRON	ug/L	4.04E+03	1.74E+04	3.00E+02	FED_SEC	**Yes**
SULFATE	ug/L	4.80E+05	1.51E+06	2.50E+05	FED_SEC	**Yes**
ZINC	ug/L	4.20E+01	9.52E+03	5.00E+03	FED_SEC	**Yes**

Notes:
1 = Essential nutrients (such as magnesium) excluded from the evaluation.
2 - Federal Maximum Contaminant Level (FED_MCL) (consistent with Indiana Groundwater Quality Standard) or Federal Secondary Drinking Water Standards (FED_SEC)

FIGURES



Legend

DuPont Property Line

Sources:

USGS Digital Line Graphs 1:100,000

USGS Land Use

Land Cover 1:250,000

Universal Transverse Mercator Projection,
Zone 16, 1983 North American Datum.

1. USS Lead Refinery
2. Riley Park
3. Salvage Yard & G C Trucking
4. Standard Oil Refinery
5. East Chicago Solid Waste Transfer Station
6. Harbison-Walker Refractories
7. Shell Oil Company
8. Robinson Steel
9. Marport Smelting
10. Former Nike Missle Base

0 2640 5280
FEET

	INITIALS
DESIGNED	
DRAWN D.H. ENGLISH	
CHECKED P.J. CHEN	
APPROVED(DESIGN) A.P. EGLER	
APPROVED(CONSTRUCTION)	

DUPONT

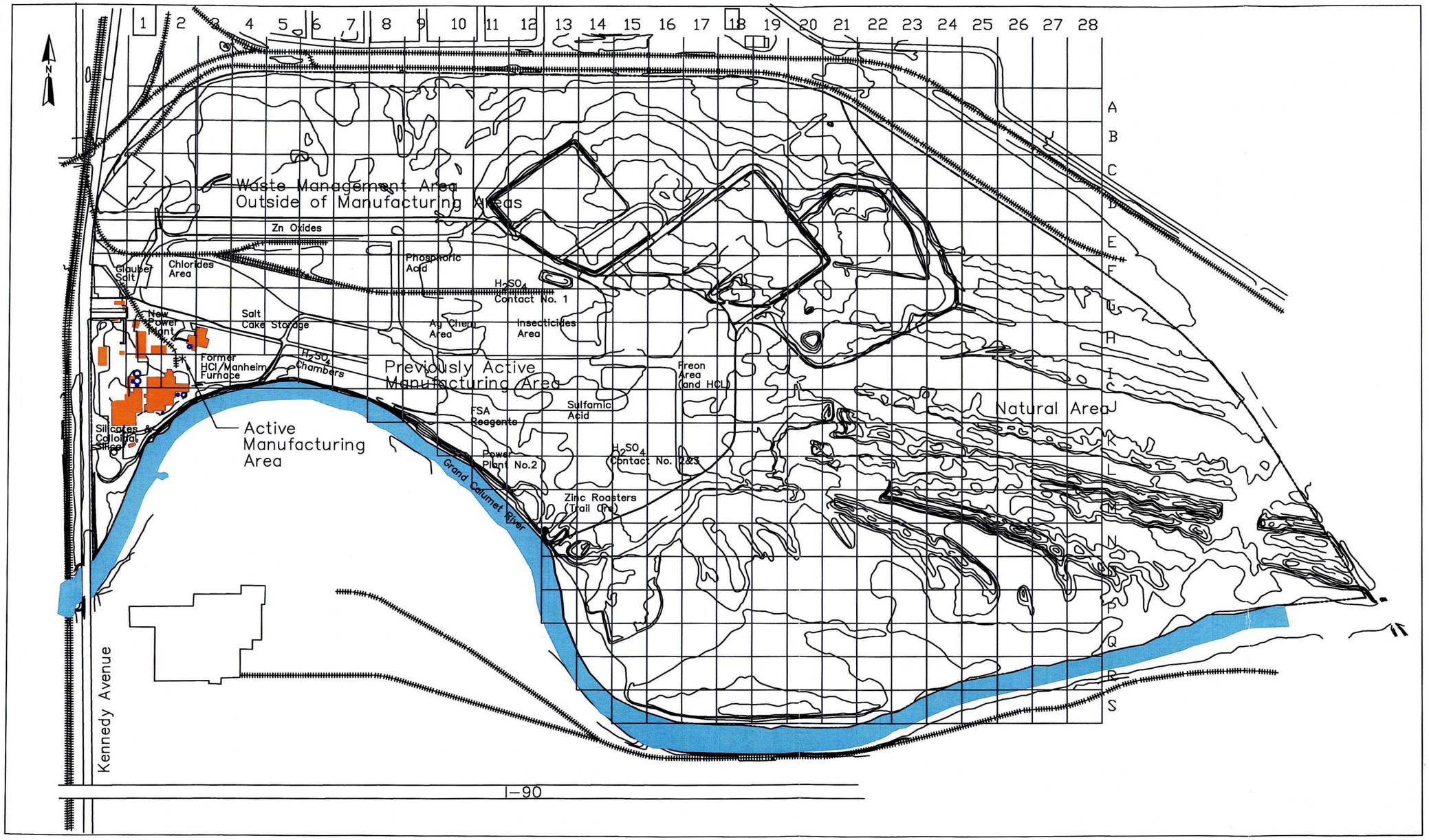
Corporate Remediation Group
An Alliance between DuPont and The W-C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

SITE LOCATION MAP

DuPONT EAST CHICAGO FACILITY
AND NORTHWEST INDIANA REGION
EAST CHICAGO, ILLINOIS

SCALE	DATE	CAD FILE NO.	FIGURE
1" = 1 MILE	SEPT 24, 2004	FIG-1	1



0 300 600
FEET

Legend

- DuPont Property Line
- Contours – 2ft Interval
- Area Boundaries
- * Silicates and Colloidal Silica

Sources:
Plant Drawings

DESIGNED	INITIALS
DRAWN D.H. ENGLISH	
CHECKED P.J. CHEN	
APPROVED(DESIGN) A.P. EGLER	
APPROVED(CONSTRUCTION)	

DUPONT

Corporate Remediation Group
An Alliance between DuPont and The W-C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

SITE MAP

DuPONT EAST CHICAGO FACILITY
AND NORTHWEST INDIANA REGION
EAST CHICAGO, ILLINOIS

SCALE	DATE	CAD FILE NO.	FIGURE
1" = 600'	SEPT 24, 2004	FIG-2	2

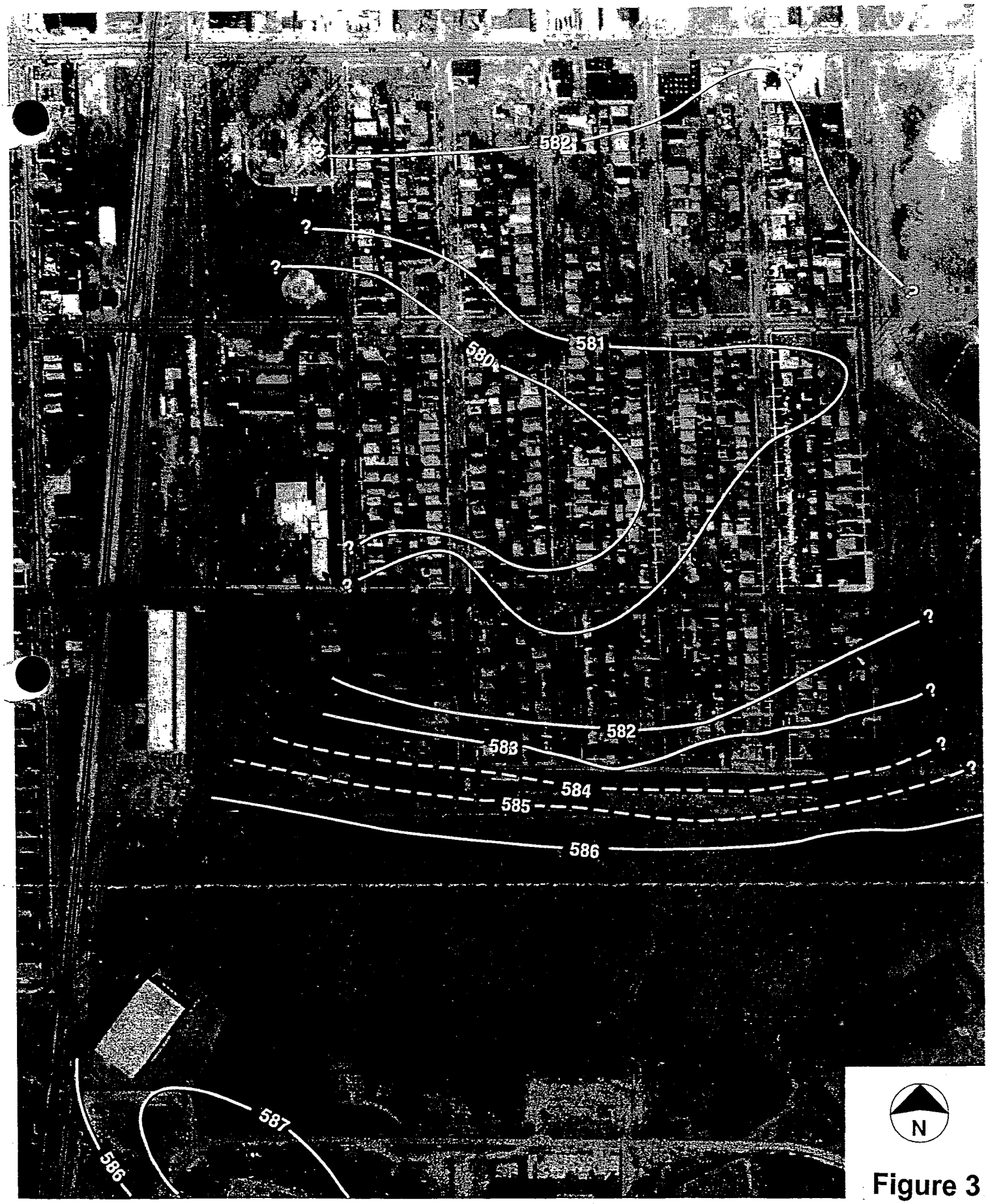


Figure 3

Site Potentiometric Surface, Riley Park and Northern Portion of DuPont Facility September 1990

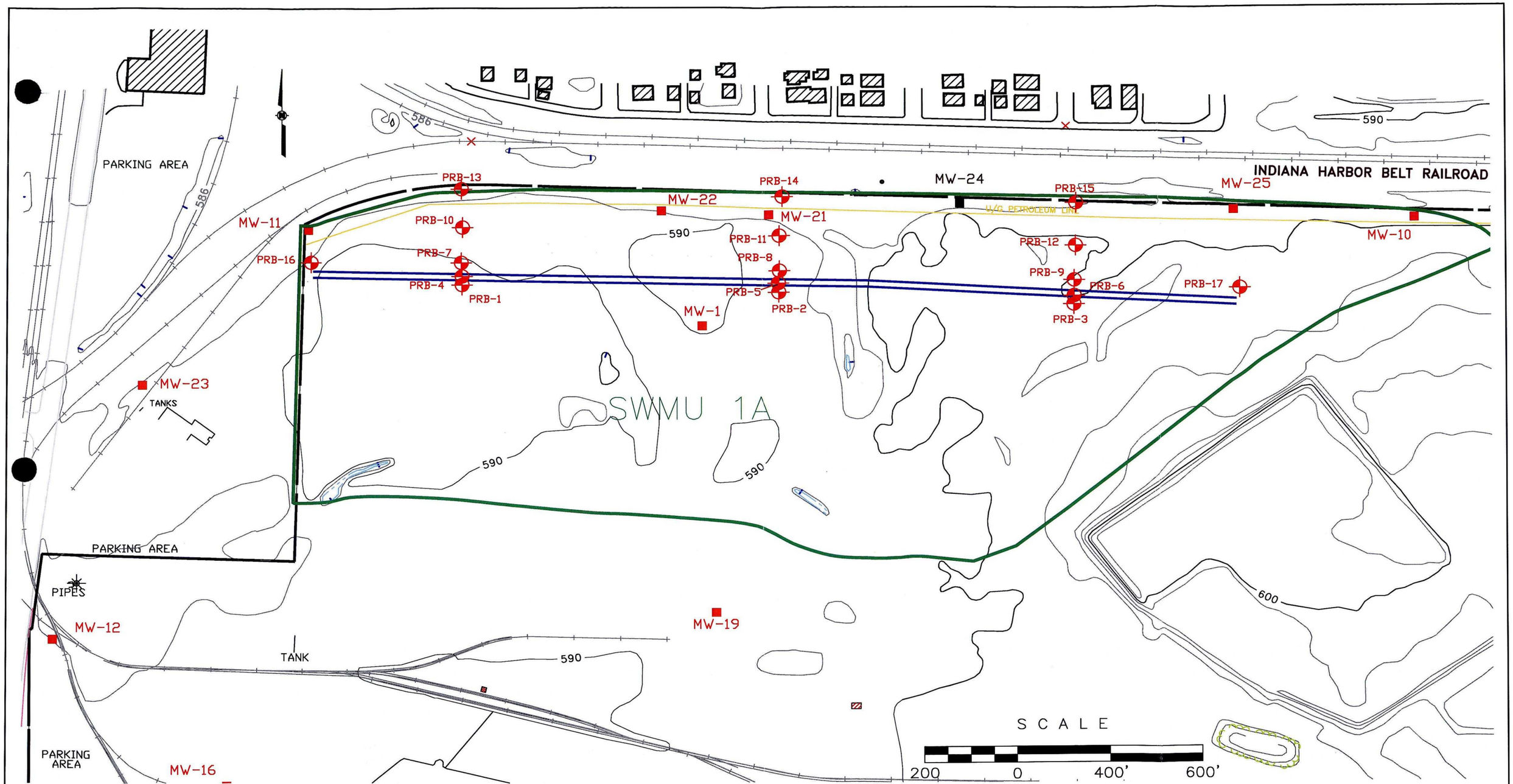
DuPont East Chicago Current Conditions Report

LEGEND

Survey area potentiometric surface data from September 27-29, 1990 sewer infiltration observations.

DuPont facility potentiometric surface data from September 10, 1990 monitoring well water level measurements.

E142837.EC.CC Site Potentio 10-17-97tll



Legend

MW-6 EXISTING MONITORING WELL

PRB-1 POST PRB CONSTRUCTION MONITORING WELL

PRB WALL

SWMU 1A BOUNDARY

DESIGNED	P.J. CHEN	INITIALS
DRAWN	D.H. ENGLISH	
CHECKED	P.J. CHEN	
APPROVED(DESIGN)		
APPROVED(CONSTRUCTION)		

DUPONT

Corporate Remediation Group

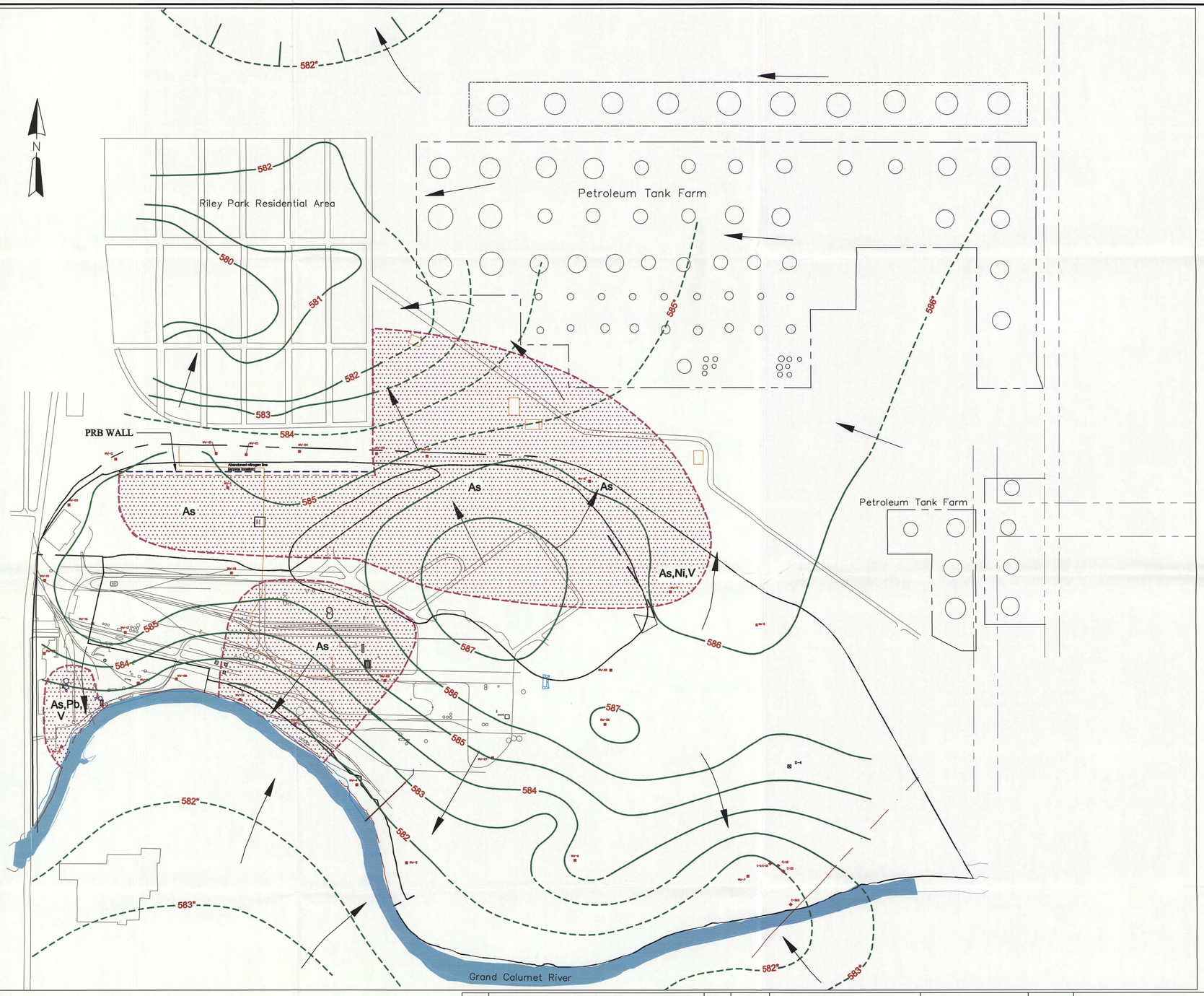
An Alliance between DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

LOCATION OF PRB WALL AND PRB MONITORING WELLS

Quarterly Groundwater Sampling
DuPont East Chicago Site
East Chicago, IN

SCALE	DATE	CAD FILE NO.	FIGURE
As Shown	09/24/2004	FIG. 4	4



LEGEND

- PRB WALL
- 583 GROUNDWATER CONTOUR WITH ELEVATION
- GROUNDWATER CONCENTRATION AREAS
- 583* GROUNDWATER CONTOUR ELEVATIONS ARE INFERRED BASED ON SIX USGS GROUNDWATER STUDIES PERFORMED IN THE EAST CHICAGO AREA. THE USGS STUDIES PRODUCED TEN (10) GROUNDWATER FLOW FIGURES FOR THE FOLLOWING MONTHS: 03/86, 05/86, 09/86, 07/88, 08/88, 02/90, 11/90, 06/92, 09/92, AND 07/97 THROUGH 02/2001.
- GROUNDWATER FLOW DIRECTION

SCALE

400' 0 400' 800'

NO.	REVISIONS	BY	DATE

	INITIALS
DESIGNED P.J. CHEN	
DRAWN D.H. ENGLISH	
CHECKED A.P. EGLER	
APPROVED(DESIGN)	
APPROVED(CONSTRUCTION)	

DUPONT

Corporate Remediation Group
An Alliance between DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

AREA-WIDE GROUNDWATER FLOW SCHEMATIC

DuPont East Chicago Facility
and Northwest Indiana Region
East Chicago, Indiana

SCALE	DATE	CAD FILE NO.	FIGURE
1" = 400'	02/18/2005	FIG. 5	5

Figure 7A: MW-2 Arsenic Dissolved Concentrations

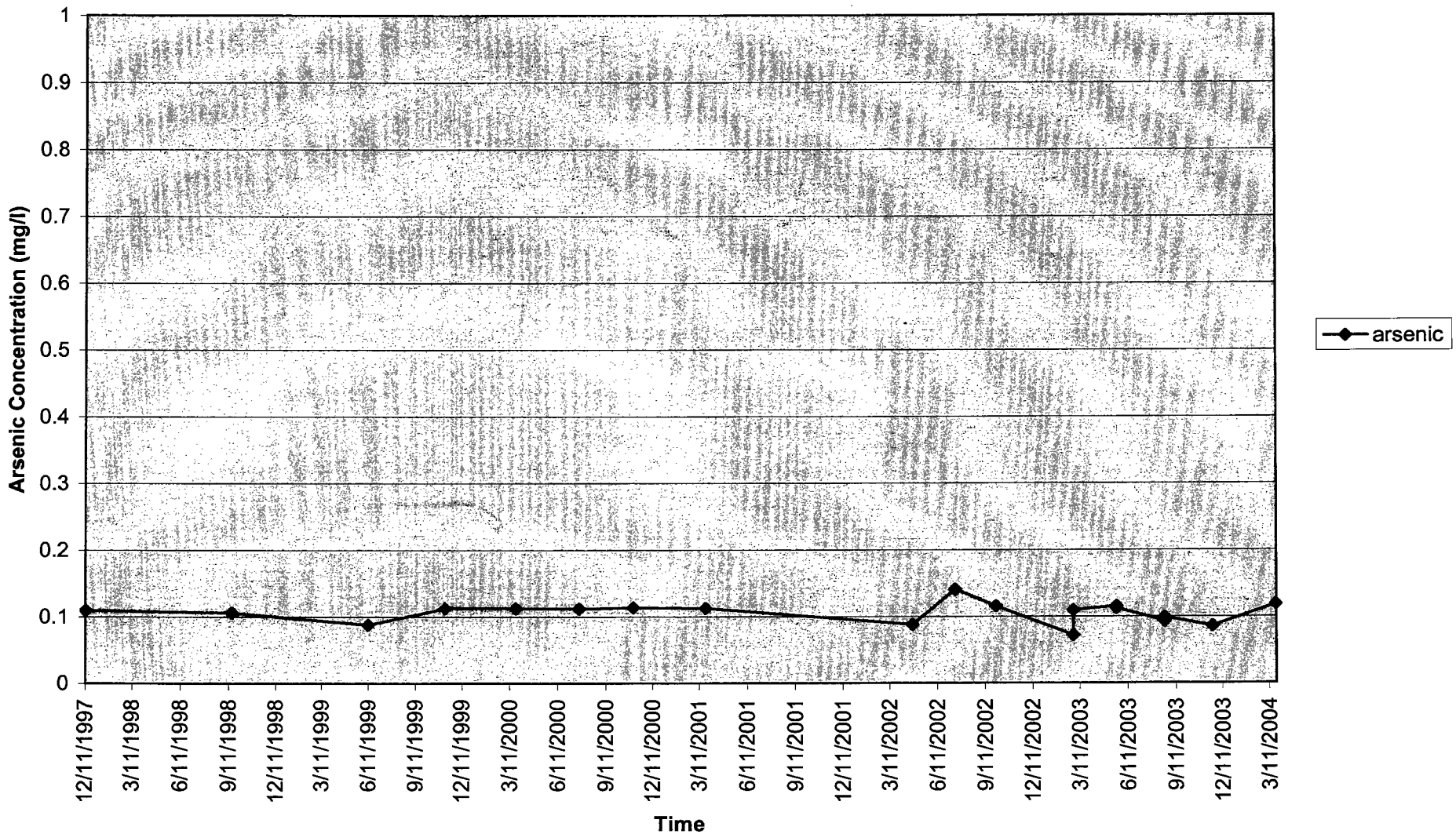


Figure 7B - MW-9 Arsenic, Nickel, Zinc Dissolved Concentrations

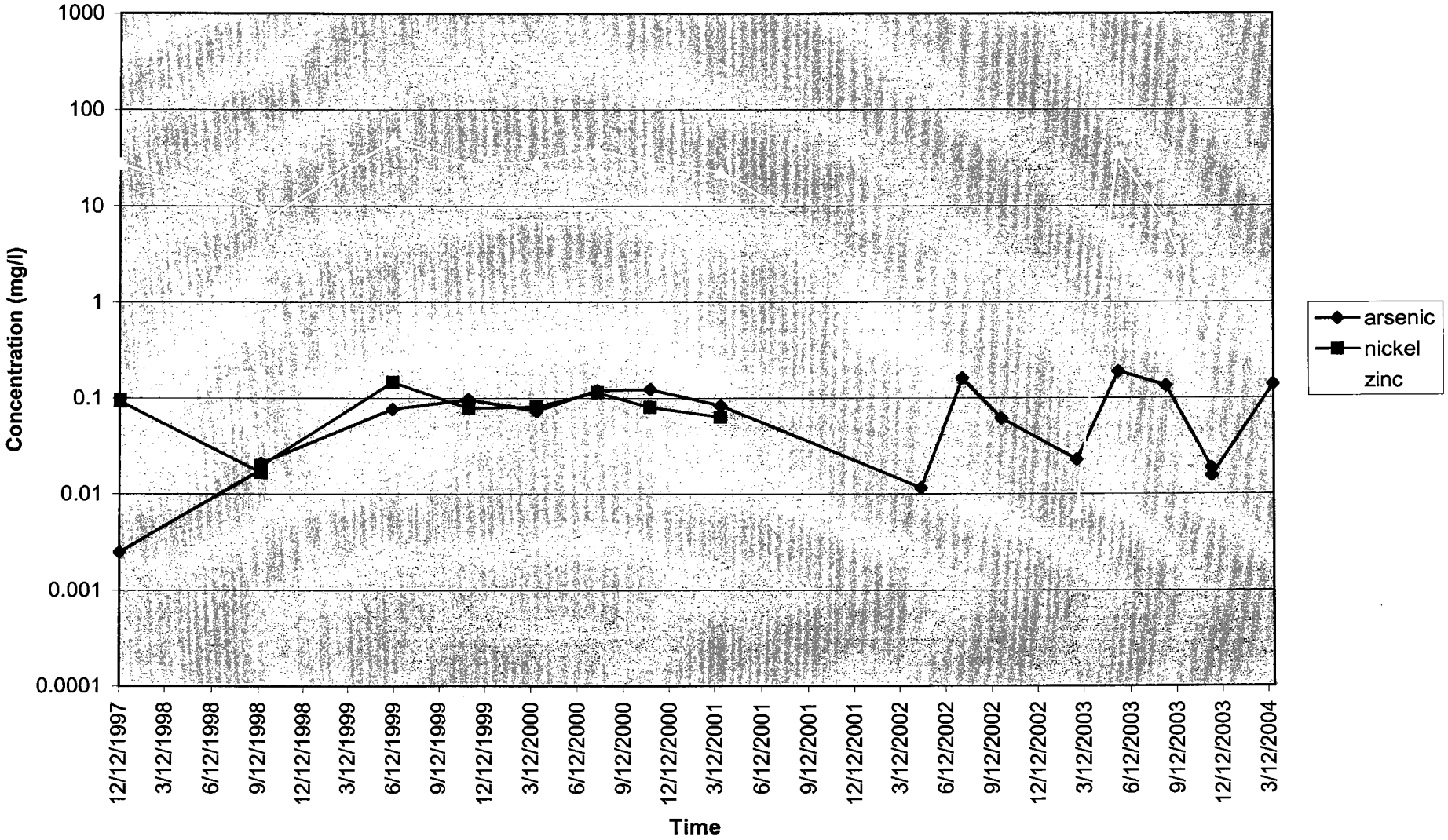
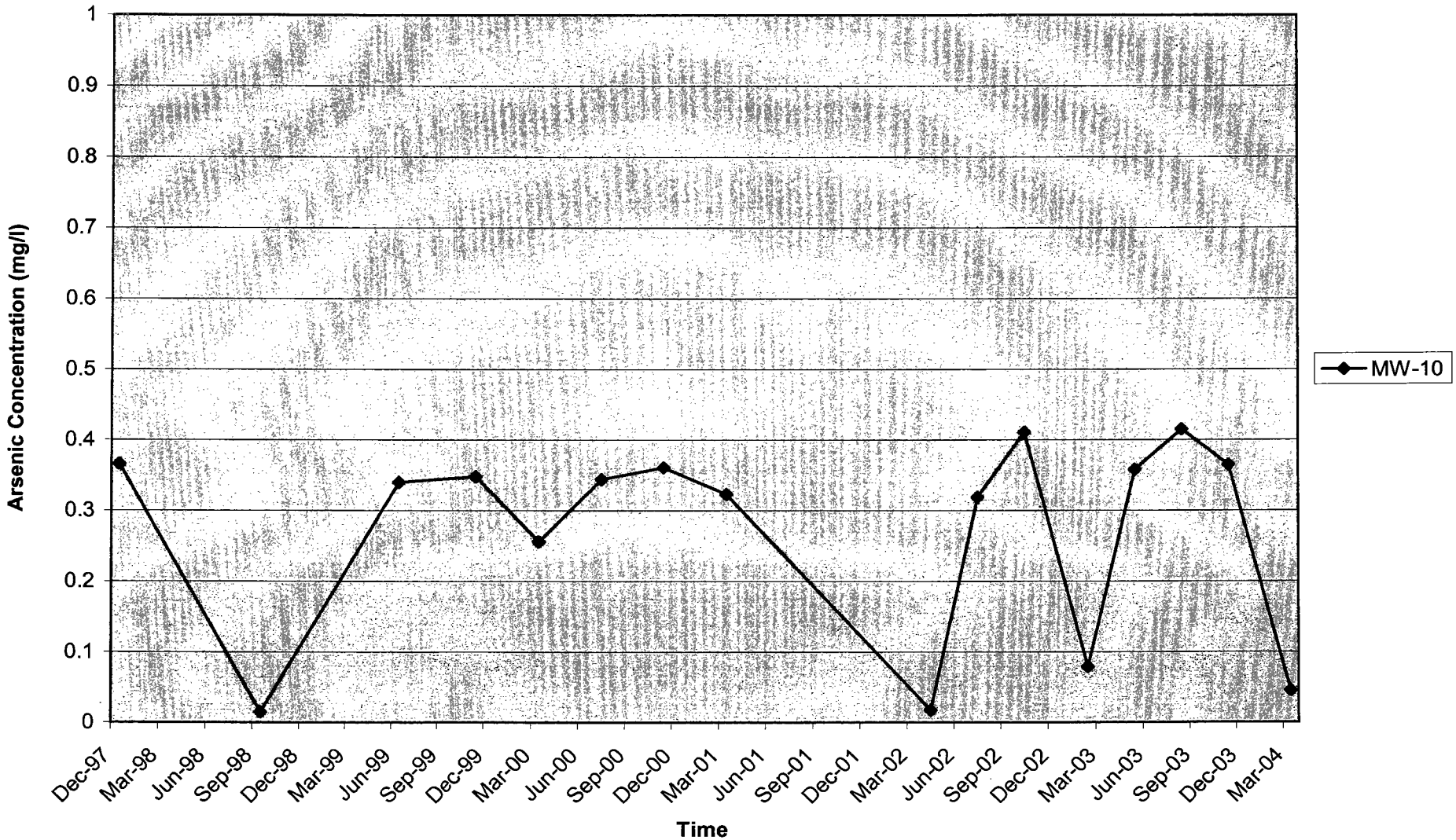


Figure 7C: MW-10 Arsenic Dissolved Concentrations



APPENDIX A

CURRENT GROUNDWATER MONITORING PROGRAM

GROUNDWATER MONITORING SCOPE OF WORK FOR DUPONT EAST CHICAGO SITE EAST CHICAGO INDIANA

Date: March 8, 2004

Project No.: 507481
18984000.04004

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

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1.1 PRB Groundwater Well Sampling 2
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4.3 Equipment Decontamination 6

5.0 Health and Safety and Waste Management Plan 7

FIGURES

Figure 1 Site Wide Groundwater Well Location Map
Figure 2 PRB Monitoring Well Location Map

APPENDICES

Appendix A Low Flow Sampling Methodology
Appendix B November 2003 Groundwater Sampling Field Data Sheets
Appendix C Health and Safety Addendum
Appendix D Waste Management Plan

1.0 INTRODUCTION

This document presents the objectives and field methods associated with the DuPont East Chicago 2004 groundwater monitoring program associated with the site permeable reactive barrier (PRB) wells and the site-wide monitoring wells.

1.1 Site History

The East Chicago facility is located at 5215 Kennedy Avenue, East Chicago, in Lake County, Indiana. The site, which is 440 acres, began manufacturing operations in 1893 under the Grasselli Corporation. DuPont operated the site from 1927 through 2000. In early 2000 the business was sold to W.R. Grace Company; DuPont maintained ownership of the property.

1.2 PRB Groundwater Well Sampling

In 2002 as part of an effort to address solid waste management units (SWMUs) and areas of concern (AOCs) on site, DuPont installed a 2002 foot PRB near the sites northern boundary to treat arsenic impacted groundwater. As part of the installation of the PRB, a groundwater monitoring program was initiated to monitor the effectiveness of the PRB. In early 2002 the PRB groundwater monitoring activities were performed on a weekly basis. By the end of 2003, the PRB groundwater monitoring event was performed on a monthly basis.

Based on the data collected as part of the 2003 PRB groundwater monitoring activities, the groundwater monitoring associated with the PRB wells will be performed on a quarterly basis starting in 2004.

1.3 Site Wide Groundwater Well Sampling

In 1999 and in 2003, as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), field activities were performed to assess on-site SWMUs and AOCs at the DuPont East Chicago site. As part of the Phase II RFI, groundwater samples were collected from specific site-wide monitoring wells located at the East Chicago site.

To determine the baseline groundwater constituent concentrations, the 2004 site-wide groundwater monitoring activities will be performed on a quarterly basis.

2.0 PURPOSE

The purpose is to collect groundwater data from site-specific wells on a quarterly basis to monitor long- term groundwater constituent concentration trends.

The quarterly groundwater monitoring activities will assist in determining the effectiveness of the PRB wall to treat impacted groundwater and in identifing the baseline groundwater concentrations within specific site-wide monitoring wells.

3.0 OBJECTIVE

The objective is to collect and ship for laboratory analysis quarterly groundwater samples from site perimeter wells and PRB wells. Samples will be collected using low-flow sampling methodology.

4.0 FIELD METHODOLOGY

General and site specific field methodology associated with the East Chicago site is presented in Sections 4.1 and 4.2. A general standard operating procedure (SOP) document pertaining to low flow sampling methodology, to be followed as deemed applicable, can be found in Appendix A.

4.1 Low Flow Sampling

Sixteen perimeter monitoring wells and 11 PRB monitoring wells are to be sampled as part of the quarterly groundwater monitoring program for the East Chicago site.

The 16 perimeter wells are as follows (See Figure 1 for location):

MW-2	MW-6 (If located)	MW-13	MW-23
MW-3	MW-9	MW-15	MW-26
MW-4	MW-10	MW-18	MW-27
MW-5	MW-12	MW-20	MW-28

The 11 PRB wells are as follows (See Figure 2 for location):

PRB-1	PRB-6	PRB-17
PRB-2	PRB-7	
PRB-3	PRB-8	
PRB-4	PRB-9	
PRB-5	PRB-16	

Field data sheets associated with the November 2003 sampling event can be found in Appendix B.

The monitoring wells associated with this quarterly program will be sampled using low-flow sampling methodology. The equipment used to complete the low-flow sampling activities will include, but will not be limited to, the following: peristaltic or grunfos pumps, field parameter monitoring instruments, depth to water meter, and 0.45 micron field filtration unit.

Each well currently contains dedicated tubing. Therefore, additional downhole tubing is not currently needed. However, this tubing may need to be replaced at a later date. The field personnel associated with this quarterly activity will determine the need for dedicated tubing change-out.

During low flow sampling, at a minimum, the following information will be noted for each well as applicable:

- ❑ Well ID
- ❑ Weather conditions
- ❑ Well security notes
- ❑ Well diameter
- ❑ Depth to water
- ❑ Purged water field parameters (temp, pH, DO, conductance, turbidity)
- ❑ Purge rate
- ❑ Total volume purged (or start and stop time of purge)
- ❑ Sample ID
- ❑ Time collected

4.2 Laboratory Analytical Parameters

The 16 perimeter wells will be analyzed for the following laboratory parameters: antimony, arsenic, barium, cadmium, chromium, copper, lead, nickel, selenium, vanadium, and zinc. All parameters will be analyzed for total and dissolved constituents.

The 11 PRB wells will be analyzed for total and dissolved arsenic.

Field samples for dissolved metals analysis must be filtered in the field by the field personnel using 0.45-micron filters.

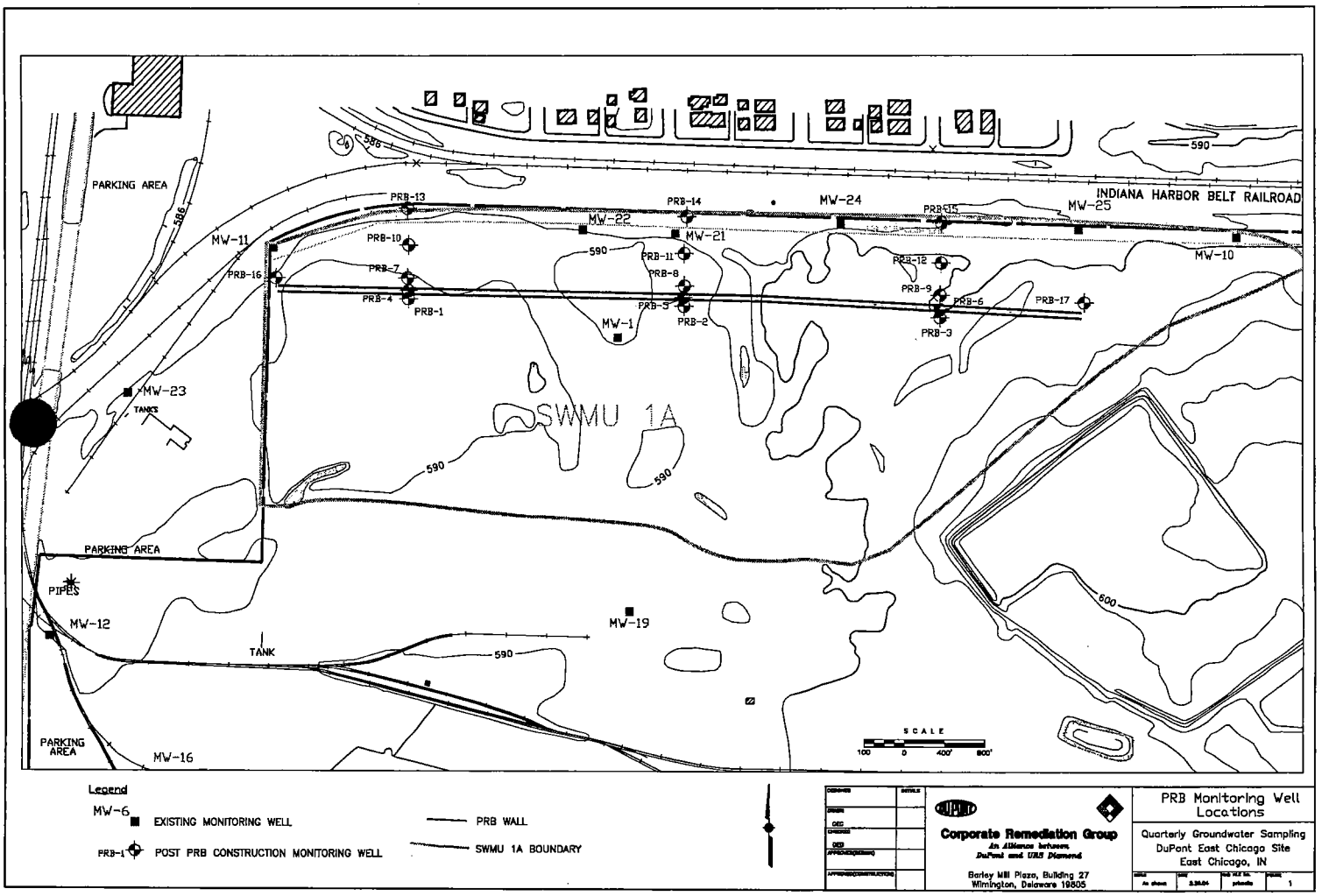
4.3 Equipment Decontamination

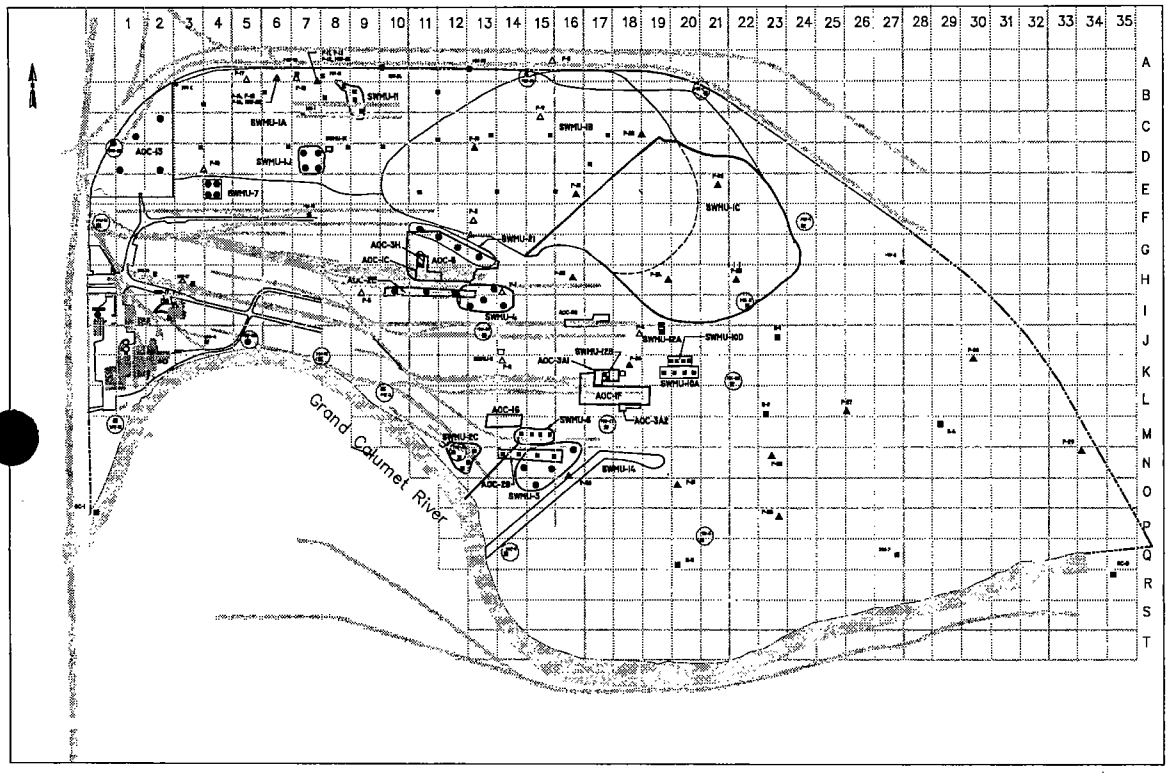
All non-disposable sampling equipment must be decontaminated prior to use in the first well and after each well is sampled. De-ionized water and a non-phosphate detergent solution will be used for decontamination.

5.0 HEALTH AND SAFETY AND WASTE MANAGEMENT PLAN

The Health and Safety Addendum for this activity can be found in Appendix C.

The Waste Management Plan for this activity can be found in Appendix D.


PARKING AREA
586
590
INDIANA HARBOR BELT RAILROAD
MW-25
MW-24
MW-22
MW-21
MW-11
MW-10
MW-1
MW-23
TANKS
SWMU 1A
PARKING AREA
PIPES
MW-12
TANK
MW-19
600
PARKING AREA
MW-16
PRB-13
PRB-14
PRB-15
PRB-10
PRB-11
PRB-12
PRB-7
PRB-8
PRB-9
PRB-16
PRB-4
PRB-1
PRB-5
PRB-2
PRB-6
PRB-17
PRB-3
SCALE
100 0 400' 800'
Legend
MW-6 EXISTING MONITORING WELL
PRB-1 POST PRB CONSTRUCTION MONITORING WELL
PRB WALL
SWMU 1A BOUNDARY
Corporate Remediation Group
An Alliance between DuPont and URS Diamond
Barley Mill Plaza, Building 27
Wilmington, Delaware 19805
PRB Monitoring Well Locations
Quarterly Groundwater Sampling
DuPont East Chicago Site
East Chicago, IN
1



Notes:
Symbols centered over sample location.

Sources:
DuPont and CH2M HILL

Legend

- DuPont Property Line
- Areas of Concern
- Solid Waste Management Units
- Monitoring Well Location
- Existing Piezometer
- Existing Monitoring Well/Piezometer

Phase I RFI

- New Staff Gauge
- New Monitoring Well
- New Piezometer

Phase II RFI

- Surficial Soil Samples
- Characterization Boring
- Part of Site-wide Groundwater Monitoring Program

0 150 300
FEET

NO.	REVISIONS	BY	DATE
1	Corrected SWMU's and boring locations labels. Piezometer locations are approximate.	L.R.	[illegible]

DESIGNED
DRAWN D.H. ENGLISH
CHECKED P.J. CHEN
APPROVED(DESIGN) A.P. EGLER
APPROVED(CONSTRUCTION)

Corporate Remediation Group
An Alliance between DuPont and the V-C Diamond Group
Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

Site Wide Groundwater Well Locations

DuPont East Chicago Facility and Northwest Indiana Region East Chicago, Illinois

SCALE 1" = 300' | DATE Feb. 27, 2004 | DRAWING NO. FIG. 2-3A | SHEET 2

STANDARD OPERATING PROCEDURE FOR LOWFLOW PURGING AND SAMPLING TECHNIQUES

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to provide guidelines for purging monitoring wells and collecting groundwater samples for chemical analysis using low flow techniques. Low flow techniques allow samples to be collected with minimal alterations to water chemistry through low water-level drawdowns and low pumping rates (ideally less than 500 ml/minute).

2. PROCEDURE

2.1 Equipment

The following equipment is needed for low flow purging/sampling:

A. Extraction Device – Adjustable-rate, submersible or bladder pumps are preferred, but a peristaltic pump may also be used.

B. Tubing – Choose the appropriate tubing for the sampling requirements. Tubing with an inner diameter of 1/4 inch or 3/8 inch is preferred, as it will help insure that the tubing remains liquid-filled when operating at very low pumping rates.

C. Water Level Measuring Device – Capable of measuring to 0.01-foot accuracy.

D. Flow Measuring Supplies – Must have a way to measure purge flow rate (i.e. a graduated cylinder and a stopwatch).

E. Power Source – Needed to run pump (generator, battery, air source, etc.).

F. Field Parameter Monitoring Instruments – Meters to measure required field parameters.

G. Flow Cell – Must have openings in the cap for inserting meter probes, must have a volume of less than 1 liter (500 ml is preferred), and must be constructed to prevent air bubbles from becoming trapped in the cell. Certain types of water quality meters come with a flow cell made by the manufacturer.

H. Decontamination Supplies – Including a non-phosphate detergent (Alconox) and de-ionized water.

I. Sample Bottles – Including those for QA/QC samples (field blanks, equipment blanks, MS/MSDs, duplicate samples, etc.), along with any other necessary sampling supplies (filters, extra bottles, ice, labels, etc.)

J. Paperwork – Including logbook, well location map, field data/notes from last sampling event, chains-of-custody, HASP, WMP, SOW, PSA, all required permits, and any other necessary forms or paperwork.

K. Keys – Keys to unlock the wells, as well as for any gates, chains, or other locks that may need to be opened during the sampling event.

L. PID – A Photo Ionization Detector (if needed) to detect levels of VOCs.

2.2 Pre-Sampling Activities

A round of water level and total well depth measurements should be performed for all wells (in the shortest amount of time possible) before beginning any purging or sampling activities. During the round of water levels, it is also advisable to check for any problems that might interfere with the sampling event (and possibly require

different or specialized equipment). These could include any damage to a well or well cap, overgrowth, treacherous site conditions (snow, ice, mud, etc.), or hard to reach locations.

At each well, before collecting any samples, it is important to fill out the field logbook with the site/job name, the date, the time of day, the well ID, the weather, the analyses to be sampled, the names of field personnel, and any other important observations. During purging and sampling, record all measurements and times (water levels, flow rates, purge start/stop time, sample time, field parameter measurements, PID measurements, etc.) in the field logbook.

2.3 Purging and Sampling Procedure

To prevent cross-contamination, wells should be sampled in order of increasing (least to most) contamination (known or anticipated) or as specified in the workplan.

A. Open the Well Cap – Be sure to watch out for pinch points and wear proper hand protection at all times. Immediately upon opening the well, measure the breathing zone and the inside of the well casing with a PID (if necessary). Record these measurements.

B. Install the Pump – Attach the appropriate tubing to the pump and lower the pump, tubing and electrical line slowly into the well to the middle of the zone to be sampled. The pump intake should be kept at least two feet above the bottom of the well to minimize disturbance of particles that may be present at the bottom of the well. Secure the tubing to the outside of the well casing with rope or duct tape, if necessary, to ensure that the pump remains at the proper depth.
Attach a flow cell to the end of the tubing. Insert meter probes into the flow cell. If a gasoline generator will be used to operate the pump, it should be placed downwind at least 30 feet away from the well, so as not to contaminate the samples with exhaust fumes.

C. Measure the Water Level – Do this before starting the pump.

D. Purge the Well – Start the pump at its lowest setting, and slowly increase the speed until discharge occurs. The pumping rate should be reduced to the minimum capabilities of the pump. Collect discharge water into a bucket. Monitor and record the water level.
When the water level has stabilized, begin to monitor field parameters. The meter probes must be submerged in water at all times. Field parameter measurements should be taken every 3 to 5 minutes, making sure that an amount of water equal to at least three times the volume of the flow cell is discharged between each set of field parameter measurements. Record measurements in the field logbook.
Purging is considered complete (and sampling may begin) when the field parameters have stabilized. Stabilization occurs when at least three consecutive readings (taken at 3 to 5 minute intervals) are within the following limits:

- ~ Turbidity – Within 10% for values greater than 1 NTU
- ~ DO – Within 10%
- ~ Specific Conductance – Within 3%
- ~ Temperature – Within 3%

~ pH – ± 0.1 unit
~ ORP (Redox) – ± 10 millivolts

All discharge water must be collected and properly disposed (in accordance with the Waste Management Plan).

E. Collect Samples – Remove the tubing from the flow cell before sampling (water to be collected for samples must not have passed through the flow cell). Put on a clean pair of gloves. Fill all sample bottles and all quality control sample bottles by allowing the pump discharge to flow slowly down the inside of the container with minimal turbulence. The sample bottles must be filled in the following order, which takes the volatilization sensitivity of ground water samples into consideration:

1.) Volatile Organics (VOA)
2.) Purgeable Organic Carbons (POC)
3.) Purgeable Organic Halogens (POX)
4.) Total Organic Halogens (TOX)
5.) Total Organic Carbon (TOC)
6.) Base Neutrals/Acid Extractables
7.) TPHC/Oil & Grease
8.) PCBs/Pesticides
9.) Total Metals
10.) Dissolved Metals*
11.) Phenols
12.) Cyanide
13.) Sulfate and Chloride
14.) Turbidity
15.) Nitrate and Ammonia
16.) Preserved Inorganics
17.) Radionuclides
18.) Non-Preserved Inorganics
19.) Bacteria

*Filter Samples (if necessary) – If dissolved samples are needed, the water must be filtered with an appropriate filter (0.45 μm is frequently used). Pre-rinse the filter with approximately 25 to 50 ml of groundwater before collecting the sample. Preserve the filtered water sample immediately.

F. Equipment blanks are only required for equipment that will not be dedicated to the well for future sampling events. At least 1 equipment blank is required for each day that non-dedicated equipment is used. The analytical laboratory that is performing the groundwater analysis will provide demonstrated analyte-free water. This water must be passed through the tubing and sampling equipment and collected. If sampling equipment is dedicated to a well for multiple rounds of sampling, no equipment blanks are required. In this case, if field conditions warrant, a field blank may be collected. Field blanks are collected by pouring analyte-free water directly into the sample bottle. The equipment blank or field blank will be analyzed for all the same parameters as the ground water samples. Note in the field book at which well the equipment or field blank was taken.

G. Fill out the chain-of-custody (C-O-C) for the sample. See the Chain-of-Custody Standard Operating Procedure for instructions on filling out a C-O-C.

H. Dry Well – Wells with a low recharge rate may become dewatered during purging. When this occurs, the well should be sampled as soon as it has recovered sufficiently to produce enough water to fill the sample bottles. Calculate the recharge rate of the well by measuring how long (in ft/sec or ft/min) it takes for the water level to rise a set distance (0.1 ft or 1.0 ft). Multiply this by the appropriate conversion factor for the casing diameter of the well (0.163 gal/ft for a 2" casing, 0.653 gal/ft for a 4" casing) to get the recharge rate in gal/min. When the well has sufficiently recharged, samples may be collected even if the indicator field parameters have not stabilized.

I. Remove Pump and Tubing – After samples have been collected, the tubing may be dedicated to the well for the next sampling event (hang the tubing inside the well) or may be properly discarded.

J. Close the Well – Make sure it is securely locked.

2.4 Decontamination

All non-disposable sampling equipment must be decontaminated prior to use in the first well and after each well is sampled. Use de-ionized water and a non-phosphate detergent solution (such as Alconox) for decontamination. Two-inch submersible pumps require at least a 10-gallon flush with de-ionized water during the decontamination procedure.

3. REFERENCES

The following sources were used in developing this guideline:

DuPont CRG, April 2001, Standard Operating Procedure for Groundwater Well Purging Using Micro Purging Techniques, Guideline No. 1202a.

N.J. Department of Environmental Protection, January 1996 Draft, Low Flow Purging and Sampling Procedure for the Collection of Ground Water Samples.

N.J. Department of Environmental Protection and Energy, May 1992, Field Sampling Procedures Manual.

U.S. E.P.A. Region I, July 1996, Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells, Revision 2.

U.S. E.P.A. Region II, Ground Water Sampling Procedure: Low Stress (Low Flow) Purging and Sampling.

APPENDIX B

NOVEMBER 2003 GROUNDWATER SAMPLING FIELD DATA SHEETS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-2 **DATE:** 11-21-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, Windy high 40's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 2.83
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1000	1003	1007	
Specific conductance	2.62	2.69	2.76	
pH	6.15	6.12	6.09	
Temp. (C)	11.69	11.68	11.63	
DO (mg/l)	0.92	0.91	0.90	
Redox (mV)	-348	-346	-344	
Turbidity (NTU)	25.9	24.8	24.6	
Color	grey	grey	grey	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-2	1010
Field Duplicate (MS, MSD)	MW-2MS,MSD	1010
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-3 **DATE:** 11/18/03
PROJECT # 18983679

Weather Conditions Sunny Clear... High 55°

Well Description
Well Security: Locked...

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 12.44
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1122	1125	1128	
Specific conductance	2.88	2.88	2.89	
pH	5.93	5.93	5.93	
Temp. (C)	14.76	14.80	14.82	
DO (mg/l)	1.00	0.95	0.92	
Redox (mV)	-86	-86	-86	
Turbidity (NTU)	16.7	16.9	16.8	
Color	Clear	Clear	Clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-3	1145
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Removed & Cut Lock

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-5 **DATE:** 11-21-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, Windy high 40's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter	2" or 4"
Depth to Water	8.04
Depth of Well	
Height of Water column	
Volume of Water in well (mL)	
Purge Rate (ml/min.)	

(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1136	1139	1143	
Specific conductance	5.18	5.17	5.17	
pH	6.15	6.14	6.14	
Temp. (C)	10.95	10.97	10.99	
DO (mg/l)	0.89	0.83	0.79	
Redox (mV)	-197	-197	-197	
Turbidity (NTU)	143.0	132.0	138.0	
Color	Rusty	Rusty	Rusty	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-5	1145
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Cut lock off

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-8 **DATE:** 11-21-03
PROJECT # 18983679

Weather Conditions Windy, partly cloudy, low 40s.

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter	2" or 4"
Depth to Water	5.18
Depth of Well	
Height of Water column	
Volume of Water in well (mL)	
Purge Rate (ml/min.)	

(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons) Purged approx. 1 gal.

Parameter	Well Volume Extracted			
	1	2	3	
Time	~~1305~~	~~1308~~	~~1312~~	
Specific conductance				
pH				
Temp. (C)	~~12.04~~			
DO (mg/l)				
Redox (mV)				
Turbidity (NTU)				
Color	Clear			
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-MW-8	~~1315~~ 1500
Field Duplicate (MS, MSD)	PRB MW-8MS/MSD	
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Horiba 11-22 Flow through cell broke down. Probe in cond. not be fixed in the field. No water quality parameters were taken - purged water before sampling

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-9 **DATE:** 11-21-03
PROJECT # 18983679

Weather Conditions Partly Cloudy Windy low 40s

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons) purged app. 1 gal

Parameter	Well Volume Extracted			
	1	2	3	
Time				
Specific conductance				
pH				
Temp. (C)				
DO (mg/l)				
Redox (mV)				
Turbidity (NTU)				
Color	Rusty-Brown			
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-MW-9	1530
Field Duplicate (MS, MSD)	PRBMW-9DUP	1530
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Horiba U-22 broke down. Could not be fixed in the field - No water ~~we~~ quality parameters were taken - purged a water before sampling

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-10 **DATE:** 11-18-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Windy, mid 50's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 4.31
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1438	1442	1445	
Specific conductance	2.27	2.27	2.27	
pH	6.16	6.16	6.16	
Temp. (C)	14.35	14.32	14.33	
DO (mg/l)	1.16	1.22	1.24	
Redox (mV)	-260	-256	-255	
Turbidity (NTU)	35.5	32.5	35.2	
Color	Clear	clear	clear	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-10	1450
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-12 **DATE:** 11-18-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, mid 50's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 3.76
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	12:50	12:53	12:56	
Specific conductance	589	0.587	0.587	
pH	6.27	6.27	6.27	
Temp. (C)	14.23	14.22	14.20	
DO (mg/l)	5.64	5.62	5.58	
Redox (mV)	83	86	87	
Turbidity (NTU)	8.7	9.1	8.4	
Color	Clear	clear	clear	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-12	13:00
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Removed/Cut lock

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-13 **DATE:** 11/18/03
PROJECT # 18983679

Weather Conditions Sunny, Clear High 55°

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter ~~2"~~ or 4"
Depth to Water 7.55
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	0900	0903	0906	
Specific conductance	8.13	8.13	8.12	
pH	8.32	8.31	8.30	
Temp. (C)	14.12	14.10	14.09	
DO (mg/l)	0.28	0.27	0.26	
Redox (mV)	-401	-405	-407	
Turbidity (NTU)	6.10	8.60	9.90	
Color	Brown	Brown	Brown	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-13	0915
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Had to cut off Lock

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-15 **DATE:** 11-18-03
PROJECT # 18983679

Weather Conditions Clear, Sunny, low-mid 50's

Well Description
Well Security:

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 10.45
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1036	1039	1042	
Specific conductance	1.91	1.91	1.91	
pH	5.96	5.96	5.96	
Temp. (C)	15.61	15.61	15.60	
DO (mg/l)	1.13	1.08	1.05	
Redox (mV)	-59	-59	-60	
Turbidity (NTU)	66.2	65.7	66.4	
Color	Clear	Clear	Clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-15	1100
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-18 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Windy,

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.39
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	800	803	806	
Specific conductance	3.53	3.53	3.53	
pH	5.97	5.97	5.97	
Temp. (C)	13.69	13.67	13.56	
DO (mg/l)	0.54	0.54	0.53	
Redox (mV)	-96	-96	-96	
Turbidity (NTU)	8.1	7.6	7.5	
Color	clear	clear	clear	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-18	815
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-23 **DATE:** 11-18-03
PROJECT # 18983679

Weather Conditions Sunny - Clear High 50's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.22
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	13:37	13:40	13:43	
Specific conductance	2.93	2.93	2.94	
pH	6.07	6.07	6.07	
Temp. (C)	13.80	13.80	13.79	
DO (mg/l)	2.91	2.91	2.91	
Redox (mV)	-89	-90	-90	
Turbidity (NTU)	52.5	47.1	48.7	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample		13:45
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Removed/Cut lock

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-26 **DATE:** 11-18-03
PROJECT # 18983679

Weather Conditions Sunny, Windy, mid 50's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 4.64
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1548	1553	1557	
Specific conductance	7.22	7.24	2.25	
pH	6.0	6.0	6.0	
Temp. (C)	13.51	13.54	13.53	
DO (mg/l)	1.05	1.09	1.10	
Redox (mV)	-160	-159	-159	
Turbidity (NTU)	12.2	12.3	12.1	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-26	1600
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: MW-28 **DATE:** 11/18/03
PROJECT # 18983679

Weather Conditions Sunny Clear High 55°F

Well Description
Well Security:

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 7.72
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	0945	0948	0951	
Specific conductance	6.54	6.52	6.49	
pH	6.00	6.01	6.01	
Temp. (C)	14.45	14.46	14.47	
DO (mg/l)	0.87	0.82	0.79	
Redox (mV)	-75	-72	-68	
Turbidity (NTU)	43.2	45.0	43.5	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	MW-28	1000
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-1 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, low, 50's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 5.18
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	0940	0943	0946	
Specific conductance	10.80	10.80	10.80	
pH	6.27	6.26	6.25	
Temp. (C)	13.64	13.65	13.67	
DO (mg/l)	0.58	0.58	0.57	
Redox (mV)	-358	-359	-360	
Turbidity (NTU)	14.0	11.7	11.2	
Color				
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-1	1000
Field Duplicate (MS, MSD)	PRB-1 MS/MSD	
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-2 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Windy mid 50's

Well Description
Well Security: Locked.

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.80
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1330	1334	1337	
Specific conductance	3.49	3.49	3.50	
pH	6.20	6.20	6.20	
Temp. (C)	13.59	13.58	13.60	
DO (mg/l)	0.95	0.95	0.92	
Redox (mV)	-242	-240	-239	
Turbidity (NTU)	24.3	22.4	22.5	
Color	Clear	clear	Clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-2	1340
Field Duplicate (MS, MSD)	PRB-2MS, MSD	1340
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-3 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, Windy - low 50's

Well Description
Well Security: Locked.

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 5.84
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1022	1025	1028	
Specific conductance	7.52	7.51	7.50	
pH	6.26	6.27	6.27	
Temp. (C)	13.37	13.36	13.35	
DO (mg/l)	0.92	0.93	0.94	
Redox (mV)	-223	-223	-223	
Turbidity (NTU)	30.0	29.3	28.9	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-3	1030
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-4 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Low 50s

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 5.34
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1015	1018	1021	
Specific conductance	8.52	8.52	8.53	
pH	7.10	7.02	6.98	
Temp. (C)	13.42	13.42	13.43	
DO (mg/l)	0.89	0.87	0.87	
Redox (mV)	-275	-272	-269	
Turbidity (NTU)	9.8	10.1	8.8	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-4	1030
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-5 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Windy, mid-50's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.60
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1415	1419	1423	
Specific conductance	6.61	6.61	6.62	
pH	9.18	9.19	9.19	
Temp. (C)	14.17	14.19	14.19	
DO (mg/l)	.90	0.90	0.89	
Redox (mV)	-376	-375	-375	
Turbidity (NTU)	21.0	21.3	21.5	
Color	clear	clear	clear	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-5	1425
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-6 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, Windy low 50's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 5.83
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1115	1118	1122	
Specific conductance	6.62	6.62	6.62	
pH	9.01	9.01	9.01	
Temp. (C)	14.15	14.17	14.16	
DO (mg/l)	0.17	0.18	0.17	
Redox (mV)	-442	-442	-442	
Turbidity (NTU)	32.3	31.3	31.9	
Color	Brown cloudy	Brown cloudy	Brown cloudy	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-6	1125
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-7 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Low 50's,

Well Description
Well Security: Locked...

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 5.94
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1108	1111	1114	
Specific conductance	8.43	8.42	8.42	
pH	5.99	6.0	6.01	
Temp. (C)	13.95	13.94	13.96	
DO (mg/l)	0.55	0.53	0.52	
Redox (mV)	-331	-323	-317	
Turbidity (NTU)	87.7	89.4	85.1	
Color	grey	grey	grey	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-7	1130
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-8 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Windy, mid-50's

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter	2" or 4"
Depth to Water	6.04
Depth of Well	
Height of Water column	
Volume of Water in well (mL)	
Purge Rate (ml/min.)	

(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1450	1454	1457	
Specific conductance	3.52	3.51	3.49	
pH	6.50	6.50	6.50	
Temp. (C)	13.96	13.96	13.98	
DO (mg/l)	0.73	0.74	0.72	
Redox (mV)	-270	-269	-269	
Turbidity (NTU)	14.5	14.3	14.0	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-8	1500
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-9 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.19
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1331	3362	3413	
Time	~~1233~~	~~1236~~	~~1241~~	
Specific conductance	3.08	3.09	3.11	
pH	6.54	6.53	6.53	
Temp. (C)	14.66	14.66	14.66	
DO (mg/l)	0.21	0.21	0.21	
Redox (mV)	-396	-394	-393	
Turbidity (NTU)	39.2	39.1	36.1	
Color	Brown	Brown	Brown	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-9	~~1245~~ 1345
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-10 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny Clear...Low 50's

Well Description
Well Security: Locked...

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 5.55
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	4
Time	1146	1149	1152	1155
Specific conductance	6.74	6.85	6.84	6.74
pH	6.24	6.23	6.22	6.20
Temp. (C)	12.96	13.29	13.31	13.26
DO (mg/l)	0.36	0.44	0.42	0.39
Redox (mV)	-372	-373	-373	-372
Turbidity (NTU)	74.2	30.1	24.6	18.5
Color				
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-10	1205
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-11 **DATE:** 11-19-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, Windy Mid 50's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 5.54
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1605	1609	1612	
Specific conductance	4.21	4.19	4.18	
pH	6.07	6.07	6.07	
Temp. (C)	14.42	14.41	14.42	
DO (mg/l)	0.57	0.58	0.57	
Redox (mV)	-249	-248	-247	
Turbidity (NTU)	27.6	26.7	26.3	
Color	Clear	clear	Clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-11	1615
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-12 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, mid 50's, windy

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2 or 4"
Depth to Water 6.62
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1425	1429	1432	
Specific conductance	7.63	7.63	7.62	
pH	6.17	6.18	6.18	
Temp. (C)	12.98	12.95	12.94	
DO (mg/l)	0.51	0.51	0.51	
Redox (mV)	-270	-265	-264	
Turbidity (NTU)	32.7	36.9	36.3	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-12	~~13:35~~ 1435
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-13 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Sunny - low 50's Clear, Windy

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 5.92
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	0820	0824	0828	
Specific conductance	4.66	4.66	4.66	
pH	6.23	6.23	6.23	
Temp. (C)	12.85	12.85	12.85	
DO (mg/l)	0.25	0.25	0.25	
Redox (mV)	-380	-379	-379	
Turbidity (NTU)	59.9	51.6	39.4	
Color	clear	clear	clear	
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-13	0830
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-14 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Sunny, Clear, mid 50's windy

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 3.72
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	7:30	7:34	7:37	
Specific conductance		5.92	5.89	5.87
pH	~~6.36~~	6.03	6.03	6.03
Temp. (C)	~~14.33~~	13.32	13.30	13.29
DO (mg/l)		0.13	0.12	0.12
Redox (mV)	-401	-339	-337	-336
Turbidity (NTU)		20.1	20.5	20.0
Color	~~grey~~	black	black	black
VoLume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-14	07:40
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Strong odor

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-15 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy, 21, Windy - mid 50's

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 4.51
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	1533	1535	1538	
Specific conductance	8.60	8.60	8.60	
pH	5.94	5.97	6.01	
Temp. (C)	12.92	12.94	12.96	
DO (mg/l)	0.48	0.40	0.35	
Redox (mV)	-330	-329	-328	
Turbidity (NTU)	33.9	32.2	32.7	
Color	grey	grey	grey	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-15	1540
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments: Strong Odor

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-16 **DATE:**
PROJECT # 18983679

Weather Conditions Sunny, Clear, High 50°F

Well Description
Well Security: Locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 4.89
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	900	903	906	
Specific conductance	2.30	2.30	2.29	
pH	6.12	6.13	6.13	
Temp. (C)	12.50	12.51	12.52	
DO (mg/l)	1.30	1.20	1.11	
Redox (mV)	-267	-265	-259	
Turbidity (NTU)	11.6	11.2	9.8	
Color				
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-16	0910
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

DuPont Chemicals
East Chicago, IN
Groundwater Sampling

WELL NUMBER: PRB-17 **DATE:** 11-20-03
PROJECT # 18983679

Weather Conditions Partly Cloudy low 50s windy

Well Description
Well Security: locked

Fluid Level Measurements from top of riser (in feet)

Well Diameter 2" or 4"
Depth to Water 6.43
Depth of Well
Height of Water column
Volume of Water in well (mL)
Purge Rate (ml/min.)
(2"well-height of water X.163 / 4"well-height of water X .653)

Purging Data

Total volume purged (gallons)

Parameter	Well Volume Extracted			
	1	2	3	
Time	0935	0939	0942	
Specific conductance	8.36	8.36	8.36	
pH	6.11	6.11	6.11	
Temp. (C)	12.61	12.60	12.60	
DO (mg/l)	0.22	0.21	0.22	
Redox (mV)	-333	-331	-329	
Turbidity (NTU)	26.9	24.7	25.0	
Color	clear	clear	clear	
Volume (gal)				

Sampling Data

	Sample ID	Time Collected
Field Sample	PRB-17	09:45
Field Duplicate (MS, MSD)		
Trip Blank		

Sampling Method Peristaltic/Grundfos Pump

Comments:

URS

ADDENDUM II
HEALTH AND SAFETY PLAN
GROUNDWATER SAMPLING
PHASE II RCRA FACILITY INVESTIGATION
DUPONT EAST CHICAGO FACILITY
EAST CHICAGO, INDIANA

March 16, 2004

Project No. 507538
18984000

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and The URS Diamond Group

Barley Mill Plaza, Building 27

Alan P. Egler
URS Diamond
Project Manager

Kathryn A. Sova
URS Diamond
Regional Health & Safety Mgr.

Addendum II
Health and Safety Plan
Phase II RCRA Facility Investigation
Groundwater Sampling
DuPont East Chicago Facility
East Chicago, Indiana

Section 1.0 Introduction

This Addendum has been prepared to address groundwater sampling activities being performed at the DuPont, East Chicago Facility. This Addendum will be used in conjunction with the DuPont East Chicago Facility Phase II RFI Health and Safety Plan (HASP) dated April 10, 2003. All personnel performing activities on site will be briefed on this Addendum and appropriate sections of the original HASP and will verify having done so by signing the HASP Compliance Form provided as Attachment 1 to this Addendum.

Section 2.0 Background

DuPont operated the East Chicago facility from 1927 through 2000. In early 2000 the business was sold to W.R. Grace company; DuPont maintained ownership of the property.

In 2002, as part of an effort to address solid waste management units (SWMUs) and Areas of Concern (AOCs) on site, DuPont installed a permeable reactive barrier (PRB) near the site's northern boundary to treat arsenic impacted groundwater. A groundwater monitoring program was initiated to monitor the effectiveness of the PRB. In early 2002 the PRB groundwater monitoring activities were performed on a weekly basis. By the end of 2003, the PRB groundwater monitoring event was performed on a monthly basis.

In 1999 and in 2003, as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), field activities were performed to assess on-site SWMUs and AOCs at the site. As part of the Phase II RFI, groundwater samples were collected from specific monitoring wells located at the perimeter of the site.

Starting in 2004, the groundwater monitoring associated with the PRB wells will be performed quarterly along with the collection of groundwater samples from specific monitoring wells at the perimeter of the site.

Section 3.0 Scope of Work

Sixteen perimeter monitoring wells and eleven PRB monitoring wells will be sampled as part of the quarterly groundwater monitoring program for the site. Groundwater samples collected from the perimeter monitoring wells will be analyzed for inorganics; samples from the PRB monitoring wells will be analyzed only for arsenic.

The monitoring wells will be sampled using low flow sampling methodology. The equipment used to complete the low flow sampling activities will include, but not be limited to, the following: peristaltic or grunfos pumps, field parameter monitoring instruments, depth to water meter, and a 0.45 micron field filtration unit.

Each well currently contains dedicated tubing, but periodically this tubing may need to be changed-out.

Section 4.0 Hazard Evaluation

Project Safety Analysis (PSA)

A Project Safety Analysis (PSA) will be performed by the project team prior to start-up of field activities.

Chemical Hazards

Results of groundwater sampling from previous investigations have shown that metals are the Constituents of Concern (COCs). The primary COCs are arsenic and lead, but antimony, barium, cadmium, chromium, copper, nickel, selenium, vanadium and zinc have also been detected. Arsenic has been detected at a maximum concentration of 18700 micrograms per liter in groundwater at the site, and lead at a maximum concentration of 56.9 micrograms per liter. Table 1 has been revised to include updated information regarding these Constituents of Concern. Arsenic is a human carcinogen. The original HASP has a lead awareness program in Attachment B.

The primary route of exposure during site activities is dermal contact with groundwater. Modified Level D Personal Protective Equipment (PPE) will be worn to provide dermal protection during groundwater sampling. Ingestion of site COCs will be avoided by close attention to personal hygiene, i.e., washing hands and face before eating or drinking.

Physical Hazards

Physical hazards include terrain, heat and cold stress, lifting, slip/trip/fall hazards, and pinch points.

- **Terrain:** Adequate site clearing should be performed to accommodate personnel and supplies and provide a safe working area.

- **Heat and cold stress:** Refer to Attachment E of the original HASP for information regarding working in hot or cold weather conditions.
- **Lifting:** Use proper lifting techniques and get help when lifting heavy or awkward items. Practice good field ergonomics.
- **Slip/trip/fall:** Good housekeeping practices should be employed to prevent slip/trip/fall hazards. Caution must be used when walking to prevent these hazards when caused by terrain such as uneven walking surfaces or hidden low spots. Be prepared to improve walking conditions during cold weather months when ice and snow are present.
- **Pinch points:** Be aware of positioning to reduce pinch point hazards, especially well caps. Wear appropriate hand protection to protect hands.

Biological Hazards

As per the original HASP, snakes, ticks, stinging insects and poisonous plants are present on site during the warmer weather months. The original HASP provides information regarding ticks and Lyme Disease. Personnel should check themselves for ticks several times during the day and use insect repellant as needed. Footed Tyvek® coveralls may need to be worn if ticks are prevalent.

Inspect work areas, including well caps, prior to set-up for insect nests. Keep "Sting-Ezze" available in the event of a bee sting.

Remove coveralls and gloves from the inside out to avoid contact with clothing that may have come into contact with poisonous plant oils. Use special barrier creams and cleansers as needed.

Section 5.0 Worker Protection

Modified Level D will be worn during groundwater sampling. This includes:

- Hard hat
- Safety glasses with affixed side shields
- Polyethylene coated Tyvek® coveralls
- Steel toe boots
- Latex booties or chemical-resistant overboots
- Nitrile outer gloves and surgical inner gloves
- Leather work gloves for clean tasks
- Hearing protection as needed

Section 6.0 Air Monitoring

Since metals are the COCs in groundwater, air monitoring will not be required.

Section 7.0 Emergency Contingency

The CRG procedure for reporting Unexpected Occurrences (UOs) is included in Attachment 2 along with an updated emergency contact list.

HEALTH AND SAFETY PLAN COMPLIANCE AGREEMENT

Project Name: _____ **Project Number:** _____

I have read, understood, and agree with the health and safety protocols presented in the Health and Safety Plan (HASP) and the information discussed in the health and safety briefing. I also understand that noncompliance with the HASP may result in dismissal from the site.

Printed Name	Organization	Signature	Date

Personnel Health and Safety briefing conducted by:

_____ _____ _____

Name Signature Date

Unexpected Occurrence Reporting

Note: You must follow this procedure when reporting unexpected occurrences!

Unexpected Occurrence Defined

A UO is any unplanned event or action which could cause: injury or illness, property damage, an environmental release*, work interruption, or occurrences indicative of a pattern. We report and investigate UOs so that we can prevent similar incidents, promote safety awareness, communicate learnings, and to collect data for trend analysis. There are several key elements of the Reporting Unexpected Occurrences CRG SOP HS-500 that you must be aware of. These are as follows:

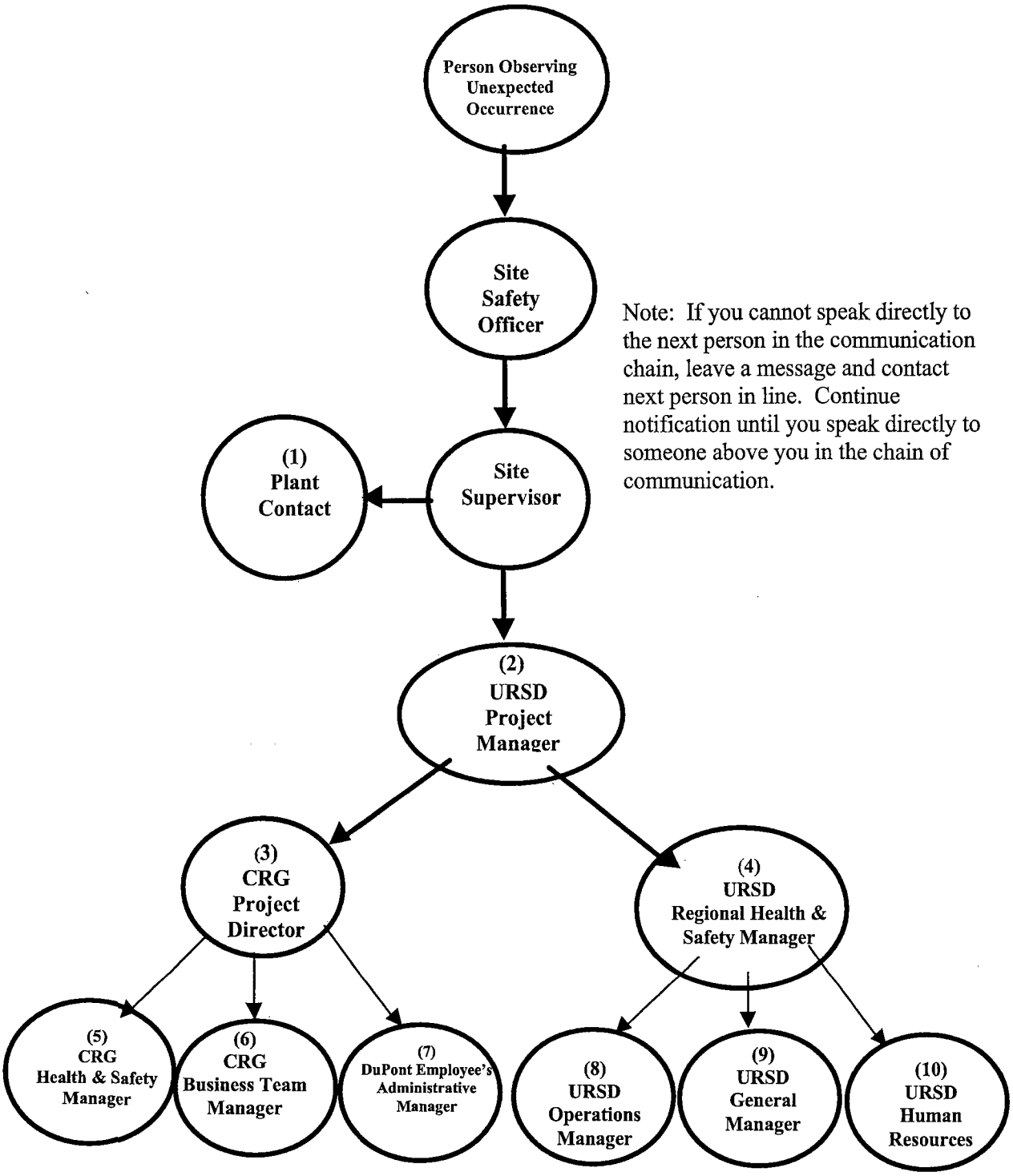
- ❑ For all project related occurrences, each employee, including contractors and subcontractors, are responsible for reporting any unexpected occurrence in which they are involved to the Site Supervisor (SS) as soon as practical. As per the SOP, the SS must contact the Project Director (PD) and the Project Manager (PM).
- ❑ The PD is responsible for contacting the CRG Health and Safety Manager (HSM) (i.e., Mary Glowacki or Brian Ambrose if Mary is not readily available), the Business Team Manager (BTM) and the affected employee's Administrative Manager (AM) as soon as feasible subsequent to the occurrence.
- ❑ The CRG HSM (along with the project team) will decide if company-wide reporting is needed and assign a tracking number.
- ❑ A preliminary communication (concise statement of what happened) must be communicated by the PD to the organization within 8 hours. The CRG HSM can assist on the proper wording of the communication.
- ❑ The PD will ensure that a final draft of the report is forwarded to the CRG HSM with sufficient lead time for review and issuance of the report within one week.
- ❑ A project-specific list of emergency contact names and telephone numbers is included on page 3 of this procedure.

Call-Up Procedure

- ❑ Reporting within URS Diamond (URSD) shall be as follows: The Site Supervisor notifies the PM. The PM, after contacting the PD, should also contact the URSD Regional Health and Safety Manager (Kathy Sova or Lisa Schatzman, as appropriate). The URSD RHSM will then notify Peter Jacobson, Edward Andrechak, and Elsie Papanastasiou. If the incident involves injury to a URS/URSD employee, contact Jeanette Schrimsher, RN, the URS Occupational Health Manager.
- ❑ In the event that it is not possible to readily contact the next person in the chain (CRG and/or URSD), leave a message in the best manner possible, and contact the next person up the chain. Continue in this manner until you have had verbal communication and/or other confirmation that the message has been delivered upwards. See attached reporting chain.

* Please note that there may be additional reporting requirements for environmental incidents.

Unexpected Occurrence Reporting Chain



Note: If you cannot speak directly to the next person in the communication chain, leave a message and contact next person in line. Continue notification until you speak directly to someone above you in the chain of communication.

ATTACHMENT 2
UNEXPECTED OCCURRENCE REPORTING

Title	Name	Phone Number	Alternate Numbers
(1) Plant Contact	Kenneth A. Jazyk	(219) 391-4659	
(2) URS Diamond Project Manager	Alan P. Egler	(302) 892-1296	Philip J. Chen (302) 892-0897
(3) CRG Project Director	Hugh Campbell	(302) 892-1268	
(4) URS Diamond Regional Health & Safety Manager	Kathy Sova or Lisa Edwin	(973) 492-7708 (281) 586-5636	Cell (713) 557-2923
(5) CRG Health & Safety	Mary Glowacki or Brian Ambrose	(302) 992-5993 (302) 992-5869	
(6) CRG Business Team Manager	Hugh Campbell	(302) 892-1268	
(7) DuPont Employee's Administrative Manager	Hugh Campbell	(302) 892-1268	
(8) URS Diamond Operations Manager	Peter Jacobson	(302) 892-7174	
(9) URS Diamond General Manager	Edward Andrechak	(302) 892-7613	Cheryl Greiser (302) 892-0615 or Cell (484) 467-5962
(10) URS Diamond Human Resources	Elsie Papanastasiou	(302) 992-6924	Sylvia Todd (302) 992-6828
URS Occupational Health Manager	Jeanette Schrimsher, RN	(866) 326-7321	(512) 419-6440

Note: If you cannot speak directly to the next person in the communication chain leave a message and contact the next person in line. Continue notification until you speak directly to someone above you in the chain of communication.

PROJECT-SPECIFIC WASTE MANAGEMENT PLAN
EAST CHICAGO SITE, EAST CHICAGO, INDIANA
QUARTERLY AND PRB GROUNDWATER SAMPLING

Date: February 12, 2004

Project No.:18983761.30001

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

Barley Mill Plaza, Building 27
Wilmington, Delaware 19805

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TABLES

Table 1 East ChicagoTeam Responsibilities

Table 2 East Chicago Anticipated Waste Streams

EXHIBITS

Exhibit 1 Field Documentation and Weekly Inspection Forms

Exhibit 2 Sample Container Labels

1.0 DESCRIPTION OF ACTIVITIES

This specific waste management and classification document covers the activities associated with the collection of soil and groundwater samples. The sampling activites will be take place at the DuPont East Chicago Site, located in City of East Chicago, Indiana.

DuPont Corporate Remediation Group (CRG) anticipates the following site activities to be conducted by the URS Diamond (URSD):

- Quarterly Groundwater monitoring of the following wells: MW-2, MW-3, MW-4, MW-5, MW-6, MW-9, MW-10, MW-11, MW-12, MW-13, MW-15, MW-18, MW-20, MW-21, MW-22, MW-23, MW-24, MW-25 MW-26, MW-27, MW-28
- Groundwater Sampling of the following 17 Permeable Reactive Barrier (PRB) wells: PRB-1, PRB-2, PRB-3, PRB-4, PRB-5, PRB-6, PRB-7, PRB-8, PRB-9, PRB-10, PRB-11, PRB-12, PRB-13, PRB-14, PRB-15, PRB-16, PRB-17.

A summary of project team roles and responsibilities is provided in Table 1.

2.0 WASTE CHARACTERIZATION AND HANDLING

2.1 Applicability of Listed Codes

Soil, sediments, and groundwater derived from investigations or other field activities are covered by the Environmental Protection Agency's (EPA's) contained-in policy. This policy requires that management of contaminated media be classified as hazardous waste if they contain a listed waste. Management of the waste media as hazardous continues until the media no longer contain the listed waste or the waste is delisted.

The applicability of RCRA listing codes to waste environmental media was evaluated at the East Chicago site in 1991. It has been determined that no K, P, or U RCRA listing codes apply to any waste media generated at the site.

2.2 Determination of RCRA Characteristic Codes

Investigation derived media [soil, protective personal equipment (PPE), or water] that does not contain Resource Conservation Recovery Act (RCRA) listed waste(s) may be classified as hazardous if it exhibits a hazardous characteristic(s). The four hazardous characteristics defined by RCRA are:

- Ignitable (D001)
- Corrosive (D002)
- Reactive (D003)
- Toxic (D004-043)

The determination of whether generated wastes exhibit RCRA characteristics will be based upon the existing groundwater quality data. Based on the review of groundwater analysis results from November 2003, a RCRA characteristic of toxicity for arsenic is assigned to purge water from MW-3 and MW-9. Purge water from all other wells will be pre-classified as RCRA non-hazardous waste.

2.3 Waste Management and Characterization

The anticipated waste streams are as follows:

- Purge Water from MW-3 and MW-9
- Purge Water from all other quarterly monitoring wells
- Purge water from the PRB wells
- PPE and disposable equipment

A summary of the waste management instructions for each anticipated waste stream is provided in Table 2.

2.3.1 Purge water from MW-3 and MW-9

Based on groundwater analyses from November 2003, these wells exhibit a RCRA characteristic of toxicity for arsenic, D004. Purge water from these 2 wells will be segregated from other purge water and placed in (1) closed head 55-gallon drum for off-site disposal. The drum will be labeled as follows (see exhibit 2).

- Yellow Hazardous waste label
- Site address and generator ID number
- DOO4
- Proper DOT shipping name of: "Hazardous Waste liquid, n.o.s.(arsenic),9, NA3082, PGIII"

This drum will be picked up by a DuPont approved contractor, TERIS, for disposal to a DuPont-approved wastewater treatment vendor

2.3.2 Purge water from the other Quarterly wells and the PRB wells

Approximately 300 gallons of purge water will be collected during monitoring of these wells. The water has been pre-classified as RCRA non-hazardous. The purge water will be temporarily contained in 5-gallon buckets and discharged to the ground on-site upgradient of the PRB wall.

2.3.3 PPE and Disposable Equipment

PPE generated from this sampling all PRB and quarterly wells has been pre-classified as RCRA non-hazardous waste. PPE and disposable equipment from non-hazardous wells will also be considered non-hazardous for disposal. Generator knowledge of the sampling procedure will be used to pre-classify PPE and disposable equipment from MW-3 and MW-9 as RCRA non-hazardous waste. PPE matrix and contact time during the sampling process is not sufficient to transfer the characteristic. All PPE and disposable equipment will be placed in plastic bags. The plastic bags will be placed inside open-head 55-gallon drums for off-site disposal

Each drum of PPE will be labeled as follows:

- Non-hazardous Waste Label
- Generator Address
- Waste Matrix – Personal Protection Equipment
- Date Waste First Put Into Container

3.0 SPILL RESPONSE AND REPORTING REQUIREMENTS

The requirements of this section must be carried out immediately whenever there is a fire, an explosion, or a hazardous substance spill that could threaten human health or the environment.

3.1 Internal DuPont Contacts

Should a release occur of any hazardous substance onto the ground, surface water, or air, it should be appropriately reported to the designated Site Emergency Coordinator, and internal DuPont contacts. Agency reporting may be required based on the compound released, quantity, and media affected.

In the event that any spill occurs, the following internal contacts will be made.

Name	Location	Telephone
Phil Chen (URS Site Project Lead)	Barley Mill Plaza	(302) 892-0897
Alan P. Egler (URSD Project Manager)	Barley Mill Plaza, Building 27 Wilmington, DE	(302) 892-1296
Hugh Campbell (DuPont CRG Business Team Leader)	Barley Mill Plaza, Building 27 Wilmington, DE	(302) 892-1268

- Hugh Campbell will make the appropriate reporting within the CRG organization.

3.2 Reporting Requirements

Specific chemicals and their quantities that require agency reporting have been established for each identified hazardous substance that may be used during the site activities or is known to be present in the waste. These quantities are shown in the table on the following page.

Reportable Quantities (RQ) for Anticipated Constituents

Constituent	RQ (pounds)*	Regulation	Comments
Arsenic	1 pound	40 CFR	Based on observed 2003 GW concentrations, the RQ for arsenic cannot be exceeded if all purge water was released
Petroleum spills to soil within the facility boundary	one thousand (1,000) gallons	Indiana Spill Rule (327 IAC 2-6.1)	
Petroleum Spills to soil beyond the facility boundary	fifty-five (55) gallons	Indiana Spill Rule (327 IAC 2-6.1)	
Petroleum products (fuels, hydraulic fluids)	• Cannot cause a sheen on the surface of the water • Cannot violate applicable water quality standards • Cannot cause a sludge or emulsion to be deposited beneath the surface of the water or upon adjoining shoreline	40 CFR 110 CWA Indiana Spill Rule (327 IAC 2-6.1)	

3.3 Reporting Requirements—State of Indiana

The Indiana Spill Rule (Title 327, IAC 2-6.1) describes spills and/or releases that require reporting in addition to federal requirements, as well as the information that must be reported. Supporting information is included as Attachment E2-1 of this exhibit. Spill and/or releases require immediate reporting of any releases that exceed the reportable quantities cited in Table E2-1 or any releases that contact surface water bodies of the state. In general, the Indiana Spill Rule requires that the following spills and/or releases be reported to the state as soon as possible, but as least within 2 hours:

- ❑ Spills to surface waters
  - Spills of hazardous substances or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less;
  - Spills of petroleum of such quantity as to cause a sheen upon the waters;

- Spills of objectionable substances as defined in section 4(11) of this rule.
  [NOTE: Section 4(11) defines "Objectionable substances" as substances that are: (A) of a quantity, and a type; and
  (B) and present for a duration and in a location; so as to damage waters of the state. This definition excludes hazardous substances, extremely hazardous substances, petroleum, and mixtures thereof.]

- Spills to soil beyond the facility boundary
  - Spills of hazardous substances or extremely hazardous substances when the amount spilled exceeds one hundred (100) pounds or the reportable quantity, whichever is less;
  - Spills of petroleum when the amount spilled exceeds fifty-five (55) gallons;
  - Spills of objectionable substances as defined in section 4(11) of this rule.
- Spills to soil within the facility boundary
  - Spills of hazardous substances or extremely hazardous substances when the amount spilled exceeds the reportable quantity;
  - Spills of petroleum when the spilled amount exceeds one thousand (1,000) gallons; or
  - Spills of objectionable substances as defined in section 4(11) of this rule.

The Indiana Spill Rule further requires information in the form of a "Spill Report," which means an oral report that includes the following information about a spill, to the extent that the following information is known at the time of the report:
(A) The name, address and telephone number of the person making the spill report.
(B) The name, address and telephone number of a contact person, if different from clause (A).
(C) The location of the spill.
(D) The time of the spill.
(E) The identification of the substance spilled.
(F) The approximate quantity of the substance that has been or may further be spilled.
(G) The duration of the spill.
(H) The source of the spill.
(1) Name and location of the waters damaged.
(J) The identity of any response organization responding to the spill.
What measures have been or will be undertaken to perform a spill response.
(L) Any other information that may be significant to the response action

3.4 Agency Spill Reporting Requirements and Contacts

If a release exceeds the quantity cited in Section 3.2, the release must be reported to the appropriate federal and/or state agency. Agency reporting will be handled by the designated Site Emergency Coordinator (the site's environmental manager or the CRG project director for inactive sites).

Federal reporting requirements for releases of hazardous substances to the environment are stipulated by the following regulations:

- Clean Air Act (CAA)/National Emissions Standards for Hazardous Air Pollutants (NESHAPS)
- Clean Water Act (CWA)
- RCRA
- Comprehensive Environmental Release Compensation and Liability Act (CERCLA)
- Emergency Planning and Community Right-to-Know Act (EPCRA).

In addition to federal reporting requirements, state spill and/or release reporting requirements may stipulate more stringent reporting thresholds than federal requirements. The Indiana rules pertaining to spill and/or release reporting require reporting of any releases that exceed the reportable quantities cited in table below or any releases that contact surface water bodies of the state. The following agencies shall be notified as necessary by Dave Wooten (URS Site Project Lead) or Alan P. Egler(URSD Project Manager).

Emergency Response and Agency Contacts for Spill Reporting

Name	Telephone
USEPA- National Response Center (for federal spill reporting—amounts exceeding reportable quantity [RQ])	(800) 424-8802
Lake County Local Emergency Planning Commission (**LEPC**)—William Trimmer, Chair 2900 West 93rd Ave., Crown Point, IN 46307 Email: jrs@tsrcom.com	(219) 756-8302
Lake County LEPC—24-Hour Reporting Number	**(219) 755-3512**
IDEM Emergency Response, 24-Hour Spill Reporting Number	**(888) 233-7745 (in-state toll-free call)** (317) 233-7745 (out-of-state calls)

4.0 WASTE STORAGE AND INSPECTION REQUIREMENTS

RCRA and the Department of Transportation (DOT) have developed specific requirements for the following:

- Waste containers provided for shipment
- Waste container labeling
- Waste container inventory
- Waste container accumulation area
- Inspection of RCRA hazardous and "ON-HOLD" wastes

The following procedure addresses these regulatory requirements.

4.1 Container Requirements and Labeling Instructions

All wastes destined for off-site disposal will be placed in containers that meet DOT specifications or stockpiled according to the stormwater protection plan for the facility. Containerized waste will be labeled as described in Section 2 and Table 2 and will describe the following:

- Content
- Date the material was placed in the container
- State of the material (e.g., liquid, solid, and slurry)
- Unique sequential identification number of that container (as detailed in Section 4.2)
- CRG project number, contact, and telephone number.

Example labels for the waste streams are included as exhibits to this addendum. Label information will be completed in a permanent marker.

4.2 Waste Container Inventory Procedures

All waste containers generated will be given a unique container identification number. This unique container identification number will be written in paint pen on the top 1/3 of the drum and on the drum lid. Adding the unique container identification number on the lid will allow inventory of large bodies of drums without rotating the containers to find the identification number. Each container will be marked with a unique sequential identification number (e.g., EC-IW-"A"-"BCDE"-"F"), where:

- ECrepresents an abbreviation for the site.
- IW represents the Investigation Waste, TW represents treatability waste, and RW represents Remediation Waste.

- "A" represents the container type (i.e., D = drum, E= end-dump trailer, T = tank truck, R = roll off, X = tote bin, and S = special container, as indicated on the container generation and tracking forms).
- "BCDE" represents a four-digit sequential number beginning with 0001. Containers will be numbered so that each number will be unique to a container, regardless of the container type. (Each four-digit sequential number will be used only once for investigation and/or remediation wastes in a year. The sequential number sequence will be reset to 0001 at the beginning of each year.)
- "F" represents the last digit of the year (for the year 2004 "F" will be the number four in all of the remediation container codes for this project).

As waste containers are generated, the field personnel will log them into a working copy of the Field Documentation Form. A hard copy of this form is included in Exhibit 1.

4.3 Waste Container Inventory Documentation

At the conclusion of the field event, the field team leader will complete the Field Documentation Form for their project in the Waste Management Database and submit for approval. Your Waste Management Network will follow up with waste disposal and record keeping responsibilities.

A blank Field Documentation Form is provided in Exhibit 1 of this addendum.

4.4 Container Storage Time Limits and Inspection Requirements

Waste containers may be stored in the designated waste accumulation area until characterization is completed and may remain in this area until shipment. Storage areas for "ON-HOLD" or RCRA hazardous wastes will be inspected on a weekly basis by the designated waste coordinator. An Accumulation Area Inspection Log is included in Exhibit 1.

Wastes that are characterized as RCRA hazardous wastes cannot be stored on site for greater than 360 days from the date of waste generation for Conditionally Exempt Small Quantity Generators (CESQG). The date of waste generation is considered to be the date waste was first placed in the storage container (e.g., drum roll-off box or tank).

Table 1
East Chicago Quarterly and PRB Groundwater Well Monitoring Project Team Responsibilities

Task	Organization	Individual
Conduct waste coordinator duties (unless specified elsewhere).	URS Baton Rouge, LA	P. Chen
Oversee waste management activities.	URSD	A. Egler
Coordinate sampling activities.	URSD	P. Chen
Select and oversee waste transportation and disposal contractors. Selection Oversight	 DuPont URSD	 J. Ciroalo (DuPont Thermal Group) A. Egler
Coordinate contract laboratory.	URSD	S. Nordstrom
Mark containers.	URSD	P. Chen
Complete container generation forms and waste tracking forms (complete and submit to site waste coordinator).	URSD	P. Chen
Evaluate pertinent information to determine applicability of listing codes to each investigation area (only as needed). Completed in 1991.	DuPont	completed
Evaluate analytical data to determine RCRA classification (characteristic codes for each waste stream).	DuPont or URSD as requested by DuPont	B. Bishop (completed)
Recommend waste characterization for each waste stream.	URSD **only if requested by DuPont**	B. Bishop (completed)
Review and approve recommended waste characterization for each waste stream.	DuPont	H. Campbell
Monitor and approve movement of waste into the waste accumulation area (drums).	DuPont	P. Chen
Prepare shipping papers (i.e., manifests and LDR forms).	DuPont or URSD as requested by DuPont	B. Bsihop Waste Disposal Contractor (DuPont must review)
Prepare/submit related reporting and maintain all required documents.	DuPont	Tim Gregg, DuPont Facility Services

Table 2
East Chicago Quarterly and PRB Groundwater Well Monitoring
Anticipated Waste Streams

Waste Stream	Proposed RCRA Classification	Anticipated Waste Characterization Testing	Container Requirements and Estimated Volume	Labeling Requirements	Anticipated Disposal Method
Purge Water from MW-3 and MW-9	D004	none	~15 gallons to be placed in DOT-approved closed-head 55-gallon drum	"Hazardous waste label. (see exhibit 2)	Will be picked up by TERIS for Disposal to DuPont approved waste facility at completion of the monitoring event
Purgewater from all other Quarterly and PRB monitoring wells	Non-hazardous based on previous analysis	none	Temporarily contain in 5-gallon buckets. Discharge to ground on-site upgradient of the PRB	none	On-site disposal
PPE and disposable equipment	Non-hazardous based on RCRA contained in rule and generator knowledge of the sampling process	None	PPE placed in plastic bags. Plastic bags placed in an open-head 55-gallon DOT-approved drum.	Green "Non hazardous waste" label, PPE, site name, date generated	Will be picked up by TERIS for Disposal to DuPont approved waste facility at completion of the monitoring event

Waste Management Field Documentation Form

INSTRUCTIONS:

Every project's Field Team Leader is to submit this form using the Lotus Notes Technology Networks Database, for automatic forwarding to the Waste Management Consultant. This form is located on the Technology Networks Database, Waste Management Network. Completion of this documentation form replaces the former "Waste Container Generation Form" and "Inventory Sheet". A hardcopy of this form will not be accepted.

The Waste Management Field Documentation form consists of two main Sections and is organized as follows:

Section A:

This Section contains general information about the project and serves as documentation that a Waste Management Plan Addendum was prepared, received and reviewed by the field team. Completion of this page will be used to document compliance with 6 Sigma improvements and the CRG waste management plan metric.

Section B:

To be completed for all wastes handled by the field team.

SECTION A

GENERAL INFORMATION:

Field Event Date(s):_____

CRG Project No._____ Project Manager: _____

Site Name: _____ Project Name: _____

Site Address: _____

Site EPA ID No.: _____

Task Name: _____

Field Team Leader: _____ Phone: _____

URSD Waste Consultant: _____

* Site environmental coordinator or contact: _____ Phone: _____

(*Orphan sites will not have an on-site contact)

WASTE MANAGEMENT PLAN DOCUMENTATION:

Was a Waste Management Plan Addendum prepared for the specific task(s) performed during this field event? _____ YES _____ NO

Date the Addendum was prepared? _____ (MM/DD/YY)

Was the Addendum received and reviewed by the Field Team before fieldwork began?

_____ YES _____ NO

SECTION B

INSTRUCTIONS: Please complete the appropriate blanks for all waste streams, as applicable.

B1. Wastes disposed of at the time of generation. Please complete all that apply.

_____ gallons (total) of purgewater to on-site resource (i.e. POTW outfall, WWTP or other approved outfall, on-site groundwater treatment system)

_____ gallons (total) of purgewater to ground

_____ (# of)bags of PPE to on-site or off-site DuPont controlled solid waste dumpster

_____ (# of) 5, 35 or 55-gallon (circle one) containers of soil or solids to on-site

_____ cubic yards of soil or solids to on-site landfill.

Other (complete the blanks as described in the parentheses):

_____ (Quantity) of _____ (volume) containers of _____ (material) managed at/by _____ (location/site authority)

B2. Wastes left for management and disposal by site personnel

_____ (# of gallons) of _____* waste left for management by on-site personnel

_____ cubic yards of stockpiled _____* waste left for management by on-site personnel

Other (complete the blanks as described in the parentheses):

_____ (Quantity) of _____ (volume) containers of _____ (material)

* Insert appropriate waste stream here (i.e. soil, debris, purgewater, PPE etc.)

Other wastes (Please describes material, number of containers, container type, volume, waste matrix, etc.):

_____

_____

_____

On-site personnel responsible for Waste Disposal referred to in Section B2:

Name: _____ Phone: _____

DOES URSD/CRG NEED TO DISPOSE OF WASTE GENERATED FROM THIS PROJECT:

_____ YES _____ NO

INSTRUCTIONS: If the answer to the above question is NO, STOP HERE.

IF THE ANSWER IS YES, PLEASE COMPLETE SECTION B3.

B3. Wastes Requiring Characterization and/or Disposal Assistance by URSD Waste Consultant

INSTRUCTIONS: This inventory must be completed to notify the URSD Waste Consultant of wastes needing disposal.

This inventory must include all waste not covered under Section B1 or B2. A separate line entry for each container must be entered. This is required to distinguish one container from another for labeling and disposal requirements. Also include the source area (i.e. SWMU or AOC number, well number, boring ID) and matrix (Plastic, PPE, groundwater, decon water, soil).

Waste Inventory Sheet

Container Number	Work Area (SWMU or boring ID)	Matrix (soil, GW, decon water, PPE, plastic)	Container Type (roll-off, 55-gal drum, 35-gal, drum, tanker)	% full (25%, 50%, 75%, 100%)	Label (On-hold, Hazardous, Non-Haz)	Accum. Start Date	Waste characterization Sample name (If applicable)

Accumulation Area Inspection Log

Date: _____ Time: _____

Inspector Name and Title: _____

Equipment	Checklist	OK (√)	Comments
Containers	Corrosion, leakage, structural damage		
Container Sealing	Open lid, rings, bung caps		
Container Labels	Improper identification, date missing		
Segregation of Incompatibles	Storage of incompatibles		
Container Stacking	Aisle space, Height		
Pallets	Damaged, drums not on pallet		
Base or Foundation	Cracks, spelling, erosion, wet spots		
Warning Signs	Damaged, missing		

Problem—Corrective Action Taken

_____

_____

_____

_____

_____

PPE and Disposable Equipment

NON-HAZARDOUS Waste

OPTIONAL INFORMATION

SHIPPER EI DuPont, East Chicago

ADDRESS _____

CITY, STATE, ZIP _____

CONTENTS PPE and Debris

NON-HAZARDOUS WASTE

Purge water from MW-3 and MW-9

HAZARDOUS WASTE

FEDERAL AND/OR STATE LAWS PROHIBIT IMPROPER DISPOSAL.

IF FOUND, CONTACT THE NEAREST POLICE OR PUBLIC SAFETY AUTHORITY, THE U.S. ENVIRONMENTAL PROTECTION AGENCY.

GENERATOR INFORMATION:

NAME: DuPont, East Chicago

ADDRESS: 5215 Kennedy Avenue PHONE:

CITY: East Chicago STATE: IN ZIP: 46312

EPA ID NO./ MANIFEST DOCUMENT NO.: IND005174354 /

ACCUMULATION START DATE: *Insert date waste placed in drum here

EPA WASTE NO.: **D004**

Hazardous Waste Liquid, n.o.s. (arsenic), 9, NA3082, PGIII

D.O.T PROPER SHIPPING NAME AND UN OR NA NO. WITH PREFIX

HANDLE WITH CARE!

APPENDIX B

DUPONT SITE GROUNDWATER FLOW MAPS

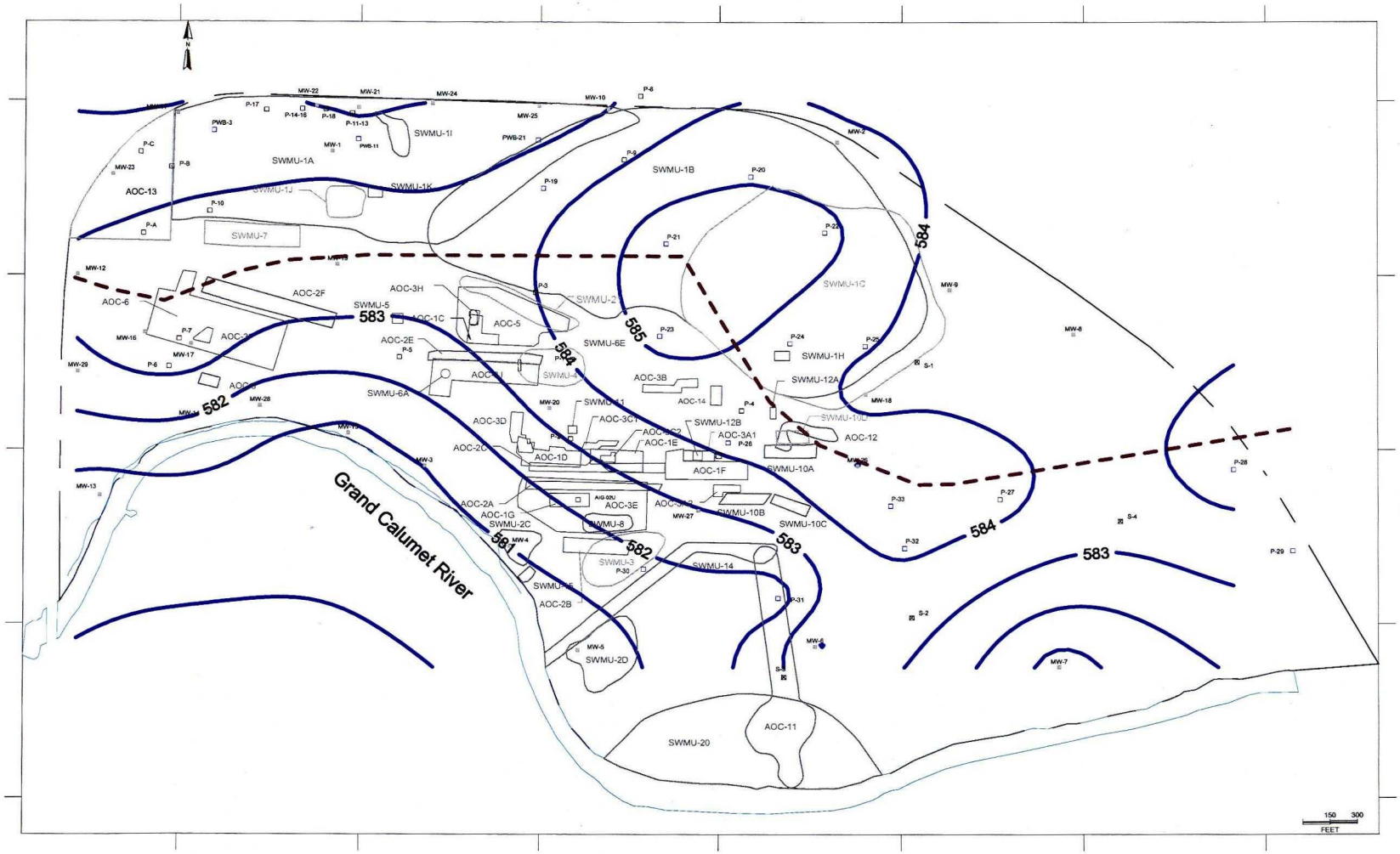

Figure 3-10a
Ground Water Elevation
November, 1999

East Chicago RFI

LEGEND

Ground Water Divide

Ground Water Contour

Coutour interval = 1 foot MSL

DUPONT

Corporate Remediation Group
An Alliance between
DuPont and The W-C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

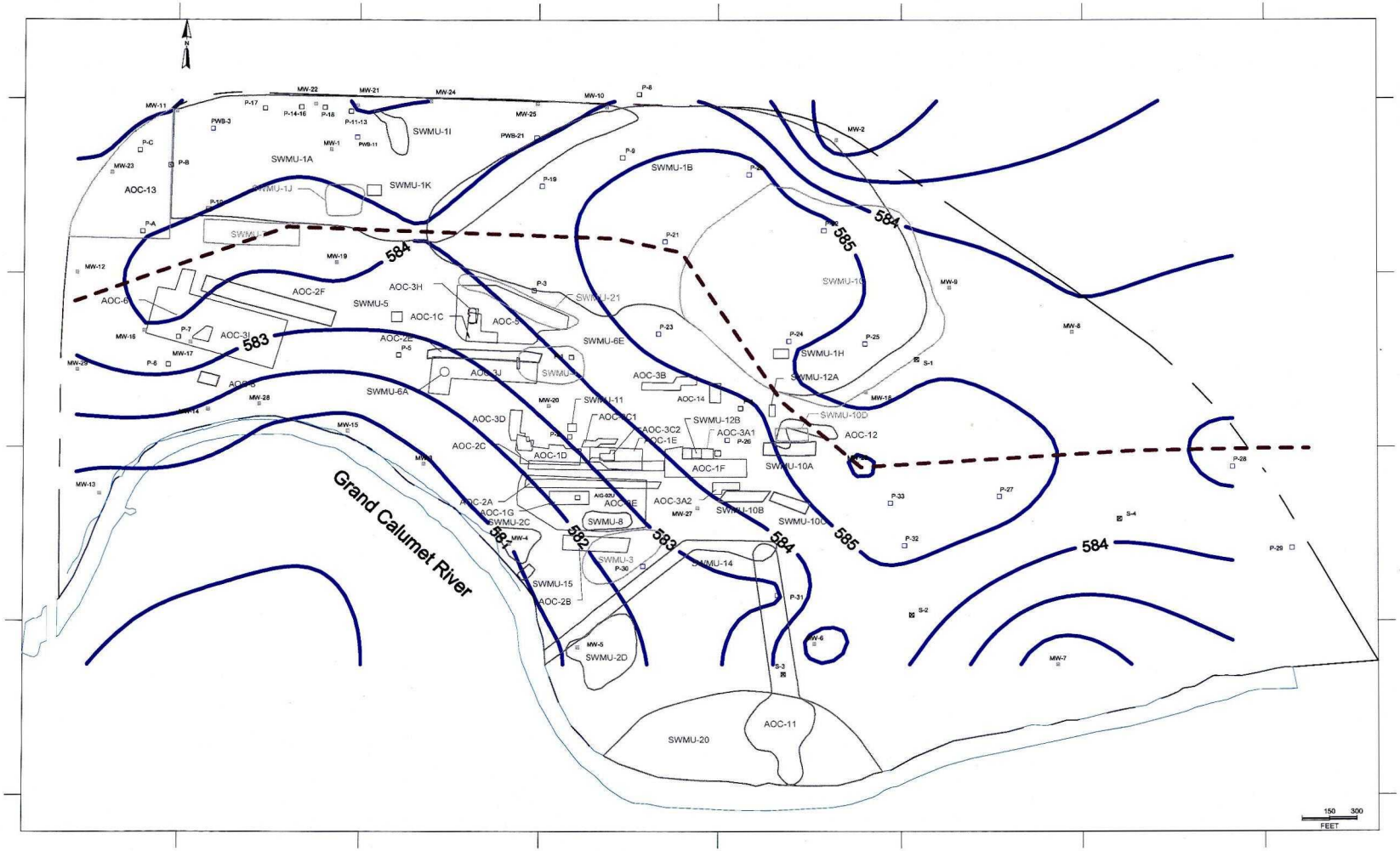

Figure 3-10b
Ground Water Elevation
January, 2000

East Chicago RFI

LEGEND

Ground Water Divide

Ground Water Contour

Coutour interval = 1 foot MSL

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Corporate Remediation Group
An Alliance between
DuPont and The W-C Diamond Group

Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

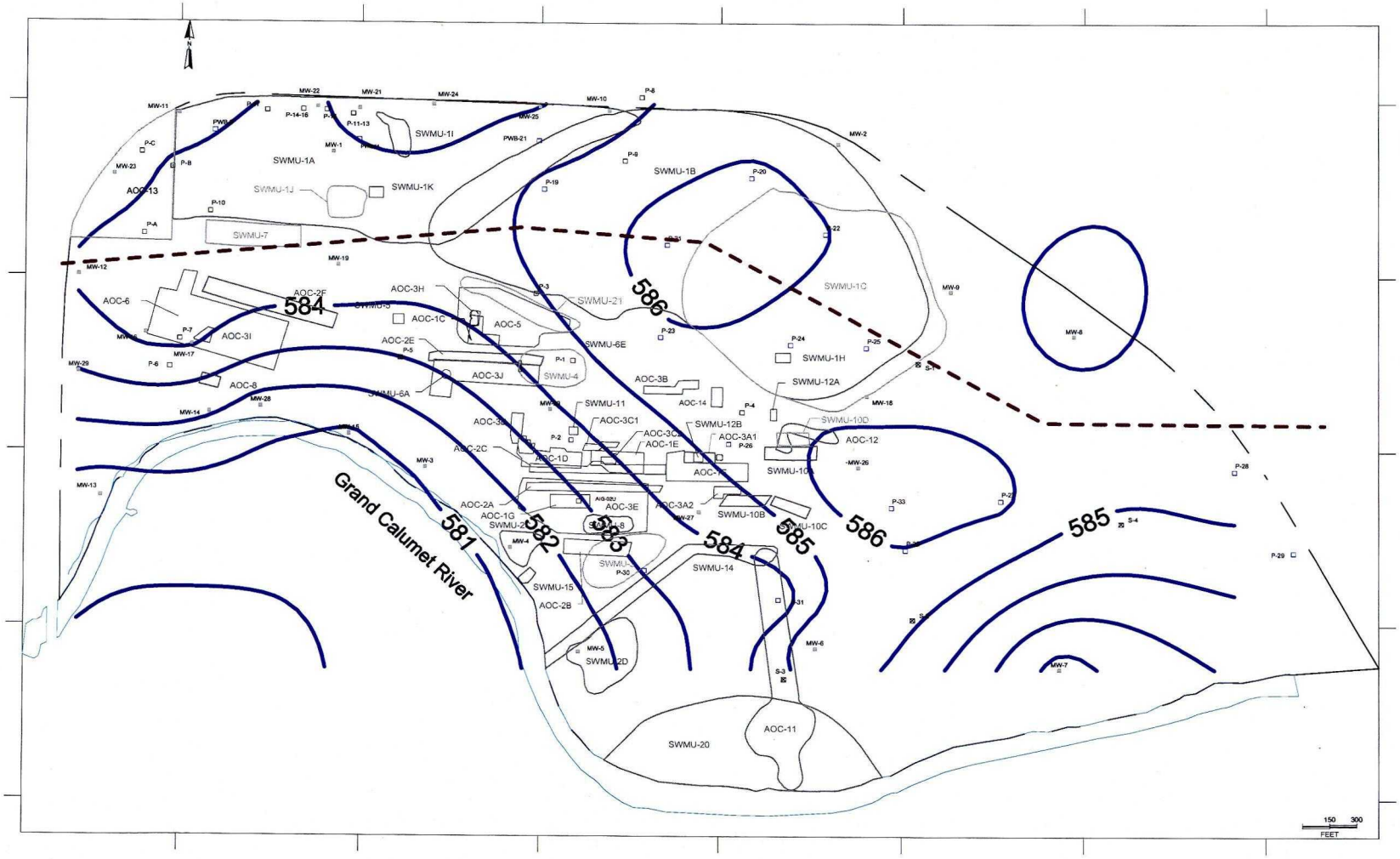

Figure 3-10c
Ground Water Elevation
March, 2000

East Chicago RFI

LEGEND

Ground Water Divide

Ground Water Contour

Coutour interval = 1 foot MSL

DUPONT

Corporate Remediation Group
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Wilmington, Delaware 19880-0027

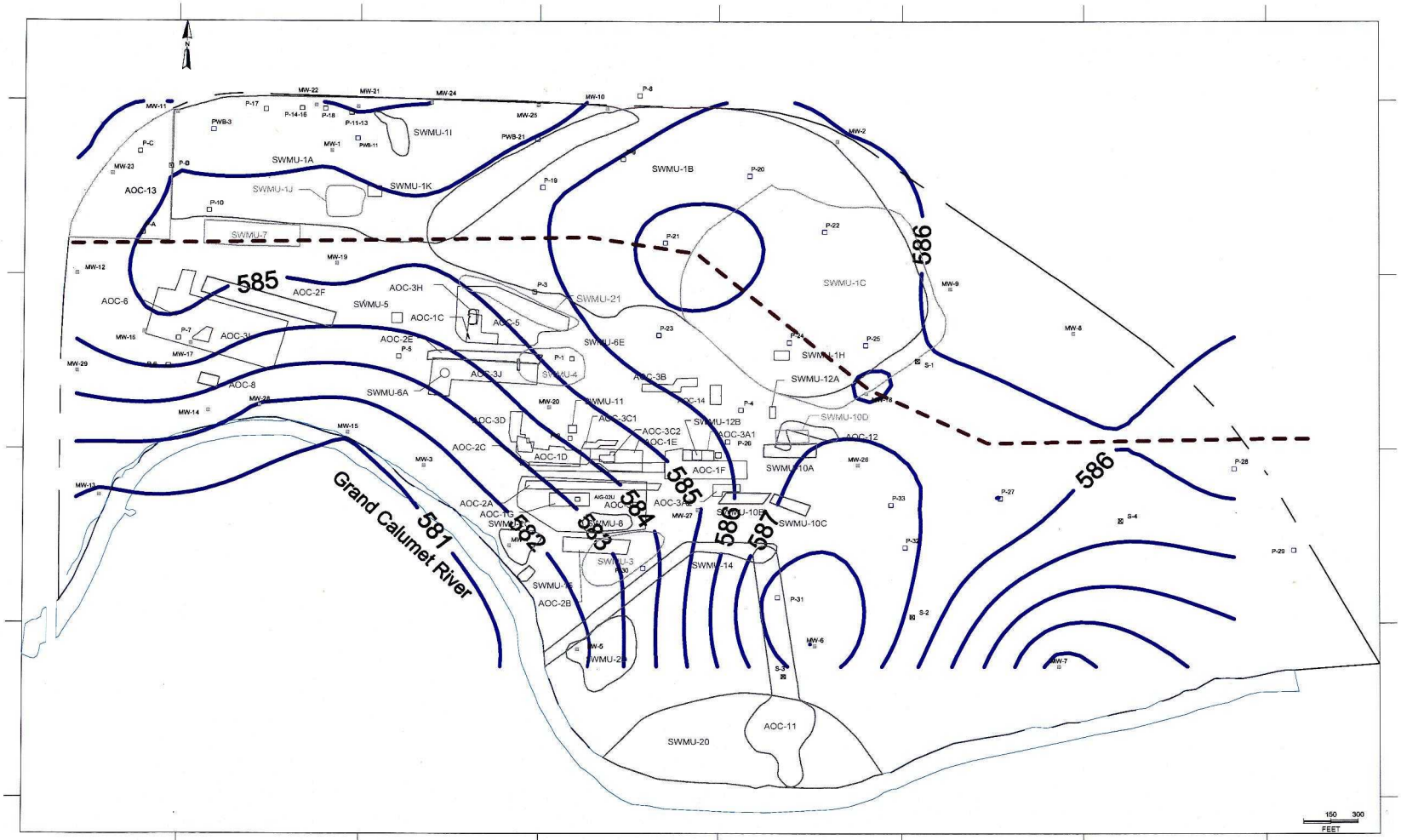

Figure 3-10d
Ground Water Elevation
May, 2000

East Chicago RFI

LEGEND

Ground Water Divide

Ground Water Contour

Coutour interval = 1 foot MSL

DUPONT

Corporate Remediation Group
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Wilmington, Delaware 19880-0027

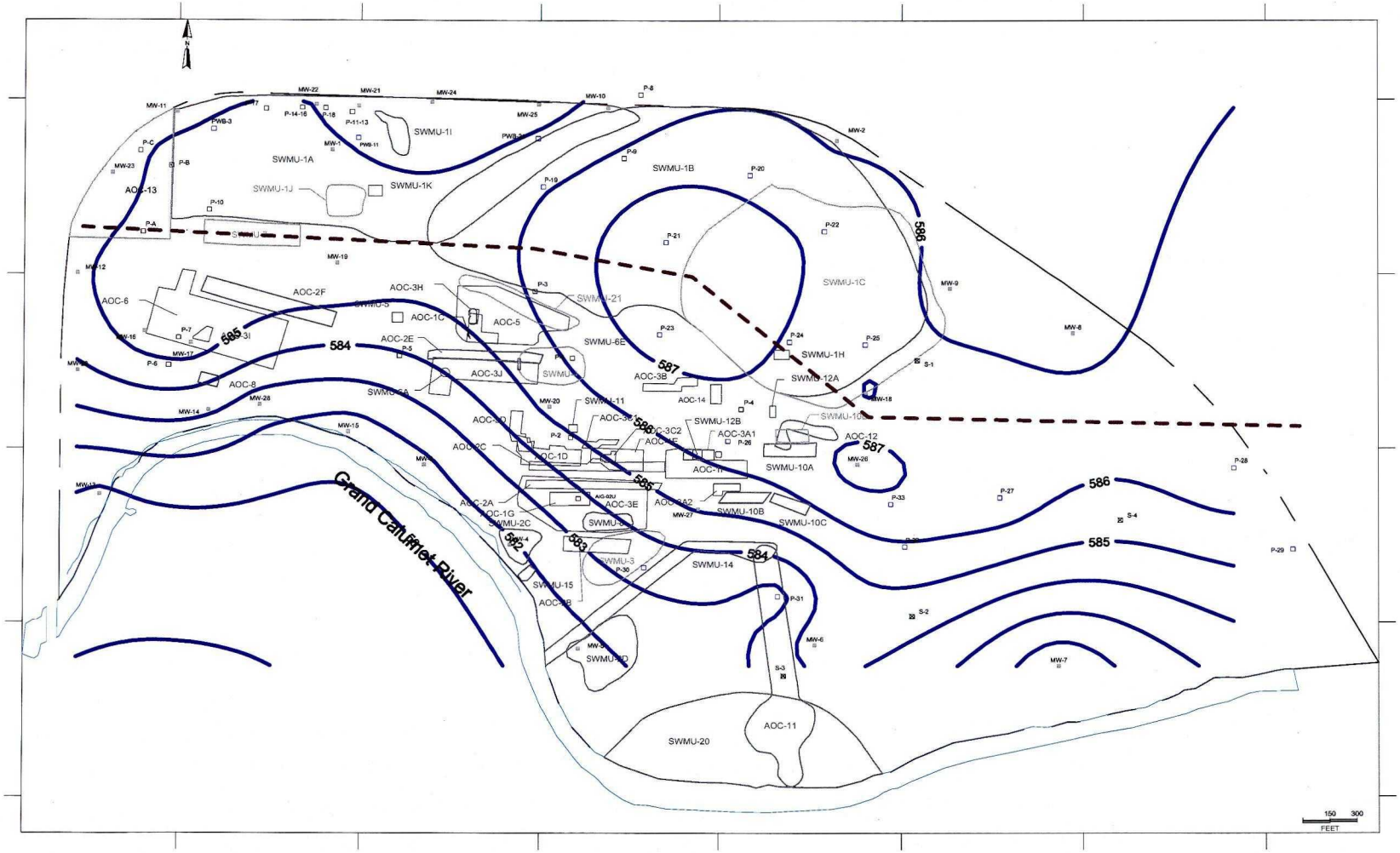

Figure 3-10e
Ground Water Elevation
July, 2000

East Chicago RFI

LEGEND

Ground Water Divide

Ground Water Contour

Coutour interval = 1 foot MSL

DuPont

Corporate Remediation Group
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Barley Mill Plaza, Building 27
Wilmington, Delaware 19880-0027

APPENDIX C

EAST CHICAGO AREA GROUNDWATER FLOW FIGURES

Geohydrology and Water Quality of the Calumet Aquifer, in the Vicinity of the Grand Calumet River/Indiana Harbor Canal, Northwestern Indiana

By JOSEPH M. FENELON and LEE R. WATSON

Prepared in cooperation with the
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

U.S. GEOLOGICAL SURVEY
Water-Resources Investigations Report 92-4115

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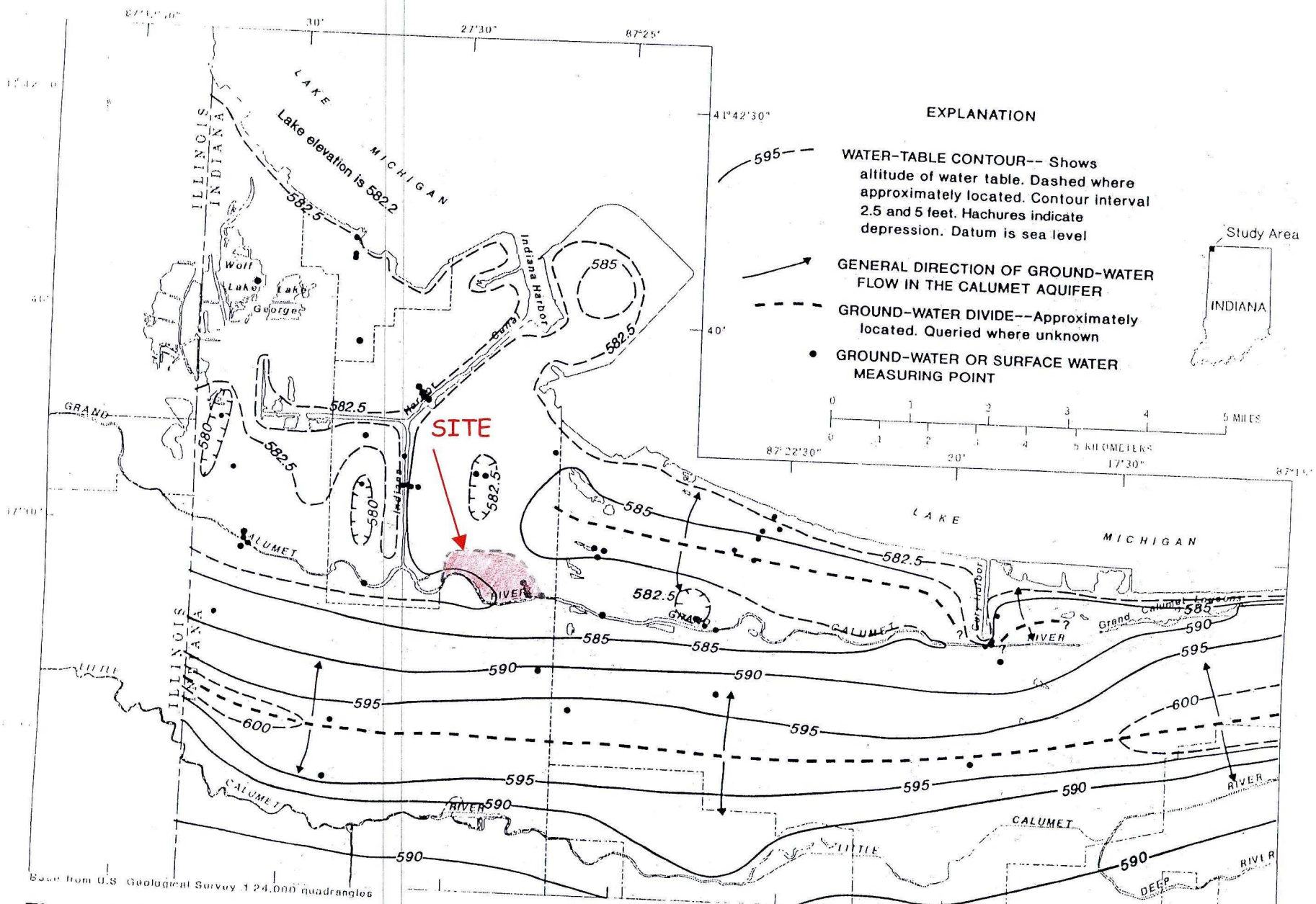

Figure 8. Configuration and altitude of the water table in the Calumet aquifer, March 31–April 4, 1986.

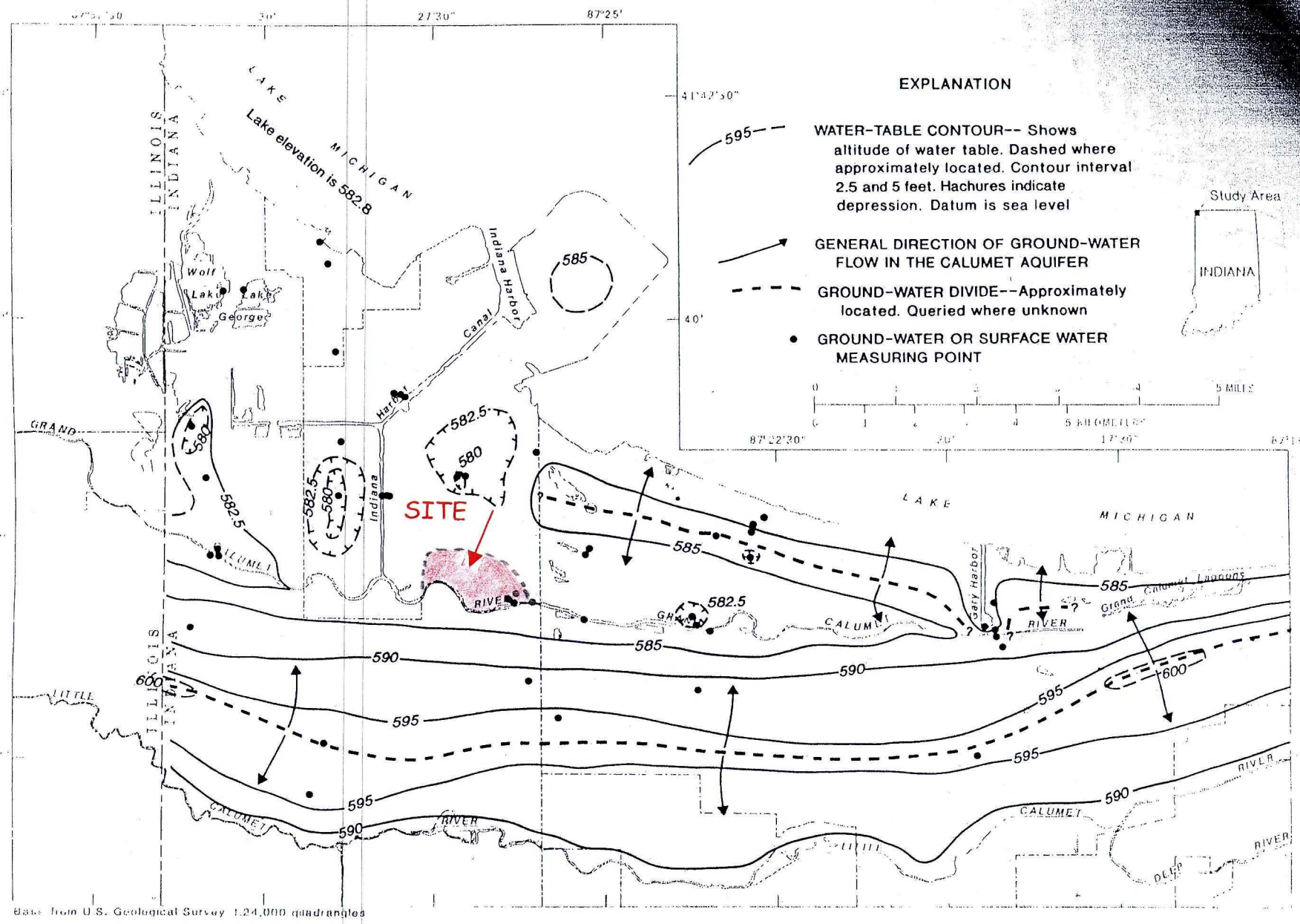

Figure 9. Configuration and altitude of the water table in the Calumet aquifer, September 22–26, 1986.

U.S. Department of the Interior
U.S. Geological Survey

An Estimate of Chemical Loads From Ground Water to the Grand Calumet River and Indiana Harbor Canal, Northwestern Indiana

By Timothy C. Willoughby and Qaadir A. Siddeeq

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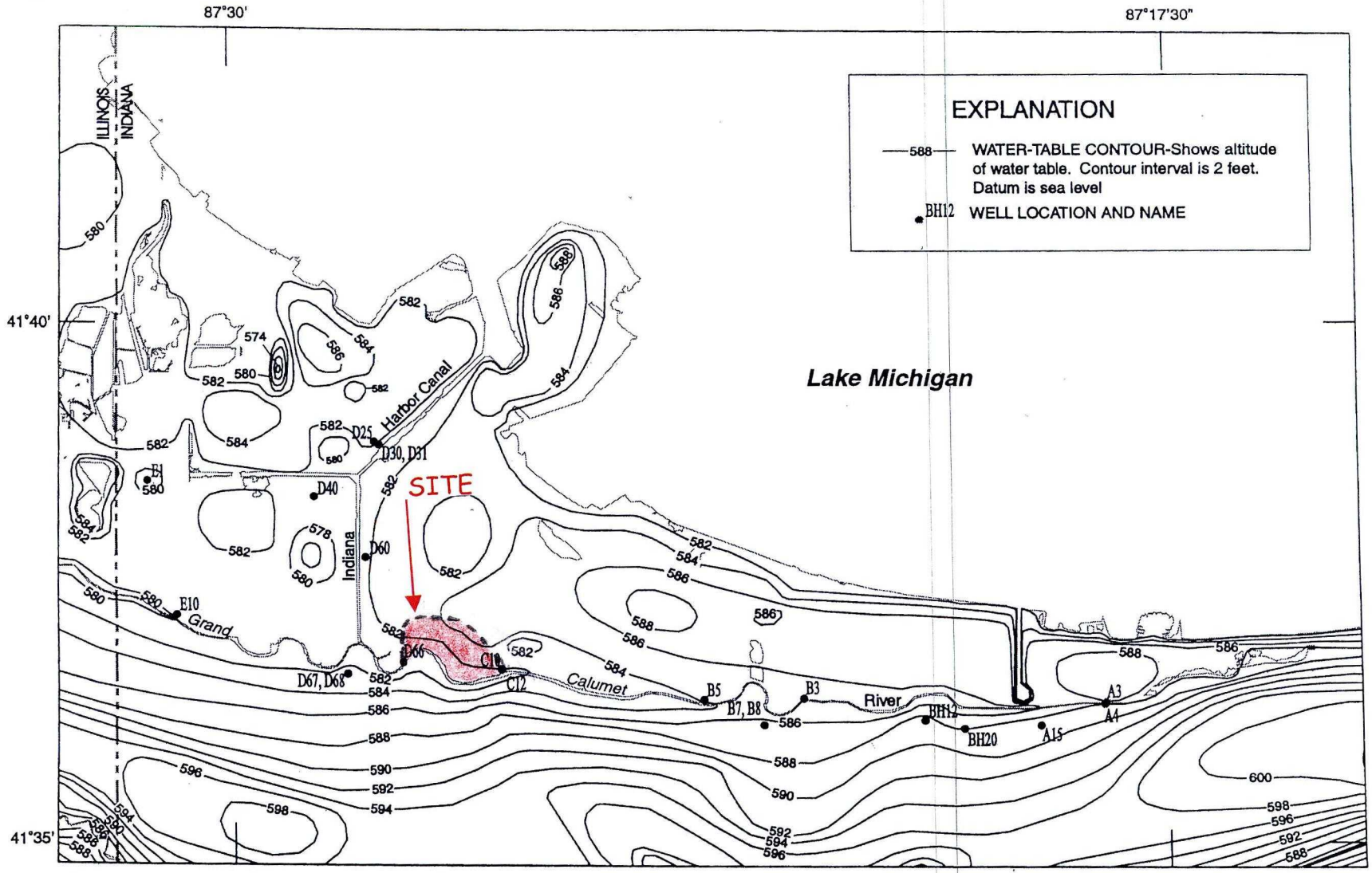
Indianapolis, Indiana
2001



Base from U.S. Geological Survey digital data, 1:24,000 digital line graphs
Albers Equal-Area Conic projection
Standard Parallels 29°30', central meridian -86°

Water-level altitude data from Kay and others, 1996

0 1 2 3 4 5 MILES

0 1 2 3 4 5 KILOMETERS

Figure 3. Water-table altitude (June 23-25, 1992) and locations of observation wells used for estimate of chemical loads from ground water to the Grand Calumet River and Indiana Harbor Canal, northwestern Indiana.

U.S. Department of the Interior
U.S. Geological Survey

Use of Isotopes to Identify Sources of Ground Water, Estimate Ground-Water-Flow Rates, and Assess Aquifer Vulnerability in the Calumet Region of Northwestern Indiana and Northeastern Illinois

By Robert T. Kay, E. Randall Bayless, and Robert A. Solak[1]

Prepared in cooperation with the
U.S. Environmental Protection Agency

Water-Resources Investigation Report 02-4213

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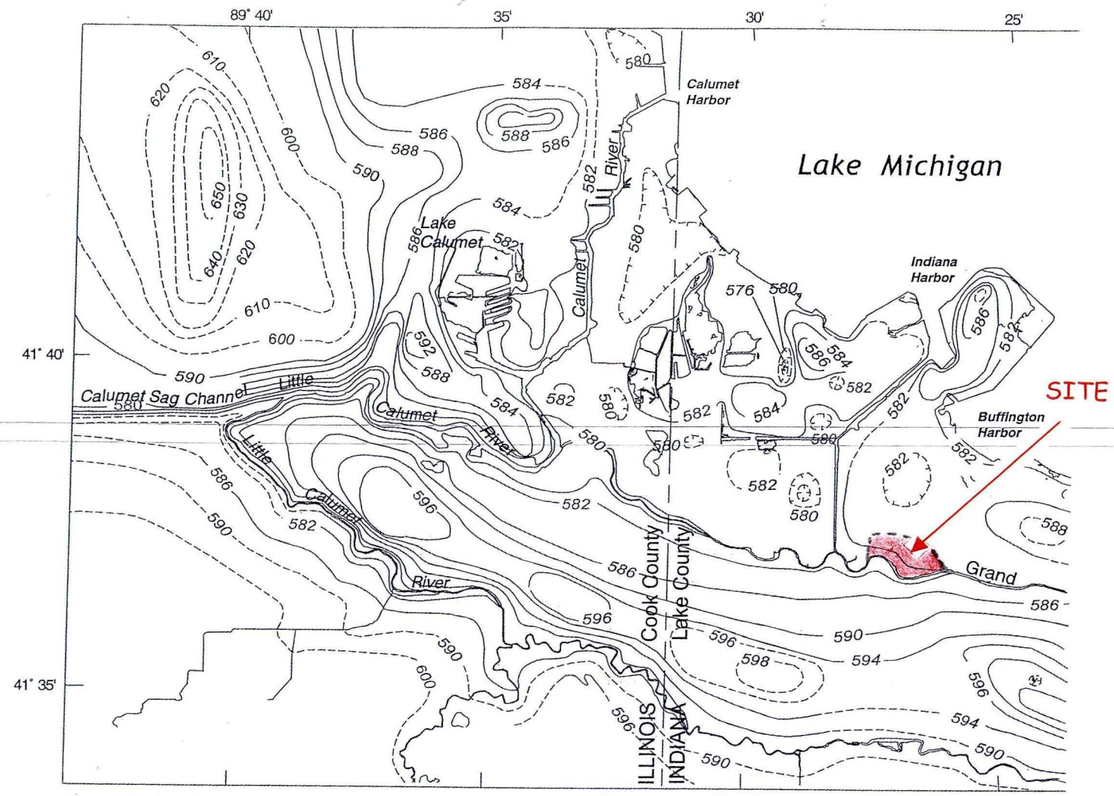
[1]MACTEC Engineering and Consulting, Novi, Michigan

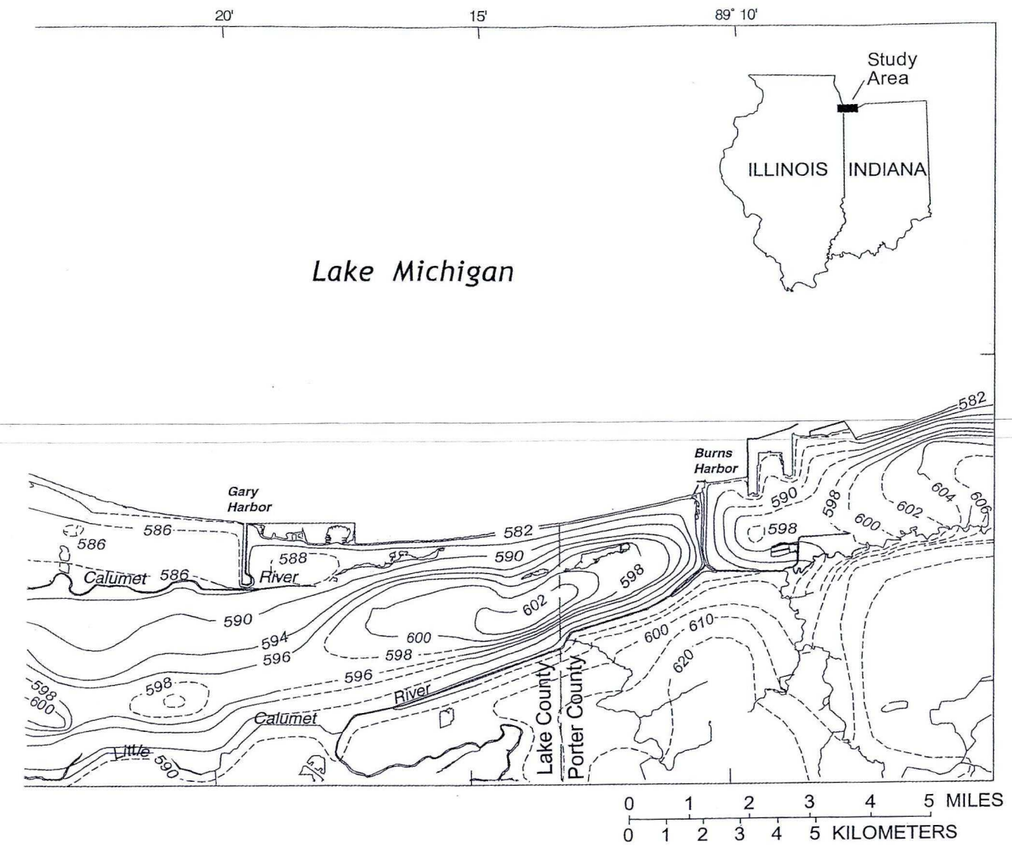


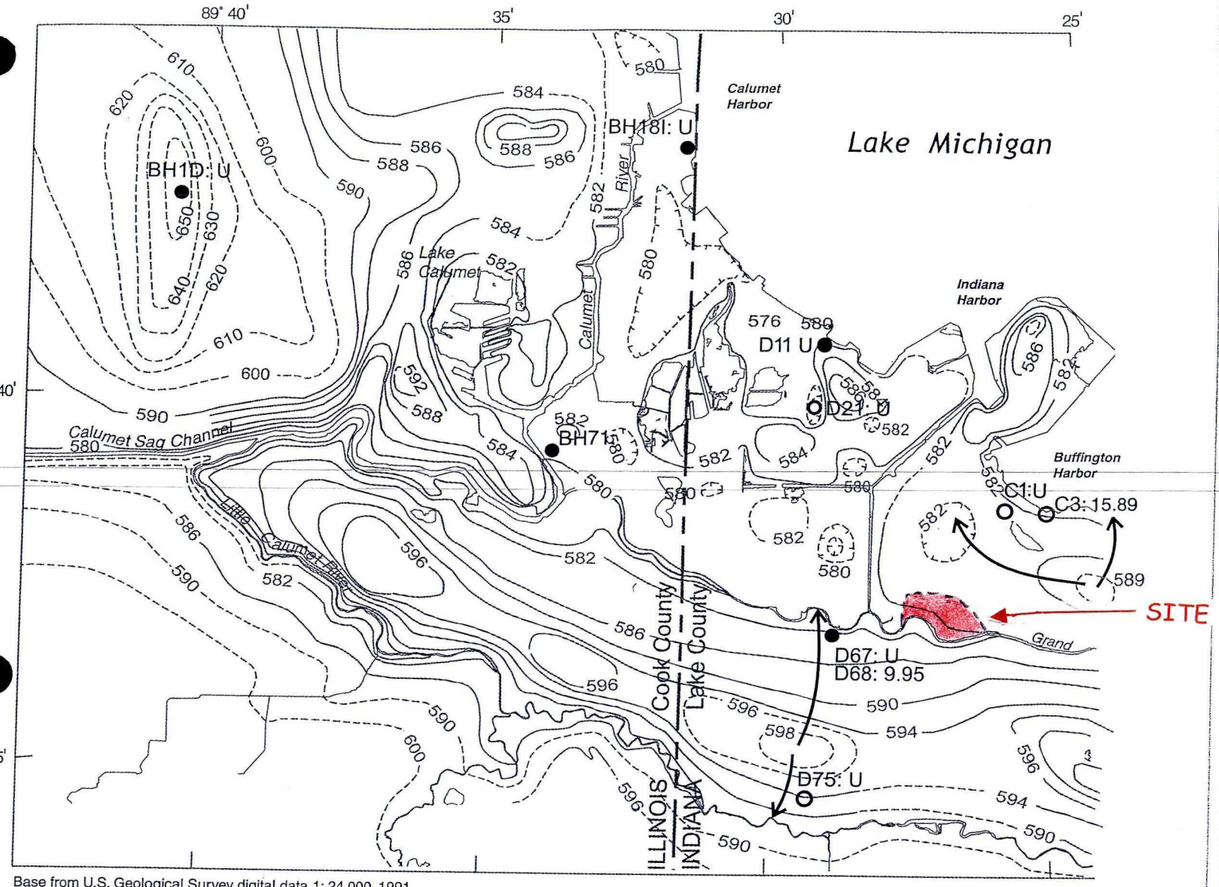
Base from U.S. Geological Survey digital data, 1:100,000, 1991
Albers Equal-Area projection
Standard parallels 33° and 45°, and central meridian -89°00'

EXPLANATION

——606---- WATER-TABLE CONTOUR-Shows altitude of water table. Dashed where approximate. Contour interval variable. Datum NGVD of 1929

Figure 9. Water-table configuration, Calumet region of northwestern Indiana and northeastern Illinois, June 23-25, 1992. (Modified from Kay and others, 1996.)





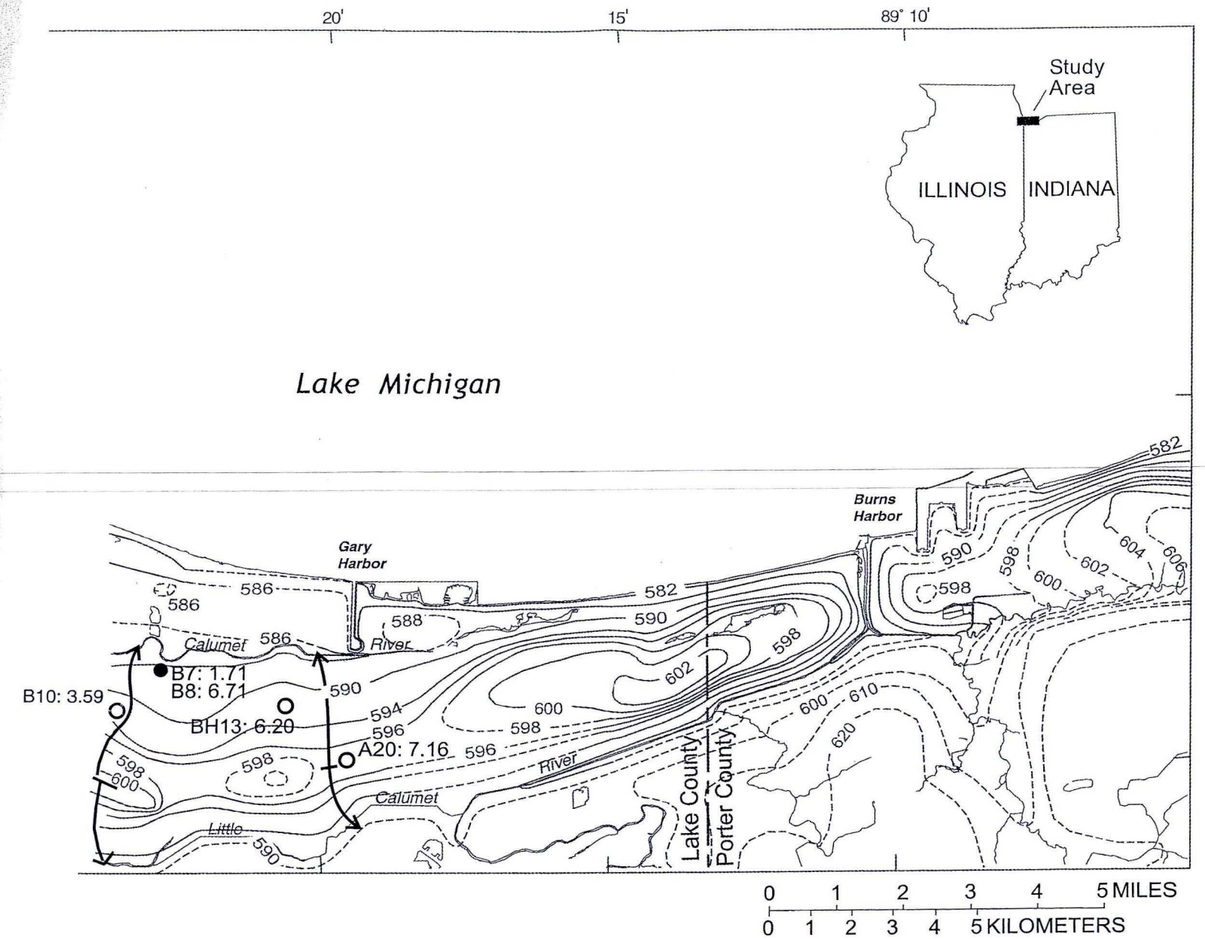
Base from U.S. Geological Survey digital data 1; 24,000, 1991
Albers Equal Area projection
Standard parallels 29°30' and 45°30' Central meridian -86°00'

EXPLANATION

606 — WATER-TABLE CONTOUR-Shows altitude of water table. Dashed where approximate. Contour interval variable. Datum NGVD of 1929

→ FLOW DIRECTION OF GROUND WATER

Figure 22. Apparent ground-water age in the Calumet aquifer, Calumet region of northwestern Indiana and northeastern Illinois, 1997–February 2001.



B10: 3.59 WELL NAME: [^{3}H]/[^{3}He] AGE, IN YEARS

O Single monitoring well

● Paired monitoring wells

U Age measurement was attempted but unsuccessful

Characterization of Fill Deposits in the Calumet Region of Northwestern Indiana and Northeastern Illinois

By ROBERT T. KAY, THEODORE K. GREEMAN, RICHARD F. DUWELIUS, ROBIN B. KING, and JOHN E. NAZIMEK, U.S. Geological Survey, and DAVID M. PETROVSKI, U.S. Environmental Protection Agency

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 96–4126

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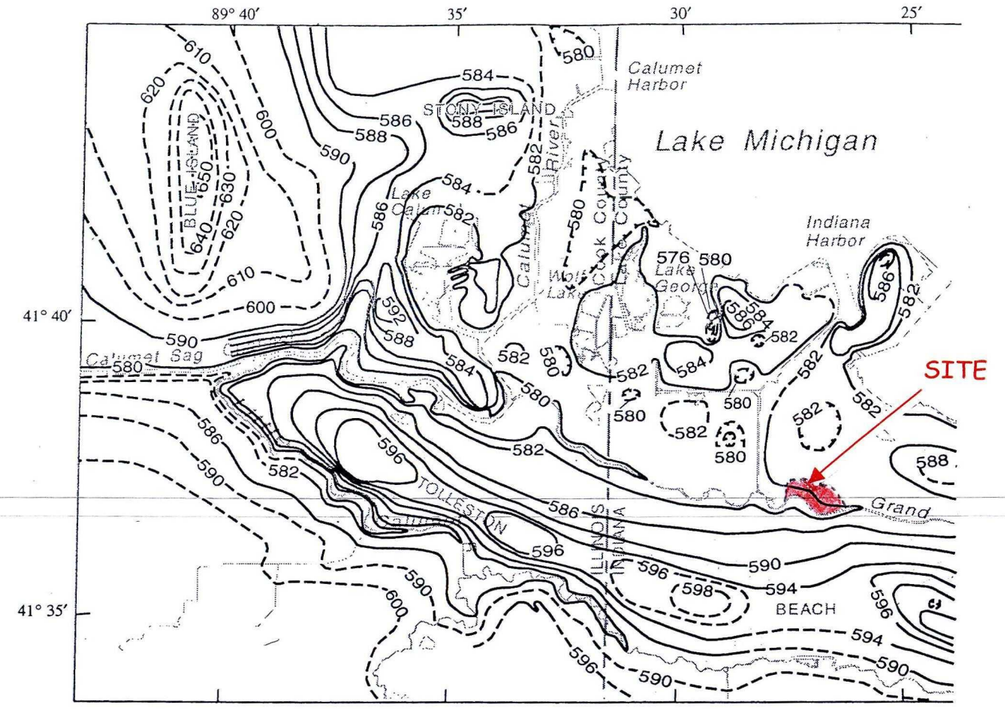

EXPLANATION

——606– – · WATER-TABLE CONTOUR--Shows altitude of water table. Dashed where inferred. Contour interval, in feet, is variable. Datum is sea level

Figure 7. Water-table configuration, Calumet region of northwestern Indiana and northeastern Illinois, June 23–25, 1992 (from Kay and others, 1996, pl. 1).

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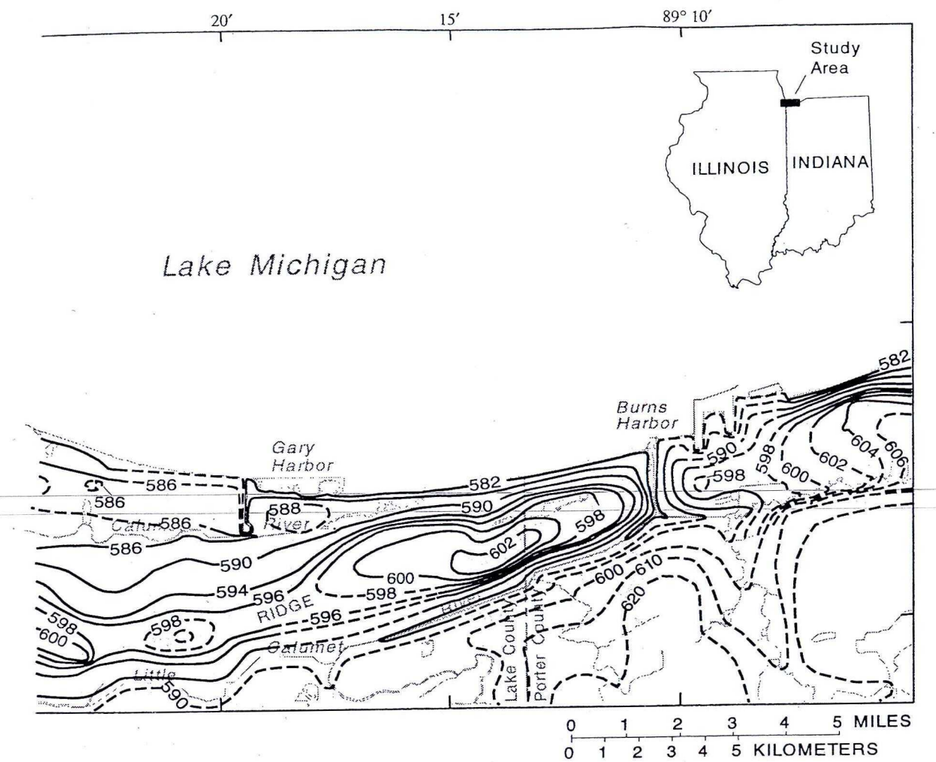

Figure 7. Continued.

PRELIMINARY ANALYSIS OF THE SHALLOW GROUND-WATER SYSTEM IN THE VICINITY OF THE GRAND CALUMET RIVER/INDIANA HARBOR CANAL, NORTHWESTERN INDIANA

By Lee R. Watson, Robert J. Shedlock, Konrad J. Banaszak, Leslie D. Arihood, and Paul K. Doss

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U.S. GEOLOGICAL SURVEY

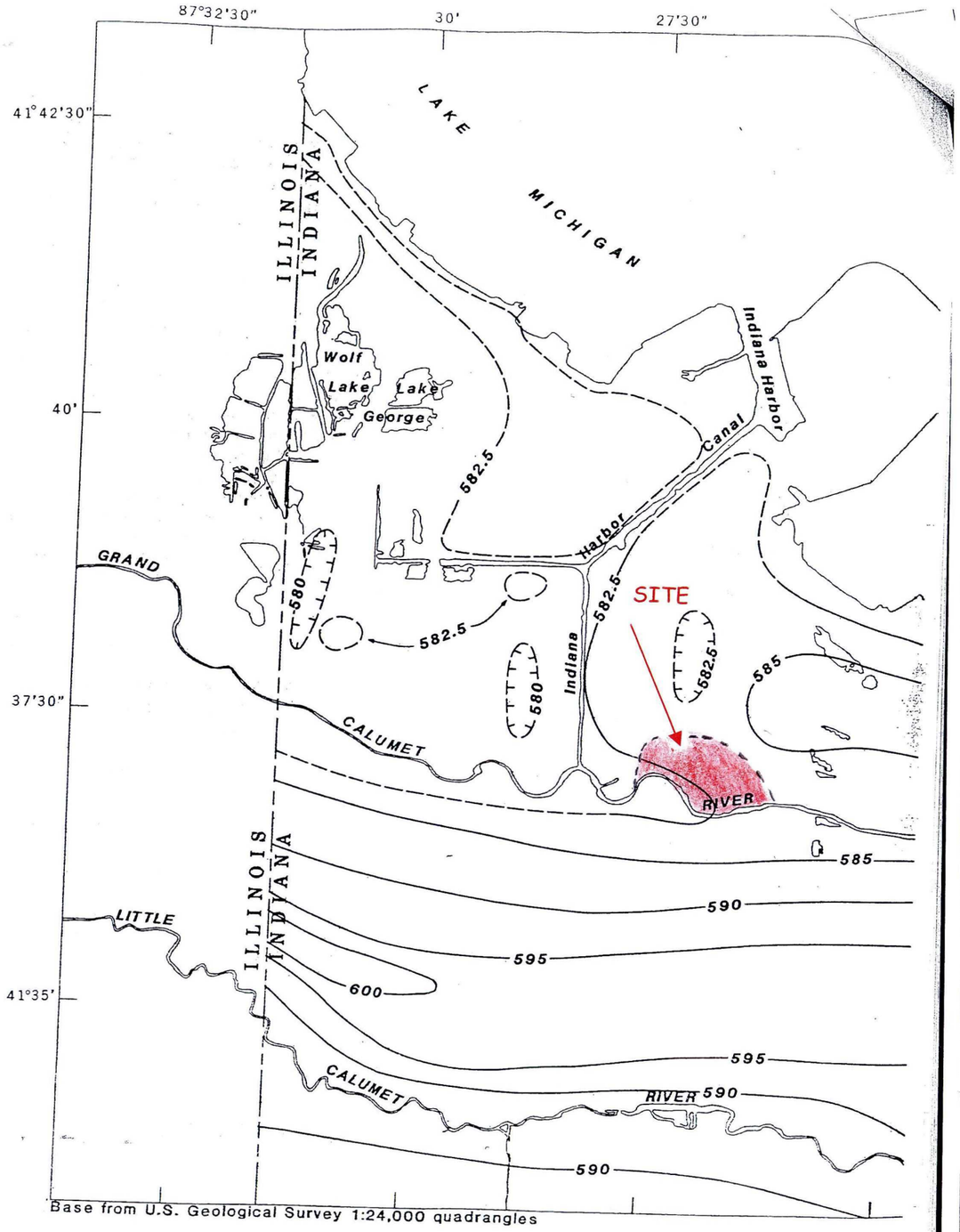
Open-File Report 88-492

Prepared in cooperation with the

U.S. ENVIRONMENTAL PROTECTION AGENCY

Indianapolis, Indiana

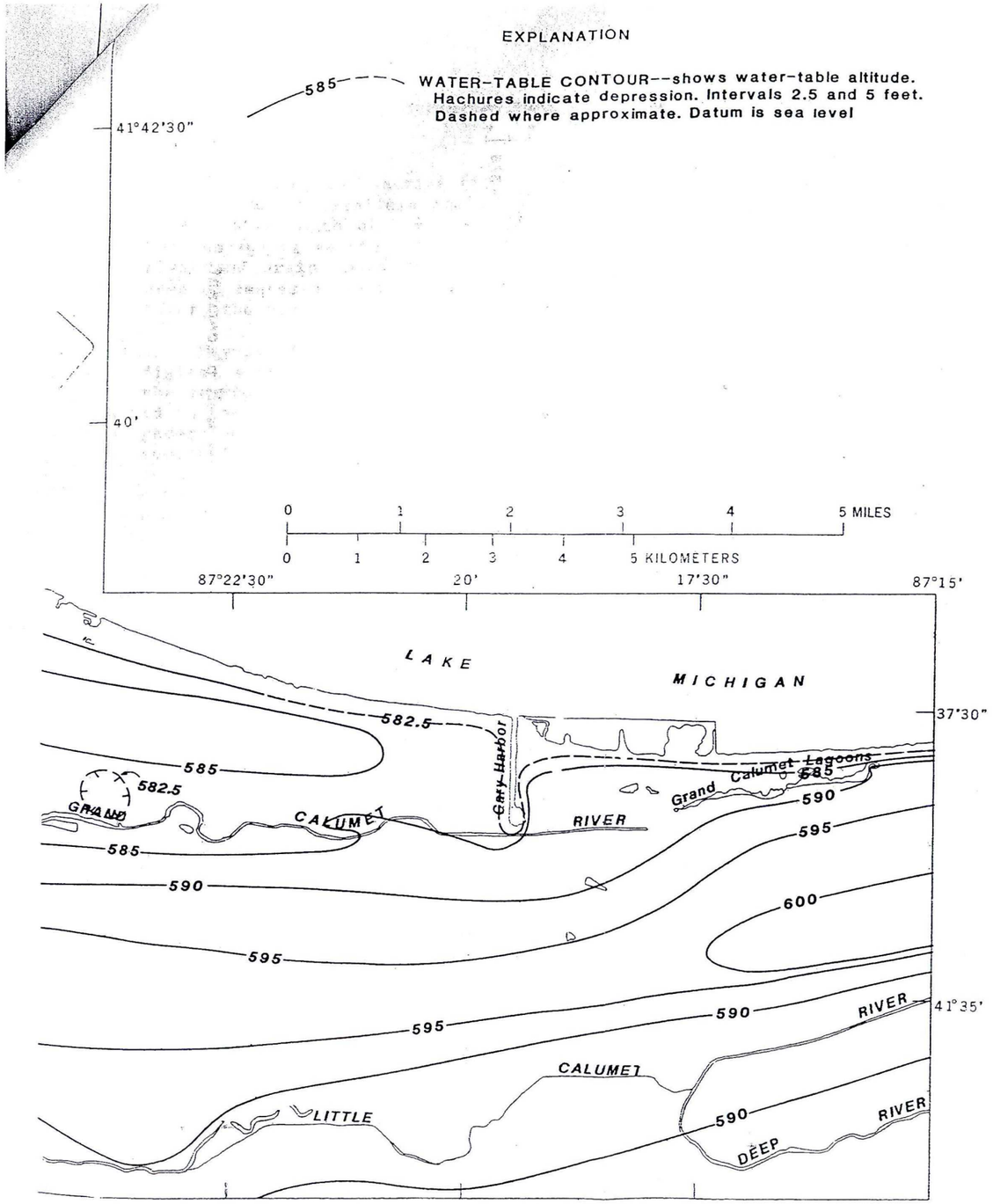
1989



Base from U.S. Geological Survey 1:24,000 quadrangles

Figure 13.-- Configuration and altitude of the water table in

U.S. GEOLOGICAL SURVEY
Open-File Report 88-492



the Calumet aquifer, March 31 through April 4, 1986.

WATER LEVELS IN THE CALUMET AQUIFER AND THEIR RELATION TO SURFACE-WATER LEVELS IN NORTHERN LAKE COUNTY, INDIANA, 1985–92

By THEODORE K. GREEMAN

Prepared in cooperation with the
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

U.S. GEOLOGICAL SURVEY
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Indianapolis, Indiana
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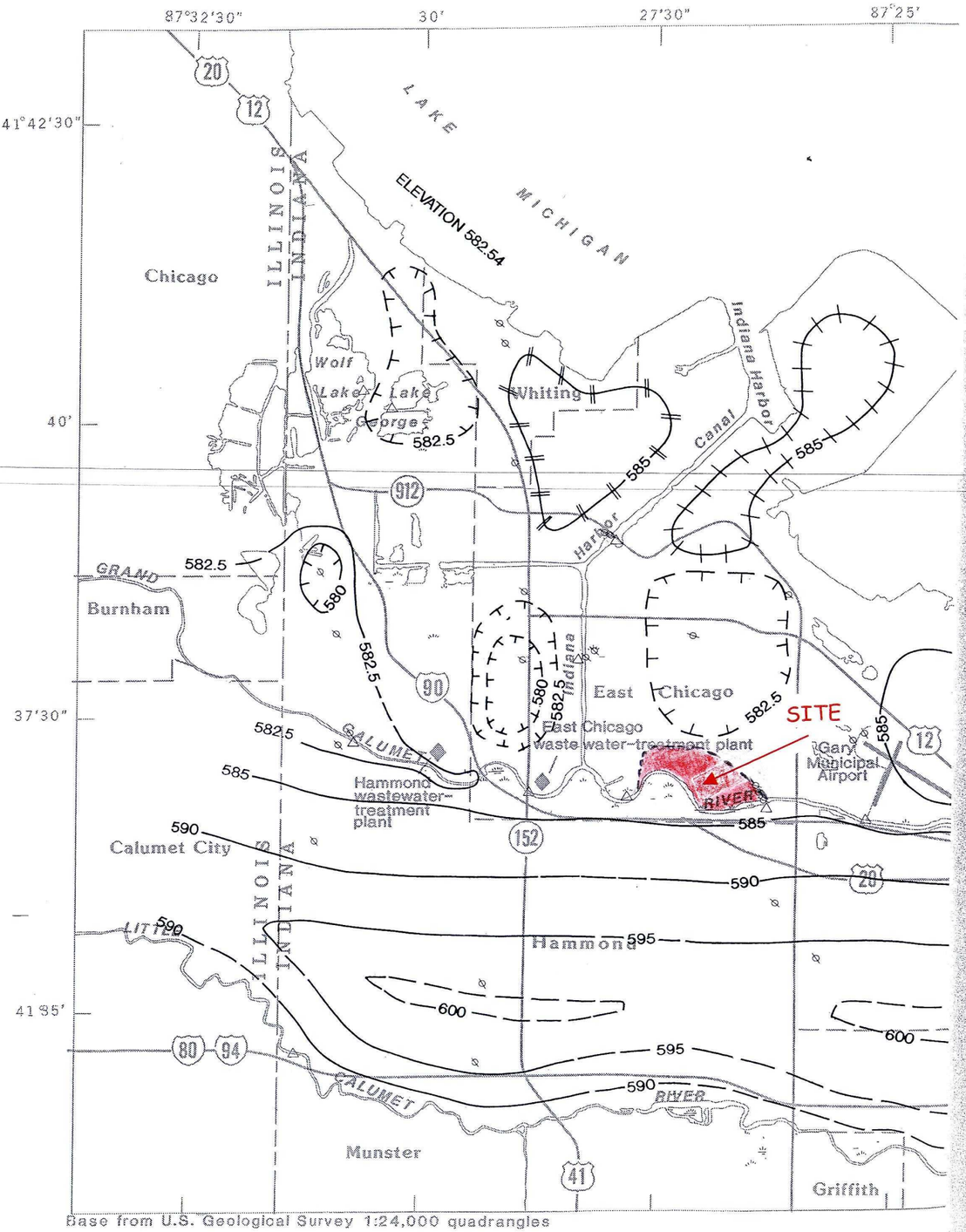


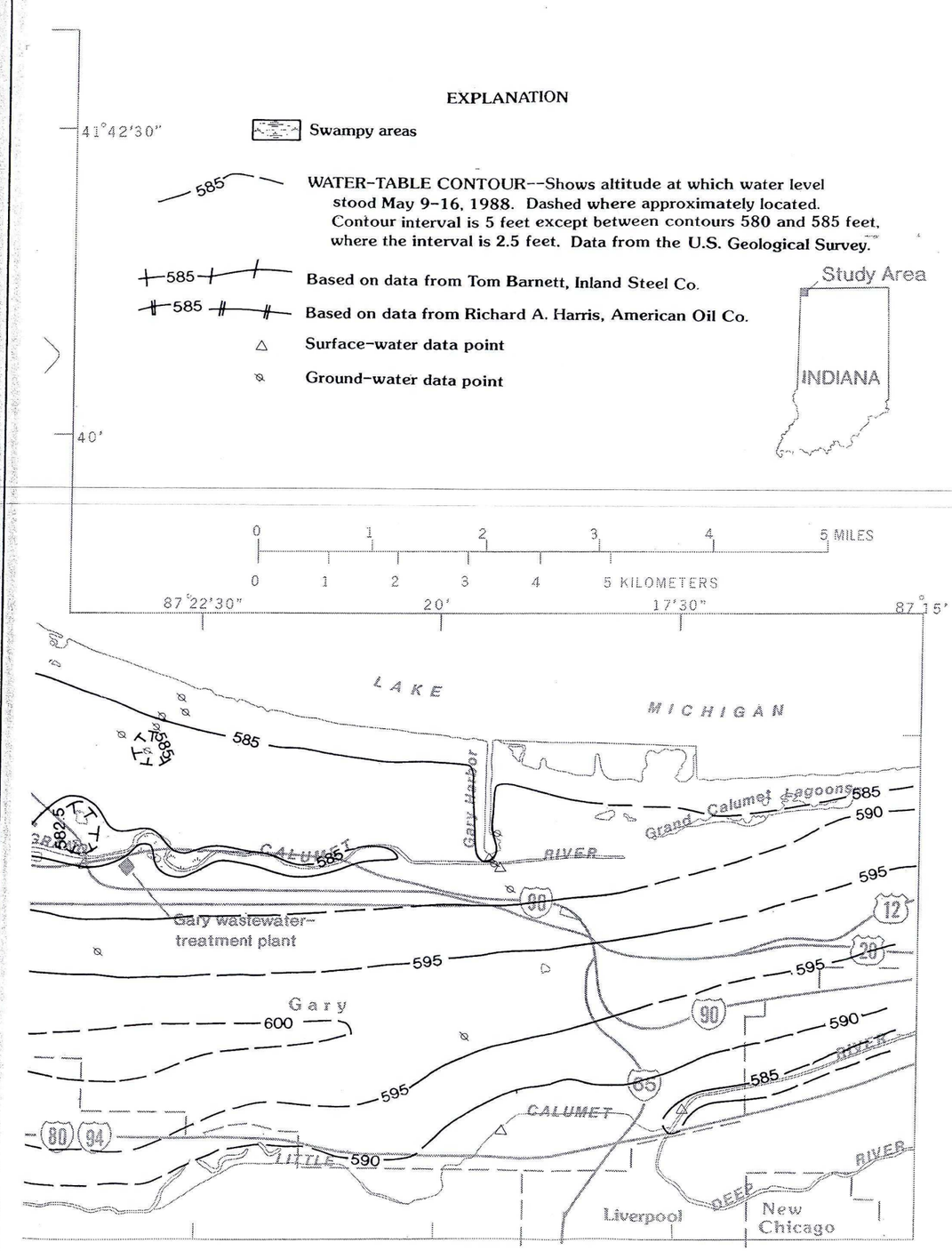
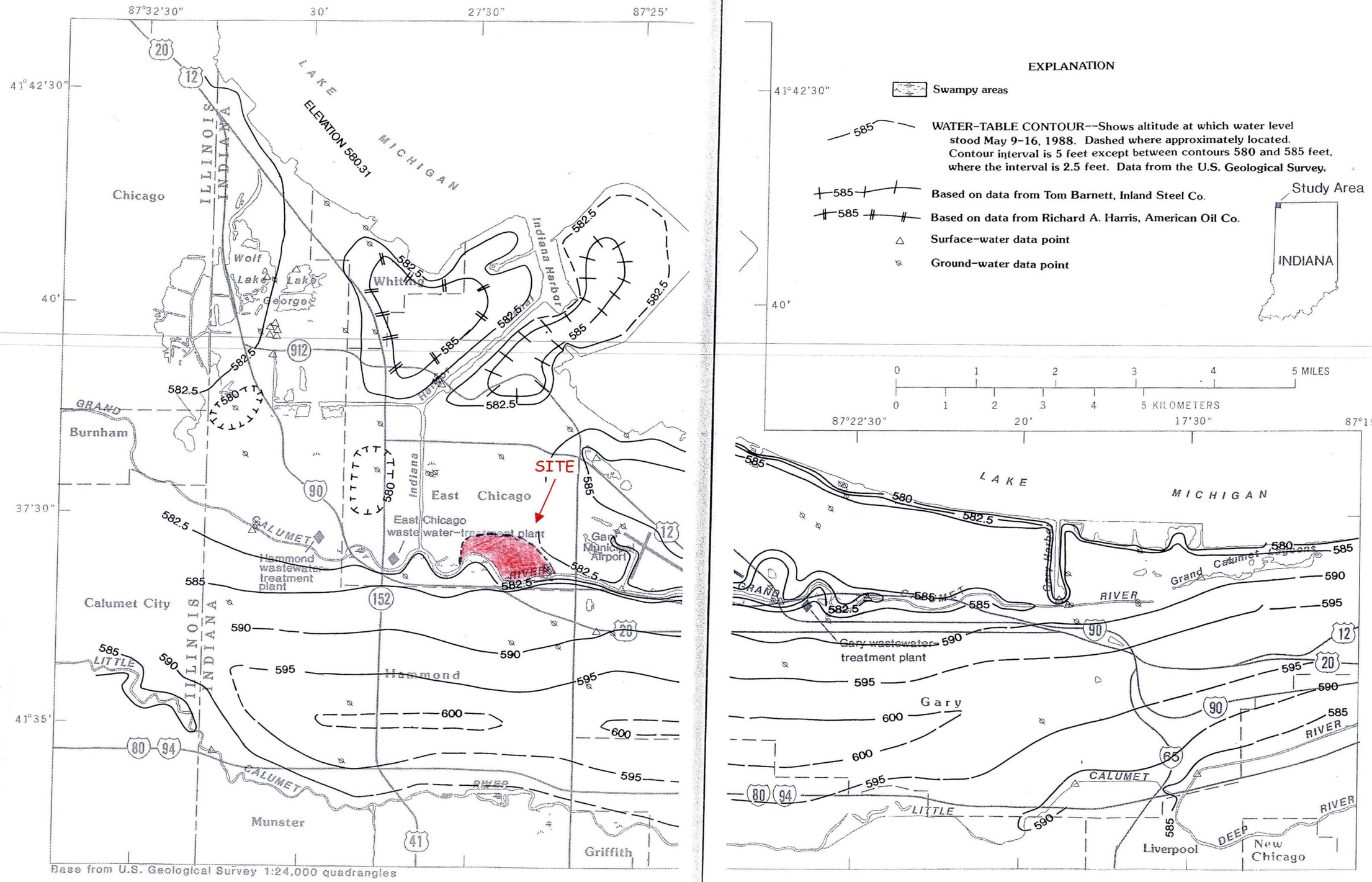


Figure 8. Water table in the Calumet aquifer, May 9–16, 1986. (Level of Lake Michigan during the preceding 5 months was below average.)

is at record high, and ground-water levels are above average. Precipitation



Base from U.S. Geological Survey 1:24,000 quadrangles

Figure 9. Water table in the Calumet aquifer, July 5-7, 1988. (Level of Lake Michigan during peak of 1988 drought. Precipitation was below normal by approximately 7 inches of Lake Michigan was below normal, lowest in the data set, and ground-water January and February was above average.)

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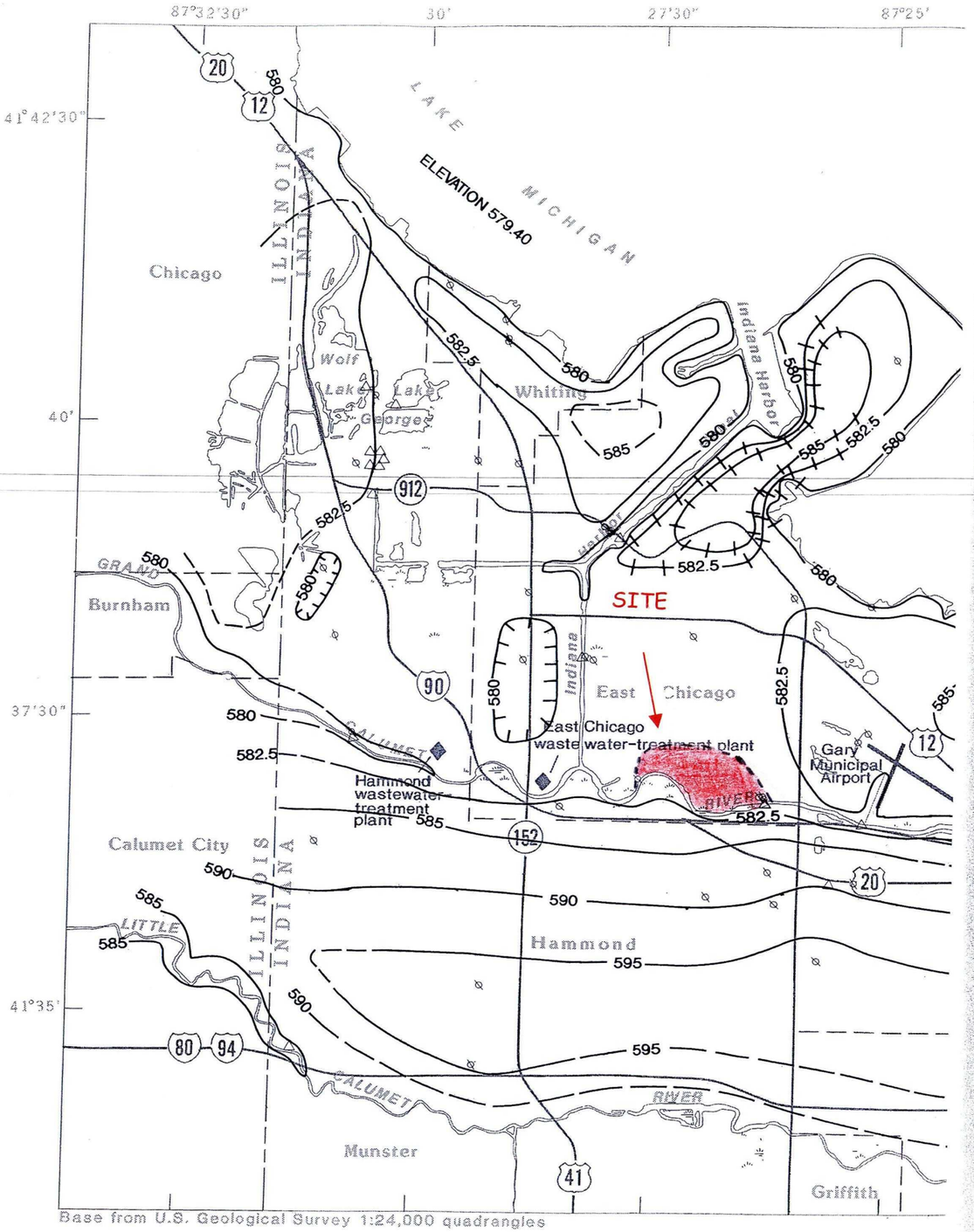


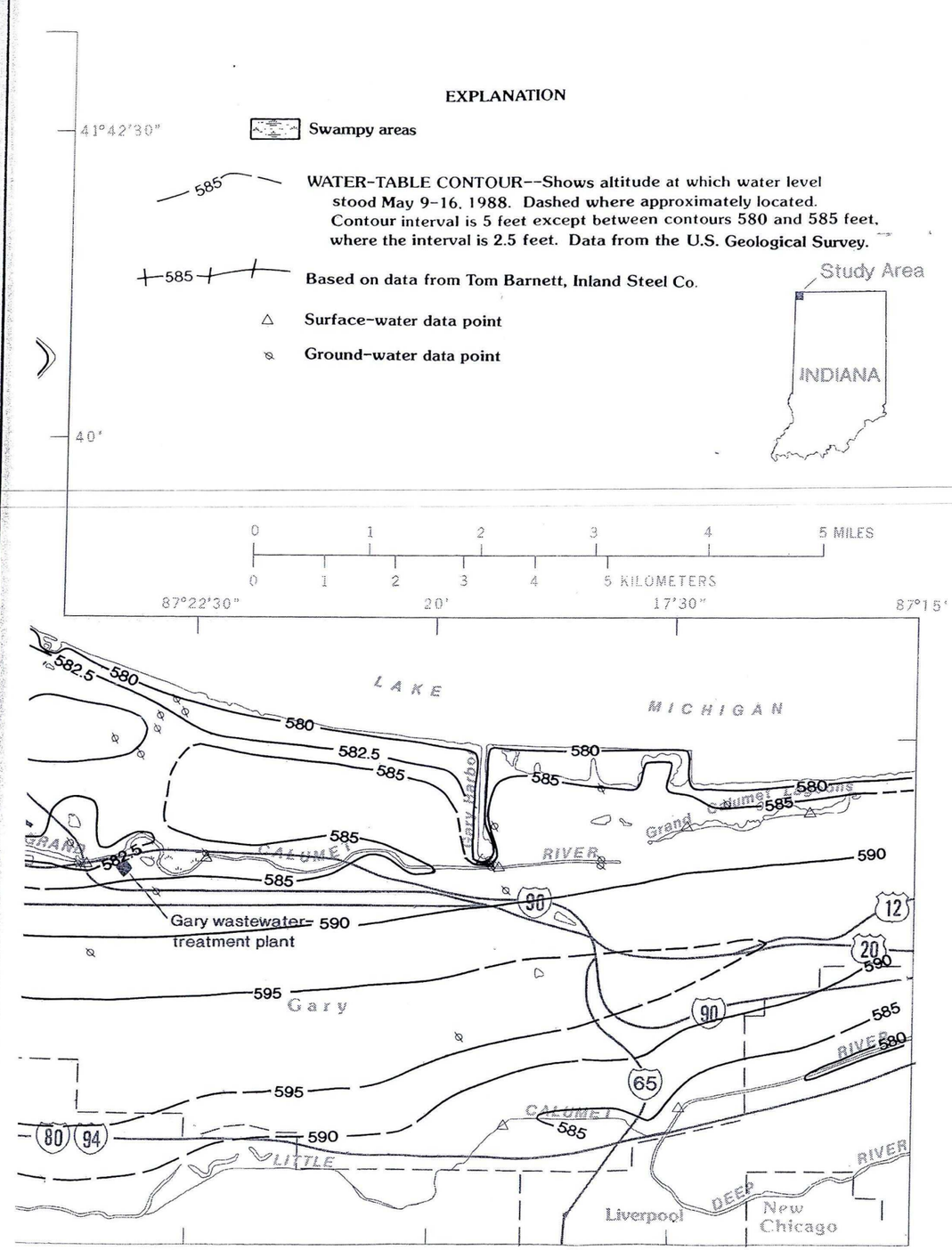
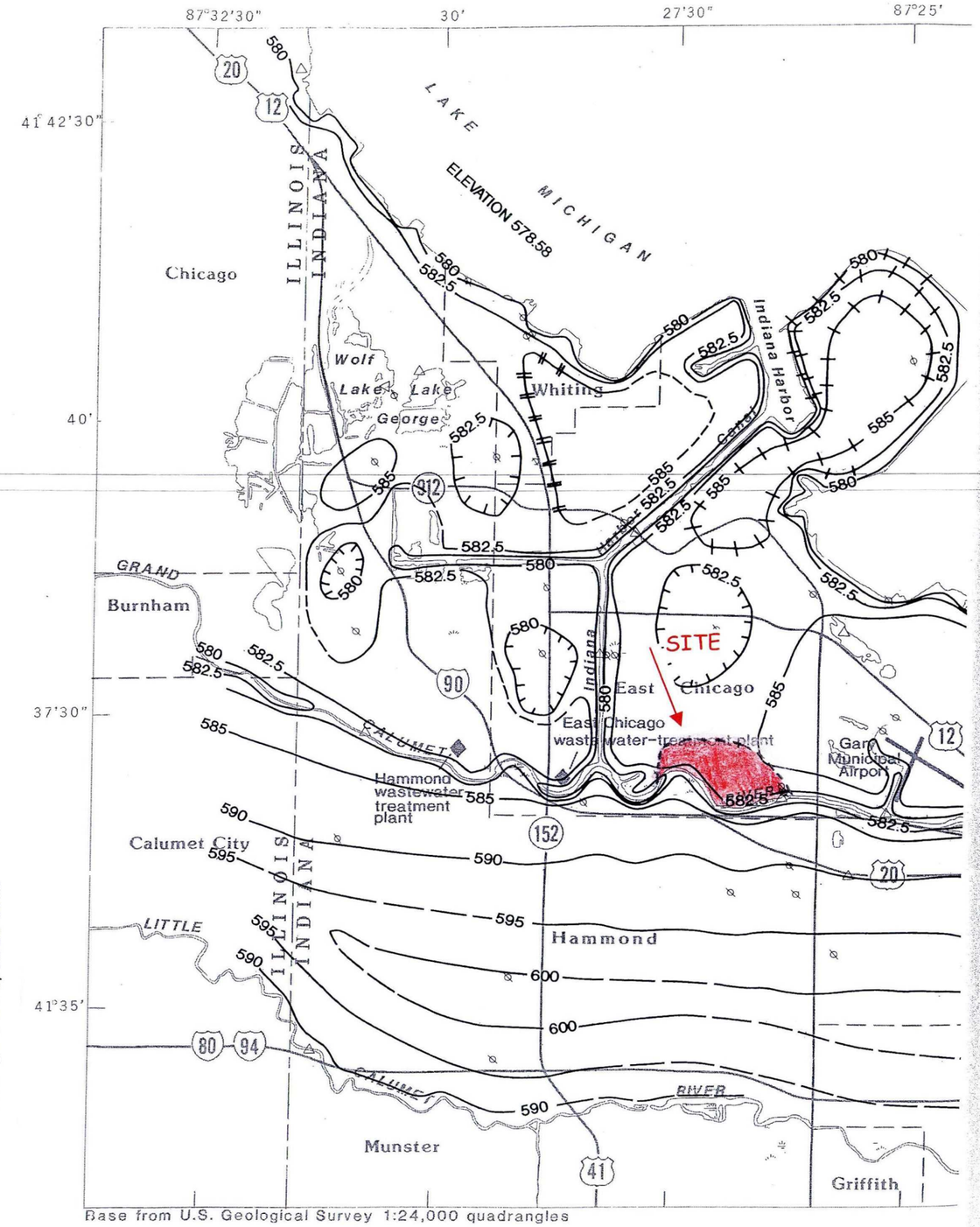


Figure 10. Water table in the Calumet aquifer, October 11–13, 1988. (Level of Lake Michigan was normal, and ground-water levels were low. Precipitation during the preceding 3 months was near average.)



Base from U.S. Geological Survey 1:24,000 quadrangles

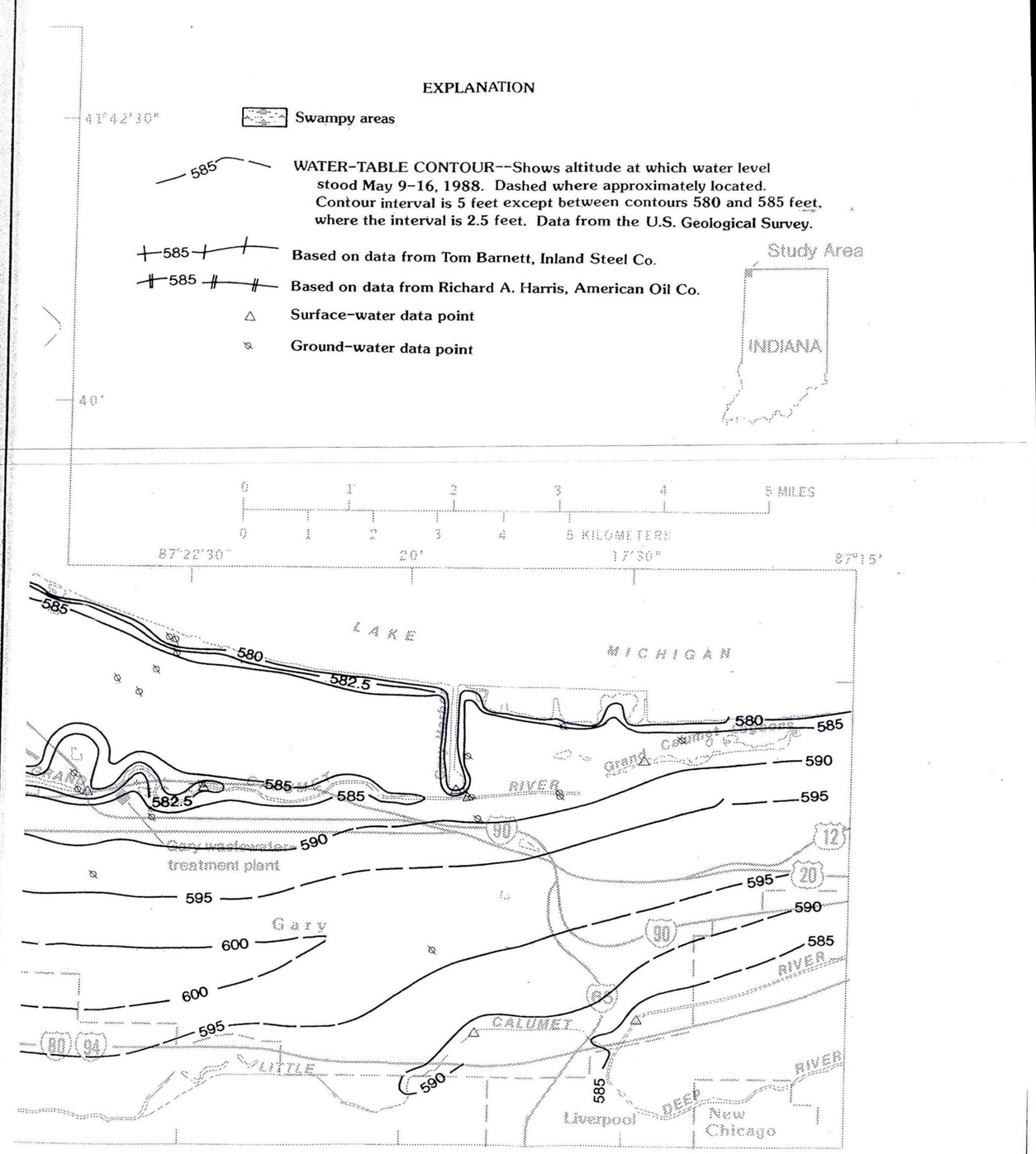


Figure 11. Water table in the Calumet aquifer, February 26–March 1, 1990. (Level levels were average. Surface-water levels were above average. Precipitation during January and February was above average.)

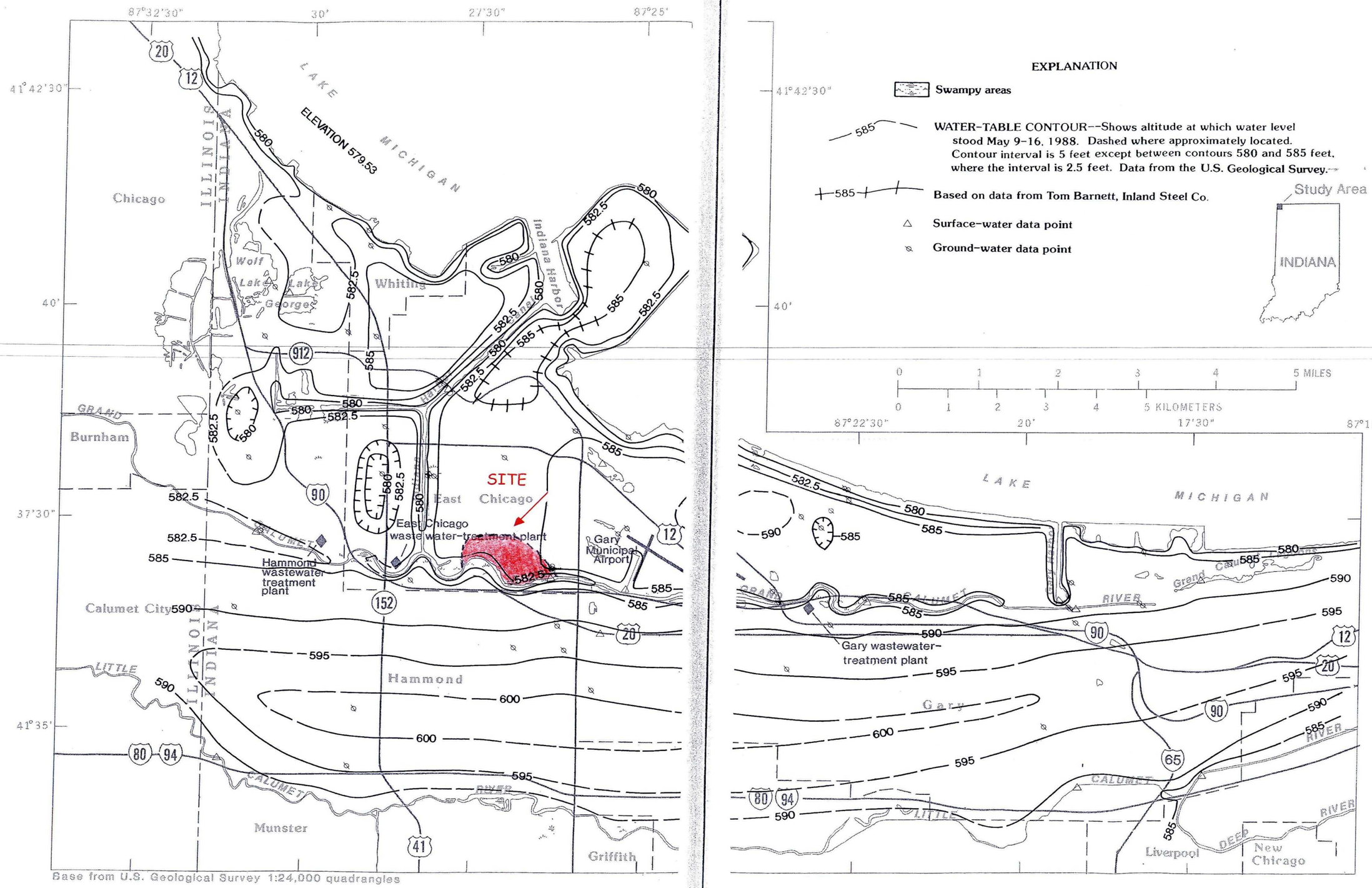


Figure 12. Water table in the Calumet aquifer, November 26–29, 1990. (Level of levels were high. Precipitation was above average, with an excess of more than 12 inches measured during preceding 4 months.)

Lake Michigan is near normal, and both ground-water and surface-water

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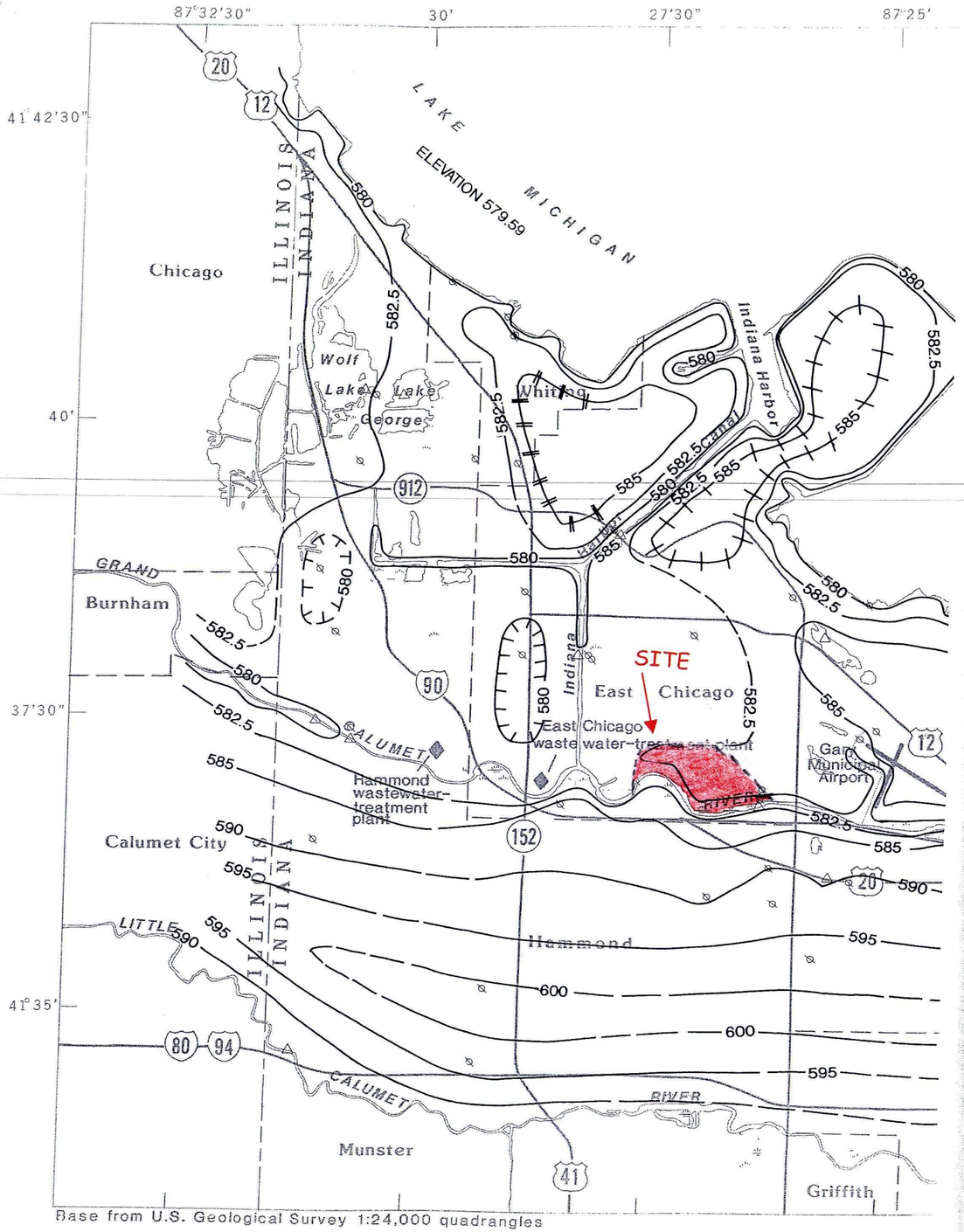
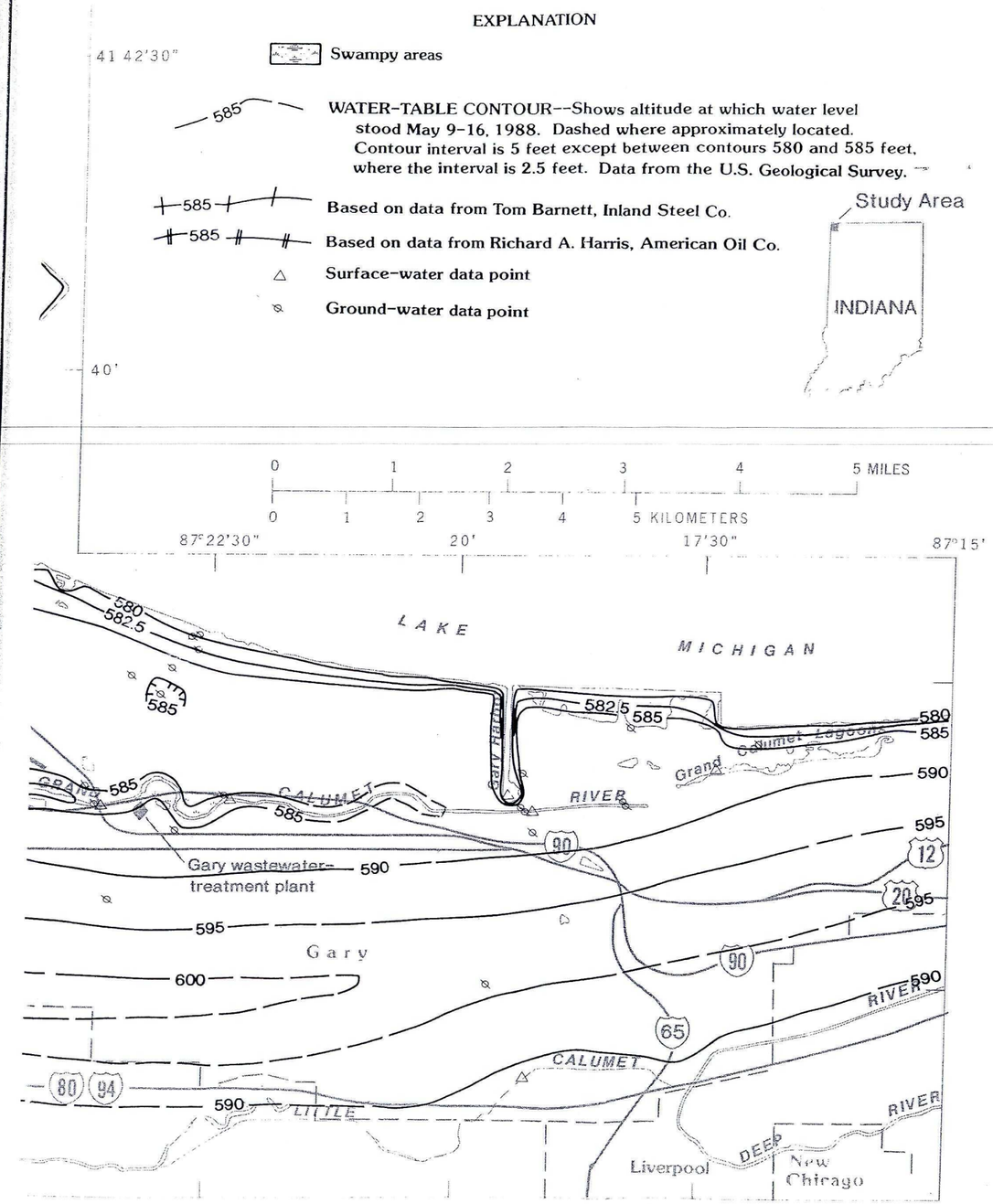


Base from U.S. Geological Survey 1:24,000 quadrangles

Figure 13. Water table in the Calumet aquifer, September 8–11, 1992. (Level of Lake Michigan is near normal, and ground-water levels were average. Precipitation was heavy during the period of data collection).



APPENDIX D

POOL A – WEST GROUNDWATER CONCENTRATION DATA

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11	MW-11
				Date	3/20/2000 15:40	7/20/2000 8:30	11/2/2000 8:00	3/22/2001 9:15	7/16/2002 11:40	12/15/1997 9:40	9/23/1998 11:00
			Federal	Top (ft)							
		Total (T)/	MCL	Bottom (ft)							
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<.0084	<0.0094	<.0094	<0.0094		<.0041	<0.0053
ARSENIC	mg/l	D	0.01		0.011	0.0203	0.0202	0.0128	0.0334	0.026	<.0070
BARIUM	mg/l	D	2		0.0252 J	0.0234 J	0.0228	0.0252		0.0229	0.0238
CADMIUM	mg/l	D	0.005		<0.00081	<0.00090	<0.00090	<0.00090		<.00042	<.00063
CHROMIUM	mg/l	D	0.1		0.0018 J	<0.0016	<0.0016	<0.0016		<.0013	<.0017
COPPER	mg/l	D	1.3		<0.0029	<0.0019	<0.0019	<0.0019		<.0014	0.0028 J
LEAD	mg/l	D	0.015		<0.0079	<0.0098	<0.0098	<0.0098		<.0034	<.0065
NICKEL	mg/l	D	0.073	**	0.0042 J	0.0019 J	0.0045 J	0.0039 J		0.006	0.0081
SELENIUM	mg/l	D	0.05		<0.0044	0.0038 J	<0.0035	<0.0035		<.0037	<.0059
VANADIUM	mg/l	D	0.0255	**	<0.0019	0.0016 J	<0.0015	<0.0015		<.0010	<.0011
ZINC	mg/l	D	5		4.5	1.95 R	6.06 J	4.81		8.07	10.6

* The antimony was non-detect for all events; the detect.
limit was often slightly higher than MCL
Shading indicates exceedence of MCL
** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-11	MW-11	MW-12	MW-12	MW-12	MW-12
				Date	6/10/1999 16:05	11/8/1999 13:10	3/21/2000 10:55	7/24/2000 10:00	11/6/2000 13:00	3/26/2001 13:00
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0053	<0.0084	<.0084	<0.0094	<0.0094	<0.0094
ARSENIC	mg/l	D	0.01		0.0099 J	0.023	0.061 J	0.0716	0.0717	0.0455
BARIUM	mg/l	D	2		0.0238	0.0275 J	0.0651	0.0681	0.0690 J	0.0824
CADMIUM	mg/l	D	0.005		<0.00063	<0.00081	<0.00081	<0.00090	<0.00090	<.00064
CHROMIUM	mg/l	D	0.1		<0.0017	0.0038 U	0.003	0.0021 J	<0.0016	<0.0016
COPPER	mg/l	D	1.3		<0.0017	<0.0029	<0.0029	<0.0019	<0.0019	<0.0019
LEAD	mg/l	D	0.015		<0.0065	<0.0079	<0.0079	<0.0098	<0.0098	<0.0098
NICKEL	mg/l	D	0.073	**	0.0049 J	0.0069 U	<0.0016	<0.0019	<0.0019	<0.0019
SELENIUM	mg/l	D	0.05		<0.0059	<0.0044	<0.0044	0.0036 J	0.0038 J	<0.0035
VANADIUM	mg/l	D	0.0255	**	<0.0011	<0.0019	<0.0019	<0.0015	<0.0015	<0.0015
ZINC	mg/l	D	5		7.89	7.72	0.0033 J	0.0171 U	<0.0031	0.0158 U

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-12	MW-12	MW-12	MW-12	MW-12	MW-12
				Date	12/9/1997 13:00	9/14/1998 13:25	6/7/1999 16:00	11/10/1999 8:30	11/18/2003 13:00	3/23/2004 13:59
			Federal	Top (ft)					0	0
		Total (T)/	MCL	Bottom (ft)					0	0
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<.0041	<0.0053	<0.0053	<0.0084	<0.0085 U	<0.0085 U
ARSENIC	mg/l	D	0.01		0.073	<.0070	0.019	0.079	<0.0049 U	<0.0049 U
BARIUM	mg/l	D	2		0.064	0.0533	0.0564	0.0746	0.0368	0.0647
CADMIUM	mg/l	D	0.005		<.00042	0.00081 J	<0.00063	0.00131 J	<0.00087 U	<0.00087 U
CHROMIUM	mg/l	D	0.1		.0016 J	<.0017	<0.0017	<.0017 UJ	<0.0022 U	<0.0022 U
COPPER	mg/l	D	1.3		<0.0014	0.0031 J	<0.0017	<0.0029	<0.0021 U	<0.0021 U
LEAD	mg/l	D	0.015		<.0034	<.0065	<0.0065	<.0079	<0.0093 U	<0.0093 U
NICKEL	mg/l	D	0.073	**	<.0016	<.0030	<0.0030	<.0016	<0.0038 U	<0.0038 U
SELENIUM	mg/l	D	0.05		<0.0037	<.0059	<0.0059	<.0044 UJ	<0.0047 U	<0.0047 U
VANADIUM	mg/l	D	0.0255	**	<0.0010	<.0011	<0.0011	<.0019 UJ	<0.0017 U	<0.0017 U
ZINC	mg/l	D	5		<.0049	0.0143 J	0.0138 B	<.0030	0.0054 B	<0.0041 U

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-21	MW-21	MW-21	MW-21	MW-21	MW-21
				Date	3/20/2000 12:30	7/20/2000 10:45	11/2/2000 10:00	3/22/2001 12:45	7/16/2002 13:40	2/27/1996 15:19
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<.0084	<0.0094	<.0094	<0.0094		
ARSENIC	mg/l	D	0.01		1.76	1.72	2	2.09	2.43	2.05
BARIUM	mg/l	D	2		0.0322	0.0324 J	0.0322	0.0329		
CADMIUM	mg/l	D	0.005		0.0112	0.0126	0.0098	0.0161		
CHROMIUM	mg/l	D	0.1		<0.0017	<0.0016	<0.0016	<0.0016		
COPPER	mg/l	D	1.3		<0.0029	<0.0019	<0.0019	<0.0019		
LEAD	mg/l	D	0.015		<0.0079	<0.0098	<0.0098	<0.0098		
NICKEL	mg/l	D	0.073	**	0.0223	0.0267	0.0237	0.0339		
SELENIUM	mg/l	D	0.05		<0.0044	<0.0035	0.0037 J	<0.0035		
VANADIUM	mg/l	D	0.0255	**	<0.0019	0.0019 J	0.0018 J	<0.0015		
ZINC	mg/l	D	5		13.6	15.1 J	14.8 J	20.8		19.6

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-21	MW-21	MW-21	MW-21	MW-22	MW-22	MW-22
				Date	12/15/1997 10:20	9/17/1998 10:35	6/11/1999 8:35	11/8/1999 14:50	3/20/2000 14:40	7/20/2000 9:45	11/2/2000 9:00
			Federal	Top (ft)							
		Total (T)/	MCL	Bottom (ft)							
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<.0041	<0.0053	<0.0053	<0.0084	<.0084	<0.0094	<.0094
ARSENIC	mg/l	D	0.01		0.612	0.014	0.541	1.5	0.299	0.224	0.458
BARIUM	mg/l	D	2		0.023	0.0154	0.0229	0.0338 J	0.0229 J	0.0204 J	0.0209
CADMIUM	mg/l	D	0.005		0.0068	0.162	0.0523	0.0153	<0.00081	<0.00090	<0.00090
CHROMIUM	mg/l	D	0.1		<.0013	<0.0017	<0.0017	0.0033 U	<0.0017	<0.0016	<0.0016
COPPER	mg/l	D	1.3		.0023 J	0.0033 J	<0.0017	<0.0029	<0.0029	<0.0019	<0.0019
LEAD	mg/l	D	0.015		<.0034	<0.0065	<0.0065	<0.0079	<0.0079	<0.0098	<0.0098
NICKEL	mg/l	D	0.073	**	0.0328	0.052	0.0339	0.0248	0.0029 J	0.0055 J	0.0021 J
SELENIUM	mg/l	D	0.05		<.0037	<0.0059	<0.0059	<0.0044	<0.0044	<0.0035	<0.0035
VANADIUM	mg/l	D	0.0255	**	<.0010	<0.0011	<0.0011	<0.0019	<0.0019	0.0016 J	<0.0015
ZINC	mg/l	D	5		17.8	22.4	16.3	13.3	2.3	3.23 J	1.75 J

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-22	MW-22	MW-22	MW-22	MW-22	MW-22
				Date	3/22/2001 13:10	7/16/2002 12:05	2/28/1996 10:20	12/12/1997 14:35	9/17/1998 11:05	6/11/1999 10:10
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0094			<.0041	<0.0053	<0.0053
ARSENIC	mg/l	D	0.01		0.0664	0.656	0.993	0.392	0.023	0.016
BARIUM	mg/l	D	2		0.0199			0.0242	0.0196	0.0216
CADMIUM	mg/l	D	0.005		<0.00090			<.00042	<0.00063	<0.00063
CHROMIUM	mg/l	D	0.1		<0.0016			<.0013	<0.0017	<0.0017
COPPER	mg/l	D	1.3		<0.0019			<.0014	0.0052	<0.0017
LEAD	mg/l	D	0.015		<0.0098			<.0034	<0.0065	<0.0065
NICKEL	mg/l	D	0.073	**	0.0062			0.0055	0.022	0.0223
SELENIUM	mg/l	D	0.05		<0.0035			<.0037	<0.0059	<0.0059
VANADIUM	mg/l	D	0.0255	**	<0.0015			<.0010	<0.0011	<0.0011
ZINC	mg/l	D	5		5.76		1.5	5	17.8	21.6

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-22	MW-23	MW-23	MW-23	MW-23	MW-23
				Date	11/8/1999 14:15	3/20/2000 18:15	7/20/2000 13:30	11/2/2000 11:30	3/22/2001 11:00	11/8/1999 16:20
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0084	<.0084	<0.0094	<.0094	<0.0094	<0.0084
ARSENIC	mg/l	D	0.01		0.9	0.053	0.0575	0.0592	0.0478	0.048
BARIUM	mg/l	D	2		0.0270 J	0.0235	0.0214 J	0.0195	0.018	0.0296 J
CADMIUM	mg/l	D	0.005		<0.00081	<0.00081	<0.00090	<0.00090	<0.00090	<0.00081
CHROMIUM	mg/l	D	0.1		0.0030 U	<0.0017	<0.0016	<0.0016	<0.0016	<0.0017
COPPER	mg/l	D	1.3		<0.0029	<0.0029	<0.0019	<0.0019	<0.0019	<0.0029
LEAD	mg/l	D	0.015		<0.0079	<0.0079	<0.0098	<0.0098	<0.0098	<0.0079
NICKEL	mg/l	D	0.073	**	0.0029 U	0.0020 J	0.0024 J	0.0025 J	<0.0019	0.0023 U
SELENIUM	mg/l	D	0.05		<0.0044	<0.0044	<0.0035	0.0084 J	<0.0035	<0.0044
VANADIUM	mg/l	D	0.0255	**	<0.0019	<0.0019	0.0029 J	<0.0015	<0.0015	<0.0019
ZINC	mg/l	D	5		1.79	1.23	1.46 J	1.49 J	1.8	1.16

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-23	MW-23	MW-24	MW-24	MW-24	MW-24
				Date	11/21/2003 13:45	3/24/2004 12:22	3/20/2000 16:40	7/20/2000 15:00	11/2/2000 15:30	3/22/2001 9:50
			Federal	Top (ft)	0	0				
		Total (T)/	MCL	Bottom (ft)	0	0				
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0085 U	<0.0085 U	<.0084	<0.0094	<.0094	<0.0094
ARSENIC	mg/l	D	0.01		0.04	0.0529	0.285	0.235	0.24	0.261
BARIUM	mg/l	D	2		0.0186	0.0196	0.0633	0.0668 J	0.068	0.0715
CADMIUM	mg/l	D	0.005		<0.00087 U	<0.00087 U	<0.00081	<0.00090	0.0012 J	<0.00090
CHROMIUM	mg/l	D	0.1		<0.0022 U	<0.0022 U	<0.0017	<0.0016	<0.0016	<0.0016
COPPER	mg/l	D	1.3		<0.0021 U	<0.0021 U	<0.0029	<0.0019	<0.0019	0.0021 J
LEAD	mg/l	D	0.015		<0.0093 U	<0.0093 U	<0.0079	<0.0098	<0.0098	<0.0098
NICKEL	mg/l	D	0.073	**	<0.0038 U	<0.0038 U	<0.0016	<0.0019	<0.0019	<0.0019
SELENIUM	mg/l	D	0.05		<0.0047 U	0.0102	<0.0044	<0.0035	<0.0035	<0.0035
VANADIUM	mg/l	D	0.0255	**	<0.0017 U	<0.0017 U	<0.0019	0.0044	0.0025 J	<0.0015
ZINC	mg/l	D	5		2.53	2.39	0.608	0.114 J	0.0655 J	0.128 J

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-24	MW-24	MW-25	MW-25	MW-25	MW-25	MW-25
				Date	7/16/2002 10:00	11/8/1999 15:35	3/22/2000 15:10	3/22/2000 15:10	7/21/2000 9:40	7/21/2000 9:40	11/2/2000 16:30
			Federal	Top (ft)							
		Total (T)/	MCL	Bottom (ft)							
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	2	1	2	1
ANTIMONY	mg/l	D	0.006	*		<0.0084	<0.0084	<0.0084	<0.0094	<0.0094	<.0094
ARSENIC	mg/l	D	0.01		0.259	0.264	0.198 J	0.256 J	0.178	0.167	0.163
BARIUM	mg/l	D	2			0.0671 J	0.0896	0.0799	0.0946 J	0.0982 J	0.0934
CADMIUM	mg/l	D	0.005			<0.00081	<0.00081	<0.00081	<0.00090	<0.00090	0.0023 J
CHROMIUM	mg/l	D	0.1			0.0039 U	<0.0017	<0.0017	0.0018 J	<0.0016	<0.0016
COPPER	mg/l	D	1.3			<0.0029	<0.0029	<0.0029	0.0033 J	<0.0019	<0.0019
LEAD	mg/l	D	0.015			<0.0079	<0.0079	<0.0079	<0.0098	<0.0098	<0.0098
NICKEL	mg/l	D	0.073	**		0.0050 U	<0.0016	<0.0016	0.0031 J	<0.0019	<0.0019
SELENIUM	mg/l	D	0.05			<0.0044	<0.0044	<0.0044	0.0054 J	0.0070 J	<0.0035
VANADIUM	mg/l	D	0.0255	**		0.0019 U	0.0022 J	0.0020 J	0.0113	0.0115	0.0061
ZINC	mg/l	D	5			2.89	0.039 U	0.051 U	0.0677 J	0.0598 J	0.0496 J

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	MW-25	MW-25	MW-25	MW-25	MW-25	MW-25	PRB-MW-11
				Date	11/2/2000 16:30	3/23/2001 14:25	3/23/2001 14:25	7/16/2002 9:10	11/9/1999 8:40	11/9/1999 8:40	10/2/2002 8:50
			Federal	Top (ft)							
		Total (T)/	MCL	Bottom (ft)							
Analyte	**units**	**Diss. (D)**		**Duplicate #**	2	1	2	1	1	2	1
ANTIMONY	mg/l	D	0.006	*	<.0094	<0.0094	<0.0094		<0.0084	<0.0084	
ARSENIC	mg/l	D	0.01		0.16	0.151 J	0.187 J	0.111	0.196	0.213	0.0527
BARIUM	mg/l	D	2		0.0963	0.1	0.0931		0.0974 J	0.0935 J	
CADMIUM	mg/l	D	0.005		0.0022 J	<0.00064	<0.00064		0.00140 J	0.00122 J	
CHROMIUM	mg/l	D	0.1		<0.0016	<0.0016	<0.0016		0.0023 U	0.0023 U	
COPPER	mg/l	D	1.3		<0.0019	<0.0019	<0.0019		<0.0029	<0.0029	
LEAD	mg/l	D	0.015		<0.0098	<0.0098	<0.0098		<0.0079	<0.0079	
NICKEL	mg/l	D	0.073	**	<0.0019	<0.0019	<0.0019		<0.0016	0.0029 U	
SELENIUM	mg/l	D	0.05		0.0041 J	<0.0035	<0.0035		<0.0044	<0.0044	
VANADIUM	mg/l	D	0.0255	**	0.0065	0.0016 J	<0.0015		0.0032 U	0.0027 U	
ZINC	mg/l	D	5		0.0548 J	0.0419	0.0224		0.128	0.106	

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	PRB-MW-11	PRB-MW-11	PRB-MW-11	PRB-MW-11	PRB-MW-21	PRB-MW-21	PRB-MW-21
				Date	1/23/2003 8:30	4/22/2003 9:35	7/22/2003 13:48	10/23/2003 13:50	10/2/2002 10:50	1/23/2003 9:45	4/22/2003 12:30
			Federal	Top (ft)		0	0	0			0
		Total (T)/	MCL	Bottom (ft)		0	0	0			0
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*							
ARSENIC	mg/l	D	0.01		0.0487	0.0162	0.0192	0.0185	1.34	0.867	0.95
BARIUM	mg/l	D	2								
CADMIUM	mg/l	D	0.005								
CHROMIUM	mg/l	D	0.1								
COPPER	mg/l	D	1.3								
LEAD	mg/l	D	0.015								
NICKEL	mg/l	D	0.073	**							
SELENIUM	mg/l	D	0.05								
VANADIUM	mg/l	D	0.0255	**							
ZINC	mg/l	D	5								

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	PRB-MW-21	PRB-MW-21	PRB-MW-21	PRB-MW-22	PRB-MW-22	PRB-MW-22
				Date	7/22/2003 15:05	10/23/2003 8:55	10/23/2003 8:55	10/2/2002 9:35	4/22/2003 13:25	7/22/2003 16:03
			Federal	Top (ft)	0	0	0		0	0
		Total (T)/	MCL	Bottom (ft)	0	0	0		0	0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	2	1	1	1
ANTIMONY	mg/l	D	0.006	*						
ARSENIC	mg/l	D	0.01		1.23	1.16	1.12	0.324	0.141	1.07
BARIUM	mg/l	D	2							
CADMIUM	mg/l	D	0.005							
CHROMIUM	mg/l	D	0.1							
COPPER	mg/l	D	1.3							
LEAD	mg/l	D	0.015							
NICKEL	mg/l	D	0.073	**						
SELENIUM	mg/l	D	0.05							
VANADIUM	mg/l	D	0.0255	**						
ZINC	mg/l	D	5							

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	PRB-MW-22	PRB-MW-24	PRB-MW-24	PRB-MW-24	PRB-MW-24	PRB-MW-24
				Date	10/23/2003 9:55	10/1/2002 15:25	1/23/2003 11:00	4/22/2003 11:31	7/22/2003 17:00	10/22/2003 14:50
			Federal	Top (ft)	0			0	0	0
		Total (T)/	MCL	Bottom (ft)	0			0	0	0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*						
ARSENIC	mg/l	D	0.01		0.642	0.254	0.263	0.283	0.284	0.276
BARIUM	mg/l	D	2							
CADMIUM	mg/l	D	0.005							
CHROMIUM	mg/l	D	0.1							
COPPER	mg/l	D	1.3							
LEAD	mg/l	D	0.015							
NICKEL	mg/l	D	0.073	**						
SELENIUM	mg/l	D	0.05							
VANADIUM	mg/l	D	0.0255	**						
ZINC	mg/l	D	5							

* The antimony was non-detect for all events; the detect. limit was often slightly higher than MCL

Shading indicates exceedence of MCL

** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID	PRB-MW-25	PRB-MW-25	PRB-MW-25	PRB-MW-25	PRB-MW-25
				Date	10/1/2002 14:40	1/23/2003 12:10	4/22/2003 10:25	7/23/2003 9:25	10/22/2003 11:55
			Federal	Top (ft)			0	0	0
		Total (T)/	MCL	Bottom (ft)			0	0	0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*					
ARSENIC	mg/l	D	0.01		0.138	0.173	0.17	0.165	0.165
BARIUM	mg/l	D	2						
CADMIUM	mg/l	D	0.005						
CHROMIUM	mg/l	D	0.1						
COPPER	mg/l	D	1.3						
LEAD	mg/l	D	0.015						
NICKEL	mg/l	D	0.073	**					
SELENIUM	mg/l	D	0.05						
VANADIUM	mg/l	D	0.0255	**					
ZINC	mg/l	D	5						

* The antimony was non-detect for all events; the detect.
limit was often slightly higher than MCL
Shading indicates exceedence of MCL
** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix D

Pool A West Perimeter Wells - Summary of Analytical Results

				Sample ID						
				Date						
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**						
ANTIMONY	mg/l	D	0.006	*						
ARSENIC	mg/l	D	0.01							
BARIUM	mg/l	D	2							
CADMIUM	mg/l	D	0.005							
CHROMIUM	mg/l	D	0.1							
COPPER	mg/l	D	1.3							
LEAD	mg/l	D	0.015							
NICKEL	mg/l	D	0.073	**						
SELENIUM	mg/l	D	0.05							
VANADIUM	mg/l	D	0.0255	**						
ZINC	mg/l	D	5							
* The antimony was non-detect for all events; the detect.										
	limit was often slightly higher than MCL									
	Shading indicates exceedence of MCL									
** Region IX Preliminary Remediation Goal for Tap Water										

< and ND = Non detect at stated reporting limit

APPENDIX E

POOL A – EAST GROUNDWATER CONCENTRATION DATA

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-02	MW-02	MW-02	MW-02	MW-02	MW-02
				Date	3/22/2000 10:05	7/21/2000 10:40	11/3/2000 9:30	3/23/2001 15:10	4/23/2002 10:10	7/15/2002 17:50
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0084	<0.0094	<.0094	<0.0094		
ARSENIC	mg/l	D	0.01		0.113	0.112	0.114	0.113	0.0882	0.141
BARIUM	mg/l	D	2		0.0334	0.0294 J	0.0285	0.0312		
CADMIUM	mg/l	D	0.005		<0.00081	<0.00090	0.0016	<0.00064	<0.00094 U	<0.00094 U
CHROMIUM	mg/l	D	0.1		<0.0017	0.0019 J	<0.0016	<0.0016		
COPPER	mg/l	D	1.3		<0.0029	<0.0019	<0.0019	<0.0019		
LEAD	mg/l	D	0.015		<0.0079	<0.0098	<0.0098	<0.0098	<0.0089 U	<0.0089 U
NICKEL	mg/l	D	0.073	***	<0.0016	<0.0019	<0.0019	<0.0019		
SELENIUM	mg/l	D	0.05		<0.0044	0.0050 J	<0.0035	<0.0035		
VANADIUM	mg/l	D	0.0255	***	<0.0019	0.0059	0.0026 J	<0.0015		
ZINC	mg/l	D	5		<0.0030	0.0079 U	0.0052 U	0.0038 U	0.0108 J	<0.0049 U

*Antimony detection limit was often slightly higher than the MCL. The single antimony detection is considered anomalous.

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-02	MW-02	MW-02	MW-02	MW-09	MW-09
				Date	12/11/1997 14:40	9/16/1998 14:15	6/10/1999 13:00	11/9/1999 11:10	3/22/2000 13:35	7/21/2000 13:05
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	.0062 J	<0.0053	<0.0053	<0.0084	<0.0084	<0.0094
ARSENIC	mg/l	D	0.01		0.11	0.106	0.088	0.113	0.074 R	0.121
BARIUM	mg/l	D	2		0.0272	0.0276	0.0278	0.0320 J	0.0293	0.0272 J
CADMIUM	mg/l	D	0.005		<.00042	<0.00063	<0.00063	0.00136 J	<0.00081	<0.00090
CHROMIUM	mg/l	D	0.1		<.0013	<0.0017	<0.0017	0.0022 U	<0.0017	<0.0016
COPPER	mg/l	D	1.3		.0033 J	<0.0017	<0.0017	<0.0029	<0.0029	<0.0019
LEAD	mg/l	D	0.015		<.0034	<0.0065	<0.0065	<0.0079	<0.0079	<0.0098
NICKEL	mg/l	D	0.073	***	.0018 J	<0.0030	<0.0030	<0.0016	0.0817 R	0.114
SELENIUM	mg/l	D	0.05		<.0037	<0.0059	<0.0059	<0.0044	<0.0044	0.0052 J
VANADIUM	mg/l	D	0.0255	***	<.0010	0.0016 J	<0.0011	<0.0019	<0.0019	0.0068
ZINC	mg/l	D	5		.0145 J	0.0194 J	0.024	0.0051 U	28.9 R	38.6 J

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-09	MW-09	MW-09	MW-09	MW-09	MW-09
				Date	11/3/2000 13:30	3/23/2001 10:05	4/23/2002 12:40	7/15/2002 17:10	12/12/1997 12:20	12/12/1997 12:25
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	2
ANTIMONY	mg/l	D	0.006	*	<.0094	<0.0094			<.0041	<.0041
ARSENIC	mg/l	D	0.01		0.124	0.0839	0.0116	0.162	<.0050	<.0050
BARIUM	mg/l	D	2		0.0245	0.0252			0.0319	0.0272
CADMIUM	mg/l	D	0.005		0.0023 J	<0.00064	<0.00094 U	<0.00094 U	<.00042	<.00042
CHROMIUM	mg/l	D	0.1		<0.0016	<0.0016			<.0013	<.0013
COPPER	mg/l	D	1.3		<0.0019	<0.0019			<.0014	<.0014
LEAD	mg/l	D	0.015		<0.0098	<0.0098	<0.0089 U	<0.0089 U	<.0034	<.0034
NICKEL	mg/l	D	0.073	***	0.0806	0.0638			0.0959	0.0927
SELENIUM	mg/l	D	0.05		0.0055 J	<0.0035			<.0037	<.0037
VANADIUM	mg/l	D	0.0255	***	0.0025 J	<0.0015			<.0010	<.0010
ZINC	mg/l	D	5		28.2 J	22.7	1.19	5.39	27.4	27.5

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-09	MW-09	MW-09	MW-09	MW-10	MW-10	MW-10
				Date	9/16/1998 9:10	9/16/1998 9:10	6/9/1999 12:05	11/9/1999 13:15	3/22/2000 9:20	7/21/2000 9:05	11/3/2000 10:30
			Federal	Top (ft)							
		Total (T)/	MCL	Bottom (ft)							
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	2	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0053	<0.0053	<.0053	<0.0084	<0.0084	<0.0094	<.0094
ARSENIC	mg/l	D	0.01		0.021	0.018	0.077	0.097	0.256	0.344	0.361
BARIUM	mg/l	D	2		0.0252	0.025	0.0282	0.0335 J	0.077	0.0788 J	0.0802
CADMIUM	mg/l	D	0.005		<0.00063	<0.00063	<0.00063	0.0026 J	<0.00081	<0.00090	0.0014 J
CHROMIUM	mg/l	D	0.1		<0.0017	<0.0017	<0.0017	0.0021 U	<0.0017	<0.0016	<0.0016
COPPER	mg/l	D	1.3		0.0045	<0.0017	<0.0017	<0.0029	<0.0029	<0.0019	<0.0019
LEAD	mg/l	D	0.015		<0.0065	<0.0065	<0.0065	<0.0079	<0.0079	<0.0098	<0.0098
NICKEL	mg/l	D	0.073	***	0.0197	0.0167	0.146	0.0788	<0.0016	<0.0019	<0.0019
SELENIUM	mg/l	D	0.05		<0.0059	<0.0059	<0.0059	<0.0044	<0.0044	0.0045 J	<0.0035
VANADIUM	mg/l	D	0.0255	***	<0.0011	<0.0011	<0.0011	<.0019 UJ	<0.0019	0.0057	0.0028 J
ZINC	mg/l	D	5		8.98	6.78	48.9	27.4	<0.0030	0.0056 U	0.0106 U

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-10	MW-10	MW-10	MW-10	MW-10	MW-10
				Date	3/23/2001 14:00	4/23/2002 14:30	7/15/2002 18:40	10/1/2002 14:00	12/15/1997 9:00	9/17/1998 8:30
			Federal	Top (ft)						
		Total (T)/	MCL	Bottom (ft)						
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0094				<.0041	<0.0053
ARSENIC	mg/l	D	0.01		0.323	0.0176	0.319	0.411	0.366	0.015
BARIUM	mg/l	D	2		0.079				0.0724	0.0309
CADMIUM	mg/l	D	0.005		<0.00064	<0.00094 U	<0.00094 U	<0.00094 U	.00105 J	<0.00063
CHROMIUM	mg/l	D	0.1		<0.0016				<.0013	<0.0017
COPPER	mg/l	D	1.3		<0.0019				<.0014	<0.0017
LEAD	mg/l	D	0.015		<0.0098	<0.0089 U	<0.0089 U	<0.0089 U	<.0034	<0.0065
NICKEL	mg/l	D	0.073	***	<0.0019				<.0016	<0.0030
SELENIUM	mg/l	D	0.05		<0.0035				<.0037	<0.0059
VANADIUM	mg/l	D	0.0255	***	<0.0015				<.0010	<0.0011
ZINC	mg/l	D	5		0.0048 U	0.0093 J	0.0062 J	<0.0049 U	<.0049	0.023

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-10	MW-10	MW-10	MW-10	MW-2	MW-2
				Date	6/10/1999 15:35	11/9/1999 7:50	11/18/2003 14:50	3/23/2004 11:51	10/1/2002 10:50	11/21/2003 10:10
			Federal	Top (ft)			0	0		0
		Total (T)/	MCL	Bottom (ft)			0	0		0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0053	<0.0084	<0.0085 U	<0.0085 U		<0.0085 U
ARSENIC	mg/l	D	0.01		0.34	0.348	0.365	0.0454	0.116	0.086
BARIUM	mg/l	D	2		0.0613	0.0788 J	0.0542	0.048		0.0363
CADMIUM	mg/l	D	0.005		<0.00063	0.00130 J	<0.00087 U	<0.00087 U	0.0016 J	<0.00087 U
CHROMIUM	mg/l	D	0.1		<0.0017	0.0032 U	<0.0022 U	<0.0022 U		<0.0022 U
COPPER	mg/l	D	1.3		0.0022 J	<0.0029	<0.0021 U	<0.0021 U		<0.0021 U
LEAD	mg/l	D	0.015		<0.0065	<0.0079	<0.0093 U	<0.0093 U	<0.0089 U	<0.0093 U
NICKEL	mg/l	D	0.073	***	<0.0030	0.0027 U	<0.0038 U	<0.0038 U		<0.0038 U
SELENIUM	mg/l	D	0.05		<0.0059	<0.0044	<0.0047 U	<0.0047 U		<0.0047 U
VANADIUM	mg/l	D	0.0255	***	<0.0011	<0.0019	<0.0017 U	<0.0017 U		<0.0017 U
ZINC	mg/l	D	5		0.023	0.0066 U	<0.0041 U	<0.0041 U	<0.0049 U	<0.0041 U

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	MW-2	MW-9	MW-9	MW-9	PRB-MW-10	PRB-MW-10
				Date	3/23/2004 9:30	10/1/2002 9:55	11/21/2003 15:30	3/23/2004 8:24	2/26/2003 9:40	5/19/2003 16:38
			Federal	Top (ft)	0		0	0	0	0
		Total (T)/	MCL	Bottom (ft)	0		0	0	0	0
Analyte	units	Diss. (D)		Duplicate #	1	1	1	1	1	1
ANTIMONY	mg/l	D	0.006	*	<0.0085 U		<0.0085 U	<0.0085 U		
ARSENIC	mg/l	D	0.01		0.119	0.0619	0.0157	0.14	0.079	0.358
BARIUM	mg/l	D	2		0.0393		0.0432	0.0257		
CADMIUM	mg/l	D	0.005		<0.00087 U	0.0029 J	0.0011 U	<0.00087 U	<0.00094 U	<0.00087 U
CHROMIUM	mg/l	D	0.1		<0.0022 U		<0.0022 U	<0.0022 U		
COPPER	mg/l	D	1.3		<0.0021 U		<0.0021 U	<0.0021 U		
LEAD	mg/l	D	0.015		<0.0093 U	<0.0089 U	<0.0093 U	<0.0093 U	<0.0089 U	<0.0093 U
NICKEL	mg/l	D	0.073	***	<0.0038 U		<0.0038 U	0.0586		
SELENIUM	mg/l	D	0.05		0.0056 J		<0.0047 U	<0.0047 U		
VANADIUM	mg/l	D	0.0255	***	<0.0017 U		<0.0017 U	<0.0017 U		
ZINC	mg/l	D	5		<0.0041 U	0.0188 J	0.369	19	0.012 J	<0.0041 U

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	PRB-MW-10	PRB-MW-2	PRB-MW-2	PRB-MW-2	PRB-MW-2	PRB-MW-2
				Date	8/20/2003 12:00	2/26/2003 15:05	2/26/2003 15:05	5/19/2003 13:18	5/19/2003 13:18	8/20/2003 11:12
			Federal	Top (ft)	0	0	0	0	0	0
		Total (T)/	MCL	Bottom (ft)	0	0	0	0	0	0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	1	1	2	1	2	1
ANTIMONY	mg/l	D	0.006	*						
ARSENIC	mg/l	D	0.01		0.415	0.11	0.072	0.116	0.113	0.0933
BARIUM	mg/l	D	2							
CADMIUM	mg/l	D	0.005		<0.00087 U	<0.00094 U	<0.00094 U	<0.00087 U	<0.00087 U	<0.00087 U
CHROMIUM	mg/l	D	0.1							
COPPER	mg/l	D	1.3							
LEAD	mg/l	D	0.015		<0.0093 U	<0.0089 U	<0.0089 U	<0.0093 U	<0.0093 U	<0.0093 U
NICKEL	mg/l	D	0.073	***						
SELENIUM	mg/l	D	0.05							
VANADIUM	mg/l	D	0.0255	***						
ZINC	mg/l	D	5		<0.0041 U	<0.0049 U	<0.0049 U	<0.0041 U	<0.0041 U	<0.0041 U

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

Appendix E

Pool A East Perimeter Monitor Wells - Summary of Analytical Results

				Sample ID	PRB-MW-2	PRB-MW-9	PRB-MW-9	PRB-MW-9	PRB-MW-9
				Date	8/20/2003 11:14	2/26/2003 12:00	5/19/2003 14:05	8/21/2003 11:15	11/20/2003 15:30
			Federal	Top (ft)	0	0	0	0	0
		Total (T)/	MCL	Bottom (ft)	0	0	0	0	0
Analyte	**units**	**Diss. (D)**		**Duplicate #**	2	1	1	1	1
ANTIMONY	mg/l	D	0.006	*					
ARSENIC	mg/l	D	0.01		0.0991	0.023	0.19	0.135	0.0188
BARIUM	mg/l	D	2						
CADMIUM	mg/l	D	0.005		<0.00087 U	0.0025 J	<0.00087 U	<0.00087 U	0.0013 J
CHROMIUM	mg/l	D	0.1						
COPPER	mg/l	D	1.3						
LEAD	mg/l	D	0.015		<0.0093 U	<0.0089 U	<0.0093 U	<0.0093 U	<0.0093 U
NICKEL	mg/l	D	0.073	***					
SELENIUM	mg/l	D	0.05						
VANADIUM	mg/l	D	0.0255	***					
ZINC	mg/l	D	5		<0.0041 U	0.0064 J	35.9	6.58	0.491

*Antimony detection limit was often slightly higher than the MCL

Shading indicates exceedence of MCL

*** Region IX Preliminary Remediation Goal for Tap Water

< and ND = Non detect at stated reporting limit

APPENDIX F

POOL B GROUNDWATER CONCENTRATION DATA

Appendix F
Summary of Pool B Analytical Results

		Total (T)/	Sample ID	Sample ID	MW-03	MW-03	MW-03	MW-03	MW-03	MW-03
			Date	Date	3/23/2000 7:52	7/25/2000 10:30	11/7/2000 8:00	3/27/2001 15:30	12/11/1997 10:55	9/15/1998 12:00
			Top (ft)	Top (ft)						
			Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0084	<0.0094	<0.0094	<0.0059	<.0041	<0.0053
ARSENIC	mg/l	D	0.23h	1150	15.1	15.1	16.6	16.8	16.4	2.58
BARIUM	mg/l	D	1 mcl	5000	0.0636	0.0713	0.0769	0.0666	0.0749	0.0398
CADMIUM	mg/l	D	1.4h	7000	<0.00081	<0.00090	<0.00090	<0.00064	<.00042	0.00070 J
CHROMIUM	mg/l	D	0.01a	50	<0.0017	<0.0016	<0.0016	<0.0017	.0016 J	<0.0017
COPPER	mg/l	D	56h	280000	<0.0029	<0.0019	<0.0019	<0.0024	.0017 J	0.0038 J
LEAD	mg/l	D	0.015 mcl	75	<0.0079	<0.0098	<0.0098	<0.0088	<.0034	<0.0065
NICKEL	mg/l	D	42h	210000	<0.0016	<0.0019	<0.0019	<0.0016	.0023 J	<0.0030
SELENIUM	mg/l	D	3.4h	17000	<0.0044	<0.0035	<0.0035	<0.0043	<.0037	<0.0059
VANADIUM	mg/l	D	0.12a	600	<0.0019	<0.0015	<0.0015	<0.0016	<.0010	<0.0011
ZINC	mg/l	D	250h	1250000	<0.0030	<0.0031	<0.0031	0.0058 U	0.024	0.029

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-03	MW-03	MW-04	MW-04	MW-04	MW-04
			Date	Date	6/8/1999 10:40	11/11/1999 15:10	3/23/2000 9:06	7/25/2000 11:30	11/7/2000 10:00	3/27/2001 9:40
			Top (ft)	Top (ft)						
		Total (T)/	Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0053	<0.0084	<0.0084	<0.0094	<0.0094	<0.0059
ARSENIC	mg/l	D	0.23h	1150	17.9	16.6	0.017	0.0303	0.0343	0.037
BARIUM	mg/l	D	1 mcl	5000	0.0692	0.0674	0.0132	0.0115	0.0125	0.009
CADMIUM	mg/l	D	1.4h	7000	<0.00063	<.00081	<0.00081	<0.00090	<0.00090	<0.00064
CHROMIUM	mg/l	D	0.01a	50	<0.0017	<.0017	<0.0017	<0.0016	<0.0016	<0.0017
COPPER	mg/l	D	56h	280000	<0.0017	<.0029	<0.0029	<0.0019	<0.0019	<0.0024
LEAD	mg/l	D	0.015 mcl	75	<0.0065	<.0079	<0.0079	<0.0098	<0.0098	<0.0088
NICKEL	mg/l	D	42h	210000	<0.0030	<.0016	0.0125	0.0169	0.0169	0.0406
SELENIUM	mg/l	D	3.4h	17000	<.0059	<.0044	<0.0044	<0.0035	<0.0035	<0.0043
VANADIUM	mg/l	D	0.12a	600	<0.0011	<.0019 UJ	<0.0019	<0.0015	<0.0015	0.0020 J
ZINC	mg/l	D	250h	1250000	0.0079 B	<.0030	0.492	0.31	0.615	0.729

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-04	MW-04	MW-04	MW-05	MW-05	MW-05
			Date	Date	9/15/1998 14:20	6/8/1999 11:40	11/11/1999 14:10	3/23/2000 10:01	7/25/2000 14:30	11/7/2000 11:00
			Top (ft)	Top (ft)						
		Total (T)/	Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0053	<0.0053	<0.0084	<0.0084	<0.0094	<0.0094
ARSENIC	mg/l	D	0.23h	1150	<0.0070	0.021	0.037	0.107	0.1	0.104
BARIUM	mg/l	D	1 mcl	5000	0.0118	0.0144	0.0154	0.0221	0.0256	0.0217
CADMIUM	mg/l	D	1.4h	7000	<0.00063	<0.00063	<.00081	<0.00081	<0.00090	<0.00090
CHROMIUM	mg/l	D	0.01a	50	<0.0017	<0.0017	<.0017	<0.0017	<0.0016	<0.0016
COPPER	mg/l	D	56h	280000	0.0031 J	<0.0017	<.0029	<0.0029	<0.0019	<0.0019
LEAD	mg/l	D	0.015 mcl	75	<0.0065	<0.0065	<.0079	<0.0079	<0.0098	<0.0098
NICKEL	mg/l	D	42h	210000	0.0247	0.0231	0.0119 J	0.0139	0.0198	0.0205
SELENIUM	mg/l	D	3.4h	17000	<0.0059	<.0059	<.0044	<0.0044	<0.0035	<0.0035
VANADIUM	mg/l	D	0.12a	600	<0.0011	<0.0011	<.0019 UJ	<0.0019	<0.0015	0.0019 J
ZINC	mg/l	D	250h	1250000	0.547	0.779	0.942	14.2	3.55 R	7.78 J

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-05	MW-05	MW-05	MW-05	MW-05	MW-06
			Date	Date	3/27/2001 11:30	12/11/1997 10:05	9/15/1998 15:00	6/8/1999 14:00	11/11/1999 11:25	7/25/2000 16:00
			Top (ft)	Top (ft)						
		Total (T)/	Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0059	<.0041	<0.0053	<0.0053	<0.0084	<0.0094
ARSENIC	mg/l	D	0.23h	1150	0.0886	0.138	0.102	0.088	0.106	0.0365
BARIUM	mg/l	D	1 mcl	5000	0.0192	0.0244	0.0274	0.0234	0.0199	0.111
CADMIUM	mg/l	D	1.4h	7000	<0.00064	<.00042	<0.00063	<0.00063	<.00081	0.0013 J
CHROMIUM	mg/l	D	0.01a	50	<0.0017	<.0013	<0.0017	<0.0017	<.0017	<0.0016
COPPER	mg/l	D	56h	280000	<0.0024	.0022 J	0.0030 J	<0.0017	<.0029	0.0021 J
LEAD	mg/l	D	0.015 mcl	75	<0.0088	<.0034	<0.0065	<0.0065	<.0079	<0.0098
NICKEL	mg/l	D	42h	210000	0.0182	0.0431	0.0357	0.0317	0.026	0.0033 J
SELENIUM	mg/l	D	3.4h	17000	<0.0043	<.0037	<0.0059	<.0059	<.0044	<0.0035
VANADIUM	mg/l	D	0.12a	600	0.0022 J	<.0010	<0.0011	<0.0011	<.0019 UJ	<0.0015
ZINC	mg/l	D	250h	1250000	7.86	8.6	5.95	6.14	7.09	<0.0155

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

		Total (T)/	Sample ID	Sample ID	MW-06	MW-06	MW-06	MW-13	MW-13	MW-13
			Date	Date	11/7/2000 14:00	3/27/2001 16:30	11/11/1999 10:15	3/21/2000 15:36	7/24/2000 11:30	11/6/2000 10:00
			Top (ft)	Top (ft)						
			Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0094	<0.0059	<0.0084	0.036 J	0.026	0.0113 J
ARSENIC	mg/l	D	0.23h	1150	0.0203	0.0276 J	0.092	0.2	0.188	0.203
BARIUM	mg/l	D	1 mcl	5000	0.0786	0.0468	1.06	0.121		0.175 J
CADMIUM	mg/l	D	1.4h	7000	<0.00090	<0.00064	0.0091 J	<0.00081	0.00094 J	<0.00090
CHROMIUM	mg/l	D	0.01a	50	<0.0016	<0.0017	<.0017	0.0152	0.0192	0.0202
COPPER	mg/l	D	56h	280000	<0.0019	<0.0024	0.0060 J	0.0908	0.0836	0.076
LEAD	mg/l	D	0.015 mcl	75	<0.0098	<0.0088	<.0079	0.041	0.0598	0.0504
NICKEL	mg/l	D	42h	210000	0.0024 J	<0.0016	0.0020 J	0.0475	0.0383	0.0448
SELENIUM	mg/l	D	3.4h	17000	<0.0035	<0.0043	<.0044 UJ	0.023 J	<0.0035	0.0142
VANADIUM	mg/l	D	0.12a	600	<0.0015	<0.0016	<.0019 R	0.121		0.146
ZINC	mg/l	D	250h	1250000	<0.0155	0.0088 U	11.9	0.044	0.071	0.0506 U

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-13	MW-13	MW-13	MW-13	MW-13	MW-13
			Date	Date	3/26/2001 9:20	12/9/1997 11:35	9/14/1998 16:45	6/7/1999 16:50	11/10/1999 10:05	11/18/2003 9:15
			Top (ft)	Top (ft)						0
		Total (T)/	Bottom (ft)	Bottom (ft)						0
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	0.0225	0.041	0.012	0.038	0.022	<0.0085 U
ARSENIC	mg/l	D	0.23h	1150	0.189	0.2	0.222	0.198	0.196	0.138
BARIUM	mg/l	D	1 mcl	5000	0.138	0.13	0.304	0.102	0.113	0.0992
CADMIUM	mg/l	D	1.4h	7000	<0.00090	<.00042	<0.00063	0.00115 J	0.00114 J	0.0011 j
CHROMIUM	mg/l	D	0.01a	50	0.0151	0.019	0.0345	0.017	0.0117	0.0131
COPPER	mg/l	D	56h	280000	0.0756	0.0668	0.078	0.108	0.066	0.062
LEAD	mg/l	D	0.015 mcl	75	0.0532	0.0327	0.053	0.042	0.033 J	0.0499
NICKEL	mg/l	D	42h	210000	0.0592	0.0455	0.076	0.148	0.0624	0.0405 J
SELENIUM	mg/l	D	3.4h	17000	0.0204 J	0.016	0.015	0.018	0.026	0.0131
VANADIUM	mg/l	D	0.12a	600	0.132	0.126	0.207	0.113	0.114	0.0976
ZINC	mg/l	D	250h	1250000	0.0464	0.077	0.062	0.259 B	0.053 R	0.0261 U

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-13	MW-14	MW-14	MW-14	MW-14	MW-14
			Date	Date	3/23/2004 14:13	3/21/2000 16:17	7/24/2000 17:00	11/6/2000 11:00	3/28/2001 10:30	12/9/1997 14:30
			Top (ft)	Top (ft)	0					
		Total (T)/	Bottom (ft)	Bottom (ft)	0					
			Duplicate #	Duplicate #	1	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0085 U	<.0084	<0.0094	<0.0094	<0.0059	<.0041
ARSENIC	mg/l	D	0.23h	1150	0.175	0.016	0.0159	0.0235	0.0109	0.016
BARIUM	mg/l	D	1 mcl	5000	0.223	0.0099 R	0.0075	0.0093 J	0.005	0.0156
CADMIUM	mg/l	D	1.4h	7000	<0.00087 U	<0.00081	0.00093 J	<0.00090	<0.00064	.00078 J
CHROMIUM	mg/l	D	0.01a	50	0.0268	<0.0017	<0.0016	<0.0016	<0.0017	<.0013
COPPER	mg/l	D	56h	280000	0.058	<0.0029	<0.0019	<0.0019	<0.0024	0.0114
LEAD	mg/l	D	0.015 mcl	75	0.0438	<0.0079	<0.0098	<0.0098	<0.0088	<.0034
NICKEL	mg/l	D	42h	210000	0.041	0.0131 J	0.0172	0.009	0.0037 J	0.0255
SELENIUM	mg/l	D	3.4h	17000	0.0057 J	<0.0044	<0.0035	<0.0035	<0.0043	<0.0037
VANADIUM	mg/l	D	0.12a	600	0.162	<0.0019	<0.0015	<0.0015	<0.0016	<0.0010
ZINC	mg/l	D	250h	1250000	0.0368	1.14 J	1.46	1.01	0.834	1.81

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-14	MW-14	MW-14	MW-15	MW-15	MW-15
			Date	Date	9/14/1998 15:30	6/7/1999 17:30	11/10/1999 15:30	3/21/2000 14:35	3/21/2000 14:35	7/24/2000 16:00
			Top (ft)	Top (ft)						
		Total (T)/	Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	1	1	1	1	2	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0053	<0.0053	<0.0084	<.0084	<.0084	<0.0094
ARSENIC	mg/l	D	0.23h	1150	<.0070	0.0071 J	0.023	0.482	0.492	0.454
BARIUM	mg/l	D	1 mcl	5000	0.0066	0.006	0.0128	0.0305	0.0307	0.0291
CADMIUM	mg/l	D	1.4h	7000	0.0015	<0.00063	0.00142 J	0.0038	0.0037	0.0037
CHROMIUM	mg/l	D	0.01a	50	<.0017	<0.0017	<.0017 UJ	<0.0017	<0.0017	<0.0016
COPPER	mg/l	D	56h	280000	<.0017	<0.0017	<0.0029	<0.0029	<0.0029	0.0030 U
LEAD	mg/l	D	0.015 mcl	75	<0.0065	<0.0065	<.0079	<0.0079	<0.0079	<0.0098
NICKEL	mg/l	D	42h	210000	0.0038 J	0.0049 J	0.0174	0.0039 J	0.0046 J	0.0044 J
SELENIUM	mg/l	D	3.4h	17000	<.0059	<0.0059	<.0044 UJ	<0.0044	<0.0044	<0.0035
VANADIUM	mg/l	D	0.12a	600	<.0011	<0.0011	<.0019 UJ	<0.0019	<0.0019	<0.0015
ZINC	mg/l	D	250h	1250000	0.803	0.988	1.86	1.71	1.71	1.6

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

		Total (T)/	Sample ID	Sample ID	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15
			Date	Date	7/24/2000 16:00	11/6/2000 15:00	11/6/2000 15:00	3/26/2001 14:00	3/26/2001 14:00	12/10/1997 13:40
			Top (ft)	Top (ft)						
			Bottom (ft)	Bottom (ft)						
			Duplicate #	Duplicate #	2	1	2	1	2	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0094	<0.0094	<0.0094	<0.0094	<0.0094	<.0041
ARSENIC	mg/l	D	0.23h	1150	0.461	0.469	0.482	0.519	0.534	0.474
BARIUM	mg/l	D	1 mcl	5000	0.0289	0.0307 J	0.0311 J	0.0313	0.0311	0.029
CADMIUM	mg/l	D	1.4h	7000	0.0037	0.0038	0.0039	0.0024	0.0025	0.0077
CHROMIUM	mg/l	D	0.01a	50	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	<.0013
COPPER	mg/l	D	56h	280000	0.0028 U	0.0033 J	0.0036 J	<0.0019	<0.0019	.0020 J
LEAD	mg/l	D	0.015 mcl	75	<0.0098	<0.0098	<0.0098	<0.0098	<0.0098	<.0034
NICKEL	mg/l	D	42h	210000	0.0036 J	0.0033 J	0.0038 J	0.0039 U	0.0034 U	.0038 J
SELENIUM	mg/l	D	3.4h	17000	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<.0037
VANADIUM	mg/l	D	0.12a	600	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<.0010
ZINC	mg/l	D	250h	1250000	1.64	1.58	1.61	1.36	1.42	2.48

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-15	MW-15	MW-15	MW-15	MW-15	MW-15
			Date	Date	9/15/1998 9:10	6/8/1999 9:40	11/10/1999 13:25	11/10/1999 13:25	11/18/2003 11:00	3/24/2004 9:45
			Top (ft)	Top (ft)					0	0
		Total (T)/	Bottom (ft)	Bottom (ft)					0	0
			Duplicate #	Duplicate #	1	1	1	2	1	1
Analyte	units	Diss. (D)	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0053	<0.0053	<0.0084	<0.0084	<0.0085 U	<0.0085 U
ARSENIC	mg/l	D	0.23h	1150	0.012	0.099	0.561 J	0.491	0.418	0.417
BARIUM	mg/l	D	1 mcl	5000	0.025	0.0261	0.0347	0.0343	0.0431	0.0417
CADMIUM	mg/l	D	1.4h	7000	0.0031	0.0055	0.0082 J	0.0090 J	0.0081	0.0015 J
CHROMIUM	mg/l	D	0.01a	50	<0.0017	<0.0017	<.0017 UJ	<.0017 UJ	<0.0022 U	<0.0022 U
COPPER	mg/l	D	56h	280000	0.0021 J	<0.0017	<0.0029	<0.0029	<0.0021 U	<0.0021 U
LEAD	mg/l	D	0.015 mcl	75	<0.0065	<0.0065	<.0079	<.0079	<0.0093 U	<0.0093 U
NICKEL	mg/l	D	42h	210000	0.0041 J	0.0052	0.0040 J	0.0033 J	0.0039 J	<0.0038 U
SELENIUM	mg/l	D	3.4h	17000	<0.0059	<.0059	<.0044 UJ	<.0044 UJ	<0.0047 U	<0.0047 U
VANADIUM	mg/l	D	0.12a	600	<0.0011	<0.0011	<.0019 UJ	<.0019 UJ	<0.0017 U	<0.0017 U
ZINC	mg/l	D	250h	1250000	2.81	3.71	2.17	2.41	2.14	1.15

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-15	MW-28	MW-28	MW-28	MW-28	MW-28
			Date	Date	3/24/2004 9:45	3/23/2000 16:18	11/6/2000 12:00	3/26/2001 10:35	11/10/1999 11:00	11/18/2003 10:00
			Top (ft)	Top (ft)	0					0
		Total (T)/	Bottom (ft)	Bottom (ft)	0					0
			Duplicate #	Duplicate #	2	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution						
ANTIMONY	mg/l	D	0.72a	3600	<0.0085 U	<0.0084	<0.0094	<0.0094	<0.0084	<0.0085 U
ARSENIC	mg/l	D	0.23h	1150	0.431	0.038	0.0382	0.0362	0.037	0.0293
BARIUM	mg/l	D	1 mcl	5000	0.0412	0.0389	0.0324 J	0.0392	0.0522	0.0373
CADMIUM	mg/l	D	1.4h	7000	0.0013 J	0.0064	<0.00090	0.0057	0.0085 J	<0.00087 U
CHROMIUM	mg/l	D	0.01a	50	<0.0022 U	<0.0017	<0.0016	<0.0016	<.0017 UJ	<0.0022 U
COPPER	mg/l	D	56h	280000	0.0022 J	0.0130 J	<0.0019	<0.0019	<0.0029	<0.0021 U
LEAD	mg/l	D	0.015 mcl	75	<0.0093 U	0.0092 J	<0.0098	<0.0098	0.014 J	<0.0093 U
NICKEL	mg/l	D	42h	210000	<0.0038 U	0.0182	0.0119	0.0165	0.0165	0.0126
SELENIUM	mg/l	D	3.4h	17000	<0.0047 U	<0.0044	<0.0035	<0.0035	<.0044 UJ	<0.0047 U
VANADIUM	mg/l	D	0.12a	600	<0.0017 U	<0.0019	<0.0015	<0.0015	<.0019 UJ	<0.0017 U
ZINC	mg/l	D	250h	1250000	1.17	7.65	2.87	6.81	6.12 J	4.1

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

			Sample ID	Sample ID	MW-28	MW-3	MW-3	MW-4	MW-5
			Date	Date	3/24/2004 11:48	11/18/2003 11:45	3/23/2004 16:03	3/23/2004 13:24	11/21/2003 11:45
			Top (ft)	Top (ft)	0	0	0	0	0
		Total (T)/	Bottom (ft)	Bottom (ft)	0	0	0	0	0
			Duplicate #	Duplicate #	1	1	1	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution					
ANTIMONY	mg/l	D	0.72a	3600	<0.0085 U	<0.0085 U	<0.0085 U	<0.0085 U	<0.0085 U
ARSENIC	mg/l	D	0.23h	1150	0.0366	12.9	15.4	0.0379	0.0801
BARIUM	mg/l	D	1 mcl	5000	0.0423	0.0801	0.0732	0.0107	0.0189
CADMIUM	mg/l	D	1.4h	7000	0.0038 J	<0.00087 U	<0.00087 U	<0.00087 U	<0.00087 U
CHROMIUM	mg/l	D	0.01a	50	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U	<0.0022 U
COPPER	mg/l	D	56h	280000	<0.0021 U	<0.0021 U	<0.0021 U	<0.0021 U	<0.0021 U
LEAD	mg/l	D	0.015 mcl	75	<0.0093 U	<0.0093 U	<0.0093 U	<0.0093 U	<0.0093 U
NICKEL	mg/l	D	42h	210000	0.0147	<0.0038 U	<0.0038 U	0.0771	0.0042 J
SELENIUM	mg/l	D	3.4h	17000	<0.0047 U	<0.0047 U	<0.0047 U	<0.0047 U	<0.0047 U
VANADIUM	mg/l	D	0.12a	600	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U	<0.0017 U
ZINC	mg/l	D	250h	1250000	7.11	<0.0041 U	<0.0041 U	0.379	2.62

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit

Appendix F
Summary of Pool B Analytical Results

		Total (T)/	Sample ID	Sample ID	MW-5	MW28
			Date	Date	3/23/2004 11:04	7/25/2000 9:30
			Top (ft)	Top (ft)	0	
			Bottom (ft)	Bottom (ft)	0	
			Duplicate #	Duplicate #	1	1
Analyte	**units**	**Diss. (D)**	IAWQS value	IAWQS values X dilution		
ANTIMONY	mg/l	D	0.72a	3600	<0.0085 U	<0.0094
ARSENIC	mg/l	D	0.23h	1150	0.0681	0.0422
BARIUM	mg/l	D	1 mcl	5000	0.0217	0.0474
CADMIUM	mg/l	D	1.4h	7000	<0.00087 U	0.0078
CHROMIUM	mg/l	D	0.01a	50	<0.0022 U	<0.0016
COPPER	mg/l	D	56h	280000	<0.0021 U	<0.0019
LEAD	mg/l	D	0.015 mcl	75	<0.0093 U	<0.0098
NICKEL	mg/l	D	42h	210000	<0.0038 U	0.019
SELENIUM	mg/l	D	3.4h	17000	0.0061 J	<0.0035
VANADIUM	mg/l	D	0.12a	600	<0.0017 U	<0.0015
ZINC	mg/l	D	250h	1250000	1.35	7.1

Shading indicates exceedence of IAWQS
X dilution = value times dilution of 5000; no constituents exceeded.
a = IAWQS Aquatic
h = IAWQS Human Health
MCL = Drink. Water Max Contam. Limit

< and ND = Non detect at stated reporting limit