2002 FIELD ACTIVITY DOCUMENTATION REPORT FOR THE FORMER DUPONT BARKSDALE WORKS BARKSDALE, WISCONSIN

Date: September 2, 2003

Project No.: 507433

18982818.20031

CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS Diamond

4200 Camp Ground Road
Louisville, Kentucky 40216

Bradley S. Nave
DuPont Project Director

Cary E. Pooler
URS Project Manager

Jon R. Hammerberg, P.E.
URS Project Engineer

TABLE OF CONTENTS

FIGURES

APPENDICES

EXECUTIVE SUMMARY

This report presents documentation of drilling, well construction and well logging activities completed between September 2002 and December 2002 at the Former E.I. du Pont de Nemours and Company (DuPont) Barksdale Works, located in Barksdale, Wisconsin. The activities were conducted in accordance with the Wisconsin Department of Natural Resources (WDNR) approved work plan. The activities were undertaken as part of continuing efforts by DuPont and the WDNR to address the presence of site-related compounds discovered in non-residential groundwater monitoring wells and adjacent residential drinking water wells in 1997.

The 2002 site activities were implemented to further characterize specific geologic and hydrogeologic conditions identified by prior investigations. The activities were focused in two subsurface locations; the deep aquifer along the northern and eastern borders of the site and the shallow aquifer near the former Burning Ground in the central portion of the site.

Activities related to evaluation of the deep aquifer (drilling and logging of two monitoring wells, construction of three new potable wells, and logging of four existing potable wells) determined the following:

- Groundwater depths and soil stratigraphy at drilling locations PZ-37 and PZ-16 are consistent with past observations in the those general vicinities.
- Depth to bedrock at 29600 Nolander Road occurs at 110 feet below ground surface (bgs), which is consistent with rock depth at PZ-03 located to the southwest.
- The upward, groundwater gradient observed in on-site well groups PZ-30 through PZ-32 is present throughout eastern Nolander Road, lake shore development, and Birch Grove Road areas. The presence of this upward flow could be responsible for the absence of site-related compounds in these areas.

Activities related to evaluation of subsurface conditions near the Burning Ground (drilling and logging of two borehole groups, construction of one shallow-aquifer and two intermediate-aquifer monitoring wells, and sounding of bedrock depths at seven locations) determined the following:

- Groundwater depths and soil stratigraphy at drilling locations PZ-38 and PZ-39 were consistent with past observations in the Burning Ground vicinity.
- Bedrock depths north of the existing Central Drainage are at or slightly above preliminary channel diversion design depths. Some rock may need to be removed to complete the proposed design; however, the proposed diversion remains a feasible response to address the current potential for erosion of waste materials from the Burning Ground into stormwater.

Because the foregoing conclusions do not indicate any potential hazards to human health or the environment, DuPont has chosen not to make any recommendations for further work at the locations investigated in fall 2002 until reviews of chemical analysis and water level logging activities associated with the fall 2002 work are completed in 2003.

1.0 INTRODUCTION

The Former DuPont Barksdale Works site (Figure 1) manufactured explosives from 1904 to 1971. Decommissioning activities conducted after closure were extensive and included the evaluation, location, and detonation of all pertinent explosives manufacturing, and process waste system areas. Once decommissioned, the site was sold to Bretting Development, Inc. (Bretting) in 1986 and has been used by Bretting for recreational hunting and minor storage.

Site investigation activities were initiated in 1997 when a sample collected by Wisconsin Department of Natural Resources (WDNR) from an adjacent residential drinking water well indicated the presence of 2,4-dinitrotoluene and 2,6-dinitrotoluene. In response, DuPont has worked closely with the WDNR to identify affected private wells; and, where warranted, installed and maintained carbon treatment systems at affected homes so that residential drinking water at the point of use meets appropriate Wisconsin Enforcement Standards for site-related constituents.

Between 1997 and spring 2002, DuPont completed multiple phases of groundwater investigation; two recommendations of which were to better define the hydrologic setting of the former on-site Burning Ground and to evaluate the deeper sandstone as an alternate water supply for affected homes.

Additional activities to address these recommendations were scoped in a work plan dated August 2002 and approved by WDNR. This work plan documents the portions of the additional field activities completed during the 2002 construction season. On-going work which includes chemical analyses and water level logging, will be reported under separate cover once completed.

1.1 Investigation Objectives

The overall objectives of the additional activities are as follows:

- Obtain geologic and construction information for existing residential wells that could explain the vertical and horizontal distribution of site-related chemicals in off-site groundwater, particularly at the northeastern portion of the site.
- Further understand groundwater conditions in the deep sandstone beneath the site and determine whether groundwater within this portion of the aquifer is a feasible alternative supply for residential drinking water.
- Extend the existing monitoring network and provide additional subsurface data in the vicinity of the former Burning Ground.

1.2 Scope Summary

Investigation objectives were accomplished by:

- Conducting geophysical logging and video recording of four existing residential supply wells and two new deep monitoring wells.

- Construction of three nests of potable supply and monitoring wells in the deep sandstone aquifer
- Construction of two nests of monitoring wells in the surficial aquifer adjacent to the Burning Ground
- Mapping of the sandstone surface in an area adjacent to the Burning Ground that could be used to divert stormwater from potential contact with Burning Ground residuals

The objectives listed above are illustrated in Figure 2. Details of the scope of work and field methodologies used at each site are described in Section 2.0.

1.3 Organization

This report is organized into the following five sections and three appendices:

- Section 1.0 presents the purpose, objectives, and organization of this report, which briefly summarizes the investigation scope of work.
- Section 2.0 describes the work sites and planned activities.
- Section 3.0 summarizes field observations made during the work.
- Section 4.0 presents conclusions and recommendations.
- Section 5.0 presents the references cited within the text.
- Appendix A presents Boring Logs
- Appendix B presents Well Construction Forms
- Appendix C presents Well Development Forms

2.0 WORK SETTING AND SCOPE OF ACTIVITES

The Former DuPont Barksdale Works consists of approximately 1,800 acres and is located in Bayfield County, south of Washburn, Wisconsin, on Chequamegon Bay, Lake Superior (Figure 1). The town of Washburn (Bayfield County Seat) is located approximately three miles north of the site. The town of Ashland (Ashland County Seat) is located approximately four miles to the southeast. State Highway 13 runs northeast across the eastern portion of the former site at about 1,000 feet from the Lake Superior shoreline. The property is bordered by township roads along its north and west sides. The security fence surrounding the former site marks the southern boundary.

In 2002, activities were conducted at off-site locations along the property perimeter and near the on-site Burning Ground. Section 2.1 details the work sites and the reasons for the activities conducted at each. Details of the methods employed in conducting the activities are included in Section 2.2.

2.1 Work Sites and Reasons for Their Selection

The work sites for the 2002 drilling and logging program are depicted in Figure 2 and Figures 2a – 2h. Below are the activities conducted at each area:

Location	Wells Logged	Supply Wells Installed	Monitor Wells Installed	Geoprobes Advanced
29600 Nolander Road	0	1	0	0
30900 Nolander Road	2	1	1	0
73025 Birch Grove Rd	1	0	0	0
72920 Hwy 13	1	0	0	0
72700 Hwy 13	1	0	0	0
72315 Hwy 13 – PZ-16	1	1	1	0
Burning Ground – PZ-38	0	0	2	0
Burning Ground – PZ-39	0	0	1	0
Burning Ground – Geoprobe Area	0	0	0	7

2.1.1 Logging Sites

Geophysical logging was conducted at four residential sites to determine existing well construction details and lithologic information to be used in determining which portion of the aquifer served as the source of each well. The residential locations were selected based on nitroamine concentrations observed during prior groundwater sampling. 30900 Nolander Road, volunteered for use by its owner, provided the geologic section typical of wells in the area where nitroamine concentrations have been historically observed. DuPont requested access to log wells at 72920 Highway 13, 72700 Highway 13, and 73025 Birch Grove Road to obtain comparable lithologic and well construction data within an area surrounded by wells with past detections but where nitroamines have not been observed to date:

- 73025 Birch Grove Road lies adjacent to the south of 73100 and 73115 Birch Grove Road, both of which have had past detections.
- 72700 Highway 13 is adjacent to the north of 72520 Highway 13; where nitroamine concentrations have regularly been detected
- 72920 Highway 13 lies within the area of clean groundwater and between the other two logged wells.

Logging was also conducted at two new deep aquifer boreholes; PZ-37R located at 30900 Nolander Road and PZ-16R located on the Former DuPont's Barksdale Works property. Logging at these boreholes provided lithologic data in the interval below the intermediate zone and helped to evaluate the conditions at the proposed screen depth of potable wells subsequently installed at these work sites.

2.1.2 Potable Well Sites

Three potable water supply wells were installed within the deep aquifer zone to evaluate supply capacity and to provide water quality information: one well located on-site at PZ-16, one well located at 30900 Nolander Road, and one well located at 29600 Nolander Road. The potable wells are used to conduct "residential demand" capacity testing and to analyze groundwater quality of the deep aquifer. At the PZ-16 and 30900 Nolander Road wells, residential withdrawals will be supplemented with additional pumping to evaluate the effects of increased withdrawal rates. The well at 29600 Nolander Road was installed primarily as an upgradient deep zone monitoring point. Normal residential usage will not be supplemented at this well.

2.1.3 Monitoring Well Sites

Monitoring wells were constructed in the boreholes at PZ-37R and PZ-16R and will be used to evaluate the radius of influence during pumping of the new potable supply wells at 30900 Nolander Road and PZ-16. At 29600 Nolander Road, the radius of influence was expected to be small due to normal residential withdrawals; therefore, no monitoring well was installed.

Three monitoring wells were also installed near the Burning Ground. Two wells, PZ-38O and PZ-38D, were installed at approximately 700 feet upgradient of the Burning Ground. One well, PZ-39D, was installed at the downgradient edge of the Burning Ground waste mass and paired with existing well TW-10. These wells were installed in pairs in order to evaluate the vertical distribution of nitramine compounds in water approaching and passing beyond the Burning Ground. This information will be used to evaluate if the waste mass is acting as a source of site related compounds to groundwater.

2.1.4 Bedrock Sounding Sites

Seven geoprobe borings were advanced on the north bank of the Central Drainage adjacent to the Burning Ground where diversion of the drainage channel has been proposed to reduce the potential erosion of waste. These geoprobe borings were advanced to the point of refusal which is assumed to indicate the top of the unweathered bedrock in that area. Five borings were drilled along the proposed diversion route and

two borings were built between the diversion and the existing channel. This information will be needed in development of engineering plans for the diversion project.

2.2 Field Methodologies

The field activities conducted for the 2002 drilling and logging program included: geophysical logging, potable well drilling, monitoring well drilling, and sounding bedrock using a geoprobe.

2.2.1 Geophysical Logging

Colog Inc., a division of Layne Christensen Company, conducted the geophysical logging. Colog conducted the following activities at each location:

- ❏ Sanitized down-hole tools and cables.
- ❏ Videotaped the borehole.
- ❏ If the video was not usable (water too turbid), then Colog ran an acoustic log:
  - If the water was still too turbid, Colog ran a caliper log; and,
  - If conditions warranted (caliper was used or major voids were identified), Colog also ran a heat-pulse log.

All waste materials generated were containerized and labeled for subsequent disposal as per appropriate regulations (Section 3.5.2).

2.2.2 Monitoring Well Drilling

Philip Environmental Services Corporation (Philip) installed deep monitoring wells using drill and drive casing and air rotary methods. Each of these wells were installed in two drilling events. During the first event, the borehole was drilled to a depth of approximately 180 feet bgs. The walls of this upper borehole were logged and a 6-inch steel casing was then grouted into the borehole. The second drilling occurred once the casing grout had set. This drilling proceeded through the grouted casing and into the clean lower sandstone to 280 feet bgs after which the borehole walls were again logged.

At the Burning Ground area, Philip used a combination of hollow stem auger and water rotary drilling methods to install three new monitoring wells. One borehole was drilled to the top of the bedrock (40 feet bgs) using hollow stem auger methods. At the other two locations (drilled to 70 feet bgs), hollow stem auger drilling was used to drill through the unconsolidated (soil) formations after which 6-inch steel casings were grouted in place. Water rotary drilling was subsequently used to advance the boreholes through the steel casings and into bedrock. Lithology in these boreholes was inferred based on drilling behavior, cutting color, and grain size.

After the logging (Section 3.1 for results), 2-inch diameter poly-vinyl chloride (PVC) monitoring wells were installed in each borehole (Section 3.2). After installation, each well was developed and sampled. Deep monitoring wells were also fitted with water level logging devices. Section 3.3 provides information regarding development and logger installation. Groundwater sampling results are pending and will be presented

under separate cover. All waste material generated by monitoring well drilling was containerized and labeled for subsequent disposal (Section 3.5.2).

2.2.3 Potable Well Drilling

Philip installed potable wells using drill and drive casing and air rotary methods. At each location, a pilot hole was first drilled using a 11.875-inch diameter tricone bit and stabilizer. The pilot hole typically extended to about 40 feet bgs; after which, a 12-inch steel casing was driven until refusal. Once the 12-inch casing had been installed as a ground seal, a 11.875-inch tricone bit or a casing hammer and tricone combination was used to advance 10-inch casing to 180 feet bgs. The casing was then tremie-grouted in place and allowed to set for at least 24 hours. Once the grout had cured, a 9.875-inch tricone bit was used to advance the borehole to 260 feet bgs and grout a 6-inch casing in place at that depth. Once the 6-inch casing grout had cured, a 5.875-inch tricone was used to advance the borehole to 280 feet bgs. The borehole was then flushed using compressed air to drive the water to the surface. If there was not a substantial return flow, the borehole was advanced another 20 feet and the flushing was repeated. If necessary, the borehole was advanced another 20 feet. Once an acceptable return flow was achieved, the borehole was air lifted until the returned water ran clear.

Each potable well was completed with a pitless adapter and vermin-proof, weather-tight cap. After groundwater sampling, each well was fitted with pumps and supply piping sufficient to serve the adjacent dwellings. Prior to being brought on-line, the wells, pumps, and piping were disinfected, flushed, and tested to be sure they were free from harmful levels of bacteria.

At 30900 Nolander Road and the PZ-16 locations, where impacts were detected in the intermediate groundwater zone, residential carbon systems were installed on the new potable wells and will be maintained through several successive monitoring events as a precautionary measure.

2.2.4 Bedrock Sounding

Geoprobe sampling equipment was used to determine the depth to bedrock at seven locations north of the Burning Ground. Five of these locations (BG-17 through BG-21) are approximately 100 feet northeast of the existing drainage channel along the path of a proposed diversion scheduled for construction in 2003. Two additional locations (BG-22 and BG-23) were sounded between the proposed path and the existing channel to determine the nature of the intervening soils for bank design purposes. At each location, a 0.75-inch solid-steel shaft was driven until refusal, which was assumed to correspond to the depth at which bedrock would interfere with the progress of excavation equipment. The depth at which the advance of the rod slowed, the point of entry into weathered rock, was also recorded.

3.0 FIELD DOCUMENTATION

This section summarizes the general geologic conditions encountered during logging, drilling, and the physical construction of wells installed during the 2002 field activities. Details of conditions at specific boreholes or wells can be found in Appendices A - C.

3.1 Well Logging Results

The logging activities undertaken at each work site are listed in Section 2.1. The details of the geologic formations and hydrologic features identified are depicted on the boring logs (Appendix A).

Key geologic and hydrogeologic findings of the logging are summarized as follows:

- Cuttings and video logging identified two geologic layers beneath the site: glacial deposits and underlying Precambrian sandstone. The thickness of the glacial deposits encountered in 2002 varied from 110 feet of unconsolidated materials (consisting of surficial clay followed by alternating layers of silty till and sandy outwash deposits) at 29600 Nolander Road to less than 4 feet of clay at 30900 Nolander Road. The sandstone formations typically observed included a fractured medium-grained reddish-brown zone in the upper portions and layered medium-grained red-and-white banded or spotted sandstone below. At the five deep wells, a finer grained dark-reddish sandstone or siltstone zone of varying thickness was encountered between depths of 240 to 275 feet bgs. This reddish layer was typically followed by more medium-grained red-and-white banded stone below. This finding is consistent with past site investigations and published regional geologic/hydrogeologic reports.
- Logging of vertical groundwater flow in the new deep boreholes identified strong downward flow between the water surface and depths of 70 to 100 feet bgs, decreasing downward flow from 100 to 170 feet bgs, neutral vertical flow between 170 and 200 feet bgs, increasing upward flow between 200 and 240 feet bgs, and strong upward flow between 240 and 280 feet bgs. This data is consistent with the three groundwater flow zones (shallow, intermediate, and deep) that have been identified at the site by past investigations, with shallow zone conditions in the strongly downward portion, intermediate conditions in the decreasing downward and neutral flow zones, and deep conditions indicated in the upward flow zones.
- Logging of vertical groundwater flow in the existing potable wells identified a general upward flow from the base of each well toward a discharge zone expressed as fractures near the base of the well casing at each location. These fractures occur at about 630 feet mean sea level (MSL) in 30900 Nolander Road and trend deeper as one heads southward at elevations 582, 581, and 579 feet MSL in existing wells at 73025 Birch Grove Road, 72920 Highway 13, and 72700 Highway 13, respectively.

3.2 Well Construction

3.2.1 Existing Supply Wells

The pertinent construction features of each existing supply well as determined by the logging and well maintenance activities is listed below:

Location	Depth of Pump (ft)	Depth of well (ft)	Casing Bottom Depth (ft)	Borehole Diam. (inch)	Casing Diam. (inch)
73025 Birch Grove Rd.	57	74.6	35.5	6.25	6
72920 Hwy 13	49	98.4	33.7	6.25	6
72700 Hwy 13	35	93.8	34.6	4.25	3.75
30900 Nolander (old)	69	102	34	6.25	6

3.2.2 New Supply Wells

The pertinent construction features of each new supply well is listed below:

Location	Depth of Pump (ft)	Depth of well (ft)	Casing Bottom Depth (ft)	Borehole Diam. (inch)	Casing Diam. (inch)
PZ-16	106	303	259	5.875	6
29600 Nolander Rd.	100	323	263	5.875	6
30900 Nolander Rd.	48	303	260	5.875	6

3.2.3 New Monitoring Wells

After logging each monitoring well borehole, a 2-inch diameter PVC monitor well was installed per WAC Ch. NR 141 (for individual well construction details see the Well Construction Forms in Appendix B). Each deep aquifer monitoring well (PZ-37R and PZ-16R) terminated with a slotted PVC screen from approximately 260 to 280 feet bgs. The two new shallow bedrock monitoring wells (PZ-38D and PZ-39D) terminated with slotted PVC screens from approximately 60 to 70 feet bgs. The new water table observation well (PZ-38-O) terminated with a slotted PVC screen from approximately 30 to 40 feet bgs. Each monitoring well was completed with a metal protective cover pipe and a locking cap.

3.3 Well Development and Preparation for Use

3.3.1 Existing Supply Wells

Following logging, existing potable wells were prepared for return to service by chlorination to concentrations of about 50 ppm. After the chlorinated water had stood for 24 hours, the pump ran until the chlorine concentrations dropped below 0.5 ppm. A bacterial sample was then collected and delivered to the City of Ashland Sewage Treatment Plant laboratory for total and fecal coliform analyses. If the test failed to read safe conditions, the chlorinatation, flushing, and sampling sequence was repeated until a safe result was obtained. Once the well was declared safe, the water line to the residence was returned to service and the temporary supply was disconnected.

3.3.2 New Supply Wells

New potable wells were prepared by airlifting until returned water ran clear. Then, a submersible electric pump rated for 15 gpm at 100 feet of submergence was installed and subsurface piping was run from a pitless adapter at the well to the adjacent residence. The well was then chlorinated to concentrations of about 50 ppm. After the chlorinated water had stood for 24 hours, a pump test was conducted to determine the appropriate permanent depth for pump installation based on draw down without headloss due to residential piping. After the pump test, the pump was set to its final depth, and the pump ran until the chlorine concentrations dropped below 0.5 ppm. A bacterial sample was then collected and delivered to the City of Ashland Sewage Treatment Plant laboratory for total and fecal coliform analyses. If the test failed to read safe conditions, the chlorinatation, flushing, and sampling sequence was repeated until a safe result was obtained. Once the well was declared safe, the water line to the residence was turned on.

Each new potable well was instrumented with a data logging device to record water level and temperature at regular intervals. This information will be accumulated through a period of several months to determine the effect of pumping on the pieziometric head of the deep aquifer zone.

3.3.3 New Monitoring Wells

After installation, each monitoring well was developed by first airlifting sediment from the well bottom and then pumping the well until stable water quality parameters were obtained over three well volumes. The wells typically contained 1 to 3 inches of sediment prior to development and were cleaned afterward. The range of water quality parameters before and after development is documented in the following table:

Parameter	Range Before	Range After
pH (SU)	8.1 to 11.1	7.9 to 9.0
Conductivity (mS/cm)	2.7 to 7.9	1.7 to 4.3
Temperature (°C)	5.3 to 9.6	6.1 to 7.2

Each new deep aquifer zone well has been instrumented with a data logging device to record water level and temperature at regular intervals. This information will be accumulated through a period of several months to determine the effect of pumping on the pieziometric head of the deep aquifer zone.

3.4 Burning Ground Bedrock Mapping Results

Geoprobe borings indicate a bedrock surface at about 11 to 12 feet bgs away from the existing drainage channel and decreasing to about 3 feet at the channel edge. This surface slopes generally to the southeast at about 2 to 3 feet per 100 feet with a small mound or ridge observed near the center of the proposed diversion alignment. The borings were able to penetrate about 2 to 4 feet of weathered rock at each location.

3.5 Ancillary Activities

Other activities required to complete the subsurface construction and logging activities included: protection of potable water supplies by providing temporary water and appropriate removal and reinstallation of existing down-well equipment; prevention of work site contamination by appropriate collection and disposal of waste water and drill cuttings; and minimization of construction impacts by appropriate creation and maintenance of access roads, location and protection of work site utilities, and post-construction restoration of work areas.

3.5.1 Potable Supply Maintenance

To ensure residences had water during the geophysical logging activities, licensed potable well drilling and maintenance contractor, Layne-Christensen Company, handled the supply systems during the logging activities.

Prior to logging activities, Layne-Christensen:

- ❏ Cleared the work area of movable objects and laid down necessary materials to protect lawns and landscaping.
- ❏ Locked out power and disconnected electrical leads.
- ❏ Connected a trailer mounted 2,000-gallon poly tank filled with potable water (obtained from the city of Washburn) to the residence using plastic piping and pressure activated booster pumps.
- ❏ Disconnected the pitless adapter and extracted well fixtures (photo documenting fixture condition as pulled – drop pipes, wire, pump, and motor).
- ❏ Covered and secured well fixtures for temporary storage (racked pipes on saw horses and wrapped the racked equipment in plastic sheeting for weather and sanitary protection).

After logging activities were completed, Layne-Christensen:

- ❏ Rinsed, chlorinated, and reinserted well fixtures.
- ❏ Reconnected pump wiring, reactivating the pump power.

- ❑ Tested the system operation, chlorinated the wells by cycling water through the pumps and piping back into the wells.
- ❑ After 24 hours of chlorine contact, flushed water from the system into a tanker truck until colorimetric testing indicated chlorine concentrations below 0.5 ppm, then hauled the water to the Former DuPont Barksdale Works decontamination pad for storage and treatment.

3.5.2 Waste Handling

All water and soil generated during the drilling and logging processes were transported to the Former DuPont Barksdale Works decontamination pad area for storage, characterization, and eventual disposal. The processing and characterization procedures are described in the site-specific Waste Management Plan developed by DuPont for this investigation. Approximately 50 cubic yards of generated solid wastes (soil, plastic liners, and disposable protective equipment) tested non-hazardous and were delivered to a DuPont contracted waste disposal site, Suburban Landfill in Glenford, Ohio. The 75,000 gallons of water generated also tested non-hazardous for site-related chemicals. As a precaution, the water was filtered using carbon absorption cylinders, which removed all organic constituents, adjusted to lower the pH that had been elevated by the presence of portland cement residue following grouting, and then transported to the City of Superior publicly owned treatment works for disposal.

3.5.3 Site Access and Restoration

The weight of the drilling and logging equipment required special measures to protect landscaped areas during entry and exit.

At logging sites, high strength plastic plates were laid out for the equipment to drive on. The plastic plates prevented damaged, and no subsequent repairs were required.

Gravel roads were constructed at PZ-16 and 29600 Nolander Road to allow drill rig access. These roads will be maintained for future use. Lawns at 29600 and 30900 Nolander Road were rutted and have been partially repaired and reseeded. Additional reseeding was conducted in the spring.

Trees, steep slopes, and underground structures (septic tanks or drain lines) restricted equipment movement at some locations. The logging proposed for 73080 Birch Grove Road was obstructed by all of the listed features and required selection of an alternate site; 73025 Birch Grove Road which is across the street.

3.5.4 Survey

All newly installed wells have been surveyed and placed on the site map. Northing and easting coordinates plus surface elevations have been recorded for all sampling points. All site coordinates have been tied to the State Plane Coordinate System – Northern Grid. All elevation information have been tied to the National Geodetic Vertical Datum (NGVD-29) elevation above MSL.

3.6 Work In Progress

Several activities scoped in the August 2002 work plan are still underway at this time. These include logging of water level data at the pumped wells and analysis of groundwater samples for site related constituents.

3.6.1 Groundwater Sampling

Following well installation, the three new potable water wells and the three Burning Ground area monitoring wells were sampled for volatile organic compounds (VOCs), nitroaromatic constituents, nitrate plus nitrite, metals, pH, conductivity, temperature, and dissolved oxygen. The new deep monitoring wells did not require sampling since they draw water from the same depths as the adjacent new potable wells.

The field procedures used during the 2001 investigation were employed during this sampling event. The results of this sampling will be used to identify the aquifer zone supplying water to the well and to evaluate the potential for use of the water for potable supplies.

Initial analytical results indicated no nitroaromatic/nitramine compounds were present in the Nolander Road potable wells, but low concentrations (below Wisconsin Enforcement Standards) of VOCs were detected.

Detected VOCs are believed to be an artifact associated with laboratory and/or well installation (e.g., chlorination) procedures. The wells were resampled and VOC concentrations have been observed to be decreasing over time. Groundwater will continue to be monitored going forward.

Data validation and resampling of selected wells was underway at the time of this report. The final results of the sampling will be reported under separate cover.

3.6.2 Water Level Monitoring

In each newly installed well and the three existing wells (PZ-16O, PZ-1D, and the former potable well at 30900 Nolander Road) water levels will be monitored using data logging devices to record the effect of pumping. Water levels in accessible wells (PZ-16O, PZ-16X, and PZ-16R) will be checked to verify logged data at each download. The potable supply wells are not accessible since they require sanitizing and bacterial analyses after each equipment insertion. The data loggers in these wells, along with PZ-37R, have been equipped with special direct read cabling which allows the loggers to be read in place without opening the well casing due to freezing at the surface. The data loggers will be removed from the wells after six months. At that time, the data obtained will be evaluated to determine the aquifer supply capacity. Results of the full evaluation will be reported under separate cover once logging is completed.

4.0 CONCLUSIONS AND RECOMENDATIONS

The 2002 site activities at the Former DuPont Barksdale Works focused primarily on characterizing geologic and hydrogeologic conditions in order to understand the flow characteristics of the deep groundwater aquifer. A secondary focus of the investigation included sampling of groundwater and mapping of the bedrock surface in the vicinity of the Burning Ground.

The 2002 activities were conducted in order to do the following:

- Obtain geologic and well construction information for existing residential wells which could explain the vertical and horizontal distribution of site-related chemicals in off-site groundwater, particularly at the northeastern portion of the site.
- Further understand groundwater conditions in the deep sandstone beneath the site and determine if groundwater within this portion of the aquifer is a feasible alternative supply for residential drinking water.
- Extend the existing monitoring network and provide additional subsurface data in the vicinity of the former Burning Ground in preparation for potential remedial actions.

A summary of the conclusions and recommendations are provided below.

4.1 Conclusions for Activities Related to Evaluation of the Deep Aquifer

- Groundwater depths and soil stratigraphy at drilling locations PZ-37 and PZ-16 were consistent with past observations in the those general vicinities.
- Depth to bedrock at 29600 Nolander Road was shallower than expected indicating that the bedrock low point observed near PZ-02 is limited in width. The depth at 29600 Nolander Road is consistent with rock depth at PZ-03 to the southwest.
- The upward groundwater gradient observed in PZ-30 through PZ-32 is present throughout the eastern Nolander Road, lake shore development, and Birch Grove Road areas. When connected within an open borehole, deep aquifer water appears to flow upward and discharge to fractures in the upper portion of the bedrock. This upwelling of clean deep zone water within these wells may provide a hydraulic barrier that prevents shallow impacted water from migrating into the deep zone within the shallower portions. This observation may explain the absence of detectable site-related compounds in past samplings of these wells.
- The water quality in the deep aquifer areas instrumented with wells will be reported under separate cover.

4.2 Conclusions for Activities Related to the Former Burning Ground Area

- Groundwater depths and soil stratigraphy at drilling locations PZ-38 and PZ-39 were consistent with past observations in the Burning Ground vicinity.
- Geoprobe investigation of bedrock depths indicates that bedrock north of the existing Central Drainage is at or slightly above preliminary channel diversion design depths. Some rock, possibly up to 2 feet thick across the work area, may need to be removed to complete the proposed design; however, the proposed diversion remains a feasible response to address the localized potential for erosion of waste materials from the Burning Ground into surface water.
- Water sample analyses from the new wells are in progress and will be reported under separate cover.

4.3 Recommendations

At this time, DuPont has no new recommendations for further work based on the results of the investigations reported above for the following reasons:

- The geologic data obtained by logging the existing clean residential wells appear to indicate that these wells are receiving water from the deeper aquifer zone; however, no clear evidence of an existing aquitard was observed within the boreholes of the wells. Therefore, as a precaution, DuPont will continue monitoring these wells in accordance with the schedule previously agreed upon with WDNR.
- While the preliminary data provided by the deep well installation program continues to indicate that the deep aquifer is a viable alternative water supply for local residential use, construction cost analyses indicate that piping municipal water to the area may be equally or more effective; therefore, additional deep aquifer investigation is not proposed as a result of the deep aquifer drilling and logging activities evaluated to date.
- Lithologies observed during the recent work near the Burning Ground are consistent with past investigation results, and no further work is proposed at that location until review of the analytical data obtained has been completed.

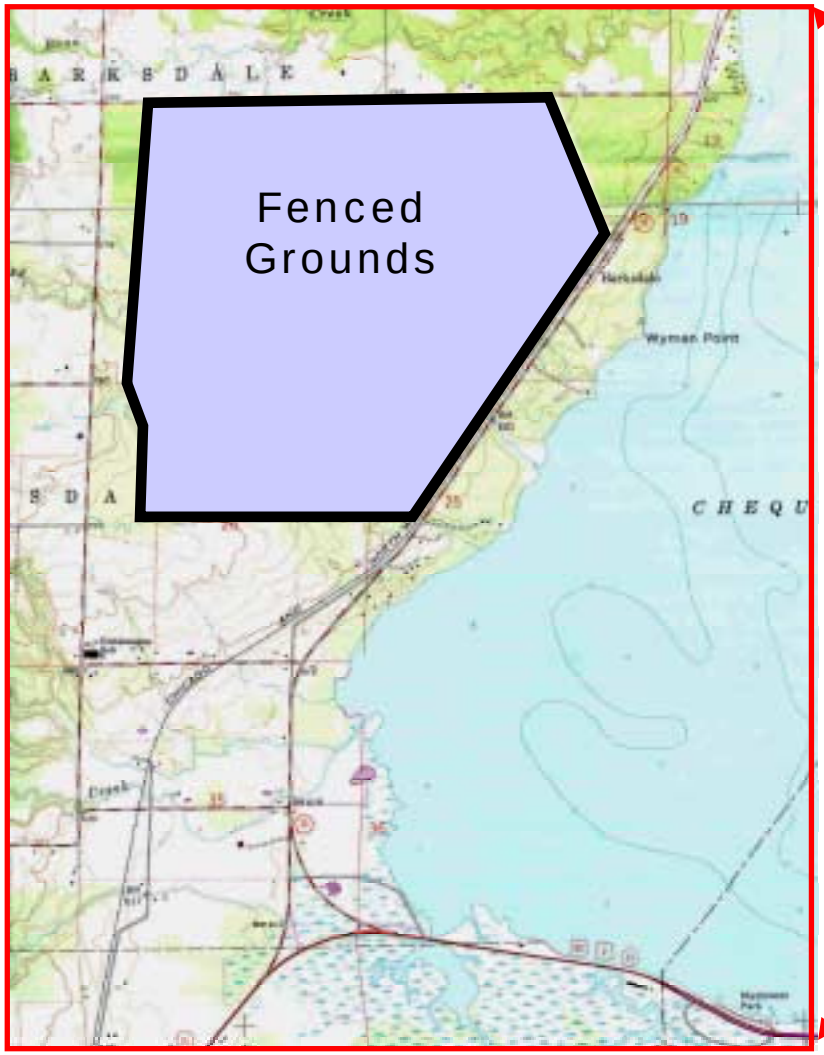
5.0 REFERENCES

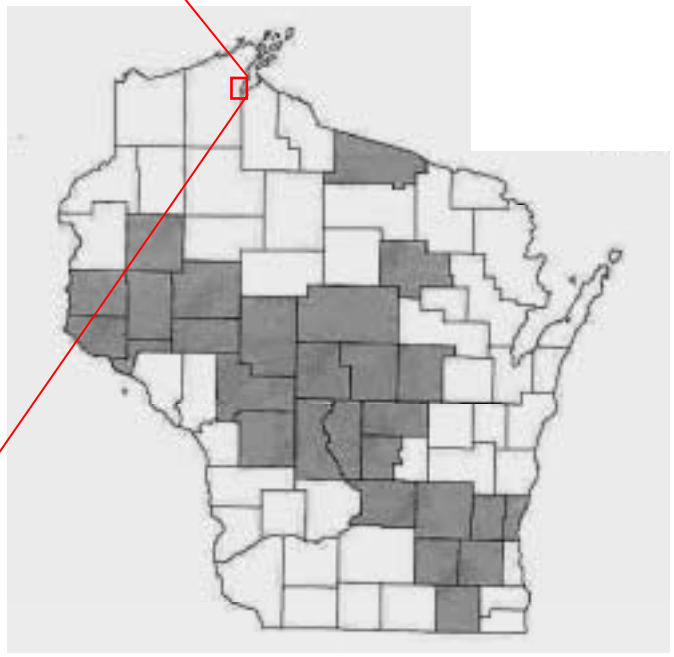
DuPont. 2002a. Supplemental Groundwater Investigation Report, Former Barksdale Works. Barksdale, Wisconsin.

DuPont. 2002b. Deep Well Installation and Residential Well Logging Work Plan, Former Barksdale Works. Barksdale, Wisconsin. August 2002.

Dupont. 2002c. Project Specific Waste Management Plan , Residential Well Logging and Potable Well Drilling Activities, Former Barksdale Works. Barksdale, Wisconsin.

FIGURES

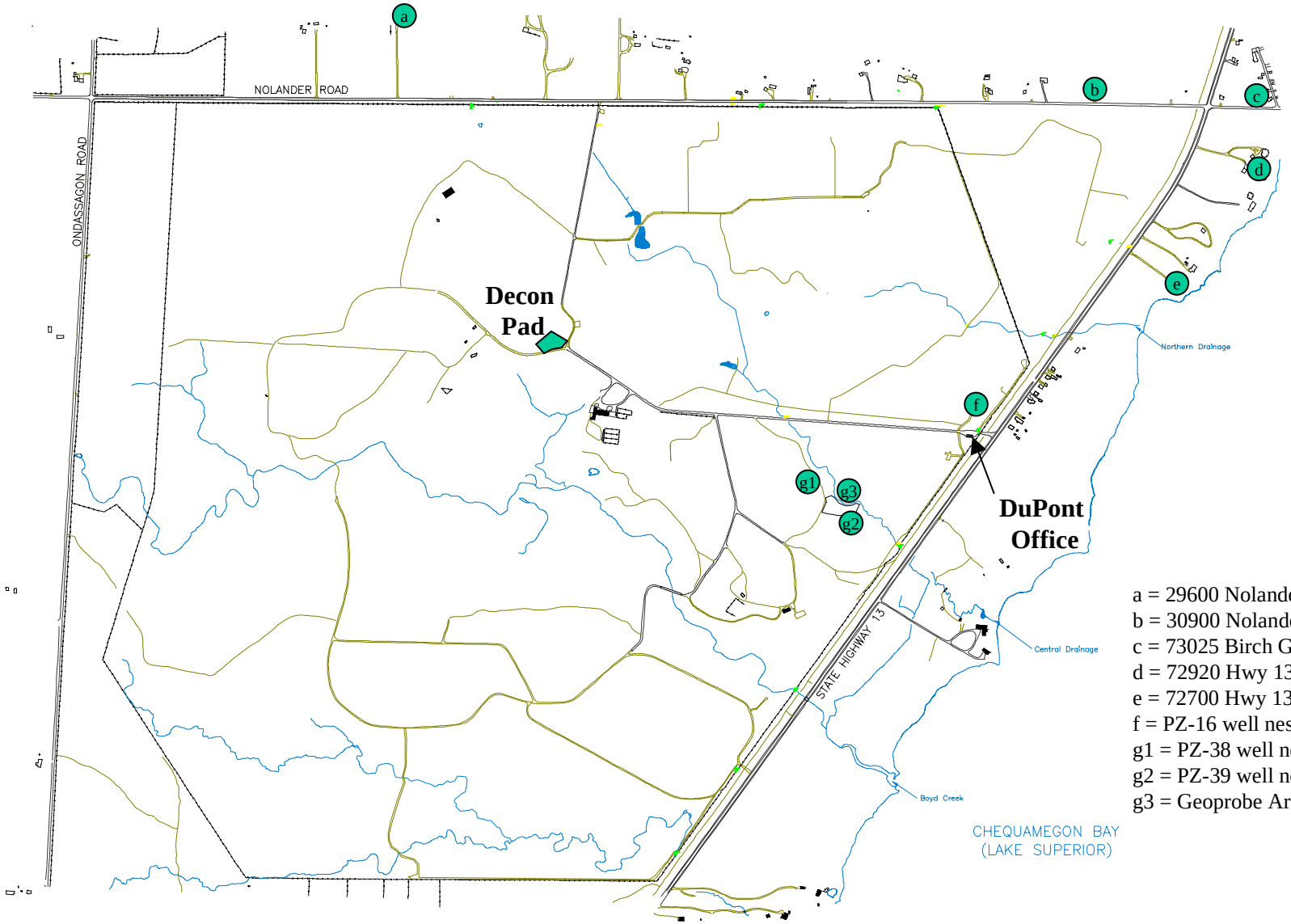




CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
Site Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

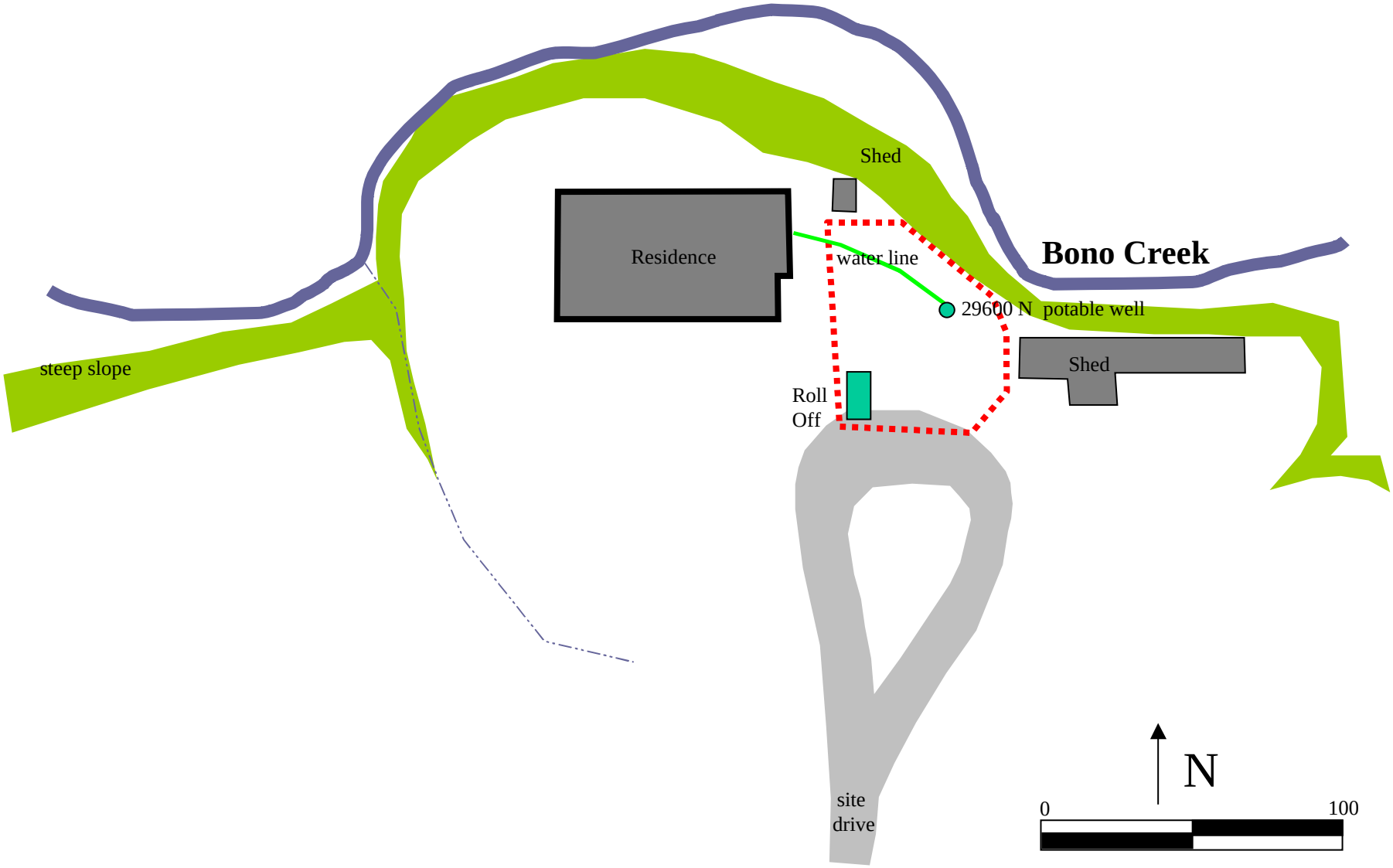
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	1
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
Work Area Locations
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

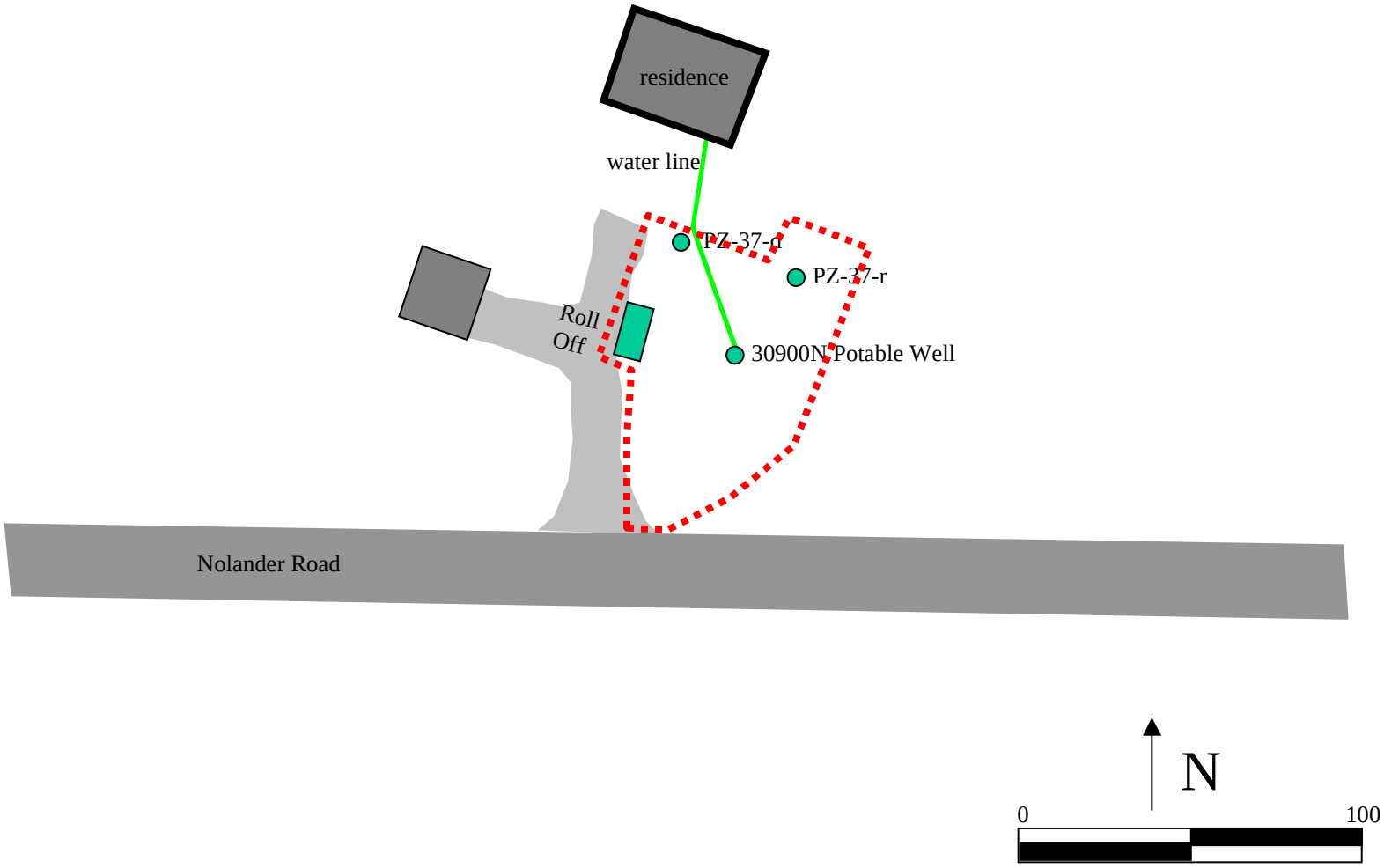
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.ppt	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
29600 Nolander Road Work Area Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

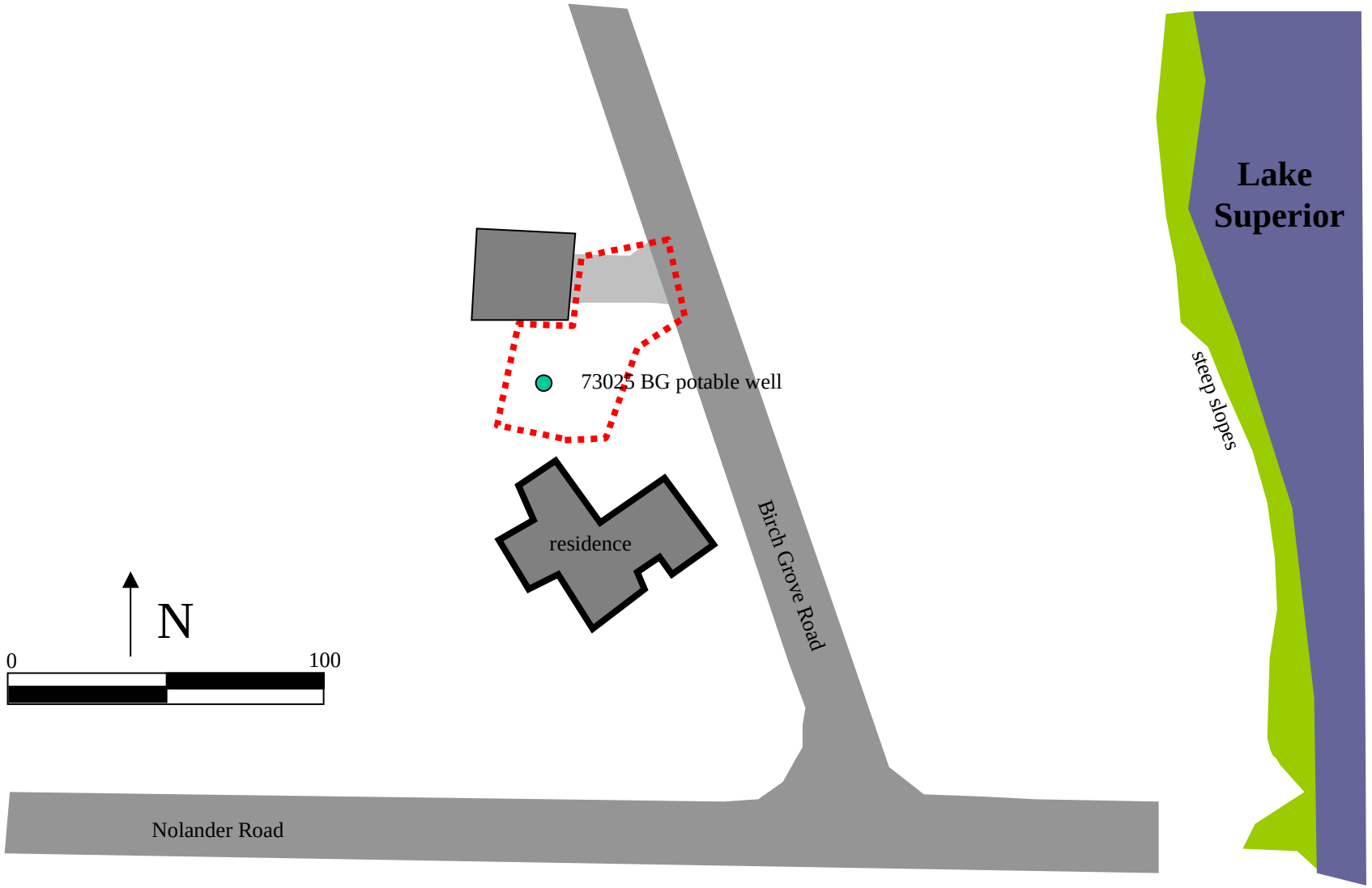
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2a
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
30900 Nolander Road Work Area Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

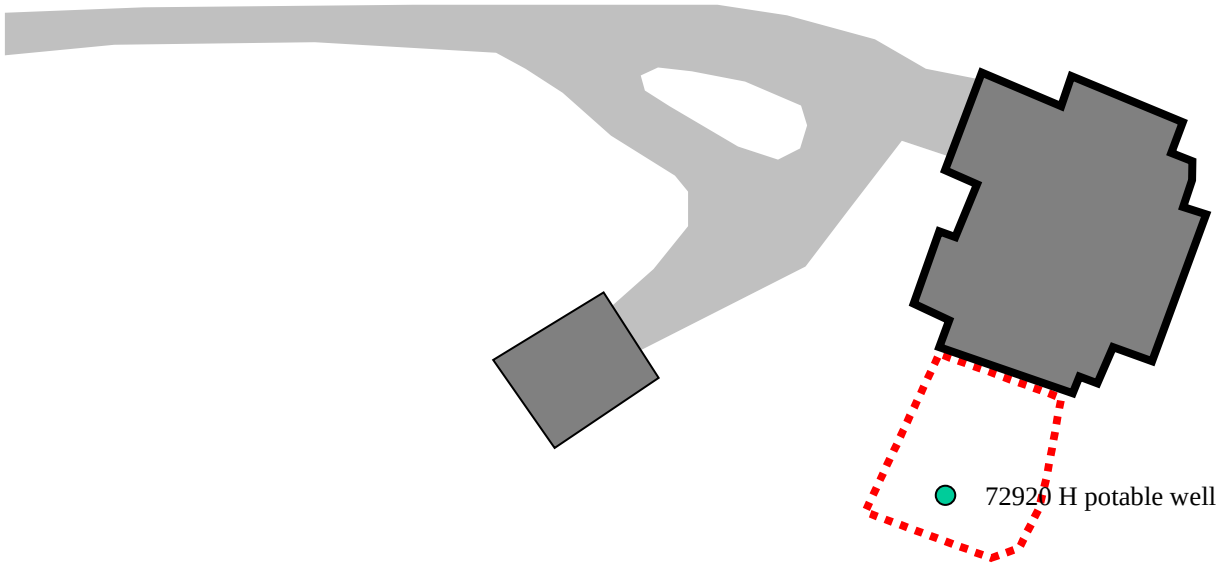
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2b
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	

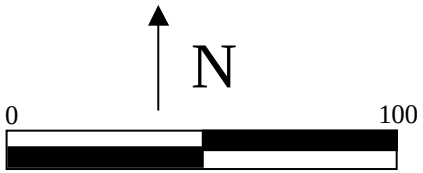


CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
73025 Birch Grove Road Work Area Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2c
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	

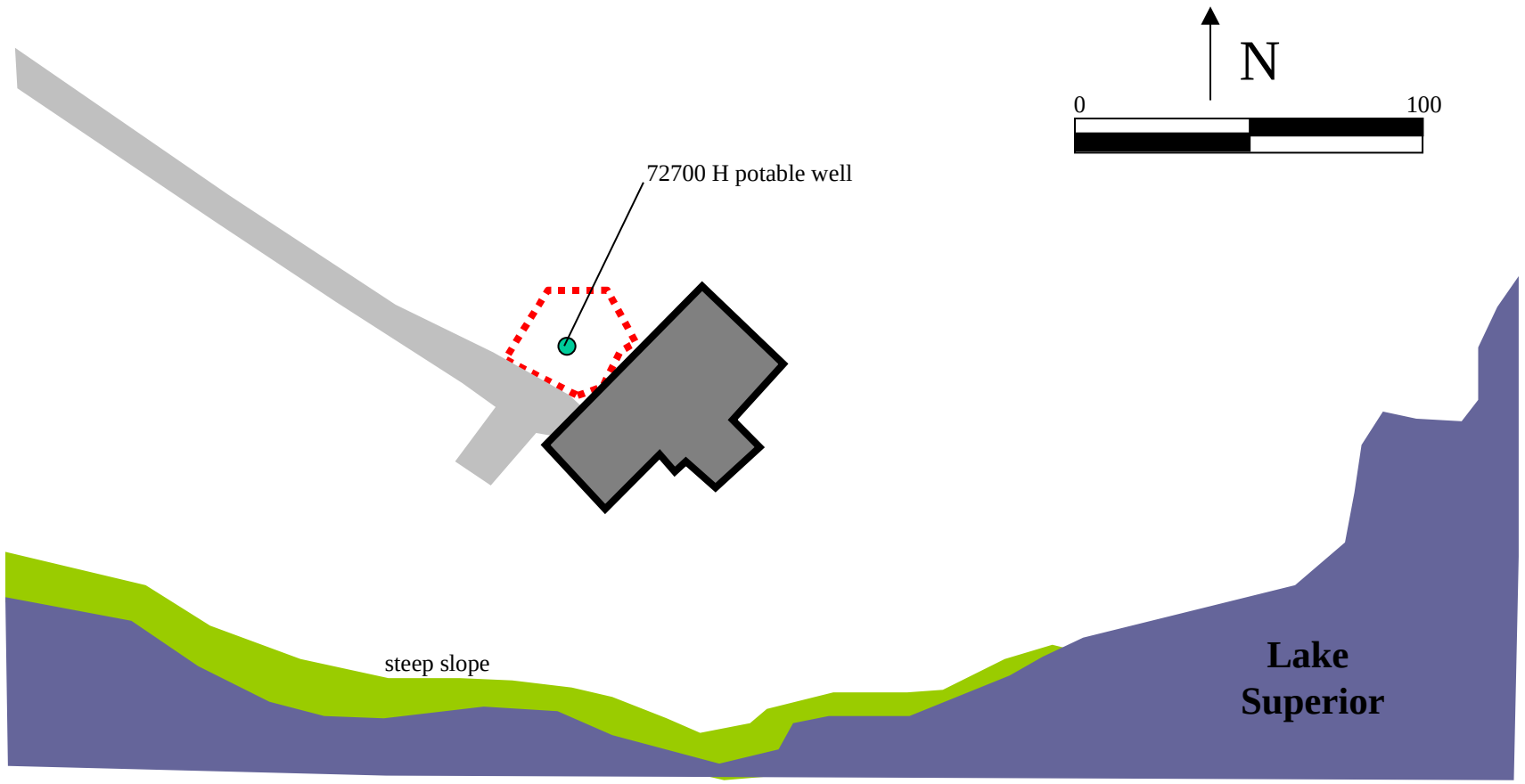




DUPONT
CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
72920 Hwy 13 Work Area Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

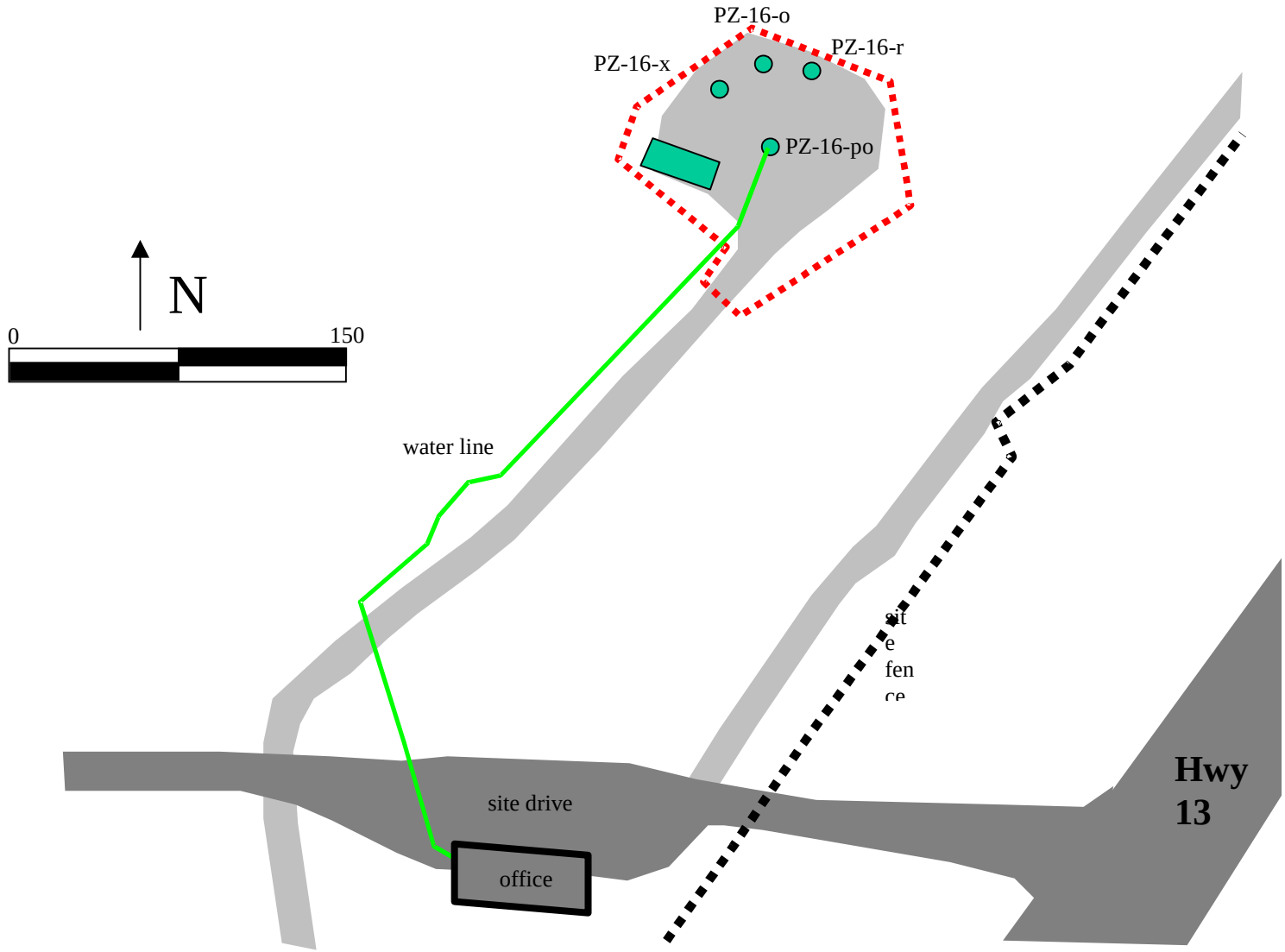
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2d
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



DUPONT
CORPORATE REMEDIATION GROUP
An Alliance between
DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
72700 Hwy 13 Work Area Location
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

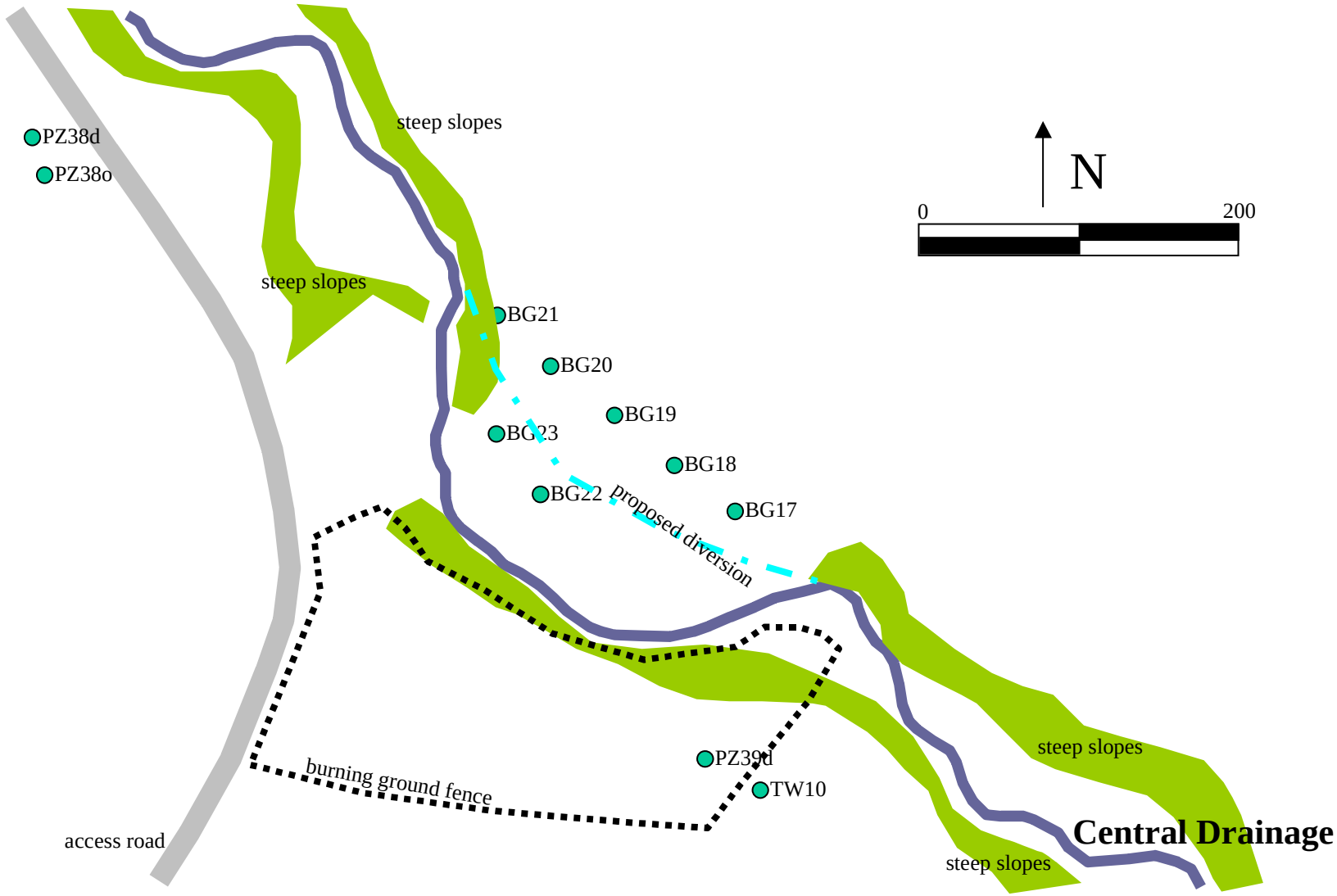
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2e
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
PZ-16 Work Area at 72315 Hwy 13
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

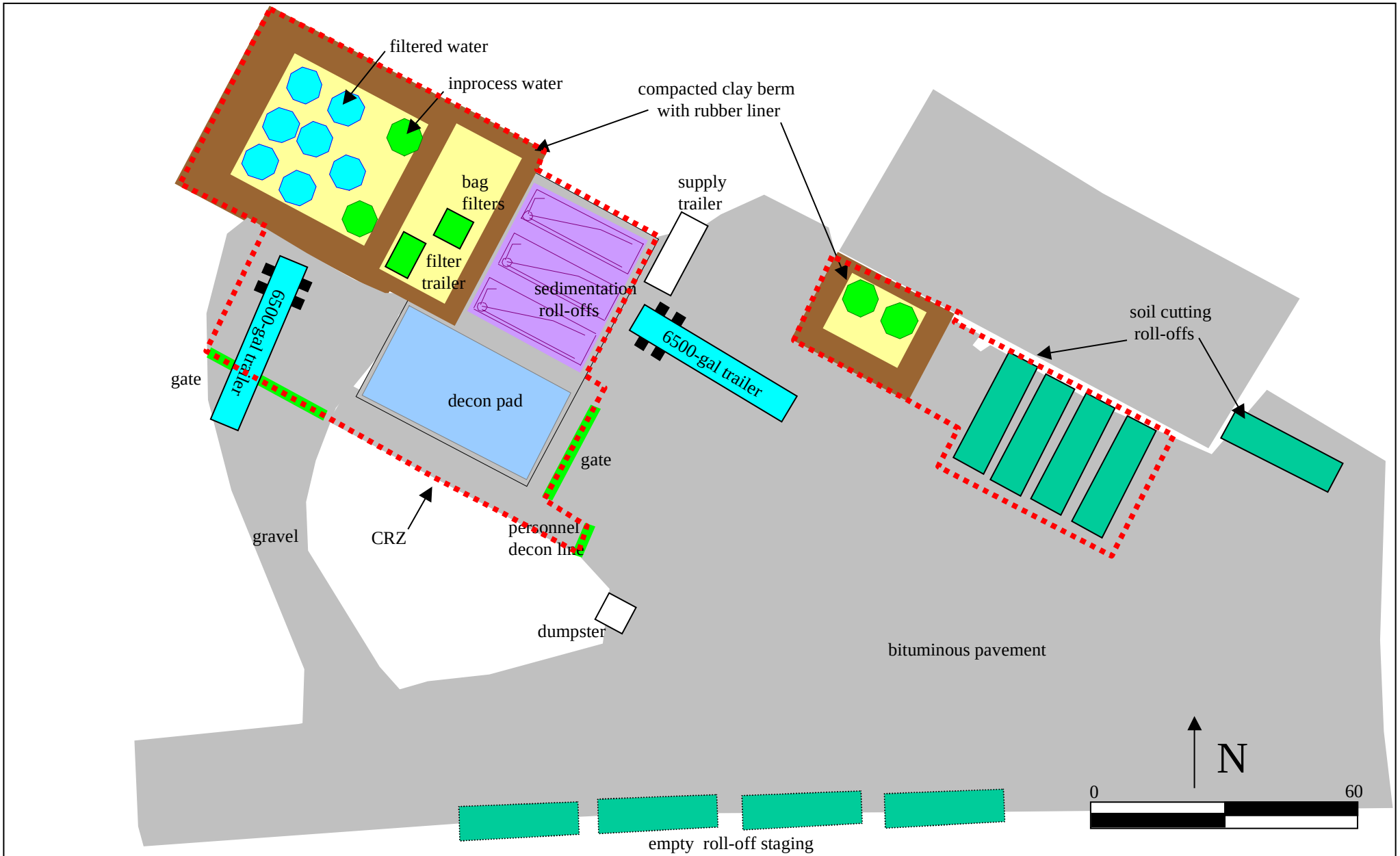
DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2f
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
PZ38, PZ39, and Geoprobe Work Areas at the Burning Grounds
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2g
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	



CORPORATE REMEDIATION GROUP
An Alliance between DuPont and URS
4200 Camp Ground Road
Louisville, Kentucky 40216

TITLE:
Decon Pad and Waste Storage Area
2002 Field Activity Documentation Report
Former DuPont Barksdale Works
Washburn, Wisconsin

DRAWN:	APPROVED:	PROJECT NO.:
JRH	CEP	7433
CHECKED:	DATE:	FIGURE NO.:
JRH	04/01/2003	2h
FILE NAME:	REVISION:	
2002 AWS Rep Draft Figures.pp	0	

APPENDICES

APPENDIX A - BORING LOGS

Boring Logs are Located in the Attached CD

APPENDIX B – WELL CONSTRUCTION FORMS

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: Former DuPont Barksdale Works	Local Grid Location of Well: 532206.0 ft. ■N. ☐S. 1732336.4 ft. ■E. ☐W.	Well Name: PZ-16-r
Facility License, Permit or Monitoring Number: 02-04-000156	Grid Origin Location: Lat. ____ ____ ____ Long. ____ ____ ____ St. Plane 0 ft. N, 0 ft. E. local grid uses State Plane Northern Section coordinates	Wis. Unique Well Number / DNR Well Number
Type of Well: Water Table Observation Well ☐ 11; Piezometer ☒ 12		Date Well Installed: 10/05/02 mm/dd/ yy
Distance Well Is From Waste/Source Boundary: Unknown	Section Location of Waste/Source: ☐E ☐W; na 1/4 of na 1/4 of Sec. na, T. na N, R. na	Well Installed By: (Person's Name and Firm): D. Gotto; Layne Christensen
Is Well A Point of Enforcement Std. Application? ☐ Yes ■ No	Location of Well Relative to Waste/Source: u ☐ Upgradient; d ☐ Downgradient; s ☐ Sidegradient; n ■ Not Known	

A. Protective pipe, top elevation	661.93	ft. MSL	
B. Well casing, top elevation	661.68	ft. MSL	
C. Land surface elevation	658.90	ft. MSL	
D. Surface seal, bottom	653.90	ft MSL or 5.00	ft
E. Bentonite seal, top	423.90	ft MSL or 235.00	ft
F. Fine sand, top	412.90	ft MSL or 246.00	ft
G. Filter pack, top	405.90	ft MSL or 253.00	ft
H. Screen joint, top	398.77	ft MSL or 260.13	ft
I. Well bottom	378.77	ft MSL or 280.13	ft
J. Filter pack, bottom	375.90	ft MSL or 283.00	ft
K. Borehole, bottom	375.90	ft MSL or 283.00	ft
L. Borehole, diameter	6.13	in.	
M. O.D. well casing	2.38	in.	
N. I.D. well casing	2.00	in.	

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

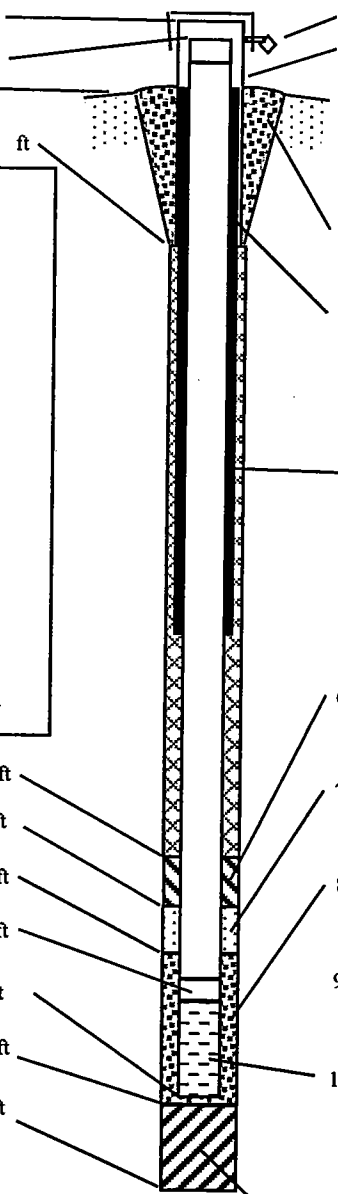
13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☒ 5 0; Hollow Stem Auger ☐ 4 1; air rotary; Other ☒ ____

15. Drilling fluid used: Water ☐ 0 2; Air ☒ 0 1; Drilling Mud ☐ 0 3; None ☐ 9 9

16. Drilling additives used? ■ Yes ☐ No
Describe: potable water

17. Source of water (attached analysis):
City of Washburn artesian well



1. Cap and lock? ■ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: 4.00 in.
b. Length: 7.0 ft.
c. Material: Steel ■ 0 4; Other ☐ ____
d. Additional protection? ☐ Yes ■ No
If yes, describe: 6"-ID steel outer casing to 180'

3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; Other ☐ ____

4. Material between well casing and protective pipe: Bentonite ■ 3 0; Annular Space Seal ☐ ____; Other ☐ ____

5. Annular space seal: a. Granular Bentonite ☐ 3 3
b. ____ Lbs/gal mud weight ..... Bentonite-sand slurry ☐ 3 5
c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐ 3 1
d. 3 % Bentonite ..... Bentonite-cement grout ■ 5 0
e. 40.0 Ft³ volume added for any of the above
f. How installed: Tremie ■ 0 1; Tremie pumped ☐ 0 2; Gravity ☐ 0 8

6. Bentonite seal: a. Bentonite granules ☐ 3 3
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 3 2
c. ____ Other ☐ ____

7. Fine sand material: Manufacturer, product name & mesh size
a. Oglebay Norton Silica Sand #100
b. Volume added 1.22 ft³

8. Filter pack material: Manufacturer, product name & mesh size
a. Oglebay Norton Quartz Sand 15x30
b. Volume added 5.21 ft³

9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; Other ☐ ____

10. Screen material: Schedule 80 Flush Threaded PVC
a. Screen type: Factory cut ☐ 1 1; Continuous slot ■ 0 1; Other ☐ ____
b. Manufacturer TIMCO
c. Slot size 0.01 in.
d. Slotted length: 20 ft.

11. Backfill material (below filler pack): None ☒ 1 4; Other ☐ ____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm URS Corporation

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: shaded areas are for DNR use only. See instruction for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: Former DuPont Barksdale Works

Local Grid Location of Well: 535266.0 ft. ■N. ☐S. 1735294.0 ft. ■ E. ☐ W.

Well Name: **PZ-37-r**

Facility License, Permit or Monitoring Number: 02-04-000156

Grid Origin Location
Lat. ____ ____ ____ Long. ____ ____ ____
St. Plane 0 ft. N, 0 ft. E.
local grid uses State Plane Northern Section coordinates

Wis. Unique Well Number | DNR Well Number

Type of Well: Water Table Observation Well ☐ 11
Piezometer ☒ 12

Date Well Installed: 10/14/02 (mm/dd/ yy)

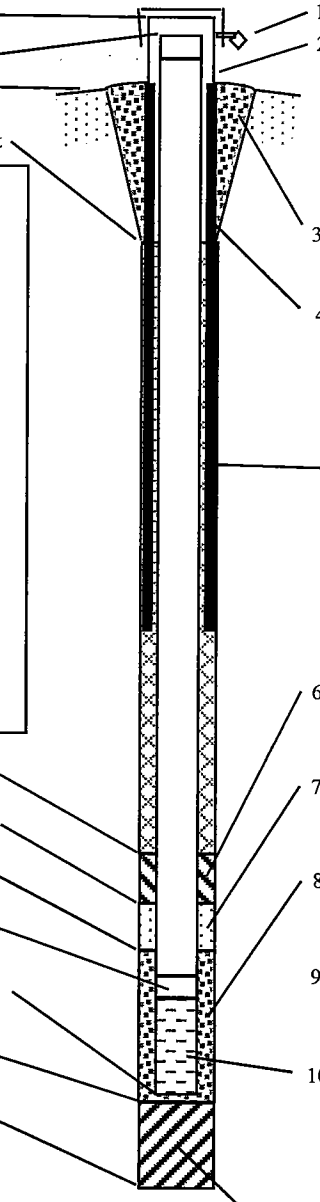
Distance Well Is From Waste/Source Boundary: Unknown

Section Location of Waste/Source ☐E ☐W
na 1/4 of na 1/4 of Sec. na, T. na N, R. na

Well Installed By: (Person's Name and Firm)
D. Gotto
Layne Christensen

Is Well A Point of Enforcement Std. Application? ☐ Yes ■ No

Location of Well Relative to Waste/Source
u ☐ Upgradient s ☐ Sidegradient
d ☐ Downgradient n ■ Not Known



A. Protective pipe, top elevation 668.14 ft. MSL
B. Well casing, top elevation 667.89 ft. MSL
C. Land surface elevation 665.00 ft. MSL
D. Surface seal, bottom 645.00 ft MSL or 20.00 ft

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☒ 5 0
Hollow Stem Auger ☐ 4 1
air rotary Other ☒

15. Drilling fluid used: Water ☐ 0 2 Air ☒ 0 1
Drilling Mud ☐ 0 3 None ☐ 9 9

16. Drilling additives used? ☒ Yes ☒ No

Describe: potable water

17. Source of water (attached analysis):
City of Washburn artesian well

E. Bentonite seal, top 411.00 ft MSL or 254.00 ft
F. Fine sand, top 406.00 ft MSL or 259.00 ft
G. Filter pack, top 405.00 ft MSL or 260.00 ft
H. Screen joint, top 403.00 ft MSL or 262.00 ft
I. Well bottom 383.00 ft MSL or 282.00 ft
J. Filter pack, bottom 383.00 ft MSL or 282.00 ft
K. Borehole, bottom 383.00 ft MSL or 282.00 ft
L. Borehole, diameter 6.13 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.00 in.

1. Cap and lock? ■ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.00 in.
b. Length: 7.0 ft.
c. Material: Steel ■ 0 4
Other ☐ _____
d. Additional protection? ■ Yes ☐ No
If yes, describe: 6"ID steel outer casing to 45'
3. Surface seal: Bentonite ■ 3 0
Concrete ☐ 0 1
Other ☐ _____
4. Material between well casing and protective pipe:
Bentonite ■ 3 0
Annular Space Seal ☐ _____
Other ☐ _____
5. Annular space seal: a. Granular Bentonite ☐ 3 3
b. _____ Lbs/gal mud weight ..... Bentonite-sand slurry ☐ 3 5
c. _____ Lbs/gal mud weight. ..... Bentonite slurry ☐ 3 1
d. 3 % Bentonite ..... Bentonite-cement grout ■ 5 0
e. 42.8 Ft³ volume added for any of the above
f. How installed: Tremie ■ 0 1
Tremie pumped ☐ 0 2
Gravity ☐ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 3 2
c. _____ Other ☐ _____
7. Fine sand material: Manufacturer, product name & mesh size
a. Oglebay Norton Silica Sand #100
b. Volume added 0.37 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Oglebay Norton Quartz Sand 15x30
b. Volume added 8.19 ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3
Flush threaded PVC schedule 80 ■ 2 4
_____ Other ☐ _____
10. Screen material: Schedule 80 Flush Threaded PVC
a. Screen type: Factory cut ☐ 1 1
Continuous slot ■ 0 1
_____ Other ☐ _____
b. Manufacturer TIMCO
c. Slot size 0.01 in.
d. Slotted length: 20 ft.
11. Backfill material (below filler pack): None ☒ 1 4
_____ Other ☐ _____

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm URS Corporation

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: shaded areas are for DNR use only. See instruction for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: Former DuPont Barksdale Works

Local Grid Location of Well: 531495.0 ft. ■N. ☐S. 1732350.0 ft. ■ E. ☐ W.

Well Name: **PZ-38-d**

Facility License, Permit or Monitoring Number: 02-04-000156

Wis. Unique Well Number | DNR Well Number

Type of Well: Water Table Observation Well ☐ 11; Piezometer ☒ 12

Grid Origin Location
Lat. ____ ____ ____ Long. ____ ____ ____
St. Plane 0 ft. N, 0 ft. E.
local grid uses State Plane Northern Section coordinates

Date Well Installed: 11/20/02 (mm/dd/ yy)

Distance Well Is From Waste/Source Boundary: Unknown

Section Location of Waste/Source ☐ E ☐ W
na 1/4 of na 1/4 of Sec. na, T. na N, R. na

Well Installed By: (Person's Name and Firm)
J. Bignall
Layne Christensen

Is Well A Point of Enforcement Std. Application? ☐ Yes ■ No

Location of Well Relative to Waste/Source
u ☐ Upgradient s ☐ Sidegradient
d ☐ Downgradient n ■ Not Known

A. Protective pipe, top elevation 669.25 ft. MSL
B. Well casing, top elevation 669.00 ft. MSL
C. Land surface elevation 666.00 ft. MSL
D. Surface seal, bottom 661.00 ft MSL or 5.00 ft

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☒ 5 0; Hollow Stem Auger ☒ 4 1; HSA to rock/air rotary below; Other ☒ ___

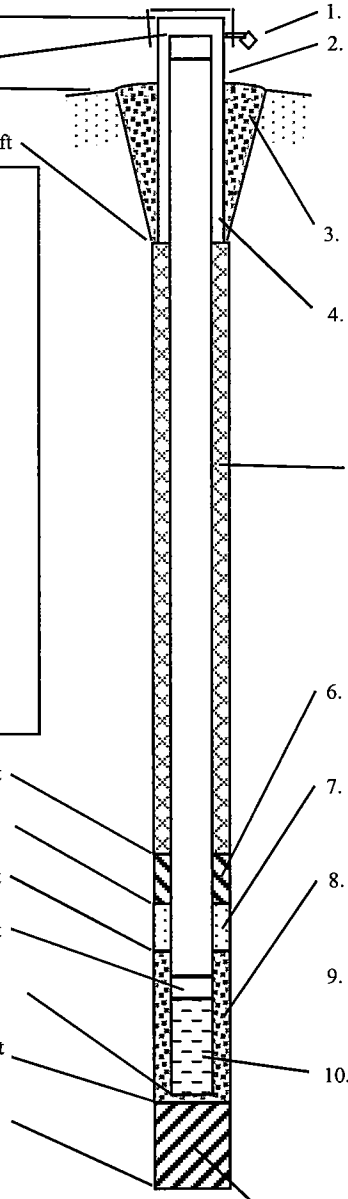
15. Drilling fluid used: Water ☒ 0 2; Air ☒ 0 1; Drilling Mud ☐ 0 3; None ☐ 9 9

16. Drilling additives used? ☒ Yes ☒ No

Describe: potable water

17. Source of water (attached analysis):
City of Washburn artesian well

E. Bentonite seal, top 613.32 ft MSL or 52.68 ft
F. Fine sand, top 608.32 ft MSL or 57.68 ft
G. Filter pack, top 607.32 ft MSL or 58.68 ft
H. Screen joint, top 605.32 ft MSL or 60.68 ft
I. Well bottom 595.32 ft MSL or 70.68 ft
J. Filter pack, bottom 595.00 ft MSL or 71.00 ft
K. Borehole, bottom 595.00 ft MSL or 71.00 ft
L. Borehole, diameter 8.25 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.00 in.



1. Cap and lock? ■ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.00 in.
b. Length: 7.0 ft.
c. Material: Steel ■ 0 4; Other ☐ ___
d. Additional protection? ☐ Yes ■ No
If yes, describe: _____
3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; Other ☐ ___
4. Material between well casing and protective pipe: Bentonite ■ 3 0; Annular Space Seal ☐ ___; Other ☐ ___
5. Annular space seal: a. Granular Bentonite ☐ 3 3
b. ____ Lbs/gal mud weight ..... Bentonite-sand slurry ☐ 3 5
c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐ 3 1
d. 3 % Bentonite ..... Bentonite-cement grout ■ 5 0
e. 17 Ft³ volume added for any of the above
f. How installed: Tremie ■ 0 1; Tremie pumped ☐ 0 2; Gravity ☐ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 3 2
c. _____ Other ☐ ___
7. Fine sand material: Manufacturer, product name & mesh size
a. Oglebay Norton Silica Sand #100 ___
b. Volume added 0.5 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Oglebay Norton Quartz Sand 15x30 ___
b. Volume added 5 ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; Other ☐ ___
10. Screen material: Schedule 80 Flush Threaded PVC ___
a. Screen type: Factory cut ☐ 1 1; Continuous slot ■ 0 1; Other ☐ ___
b. Manufacturer TIMCO
c. Slot size 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filler pack): None ☒ 1 4; Other ☒ ___

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm URS Corporation

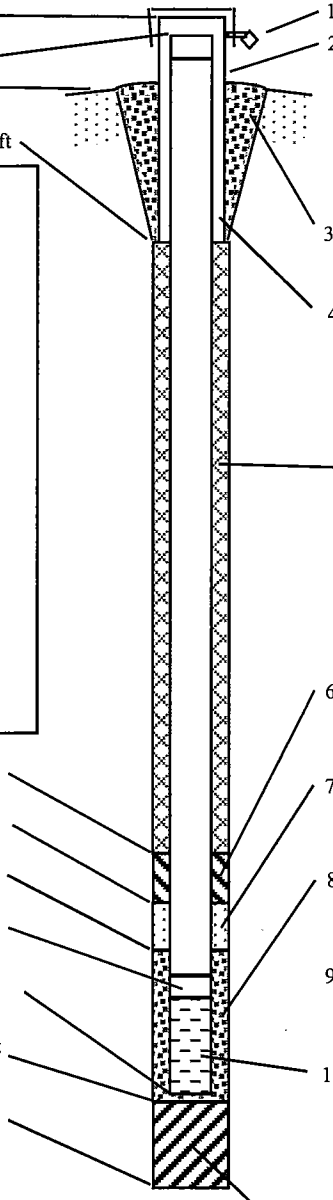
Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: shaded areas are for DNR use only. See instruction for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: Former DuPont Barksdale Works	Local Grid Location of Well: 531510.0 ft. ■N. ☐S. 1732340.0 ft. ■ E. ☐ W.	Well Name: **PZ-38-o**
Facility License, Permit or Monitoring Number: 02-04-000156	Grid Origin Location: Lat. ____ ____ ____ Long. ____ ____ ____ St. Plane 0 ft. N, 0 ft. E. local grid uses State Plane Northern Section coordinates	Wis. Unique Well Number / DNR Well Number
Type of Well: Water Table Observation Well ☒ 11; Piezometer ☐ 12		Date Well Installed: 11/17/02 (mm/dd/yy)
Distance Well Is From Waste/Source Boundary: Unknown	Section Location of Waste/Source: ☐ E ☐ W; na 1/4 of na 1/4 of Sec. na, T. na N, R. na	Well Installed By: (Person's Name and Firm): J. Bignall; Layne Christensen
Is Well A Point of Enforcement Std. Application? ☐ Yes ■ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ■ Not Known	



A. Protective pipe, top elevation 669.10 ft. MSL
B. Well casing, top elevation 668.85 ft. MSL
C. Land surface elevation 666.00 ft. MSL
D. Surface seal, bottom 661.00 ft MSL or 5.00 ft

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☐ 5 0; Hollow Stem Auger ☒ 4 1; 4.25 HSA; Other ☒ ___

15. Drilling fluid used: Water ☐ 0 2; Air ☐ 0 1; Drilling Mud ☐ 0 3; None ☒ 9 9

16. Drilling additives used? ☐ Yes ☒ No

Describe: potable water

17. Source of water (attached analysis):
City of Washburn artesian well

E. Bentonite seal, top 661.00 ft MSL or 5.00 ft
F. Fine sand, top 638.66 ft MSL or 27.34 ft
G. Filter pack, top 637.66 ft MSL or 28.34 ft
H. Screen joint, top 635.66 ft MSL or 30.34 ft
I. Well bottom 625.66 ft MSL or 40.34 ft
J. Filter pack, bottom 625.00 ft MSL or 41.00 ft
K. Borehole, bottom 625.00 ft MSL or 41.00 ft
L. Borehole, diameter 8.25 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.00 in.

1. Cap and lock? ■ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.00 in.
b. Length: 7.0 ft.
c. Material: Steel ■ 0 4; Other ☐ ___
d. Additional protection? ☐ Yes ■ No
If yes, describe: _____
3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; Other ☐ ___
4. Material between well casing and protective pipe: Bentonite ■ 3 0; Annular Space Seal ☐ ___; Other ☐ ___
5. Annular space seal: a. Granular Bentonite ☐ 3 3
b. _____ Lbs/gal mud weight ..... Bentonite-sand slurry ☐ 3 5
c. _____ Lbs/gal mud weight ..... Bentonite slurry ☐ 3 1
d. 3 % Bentonite ..... Bentonite-cement grout ■ 5 0
e. 8 Ft³ volume added for any of the above
f. How installed: Tremie ■ 0 1; Tremie pumped ☐ 0 2; Gravity ☐ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 3 2
c. _____ Other ☐ ___
7. Fine sand material: Manufacturer, product name & mesh size
a. Oglebay Norton Silica Sand #100 ___
b. Volume added 0.5 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Oglebay Norton Quartz Sand 15x30 ___
b. Volume added 5.0 ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; Other ☐ ___
10. Screen material: Schedule 80 Flush Threaded PVC ___
a. Screen type: Factory cut ☐ 1 1; Continuous slot ■ 0 1; Other ☐ ___
b. Manufacturer TIMCO
c. Slot size 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filler pack): None ☒ 1 4; Other ☒ ___

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm URS Corporation

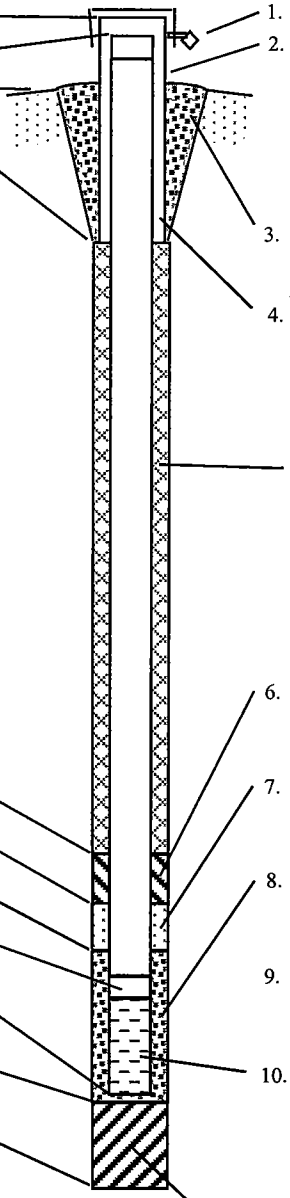
Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: shaded areas are for DNR use only. See instruction for more information including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: Former DuPont Barksdale Works	Local Grid Location of Well: 531100.0 ft. ■N. ☐S. 1732775.0 ft. ■ E. ☐ W.	Well Name: **PZ-39-d**
Facility License, Permit or Monitoring Number: 02-04-000156	Grid Origin Location: Lat. ____ ____ ____ Long. ____ ____ ____	Wis. Unique Well Number / DNR Well Number
Type of Well: Water Table Observation Well ☐ 11; Piezometer ☒ 12	St. Plane 0 ft. N, 0 ft. E. local grid uses State Plane Northern Section coordinates	Date Well Installed: 11/21/02 mm/dd/ yy
Distance Well Is From Waste/Source Boundary: Unknown	Section Location of Waste/Source ☐E ☐W: na 1/4 of na 1/4 of Sec. na, T. na N, R. na	Well Installed By: (Person's Name and Firm): J. Bignall; Layne Christensen
Is Well A Point of Enforcement Std. Application? ☐ Yes ■ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ■ Not Known	



A. Protective pipe, top elevation 657.25 ft. MSL
B. Well casing, top elevation 657.00 ft. MSL
C. Land surface elevation 654.00 ft. MSL
D. Surface seal, bottom 649.00 ft MSL or 5.00 ft

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☒

13. Sieve analysis attached? ☐ Yes ■ No

14. Drilling method used: Rotary ☒ 5 0; Hollow Stem Auger ☒ 4 1; HSA to rock/air rotary below; Other ☒ ☐☐

15. Drilling fluid used: Water ☒ 0 2; Air ☒ 0 1; Drilling Mud ☐ 0 3; None ☐ 9 9

16. Drilling additives used? ☒ Yes ☒ No

Describe: potable water

17. Source of water (attached analysis):
City of Washburn artesian well

E. Bentonite seal, top 600.65 ft MSL or 53.35 ft
F. Fine sand, top 595.65 ft MSL or 58.35 ft
G. Filter pack, top 594.65 ft MSL or 59.35 ft
H. Screen joint, top 592.65 ft MSL or 61.35 ft
I. Well bottom 582.65 ft MSL or 71.35 ft
J. Filter pack, bottom 582.00 ft MSL or 72.00 ft
K. Borehole, bottom 582.00 ft MSL or 72.00 ft
L. Borehole, diameter 8.25 in.
M. O.D. well casing 2.38 in.
N. I.D. well casing 2.00 in.

1. Cap and lock? ■ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 4.00 in.
b. Length: 7.0 ft.
c. Material: Steel ■ 0 4; Other ☐ ☐☐
d. Additional protection? ☐ Yes ■ No
If yes, describe: _____
3. Surface seal: Bentonite ■ 3 0; Concrete ☐ 0 1; Other ☐ ☐☐
4. Material between well casing and protective pipe: Bentonite ■ 3 0; Annular Space Seal ☐ ☐☐; Other ☐ ☐☐
5. Annular space seal: a. Granular Bentonite ☐ 3 3
b. ____ Lbs/gal mud weight ..... Bentonite-sand slurry ☐ 3 5
c. ____ Lbs/gal mud weight ..... Bentonite slurry ☐ 3 1
d. 3 % Bentonite ..... Bentonite-cement grout ■ 5 0
e. 20.5 Ft³ volume added for any of the above
f. How installed: Tremie ■ 0 1; Tremie pumped ☐ 0 2; Gravity ☐ 0 8
6. Bentonite seal: a. Bentonite granules ☐ 3 3
b. ☐ 1/4 in. ■ 3/8 in. ☐ 1/2 in. Bentonite pellets ■ 3 2
c. _____ Other ☐ ☐☐
7. Fine sand material: Manufacturer, product name & mesh size
a. Oglebay Norton Silica Sand #100 ☐☐
b. Volume added 0.5 ft³
8. Filter pack material: Manufacturer, product name & mesh size
a. Oglebay Norton Quartz Sand 15x30 ☐☐
b. Volume added 5.0 ft³
9. Well casing: Flush threaded PVC schedule 40 ☐ 2 3; Flush threaded PVC schedule 80 ■ 2 4; Other ☐ ☐☐
10. Screen material: Schedule 80 Flush Threaded PVC ☐☐
a. Screen type: Factory cut ☐ 1 1; Continuous slot ■ 0 1; Other ☐ ☐☐
b. Manufacturer TIMCO
c. Slot size 0.01 in.
d. Slotted length: 10 ft.
11. Backfill material (below filler pack): None ☒ 1 4; Other ☒ ☐☐

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature | Firm: URS Corporation

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats., and ch. NR 141, Wis. Ad. Code. In accordance with ch. 144, Wis. Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: shaded areas are for DNR use only. See instruction for more information including where the completed form should be sent.

APPENDIX C – WELL DEVELOPMENT FORMS

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113B Rev. 4-90

Facility/Project Name	County Name	Well Name
Former DuPont Barksdale Works	Bayfield	PZ-16-r

Facility License, Permit or Monitoring Number	Wis. Unique Well Number	DNR Well Number
WDNR BRRTS Case #: 02-04-000156		

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method
   - surged with bailer and bailed ☐ 4 1
   - surged with bailer and pumped ☐ 6 1
   - surged with block and bailed ☐ 4 2
   - surged with block and pumped ☐ 6 2
   - surged with block, bailed and pumped ☐ 7 0
   - compressed air ☐ 2 0
   - bailer only ☐ 1 0
   - pumped only ☐ 5 1
   - pumped slowly ☐ 5 0
   - Other surged with block, air lifted, pumped ■ ☒☒

3. Time spent developing well: 240 min.

4. Depth of well (from top of well casing): 282.91 ft.

5. Inside diameter of well: 2.00 in.

6. Volume of waters in filter pack and well casing: 55.36 gal.

7. Volume of water removed from well: 4080.0 gal.

8. Volume of water added (if any): 1000 gal.

9. Source of water added (if any): City of Washburn.

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ■ No

	Before Development	After Development
11. Depth to Water (from top of well casing) a.	8.72 ft.	8.84 ft.
Date b.	10/31/02 mm/dd/yy	11/01/02 mm/dd/yy
Time c.	08:00	12:00
12. Sediment in well bottom	3.5 inches	0.0 inches
13. Water clarity	Clear ☐ 1 0 Turbid ☒ 1 5 (Describe)	Clear ■ 2 0 Turbid ☐ 2 5 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility.

14. Total suspended solids	N.A. mg/l	N. A. mg/l
15. COD	N.A. mg/l	N. A. mg/l

16. Additional comments on development:

Parameter	pH (SU)	Conductivity (mS/cm)	Temperature (C)
before:	8.6	7.9	6.6
after:	7.9	2.0	6.8

Well developed by: Person's Name and Firm

Name: J. Bignal

Firm: Philip Services Corp

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: [signature]

Print Initials: JRH

Firm: URS Corporation

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113B Rev. 4-90

Facility/Project Name	County Name	Well Name
Former DuPont Barksdale Works	Bayfield	PZ-37-r
Facility License, Permit or Monitoring Number: WDNR BRRTS Case #: 02-04-000156		Wis. Unique Well Number: _____ DNR Well Number: _____

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 4 1
surged with bailer and pumped	☐ 6 1
surged with block and bailed	☐ 4 2
surged with block and pumped	☐ 6 2
surged with block, bailed and pumped	☐ 7 0
compressed air	☐ 2 0
bailer only	☐ 1 0
pumped only	☐ 5 1
pumped slowly	☐ 5 0
Other surged with block, air lifted, pumped	■ ☆☆

3. Time spent developing well: 135 min.

4. Depth of well (from top of well casing): 284.89 ft.

5. Inside diameter of well: 2.00 in.

6. Volume of waters in filter pack and well casing: 55.10 gal.

7. Volume of water removed from well: 3200.0 gal.

8. Volume of water added (if any): 500 gal.

9. Source of water added (if any): City of Washburn.

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ■ No

		Before Development	After Development
11. Depth to Water (from top of well casing)	a.	-0.02 ft.	-0.02 ft.
Date	b.	11/04/02 mm/dd/yy	11/05/02 mm/dd/yy
Time	c.	14:45	17:00
12. Sediment in well bottom		1.2 inches	0.0 inches
13. Water clarity		Clear ☐ 1 0 Turbid ☒ 1 5 (Describe)	Clear ■ 2 0 Turbid ☐ 2 5 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility.

14. Total suspended solids	N.A. mg/l	N. A. mg/l
15. COD	N.A. mg/l	N. A. mg/l

16. Additional comments on development:

Parameter	pH (SU)	Conductivity (mS/cm)	Temperature (C)
before:	8.1	3.4	8.7
after:	7.9	1.8	7.2

Well developed by: Person's Name and Firm

Name: J. Bignal

Firm: Philip Services Corp

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: _____

Print Initials: JRH

Firm: URS Corporation

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113B Rev. 4-90

Facility/Project Name	County Name	Well Name
Former DuPont Barksdale Works	Bayfield	PZ-38-d
Facility License, Permit or Monitoring Number: WDNR BRRTS Case #: 02-04-000156		Wis. Unique Well Number / DNR Well Number

	Before Development	After Development
1. Can this well be purged dry?	☐ Yes ☒ No	
2. Well development method		
surged with bailer and bailed	☐ 4 1	
surged with bailer and pumped	☐ 6 1	
surged with block and bailed	☐ 4 2	
surged with block and pumped	☐ 6 2	
surged with block, bailed and pumped	☐ 7 0	
compressed air	☐ 2 0	
bailer only	☐ 1 0	
pumped only	☐ 5 1	
pumped slowly	☐ 5 0	
Other surged with block, air lifted, pumped	■ 7 7	
3. Time spent developing well	285 min.	
4. Depth of well (from top of well casing)	73.68 ft.	
5. Inside diameter of well	2.00 in.	
6. Volume of waters in filter pack and well casing	15.03 gal.	
7. Volume of water removed from well	720.0 gal.	
8. Volume of water added (if any)	100 gal.	
9. Source of water added (if any)	City of Washburn.	
10. Analysis performed on water added? (If yes, attach results)	☐ Yes ■ No	
11. Depth to Water (from top of well casing) a.	37.77 ft.	37.77 ft.
Date b.	12/02/02 mm/dd/yy	12/03/02 mm/dd/yy
Time c.	09:30	15:30
12. Sediment in well bottom	2.8 inches	0.0 inches
13. Water clarity	Clear ☐ 1 0 Turbid ☒ 1 5 (Describe)	Clear ■ 2 0 Turbid ☐ 2 5 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility.		
14. Total suspended solids	N.A. mg/l	N. A. mg/l
15. COD	N.A. mg/l	N. A. mg/l

16. Additional comments on development:

Parameter	pH (SU)	Conductivity (mS/cm)	Temperature (C)
before:	10.2	0.3	5.3
after:	9.5	0.5	6.1

Well developed by: Person's Name and Firm

Name: L.Crider

Firm: Philip Services Corp

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: [signature]

Print Initials: JRH

Firm: URS Corporation

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113B Rev. 4-90

Facility/Project Name	County Name	Well Name
Former DuPont Barksdale Works	Bayfield	PZ-38-o

Facility License, Permit or Monitoring Number	Wis. Unique Well Number	DNR Well Number
WDNR BRRTS Case #: 02-04-000156		

1. Can this well be purged dry? ☒ Yes ☐ No

2. Well development method
- surged with bailer and bailed ☐ 4 1
- surged with bailer and pumped ☐ 6 1
- surged with block and bailed ☐ 4 2
- surged with block and pumped ☐ 6 2
- surged with block, bailed and pumped ☐ 7 0
- compressed air ☐ 2 0
- bailer only ☐ 1 0
- pumped only ☐ 5 1
- pumped slowly ☐ 5 0
- Other surged with block, air lifted, pumped ■ _ _

3. Time spent developing well #VALUE! min.

4. Depth of well (from top of well casing) 43.19 ft.

5. Inside diameter of well 2.00 in.

6. Volume of waters in filter pack and well casing 11.54 gal.

7. Volume of water removed from well 95.0 gal.

8. Volume of water added (if any) 0 gal.

9. Source of water added (if any) City of Washburn.

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ■ No

		Before Development	After Development
11. Depth to Water (from top of well casing)	a.	30.75 ft.	30.75 ft.
Date	b.	12/03/02 mm/dd/yy	#N/A mm/dd/yy
Time	c.	15:35	
12. Sediment in well bottom		#VALUE! inches	0.0 inches
13. Water clarity		Clear ☐ 1 0 Turbid ☒ 1 5 (Describe)	Clear ■ 2 0 Turbid ☐ 2 5 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility.

14. Total suspended solids	N.A. mg/l	N. A. mg/l
15. COD	N.A. mg/l	N. A. mg/l

16. Additional comments on development:

Parameter	pH (SU)	Conductivity (mS/cm)	Temperature (C)
before:	8.4	2.7	2
after:			

Well developed by: Person's Name and Firm

Name: L.Crider

Firm: Philip Services Corp

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: _____

Print Initials: JRH

Firm: URS Corporation

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ■ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113B Rev. 4-90

Facility/Project Name	County Name	Well Name
Former DuPont Barksdale Works	Bayfield	PZ-39-d
Facility License, Permit or Monitoring Number	**Wis. Unique Well Number**	**DNR Well Number**
WDNR BRRTS Case #: 02-04-000156		

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method
   - surged with bailer and bailed ☐ 4 1
   - surged with bailer and pumped ☐ 6 1
   - surged with block and bailed ☐ 4 2
   - surged with block and pumped ☐ 6 2
   - surged with block, bailed and pumped ☐ 7 0
   - compressed air ☐ 2 0
   - bailer only ☐ 1 0
   - pumped only ☐ 5 1
   - pumped slowly ☐ 5 0
   - Other surged with block, air lifted, pumped ■ 8 8

3. Time spent developing well 165 min.

4. Depth of well (from top of well casing) 74.35 ft.

5. Inside diameter of well 2.00 in.

6. Volume of waters in filter pack and well casing 16.96 gal.

7. Volume of water removed from well 475.0 gal.

8. Volume of water added (if any) 100 gal.

9. Source of water added (if any) City of Washburn

10. Analysis performed on water added? (If yes, attach results) ☐ Yes ■ No

		Before Development	After Development
11. Depth to Water (from top of well casing)	a.	26.63 ft.	27.10 ft.
Date	b.	12/03/02 mm/dd/yy	12/04/02 mm/dd/yy
Time	c.	13:30	16:15
12. Sediment in well bottom		1.2 inches	0.0 inches
13. Water clarity		Clear ☐ 1 0 Turbid ☒ 1 5 (Describe)	Clear ■ 2 0 Turbid ☐ 2 5 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility.

14. Total suspended solids	N.A. mg/l	N. A. mg/l
15. COD	N.A. mg/l	N. A. mg/l

16. Additional comments on development:

Parameter	pH (SU)	Conductivity (mS/cm)	Temperature (C)
before:	11.7	0.7	6.3
after:	9.0	1.7	6.8

Well developed by: Person's Name and Firm

Name: L.Crider

Firm: Philip Services Corp

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: [signature]

Print Initials: JRH

Firm: URS Corporation

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.