



Superfund At Work

Hazardous Waste Cleanup Efforts Nationwide

Seymour Recycling Site Profile

Site Description:

A former chemical recycling, storage, and incineration facility near Seymour, Indiana

Site Size: 14 acres

Primary Contaminants:

Volatile organic compounds (VOCs) and heavy metals

Potential Range of Health Risks:

Increased risk of cancer through drinking contaminated ground water

Nearby Population:

300 people within one mile

Ecological Concerns:

A shallow aquifer and ground water are contaminated; fish kills in the White River

Year Listed on NPL: 1983

EPA Region: 5

State: Indiana

Congressional District: 9

Success in Brief

Model Superfund Cleanup in Seymour, Indiana

Leaking barrels of chemicals reacted and erupted into spontaneous fires and explosions at the Seymour Recycling Corporation in the 1970s. This poorly managed and overburdened hazardous waste storage and incineration facility polluted soil and ground water with solvents, acids, and heavy metals. By 1980, more than 50,000 drums and storage tanks stood on site, many of them rusted, punctured or leaking.

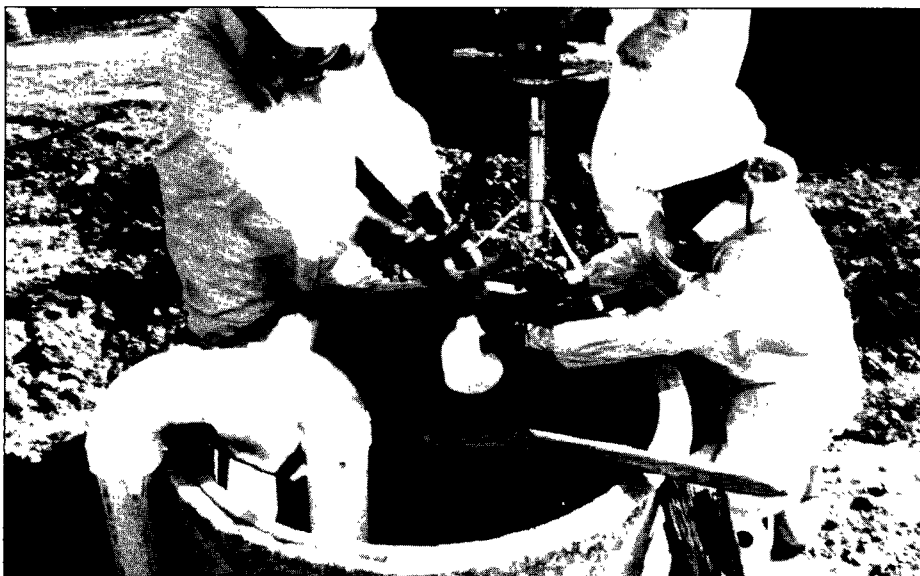
Using Superfund authority, the U.S. Environmental Protection Agency (EPA) negotiated voluntary cleanup agreements with waste generators to clean up this Jackson County facility. With help from the Indiana Department of Environmental Management (IDEM) and the City of Seymour, cooperative efforts lead to an effective remediation of the site, including:

- an immediate removal of drums, tanks and soil;
- a comprehensive ground water treatment system and extension of the municipal water supply to affected residents; and
- use of two innovative technologies, bioremediation and soil vapor extraction, to treat contaminated materials under a multi-layer protective cover.

Simultaneous construction activities, clear communication, and harmonious resolution of legal issues were key to beating the cleanup schedule by more than two years.

The Site Today

All construction activities at the site are complete. The site is fenced and a protective "cap" encapsulates contaminated soil, dredged sediments, and debris. A vapor extraction system is currently removing VOCs from underneath the cap, in conjunction with bioremediation. Precautionary air sampling continues to monitor any potential releases from that system. Ground water treatment will continue for 12 to 30 years.



Workers take water samples from a conduit to check treatment plant discharge.

A Site Snapshot

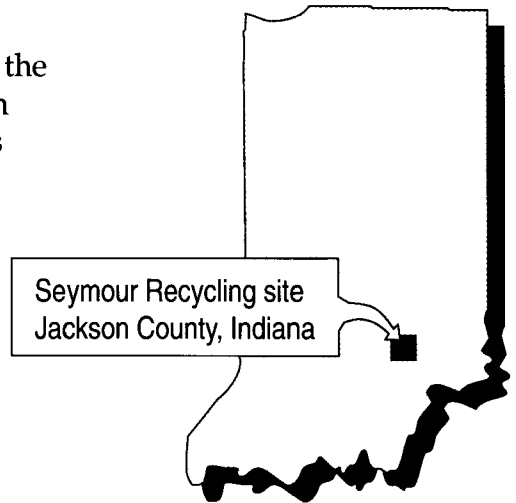
The Seymour Recycling Corporation is located on a 14-acre site two miles southwest of Seymour in Jackson County, Indiana. Surrounding land use is primarily agricultural except for the Freeman Municipal Airport and Industrial Park, and a residential community of about 100 homes located within one mile of the site. Drinking water for the airport, industrial park, and subdivision was supplied by private wells until 1985 when the waste contributors paid for an extension of the Seymour municipal water system to the area.

The company processed, stored, and incinerated chemical waste throughout the

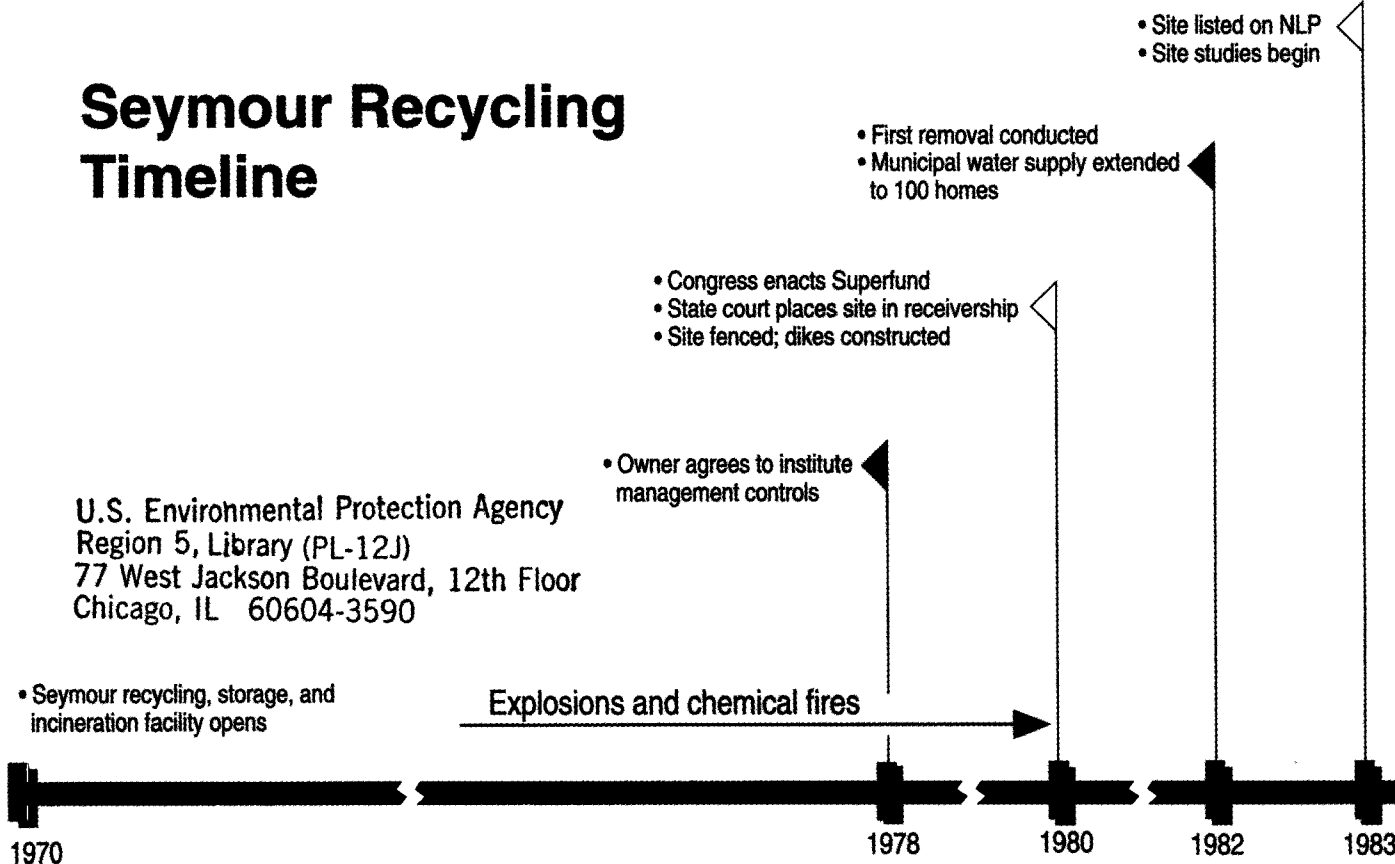
1970s. Wastes accumulated in drums, bulk storage tanks, and tank trucks; by 1980, 100 storage tanks and 50,000 drums stood on the site, many rusted, punctured or leaking. Contaminants spread over a wide area, releasing toxic vapors and erupting in small fires until the facility finally closed in 1980.

Soil and ground water at the site were contaminated with volatile organic compounds (VOCs) and heavy metals, including arsenic, manganese, and beryllium. A shallow aquifer was highly contaminated with various hazardous chemicals, and fish kills have been reported in the White River. Although

area residents have not been directly exposed, VOCs and heavy metals do not break down easily, remain in the environment for many years, and require long-term remediation.



Seymour Recycling Timeline



Innovative Technologies Treat Hazardous Wastes

Poor Management Practices

The Seymour Recycling Corporation accepted waste without adequate management plans for inventory, treatment or storage. Barrels of chemicals were frequently stored without checking their contents or emptied directly onto the ground. On several occasions, chemicals reacted, causing explosions and fires. Area residents complained of offensive odors.

In 1978, the company agreed to stop receiving waste and to institute better controls. But in 1980, the company's failure to follow that agreement led an Indiana state court to place the site under state receivership for

failure to comply with environmental laws.

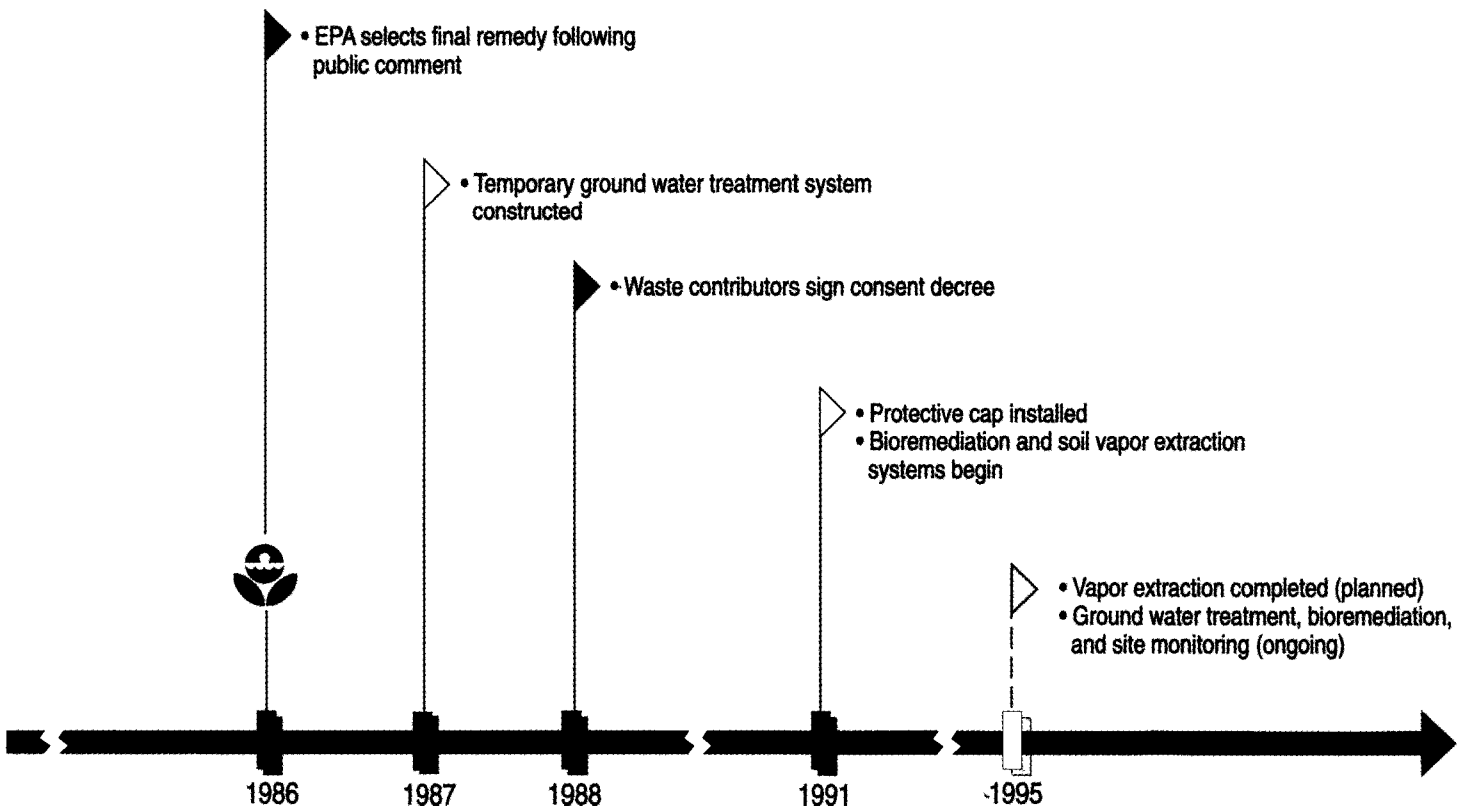
Superfund Reduces Immediate Risks

In the spring of 1980, leaking chemicals caused an explosion and fire at the site, and shortly thereafter, the state turned to EPA for help. Congress had enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) that year, establishing the Superfund program to address thousands of hazardous waste sites nationwide. CERCLA empowered EPA to compel those responsible for contaminating sites to undertake prescribed cleanup actions. EPA

quickly identified a group of waste contributors who removed some of the drums and constructed levees to prevent the hazardous waste from spreading. EPA then relocated several area residents and fenced the site to restrict access.

50,000 drums and 100 storage tanks were abandoned on the site

In 1982, EPA entered into a cleanup agreement with a small group of the hazardous waste contributors. Between 1982 and 1984, this group removed and



disposed of 50,000 drums, 100 storage tanks, and contaminated soil to a depth of one foot from about 75 percent of the site. The excavated areas were covered with clay and clean soil to immobilize the underlying contaminants. These efforts cost about \$2 million; subsequently, this group of waste contributors was released from future liability at the site.

Agreements between EPA and additional parties in 1982 and 1983 established an escrow account of approximately \$10 million. This account was used in 1985 to complete the soil cleanup and to extend the Seymour municipal water system to 100 residents of a nearby subdivision and on a farm.

EPA and Indiana Select Final Remedy

In 1983, EPA placed Seymour

Recycling on the National Priorities List (NPL), a roster of uncontrolled or abandoned hazardous waste sites requiring comprehensive cleanup under the Superfund program.

Between 1983 and 1986, EPA investigated the nature and extent of the remaining contamination and evaluated appropriate cleanup technologies. The investigation indicated a moving pool of contaminated ground water extending three-quarters of a mile from the site as well as 150,000 cubic yards of contaminated soil and sediment.

Following a period of public comment on various cleanup strategies, officials from EPA and the Indiana Department of Environmental Management (IDEM) selected the final remedy for the site in September 1986. The plan

had four major components: treatment of ground water, a multi-layer protective soil cover, bioremediation, and vapor extraction for treating soil and sediment.

Waste Contributors Establish Trust Fund

After two years of negotiations, 150 waste contributors signed a settlement document called a consent decree with EPA and IDEM to conduct the selected remedy. During negotiations, the waste contributors installed a temporary ground water pump and treatment system to minimize the movement of contaminated ground water and to test the effectiveness of the treatment technology being considered for the final cleanup.

continued on page 5



Solvents, acids, and heavy metals from leaking barrels polluted soil and ground water over a 12 - year period.

Innovative Technologies

continued from page 4

In 1988, the waste contributors established a trust fund of almost \$30 million for cleaning up the site. A selected trustee managed the fund and directed construction activities.

Ground Water and Soil Addressed First

Initial cleanup efforts focused on addressing contamination in ground water, soil, and sediments from a ditch filled with runoff. Ground water was first exposed to an air stream that removed VOCs and then was filtered through activated carbon. That water was then pumped to the city wastewater treatment plant for further processing and disposal. Private wells in the nearby subdivision were sealed following their connection to the municipal water supply. Ground water treatment will continue for at least 12 and up to 30 years until cleanup goals are met.

A seven-layer protective cover called a "cap" was constructed over the remaining contaminated soil and excavated sediment from the ditch. Several buildings on the site also were demolished and the debris consolidated with the soil. The cap provides a barrier against rain seeping into the ground water and prevents direct exposure to the underlying soil.

EPA is continuing to treat the soil, sediment and debris under

Soil Vapor Extraction

An unusual method of vapor extraction was employed at the Seymour Recycling site to remove VOCs from the soil. Conventional vapor extraction systems rely on a series of wells placed vertically into contaminated soil. A vacuum is applied to alternate wells with those in between left open to the atmosphere to allow air circulation. The VOCs are drawn out of the soil and sent to an exhaust system. Because of the reliance on air, vapor extraction can only be conducted under dry conditions.

This conventional technique did not work at the Seymour Recycling site because the VOCs were buried beneath the multi-layered cap and ground water was six feet below ground level. Horizontal wells were placed 30 inches below the cap and slotted and wrapped with filter cloth to keep out sand and soil. The horizontal wells were then connected to headers at the north and south end of the cap. A vacuum pump hooked to the header at one end draws air from the header at the other end, and VOC-laden air from the soil flows through the system to the exhaust. In addition, bioremediation occurring beneath the cap puts more VOCs into air spaces in the soil.

the cap using an innovative technology called bioremediation. The technology takes advantage of naturally occurring bacteria in the soil to "eat" away the contaminants. To speed growth of the bacteria, nutrients were added to the soil before the cap was completed.

"...government and industry have joined together at Seymour to implement the best technology available..."

The bioremediation technique complemented another technology known as vapor extraction which acts like a giant vacuum cleaner, drawing VOCs from the soil. Together, both approaches

prevent further migration of contaminants into local ground water.

Construction Completed Early

The remedial plan for the site specified a completion date of five years, but a high degree of cooperation among the settling parties enabled the effort to be completed in 1991, more than two years ahead of schedule. Early start up, simultaneous work activities, team communications, harmonious resolution of legal issues, and cooperative management decision making were key to beating the cleanup schedule. EPA's Regional Administrator in Chicago stated, "... government and industry have joined together at Seymour to implement the best technology available to restore the area."

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Keeping the Community Informed

Before selecting the final remedy for the site, EPA held a public meeting and invited the residents to comment on different cleanup alternatives. EPA representatives periodically appeared on the local cable network channel to provide updates on site progress. In addition, EPA, IDEM, and the waste contributors conducted open houses and

tours, held early and frequent meetings with key community leaders, gave frequent presentations, distributed newsletters and information pamphlets, and designed and displayed an exhibit about the site. During construction, monthly progress reports were provided to the mayor of Seymour.

Success at Seymour Recycling

From early investigations through completion of construction, EPA, the state, and the waste contributors worked in harmony to reduce risks at the site.

Leaking drums, chemical storage tanks, and contaminated surface soil were quickly removed and disposed of off site. Treatment of ground water, soil, and sediment was completed more than two years ahead of schedule and bioremediation continues to break down contaminants under a multi-layered protective cover.

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