



United States
Environmental Protection
Agency
Region 5
Office of RCRA

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A Hazardous Waste Cleanup In The Dunes: A Success Story

National Steel is monitoring the system to ensure that no future releases occur. Clean-up activities are expected to be completed in the near future. In the meantime, nature has taken over. The areas that once contained hazardous waste are developing the characteristics of natural dunes, with the potential for the threatened Pitcher's thistle species to return to the area.



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Overview

The U.S. Environmental Protection Agency (EPA) has served as the public's advocate for a livable environment throughout its 23-year history. The EPA is divided into 10 regions. Region 5 consists of six of the Great Lakes states, including Indiana. With its Northwest Indiana Initiative, Region 5 has focused on the environmental impact of the steel-making industry on the shores of Lake Michigan because 40 percent of the Nation's steel making capacity is located there. Steel operations generate hazardous and non-hazardous wastes. The past hazardous waste management practices of the steel industry have adversely affected the environment. However, cooperation between the Agency, the Indiana Department of Environment Management (IDEM), the public, and industry partners like National Steel Corporation's Midwest Division have resulted in positive, tangible benefits to the environment.



Environmental Perspective

The dunes' unique ecology began in the Ice Age when diverse species deposited their seeds. This resulted in the unique combination of arctic and desert plants which exists on the dunes today. Sandy beaches were created when Lake Michigan was formed by a glacier. Dunes were formed by wind and waves.

Sand accumulates against rocks, trees, and other stationary objects to create miniature dunes. As a dune increases in size, plants establish roots, and serve as natural barriers to the wind and waves, preventing erosion, and maintaining the shape of the dune.

However, wind not only helps create and shape a dune, but can destroy one as well. Blowout areas begin as small channels or gaps created by wind in a preexisting dune. The gap enlarges until it looks like an amphitheater. This rapid removal of sand eventually strips the dune of most of its vegetation.



Dunes develop in sequence, with each sequence of dunes exhibiting distinct types of plant and animal life. As plants grow and die on a dune, they influence the other forms of life in that area. This process is called "succession." As a result, a location's plants and animals are often replaced by completely different species.

The fragile dune ecosystem can be adversely affected by the forces of nature and the actions of humans. The activities of humans who trample the dunes and deposit wastes, adversely affect dune vegetation and animal life.

The dunes serve as home for many rare, threatened, and endangered species of plants and animals. Twenty-six percent of the endangered or threatened plants in Indiana are found at the dunes. For example, the threatened plant species Pitcher's thistle grows in some blowout areas of the dunes and the endangered Karner blue butterfly can be spotted in some of the wooded dunes.

The Endangered Karner Blue Butterfly

The geographic area in which the Karner blue butterfly lives generally follows the growth of the wild lupine plant because the wild lupine is the sole known source of food for the larvae. The Karner blue butterfly's habitat in the Midwest includes Black Oak Savanna and Jack Pine stands. Females lay their eggs on the wild lupine plants twice a year, during the spring and during the summer. The larva hatch and feed on the surfaces of the lupine plants until they are mature. Adult butterflies have an average life span of five to seven days.

At this time, the Karner blue butterfly is believed to be extirpated in Illinois, and extinct in Ohio, Massachusetts, Pennsylvania, and Ontario. The species is endangered in New York, New Hampshire, Wisconsin, Minnesota, Michigan, and Indiana. Over the past 100 years, the Karner blue butterfly's population has decreased drastically by 99% (90% of this decrease occurring within the past 10 to 15 years). Because of industrial, residential, and commercial activity, the butterfly's habitat is declining. In addition, buildings and other man-made structures act as effective barriers to the migration of the butterfly.



Historical Perspective

By 1900, the United States led the world in the production of iron and steel. In 1901, Inland Steel Corporation became the first of many steel facilities to bring its operations to the southern shores of Lake Michigan. The American steel industry developed in this area for three important reasons:

- The Great Lakes provided ideal transportation routes;
- Michigan, Minnesota, and Wisconsin contained vast supplies of iron ore deposits; and
- The American railroads expanded westward

Steel Finishing

Two types of steel plants are commonly operated: steel-production facilities and steel-finishing plants. Steel-finishing facilities like National Steel's Midwest Division treat coils of sheet steel with hydrochloric acid to remove surface imperfections from manufacturing, a process called "pickling." After the steel sheets have been treated with acid, they are "galvanized" with a protective coating of tin, chrome, or zinc to prevent corrosion.

Pickling operations generate hazardous wastewater. Generally, wastewater contains hazardous constituents like metals. In the past, hazardous wastewater was discharged

into large, unlined pits called "lagoons." In the lagoons, the heavier particles in the wastewater settled to the bottom and the liquids either evaporated or leached into the ground over a period of several months, creating sludge. Sludge generated at National Steel's Midwest Division is classified as a hazardous waste because it contains a high concentration of metals. When the sludge was dry, it was excavated from the lagoons and disposed of in the onsite hazardous waste landfill. Years later, the adverse effects on the environment from this waste management practice became evident.

Citizens concerned about the effect of industrial activity near the dunes and the surrounding fragile ecosystem organized conservation groups. One such organization was the Save the Dunes Council. As a result of its efforts, and the efforts of Indiana Senator Paul Howard Douglas, Federal laws were passed which created the Indiana Dunes National Lakeshore and authorized the purchase of additional land.

What are the Closure and Corrective Action Programs?

In an effort to promote the protection of human health and the environment, and to conserve valuable natural resources, Congress passed laws enforcing the management of solid and hazardous wastes.

Congress passed the Resource Conservation and Recovery Act (RCRA) in 1976, establishing a national hazardous waste management program for companies that generate, store, treat, dispose of, or transport hazardous waste. The program provides for appropriate hazardous waste management practices from the time a waste is generated to the time it is disposed. This is known as "cradle-to-grave" management.

Since 1976, RCRA has been amended several times, most significantly by the Hazardous and Solid Waste Amendments (HSWA) of 1984. HSWA created a program to identify and contain or clean up uncontrolled chemical releases from facilities, including releases which extend beyond the facility's boundaries. This process is known as RCRA Corrective Action.

The RCRA Corrective Action program has the following objectives:

- Determining whether a release of hazardous waste or hazardous constituents has occurred;
- Evaluating the nature, rate, and extent of any releases;
- Developing methods to remediate or contain releases; and
- Designing, building, and monitoring cleanup methods or containment devices and preventing future releases.

HSWA also established minimum design requirements for hazardous waste management units to prevent releases of hazardous waste to the environment. Facilities were required, as of November 8, 1988, to either redesign land disposal units to meet the minimum requirements or close the units according to the existing standards.

The RCRA Closure and Corrective Action programs are cooperative efforts between EPA, IDEM, and industry. EPA and IDEM help industry select and design the most appropriate method to clean up the environment and close a unit. Implementation of the remediation process is a joint activity. Industry performs the remediation while EPA and IDEM oversee the operation.

National Steel's Midwest Division, EPA, and IDEM are trying to achieve the goals of the RCRA Corrective Action and Closure programs.



A Hazardous Waste Cleanup Success Story

In 1960, National Steel's Midwest Division facility began operating as a finishing plant for rolls of sheet steel manufactured at steel-production factories. National Steel's Midwest Division is located in Portage, Indiana.

Until 1988, National Steel discharged its treated wastewater to five "lagoons" to concentrate the waste into sludge. The dried sludge was then removed from the lagoons and transferred to an onsite hazardous waste landfill. In 1988, the facility decided to stop using the lagoons instead of retrofitting them with the minimum required technology to prevent releases. Since then, National Steel has used a mechanical device that dries the sludge more quickly and efficiently than the lagoons. National Steel is working with EPA and IDEM to close three of the five lagoons.

On November 7, 1988, EPA issued National Steel a RCRA land-disposal operating permit for its onsite hazardous waste landfill. EPA included RCRA Corrective Action provisions which required the facility to determine the extent of contamination at the other two lagoons and develop a method to clean up the dune environment. EPA determined that a release of hazardous constituents had likely occurred into the surrounding dune environment from the unlined lagoons. To clean up the area, National Steel removed almost 400,000 cubic yards of sludge and underlying contaminated soil from four of the five lagoons and placed it in the onsite landfill.

The sludge almost filled the onsite landfill. In order to complete clean-up activities, National Steel had to apply to EPA and IDEM for a permit to expand the onsite landfill. EPA and the U.S. Fish and Wildlife Service (USFWS) determined that the planned landfill expansion threatened a habitat of the endangered Karner blue butterfly. EPA, IDEM, USFWS and National Steel, in cooperation with local community groups, worked out an arrangement to create a conservation area for the butterfly.

In early 1993, the facility relocated wild lupine plants from the landfill-expansion area to a 45-acre site on the west side of the facility, next to National Park Service land. By the end of 1993, a population of Karner blue butterflies was documented in the conservation area.