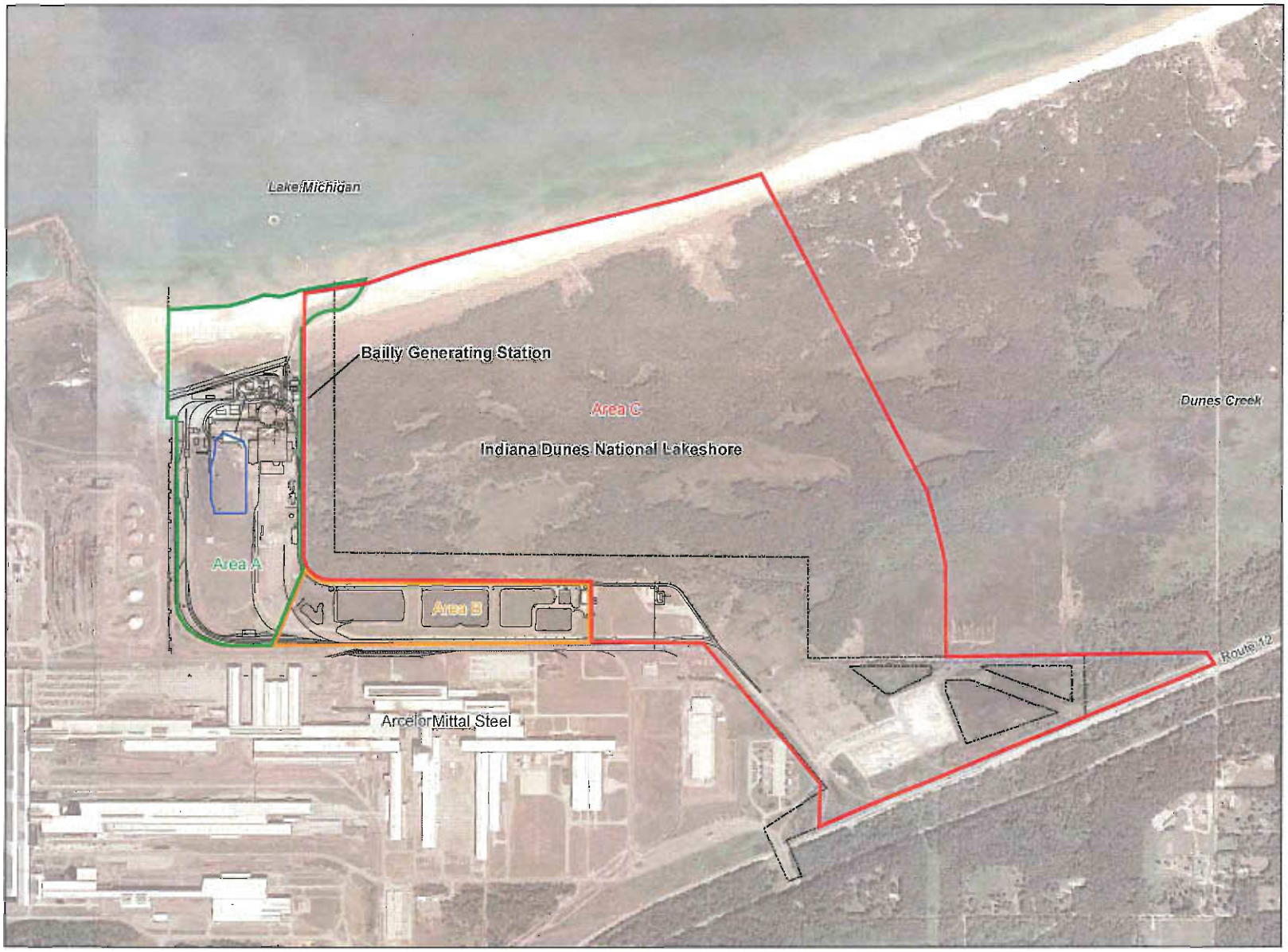
FIGURES



Sitewide Overview and Site Features

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Bailly Generating Station Property Line
- Approximate Slurry Wall Location
- Railroad
- Area A
- Area B
- Area C

Location of Site

Notes and Sources

FIGURE 1

Aerial Photo: March 2003
Courtesy of Indiana Spatial Data Portal

0 750 1,500 Feet

amec
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Westford, MA 01886
(978) 692-9090

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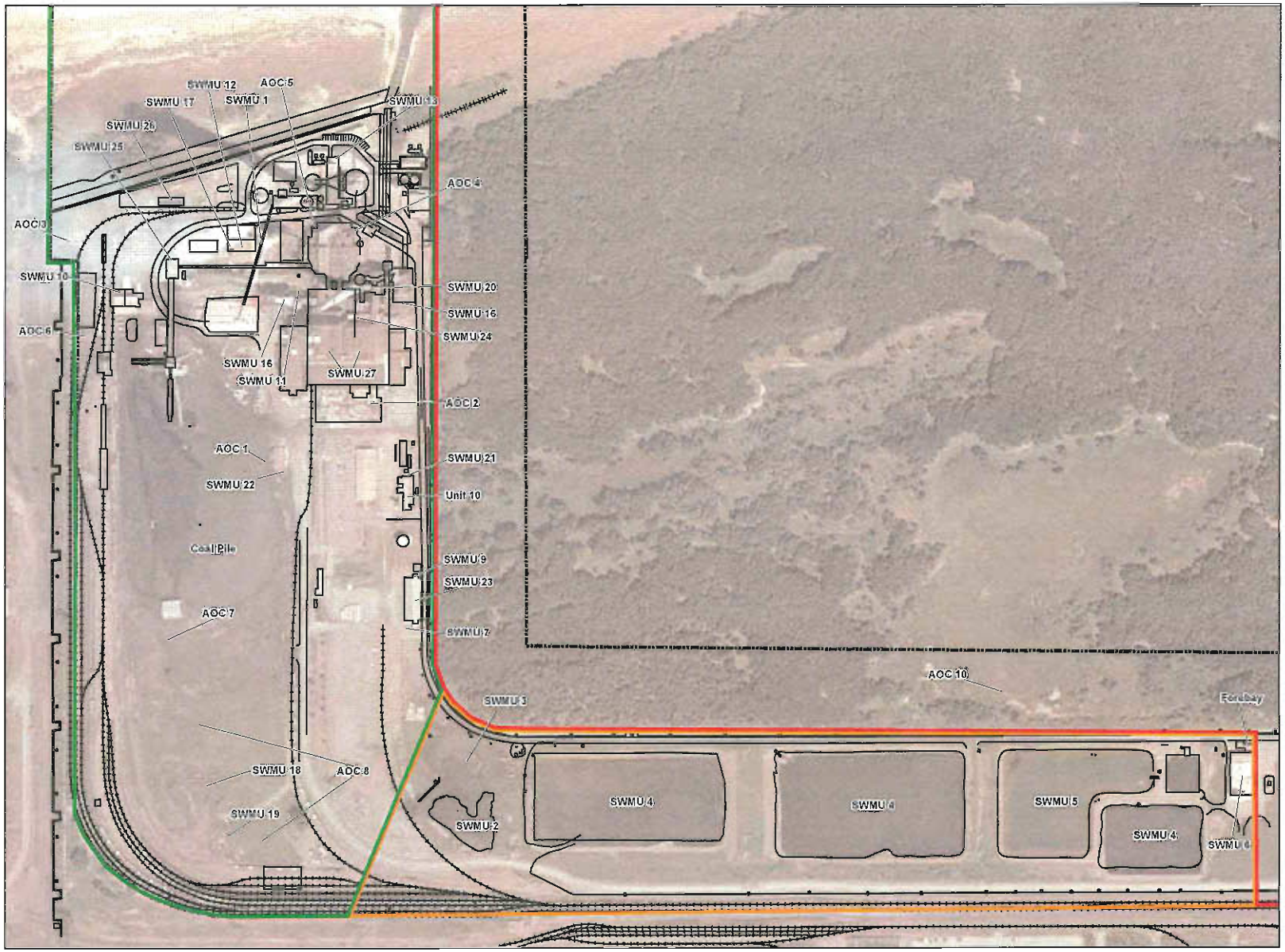

Area A and B SWMUs and AOCs

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Bailly Generating Station Property Line
- Railroad
- Area A
- Area B
- Area C
- Fence

Location of Site

Notes and Sources

FIGURE 2

Aerial Photo. March 2003
Courtesy of Indiana Spatial Data Portal
Monitoring Wells: Digitized from ESE Groundwater Report, 1984

N

0 150 300 Feet

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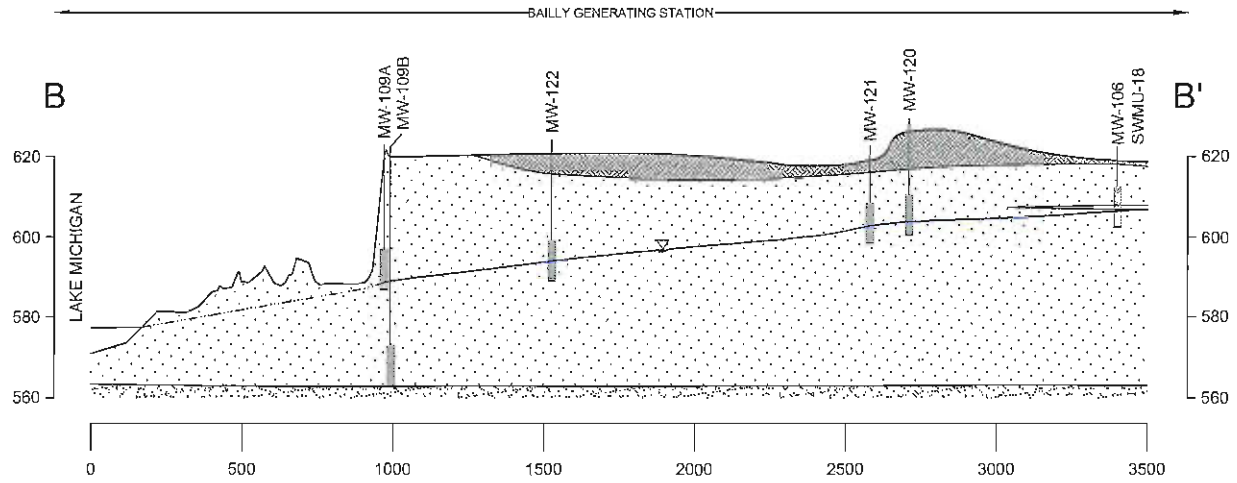

NOTES:

1. WATER LEVELS MEASURED BY AMEC PERSONNEL FROM OCTOBER 12 THROUGH OCTOBER 23, 2009.
2. LAKE MICHIGAN WATER LEVEL IS AVERAGE FROM OCTOBER 12 THROUGH OCTOBER 23, 2009 AS MEASURED AT CALUMET HARBOR, LAKE MICHIGAN, IL.
3. 20 X VERTICAL EXAGGERATION.

LEGEND:

- DUNE-BEACH AND LACUSTRINE SAND
- GROUNDWATER FLOW DIRECTION
- WATER TABLE (INFERRED)
- WATER TABLE (KNOWN)
- FILL
- PEAT
- TILL AND GLACIAL-LACUSTRINE CLAY AND SILT

HORIZONTAL SCALE: 1" = 400'

0 400' 800'

0 20' 40'

VERTICAL SCALE: 1" = 20'

CLIENT: NORTHERN INDIANA PUBLIC SERVICE COMPANY

AMEC Earth & Environmental, Inc.
2 ROBBINS ROAD
WESTFORD, MASSACHUSETTS 01886
(978) 692-9090

DRAWN BY: M. YAU
CHECKED BY: J. RAGUCCI
DATUM: N/A
PROJECTION: N/A
SCALE: AS SHOWN

PROJECT: Northern Indiana Public Service Company
Bailly Generating Station
Chesterton, Indiana

TITLE: Geologic Cross Section B-B'

DATE: 16 FEBRUARY 2011
PROJECT NO: 3-7788-0004
REV. NO.: A
FIGURE No. 1

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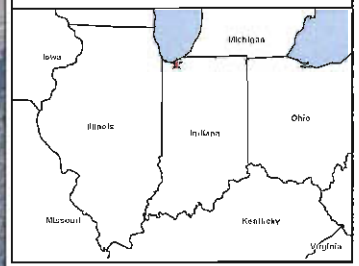
Lake Michigan Beach Groundwater Sampling Locations

Northern Indiana Public Service Company
Bailly Generating Station
Chesterton, Indiana

Legend

- Bailly Generating Station Property Line
- Groundwater Sampling Points

Location of Site



Notes and Sources

FIGURE 4

Aerial Photo: TerraServer, 8/17/2008.

N

0 300 Feet

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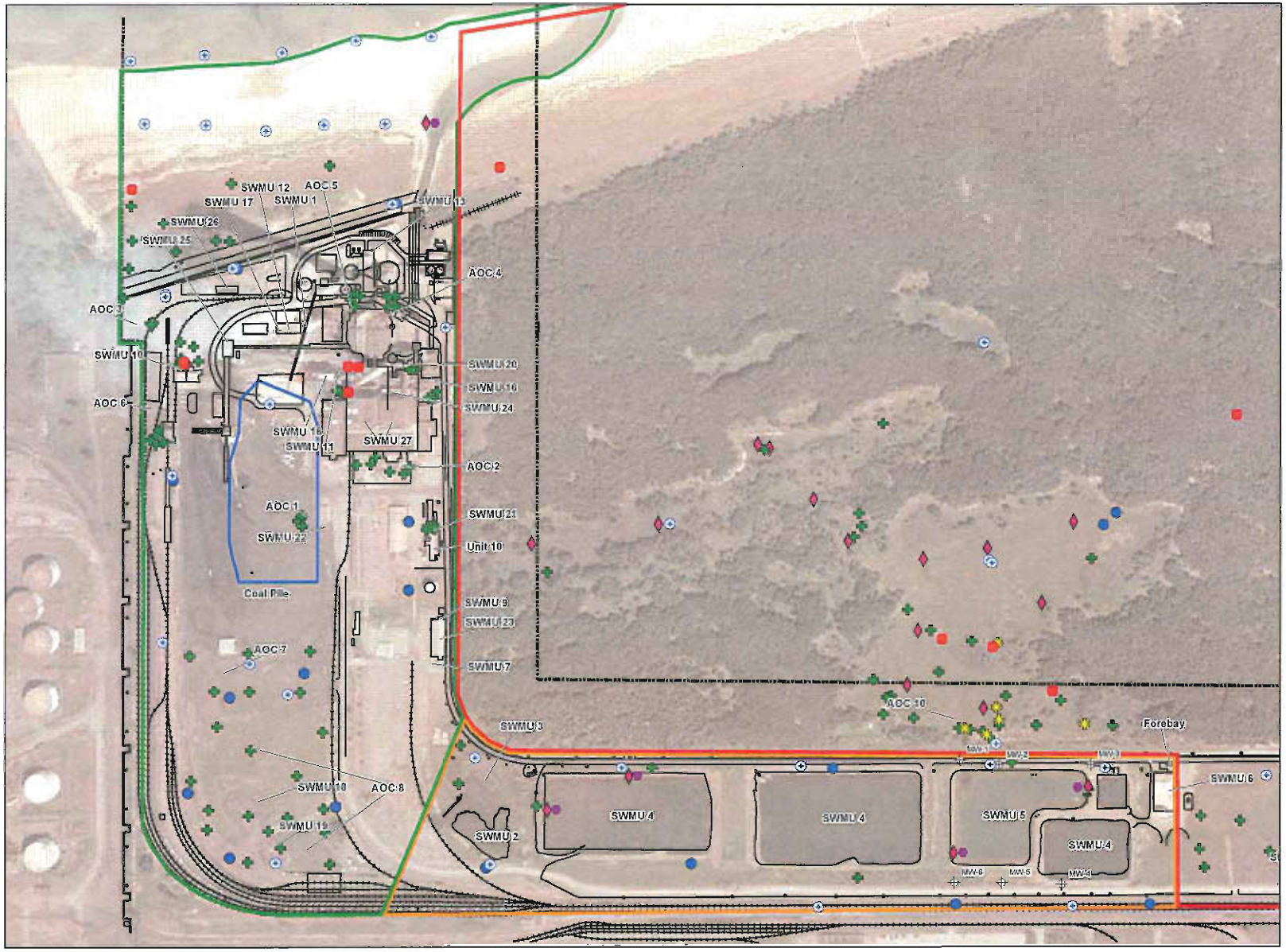

Area A and B Sampling Locations

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Direct Push Groundwater Sampling Location
- pH Sampling Location
- Sediment Sampling Location
- Soil Boring Sampling Location
- Surface Water Sampling Location
- Monitoring Well Sampling Location
- Vegetation Sampling Location
- Monitoring Well
- Approximate Slurry Wall Location
- Bailly Generating Station Property Line
- Railroad
- Area A
- Area B
- Area C

Location of Site

Notes and Sources

FIGURE 5

Aerial Photo: March 2003
Courtesy of Indiana Spatial Data Portal
Slurry Wall: Digitized from USGS Open File Report 80-1105,1980
Monitoring Wells: Digitized from ESE Groundwater Report, 1984

N

0 400 Feet

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TABLES

Table 1. Comparison of Implemented and Proposed Remedies
RCRA Corrective Measures Proposal for Areas A and B
Bailly Generating Station

	Area A																					Area B	
Unit	SWMU 10			SWMU 20			SWMU 21			AOC 1			AOC 4 & 5			SWMU 16			SWMU 18			SWMU 4 & 5	
Description	Coal Handling Bldg.			Fmr. Waste Oil UST			Unit #10 UST			Empty Drum Storage			Fan Bearings			Frac Tank			Horsehoe Area			Surface Impoundments	
Proposed Remedy	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Cap	Exc	NFA	Clay Liner
Threshold Criteria																							
Protection of Human Health and the Environment	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2
Attain Media Cleanup Standards	1	1	3	1	1	3	1	1	3	1	1	3	1	1	3	1	1	3	1	2	3	1	2
Control the Sources of Release	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2
Comply with Standards for Waste Management	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	3	2	3	2
Balancing Criteria																							
Long-Term Effectiveness	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	3
Toxicity, Mobility, and Volume Reduction	1	1	3	1	1	3	1	1	3	1	1	3	1	1	3	1	1	3	1	2	3	1	2
Short-Term Effectiveness	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3	3	1	3
Implementability	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3	2	2	3	1
Cost	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3	2	1	3	1	2	3	1
Community Acceptance	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	3
State Acceptance	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	2	1	3
Score	17	22	28	17	22	28	17	22	28	17	22	28	17	22	28	17	22	28	17	23	29	17	24
Implemented/ Recommended Remedy	Excavation			Excavation			Excavation			Excavation			Excavation			Excavation			Excavation			Clay Liner	
Cost (actual or estimated)	$39,000			$8,000			$10,000			$59,000			$33,000			$7,000			$63,000 to $107,000			Actual costs unavailable	

Notes: NFA - No Further Action
Cap - Synthetic liner and soil cover (vegetated for SWMU 18)
Exc - Excavation and Off-Site Disposal
Scores:
1 - Does not achieve objective (for cost - most expensive)
2 - Partially meets objective (for cost - medium expensive)
3 - Best able to meet objective (for cost - least expensive, or no cost)
Cost = actual cost at time of implementation for completed remedies
Higher score is better alternative

ATTACHMENT 1

Index to the Administrative Record

Portage Public Library
2665 Irving Street
Portage, IN 46368
(219) 763-1508

EPA, Region 5
7th Floor Record Center
77 W. Jackson Blvd.
Chicago, IL 60604
(312) 886-4253

Document Title	Date
RCRA 3008(h) Administrative Order on Consent	3/31/2005
Current Conditions Report	4/13/2005
Technical Memorandum 05-01 Supplement to the Current Conditions Report	5/19/2005
RFI Work Plan with QAPP and HASP	5/25/2005
Technical Memorandum 05-02 Test Pit Summary	7/1/2005
Technical Memorandum 05-03	7/13/2005
Quarterly Report 05-02	7/13/2005
Quarterly Report 05-03	10/14/2005
Quarterly Report 05-04	1/13/2006
Quarterly Report 06-01	4/14/2006
BGS GW Sampling Frequency Evaluation	6/26/2006
Quarterly Report 06-02	7/14/2006
IDNL ERA SAP	10/6/2006
Quarterly Report 06-03	10/13/2006
HH EI 725	11/17/2006
Quarterly Report 06-04	1/12/2007
IDNL Investigation Tech Memo 07-01	2/21/2007
Letter from EPA to NIPSCO regarding Threatened and Endangered Species Info Requests	2/22/2007
SAP March 2007	3/15/2007
Quarterly Report 07-01	4/13/2007
Quarterly Report 07-02	7/13/2007
GW Sampling Frequency Eval	7/18/2007
Letter from EPA to NIPSCO regarding Piping Plover Evaluation	8/9/2007
Letter regarding application of St. Joseph study to BERA process	8/31/2007
Quarterly Report 07-03	10/15/2007
Quarterly Report 07-04	1/8/2008
Quarterly Report 08-01	4/10/2008
Quarterly Report 08-02	7/15/2008
Quarterly Report 08-03	10/7/2008

Letter regarding Lake Michigan groundwater/surface water interface	12/30/2008
Quarterly Report 08-04	1/8/2009
EPA response on GSI proposed work	2/4/2009
NIPSCO letter regarding piping plover evaluation	2/9/2009
Quarterly Report 09-01	4/10/2009
EPA Comments on Area A CMP	5/11/2009
EPA memo regarding piping plover screening values	5/13/2009
NIPSCO response to EPA 5/11/09 Letter	6/10/2009
Eastern Landfill Predesign Invest	7/10/2009
EPA Second Round Comments on Area A CMP	7/13/2009
Quarterly Report 09-02	7/15/2009
NIPSCO response to EPA's 7/13/09 Comments	7/24/2009
EPA email to NIPSCO regarding lab detection limits	7/27/2009
EPA Comments on Lake Michigan Groundwater Sampling	9/3/2009
LM Beach Sampling Plan Rev4	9/21/2009
Quarterly Report 09-03	10/13/2009
Quarterly Report 09-04	1/11/2010
EPA memo to NIPSCO regarding Area A BERA approach	1/20/2010
Amphibian Survey Plan	2/25/2010
Plover Delineation Memo	3/4/2010
Amphibian Toxicity Study Plan	3/14/2010
EPA email regarding piping plover delineation	3/29/2010
Quarterly Report 10-01	4/13/2010
EPA comments regarding Area A RFI	6/9/2010
Plant Toxicity Testing Plan	6/21/2010
EPA comments on Area A CMP and Area B RFI	7/6/2010
Quarterly Report 10-02	7/15/2010
NIPSCO email response to EPA's 6/9/10 comments	8/12/2010
HHRA Area B	8/16/2010
RFI Area B	8/16/2010
HHRA Area A	9/1/2010
RFI Area A	9/1/2010
BERA Area A	9/1/2010
Quarterly Report 10-03	10/13/2010
CMP for Areas A and B	11/9/2010
Amphibian Toxicity Report	11/17/2010
2009 Amphibian Survey	11/22/2010
Quarterly Report 10-04	1/14/2011
Rhizome Testing Results	1/14/2011
Amended Sampling Frequency	1/19/2011
Area B SLERA memo	2/22/2011

ATTACHMENT 2

GREAT LAKES PIPING PLOVER CRITICAL HABITAT QUESTIONS AND ANSWERS

The U.S. Fish and Wildlife Service (Service) is designating critical habitat for the piping plover on its breeding grounds in the Great Lakes area. Critical habitat is a term used in the Endangered Species Act that refers to specific geographic areas that contain habitat features essential for the conservation of a threatened or endangered species. These areas may require special management considerations or protection for the species. The final critical habitat determination for the Great Lakes breeding habitat will be published in the Federal Register. The following frequently asked questions are provided with responses to help you understand the critical habitat designation for the piping plover.

---

1. What is a piping plover?

The piping plover (*Charadrius melodus*), named for its melodic mating call, is a small, pale-colored North American shorebird. The bird's light sand-colored plumage blends in with the sandy beaches and shorelines that are its primary habitat. It weighs 1-2 ounces (43-63 grams) and is 6-6 ½ inches (17-18 centimeters) long. During the breeding season the legs are bright orange and the short stout bill is orange with a black tip. There are two single dark bands, one around the neck and one across the forehead between the eyes. Plumage and leg color help distinguish this bird from other plovers. The female's neck band is often incomplete and is usually thinner than the male's neck band. In winter, the bill turns black, the legs remain orange but pale, and the black plumage bands on the head and neck are lost. Chicks have speckled gray, buff, and brown down, black beaks, orange legs, and a white collar around the neck. Juveniles resemble wintering adults and obtain their adult plumage the spring after they fledge.

2. Where do piping plovers live?

Historically, piping plovers bred across three geographic regions. These regions include: the United States and Canadian Northern Great Plains from Alberta to Manitoba and south to Nebraska; the Great Lakes beaches; and the Atlantic coastal beaches from Newfoundland to North Carolina. Currently, piping plovers live in an area similar to their historical range, although the numbers of those breeding in the Great Lakes region have decreased significantly since the 1930s. The Great Lakes breeding population is now found only in Michigan. Generally, piping plovers favor open sand, gravel, or cobble beaches for breeding. Breeding sites are generally found on islands, lakeshores, coastal shorelines, and river margins.

Piping plovers winter in coastal areas of the United States from North Carolina to Texas. They also winter along the coast of eastern Mexico and on Caribbean islands from Barbados to Cuba and the Bahamas. Information from observation of color-banded piping plovers indicates that the winter range of the three breeding populations overlap, to a significant degree. Therefore, the source breeding population of a given wintering individual cannot be accurately determined in the field, without having marked the individual.

Piping plovers begin arriving on the wintering grounds in early July, with some late nesting birds arriving in September. A few individuals can be found on the wintering grounds throughout the year, but sightings are rare in June and early July.

3. What do piping plovers eat?

Piping plovers feed along beaches and intertidal mud and sand flats. Primary prey for piping plovers includes worms, crustaceans, insects, and occasionally bivalve mollusks.

4. How many piping plovers are there?

2000 census numbers: Great Lakes - approximately 30 breeding pairs (all are in Michigan). 1996 census numbers: Northern Great Plains (including the Canadian Prairie region) - approximately 1,398 breeding pairs; and the Atlantic Coast - approximately 1,372 breeding pairs.

5. Is the piping plover an endangered species?

The piping plover first received protection under the Endangered Species Act (ESA) in 1985. Piping plovers nesting in the Great Lakes are listed as endangered; piping plovers nesting along the Atlantic Coasts and in the northern Great Plains of the U.S. and Canada are listed as threatened. All piping plovers on the wintering grounds are considered threatened.

6. What do the terms "endangered" and "threatened" mean?

An endangered species, by definition, is one that is in danger of extinction throughout all or a significant portion of its range. A threatened species is one likely to become endangered within the foreseeable future. Except for special circumstances outlined at the time of listing, regulations applicable to endangered species are also applicable to threatened species.

7. Why are piping plover populations declining? What are the threats to the piping plover?

Piping plovers often nest on beaches where people like to live and enjoy the shoreline. Their nests accidently get stepped on or crushed by people and vehicles. The presence of people also may cause the birds to desert the nest, exposing eggs or chicks to the hot sun and predators. Interruption of feeding may stress juvenile birds during critical periods in their life cycle. Pets, especially dogs, may harass or kill the birds. Many of the coastal beaches traditionally used by piping plovers for nesting, feeding, and roosting have been lost to commercial, residential, and recreational developments. Also, developments near beaches provide food that attracts increased numbers of predators such as racoons, skunks, and foxes. Water level manipulation along the major rivers may also lead to loss of breeding habitat. In order to recover the piping plover and remove it from the endangered species list, threats to reproductive success at breeding grounds must be addressed. Availability of quality foraging and roosting habitat in the regions where this species winters is necessary in order to ensure that an adequate number of adults survive to migrate back to breeding sites and successfully nest.

8. What is being done to protect the piping plover?

A variety of protection measures are implemented as prescribed in recovery plans, and include:

Listing: In 1985, the Great Lakes breeding population of the piping plover was listed as

endangered, while populations in all other portions of the species' range were listed as threatened.

Recovery Plans: The Service developed recovery plans that describe actions that need to be taken to help the bird survive and recover. Recovery plans currently exist for all three areas of the breeding range. These recovery plans are in various stages of revision.

Research: Several cooperative research groups have been set up among Federal and state agencies, university and private research centers, and the Canadian Wildlife Service. Studies are being conducted to estimate numbers, evaluate reproductive success, monitor long-term changes in populations, and determine where plovers breed and winter. Other studies have addressed the effectiveness of captive breeding efforts. The effectiveness of predator exclosures and habitat manipulations have also been evaluated.

Management and Habitat Protection: Measures to ensure successful nesting are conducted each year, including controlling human access to nesting areas, monitoring nesting activity, and protecting nests, eggs and young birds from predators. This requires intensive management efforts and significant participation by dedicated volunteers. In Michigan, several landowners have formally agreed to protect plover nesting habitat. Protection of habitat also requires constant vigilance and includes managing residential and industrial development to ensure that projects are designed to limit impacts to habitat, and properly managing water flow to ensure that the geologic processes which have historically maintained habitat for the plover can continue to function.

Public Education: Many states and private agencies are running successful public information campaigns to raise awareness of the plover's plight. In Michigan, residents of coastal communities where the birds nest have been contacted by an "ambassador" and provided information about the plight of the piping plover.

9. What are the recovery goals for the piping plover?

The recovery goals for the piping plovers breeding in the Great Lakes were outlined in the Recovery Plan for the Great Lakes and Northern Great Plains Piping Plover. These goals are to have 100 breeding pairs in the State of Michigan and 50 breeding pairs in other Great Lakes states and for these numbers to remain stable for 15 years. Goals for wintering areas have been suggested in existing recovery plans and include protection of specific sites that provide the essential requirements for the wintering populations of the piping plover. As populations in all three breeding areas begin to recover, densities on both the breeding and wintering grounds will increase. In order to achieve recovery, it is necessary to maintain sufficient habitat to ensure the survival of these birds.

10. What protection does the piping plover receive as a listed species?

The ESA prohibits the import, export, or interstate or foreign sale of protected animals and plants without a special permit. It also makes "take" illegal – forbidding the killing, harming, harassing, possessing, or removing of protected animals from the wild. Federal agencies must consult with the Service to conserve listed species and ensure that any activity they fund, authorize, or carry out will not jeopardize the continued survival and recovery of a listed species. This is referred to as a section 7 consultation process.

Under section 10 of the ESA, permits may be issued to take listed wildlife species for scientific purposes, to enhance the propagation, survival or recovery of the species, and for incidental

take in the course of certain otherwise lawful activities.

In addition, the ESA requires that Federal agencies not only take action to prevent further loss of a species, but also pursue actions to recover species to the point where they no longer require protection and can be de-listed.

11. What is critical habitat?

Critical habitat is a term used in the Endangered Species Act of 1973, as amended. It refers to specific geographic areas that are essential for the conservation of a threatened or endangered species and that may require special management consideration or protection. These areas do not necessarily have to be occupied by the species at the time of designation. This means that areas must be identified which will allow for the protection of the current population, and any population increases that may be required to achieve recovery (allowing the species to be removed from the endangered species list).

12. Do listed species in critical habitat areas receive more protection?

A critical habitat designation does not set up a preserve or refuge, it only affects activities with Federal involvement, such as Federal funding or a Federal permit. Listed species and their habitats are protected by the ESA whether or not they are in areas designated as critical habitat.

Designation of critical habitat can help focus conservation activities for a listed species by identifying areas that contain the physical and biological features that are essential for the conservation of that species. Critical habitat also alerts the public as well as land managing agencies to the importance of these areas, but the ESA only imposes additional restrictions on actions or programs that are authorized, funded, permitted, or carried out by a Federal agency.

13. What is the purpose of designating critical habitat?

Designating critical habitat is a tool to identify areas that are important to the recovery of a listed species. It is also a tool used to notify Federal agencies of areas that must be given special consideration when they are planning, implementing, or funding activities. Federal agencies are required to consult with the Service on actions they carry out, authorize, fund, or permit, that may affect critical habitat. A critical habitat designation has no effect when a federal agency is not involved. For example, a landowner undertaking a project on private land that involves no Federal funding or permit has no additional responsibilities if his property falls within critical habitat boundaries.

14. Do Federal agencies have to consult with the Service outside critical habitat areas?

Not always. It is the responsibility of the Federal agency to determine if a proposed project may affect threatened or endangered species. If a "may affect" determination is made, that requires the Federal agency to initiate the section 7 process. Even when critical habitat is not designated, Federal agencies must consult with the Service, if an action that they fund, ~~or~~ authorize, or permit may affect listed species.

15. What impact will critical habitat designation have on beach use?

There may be a need on some Federally managed beaches to temporarily restrict use in some areas during the spring and early summer to allow for piping plovers to nest. However, most beaches within designated critical habitat do not come under Federal authority, and therefore are not affected by the designation. In those limited cases we will work with the Federal agency to protect potential breeding sites while keeping any restrictions on humans' enjoyment of the areas as minimal as possible.

16. What activities could adversely affect critical habitat?

Some activities could have an adverse effect on piping plover critical habitat. Such activities might include:

- dredging and dredge spoil placement
- seismic exploration
- construction and installation of facilities, pipelines, and roads associated with oil and gas development
- oil spills and oil spill clean-up
- construction of dwellings, roads, marinas, and other structures and associated impacts such as staging of equipment and materials
- beach nourishment, stabilization and cleaning
- certain types and levels of recreational activities such as all-terrain vehicle activity
- stormwater and wastewater discharge from communities
- sale, exchange, or lease of Federal land that contains suitable habitat that is likely to result in the habitat being degraded
- military maneuvers.

Specific threats are likely unique to each area and are best addressed in recovery plans, management plans, and section 7 consultations.

17. How does the Service determine which areas to designate as critical habitat?

Biologists identify physical or biological habitat features needed for life and successful reproduction of the species. These features are known as primary constituent elements and include, but are not limited to:

- space for individual and population growth and for normal behavior;
- food, water, air, light, minerals, or other nutritional or physiological requirements;
- cover or shelter;
- sites for breeding and rearing of offspring; and
- habitats that are protected from disturbance or are representative of the historic geographical and ecological distributions of a species.

Areas containing these elements of the habitat are identified in the landscape. By law, the Service is required to identify sufficient areas containing these characteristics to ensure conservation of the listed species.

18. Are all areas within the piping plover critical habitat boundaries considered critical habitat?

No. Paved areas and areas that contain structures such as marinas, boat ramps, and parking lots are not critical habitat. Areas that are now ocean or lake are also not considered critical habitat although if these areas , because of coastal dynamics, become land in the future, they will be critical habitat.

19. Does the ESA require an economic analysis as part of designating critical habitat?

Yes. The Service must take into account the economic and other relevant impacts of specifying any particular areas as critical habitat. The Service may exclude any area from critical habitat if it determines that the benefits of such exclusion outweigh the benefits of specifying the area as part of critical habitat unless it determines, based on the best scientific and commercial data available, that the failure to designate the area as critical habitat will result in the extinction of the species. The Service contracted independent economists to develop an economic analysis for the critical habitat designation. The draft analysis was made available during the public comment period. According to the analysis, in general, while critical habitat designation for the piping plover may lead to additional consultations by the Service and other Federal agencies, project modifications that will be required as a result of the designation are expected to be minimal. The draft economic analysis and final addendum are available on the Service's website at http://midwest.fws.gov/endangered/pipingplover.

20. Does this economic analysis have any effect on the decision to list a species?

No. Under the ESA, a decision to list a species is made solely on the basis of scientific data and analysis.

21. What is the impact of a critical habitat designation on economic development?

The vast majority of activities that require a section 7 consultation with the U.S. Fish and Wildlife Service proceed with little or no modification. If a proposed project were to affect critical habitat of the piping plover, consultation under section 7 of the Endangered Species Act would be required. During this process, coordination between the agencies involved would examine modifications to the project that would reduce impacts to piping plover and designated critical habitat areas. In cases where critical habitat has been designated for areas occupied by the listed species, consultations would likely have been required, regardless of the designation of critical habitat. In those cases, critical habitat designation would have little or no additional impact on economic development.

22. For how many species has the Service designated critical habitat?

To date, the Service has designated critical habitat for 135 of the 1,243 species listed as threatened or endangered.

23. Why hasn't the Service designated critical habitat for more species?

In the past the Service assigned a low priority to designating critical habitat because we believe that a more effective use of limited resources is to place imperiled species on the threatened and endangered species list. Recent court decisions however, have required the Service to designate critical habitat for an increasing number of listed species.

24. Why is critical habitat being designated for the piping plover?

Section 4(a)(3) of the ESA states that when a species is added to the threatened or endangered species list, we must designate critical habitat "to the maximum extent prudent." The 1985 final listing rule for the piping plover did not include a critical habitat designation, but deferred the determination for one year. We did not determine whether critical habitat designation was prudent or designate critical habitat by the end of that year. Because of this omission, in December 1996, Defenders of Wildlife filed a lawsuit against the Department of the Interior and the Service for failing to designate critical habitat for the piping plover. As a result of the lawsuit, the court has ordered the Service to designate critical habitat for the piping plover in the Great Lakes breeding area by April 30, 2001. The Service was also ordered to designate critical habitat for the Great Plains population by March 15, 2002.

25. What did the Service do with the comments it received?

Public comments are an important factor in making our final decision on how to proceed with the proposed action. All substantive input received by the close of the comment period was considered in our decision-making process. The Service does not reply to individual comments, but the final *Federal Register* document provides responses to significant and relevant issues raised by those who commented and explains why suggested changes are, or are not, incorporated. In finalizing the critical habitat designation, the Service revised its proposal after reviewing input received from the public.

26. How does the final determination differ from the proposal?

Based on a review of public comments received on the proposed determination of critical habitat for the Great Lakes breeding population of the piping plover, we re-evaluated our proposed designation of critical habitat for the piping plover. As a result, we made three significant changes in the final determination.

(1) We removed three sites -- Pensaukee Harbor and Peshtigo Point in Wisconsin and Erie Pier/Hearding Island (retaining Interstate Island) in Minnesota -- from the final critical habitat designation. We determined that these sites do not have, and are unlikely to develop, the features and habitat characteristics that are necessary to sustain the species and thus are no longer considered essential for the conservation of the species.

(2) The inland boundary for all critical habitat units was changed from the proposed 1 km to 500 meters (1,640 feet) inland from normal high water line. The proposed 1 km (0.6 mi.) inland boundary was intended to incorporate blow-out areas and extensive dune-wetland systems. These inland areas provide important foraging habitat as well as cobble pans between the dunes where plovers occasionally nest. Information received during the comment period indicates that the majority of the dune systems within designated critical habitat do not extend further than 500 meters (1,640 feet) inland from the normal high water line.

(3) We excluded lands covered by an approved Habitat Conservation Plan (HCP) from the final determination of critical habitat for the Great Lakes breeding population of the piping plover. In our proposed determination of critical habitat for the Great Lakes population of the piping plover, we asked for public comment on the appropriate relationship between approved

HCPs and designated critical habitat. After considering the comments we received, we have chosen to evaluate areas covered by an approved HCP for the piping plover for exclusion under the benefits-balancing test found in section 4(b)(2) of the Act. This section allows us to exclude areas upon determination that the benefits of excluding the area outweigh the benefits of including the area in the critical habitat designation, provided the exclusion would not result in the extinction of the species.

Currently, one approved HCP (The Magic Carpet Woods Association HCP) exists for the piping plover in the Great Lakes region. This HCP covers approximately 2,600 feet (792 meters) of shoreline along Cathead Bay in Leelanau County, Michigan. This plan addresses the piping plover as a covered species and provides conservation management and protection for the species. We evaluated this plan and determined that the conservation management measures and protection afforded the piping plover are sufficient to assure its conservation on the involved lands.

27. The original proposal for piping plover critical habitat included approximately 189 miles (305 km) of shoreline. This final determination includes approximately 201 miles (325 km) of shoreline as designated critical habitat. Are you adding more land to the critical habitat designation?

No, we are not adding more land to this final determination. In fact, more than 8 miles of shoreline (13 km) were removed from the proposed critical habitat determination. Most of the apparent shoreline additions are the result of corrections made in response to public comments. While the descriptions in the proposed rule accurately represented the areas, in some cases the length of the shoreline was not accurate and was corrected in this final determination.

28. Why is unoccupied habitat being designated?

Currently, there are about 30 breeding pairs of piping plovers in the Great Lakes area, all of which occur in Michigan. The Great Lakes and Northern Great Plains Piping Plover Recovery Plan (1988) establishes a recovery goal of 150 breeding pairs in the Great Lakes watershed. This number is considered a minimum for the recovery of the species and eventual removal from the protections of Act. Of these 150 breeding pairs, at least 100 are planned in Michigan and at least 50 in other Great Lakes states. In order to achieve this recovery goal, additional habitat areas are needed beyond those currently occupied by the species. We have designated unoccupied areas as critical habitat on the basis of historical occurrence and the existence of some or all of the primary constituent elements.

29. When does the final determination become effective?

This final determination of critical habitat goes into effect 30 days following its publication in the *Federal Register*.

30. Where can I get more information on the piping plover and critical habitat?

For more information, visit our web sites at: http://midwest.fws.gov/endangered/pipingplover You may also telephone the Fort Snelling, Minnesota, Division of Endangered Species office at 612-713-5350.

Summary of the Final Determination of Critical Habitat for the Great Lakes Breeding Population of the Piping Plover

Under the terms of a court order, the U.S. Fish and Wildlife Service (Service) is designating critical habitat for the Great Lakes breeding population of the piping plover (*Charadrius melodus*), in certain areas along the Great Lakes shorelines of Minnesota, Wisconsin, Michigan, Illinois, Indiana, Ohio, Pennsylvania, and New York. This population of the piping plover is listed as endangered under the Endangered Species Act of 1973, as amended (Act).

Background

The piping plover is a small, stocky, sand-colored shorebird. The adult has yellow-orange legs, a black band across the forehead from eye to eye, and a black ring around the base of the neck. They breed on the shoreline and islands of the Great Lakes in north-central United States and south-central Canada and migrate to their wintering grounds on the Atlantic and Gulf Coasts from southern North Carolina to Mexico and into the West Indies and Bahamas.

Historically, the Great Lakes population of the piping plover nested on beaches in Illinois, Indiana, Michigan, Minnesota, Ohio, Pennsylvania, New York and Wisconsin and in Ontario, Canada. Although piping plovers were never abundant, pre-settlement populations in the Great Lakes are estimated at 492-682 breeding pairs. Piping plover populations have declined drastically, especially in the Great Lakes. As shoreline development expanded, the plovers lost their breeding habitat. By the time the species was listed under the Endangered Species Act in 1985, the Great Lakes population numbered only 17 breeding pairs and the breeding areas had been reduced from sites in eight states to only northern Michigan.

In recent years, the Great Lakes population has gradually increased and expanded to the south and west. In 2000, 30 pairs of piping plovers nested on United States Great Lakes shores, but all of these pairs were in northern Michigan. This population increase is the result of State, Tribal, Federal, and private conservation actions directed at the protection of the piping plover. Activities such as habitat surveys, beach restoration, public education, habitat protection and enhancement, and protecting nests from predators and disturbance through the use of predator exclosure fencing have all contributed to the improving status of the Great Lakes piping plover.

Critical habitat is a tool within the Act that identifies areas that are important to the conservation and recovery of a listed species. Within areas that are designated as critical habitat, Federal agencies are required to do a special review of activities that they intend to carry out, fund, or permit. Their activities cannot destroy or adversely modify the important components of critical habitat. However, a critical habitat designation does not affect actions that do not involve a Federal agency. For example, the designation of critical habitat does not affect a landowner undertaking a project on private land that does not involve Federal funding or require a Federal permit or authorization.

Designation of critical habitat can help focus conservation activities for a listed species by

identifying areas that contain the physical and biological features that are essential for the conservation of that species. Also, designation of critical habitat alerts the public as well as land-managing agencies to the importance of these areas, but the Endangered Species Act only imposes additional restrictions on the actions of Federal agencies.

When deciding what areas to designate as critical habitat, the Service looks at the physical and biological features that are necessary for the species to survive. These required features are called "primary constituent elements." Primary constituent elements include: 1) space for individual and population growth, and for normal behavior; 2) space for food, water, air, light, minerals, or other nutritional or physiological requirements; 3) cover or shelter; 4) sites for breeding, reproduction, or rearing of offspring; and; 5) habitat that is protected from disturbance or is representative of the historic geographical and ecological distributions of a species.

The Critical Habitat Designation

The primary constituent elements required to sustain the Great Lakes population of the piping plover are found on Great Lakes islands and mainland shorelines that support, or have the potential to support, open, sparsely vegetated sandy habitats, such as sand spits or sand beaches, that are associated with wide, unforested systems of dunes and inter-dune wetlands. Areas that may revert to these types of habitats or that can be restored to meet the needs of the piping plover may also be included, but it is only the areas with the primary constituent elements that are critical habitat, not all areas within the mapped boundaries. Urban areas, paved areas, buildings, marinas, boat ramps, and natural areas that do not contain the primary constituent elements, as outlined in the final determination, are not critical habitat even if they are within the mapped areas.

The Service is designating 35 critical habitat units for the Great Lakes population of the piping plover. These units occur in:

- St. Louis County, Minnesota
- Douglas, Ashland, Marinette, and Manitowoc Counties, Wisconsin
- Lake County, Illinois
- Porter County, Indiana
- Erie and Lake Counties, Ohio
- Erie County, Pennsylvania
- Oswego and Jefferson Counties, New York
- Alger, Schoolcraft, Luce, Mackinac, Chippewa, Iosco, Presque Isle, Cheboygan, Emmet, Charlevoix, Leelanau, Benzie, Mason and Muskegon Counties, Michigan.

The Service is designating critical habitat within approximately 201 miles (325 km) of mainland and island shoreline for the piping plover in these 26 counties. Within the 35 critical habitat units, only the areas that contain the primary constituent elements of piping plover habitat, as described above, are designated as critical habitat.

Changes from Proposal

The Service proposed critical habitat for the Great Lakes breeding population of the piping plover on July 6, 2000. A 137-day public comment period followed. Based on a review of public

comments received on the proposal, we re-evaluated our proposed designation of critical habitat for the piping plover. As a result, we made three significant changes in the final determination.

(1) We removed three sites – Pensaukee Harbor and Peshtigo Point in Wisconsin, and Erie Pier/Hearding Island (retaining Interstate Island) in Minnesota -- from the final critical habitat designation. We determined that these sites do not have, and are unlikely to develop, the features and habitat characteristics that are necessary to sustain the species and thus are no longer considered essential for the conservation of the species.

(2) The inland boundary for all critical habitat units was changed from the proposed 1 km to 500 meters (1,640 feet) inland from normal high water line. The proposed 1 km (0.6 mi.) inland boundary was intended to incorporate blow-out areas and extensive dune-wetland systems. These inland areas provide important foraging habitat as well as cobble pans between the dunes where plovers occasionally nest. Information received during the comment period indicates that the majority of the dune systems within designated critical habitat do not extend further than 500 meters (1,640 feet) inland from the normal high water line.

(3) We excluded lands covered by an approved Habitat Conservation Plan (HCP) from the final determination of critical habitat for the Great Lakes breeding population of the piping plover. In our proposed determination of critical habitat for the Great Lakes population of the piping plover, we asked for public comment on the appropriate relationship between approved HCPs and designated critical habitat. After considering the comments we received, we have chosen to evaluate areas covered by an approved HCP for the piping plover for exclusion under the benefits-balancing test found in section 4(b)(2) of the Act. This section allows us to exclude areas upon determination that the benefits of excluding the area outweigh the benefits of including the are in the critical habitat designation, provided the exclusion would not result in the extinction of the species.

Presently, one approved HCP (The Magic Carpet Woods Association HCP) exists for the piping plover in the Great Lakes region. This HCP covers approximately 2,600 feet (792 meters) of shoreline along Cathead Bay in Leelanau County, Michigan. This plan addresses the piping plover as a covered species and provides conservation management and protection for the species. We evaluated this plan and determined that the conservation management measures and protection afforded the piping plover are sufficient to assure its conservation on the involved lands.

The Economic Analysis

The Service conducted an analysis of the economic and other relevant impacts that may result from this designation of critical habitat. A draft of this economic analysis was made available for public review and comment. The final addendum to the economic analysis on the designation is available on our website or by contacting us at the phone number or address below.

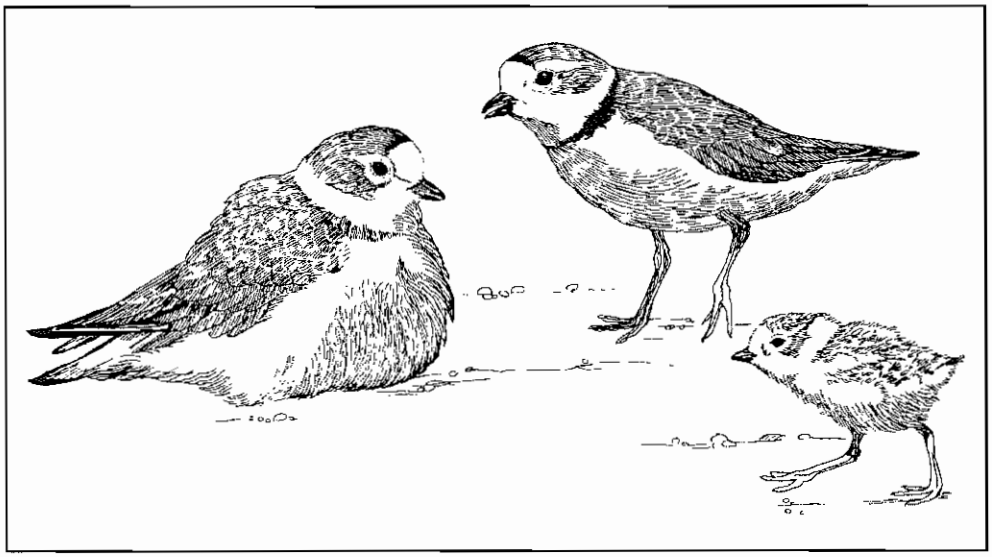
Contacts

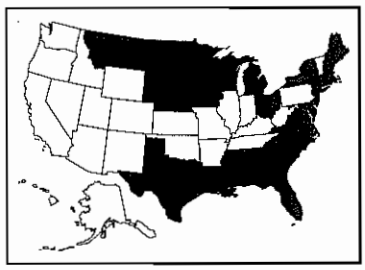
For more information or to request a copy of the final critical habitat determination for the

Great Lakes breeding population of piping plovers or the economic analysis write to the U.S. Fish and Wildlife Service, 1 Federal Drive, Fort Snelling, Minnesota 55111 or call 612-713-5350. Additional information and the complete documents are also available on our World Wide Web site at http://midwest.fws.gov/endangered/pipingplover

U.S. Fish & Wildlife Service

Endangered Species Facts





States in which the piping plover is found. This map includes both summer and winter locations.

Piping Plover

The piping plover in the Great Lakes area is an *endangered species.* Endangered species are animals and plants that are in danger of becoming extinct. The Northern Great Plains and Atlantic Coast piping plovers are *threatened species.* Threatened species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is the Piping Plover?

Scientific Name - *Charadrius melodus*

Appearance - These small, stocky shorebirds have a sand-colored upper body, a white underside, and orange legs. During the breeding season, adults have a black forehead, a black breast band, and an orange bill.

Habitat - Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands.

Reproduction - The female lays four eggs in its small, shallow nest lined with pebbles or broken shells. Both parents care for the eggs and chicks. When the chicks hatch, they are able to run about and feed themselves within hours.

Feeding Habits - The plovers eat insects, spiders, and crustaceans.

Range - Piping plovers are migratory birds. In the spring and summer they breed in the northern United States and Canada. There are three locations where piping plovers nest in North America: the shorelines of the Great Lakes, the shores of rivers and lakes in the Northern Great Plains, and along the Atlantic Coast. Their nesting range has become smaller over the years, especially in the Great Lakes area. In the fall, plovers migrate south and winter along the Gulf Coast or other southern locations.

The Great Lakes population of the piping plover is at a perilously low level. Since 1983, the number of nesting pairs has ranged from 12 to 32. In 2000, all of the Great Lakes pairs nested in Michigan.

Why is the piping plover endangered?

Habitat Loss or Degradation - Many of the coastal beaches traditionally used by piping plovers for nesting have been lost to commercial, residential, and recreational developments. Through the use of dams or other water control structures, humans are able to raise and lower the water levels of many lakes and rivers of plover inland nest sites. Too much water in the spring floods the plovers' nests. Too little water over a long period of time allows grasses and other vegetation to grow on the prime nesting beaches, making these sites unsuitable for successful nesting.

Nest Disturbance and Predation - Piping plovers are very sensitive to the presence of humans. Too much disturbance causes the parent birds to abandon their nest. People (either on foot or in a vehicle) using the beaches where the birds nest sometimes accidentally crush eggs or young birds. Dogs and cats often harass and kill the birds. Other animals, such as fox, gulls, and crows, prey on the young plovers or eggs.

What is being done to prevent extinction of the piping plover?

Listing - The Great Lakes population of the piping plover was listed as an endangered species in 1986, and the Northern Great Plains and Atlantic Coast populations were listed as threatened species that same year.

Recovery Plans - The U.S. Fish and Wildlife Service developed recovery plans that describe actions that need to be taken to help the bird survive and recover.

Research - Several cooperative research groups have been set up among federal and state agencies, university and private research centers, and the Canadian Wildlife Service. Studies are being conducted to determine where plovers breed and winter, estimate numbers, and monitor long-term changes in populations.

Habitat Protection - Measures to protect the bird's habitat are conducted each year (often by volunteers), including controlling human access to nesting areas, nest monitoring and protection, limiting residential and industrial development, and properly managing water flow. In Michigan, several landowners have formally agreed to protect plover nesting habitat.

Public Education - Many states and private agencies are running successful public information campaigns to raise awareness of the plover's plight. In Michigan, residents of coastal communities where the birds nest have been contacted by an "ambassador" and provided with information about the plight of the plover.

What can I do to prevent the extinction of species?

Learn - Learn more about the piping plover and other endangered and threatened species. Understand how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity. Tell others about what you have learned.

Volunteer - If piping plovers live near you, join the "Plover Patrol" (information about the "Plover Patrol" is on the website to the right). Or volunteer your time at a nearby Nature Center, Wildlife Sanctuary or National Wildlife Refuge. Make sure you control pets, and always remove litter on beaches. Encourage others to do the same.

U.S. Fish & Wildlife Service
1 Federal Drive
Fort Snelling, Minnesota 55111
612/713-5337
http://midwest.fws.gov/eco_serv/endangrd

ATTACHMENT 3

Memo to File February 22, 2011

From Carolyn Bury, CAS2 Ecologist Carolyn Bury

Subject: Abbreviated Screening Level Ecological Risk Assessment

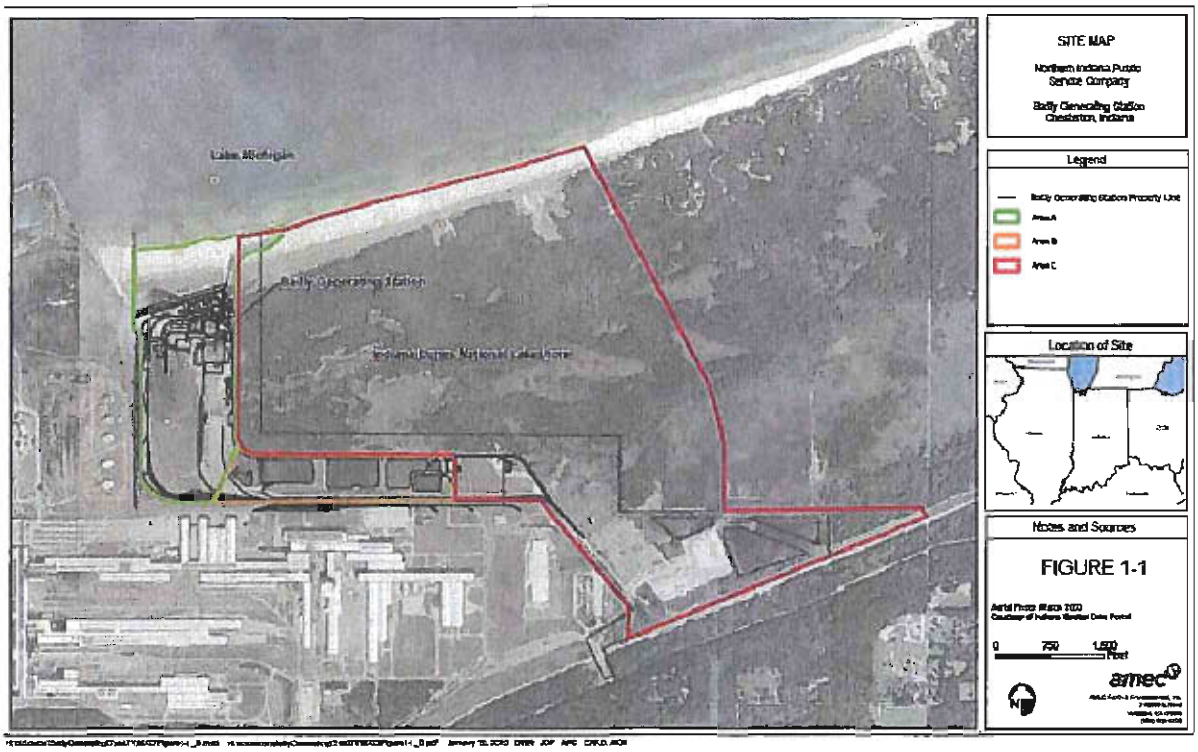
Northern Indiana Public Service Company, Bailey Generating Station, **Area B** (see attached figures)

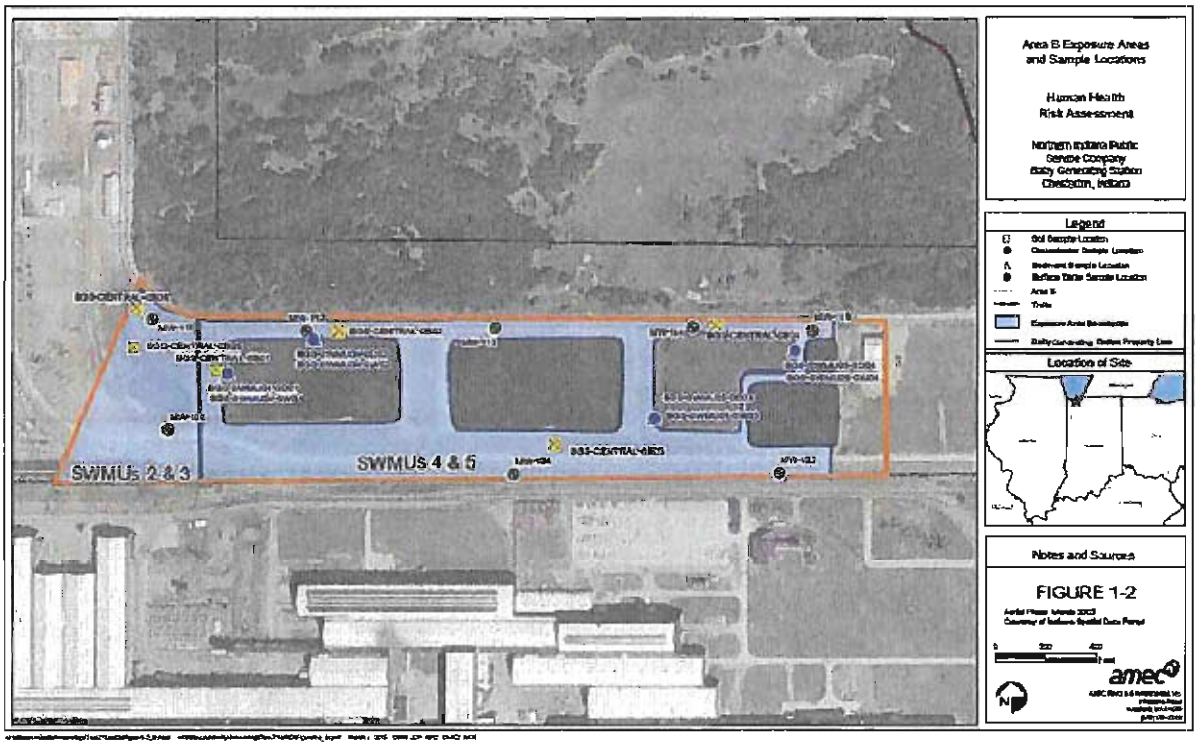
EPA ID # IND 000 718 114, Docket # RCRA-05-2005-0005

The landscape of Area B is dominated by four fly-ash ponds, a busy access road, berms and a fence. The limited habitat present is highly disturbed and of low quality. While Area B is directly adjacent to the Buffer Zone and Indiana Dunes National Lakeshore to the north, it is built on fill and significantly elevated above these areas and separated by a fence. To the south is a steel mill (currently Arcelor Mittal). Area B is separated from the steel mill by train tracks.

Between 2006 and 2009 I completed four field visits to this Site and did not observe wildlife/waterfowl use in Area B. However, incidental use by waterfowl is expected and this area is also likely a travel corridor for deer, coyotes, and other species. Therefore, while occasional complete exposure pathways to occasional receptors are probable, the exposures are not considered to be significant.

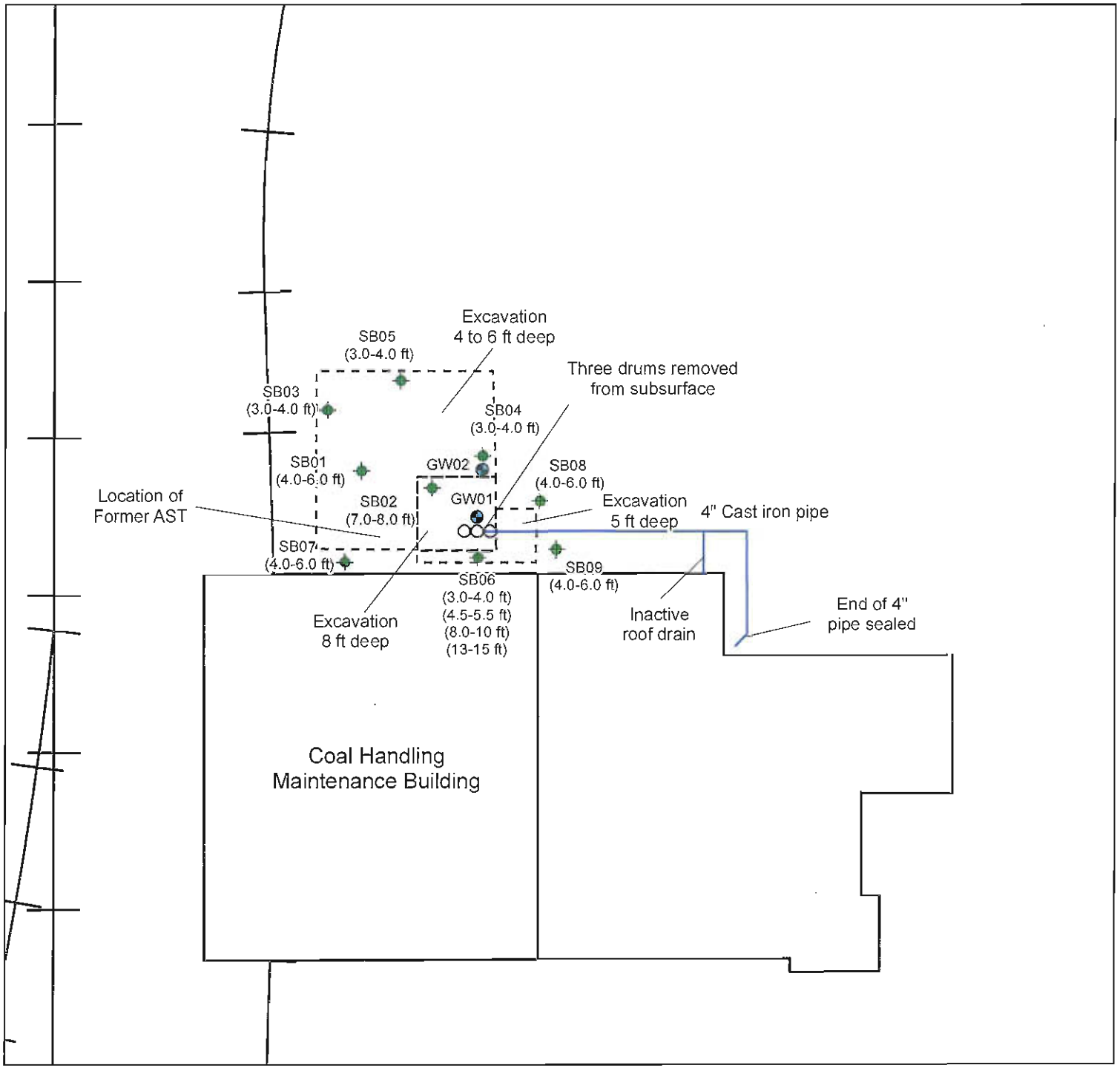
Because Area B is part of the facility's operations and contains only highly degraded habitat, the area should be eliminated from further ecological risk assessment.





Figures from *Draft Human Health Risk Assessment, NIPSCO Bailly Generating Station: Area B, Chesterton, Indiana*, March 29, 2010

ATTACHMENT 4



SWMU 10
Soil Excavation

Northern Indiana Public
Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Soil Sample Location
- (0.0-2.0 ft) Depth of Sample for Laboratory Analysis
- Existing Screening Level Groundwater Sample (at water table)
- Pipe
- Extent of Excavation

Location of Site

Notes and Sources

FIGURE 1

N

0 10 20
Feet

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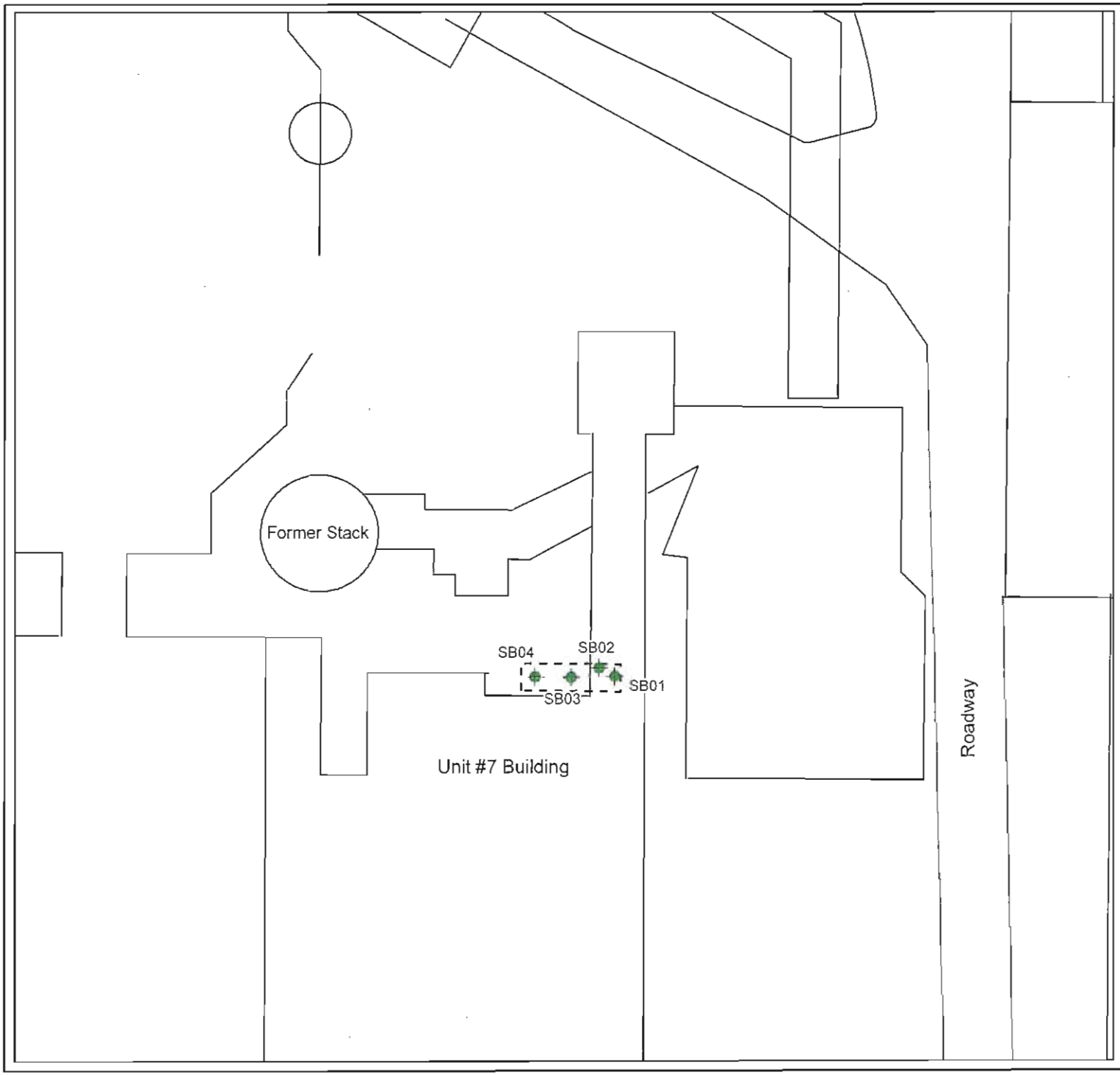

SWMU 20
Soil Excavation

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

Soil Sample Location

Extent of Excavation

Location of Site

Notes and Sources

FIGURE 2

N

0 20 40
Feet

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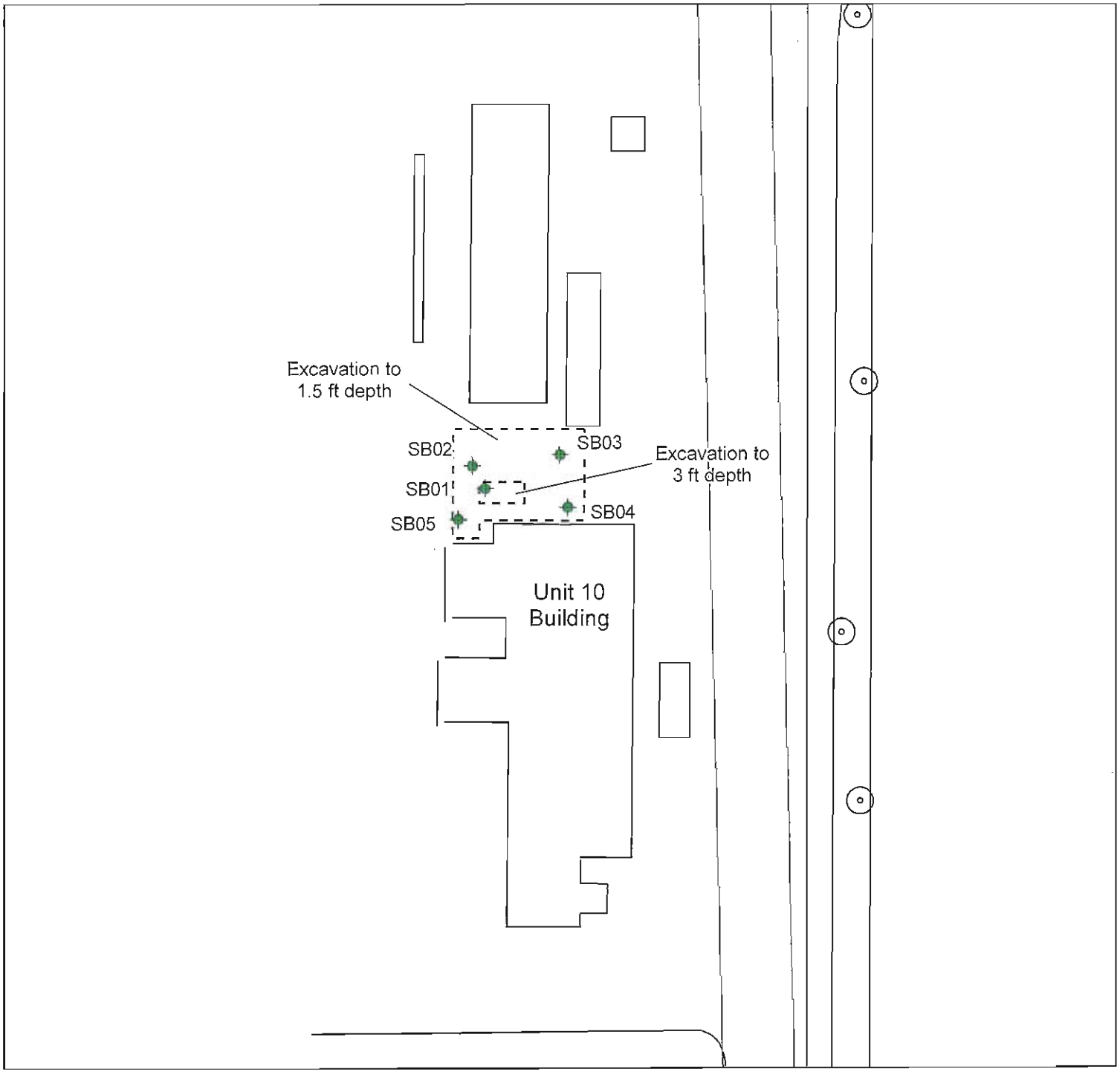


SWMU 21
Soil Excavation

Northern Indiana Public
Service Company

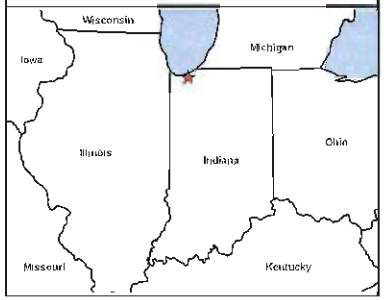
Bailly Generating Station
Chesterton, Indiana

Legend

Soil Sample Location

Extent of Excavation

Location of Site



Notes and Sources

FIGURE 3

N

0 20 40
Feet

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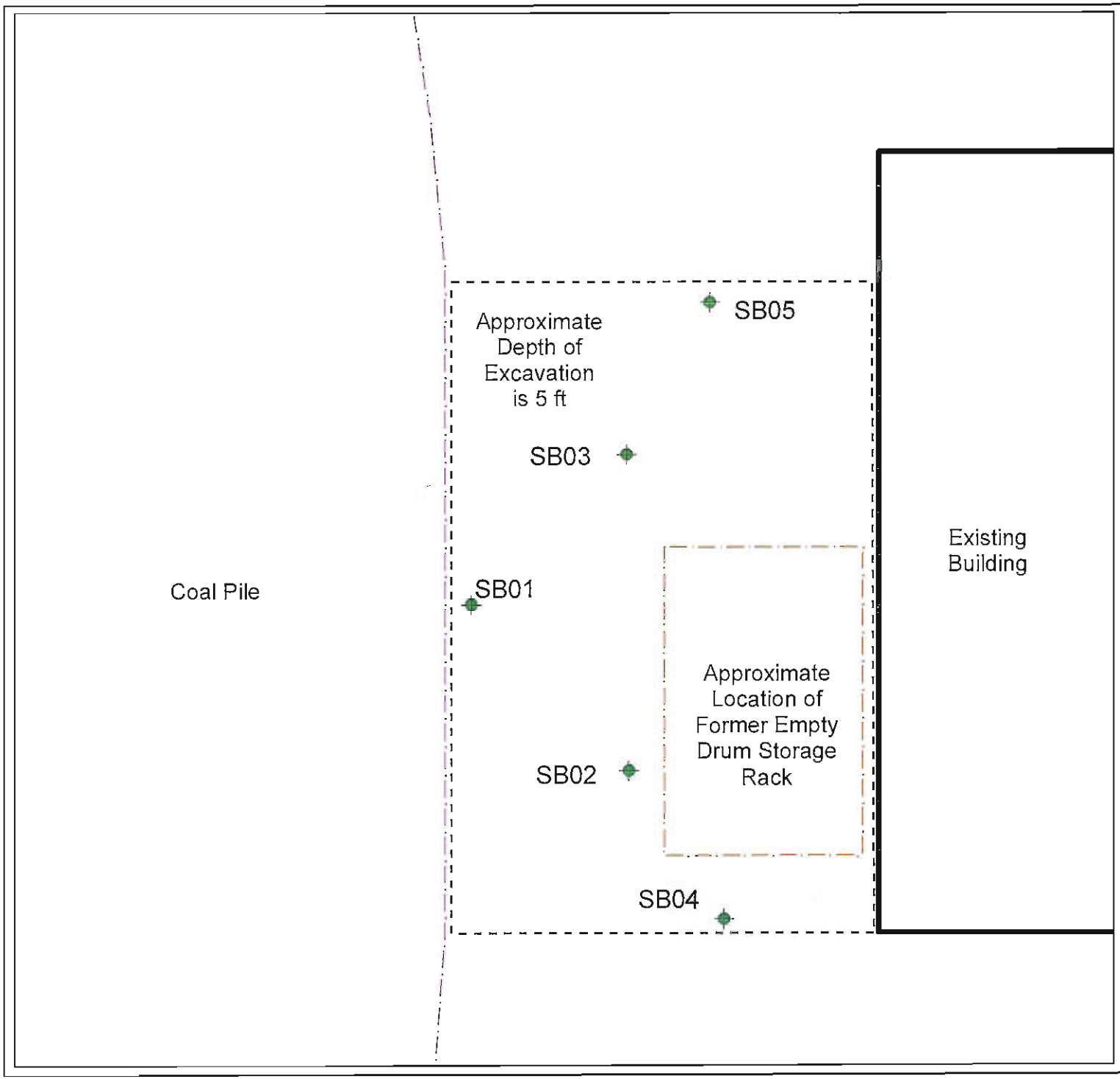


AOC 1
Soil Excavation

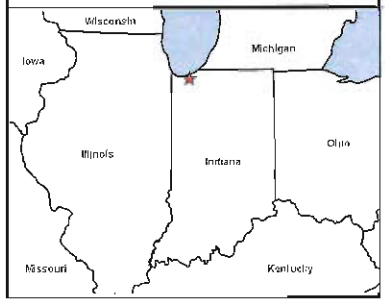
Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Soil Sample Location
- Extent of Excavation
- Coal Pile
- Former Drum Storage

Location of Site



Notes and Sources

FIGURE 4

N

0 5 10 Feet

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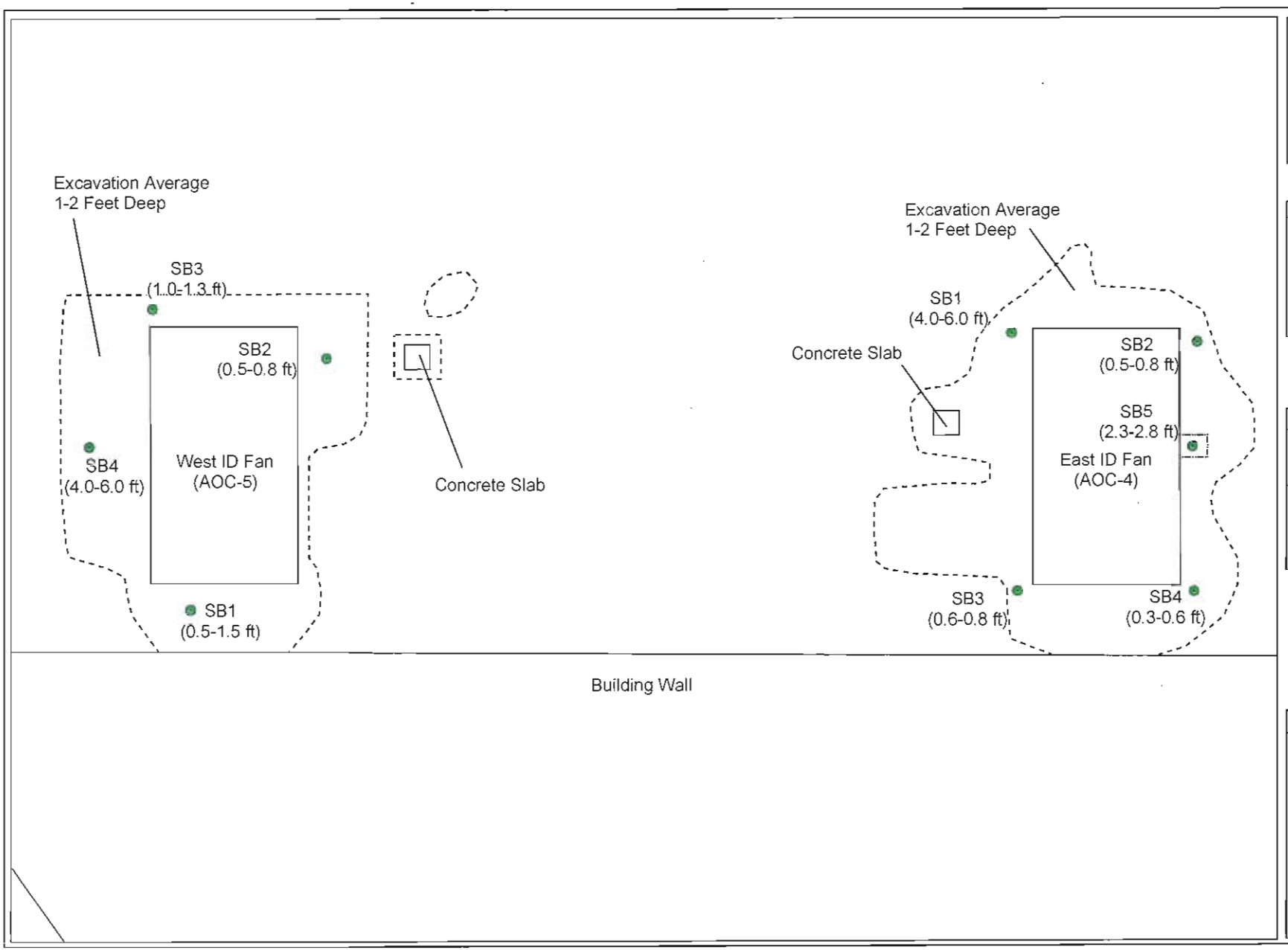

AOC 4/AOC 5
Soil Excavation

Northern Indiana Public
Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

Soil Sample Location

(0.0-2.0 ft) Depth of Sample for Laboratory Analysis

Extent of Excavation

Supplemental Excavation Area

Location of Site

Notes and Sources

FIGURE 5

N

0 10 20 Feet

amec

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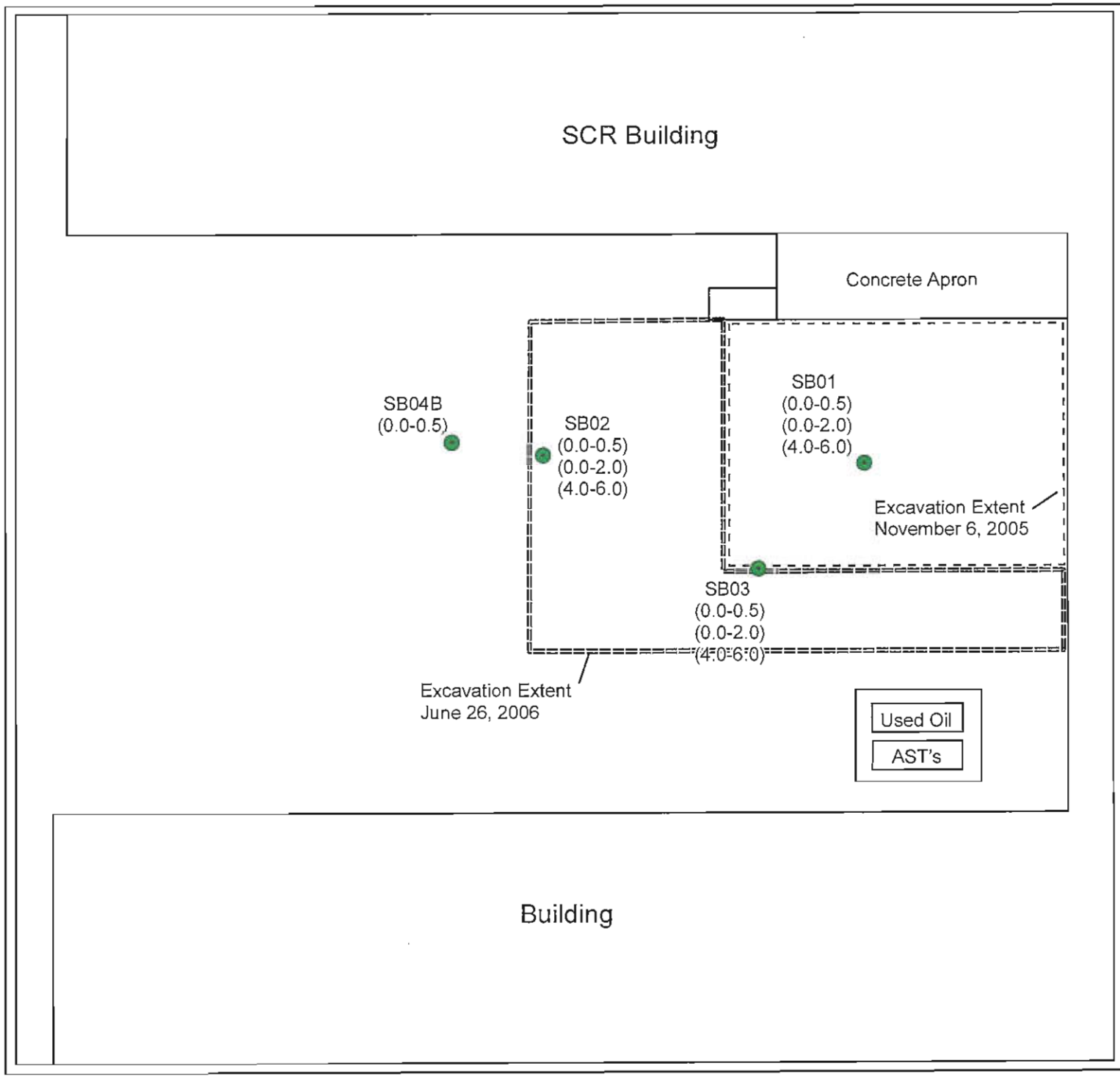

SWMU 16
Soil Excavation

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

- Soil Sample Location
- (0.0-2.0 ft) Depth of Sample for Laboratory Analysis
- Extent of Excavation
- Secondary Excavation

Location of Site

Notes and Sources

FIGURE 6

N

0 5 10
Feet

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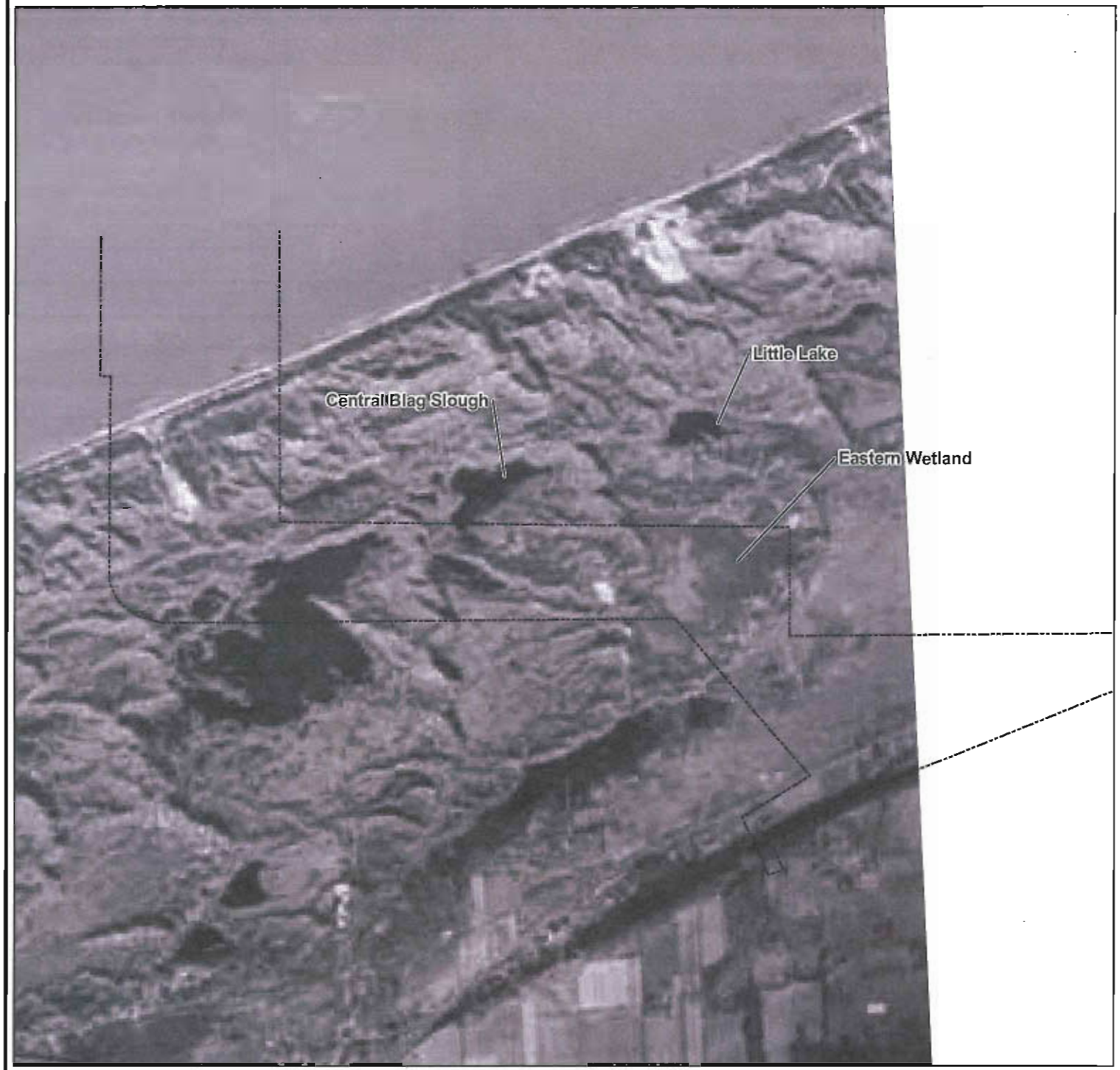
ATTACHMENT 5



Historic Air Photo 1951

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

---- Bailly Generating Station Property Line

Location of Site

FIGURE B-1

Aerial Photo: 1951,
Courtesy of USGS.

Approximate location of Bailly Generating Station.

N

0 400 800
Feet

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2 Robbins Road
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(978) 692-9090

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Historic Air Photo 1967

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

---- Bailly Generating Station Property Line

Location of Site

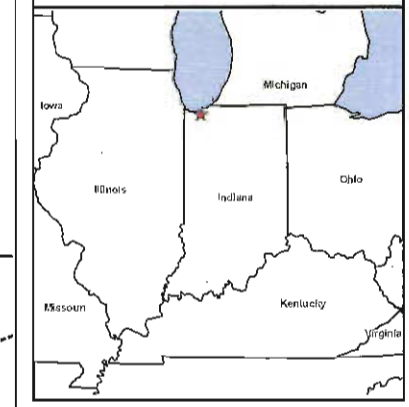

FIGURE B-2

Aerial Photo: 1967,
Courtesy of USGS.

Approximate location of Bailly Generating Station.

N

0 400 800
Feet

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2 Robbins Road
Westford, MA 01886
(978) 692-9090

Historic Oblique Air Photo c. 1970s

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

Bailly Generating Station Property Line

Location of Site

FIGURE B-3

1970s era aerial photograph looking southeast towards Bailly Generating Station. Photo provided by USGS.

Not to Scale

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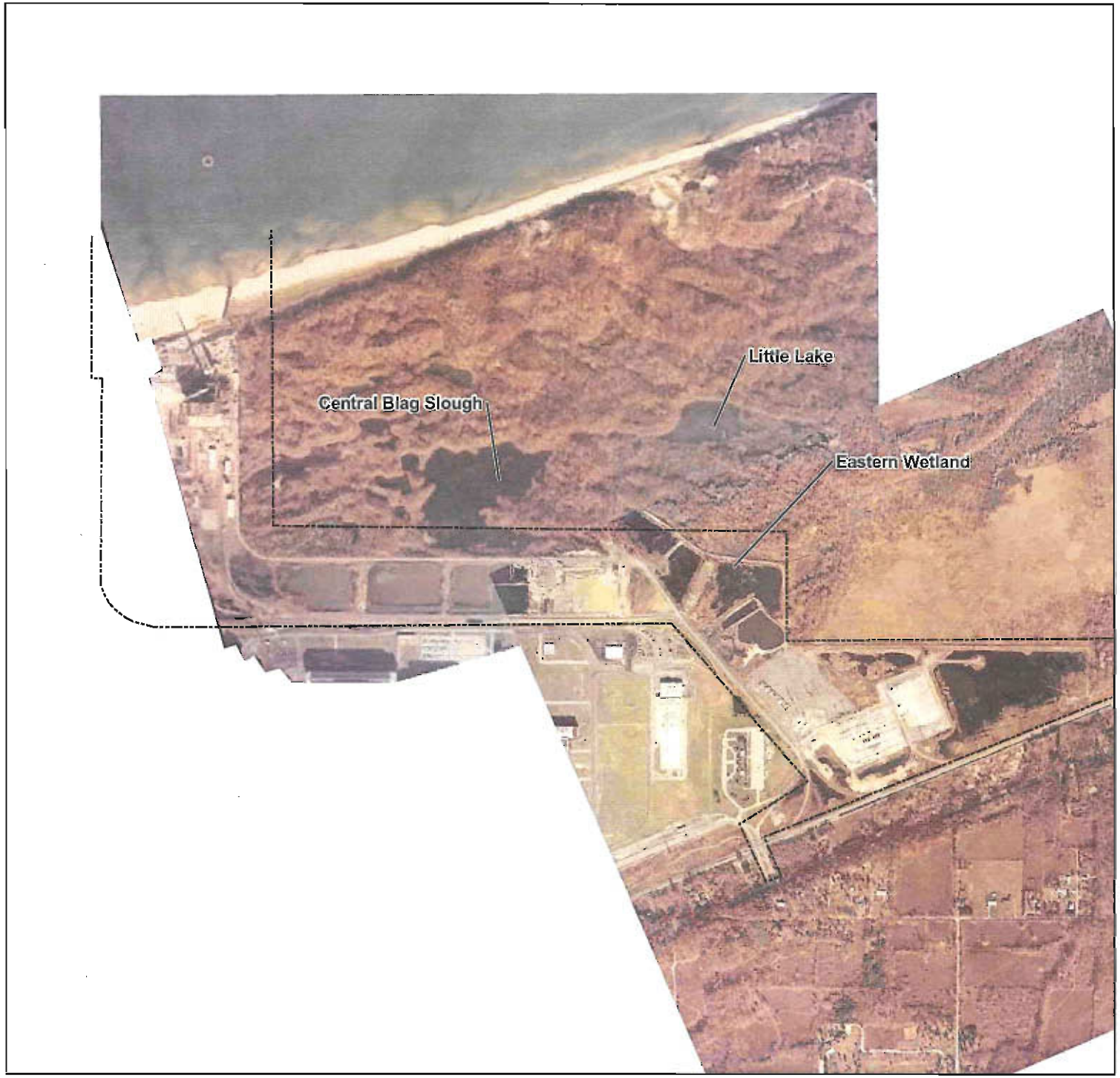

Historic Air Photo
1979

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

---- Bailly Generating Station Property Line

Location of Site

FIGURE B-4

Aerial Photo: 1979,
Courtesy of USGS.

Approximate location of Bailly Generating Station.

N

0 400 800
Feet

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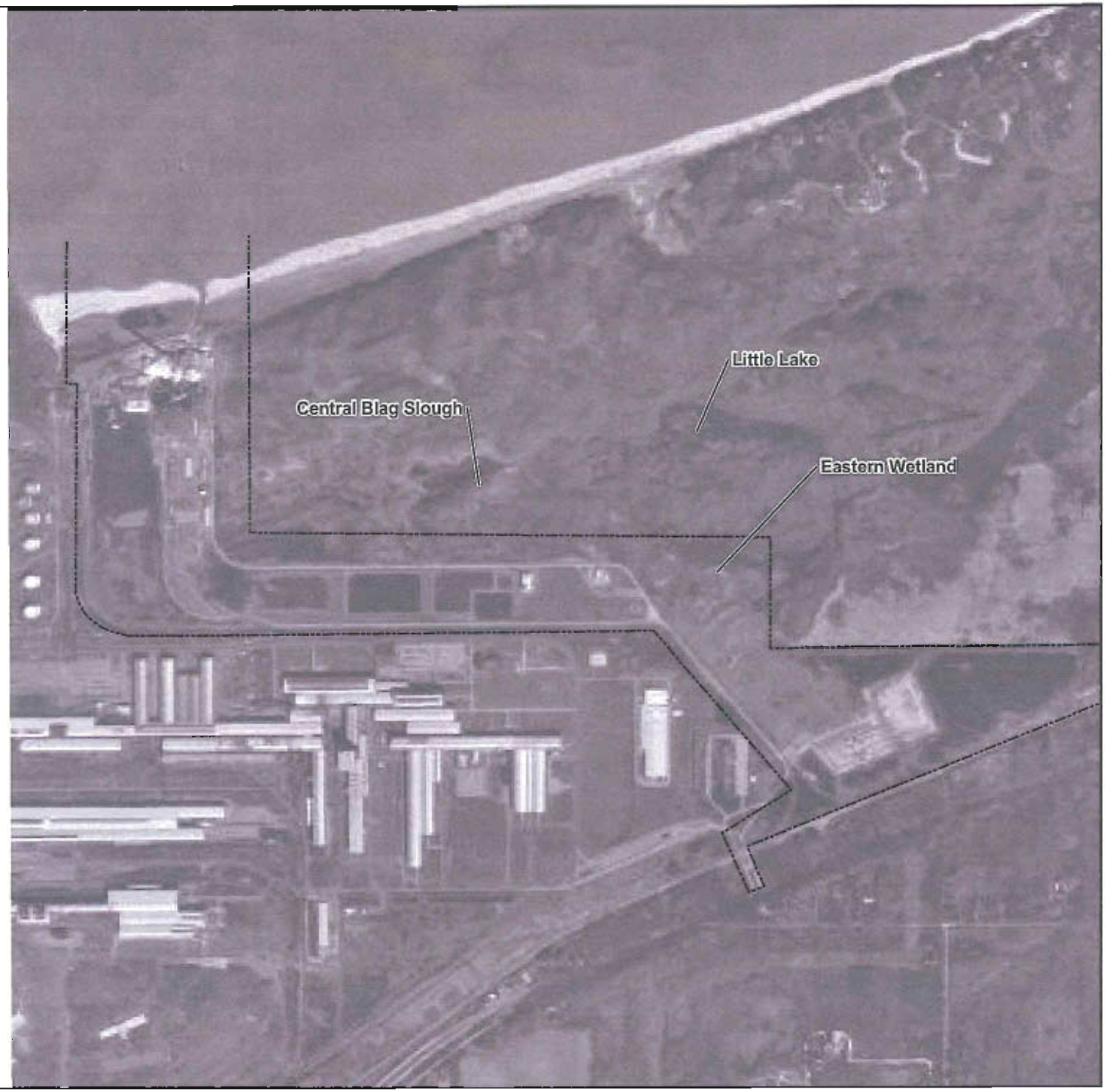

Historic Air Photo 1998

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

---- Bailly Generating Station Property Line

Location of Site

FIGURE B-5

Aerial Photo: 1998,
Courtesy of USGS.

Approximate location of Bailly Generating Station.

N

0 400 800
Feet

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Historic Air Photo 2003

Northern Indiana Public Service Company

Bailly Generating Station
Chesterton, Indiana

Legend

---- Bailly Generating Station Property Line

Location of Site

FIGURE B-6

Aerial Photo: March 2003,
Courtesy of Indiana Spatial Data Portal.

Approximate location of Bailly Generating Station.

N

0 400 800
Feet

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Westford, MA 01886
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Enclosure A

STATEMENT OF BASIS

for
Proposed Remedy for Soil and Groundwater Contamination at
Northern Indiana Public Service Company, NIPSCO
Bailly Generating Station
Areas 'A' and 'B'

Chesterton, Indiana

EPA ID No. IND 000 718 114

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF BASIS

July 2011

Northern Indiana Public Service Company (NIPSCO)
Bailly Generating Station
246 Bailly Station Road
Chesterton, Indiana
Areas "A" and "B"
EPA ID#: IND 000 718 114

INTRODUCTION

This *Statement of Basis* (SB) for the Northern Indiana Public Service Company (NIPSCO) Bailly Generating Station (the Facility), located in Chesterton, Indiana presents the proposed remedy to address the operational portions of the Facility, referred to as "Areas A and B". This SB does not apply to the other portion of the Facility, known as "Area C", or to off-site areas currently under investigation. In 2009, US Environmental Protection Agency (EPA) divided the Facility into three sub-sections (Areas A, B, and C) for the purpose of streamlining the corrective action process (Figure 1). Areas A and B are defined as those portions of the Facility which are involved in the current, on-going operations of the Facility. Area C is defined as that portion of the Facility that contains historic coal combustion by-product landfills and the off-site Indiana Dunes National Lakeshore (IDNL) area. The proposed remedy for Area C and any additional off-site areas identified will be presented in a separate SB in the future. EPA will select a final remedy only after the public comment period has ended and the information submitted during this time has been reviewed and considered. At this time, EPA is only taking comments on Areas A and B, as described in this document. EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA).

This document summarizes information that can be found in greater detail in the *Corrective Measures Proposal* (CMP) and other documents contained in the administrative record for this Facility (Attachment 1: Index to the Administrative Record). EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the Facility and activities that have been conducted there under the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §6901 et seq. The administrative record can be found at the local repository located within the

Portage Public Library and at EPA's Chicago office[1], as well as on-line at http://www.epa.gov/reg5rcra/wptdiv/sites/nipsco/index.html.

EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all corrective measure alternatives. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record and by attending the public meeting.

PROPOSED REMEDIES

EPA is proposing the following remedies to address contaminated soil and groundwater at several Solid Waste Management Units (SWMUs) and other Areas of Concern (AOCs) at the NIPSCO Facility (Figure 2). The following table is a summary of remedies proposed by EPA. In the following sections of this document more detailed explanation of each remedy is provided.

Contaminated Media		Proposed Remedy
Area A*	Soil	1. Excavation and off-site disposal 2. Institutional controls to limit future land use and potential exposure risk
	Groundwater	1. Monitoring to confirm soil remedy success 2. Institutional controls to limit potential future use and risk
Area B**	Soil	Institutional controls to limit future land use and potential exposure risk
	Groundwater	Institutional controls to limit potential future use and risk
Site Wide	All	Financial assurance to ensure remedies can be implemented and maintained

*Area A = SWMUs 10, 16, 18, 20, 21 and AOCs 1, 4, 5
**Area B = SWMUs 4 & 5

FACILITY BACKGROUND

The NIPSCO Facility is located in Northwestern Indiana, in the town of Chesterton. It provides electricity to customers throughout Northern Indiana. The entire site occupies approximately 330 acres in an industrial area along the shoreline of Lake Michigan. It is bordered on the north by Lake Michigan, on the north and east by a portion of the Indiana Dunes National Lakeshore (IDNL), on the west and south by the ArcelorMittal Steel Burns Harbor Plant, and partially on the south by U.S. Route 12 and freight and commuter rail lines.

1 Portage Public Library, 2665 Irving St., Portage, IN 46368, (219) 763-1508; EPA Region 5, 7th Floor Record Center, 77 W. Jackson Blvd., Chicago, IL 60604, (312) 886-4253.

The site consists of two coal fired electricity-generating units and their supporting buildings. In 1959, construction began on what would become known as Unit 7, a 194 Megawatt (MW) capacity high-pressure boiler and steam turbine. Unit 7 was completed and became operational in 1962. In 1966, a major plant modification and expansion project was undertaken to allow the construction of a second coal-fired generating unit. Referred to as Unit 8, this 422 MW capacity high-pressure boiler and steam turbine became operational in 1968.

The Facility currently consists of about 300,000 square feet of buildings, offices, and production areas. The Facility employs 180 people, and operates 24 hours a day, producing and supplying electricity to the northern one-third of Indiana. The western portion of the Facility, termed "Area A", contains rail lines, the coal feedstock pile, the coal feedstock pile run-off infiltration basin, debris storage areas, fly ash staging areas, and the majority of the Site's other SWMUs and AOCs. Area B is composed of the Settling Ponds and the Industrial Wastewater Treatment Plant, while Area C consists of the eastern landfill areas and the INDL Study Area (which is still under investigation). The Facility generates electricity for distribution to industrial, commercial, and residential customers using two coal-fired, high-pressure steam boilers, Boiler Units No. 7 and 8 (SWMU 27), each connected to a steam turbine generator. A third generator (Umit No. 10), which burns natural gas, is available during peak electrical demand.

Site Specific Characteristics and Physical Setting

Hydrogeological Setting

The Facility is located within the Calumet Lacustrine Plain, an area characterized by three post-glacial dune-beach complexes, and bordered on the north by Lake Michigan and on the south by the Valparaiso Morainal Area. The dune-beach complexes parallel the Facility and the current lakeshore boundary. Local geomorphology from the lakeshore to the south consists of the Holocene and Tolleston dune-beach complex, the western portion of the Great Marsh (an interdunal lowland), and the Calumet and Glenwood dune-beach complex. The Facility is situated within the Holocene and Tolleston dune-beach complex; however, the landscape has been modified to support Facility activities and consists primarily of fill materials. The land surface elevation ranges from approximately 578 feet above mean sea level (amsl) along the shore of Lake Michigan to approximately 620 ft amsl within the Facility, including Areas A and B (Figure 3).

The surficial aquifer under the Facility consists of glacially derived sediments associated directly or indirectly with the advance and retreat of the Lake Michigan ice lobe during the Wisconsinan glaciation. In the vicinity of Areas A and B, the surficial aquifer consists primarily of unconfined lacustrine sands and ranges in thickness from 20 to 40 ft. In unpaved areas, precipitation directly recharges the shallow unconfined aquifer via infiltration through permeable unsaturated zone soils. Groundwater flow in this aquifer is primarily horizontal and northward toward Lake Michigan.

Ecological Setting

Regionally, the Facility resides within an industrial corridor of Northwest Indiana. The site shares a border with a portion of the Indiana Dunes National Lakeshore. The IDNL is east and north of Areas A and B and currently still under EPA study as part of Area C (Figure 1). IDNL is a globally rare dune and swale ecosystem, meaning the land consists of a series of roughly parallel, sandy ridges and low, wet swales formed from irregular cycles of high and low water levels[2]. As a whole, the IDNL is composed of over 15,000 acres of dunes, oak savannas, swamps, bogs, marshes, prairies, rivers, and forests. Its landscape represents at least four major successive stages of historic Lake Michigan shorelines, making it one of the most extensive geologic records of one of the world's largest, fresh water bodies. Biological diversity within the IDNL is amongst the highest per unit area of all the national parks, with over 1,100 flowering plant species and more than 350 species of birds[3].

IDNL's unique ecosystem and proximity to the site warrants more extensive study to ensure that it is appropriately protected. EPA continues to evaluate IDNL and the nearby NIPSCO landfills while moving ahead with the remedy selection for the other areas of the Facility, Areas A and B. Areas A and B contain a limited amount of ecological habitat due to the industrialized nature of these portions of the Facility. Attachment 3 documents the absence of ecological habitat in Area B based upon the nature of the area being highly disturbed and of low ecological quality. The northern-most portion of Area A includes the Lake Michigan beach area, which was evaluated and the findings are presented later in this document within the "Investigations" and "Facility Risks" sections.

Although the total area of ecological habitat for these areas is small, of particular importance is the evaluation of potential risk to the piping plover, a federally endangered shore bird. Endangered species are animals and plants that are in danger of becoming extinct. By the time the piping plover was listed under the Endangered Species Act in 1985, the Great Lakes population numbered only 17 breeding pairs, and the breeding areas had been reduced from sites in eight states to only northern Michigan[4]. That is why it is so important that part of the Lake Michigan shoreline is designated "critical habitat". Critical habitat is afforded the same protections as the endangered species for which the habitat is listed. The designation can assist in land management decisions as well as alert the public and other regulatory authorities of the need for special consideration. Therefore, even though the plover is not known to visit this particular stretch of shoreline, it is recognized that the habitat is ideal for the plover and consequently a key in its recovery. The proximity of the critical habitat to the Facility was the basis for the evaluation of the plover as a receptor in the ecological risk assessment (see Attachment 2 for more information on IDNL and the piping plover).

Interim Measures

Some remediation work has been performed at the facility in the past. NIPSCO began conducting its investigation of soil and groundwater contamination shortly after signing

2 The Nature Conservancy, www.nature.org
3 The National Park Service, www.nps.gov
4 US Fish & Wildlife Service, www.fws.gov

an Administrative Order on Consent with EPA in 2005. When NIPSCO discovered unacceptable levels of contamination, they proposed and implemented remedies to address the problem. EPA had not selected the final remedy at the time they were discovered; these actions were done as "Interim Measures."

Eight units investigated during the RCRA Facility Investigation (RFI) in Area A were determined to have releases. Seven of these units include areas where interim measures were conducted: SWMU 10, SWMU 20, SWMU 21, AOC 1, AOC 4, AOC 5 and SWMU 16; these were remediated during implementation of the RFI (Attachment 4: Interim Measures Figures). Excavated soil from these units was sent to the Forest Lawn Landfill in Three Oaks, Michigan. All excavations were backfilled with clean fill obtained from Duneland Sand Company in Valparaiso, Indiana. The details of that work are below:

SWMU 10

Soil excavation was performed at SWMU 10 (Coal Handling Maintenance Building, see Attachment 4, Figure 1) after the previous above ground storage tank (AST) and associated piping were removed. Soil excavation started on April 12, 2006 and was completed on April 13, 2006. Excavation continued until all visually stained soil was removed, soil headspace measurements were at or below background readings of 0 – 1 ppm, and post confirmation soil sampling demonstrated removal of contaminated soil was complete. Six soil samples were collected to document post-excavation soil conditions. Based on these findings, three additional soil samples were collected. To achieve vertical delineation two deeper samples (8 to 10 and 13 to 15 ft bgs) were also collected. No compounds were detected above screening criteria and the sampling delineated the horizontal and vertical extent of detections.

To ensure any impact to the groundwater was appropriately characterized, two temporary "hydropunch" groundwater samples were collected at the water table, at approximately 32-34 ft bgs on June 7, 2006 for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) and metals analysis. Analytical results show there are no concentrations above the Indiana Department of Environmental Management Risk Integrated System of Closure (IDEM RISC) Default Industrial Groundwater Closure Levels for these groundwater samples. Based on these results and the results of the human health risk assessment, discussed above, the interim measure remediation has been completed for SWMU 10. After remediation efforts were completed, a new AST with automated overflow protection and secondary containment was installed at the site of the former structure. No additional work is required for SWMU 10.

SWMU 20

Soil excavation at SWMU 20 (Former Waste Oil Underground Storage Tank) started on April 4, 2006 and was completed on April 5, 2006 (see Attachment 4, Figure 2). The tank began operation in 1962 and was removed in 1988; however, the surrounding soil was not removed at that time. The excavation extended from the northern edge of the foundation of Unit #7 approximately 15 ft northward, and extended east-west approximately 50 ft. The excavation continued until all visually stained soil was removed, and soil headspace measurements were at or below background levels, which

was achieved at a depth of 3 ft bgs. Five post excavation soil samples were collected and validated analytical results indicate no constituents were detected above the IDEM RISC industrial soil closure levels at SWMU 20. Based on these results, the interim measure remediation was completed and no additional work is required at SWMU 20.

SWMU 21

Soil excavation was performed at SWMU 21 (Unit No. 10 UST) on April 4, 2006 (see Attachment 5, Figure 3). Soil excavation efforts continued until all visually stained soil was removed, and soil headspace measurements were at or below background. The final excavation was approximately 40 ft wide in the east-west direction, and extended approximately 30 ft north of the Unit No. 10 foundation, to a depth of approximately 1.5 ft bgs. Soil immediately around the overflow pipe was excavated to a depth of approximately 3 ft. A layer of unstained soil was present between the top of the UST and the stained soil that was removed beginning at the ground surface. Therefore, it was concluded that the UST at SWMU 21 did not need to be removed because the source of oil-stained soil was the overflow pipe above the ground surface, not loss of product from the tank itself. Five post-excavation soil samples were collected and validated analytical results indicated no constituents were detected above the IDEM RISC industrial soil closure levels at SWMU 21. Based on these results, the interim measure remediation was completed. After remediation efforts were completed, new automated overflow protection was installed in the Unit No. 10 UST. No additional work is required for SWMU 21.

AOC 1

Soil excavation was performed at AOC 1 (Empty Drum Storage) on April 10 and 11, 2006 (see Attachment 4, Figure 4). The excavation extent was based on the location of the drum storage rack and previous sampling conducted at the AOC. The excavation continued until all visually stained soil was removed, and soil headspace measurements were at or below background. The final excavation footprint was approximately 30'x50' and the depth was approximately 5 ft bgs. Five post-excavation soil samples were collected and validated analytical results indicate no constituents were detected above the IDEM RISC industrial soil closure levels. Based on these results, the interim measure remediation was completed. After remediation efforts were completed, a new enclosed containment structure with secondary containment was constructed at the site of the former unit. No additional work is required for AOC 1.

AOCs 4 & 5

Soil excavations were performed at AOC 4 and AOC 5 from June 21, 2006 to June 28, 2006, until all visually stained soil was removed, and soil headspace measurements were at or below background (see Attachment 4, Figure 5). VOC contaminated soil was removed from an approximate 60'x60' and 40'x60' footprint. The average excavation depth was one to two feet below ground surface. Five post excavation soil samples were collected at AOC 4 and AOC 5. Validated analytical results indicate no constituents were detected above the IDEM RISC industrial soil closure levels at AOC 4 and AOC 5. Based on these results, the interim measures remediation was completed. The east (AOC 4) and west (AOC 5) Induced Draft (ID) fan bearings and associated piping were replaced by NIPSCO. No additional work is required for AOCs 4 & 5.

SWMU 16

NIPSCO performed soil excavation at the former chemical cleaning fractionation tank (SWMU 16) located on the west side of the Unit No. 7 building (see Attachment 4, Figure 6). Five post-excavation soil samples were collected at SWMU 16. Validated analytical results indicate arsenic, benzo(a)pyrene toxic equivalent (BaP-TE), benzo(a)anthracene, benzo(a)pyrene, and benzo(b)flouranthene were detected above the IDEM RISC industrial soil closure levels in SWMU 16 soil that remained after the excavation was complete. Due to the inaccessibility of SWMU 16 to the public, as well as the determination that the future use for this area is industrial only, the human health risk assessment demonstrated that the presence of these compounds in SWMU 16 soil does not pose an unacceptable risk to human health. Based on this analysis and resulting conclusion, the interim measure remediation has been completed and no additional work is required for SWMU 16.

In addition to the past remediation activities in Area A, five units were investigated during the RFI in Area B and were determined to require no further action. These units included the Bottom Ash Pond (SWMU 2), the Bottom Ash Waste Pile (SWMU 3), the Settling Ponds (SWMU 4) and the Secondary Settling Pond #2 (SWMU 5). Historic releases to groundwater from the surface impoundments were terminated when the central settling ponds were dredged, reinstalled and lined in 1980. Current plumes of boron and selenium in groundwater were identified, delineated to screening level criteria and shown to be dissipating or stable, confirming the absence of a current source within Area B. The Human Health Risk Assessment for Area B, discussed above, concluded there are no unacceptable risks to human receptors in Area B. Remedial actions already performed are further discussed below.

Although not an action taken as a part of the RCRA Corrective Action, releases from the facility's unlined surface impoundments were addressed in the past. In July 1976, the National Park Service (NPS) notified NIPSCO that it estimated 1 million gallons of water per day were infiltrating from NIPSCO's unlined surface impoundments into the Indiana Dunes. In February 1978, NIPSCO agreed to permanently terminate the seepage. As part of this agreement, the company applied to the Indiana Stream Pollution Control Board for an amendment to its National Pollutant Discharge Elimination System (NPDES) permit that would authorize NIPSCO to discharge water from its ponds into Lake Michigan, currently known as Outfall 001 and regulated by IDEM. NIPSCO also reconfigured and sealed the ponds with a foot of natural clay liner, a membrane liner, and sand and buffer materials, completing construction in 1980 (Attachment 5: Historic Site Photos). Although the pond sources appear to be controlled, their legacy includes elevated groundwater metals plumes and soils with lowered pH within the IDNL.

The remaining Area A unit, SWMU 18 (also referred to as the Horseshoe Area) was identified as the source of dissolved metals plumes in groundwater that extend from SWMU 18 northward toward Lake Michigan. This area has been used to temporarily store coal combustion byproduct, or fly ash, generated intermittently when boilers or ductwork is cleaned since approximately 1986. The result of staging the material on bare ground was infiltration of contaminants through the soil and into the underlying groundwater. The plume has been delineated and is not discharging to Lake Michigan, as demonstrated by the data presented in the following section. Identification of SWMU 18

as the source was based upon waste stream knowledge, historic residuals management practices in the operating area of the site, groundwater flow direction, and the geometry of the plume as evidenced by monitoring well data. Based upon the size and scope of remediation needed at SWMU 18, it was not addressed as an interim measure. The proposed remedy for this SWMU is presented in more detail later in this document.

Investigations

Investigation activities conducted within Areas A and B included sampling of groundwater, soil, surface water, and sediment. The sample results presented here describe the current conditions, not the conditions that existed prior to the implementation of Interim Measures.

Groundwater, Surface Water, Soil and Sediment

Screening criteria are used to delineate the nature and extent of contamination on site compared to conservative values considered safe. Groundwater and surface water screening criteria, based upon the facility's conceptual site model and proximity to Lake Michigan, were derived from the Great Lakes Basin Methodologies (Indiana Department of Environmental Management, IDEM, 2002), also known as the Great Lakes Initiative (GLI) values. Some constituents did not have applicable GLI screening criteria and were therefore compared to other values, such as background values, National Recommended Surface Water Quality Criteria, Indiana Department of Environmental Management (IDEM) Risk Integrated System of Closure (RISC) values and EPA Regional Screening Levels for tap water (RSLs). Shallow groundwater was also compared to plant toxicity screening values, again, based upon the site-specific conceptual site model and the presence of shallow groundwater. Soil and sediment constituents were compared to IDEM RISC Industrial Soil Closure Levels or EPA Industrial Soil Regional Screening Levels. They were also compared to ecological values such as EPA Ecological Soil Screening Levels and EPA Region 5 Ecological Screening Levels.

The primary constituents of concern (COCs) found to be associated with the site are metals. Volatile and semi-volatile organic compounds (VOCs and SVOCs) were not consistently detected in the groundwater at the site. All thirteen groundwater-monitoring wells were sampled for these constituents before determining that further investigation was not warranted for these specific constituents. Based upon those findings, the groundwater has not been impacted by VOCs or SVOCs. Due to the presence of certain VOCs or SVOCs in the on-site Facility soils; however, these constituents were carried through the risk assessment process in both the human health and ecological risk assessments. That information will be covered in the risk portion of this document.

A variety of potential receptors were evaluated in the human health risk assessment including current and future Facility workers, trespassers and construction workers. Eleven ecological receptors, including four mammals, five birds (including the endangered piping plover), soil invertebrates, and terrestrial plants were evaluated in the ecological risk assessment. More information regarding those risk assessments can be found later in this document.

The potential risks from the Facility to the piping plover were evaluated through groundwater samples on the Lake Michigan shoreline. The plover is a shore bird that feeds and nests along the beach, its greatest potential risk from the Facility conditions would be the presence of contaminated groundwater, discharging to the Lake or accessible to the bird through feeding on the shoreline, above screening levels calculated specifically for the plover. The groundwater samples for the plover evaluation were collected within 100 feet of the shoreline in the surf zone where shorebirds would be expected to feed (Figure 4). EPA determined the sample locations. Although samples were collected at multiple depth intervals, the shallow groundwater samples were used for the purpose of evaluating the plover because deeper groundwater would not be accessible to the bird. A subset of data for the plover evaluation is presented below. In general, groundwater concentrations did not exceed the plover screening criteria; however, the plover was further evaluated within the ecological risk assessment, discussed below.

Piping Plover
Lake Michigan Beach Groundwater (100' Surf Zone)
Highest Concentration found in Five Samples

Constituent	Screening Criterion (ppm*)	Background GW Concentration** (ppm)	Highest Sample Concentration (0-2') (ppm)
aluminum	0.0269	0.14	0.01
arsenic	0.0006072	0.0032	0.00097
barium	0.0103	0.019	0.02
boron	0.2544	0.12	**0.27**
cadmium	0.00001001	0.001	0.0004
chromium	0.0004325	0.001	0.00078
copper	0.009	0.00228	0.0015
lead	0.0025	0.0017	0.0004
magnesium	1.963	22	12
manganese	0.0008149	1	0.0018
mercury	2.349E-09	0.000115	**0.00023**
molybdenum	0.008833	0.01	0.0041
selenium	0.00002163	0.001	0.00056
silver	0.0032	0.001	0.0004

*ppm = parts per million is a measurement equivalent to 1 milligram of the constituent per liter of water (mg/l) or 1 milligram per kilogram soil (mg/kg)

**Background groundwater concentrations are sampled from outside of the influence of the site in order to compare the Facility 's impacts to any naturally or regionally occurring concentrations of constituents.

It is important to compare the concentrations in the groundwater to the appropriate surface water quality standards because groundwater at the site discharges to Lake Michigan. Groundwater was screened against IDEM GLI criteria to ensure the site was not adversely impacting other receptors, particularly those specific to the Great Lakes. A summary of the Lake Michigan beach groundwater sampling from two locations is below. Although only two sample locations are presented below, there were a total of ten

sampling locations within this area of the lakeshore (Figure 4). Some locations consisted of multiple groundwater depth sampling intervals; a total of 21 individual samples were collected at the beach immediately north of the Facility. The robust nature of the sampling design ensured adequate delineation of groundwater quality both horizontally and vertically. Sample depth intervals ranged from 0-2 feet deep to 17-19 feet deep, where groundwater aquifers were encountered. This sample design allowed multiple exposure pathways and potential receptors to be evaluated from this single sampling event. Of the 21 individual samples, one location had boron, magnesium and selenium concentrations above background and screening values, and another location had boron only at concentrations above background and the screening value. Those samples are presented in the tables below (see Administrative Record for other samples).

An effort was taken to mitigate the effects of the Lake water on the groundwater aquifer, to ensure EPA was evaluating groundwater results before mixing in the groundwater-surface water interface. Through the development of a piper diagram, a graphical representation of the chemistry of a water sample, it was determined that although the aquifer is heavily influenced by lake water deeper samples were representative of groundwater outside of the zone where groundwater mixes with surface water.

Lake Michigan: Groundwater Delineation at the Shore (500' inland)

Sample Location LMB-GW06

Constituent	Background* Concentration (ppm)	GLI** Criteria (ppm)	Sample Concentration (5.7'-7.7') (ppm)	GLI** Criteria (ppm)	Sample Concentration (15.5'-17.5') (ppm)
aluminum	0.14	0.2	0.016	0.2	0.1
arsenic	0.0032	0.15	0.00044	0.15	0.0089
barium	0.019	0.91	0.019	7.24	0.054
boron	0.12	1.6	0.035	1.6	**1.8**
cadmium	0.001	0.0039	0.0004	0.018	0.002
chromium	0.001	0.13	0.00049	0.64	0.0006
copper	0.0023	0.016	0.001	0.085	0.0024
lead	0.0017	0.011	0.0004	0.075	0.002
magnesium	22	82	12	82	**110**
manganese	1	0.97	0.02	5.37	2.4
mercury	0.000115	0.00077	0.00023	0.00077	0.00023
molybdenum	0.01	0.8	0.0048	0.8	0.003
selenium	0.001	0.0046	0.00036	0.0046	**0.0059**
silver	0.001	0.1	0.0004	0.1	0.002

*Background concentrations were calculated in accordance with "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Interim Final Guidance" (USEPA 1989) and the "Addendum to Interim Final Guidance" (USEPA, 1992). **GLI criteria for certain constituents are hardness dependent and calculated in accordance with IDEM GLI methodologies using the following equation: GLI = exp{A*[ln(hardness)]+B}/1000ug/mg

Concentrations in bold exceed the GLI criteria and the background concentrations.

Sample Location LMB-GW08: (East of GW06)

Constituent	Background Concentration (ppm)	GLI Criteria (ppm)	Sample Concentration (5.7'-7.7') (ppm)	GLI Criteria (ppm)	Sample Concentration (16'-18') (ppm)
aluminum	0.14	0.2	0.0075	0.2	0.1
arsenic	0.0032	0.15	0.00055	0.15	0.015
barium	0.019	1.21	0.029	4.68	0.036
boron	0.12	1.6	0.09	1.6	**2.2**
cadmium	0.001	0.0048	0.0004	0.013	0.002
chromium	0.001	0.16	0.00034	0.46	0.002
copper	0.0023	0.02	0.0011	0.06	0.0019
lead	0.0017	0.014	0.0004	0.051	0.002
magnesium	22	82	17	82	74
manganese	1	1.22	0.027	3.75	1.3
mercury	0.000115	0.00077	0.00023	0.00077	0.00023
molybdenum	0.01	0.8	0.0023	0.8	0.003
selenium	0.001	0.0046	0.0015	0.0046	0.0045
silver	0.001	0.1	0.0004	0.1	0.002

Soil

As indicated above, the Facility investigation also included several rounds of soil samples within Areas A & B (Figure 5). Soil samples were collected between 2005-2009 with a subset of the analytical data presented below. The following table presents sampling data that exceeded the screening criteria, IDEM RISC industrial values or EPA Regional Screening Levels for industrial land use in the absence of IDEM values. Within Area A, 15 total SWMUs or AOCs were sampled, and 7 had constituents in exceedence of the screening criteria. Within Area B, 4 SWMUs or AOCs were sampled and one had a single constituent in exceedence of the screening criteria. All exceedences were carried through to the risk assessment process, described in more detail below. The table presenting the soil samples contains only the highest concentrations of all constituents found above screening values within Areas A and B.

Areas A & B: Soil Samples Exceeding Screening Criteria

Area and Location of Samples[1]	Constituent	Screeuing Criterion[2,3]	Maximum Concentration Detected[2]	Depth[4]
Area A: SWMU 10	Benzo(A)Anthracene	15 ppm	60 ppm	4.5-5.5'
Area A: SWMU 10	Benzo(A)Pyrene	1.5 ppm	49 ppm	4.5-5.5'
Area A: SWMU 10	Benzo(B)Fluoranthene	15 ppm	70 ppm	4.5-5.5'
Area A: SWMU 10	Dibenzo(A,H)Anthracene	1.5 ppm	13 ppm	4.5-5.5'
Area A: SWMU 10	Indeno(1,2,3-CD)Pyrene	15 ppm	33 ppm	4.5-5.5'
Area A: SWMU 16/18	Arsenic	20 ppm	126J[5]/79 ppm	0-0.5'

[1]Solid Waste Management Unit (SWMU) or Area of Concern (AOC)

[2]Concentrations in parts per million (ppm); one ppm is equivalent to 1 milligram per kilogram soil (mg/kg)

[3]Indiana Department of Environmental Management (IDEM) RISC Industrial soil criteria (http://www.in.gov/idem/files/risctech_appendix1_2006.pdf)

[4]The depth refers to feet below ground surface

[5] "J" refers to this value as being an estimated value, meaning something interfered with the reliability of the data within the laboratory; however, for screening purposes that data can still be used to guide an investigation. The samples nearby this specific sample had much lower arsenic values, 1.4-26 ppm, likely more representative of concentrations at that SWMU. The next highest value from SWMU 18 is also reported.

SUMMARY OF FACILITY RISKS

The purpose of the risk assessments is to evaluate the potential adverse affects site-related constituents may be having, or may have in the future, on receptors. Human health risk assessments were conducted for both Areas A and B. An ecological risk assessment was conducted for Area A; but not for Area B. It was determined early in the site evaluation process that no viable ecological habitat exists within Area B, therefore, an ecological risk assessment was not preformed for Area B. Presented below is a summary of the data evaluated as part of the risk assessments. The tables present the various receptors that were evaluated as part of the risk assessment process after constituents of potential concern were identified in various media. Additional information on each risk assessment is provided below.

Area A: Ecological Risk

Exposure Area / Habitat	Receptor (1)	Total Hazard Quotients (2)										
		ALUMINUM	ARSENIC	BARIUM	BORON	CADMIUM	CHROMIUM	COPPER	LEAD	MANGANESE	MOLYBDENUM	SELENIUM
Northwest Area Woodland Swale	Shrew	2E-03			8E-02	6E-01		1E-03	2E-01	1E-01		
	Vole	2E-03			4E-01	2E-01		1E-03	1E-02	4E-01		
	Fox	3E-05			3E-04	8E-04		6E-06	2E-04	2E-04		
	Mink	3E-04			3E-04	3E-02		8E-05	1E-02	4E-03		
	Woodcock	2E-04			1E-02	1E-01		2E-04	3E-01	1E-02		
	C. Goose	5E-07			7E-05	1E-05		5E-07	9E-06	1E-05		
	Robin	1E-03			1E+00	4E-01		1E-03	9E-01	2E-01		
	Hawk	8E-07			3E-05	9E-04		7E-07	2E-03	1E-04		
	Plants-Soil				1E+00	2E-02			3E-01	2E+00		
	Plants-GW				7E-01					1E-01	3E-02	5E-03
	Soil Inv.				6E-01	4E-03			2E-02	1E+00		
SWMU26 Upland Slope Sucessional Meadow	Shrew				1E-01	6E-01	3E-01		2E-01	2E-01		
	Vole				4E-01	2E-01	4E-02		8E-03	5E-01		
	Fox				2E-03	5E-03	2E-03		1E-03	1E-03		
	Mink				2E-03	2E-01	7E-02		4E-02	3E-02		
	Woodcock				7E-02	5E-01	5E-01		8E-01	7E-02		
	C. Goose				5E-04	7E-05	3E-05		3E-05	9E-05		
	Robin				1E+00	5E-01	4E-01		6E-01	3E-01		
	Hawk				2E-04	5E-03	5E-03		8E-03	1E-03		
	Plants-Soil				1E+00	2E-02	1E+00		2E-01	**3E+00**		
	Plants-GW	2E-01	4E-02		**2E+00**	3E-03	2E-02	5E-02		2E-01	5E-02	2E-02
	Soil Inv.				7E-01	5E-03	5E-01		1E-02	1E+00		
West Area Upland Successional Meadow	Shrew			7E-02	1E-01					7E-02	4E-01	7E-01
	Vole			6E-02	2E-01					4E-02	7E-02	2E-01
	Fox			2E-04	8E-04					3E-04	5E-04	4E-03
	Mink			8E-03	5E-03					1E-02	9E-03	1E-01
	Woodcock			3E-01	2E-01					4E-02	1E-01	4E-01

	C. Goose			6E-05	1E-04					6E-06	5E-06	4E-05
	Robin			6E-01	8E-01					6E-02	1E-01	5E-01
	Hawk			3E-03	4E-04					4E-04	1E-04	4E-03
	Plants-Soil			3E-01	**7E+00**					**2E+00**		**3E+00**
	Soil Inv.			1E+00	**3E+00**					1E+00	2E-02	3E-01
Lake Michigan Beach and Outfall OO1												
LMB-GW01 & Outfall	Piping Plover	2E+00	2E+0	9E+00	9E-01		2E+01	2E+01	9E-01	4E-01	3E-01	2E+01
LMB-GW03 & Outfall		2E+00	2E+0	9E+00	6E-01		2E+01	2E+01	9E-01	4E-01	4E-01	2E+01
LMB-GW05 & Outfall		2E+00	2E+0	9E+00	9E-01		2E+01	2E+01	9E-01	4E-01	3E-01	2E+01
LMB-GW07 & Outfall		2E+00	2E+0	9E+00	**2E+00**		2E+01	3E+01	9E-01	8E-01	7E-01	4E+01
LMB-GW09 & Outfall		2E+00	3E+0	8E+00	7E-01		1E+01	3E+01	9E-01	4E-01	4E-01	2E+01

Notes:

(1) Terrestrial plants were evaluated for potential exposure to soil and groundwater. Receptors defined as "Plants-GW" and 'Plants-Soil" represent these pathways.

(2) Total hazard quotients represent the sum of all applicable hazard quotients for eaeh reeeptor (For example, the total HQ for the shrew is equal to the sum of HQs ealculated from soil, surface water, plants, and invertebrate).

HQ>1.0 There is potential for harmful effeets due to the contaminant in question that should be further evaluated through a risk management approaeh.

HQ=1 Contaminant *alone* is not likely to eause eeologieal risk

HQ<1.0 Harmful effeets are NOT likely

Bold indieates the HQ exeeeded both the target HQ of 1 as well as the respeetive referenee area HQ. Sec the discussion below for further explanation. Blank cells indicate constituent was not a COPEC in the given exposure area

Areas A and B: Human Health Risk

Potential Carcinogenic Risks

Receptor	Exposure Area	COPC	Medium	Maximum Concentration (mg/kg or mg/L)	Exposure Point Coucentration (mg/kg or mg/L) (1)	Total Excess Lifetime Cancer Risk
Current Facility Worker	NW Drainageway	BAP-TE	Surface Soil	3.4	3.4	$3x10^{-7}$
	NW Area	Arsenic	Surface Soil	126	29.4	$9x10^{-6}$
Current Trespasser	NW Drainageway	BAP-TE	Surface Soil	3.4	3.4	$1x10^{-7}$
	NW Area	Arsenic	Surface Soil	126	29.4	$2x10^{-7}$
Future Facility Worker	NW Drainageway	BAP-TE	Surface Soil	3.4	3.4	$3x10^{-6}$
	NW Area	Arsenic	Surface Soil	126	29.4	$9x10^{-6}$
Future Construction Worker	NW Drainageway	BAP-TE	Subsurface Soil	3.4	3.4	$2x10^{-7}$
	NW Area	Arsenic	Groundwater	0.018	0.018	$1x10^{-7}$
		BAP-TE	Subsurface Soil	78.6	5.2	$3x10^{-7}$
		Total				$4x10^{-7}$
	SWMU 26	Arsenic	Groundwater	0.018	0.018	$1x10^{-7}$
	Future Area B	Arsenic	Subsurface Soil	30	30	$6x10^{-7}$

Notes:

(1) Exposure Point Concentrations (EPCs) are the lower of the maximum detected concentrations and the 95% upper confidence limit (UCL) on the mean coneentration. The 95% UCL, as a means to guide a risk based deeision, is more conservative than the arithmetie average of the data. This is beeause it represents a coneentration at whieh 95% of the time the actual coneentration is below. Using the 95% UCL provides a wide margin of safety that takes into consideration the many variables and unknowns associated with environmental sampling and analysis.

Bold indieates the total exeess lifetime cancer risk exceeded the target risk of $10x10^{-5}$.

Blank cell indicate constituent was not a COPEC in the given exposure area

COPC – Constituent of potential concern

Mg/kg – milligrams per kilogram

Mg/L – milligrams per liter

Potential Non-Carcinogenic Hazards

Receptor	Exposure Area	COPC	Medium	Maximum Concentration (mg/kg or mg/L)	Exposure Point Concentration (mg/kg or mg/L) (1)	Total Hazard Index
Current Facility Worker	NW Drainage- way	Manganese	Surface Water	2.5	2.5	$2x10^{-4}$
		Benzo(a)pyrene	Surface Soil	2.1	2.1	$5x10^{-6}$
		Total				$2x10^{-4}$
	NW Area	Arsenic	Surface Soil	126	29.4	$5x10^{-2}$
		Total				$5x10^{-2}$
	SWMUs 4 & 5	Manganese	Surface Water	0.95	0.95	$6x10^{-5}$
Current Trespasser	NW Drainage- way	Manganese	Surface Water	2.5	2.5	$5x10^{-4}$
		Benzo(a)pyrene	Surface Soil	2.1	2.1	$7x10^{-6}$
		Total				$5x10^{-4}$
	NW Area	Arsenic	Surface Soil	126	29.4	$5x10^{-3}$
	SWMUs 4 & 5	Manganese	Surface Water	0.95	0.95	$2x10^{-4}$
Future Facility Worker	NW Drainage- way	Benzo(a)pyrene	Surface Soil	2.1	2.1	$6x10^{-5}$
	NW Area	Arsenic	Surface Soil	126	29.4	$5x10^{-2}$
Future Construction Worker	NW Drainage- way	Benzo(a)pyrene	Subsurface Soil	2.1	2.1	$6x10^{-5}$
	NW Area	Arsenic	Groundwater	0.018	0.018	$2x10^{-2}$
		Benzo(a)pyrene	Subsurface Soil	49	3.3	$1x10^{-4}$
		Manganese	Groundwater	2.4	2.4	$1x10^{-2}$
		Total				$3x10^{-2}$
	SWMU 26	Arsenic	Groundwater	0.018	0.018	$2x10^{-2}$
	Future Area B	Arsenic	Subsurface Soil	30	30	$9x10^{-2}$

Notes:

(1) Exposure Point Concentrations (EPCs) are the lower of the maximum deteeted concentrations and the 95% upper confidence limit (UCL) on the mean eoncentration. The 95% UCL, as a means to guide a risk based decision, is more conservative than the arithmetic average of the data. This is because it represents a concentration at which 95% of the time the actual eoncentration is below. Using the 95% UCL provides a wide margin of safety that takes into consideration the many variables and unknowns associated with environmental sampling and analysis.

Bold indieates the total hazard quotient (HQ) exceeded the target HQ of of 1.

Blank cell indicate constituent was not a COPEC in the given exposure area

COPC – Constituent of potential eoncern

Mg/kg – milligrams per kilogram

Mg/L – milligrams per liter

Area A Ecological Risk Assessment

An ecological risk assessment is the process through which scientists evaluate the likelihood that adverse ecological effects might occur, or are occurring, due to exposure to one or more stressors, such as chemical contamination. Within Area A, four exposure areas were identified as potential ecological habitat: the northwest swale, SWMU 26, the west area, and the Lake Michigan beach. Within these areas, eleven potential receptors and respective food-chains were evaluated, including: mammals, birds, invertebrates and plants. More specifically:

- Mammals:
  - Invertivores: shrew
  - Herbivores: meadow vole
  - Omnivores: fox
  - Carnivores: mink

- Birds:
    - Inland invertivores: woodcock
    - Shoreline invertivores: piping plover
    - Herbivores: Canada goose
    - Omnivores: robin
    - Carnivores: hawk
- Soil Invertebrates
- Plants

Assessment endpoints and risk questions were developed for each receptor in each potential habitat to help guide and focus the risk assessment. The endpoints were based on protecting the reproductive success and population sustainability of the selected non-Federally protected receptors for each habitat and were based on protecting *individual* members of the Federally protected species, the piping plover. Due to the sensitive nature of threatened or endangered species, risks are evaluated on an individual organism level. This provides an extra layer of conservatism, beyond protection of an overall population, by ensuring potential risks from the Facility won't adversely affect a single protected organism.

Risk questions developed from the assessment endpoints described above included:

- Does exposure to site-related contamination result in unacceptable adverse effects to the reproductive success and population sustainability of ecological receptors?
- Does exposure to site-related contamination result in unacceptable adverse effects to the survival, growth and reproduction of individual piping plovers?

The outcome of all measurement endpoint evaluations is a hazard quotient (HQ), which is the ratio of an estimated exposure dose to an established reference value. Basically, it provides a quantitative reference point for the potential risks associated with constituents of concern, hazardous chemicals and metals, for the purpose of making risk management decisions. An HQ greater than 1 means there is potential for harmful effects due to the chemical in question that should be further evaluated through a risk management approach. An HQ equal to 1 means the chemical alone is not likely to cause ecological risk. An HQ less than 1 means harmful effects are not likely. The result of the risk characterization for each habitat is as follows.

The northwest swale was evaluated as potential habitat for wildlife, invertebrates and plants. Hazard quotients (HQs) did not exceed 1 for both site media and reference areas for any receptors. Therefore, this habitat does not pose an unacceptable potential risk to the evaluated receptors.

SWMU 26 was evaluated as potential habitat for wildlife, invertebrates and plants. Hazard quotients did not exceed 1 for any wildlife or invertebrates, demonstrating that this habitat does not pose an unacceptable potential risk to those receptors. The HQs for plants relating to boron and manganese exposure (2 and 3, respectively) exceed the

threshold criteria of 1. When the HQ is greater than 1, potential risk should be further evaluated. Additional information was weighed during the risk management decision process for this SWMU and Area A as a whole as a result of the HQ exceeding 1. This area is within an active electricity-generating portion of the Facility, where ecological restoration would not be prudent. Neither the primary function nor use of this area is ecological habitat. Furthermore, the risk evaluation utilized "no-effects" reference points for the risk assessment due to the lack of "low-effects" reference points. This means the contaminated soil was compared to conservative "no observed effect" levels rather than more representative "low observed effect" levels. Consequently, the level of true site risk to plants at this SWMU was conservatively *overestimated.* This process, although producing extra conservative results, is fundamental in the risk management decision-making process that takes place in the proposed remedy evaluation and selection. EPA proposes the source control measures detailed below at SWMU 18 will serve to further reduce potential risk at SWMU 26; however, the current ecological risk associated with this SWMU is acceptable.

The west area was evaluated as potential habitat for wildlife, invertebrates and plants. Hazard quotients did not exceed 1 for wildlife; therefore, this area does not pose an unacceptable risk to those receptors. The HQs for plants exposure to boron, manganese and selenium exceed 1 (7, 2, 3 respectively). The HQ for invertebrates exposed to boron exceeds 1 (HQ=3). This risk evaluation helped guide the risk management decisions associated with the proposed remedy to address Area A as a whole. This area is also within an active portion of the site, where electricity is generated, making ecological restoration unrealistic. Further, the conservatism associated with an evaluation based upon "no-effect" levels provides adequate confidence that this area's potential risk to plants and invertebrates is extremely low. EPA's risk management decision for Area A, eliminating the source of groundwater contamination at SWMU 18 and employing appropriate institutional controls, may serve to further reduce the already acceptable risk in this nearby area.

The Lake Michigan beach area was evaluated as potential habitat for the endangered piping plover. All HQs for exposure to contamination in groundwater, surface water and sediment were below 1 or equivalent to reference area HQs, except for boron at location LMB-GW07. The total hazard quotient for exposure to boron at LMB-GW07 was 2, and about 75% of this estimated risk is from the groundwater exposure pathway, and 25% is from the surface water exposure pathway. The total HQ of 2 is essentially equivalent to the background groundwater HQ of 0.7. Based on this analysis, the beach habitat does not pose an unacceptable potential risk to the piping plover from site related constituents. Again, to further reduce the already acceptable risk, EPA's risk management decision for Area A is to eliminate the source of groundwater contamination from SWMU 18.

Areas A & B Human Health Risk Assessments

A human health risk assessment is the process by which scientists evaluate the potential for adverse risks to people in contact with certain medium at a site. Risk assessments characterize potential risks that may be present currently or could exist in the future from

site related contamination. Risk assessments performed for both Facility Areas A and B evaluated potential risks to the following human health receptor scenarios: current and future Facility workers, current and future trespassers, and future construction workers.

The first step in the risk assessment process is to determine the potential constituents of concern, or contaminants, to which potential human exposures may occur. Four constituents of concern were identified within Area A: arsenic, benzo(a)pyrene, benzo(a)pyrene toxic equivalents and manganese. Two constituents of concern were identified within Area B: arsenic and manganese. Affected media evaluated in both areas included surface soil, subsurface soil, surface water, sediment and groundwater. Exposure areas are then identified where potential risks could exist. Those areas within Area A include: the northwest drainage way, SWMU 26, Outfall 001, the northwest area and the west area. Within Area B they include: SWMUs 2 and 3, SWMUs 4 and 5, and the future use of the entire Area B.

The final risk characterization step of the risk assessment process combines toxicity information from the constituents of concern with receptor-specific parameters to provide a quantitative estimate of potential human health risks associated with each combination of constituent, medium, exposure area and receptor. The EPA has determined that the acceptable cancer risk range is between $1x10^{-4} - 1x10^{-6}$. In other words, the acceptable range for the chance of developing an additional incident of cancer from the contamination alone is 1-in-10,000 to 1-in-1 million. EPA prefers to select remedies that are at the more protective risk range. The non-carcinogenic risk is characterized by the hazard quotient (HQ), a ratio of an exposure level by a contaminant (e.g., maximum concentration) to a screening value selected for the risk assessment for that substance. The HQ is a means to express the relative safety of contaminants that are noncancerous but could cause other health or environmental problems. For contaminants that are cancerous, risks are estimated by the Excess Lifetime Cancer Risk, which is a function of the exposure and the toxicity of the contaminant. If the exposure level is higher than the toxicity value, then there is the potential for risk to the receptor and a risk management decision must be made.

In both Areas A and B, the estimated potential carcinogenic risks associated with potential exposures to all media and exposure areas were calculated to be less than the target risk of $1x10^{-5}$ and all non-carcinogenic hazard indices were less than the target hazard index of 1. Based on these findings, EPA has determined there are no unacceptable risks to human receptors in either Areas A or B.

SCOPE OF CORRECTIVE ACTION

As a result of historic waste management activities, EPA identified the NIPSCO Facility as being subject to certain provisions of RCRA, in particular RCRA Corrective Action. In April 2005, pursuant to Section 3008(h) of RCRA, 42 U.S.C. § 6928(h), EPA and NIPSCO entered into an Administrative Order on Consent (Order) requiring that various Corrective Action activities be undertaken and completed consistent with guidance and according to performance schedules.

A RCRA Facility Investigation (RFI) was conducted for Facility Areas A and B, and is currently on-going for Area C and portions of the adjacent IDNL property as required by the Order. Initially, RFI activities and reports (including site maps) referred to four distinct areas of the Facility and the adjacent IDNL property. To streamline implementation of the Corrective Action process, these five subdivisions were subsequently categorized into three primary areas – Area A, Area B and Area C (Figure 1). This document addresses Area A, upon which are located the primary operations of the Facility, and Area B in which the NPDES-permitted settling ponds are located. Although RFI activities are ongoing in Area C, investigation work and findings within Areas A and B are sufficiently complete to allow implementation of the next phase of the Corrective Action process; proposing, selecting and implementing final remedies which will be presented in more detail later in this document. Upon completion of the RFI activities in Area C, proposed remedies will be presented in a separate Statement of Basis at a later date.

SUMMARY OF ALTERNATIVES

Area A

This section provides descriptions of various remedial options that are potentially appropriate to address the migration of metals from SWMU 18 to the underlying groundwater, the remaining source of contamination within Area A. These remedial options have been chosen based on consideration of site-specific circumstances, and include only appropriate, implementable approaches consistent with expected future land use.

For the other parts of Area A, discussed in the Interim Measures section, excavation was chosen as the presumptive, interim remedy during various phases of the investigation. Excavation was the obvious choice due to its: (1) ease of implementation, (2) flexibility to allow additional removal based on visual assessment and field screening, (3) effectiveness in the short- and long-term by eliminating sources, which was easily verified through post-excavation sampling and analysis, (4) cost-effectiveness, (5) permanence and (6) acceptance as a proven technology. EPA is proposing that the interim measures conducted at the SWMUs and AOCs detailed above have adequately cleaned up the contamination to the standards appropriate for industrial land use. EPA's proposed remedy for SWMU 10, SWMU 20, SWMU 21, Area of Concern (AOC) 1, AOC 4, AOC 5 and SWMU 16 is that NIPSCO must maintain institutional controls to make sure that these areas cannot be converted to residential land use in the future, unless additional cleanup is conducted.

Area B

Area B also had work conducted previously to eliminate contaminant sources from the surface impoundments. Although that work, detailed in the previous section, was not part of the current corrective action program, EPA is proposing those remedial actions have

cleaned up those surface impoundments adequately, and that NIPSCO must file appropriate institutional controls to prevent unacceptable exposures.

Areas A & B

All interim and proposed final remedies will also include the appropriate institutional controls to ensure future land use remains industrial and potential exposure does not pose an unacceptable risk to any receptors. The following remedial options have been considered for all SWMUs and AOCs, with the exception of the previously lined surface impoundments:

No Further Action

This alternative assumes the degree of impacts from SWMU 18 are well understood and are generally minor; that natural processes such as sorption, dispersion and dilution are sufficient to address potential risks to Area A and Lake Michigan habitats; and, therefore, no additional monitoring or remedial efforts are necessary. No further action is the baseline case against which all other corrective measures are compared, as a point of reference.

Soil Capping

This alternative involves construction of a cap that would minimize the infiltration of water through SWMU 18 soils and thereby minimize the further migration of metals from soils to the underlying groundwater. Capping is assumed to include removal of all above ground coal combustion byproduct material present, installation of a 40-mil geomembrane liner over approximately one acre within the SWMU 18 berm, and placement of 6 inches of topsoil over the liner along with seeding, mulching, and installation of a perimeter drainage swale. Under this alternative, an appropriate institutional control would be recorded to limit land use to industrial purposes and would include specific operation and maintenance provisions to maintain the integrity of the cap and prevent worker exposure.

Soil Excavation and Off-Site Disposal

Excavation and off-site disposal of soils would serve to remove source material in SWMU 18 and thereby minimize the migration of metals from soils to the underlying groundwater. This alternative includes removal of coal combustion byproduct present at SWMU 18, excavation of impacted soils to target leachate goals[5] developed in the Corrective Measures Proposal for Areas A and B, and transportation to an off-site permitted landfill. The media cleanup standards will be site-specific target leachate goals for the purpose of aquifer restoration and protection. Approximately 780 cubic yards of soil will be removed, but may be increased based upon confirmation sampling. The excavation would be backfilled with a minimum of 6 inches of topsoil or other material capable of supporting vegetation, then seeded and mulched. Post excavation

[5] Target leachate goals were developed consistent with EPA's Soil Screening Guidance.

groundwater monitoring will occur in order to measure the success of the remedy. Appropriate groundwater points of compliance will be established up gradient of the excavation area. These locations will be monitored for metals until groundwater concentrations meet the GLI or MCL criteria, with the final remedial goal being the more conservative of the two. Once the criteria are met, the wells will continue to be monitored for a period of at least two years to confirm compliance.

As stated above, the long-term goals for groundwater remediation will be to meet either the GLI or MCL criteria (the more conservative of the two). The Great Lakes Water Quality Initiative was established to develop a consistent level of environmental protection for the Great Lakes ecosystem [60 Fed Reg 15366-15425]. Part of the intent behind the GLI program was to reduce disparities between water quality programs such that Great Lakes-specific criteria and methodologies to protect aquatic life, wildlife and human health were developed. The GLI methodologies were developed with the sensitivity of the Great Lakes resources in mind, including the lakes themselves, their connecting channels plus all of the streams, rivers, lakes and other bodies of water that are within the drainage basin of the Lakes [60 Fed Reg 15367]. However, for certain site constituents, the MCLs are more conservative than the GLI criteria. The Indiana portions of Lake Michigan waters are designated Outstanding State Resource Waters within the Great Lakes Basin [327 IAC 2-1.5-19] and provide a source of drinking water. "EPA expects final remedies to return 'usable' groundwaters to their maximum beneficial use, wherever practicable, within a timeframe that is reasonable given the particular circumstances of the facility" (EPA ANPR 1996a; EPA Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action 2004). Therefore, for those constituents that have more conservative MCLs, the drinking water criteria will be applied as a final remedial goal at appropriate points of compliance for this area of the site. Final remedy goals for the remaining area of the site, Area C, may differ with site-specific conditions, discussed below.

EPA's proposed goals are appropriate and technically practicable within Area A of the facility based upon area-specific circumstances, such as: the aquifer's direct discharge to the lake, the maximum beneficial groundwater use for the aquifer at this location of the site, and the already moderate concentrations of constituents that will be further reduced with source control. Dividing the site into multiple areas acknowledges the area-specific exposure and risk profiles as well as the technical practicability of reaching specific final remedy goals. Appropriate final remedy goals will be selected for Area C in consultation with the National Park Service and will take area-specific circumstances into consideration, balancing exposure and risk against groundwater restoration.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

The interim measure remedies completed in Area A at the SWMUs listed below are also evaluated in Table 1 (attached) using the four performance standards and the seven balancing criteria presented below for SWMU 18. For these SWMUs and AOCs, based upon screening criteria it was clear that a 'No Further Action' remedy is not appropriate.

SWMU 10
Soil excavation and off-site disposal was implemented as an interim measure. An approximate area of 30'x30', as deep as 8' in some areas, was removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the production areas. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

SWMU 20
Soil excavation and off-site disposal was implemented as an interim measure. An approximate area of 50'x15' and 3' deep was removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the production areas. The relatively small excavation footprint also ruled out a cap. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

SWMU 21
Soil excavation and off-site disposal was implemented as an interim measure. An approximate area of 40'x30' and approximately 1.5' deep was removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the production areas. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

AOC 1
Soil excavation and off-site disposal was implemented as an interim measure. An approximate area of 30'x50' and depth of 5' was removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the production areas. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

AOCs 4 & 5
Soil excavation and off-site disposal was implemented as an interim measure. Approximate areas of 60'x60' and 40'x60' at 2' deep were removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the production areas. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

SWMU 16
Soil excavation and off-site disposal was implemented as an interim measure. An approximate area of 40'x30' at 1' deep was removed and backfilled with clean material. Capping was ruled out because of anticipated issues with grade changes and because ongoing cap maintenance and avoidance by traffic was not deemed viable for the

production areas. Excavation was determined to be the best possible option at addressing the performance criteria (see Table 1).

Although these remedies were completed as interim measures, and likewise the lining of Area B settling ponds was performed in 1980 (well before EPA's corrective action investigation), they are nevertheless included in Table 1 as part of the evaluation of remedial technologies for Areas A and B. The following evaluation, therefore, focuses on the proposed remedy for SWMU 18.

No Further Action

With respect to the Protection of the Environment performance standard, it is possible that without any further remedial activities, natural processes will work to deplete existing sources of coal combustion byproduct within the SWMU 18. However, the processes that would act to reduce source area concentrations (e.g., infiltration and migration with groundwater) may not act to sufficiently and conservatively protect Lake Michigan.

Further, with respect to the Achieve Media Cleanup Objectives performance standard, the No Further Action scenario would not be capable of achieving the leachate and groundwater action levels developed to protect Lake Michigan. Based on the inability to achieve the first two performance standards, the No Further Action scenario does not pass the initial screening, and will not be further evaluated in this SB.

Soil Capping

With respect to the Protection of the Environment performance standard, soil capping could create a land surface that can support native vegetation as well as minimize infiltration through impacted soils and reduce impacts on underlying groundwater. These actions would reduce potential impacts to ecological receptors in the down gradient habitats. Thus, soil capping appears to be capable of achieving the Protection of the Environment performance standard.

With respect to the Achieve Media Cleanup Objectives performance standard, the soil capping scenario would likely be capable of preventing the infiltration of leachate and achieving the groundwater action levels developed to protect Lake Michigan.

The remedial time frame for this option includes the time required installing the cap and the time required for the concentrations of metals in groundwater to decline. The time frame to install the soil cap would be one year or less. The time frame for native vegetation to become established would be a function of natural environmental processes and may be a gradual process that takes several years. The time frame for groundwater concentrations at the compliance wells to decline below the groundwater action levels is a function of aquifer hydrologic properties and the fate and transport characteristics of the metals. Based on an estimated linear groundwater velocity of 0.6 to 1.3 foot per day, and a distance of 60 ft between SWMU 18 and the nearest compliance wells, the minimum

amount of time required before the effect of capping might be observed would be 46 to 100 days (not taking into account the effects of dispersion or retardation). Despite some uncertainty in the remedial time frame, soil capping appears to be capable of achieving the Achieve Media Cleanup Objectives performance standard.

With respect to the Control the Sources of Releases performance standard, soil capping should control the migration of metals from SWMU 18 by cutting off infiltration. Soil capping therefore appears capable of achieving the Control the Sources of Releases performance standard. Soil capping would not require source removal therefore the requirement to Comply with Standards for Waste Management does not apply.

Based on the ability of soil capping to achieve the Protection of the Environment, Achieve Media Cleanup Objectives and Control the Sources of Releases performance standards, the soil capping scenario does pass the initial screening, and will be further evaluated in the detailed screening portion of this SB, below.

Excavation and Off-Site Disposal

With respect to the Protection of the Environment performance standard, excavation and off-site disposal followed by backfilling and seeding could create a land surface that can support native vegetation as well as reduce the impact of contaminated soil pore water and underlying groundwater. These actions would reduce potential impacts to ecological receptors in the down gradient habitats. Thus, excavation and off-Site disposal appears to be capable of achieving the Protection of the Environment performance standard.

With respect to the Achieve Media Cleanup Objectives performance standard, the excavation and off-site disposal scenario would likely be capable of preventing the infiltration of leachate and achieving the groundwater action levels developed to protect Lake Michigan.

The remedial time frame for this option includes the time required to remove all coal combustion byproduct and excavate impacted soil, as well as the time required for the concentrations of metals in groundwater to decline. The time frame to design and perform soil excavation would be one year or less. The time frame for native vegetation to become established would be a function of natural environmental processes and may be a gradual process that takes several years. The time frame for groundwater concentrations at the compliance wells to decline below the groundwater action levels is a function of aquifer hydrologic properties and the fate and transport characteristics of the metals. Based on rationale described above, the minimum amount of time required before the effect of excavation and off-site disposal could be observed would be 46 to 100 days. Despite some uncertainty in the remedial time frame, excavation and off-Site disposal appears to be capable of achieving the Achieve Media Cleanup Objectives performance standard.

With respect to the Control the Sources of Releases performance standard, excavation and off-Site disposal should control the migration of metals from SWMU 18 by reducing

the impact of contaminated soil pore water and underlying groundwater. Excavation and off-Site disposal therefore appears capable of achieving the Control the Sources of Releases performance standard. Excavation and off-Site disposal is a proven technology and would readily achieve the performance standard Comply with Standards for Waste Management.

Based on the ability of excavation and off-site disposal to achieve the Protection of the Environment, Achieve Media Cleanup Objectives and Control the Sources of Releases performance standards, the excavation and off-site disposal scenario passes the initial screening, and will be further evaluated in the detailed screening portion of this SB, below.

The following sections weigh the technologies that are able to achieve the four threshold performance standards (soil capping and excavation with off-site disposal) using the seven balancing criteria. The balancing criteria are: Long Term Effectiveness; Toxicity, Mobility and Volume Reduction; Short-term Effectiveness; Implementability; Cost; Community Acceptance; and State Acceptance.

Long Term Effectiveness

This criterion evaluates long-term reliability and effectiveness, degree of certainty that the remedy will remain protective, and the magnitude of risks remaining from untreated waste or treatment residuals.

With respect to the soil cap scenario, the addition of a geomembrane liner would minimize the infiltration of soil moisture for the lifespan of the liner. The actual lifespan of a liner depends on numerous design and installation factors, but a typical design lifespan is 50 years. As long as the liner is effective, residual contamination under the liner would be physically and hydrologically isolated, and thus would present little risk to the down gradient habitats or Lake Michigan.

With respect to the excavation and off-site disposal scenario, because the excavation would be backfilled and seeded, the approach would be protective of nearby habitat. In addition, because this approach permanently removes source materials and immediately underlying soil that contains inorganic constituents greater than the site-specific, target leachate goal developed to protect Lake Michigan, the risks from residual contamination are low.

Over the long term, the excavation and off-site disposal scenario does appear to be more reliable compared to the soil cap scenario because it reduces or eliminates the source of impacted soil and does not rely on an engineered barrier with a finite lifespan.

Toxicity, Mobility and Volume Reduction

This criterion evaluates the ability of a remedy to reduce the toxicity, mobility and volume of waste with particular emphasis on the degree to which a treatment is irreversible.

With respect to the soil cap scenario, this approach minimizes the mobility of the metals in unsaturated zone soils under the cap, but does not reduce the volume of soil impacted by contamination. In addition, given the finite lifespan of the soil cap, this scenario may not provide an irreversible solution.

With respect to the excavation and off-site disposal scenario, the approach also reduces the mobility of the metals in the remaining unsaturated zone soils. However, unlike the capping scenario, excavation and off-site disposal directly reduces the volume of source material. Because source materials would be removed, excavation and off-site disposal, in combination with alternate fly ash management methods, may provide an irreversible solution.

Short-term Effectiveness

This criterion considers the short-term effectiveness and the short-term risks that the remedy poses, along with the amount of time for remedy design, construction and implementation.

With respect to the soil cap scenario, this solution could be designed and implemented in less than one year, and would effectively mimimize migration of metals to groundwater. However, subsequent reductions in concentrations at the down gradient points of compliance could take months or years. Therefore this scenario is not necessarily effective in the short term.

With respect to the soil excavation and off-site disposal scenario, this solution could be designed and implemented in less than one year. This approach would also minimize migration of metals to groundwater, but reductions in concentrations at the down gradient points of compliance could take months or years. Therefore this scenario is also not necessarily effective in the short term for those particular points of compliance.

Implementability

This criterion evaluates remedies based on the degree of difficulty to implement, and includes consideration of technical and administrative feasibility as well as the availability of required services and materials.

For the soil cap scenario and the soil excavation scenario, the technical design challenges and the administrative aspects of hiring a subcontractor to implement the work are relatively straight-forward. Either of these solutions could potentially be designed and constructed in less than one year.

Cost

This criterion evaluates remedies based on capital (i.e., initial) and operations and maintenance (O&M) costs, and the net present value of the initial and O&M costs. For soil capping, materials costs were estimated assuming a 40-mil geomembrane liner. A drainage swale constructed around the cap would manage storm water than runs off the capped surface. For both the capping and excavation scenarios, SWMU 18 would be covered with a minimum 6 inches of topsoil or other suitable fill material and seeded. Mobilization, demobilization and erosion control measures were estimated assuming 20% of materials costs and engineering efforts were estimated to be 15% of materials costs.

O&M costs were extrapolated from actual recent sampling costs and were estimated for a 5-year period into the future using net present value analysis. The 5-year O&M timeframe was determined by assuming the source is either isolated (capping) or eliminated (excavation), the 46 to 100 day time-of-travel estimate from SWMU 18 to the three down gradient monitoring wells, and flushing with 18 to 40 pore volumes. Because this component of the cost estimate is the same for both remedies, it is not a differentiator in the cost comparison. As summarized in Table 1, for soil capping, the initial and O&M costs are estimated to be approximately $154,000, and for soil excavation and off-site disposal of the upper 6 inches of coal combustion byproduct and affected soil, the initial and O&M costs are estimated to be approximately $63,000. If an additional 6 inches of material required excavation, the initial and O&M costs would increase to approximately $107,000. Based on these analyses of the final two remedy options, excavation and off-site disposal is the most cost-effective.

Community Acceptance

Outside stakeholders, would most likely be interested in the expeditious implementation of a permanent solution at SWMU 18 that minimizes impacts to groundwater. Because the capping approach has a finite lifespan, the excavation approach may have slightly greater community acceptance. EPA looks forward to reviewing public comments received during the public participation period, discussed below, to better understand stakeholder opinion.

State Acceptance

The "Final Remedy Selection Criteria for Results-Based RCRA Corrective Action" (EPA, 2000) suggests remedies should also be evaluated based on the degree to which they are acceptable to the State of Indiana. The IDEM RISC policies for the evaluation and selection of remedial technologies for RCRA sites indicate remedial technologies must be capable of achieving a timely closure and must be cost-effective. In addition, proposed remedies must be made available for public comment and details of the public participation period are below. Since both remediation scenarios are capable of achieving timely closure and are relatively cost effective, and because this SB will be made available for public comment, both the soil capping and soil excavation scenarios

have approximately the same potential to be acceptable to the State of Indiana. In addition, EPA believes performance monitoring based on MCLs and GLI criteria, derived from the Indiana Department of Environmental Management's *Criteria and Values for Selected Substances Calculated using the Great Lakes Basin Methodologies* (IDEM, 2002), should be acceptable to the State.

Summary of Evaluation of Remedial Technologies

Both the soil capping and soil excavation scenarios were determined to be able to achieve the performance standards, and thus were carried forward for additional evaluation. These two remedies were compared using the seven balancing criteria. As summarized above, the two remedial scenarios have approximately equal potential to be effective in the short-term, both are technically and administratively feasible, and both would likely achieve state acceptance. However, soil excavation and off-site disposal has a greater potential to be effective in the long-term, reduces the volume of impacted soil, would be less expensive and may be more acceptable to the community. Based on these considerations, EPA is proposing soil excavation and off-site disposal to control the leaching of metals from SWMU 18 soil to groundwater. Within 90days after EPA issues the Final Decision and Response to Comments, NIPSCO must submit a Corrective Measures Implementation work plan documenting the remedy to be performed and the operation and maintenance that will follow. The work plan must identify the appropriate screening criteria (the more conservative of either the GLI or MCL), compliance points and schedule.

FINANCIAL ASSURANCE

EPA is also selecting financial assurance as a component of the final remedy. NIPSCO must demonstrate that adequate funds will be available to complete the construction as well as the operation and maintenance of all selected remedies. NIPSCO must provide this financial assurance within 90 days after EPA issues the Final Decision and Response to Comments. Any of the following financial mechanisms may be used to make this demonstration: financial trust, surety bonds, letters of credit, insurance, or qualification as a self insurer by means of a financial test. After successfully completing the construction, NIPSCO may request that the amount of the financial assurance be reduced to the amount necessary to cover the remaining costs. NIPSCO may make similar requests from time to time as the operation and maintenance phase of the remedies proceeds.

PUBIC PARTICIPATION

EPA solicits input from the community on the cleanup methods proposed under each of the previous alternatives. EPA has set a public comment period from July 14–August 28, 2011, to encourage public participation in the selection process. Previous public participation opportunities regarding the site included an EPA fact sheet mailed to the community and local environmental groups in February 2010. EPA will host a public meeting at the Indiana Dunes National Lakeshore Visitor Center, 1215 N. State Road 49,

Porter, Indiana for this Statement of Basis on July 28, 2011 from 6pm – 8pm. We encourage community members to attend the meeting and submit any comments regarding these proposed remedies in writing by August 28, 2011.

The administrative record is available at the following locations (please call for hours):

EPA, Region 5
7th Floor Record Center
77 W. Jackson Blvd.
Chicago, IL 60604
(312) 886-4253

Portage Public Library
2665 Irving Street
Portage, IN 46368
(219) 763-1508

Comments will be summarized and responses provided in the Response to Comments. The Response to Comments will be drafted at the conclusion of the public comment period and incorporated into the administrative record. To send written comments or obtain further information, contact:

Michelle Kaysen (LU-9J)
77 W. Jackson Blvd
Chicago, IL 60604
(312) 886-4253
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