



## Remedial Investigation Report

### ***In this Pines Update....***

This *Pines Update* provides information about the environmental study that was completed for the Area of Investigation. This study, called the Remedial Investigation, is one of several steps of the site assessment process. *Pines Update* No. 6 (February 2005), available at [www.pinesupdate.com](http://www.pinesupdate.com), provides a general description of all the steps of the assessment being conducted in the Area of Investigation.

### ***Use of the term “Coal Combustion By-Products”***

A significant element of the RI was the identification of suspected coal combustion by-products. These determinations were made from visual examinations performed by geologists and trained field staff based on a USEPA-approved protocol. In the Area of Investigation, materials suspected to be coal combustion by-products generally appear distinct from native soils, but not necessarily distinct from other types of fill. Thus, for the RI, fill materials having a visual appearance consistent with coal combustion by-products are labeled as “suspected coal combustion by-products.” This term is applied to a range of materials that may include a very small to a larger portion of “suspected” coal combustion by-products.

Northern Indiana Public Service (NIPSCO) and Brown Inc. (Brown) have completed an environmental study (called the Remedial Investigation or RI) of the nature and occurrence of coal combustion by-products in the Pines Area of Investigation. The final RI Report, was submitted to the US Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM) on March 5, 2010. This *Pines Update* discusses in more detail the RI Report and its findings.

### **What is the Remedial Investigation?**

As you may recall, activities in the Pines Area of Investigation follow the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This Act (and its corresponding guidance) provides procedures for environmental investigations, which include:

- Remedial Investigation
- Risk Assessments
  - Human Health Risk Assessment
  - Ecological Risk Assessment
- Feasibility Study

The RI is the step in the process at which environmental samples are collected and analyzed. For the Pines Area of Investigation, the RI involved determining where constituents derived from coal combustion by-products were present in the soil, groundwater, and other environmental media. The concentrations of these constituents were also determined for comparison purposes. Information was collected, evaluated, and pieced together much like the pieces of a puzzle, to give a complete picture of conditions at the Area of Investigation.

The RI included collecting numerous environmental samples and performing analyses, tests, and studies. All the testing was conducted following CERCLA, applicable USEPA guidance, and the USEPA approved Work Plan that was prepared for the RI. *Pines Update* No. 16, available at [www.pinesupdate.com](http://www.pinesupdate.com), details the number and types of samples collected.

After USEPA reviewed and provided comments on the draft RI Report, the final RI Report was prepared and provided to USEPA and IDEM on March 5, 2010. It includes over 3700 pages of text, tables, figures and appendices. The complete final RI Report has been posted to USEPA’s website for the project: <http://www.epa.gov/region5/sites/pines/index.htm>

### **What are the key findings of the RI?**

#### **Groundwater Setting**

Groundwater is present in a sandy, shallow aquifer in the Area of Investigation at depths ranging from near the ground surface (in wetland areas) to approximately 25 feet beneath upland dune areas. The aquifer is thickest beneath upland dune areas, is thinner beneath low-lying wetlands areas between the dunes (such as the Great Marsh in the IDNL), and pinches out completely to the south. Prior to the installation of the municipal water service,

### Risk-Based Comparison Levels

Established, conservative Federal and State risk-screening levels are used in the RI for risk-based comparison levels. Those constituents present at concentrations above a comparison level are considered “constituents of potential concern,” and will undergo further assessment.

If a constituent is above a conservative comparison level, it does not necessarily mean it poses an unacceptable risk, but it will be subjected to additional evaluation in the Risk Assessment process.

this shallow aquifer served as the source of private well water as well as the discharge area for septic systems.

In general, during both wet and dry periods, groundwater flows from the upland areas to Brown Ditch and wetlands located in the low-lying areas. Groundwater from Yard 520 flows into Brown Ditch and its related tributaries and wetlands in the immediate vicinity of Yard 520, and does not flow to the south beneath Brown Ditch.

### Background Investigation

The RI included a study of geologic materials (soil, groundwater, surface water, and sediment) that were not impacted by suspected coal combustion by-products (called “background materials”).

The RI showed that the background materials in the Area of Investigation contain a wide variety of metals at different concentrations.

- **Soil.** Arsenic was present in all the background soil samples at concentrations above the USEPA-derived risk-based comparison level for human health. (Note that arsenic levels above the USEPA level are common for many background soils throughout the United States.) Other constituents were also detected in one or more background soil samples at concentrations above the human health risk-based comparison level. A laboratory analysis of a subset of the background samples indicated that in the few samples where coal combustions by-products were identified as present, they comprised an insignificant fraction (less than 1%) of the sample. Thus the background soil results are appropriate for comparison purposes.
- **Groundwater.** The US Geological Survey has documented that natural levels of boron in the deeper confined aquifers are generally above the USEPA’s Removal Action Level (RAL) of 0.9 mg/L and above the human health risk-based comparison level of 0.73 mg/l.
- **Surface Water and Sediment.** The presence of several metals in surface water and sediment is to be expected because of natural weathering and erosion of local soils and geologic formations as well as man-made influences such as agricultural practices and run-off from roadways and railroads.

### Coal Combustion By-Products

Coal combustion by-products were placed in Yard 520 in accordance with its permit. However, coal combustion by-products are also reported to have been used as road sub-base material and/or fill in other areas in and outside the Town of Pines, activities that are not associated with the Respondents. As part of the RI, an inspection program was conducted, which documented the presence of suspected coal combustion by-products along many roadways in the eastern portion of the Town of Pines, as well as Maple Street and Railroad Avenue. This program also found that suspected coal combustion by-products appear to have been used on some private properties to surface driveways, and at certain locations over wider areas extending well beyond the roadways, suggesting they were used as fill. Figure 3-19 of the RI Report shows where suspected coal combustion by-products were observed.

Samples taken of suspected coal combustion by-products show concentrations of metals that are also present in background soils:

- Arsenic concentrations in the suspected coal combustion by-products samples were above the risk-based comparison level as were arsenic concentrations in all of the background soil samples.
- Iron was present in many suspected coal combustion by-products samples at concentrations above the risk-based comparison level for human health.

### Groundwater

Coal combustion by-product-derived constituents in groundwater include boron, sulfate, calcium, magnesium, strontium, and molybdenum. Also, arsenic appears to migrate from coal combustion by-products to groundwater, at least at Yard 520, but it is not transported any significant distance with the groundwater. Iron and manganese may also have the potential to migrate from coal combustion by-products to groundwater, but their mobility in groundwater is controlled by geochemical conditions below the ground surface (i.e., in areas where oxygen is or is not available), and they are also present in areas where groundwater has not been affected by coal combustion by-products.

The extent of coal combustion by-product-derived constituents in groundwater is documented in the RI (see for example Figure 4-19 of the RI Report):

- Concentrations of these constituents are elevated at and downgradient from Yard 520. In the east part of the Area of Investigation, elevated concentrations are present in areas where coal combustion by-products may have been used as fill over a large area, and downgradient toward the East Branch of Brown Ditch.
- Coal combustion by-product-derived constituents in groundwater do not extend northward toward the Indiana Dunes National Lakeshore at levels of significance.
- In the area near the intersection of South Railroad Avenue and Ardentale, coal combustion by-products have been used in residential yards and driveways and as road sub-base. Groundwater there might be impacted by coal combustion by-products but the levels are too low to be able to tell, and, concentrations are below human health comparison levels, with the exception of one sample collected by USEPA in 2003, which had a result that was greater than the comparison level for boron (0.73 mg/L) used in the RI, but below the USEPA screening level for tap water (7.3 mg/L).

Finally, groundwater beneath the Area of Investigation shows evidence of other sources of impacts, including septic system discharges, and road salt. Also, directly south of Yard 520 and the West Branch of Brown Ditch, groundwater appears to be impacted by a landfill to the south (Pines Landfill, owned by Waste Management).

### Who is AECOM? Why did they conduct the RI?

As a part of the CERCLA process, USEPA approves all contractors working on the Pines Area of Investigation. AECOM was selected by the Respondents to conduct the Remedial Investigation on their behalf, and AECOM's qualifications were approved by the USEPA on May 7, 2004.

The Remedial Investigation work for the Pines Area of Investigation has been conducted by AECOM scientists that are experienced and well-qualified in environmental investigation and data evaluation. Our staff have scientific backgrounds and degrees, many with advanced degrees including masters degrees (MS) and doctoral degrees (Ph.D.'s), and have professional certifications such as Professional Engineers (PEs), Professional Geologists (PGs), and Diplomates of the American Board of Toxicology (DABTs). Working in the context of a large global company affords our staff access to other professionals with a wide variety of backgrounds and specializations, whose expertise they can bring to bear on a project-specific basis.

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. AECOM has been recognized in Engineering News-Record's (ENR) 2009 Top 500 Design Firms' rankings, where it is ranked #1 in the Hazardous Waste market sector.

<http://www.aecom.com/>

### Surface Water

Surface water in Brown Ditch showed concentrations of several metals at levels higher than in upgradient samples. Concentrations of boron were above the human health and ecological comparison levels in certain samples in the West, East, and Main Branches of Brown Ditch. On the West Branch, some of these samples also have molybdenum concentrations above the human health risk-based comparison level (but not the ecological comparison level). These elevated concentrations are most likely due to the contribution of groundwater containing coal combustion by-product-derived constituents to the ditches.

### Sediments

The sediment samples from Brown Ditch contained a higher percentage of fine-grained sediment (silt and clay), higher organic carbon concentrations, and lower percent solids compared to upgradient sediments. Thus, it is difficult to distinguish the contribution that background and coal combustion by-products may have on the analytical results for these samples. Also, boron was detected in two sediment samples from Brown Ditch. Based on the locations of the samples and the concentrations found, the boron in these sediment samples may be associated with the effect of groundwater containing coal combustion by-product-derived constituents.

### What happens next?

The next step of the process is to complete the Human Health Risk Assessment and the Ecological Risk Assessment. In these Risk Assessments, the data from the RI are evaluated using USEPA-approved procedures to produce an objective determination of potential risks in the Area of Investigation. The risk assessments are very conservative by design, and are intended to overestimate potential risk rather than underestimate it. More details on the risk assessment process are provided in *Pines Update* No. 18 (August 2008) available at [www.pinesupdate.com](http://www.pinesupdate.com).

#### Our Commitment....

NIPSCO and Brown are committed to keeping you informed on the progress of the investigation of the Pines Area of Investigation. Look for future *Pines Updates* to update you to our progress. We also have a website to provide continual updates on the project:

**[www.pinesupdate.com](http://www.pinesupdate.com)**

Please contact the Communications Coordinator at the address listed below to be placed on the mailing list.

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