

July 26, 2004

**RCRA FACILITY INVESTIGATION (RFI)
WORK PLAN ADDENDUM NO. 5**

**GM POWERTRAIN BEDFORD FACILITY
105 GM DRIVE
BEDFORD, INDIANA**

EPA ID# IND006036099

JULY 2004

REF. NO. 13968 (83)

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LIST OF ACRONYMS

Agreement	RCRA Corrective Action Agreement
AOI	Area of Interest
CRA	Conestoga-Rovers and Associates
DNAPL	Dense Non-Aqueous Phase Liquid
Facility	GM Powertrain Bedford Plant
GM	General Motors Corporation
MSDS	Material Safety Data Sheet
PCB	polychlorinated biphenyls
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
STL	Severn-Trent Laboratories
SVOC	Semi-Volatile Organic Compound
TCL	Target Compound List
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This document presents an Addendum No.5 to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan (RFI Work Plan) for the General Motors Corporation (GM) Powertrain Bedford Plant (Facility) located in Bedford, Indiana (U.S. EPA ID# IND006036099).

1.1 GENERAL

The Facility is located at 105 GM Drive, Bedford, Lawrence County, Indiana, 47421. The Facility produces aluminum casting products, such as transmission cases, pistons, and engine blocks. Major aluminum production processes include die casting and permanent molding. The Bedford Facility has been operating as an aluminum foundry since 1942, with major facility modifications completed in 1950, 1953, 1966, 1971, 1974, 1977, 1979, and 1980.

The Facility, located on 152.5 acres, contains approximately 915,000 square feet of floor space and employs approximately 1,000 people.

1.2 RFI APPROACH

GM signed a Performance-Based RCRA Corrective Action Agreement (Agreement) with the United States Environmental Protection Agency (U.S. EPA) for the Bedford Facility on March 20, 2001, as amended on August 31, 2002. The signed Agreement states that GM will work with the U.S. EPA to identify and define the nature and extent of releases of hazardous waste and/or hazardous constituents at or from the Bedford Facility.

1.3 PURPOSE

On October 29, 2001, GM submitted a RFI Work Plan (CRA, October 29, 2001) for completing the first phase of investigative activities within the Facility property.

The first RFI Work Plan Addendum (Addendum No. 1) described additional proposed on-Site and off-Site investigative activities based on preliminary RFI results (CRA, November 18, 2002). The purpose of the proposed additional investigative activities was to further define the extent of hazardous constituents in soil at the Facility, and to

obtain additional information on the relationship between the groundwater and surface water system at and near the Facility.

The RFI Work Plan Addendum No. 2 described additional investigative activities at the Former North Disposal Area; identified as Area of Interest (AOI) 4 in the Current Conditions Report (CRA, May 25, 2001).

The RFI Work Plan Addendum No. 3 presented additional investigative activities at the GM hourly parking lot and in the vicinity of Breckenridge Street and GM Drive (CRA, December 1, 2003).

The RFI Work Plan Addendum No. 4 presented proposed test pit locations and soil sampling protocol for the verification of detected anomalies in the completed surface geophysical survey conducted on the Facility property and at off-Site locations (CRA, December 1, 2003).

The purpose of this RFI Work Plan Addendum No. 5 is to present additional Site investigation activities. The proposed scope of work (SOW) is based on the results of the groundwater sampling conducted in 2003 and includes: an aerial thermal imaging survey, proposed dye trace testing to assist in the understanding of groundwater flow through the Mississippian carbonate rocks underlying the Bedford Facility, and the installation and sampling of shallow bedrock groundwater monitoring wells at various locations within and away from the Facility.

2.0 SCOPE OF WORK

2.1 THERMAL IMAGING SURVEY

An aerial survey will be conducted of the Facility and surrounding drainage areas utilizing thermal imaging equipment. Thermal imaging of the area will be completed in an attempt to identify temperature differences along the creek systems, which may represent groundwater discharge springs (e.g., colder groundwater discharging into relatively warmer industrial water fed creek). The aerial thermal imaging survey will be completed using a Jet Ranger helicopter at an approximate altitude of 750 feet above the land surface. The images will be obtained using a Mitsubishi 5120C infrared imager, and the resolution from 750 feet is approximately 3-inch pixels. The temperature differential detectable with this equipment is less than one degree centigrade. The positional accuracy for mapping anomalies is dependant on the Global Positioning System (GPS) being used and on the number of satellites that can be linked. However, ground positioning is typically five to ten meters for the image stamp. Higher fidelity of positional information can then be determined from image interpolation and ground features visible in the infrared image, resulting in a positional accuracy of approximately 2-3 meters, or better. The flight will be conducted after dark in the late evening and will be completed in several passes. One pass will be to establish the flight grid; a second pass will be conducted along the grid; and a third pass may be conducted to concentrate on thermal anomalies observed along the creek system.

Thermal anomalies detected during this survey will be verified in the field (i.e., the ground surface will be visually inspected at each location which is accessible). Any previously unknown seep and/or spring, which is field verified, will be considered for inclusion in the dye trace recovery monitoring and the Site Source Control monitoring, as applicable.

2.2 DYE TRACE TESTING

Carbonate rocks are prone to dissolution by infiltrating water passing through the soil cover. Therefore, complicated patterns of flow can be encountered in groundwater especially in the shallow bedrock referred to as epikarst. The epikarst develops most intensely at the soil/bedrock interface. In this zone the bedding planes, vertical joints, and fractures are solutionally enlarged creating a zone of enhanced secondary porosity and permeability. This zone can transport water both laterally and vertically during wet periods and heavy rain events. The purpose of the dye trace test will be to provide information on the groundwater flow and aqueous phase contaminant migration

directions and discharge points. Dense non-aqueous phase liquids (DNAPLs), such as the oil observed at this Facility, can settle in pockets within the epikarst and can subsequently be transported either as DNAPL, or as aqueous phase components during storm events. The distance of transport will vary according to the intensity and duration of flow in the epikarst.

Dye tracing in Karst terrains is the standard method for assessing groundwater flow directions, velocity of flow and the interconnections of dissolved contaminant transport from injections point to points of resurgence.

The initial dye trace will be conducted in the area of Outfall 002 at this time because the Plant's discharge is currently being re-routed around on-going cleanup activities and the springs in this area are isolated from this flow. The Outfall 002 area is also a high priority at this time with respect to characterization activities because of the fact that groundwater containment and surface water diversion systems must be constructed here prior to the initiation of downstream sediment excavation actions. This initial test will be completed under base-flow conditions. A second dye trace test in this area will be completed under high flow conditions. Continuous discharge measurements will be conducted at locations where dye appears until volumes have receded to approximately 25% of peak values, or until deemed reasonable by the investigation team, in order to quantify the base flow volumes.

Subsequent tests in the other areas (e.g., northern and western tributaries, AOIs 4, 6, and 9) will be described in future Work Plan Addenda, as deemed necessary.

2.2.1 FIELD PROCEDURES

2.2.1.1 BACKGROUND

Prior to injection of the dye, background fluorescence will be established for all monitoring locations. Several water samples will be taken to determine the presence of any existing dye, or other natural fluorescence, in the water.

In addition, all intended recovery spring and seep locations will be analyzed for total and dissolved PCBs, in accordance with the Quality Assurance Project Plan (QAPP).

2.2.1.2 INJECTION

The injection point of the dye will be at the existing groundwater monitoring well MW-X233Y087S (Figure 2.1). Fluorescein is the common term for the dye that will be used for this test. Fluorescein is technically sodium fluorescein ($C_{20}H_{10}O_5Na_2$), which is highly soluble in water and relatively harmless if exposure occurs (Attachment A presents the Material Safety Data Sheet for concentrated Fluorescein). This dye is also referred to as Acid Yellow 73 and in Europe as uranine. For the purpose of this test the dye will be referred to as fluorescein. Fluorescein dissolves rapidly in water producing a bright green color and is visible in water containing concentrations greater than 40 parts per million (ppm). Fluorescein can be detected down to concentrations on the order of 10 to 100 parts per trillion (ppt) in water using analytical equipment. Up to approximately 250 milliliters (ml) of fluorescein (50%(wt/wt) of the 75% mixture) will be injected at the existing monitoring well location MW-X233Y087S. Prior to dye injection, a K-type packer will be installed above the PVC sump within the well so that the dye will not enter the sump. The dye will be dissolved in one gallon of water and will be followed by a flush of 10-20 gallons of water. Actual volumes may vary depending upon Site conditions.

2.2.1.3 DYE RECOVERY

Three methods of sample collection will be used during the dye trace testing: water grab samples, passive detectors, and ISCO continuous water samples. A passive detector is a material such as activated charcoal that allows the dye to accumulate on its surface over time. This method allows dye detection for very low concentrations in water. The charcoal samples are washed and covered with a mixture of ammonium hydroxide, ethanol and distilled water for 3 hours. After the 3-hour period, the resulting solution is analyzed for the presence of the dye. Charcoal packages are best used to establish either the absence or presence of dye at a monitoring location, while grab samples are best used to establish a dye concentration in water. Both types of sampling will be utilized in this study, along with automated water sample collection using ISCO devices.

The monitoring points for dye recovery will consist of seeps and springs, surface water, and existing on-Site monitoring wells in the vicinity of the injection point that have standing water (Table 2.1 and Figures 2.2 and 2.3). The proposed monitoring wells to be sampled are TMW-X193Y251, MW-X234Y157S, MW-X233Y095, MW-X233Y100, MW-X233Y105B, MW-X233Y071B, MW-X242Y060, MW-X209Y078S, MW-X251Y189D-7, MW-X085Y070S-1, MW-X169Y058S-1, and the piezometer location PZ08. The Former

Stormwater Lagoon (sump at AOI 7) and the Former South Lagoon #4 (sump at AOI 8) will also be monitored for the presence of the dye. Springs or seeps on Parcels 3 and 205 will be monitored by taking water and charcoal samples. These parcels are currently isolated from each other and the Plant's discharge due to the ongoing Removal Action activities, so separate samples will be taken. Parcel 3 contains a spring immediately adjacent to Outfall 002 (due to the current status of the Site Source Control installation, the sump (Wet Well #1) will be monitored, which will include this spring). Parcel 205 contains a spring on the south bank that is probably coming from uplands of Parcel 3 (labeled as Seep_001(5012), which is at a higher elevation than the static water level of the injection point. The spring on the south bank does not contain PCBs and is probably not in hydrologic connection with AOI-8. The water in the stream bottom of Parcel 205 may be receiving recharge from lateral flow within the overburden and/or epikarst in addition to the spring flow and will be monitored separately from Wet Well #1 for this reason (due to the current status of the Site Source Control installation, the sump (Wet Well #2) will be monitored, which will include this spring).

In addition, springs and seeps known as Spring_018(5047), Spring_004(5046), Spring_009(5048), and Seep_002 will be monitored for the presence of dye. The eastern springs near the Outfall 003 (SW-X216Y274, Spring East of Storm Pond-1, and Spring East of Storm Pond-2), springs northeast of AOI-4 (Eastern Seep Area 01, Eastern Seep Area 02, Spring East of Storm Pond 01, Spring East of Storm Pond 02, and SW-X216Y274) will be sampled upstream of the confluence (one sample on each branch, with the exception of Eastern Seep Area 01, which will also be sampled individually) and again before they enter Bailey's Branch (after confluence of the two branches). Bailey's Branch will be monitored upstream of the confluence with the springs in AOI-4 and Outfall 003, unless remediation activities are being completed in this area. A spring, which is located on a northern tributary to Leatherwood Creek (6th Street), will be monitored (dependent upon access) to determine if groundwater from the injection site traverses to this separate surface water drainage basin. Lastly, the headwater and one additional location at the Northern Tributary and the Western Tributary will be monitored for the presence of the dye (two locations each). A spring located on Parcel 60 along the Western Tributary (Spring_60) will be monitored during the dye recovery phase.

The dye recovery sampling frequency will be as follows:

- at a minimum, samples will be collected at the ISCO auto-samplers every hour;
- and grab samples and charcoal packs will be collected every 6 hours.

Once the majority of the dye has been recovered, the ISCO samples and grab samples will be discontinued. The charcoal packs will remain at the recovery points where the dye is not detected during the test for two weeks following the dye injection (with daily collection after the test is terminated).

Table 2.1 Dye Recovery Monitoring Locations and Methods		
Monitoring Point	Sampling Method	Backup¹
Monitoring Wells (listed in text)	Waterloo samplers or bailers	None
Former Stormwater Lagoon sump (AOI 7)	Grab water sample	Charcoal
Former South Lagoon #4 sump (AOI 8)	Grab water sample	Charcoal
Spring_018(5047)	Grab water sample	Charcoal
Spring_009(5048)	Grab water sample	Charcoal
Seep_002: Wet Well #2	Grab water sample	Charcoal
Parcel 3 at Outfall 002: Wet Well #1	ISCO continuous water sampler ²	Charcoal
Seep_001(5012)	ISCO continuous water sampler ²	Charcoal
Spring_004 (5046)	Grab water sample	Charcoal
Eastern springs near Outfall 003 Eastern Seep Area 01 Eastern Seep Area 02	Grab water sample	Charcoal
Springs NE of AOI 4 SW-X216Y274 Spring East of Storm Pond-1 Spring East of Storm Pond-2	Grab water sample	Charcoal
Drainage from E of AOI 4 and NE of AOI-4 (after confluence of branches)	ISCO continuous water sampler	Charcoal
Bailey's Branch before confluence w/ E of AOI 4 and AOI-4 ³	ISCO continuous water sampler	Charcoal
Northern Tributary (2 locations)	Grab water sample	Charcoal
Western Tributary (2 locations)	Grab water sample	Charcoal
Spring_060	Charcoal	None
Northern Trib. To Leatherwood Creek (if accessible)	Charcoal	None

1 Backup samples will only be analyzed in the case where the equipment malfunctions.

2 ISCO samplers will be utilized within the existing Wet Wells, if possible. Otherwise, this sampling will be grab.

3 At the time of this publication, this part of the creek is under remediation. Therefore, water samples cannot be collected at this location unless this proposed dye trace test is not completed until after restoration of the creek in this area.

2.2.2 LABORATORY PROCEDURES

All samples (grab, charcoal, or ISCO) will be analyzed on the Shimadzu 5000U scanning spectrofluorophotometer. The instrument can detect dyes in the parts per trillion (ppt) ranges. It produces a fluorogram of intensity vs. wavelength (nanometers) for each sample analyzed. The intensity will be converted to concentration allowing for construction of a breakthrough curve of time vs. concentration. Water samples allow for construction of the breakthrough curve that can give an accurate time of arrival, apparent velocity and information concerning the mode of transport. If the

breakthrough curve is a sharp peak of short duration it indicates rapid flow along a fracture. Broader peaks with a long duration indicate a more diffuse pathway of groundwater flow. Additional dyes can be injected if the fluoresce is at a wavelength far enough apart from fluorescein that their peaks do not overlap. A table of common dyes and the wavelength for fluoresce is given below in Table 2.2. However, for this initial test, only Fluorescein will be used.

A calibration curve will be constructed for aqueous dye solutions, and also for the elutant in equilibrium with charcoal samples. The instrumentation parameters will be 5x5 for both water and charcoal. In addition, blanks will be employed for both water and charcoal as well as a daily mid-range Fluorescein standard.

<i>Table 2.2 Common Dyes and Wavelengths</i>	
<i>Dye</i>	<i>Wavelength (nanometers)</i>
Optical Brighteners	435±5 and 410±5
Direct Yellow	452±5
Fluorescein	510-518
Eosine	535±5
Rhodamine WT	577±5

All background surface water samples will be analyzed for total and dissolved PCBs at Severn Trent Laboratories (STL) in North Canton, Ohio, in accordance with the QAPP.

2.2.3 OTHER POTENTIAL DYE TESTING

Other areas may be selected later this year for additional dye trace testing to confirm the direction of groundwater flow and potential discharge locations. These areas may include the Former North Disposal Area (AOI 4), the Former Sludge Disposal and Fire Training Area (AOI 6), the Service Tunnels (AOI 9), and the fill area located north of Breckenridge Road.

Any additional drilling that may be required for injection or recovery points will be described in a separate Addendum, as necessary. However, if an injection point is required within AOI 9, the drilling of such could only occur during the two-week shutdown period in the summer (near July 4) due to the ongoing manufacturing at the Facility.

2.3 GROUNDWATER MONITORING WELLS

Based on the results of the initial groundwater samples, additional monitoring wells will be installed at various off-Site properties, as described below. These analytical results also indicate that the dominant constituents of concern are PCBs, and therefore, this SOW describes investigation activities for the identification of off-Site migration of PCBs.

Unless otherwise stated, each monitoring well described below will be installed by coring the bedrock with a HQ core barrel. At each location, a larger diameter steel outer casing will be installed (as shallow into the bedrock as possible) prior to coring to prevent vertical migration of surface water to the corehole. Each well will be advanced through the upper, weathered bedrock surface and will be completed upon reaching more competent bedrock (rock quality index of 100 percent). Each groundwater monitoring well will be completed as an open hole well (i.e., open from below the surface casing to total depth). A PVC sump will be installed at the bottom of each monitoring well as a precaution in case any DNAPL migrates to a well. The sumps will be approximately two feet in length and will be grouted in place. All newly installed monitoring wells will be checked on a regular basis for the presence of non-aqueous fluids (LNAPL and DNAPL). All monitoring wells will be completed at depths that are at least five feet below the expected potentiometric surface so that the open interval intersects the water table surface (if permeable features are encountered). All wells will also be tested for permeability upon completion (i.e., single-well slug tests). All wells will be completed at the ground surface with a locking above ground casing protector. The locations of all proposed groundwater monitoring wells are presented on Figure 2.4. Actual locations may be altered depending upon local Site conditions (e.g., drill rig accessibility).

2.3.1 EAST SIDE OF FACILITY

The initial groundwater analytical results support the conceptual Site model developed for the project; that is, the PCBs appear to be within the shallow groundwater flow system. With the exception of one well (overburden well located within AOI 4, all detections of PCBs in groundwater were from samples collected from monitoring wells located along the eastern portion of the GM property. The potentiometric surface for the shallow bedrock indicates groundwater flow toward the local tributaries to Bailey's Branch of Pleasant Run Creek. It is also clear from the progression of the Removal Action that the headwater of the creek, which begins at Outfall 002, is a major discharge area for the shallow bedrock groundwater flow. Although it is likely, it is not certain

that this creek acts as a hydraulic barrier for the migration of PCBs in the shallow groundwater flow system.

Two additional, shallow bedrock groundwater monitoring wells will be installed along the northern and western boundaries of the unnamed tributary, which begins at Outfall 002 ("inside", or on the Plant side of the creek) outside of the floodplain. These two new monitoring wells will supplement two existing monitoring wells (i.e., MW-X251Y189-7 and PZ08) to complete a line of four monitoring points on the inside of the creek (Figure 2.4). In addition, four shallow bedrock groundwater monitoring wells will also be installed on the "outside" (or south and east of the creek), near the same location as the inside line of wells, and will also be located outside of the floodplain. The purpose of these wells is to identify if PCBs have migrated to the creek system and if so, to help determine whether the creek system is a hydraulic barrier to the further migration of PCBs that may be present in groundwater on the GM property.

2.3.2 WEST SIDE OF FACILITY

Previous drilling activities along the western portion of the GM property indicate the presence of approximately forty feet of fill material at the location of existing monitoring well MW-X033Y147S/D. In addition, surficial soil samples collected at an adjacent property (Parcel 2) indicate the presence of PCBs within a drainage swale. This drainage swale initiates just downslope from a retaining wall at a much lower elevation than the ground surface at the Facility. It is uncertain as to the origin of the PCBs at this location, as well as the origin of the surface water within the drainage swale.

One shallow bedrock well is proposed to be installed between the Facility and the retaining wall to investigate the potential for migration of PCB-impacted groundwater from the Facility. If saturated conditions are encountered within the overburden, a two-inch inside diameter (ID) PVC well casing and screen will be installed in addition to the shallow bedrock monitoring well. The purpose of this well is to determine the groundwater quality along the west side of the Facility and potential PCB impacts associated with the discharge of the groundwater into the swale.

2.3.3 NORTH SIDE OF FACILITY

To investigate the potential that groundwater may be migrating to the north and potentially discharging to the northern tributary, four shallow bedrock groundwater monitoring wells will be installed along the north side of Breckenridge Road. One of

these wells will be located as near as possible to the former drainage feature identified in historical drawings (CRA, RFI Work Plan Addendum No. 3).

One of these wells will be located to the north of the east-west drainage currently undergoing Removal Action activities north of Areas of Interest (AOI) 4 and 15. The purpose of this monitoring well will be to determine whether PCB-impacted groundwater has migrated laterally beyond this drainage ditch. This well will be located outside of the floodplain.

2.4 SEWER INVESTIGATION AT PARCEL 400

During soil sampling activities completed at Parcel 400, a manhole was discovered near the back portion of the property (see Figure 2.5). Water and piping was observed within the manhole structure. The results of the soil sampling indicated the detection of PCBs at concentrations above the selected cleanup criterion near the manhole. Follow up with the property owner and with the City of Bedford did not reveal any information as to the origin of the structure or where the observed piping may be emanating and/or discharging.

In order to determine more information on this system, a specially fitted television camera will be inserted into each of the observed pipes and the length of the piping system will be taped, if possible (e.g., obstruction or collapse of the pipe may prevent the entire length to be taped, etc.). A water and a sediment sample will be collected from the manhole and from each pipe emanating from the manhole, if possible. All samples will be submitted to STL for analysis of the Target Compound List (TCL) for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and the Target Analyte List (TAL) for inorganics (minus the earth metals).

The results of this investigation will aid in further evaluating this property.

2.5 SAMPLING PROCEDURES

2.5.1 SOIL

At each drilling location, soil samples will be collected as described in the RFI Work Plan (CRA 2001). All soil samples will be submitted to STL in North Canton, Ohio for analysis of Target Compound List (TCL) volatile organic compounds (VOCs),

semi-volatile organic compounds (SVOCs), PCBs, and the Site-specific inorganics. All sampling, decontamination, and analytical procedures will be in accordance with those described in the RFI Work Plan and the QAPP.

2.5.2 GROUNDWATER

All newly installed groundwater monitoring wells will be developed in accordance with the procedures outlined in the RFI Work Plan. At a minimum of two weeks after well development, all newly installed groundwater monitoring wells will be sampled, if sufficient volume of groundwater is present. Groundwater samples will be submitted to STL for analysis of TCL VOCs, SVOCs, PCBs (total and dissolved), and Site-specific inorganics (total and dissolved). All sampling, decontamination, shipping, and laboratory procedures will be followed in accordance with the RFI Work Plan and QAPP.

2.6 ELEVATION SURVEY

Upon completion of all drilling activities, all newly installed wells and borings will be surveyed for horizontal location to the nearest 0.1 foot, and ground and top of casing elevations to the nearest 0.01 foot.

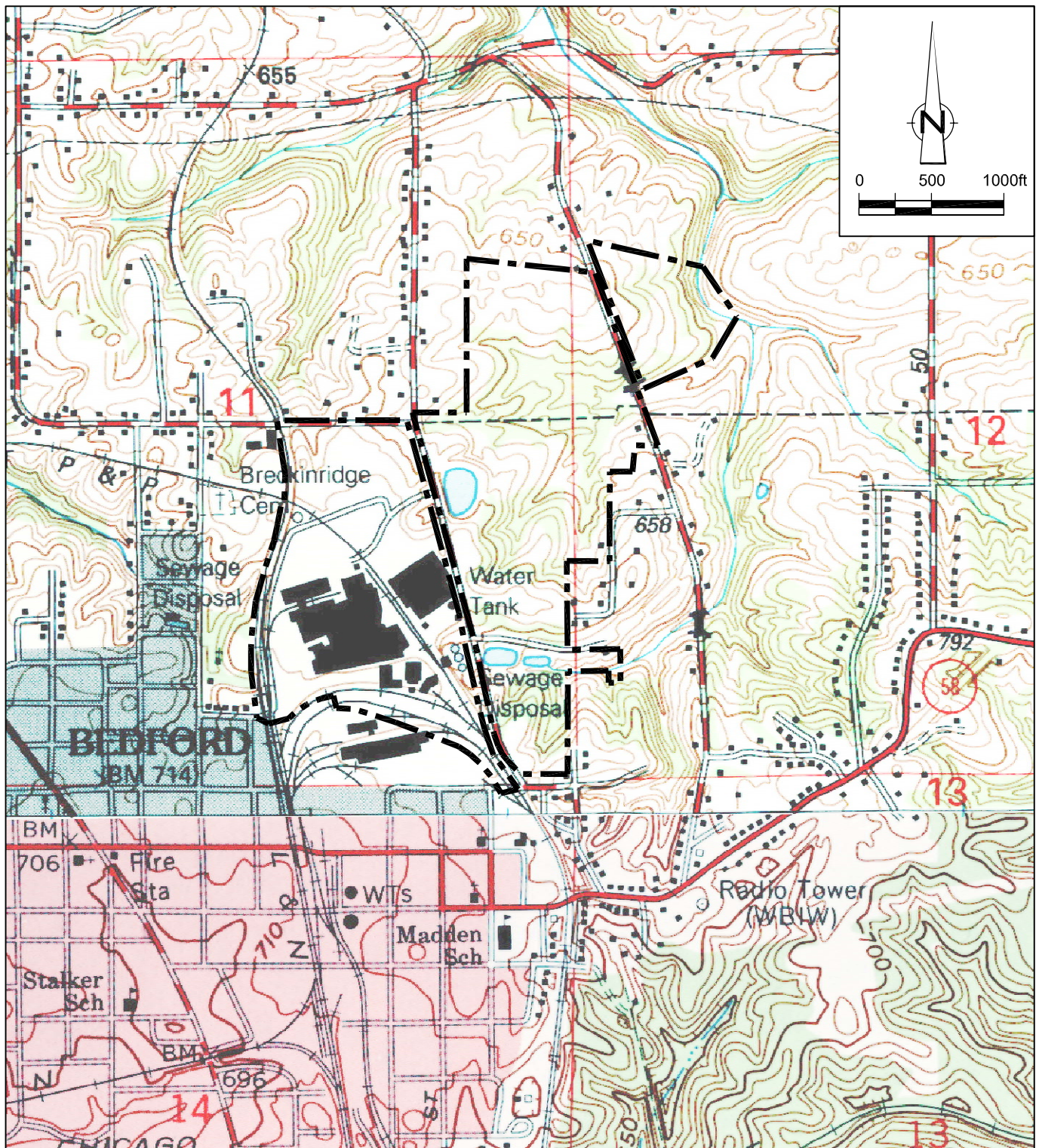
All newly installed groundwater monitoring wells will be added to the routine groundwater elevation measurement program upon completion.

3.0 REPORTING AND SCHEDULE

Upon completion of all field activities and upon receipt of all final, validated analytical data, a Technical Memorandum (TM) will be prepared describing the activities and results of the completed work.

The fieldwork, as described above, will be initiated within three weeks of approval of this Work Plan Addendum (Figure 3.1). The thermal imaging will be completed as soon as possible upon approval. The dye trace testing and off-site monitoring well installation can begin simultaneously (note: any newly installed off-Site monitoring well that is completed prior to dye injection will be used as a dye recovery point).

Once all work activities are complete, CRA will prepare the TM for this scope of work and will submit it to U.S. EPA upon completion.



BASE SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES;
 BARTLETTSVILLE, INDIANA 1994
 BEDFORD EAST, INDIANA 1978
 BEDFORD WEST, INDIANA 1993
 OOLITIC, INDIANA 1987

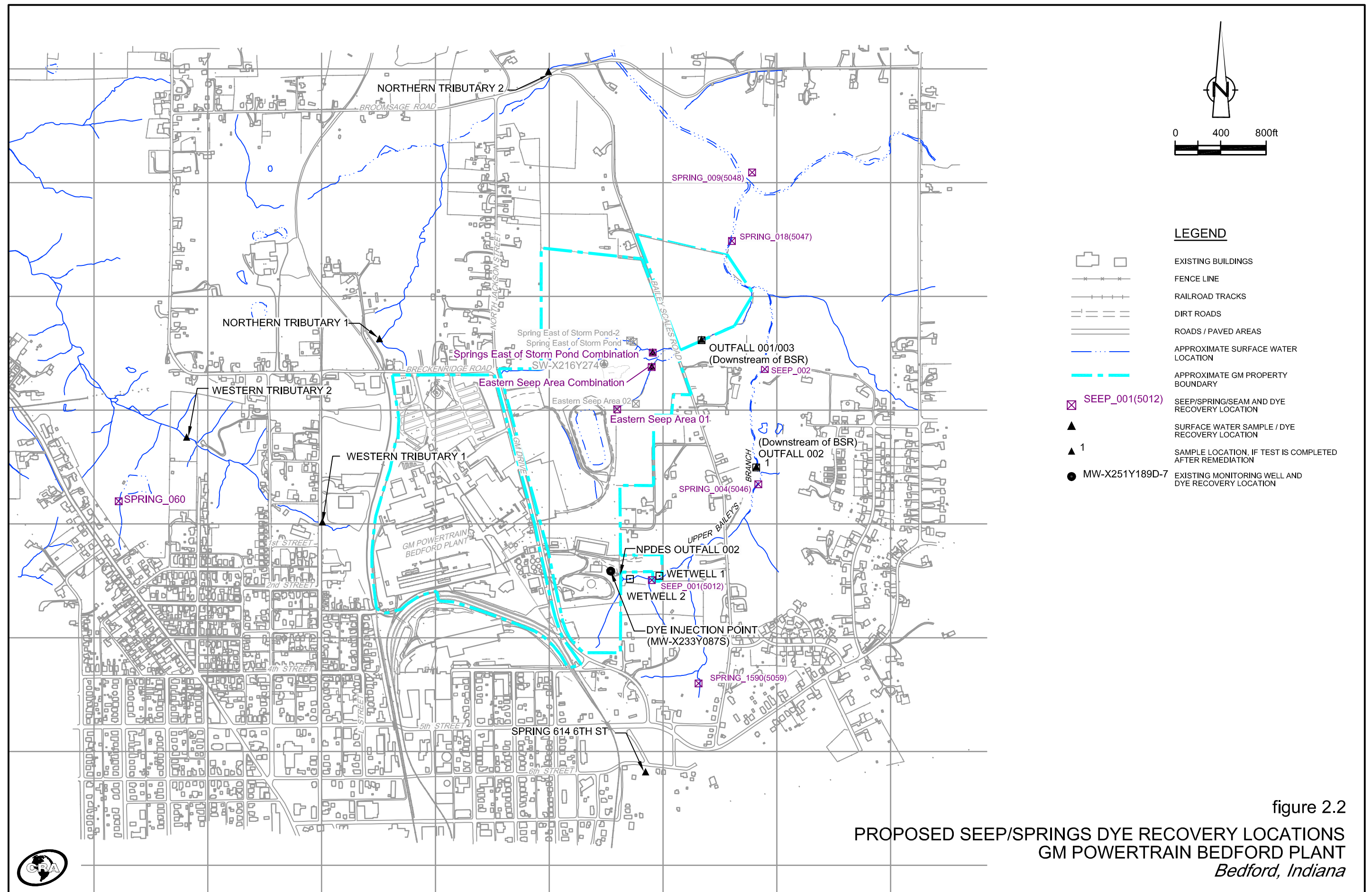
LEGEND

 FACILITY BOUNDARY



figure 2.1

SITE PLAN GM POWERTRAIN BEDFORD PLANT *Bedford, Indiana*



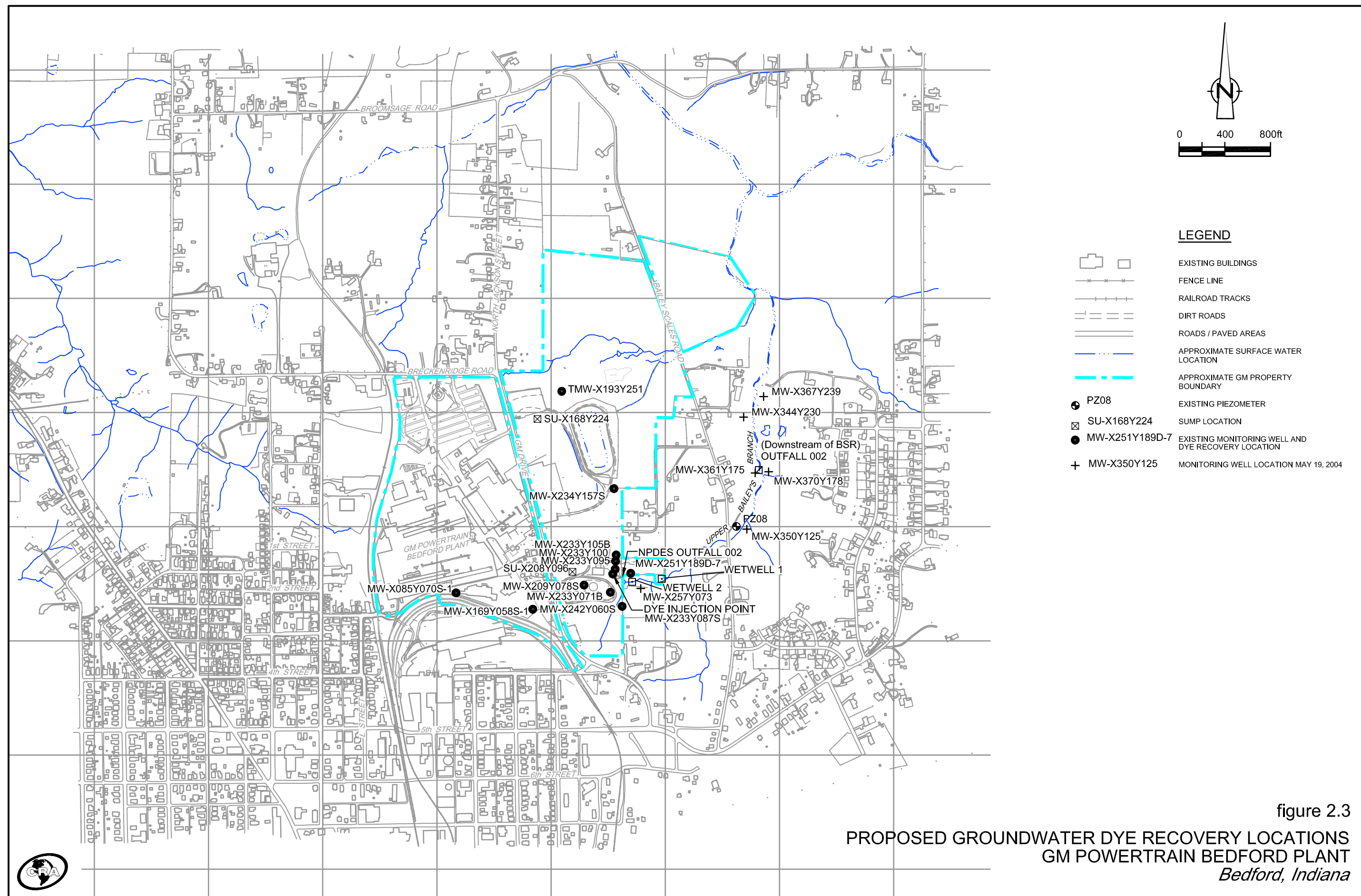
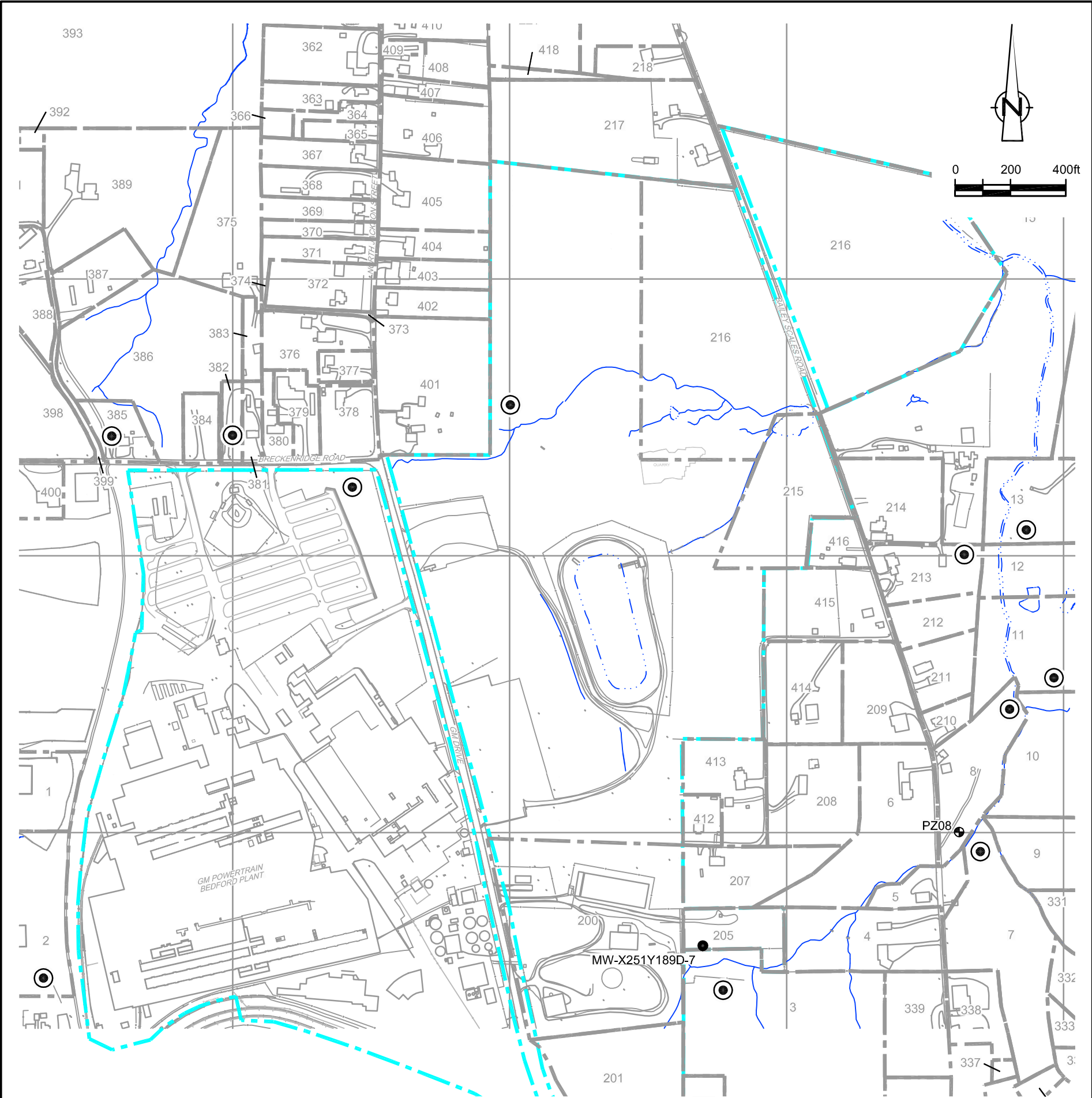


figure 2.3

PROPOSED GROUNDWATER DYE RECOVERY LOCATIONS
GM POWERTRAIN BEDFORD PLANT
Bedford, Indiana

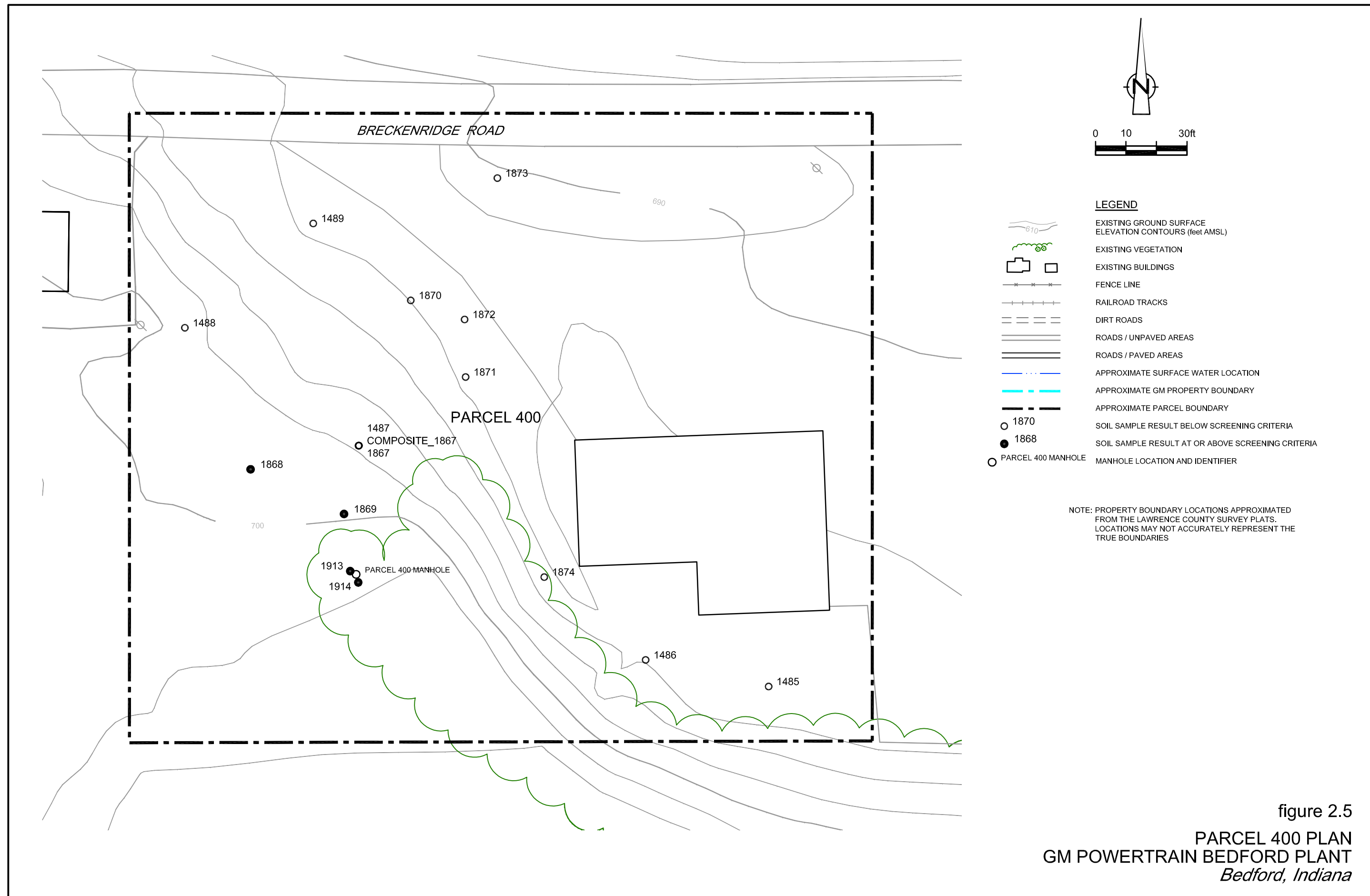


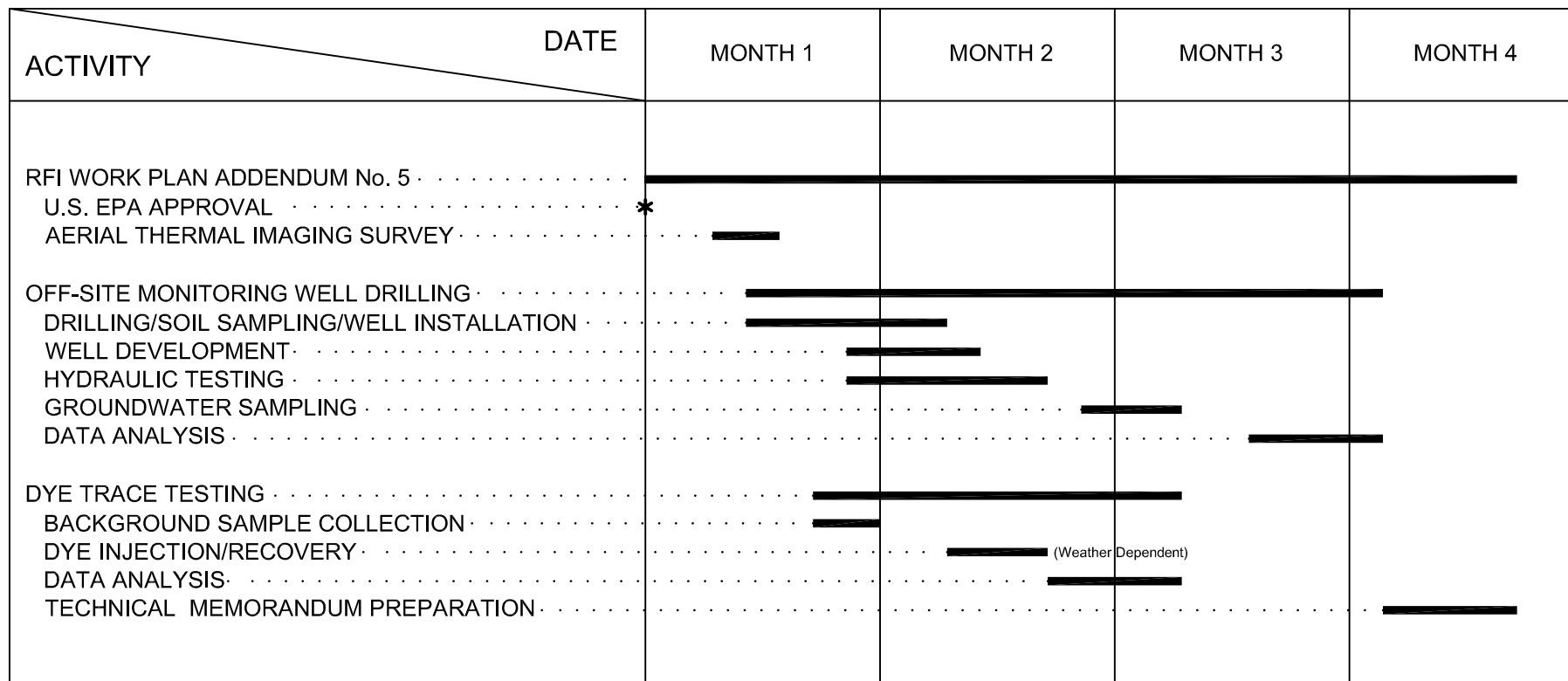
LEGEND

- EXISTING BUILDINGS
- FENCE LINE
- RAILROAD TRACKS
- DIRT ROADS
- ROADS / PAVED AREAS
- APPROXIMATE SURFACE WATER LOCATION
- APPROXIMATE GM PROPERTY BOUNDARY
- APPROXIMATE PARCEL BOUNDARY
- PZ08 EXISTING PIEZOMETER
- MW-X251Y189D-7 EXISTING MONITORING WELL
- PROPOSED SHALLOW BEDROCK WELL

figure 2.4
PROPOSED GROUNDWATER MONITORING WELL LOCATIONS
GM POWERTRAIN BEDFORD PLANT
Bedford, Indiana







LEGEND

- CONTINUOUS ACTIVITY
 * MAJOR MILESTONE

figure 3.1
 ANTICIPATED SCHEDULE (GENERAL)
 RFI WORK PLAN ADDENDUM No.5
 GM POWERTRAIN BEDFORD PLANT
Bedford, Indiana



APPENDIX A

MSDS FOR FLUORESCEIN DYE

FEB-18-2004 15:29 FROM: IU GEOLOGICAL SCIENC 8128557899

TO: 912693448558P5414356 P: 1/7

02/17/2004 TUE 08:47 FAX

0002

D11006 Chromatint Uranine HS Liquid
RTN Number: 00000269Page 1
March 19, 2002

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Identification

Product Name: D11006 Chromatint Uranine HS Liquid
Chemical Name: Acid Yellow 73, potassium salt
Chemical Family: Xanthene
CAS Number: 6417-85-2

Company Identification

Chromatech Inc.
7723 Market Street
Canton, MI 48187 USA
734-451-1230 (For questions and emergencies)

2. COMPOSITION/INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>Amount</u>	<u>CAS Number</u>
D11006 CHROMATINT URANINE HS LIQUID	100.0 %	6417-85-2
(See section 8 for exposure guidelines)	50% ACTIVE	
(See Section 15 for regulatory information)	INGREDIENT	
	50% OF POWDER	
	75-80% POWDER	

HAZARDS DISCLOSURE

This product contains no known hazardous materials as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200.

As defined under Sara 311 and 312, this product contains no known hazardous materials.

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3. HAZARDS IDENTIFICATION

***** EMERGENCY OVERVIEW *****

*
* The hazards of this product should be low under *
* normal industrial and commercial uses. May cause *
* skin or eye irritation after repeated or prolonged *
* contact. This material is a concentrated colorant *
* and should not be allowed to enter soil or surface *
* water. *
* *

HMIS Rating - Health: 1
Flammability: 0
Reactivity: 0
Personal Protection Index: C

POTENTIAL HEALTH EFFECTS

EYE:

Not known to cause permanent injury to eye tissue. Contact may cause eye irritation.

SKIN:

Prolonged or repeated contact may cause skin irritation. Not expected to be a skin irritant.

INHALATION:

No known hazards in normal industrial use. No information regarding inhalation available.

INGESTION:

No information regarding ingestion available. May be harmful if swallowed.

4. FIRST AID MEASURES

EYE CONTACT FIRST AID:

In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation develops or persists.

SKIN CONTACT FIRST AID:

Get medical attention if irritation develops or persists. Wash affected area immediately with large amounts of soap and water.

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(section 4 continued)

INHALATION FIRST AID:

Get medical attention if cough or other symptoms develop. Although this product is not known to cause respiratory problems, if breathing is difficult, remove to fresh air and provide oxygen.

INGESTION FIRST AID:

Contact a physician. Never give anything by mouth to an unconscious person. If swallowed, immediately give 2 glasses of water. Unless advised otherwise, induce vomiting by either giving Syrup of Ipecac followed by 2 glasses of water, or by sticking finger down throat.

5. FIRE FIGHTING MEASURES**FLAMMABLE PROPERTIES**

COC Flash Point: N/A

Autoignition Temperature: N/A

FLAMMABLE LIMITS IN AIR

LEL: %

UEL: %

EXTINGUISHING MEDIA:

Water, carbon dioxide, foam or dry powder.

FIRE & EXPLOSION HAZARDS:

No known unusual hazards in a fire/explosion situation.

FIRE FIGHTING INSTRUCTIONS:

As in any fire, wear self-contained breathing apparatus pressure-demand MSHA/NIOSH (approved or equivalent) and full protective gear. Contain runoff water. Contaminated extinguishing water must be disposed of in accordance with applicable regulations. Avoid breathing smoke, fumes, and decomposition products.

6. ACCIDENTAL RELEASE MEASURES**SAFEGUARDS (PERSONNEL):**

Wear appropriate personal protective equipment.

INITIAL CONTAINMENT:

Contain spilled material. Do not allow material to enter soil or surface water. Absorb spills with inert material. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements. Wash area to prevent slipping.

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(section 6 continued)

LARGE SPILLS PROCEDURE:

This material is a concentrated colorant. Contain spilled material. Large spillage should be dammed-off and pumped into containers. Take up the remainder by absorbent material. Prevent spilled product from entering streams or drinking water supply. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

SMALL SPILLS PROCEDURE:

Absorb spills with inert material. Avoid disposal into waste water treatment facilities. Floor may become slippery. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

7. HANDLING AND STORAGE**HANDLING (PERSONNEL):**

Do not get in eyes, on skin or clothing. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. When sampling containers use appropriate personal protective equipment.

HANDLING (PHYSICAL ASPECTS):

Avoid extremes temperatures. Keep container closed to avoid contamination. Avoid contact with strong oxidizing agents.

STORAGE PRECAUTIONS:

Protect containers from physical damage. Do not stack drums more than three pallets high.

SPECIAL SENSITIVITY:

KEEP FROM FREEZING.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION**ENGINEERING CONTROLS:**

Good general ventilation should be sufficient to control airborne levels.

EYE / FACE PROTECTION REQUIREMENTS:

Wear safety glasses. Where contact with this material is likely, eye protection is recommended.

SKIN PROTECTION REQUIREMENTS:**UNCONTROLLED DOCUMENT**

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(section 8 continued)

Wear protective gloves to minimize skin contamination. For brief contact, normal work attire should be sufficient. When prolonged or frequently repeated contact could occur, use protective clothing impervious to this material.

RESPIRATORY PROTECTION REQUIREMENTS:

Under normal use conditions, with adequate ventilation, no special handling equipment is required.

EXPOSURE GUIDELINES:

No Information Available.

9. PHYSICAL AND CHEMICAL PROPERTIES

FORM: Liquid
COLOR: Amber
ODOR: No odor
SOLUBILITY IN WATER: Soluble
SPECIFIC GRAVITY: 1.19 (Water = 1)
PH: 9.8 (undiluted)

10. STABILITY AND REACTIVITY**STABILITY:**

This compound is stable at ambient conditions.

POLYMERIZATION:

Hazardous polymerization will not occur.

INCOMPATIBILITY WITH OTHER MATERIALS:

Avoid contact with strong oxidizing agents.

DECOMPOSITION:

Decomposition will not occur if handled and stored properly. In the case of a fire, oxides of carbon, hydrocarbons, fumes, and smoke may be produced.

11. TOXICOLOGICAL INFORMATION**MISCELLANEOUS:**

Liquid contact may irritate eyes and skin. Solution is alkaline.

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D11006 Chromatint Uranine HS Liquid
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March 19, 2002**12. ECOLOGICAL INFORMATION****MISCELLANEOUS:**

No information available.

13. DISPOSAL CONSIDERATIONS**WASTE DISPOSAL:**

Uncleaned empty containers should be disposed of in the same manner as the contents. Due to the highly concentrated color, avoid washing material into sewer systems without proper treatment and authorization by the treatment facility management. Treat or dispose of waste material in accordance with all local, state/provincial, and national requirements.

14. TRANSPORTATION INFORMATION

PRODUCT LABEL.....: D11006 Chromatint Uranine HS Liquid
D.O.T. SHIPPING NAME.....: N/A
TECHNICAL SHIPPING NAME....: N/A
D.O.T. HAZARD CLASS.....: Non-Hazardous
ON NUMBER.....: N/A
D.O.T. LABEL.....: N/A
D.O.T. PLACARD.....: N/A
BULK CLASS.....: N/A
PACKAGE CLASS.....: N/A

15. REGULATORY INFORMATION**MISCELLANEOUS INFORMATION:**

This material or all of its components are listed on the Inventory of Existing Chemical Substances under the Toxic Substance Control Act (TSCA).

WEMIS Hazard Symbols:

None

EEC Symbols and Indications of Danger:

None

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March 19, 2002**16. OTHER INFORMATION**

Reason For Issue....: Update
Prepared By.....: Lezlie Luceus
Approved By.....: Lezlie Luceus
Title.....: Development Associate
Approval Date.....: February 17, 1999
Supercodes Date....: March 26, 1999
RTN Number.....: 00000269

ADDITIONAL INFORMATION:

The data in this Material Safety Data Sheet relates only to the specific material designated herein. It does not relate to use in combination with any other material or in any process.

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END OF MSDS

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