

Executive Summary

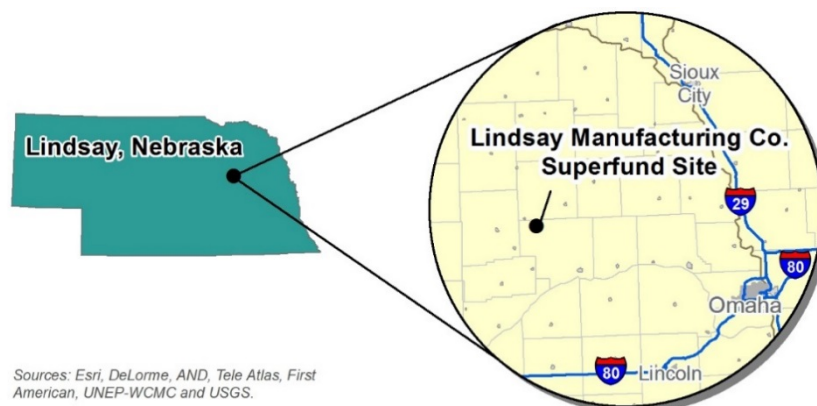
Lindsay Manufacturing has operated an irrigation equipment manufacturing business in rural Nebraska for over 50 years. Past waste disposal practices contaminated soil and groundwater at the Lindsay Manufacturing Co. Superfund site. EPA collaborated with the Nebraska Department of Environmental Quality (NDEQ) and the company to clean up the property and support its continued use. Coordination of cleanup activities to minimize business disruptions as well as an innovative cleanup approach that conserves valuable groundwater illustrate how Superfund site cleanup can generate economic benefits for local communities. Today, Lindsay Manufacturing continues to operate on site and is a major local employer. Treated groundwater irrigates agricultural crops, reducing cleanup costs. This case study explores the site’s cleanup and reuse, illustrating the opportunities and beneficial effects of Superfund redevelopment in action.



Figure 1. The town of Lindsay, Nebraska.

Beneficial Effects

- An innovative groundwater treatment approach that relies on Lindsay Manufacturing’s irrigation equipment has reduced the groundwater cleanup system’s annual operating costs by about \$100,000.
- Lindsay Corporation continues to operate on site, generating over \$196 million in annual sales.
- Site businesses employ over 520 people, providing annual employment income of \$23.8 million to the local community.
- In 2016, site property parcels generated over \$31,500 in tax revenues. They had an estimated property value of over \$2.9 million.



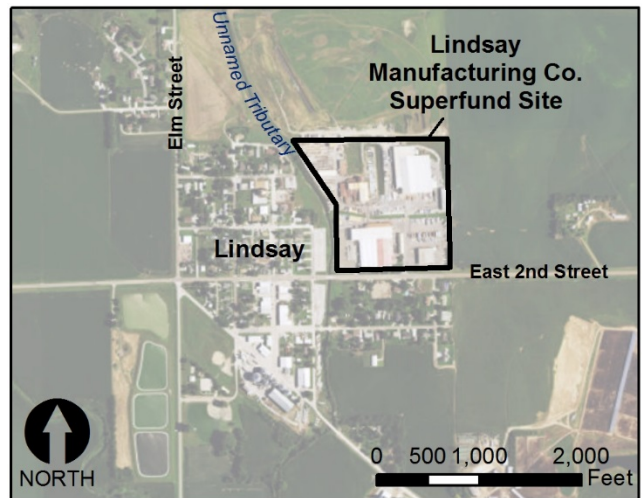
Sources: Esri, DeLorme, AND, Tele Atlas, First American, UNEP-WCMC and USGS.

Figure 2. Site location in Lindsay, Nebraska.

Introduction

When Superfund site properties are remediated for reuse, they can revitalize local economies with jobs, new businesses, tax revenues and local spending. Cleanup may also take place while active land uses remain on site. This case study documents the beneficial effects of continued use at the Lindsay Manufacturing Co. Superfund site in Lindsay, Nebraska.

Lindsay Manufacturing makes galvanized irrigation sprinkler equipment at its 42-acre facility. The industrial operation is located on the northeast side of the Village of Lindsay. About 240 people live in the village.¹ Farmland surrounds the site to the north and east. Residential areas surround the site to the south and west. A tributary to Shell Creek runs along the western side of the site (Figure 3).



Sources: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, the GIS User Community and the 2008 Five-Year Review.

Figure 3. Aerial view of the Lindsay Manufacturing Co. facility, Lindsay, and the surrounding area.

Site History

In the 1960s, Lindsay Manufacturing began making agricultural irrigation systems at its manufacturing facility, which was built on the site of a former gas station. The manufacturing process included galvanizing irrigation system parts, a process that generates waste acids. Starting in the early 1970s, the company disposed of these spent acids in an unlined earthen pit on site. It also used chlorinated solvents to clean and degrease metal parts. The company disposed of these solvents by releasing them directly onto the ground.

In the early 1980s, Lindsay Manufacturing built a wastewater treatment plant to treat the acid and stopped using the earthen pit. During construction, groundwater testing detected abnormal acidity levels and high water temperatures. The company began investigating the nature and extent of contamination at the site after reporting its findings to NDEQ. The company installed a groundwater extraction well to intercept and recover contaminated groundwater in 1983. Due to the threat posed by contamination of heavy metals and volatile organic compounds in groundwater and soil, EPA proposed the site for listing on the Superfund program's National Priorities List (NPL) in 1984. That year, Lindsay Manufacturing began operating a groundwater extraction and treatment system to address the contamination. In 1988, the site's remedial investigation and feasibility study began to investigate the contamination and determine potential cleanup options. EPA finalized the site on the NPL in 1989. To control off-site migration of contamination, Lindsay Manufacturing installed a second extraction well that year.

¹ 2015 American Community Survey 5-Year Population Estimate. Accessed at https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#.

Site Cleanup and Transformation

EPA's 1990 Record of Decision documented the site's final remedy. Cleanup included a pilot project to treat contaminated soil by collecting contaminated air trapped within the soil, a technique called soil vapor extraction (SVE). A full-scale SVE cleanup would follow if it was determined to be practicable based on pilot study results. Additional remedy components included enhancing the existing groundwater extraction and treatment system, groundwater monitoring, and an effort to prevent installation of drinking water wells within the contaminant plume. Under a 1992 Consent Decree, Lindsay Manufacturing agreed to design and implement the remedy, clean up the site under EPA and NDEQ oversight, and pay for the cost of cleanup.

Soil

Initial soil cleanup finished quickly. The successful SVE pilot concluded in 1993; the full-scale SVE system began operating in 1995. In 1998, EPA determined that soil cleanup goals had been achieved and the system was decommissioned.

Groundwater

Additional groundwater cleanup efforts have included installation of additional extraction, irrigation and interceptor wells; use of an innovative technology to enhance naturally occurring biodegradation of contamination; and installation of treatment systems in homes with wells affected by contamination. During the site's 2008 five-year review, EPA determined that the contaminant plume had migrated over 2.5 miles from the facility. Lindsay Manufacturing led several efforts to further delineate the plume, identify any additional source areas and evaluate the potential for migration of contamination from the soil into the enclosed building spaces above, called vapor intrusion. The plume has been delineated and EPA has determined that vapor intrusion at the facility and in downgradient residences does not present an unacceptable risk to human health.

EPA has collaborated with the company throughout the cleanup process to minimize impacts on ongoing facility operations. EPA has scheduled site work during quieter periods for the business and phased it to contain activities in specific areas to minimize disruptions. EPA and Lindsey Manufacturing have also pursued cost-effective remedial strategies. EPA and Lindsay Manufacturing integrated the company's irrigation technology as part of the cleanup approach, to reuse groundwater. A Nebraska Department of Health risk assessment found that the method did not pose unacceptable risks. EPA approved a plan to modify the groundwater pumping treatment system to include the beneficial reuse of groundwater via irrigation in 1997. During the growing season, groundwater is sprayed on nearby farm fields. Groundwater is alternatively discharged to Shell Creek.

Current Cleanup Status

Sampling has determined that source contamination remains at the site; efforts to identify the source area are ongoing. Once the source area is identified, EPA will prepare a plan to address the contamination.



Figure 4. Lindsay Manufacturing Co. facility as seen from the southwest.

Local Impacts

Since the 1950s, Lindsay Manufacturing has expanded significantly. Headquartered in Olathe, Kansas, the business now has facilities at over 15 locations worldwide. In addition to irrigation equipment, it manufactures moveable barriers, railroad equipment and other transportation-related goods, wireless equipment, and tubing. With its subsidiaries Lindsay Transportation and Lindsay International Sales Corporation, the firm employs 520 people on site, contributing \$23.7 million in estimated annual employment income and generating \$196.1 million in estimated annual sales. Electrical contractor Barr-Thorp Electric is also located on site. The company contributes \$84,448 in estimated annual employment income and generates \$154,500 in estimated annual sales.



Figure 5. Lindsay Manufacturing's offices on site.

Groundwater Cleanup

Reuse of contaminated groundwater is an innovative practice at a growing number of sites nationwide. In recent years, EPA has prioritized the reuse and recycling of treated wastewater and groundwater for beneficial use at Superfund sites and other contaminated lands. These uses include agricultural and landscape irrigation, industrial processes, household utilities and drinking water supplies. In the summer, when agricultural demand for water is high, site groundwater irrigates crops at a nearby farm whose wells were affected by the contamination. This approach benefits the farmer and Lindsay Manufacturing, irrigating fields and reducing the groundwater cleanup system's annual operating costs by about \$100,000.

Property Values and Property Tax Revenues

Properties cleaned up under the Superfund program and kept in use provide tax revenues for local municipalities, providing funding for schools and local government operations. The 2017 value of land and improvements at the site was \$2,944,000. Site properties contributed \$31,583 in annual property taxes. On-site businesses also generate tax revenues through the collection of sales taxes, which support state and local governments.²

Conclusion

Collaboration among EPA, NDEQ and Lindsay Manufacturing at the Lindsay Manufacturing Co. Superfund site has protected public health and the environment while also supporting the continued operation of this important local employer. In 2016, on-site businesses employed over 520 people, provided annual employment income of \$23.8 million and generated \$196 million in annual sales. Innovative groundwater cleanup has conserved groundwater and reduced cleanup costs. Looking forward, EPA and other stakeholders will work together to make sure the Superfund cleanup and on-site facilities continue to yield valuable benefits for the community.

*For more information about EPA's Superfund Redevelopment Initiative (SRI), visit:
<https://www.epa.gov/superfund-redevelopment-initiative>.*

² The Nebraska sales tax rate is 5.5 percent. Sales tax rate information for the Town of Lindsay are not listed. For more information, see <http://www.revenue.nebraska.gov/question/sales.html>.



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Reuse and the Benefit to Community Lindsay Manufacturing Co.

Technical Appendix

Employment Information for On-site Jobs

EPA obtained the data included in this Technical Appendix directly from reputable sources, and reported the data as presented by those sources. Information on the number of employees and sales volume for on-site businesses came from the Hoovers/Dun & Bradstreet ([D&B](#)) database. EPA also gathered information on businesses and corporations from D&B. D&B maintains a database of over 225 million active and inactive businesses worldwide. Database data include public records, financials, private company insights, extensive global information, telephone numbers and physical addresses.

The D&B database includes data reported by businesses. Accordingly, some reported values might be underestimates or overestimates.

Wage and Income Information for On-site Jobs

EPA obtained wage and income information from the U.S. Bureau of Labor Statistics (BLS). Part of the U.S. Department of Labor, the BLS is the principal federal agency responsible for measuring labor market activity, working conditions and price changes in the economy. Its mission is to collect, analyze and disseminate essential economic information to support public and private decision-making. All BLS data meet high standards of accuracy, statistical quality and impartiality.

EPA used the BLS Quarterly Census of Employment and Wages database to obtain average weekly wage data for businesses at the Lindsay Manufacturing Co. Superfund site. Average weekly wage data were identified by matching the North American Industry Classification System (NAICS) codes for each type of business with weekly wage data for corresponding businesses in Platte County. If weekly wage data were not available at the county level, EPA sought wage data by state or national level, respectively. In cases where wage data were not available for the six-digit NAICS code, EPA used higher-level (less-detailed) NAICS codes to obtain the wage data.

To determine the annual wages (mean annual) earned from jobs generated by each of the selected businesses at the Lindsay Manufacturing Co. Superfund site, EPA multiplied the average weekly wage figure by the number of weeks in a year (52) and by the number of jobs (employees) for each business.

Table 1. Lindsay Manufacturing Co. Superfund Site: Information for On-site Businesses

On-site Business	NAICS Code ^a	NAICS Title	Number of Employees ^b	Average Weekly Wage (2015) ^c	Annual Wage (Mean Annual) per Employee	Total Annual Income ^d	Annual Sales (2016) ^b
Lindsay Corporation	333111	Farm Machinery and Equipment Manufacturing	500	\$879	\$45,708	\$22,854,000	\$189,022,694 ^e
Lindsay Transportation, Inc.	484121	General Freight Trucking, Long-Distance, Truckload	10	\$692	\$35,984	\$359,840	\$2,560,000
Lindsay International Sales Corporation	423820	Farm and Garden Machinery and Equipment Merchant Wholesalers	10	\$913	\$47,476	\$474,760	\$4,530,000
Barr-Thorp Electric Co.	238210	Electrical Contractors and Other Wiring Installation Contractors	2	\$812	\$42,224	\$84,448	\$154,500
Total			522			\$23,773,048	\$196,267,194

^a NAICS code provided in the D&B database.

^b Data are from the D&B database.

^c Average weekly wage per employee based on BLS 2015 Average Weekly Wage data.

^d Total annual income figures derived by multiplying “Number of Employees” by “Annual Wage (Mean Annual) per Employee.”

^e Annual sales value calculated using the “Sales Per Employee” method. In cases where information sources do not provide annual sales data, an estimated annual sales value was calculated using the “Sales Per Employee Method”. This method involves dividing the company-wide sales value by the number of employees that work at all branches of the business. That value equals an estimated business sales value per employee for the entire business, for all locations. That value is then multiplied by the number of employees at the on-site business location to calculate an estimated annual sales value for the site-specific business location.

Property Values and Local Tax Revenue Generated from Property Taxes

EPA obtained data on the most recently assessed values for property parcels at the Lindsay Manufacturing Co. Superfund site in April 2017 through property records accessible through Platte County's online property appraisal database (<https://platte.gisworkshop.com/?&t=assessor>). EPA also obtained 2016 property tax information for the site parcels.

Table 2. Property Value and Tax Summary for Taxes Payable in 2016

Parcel ID No.	Total Assessed Value of Land and Improvements (2016)	Total Property Tax (2016)
710073101	\$1,391,900	\$14,932.30
710073010	\$1,552,100	\$16,650.92
Total	\$2,944,000	\$31,583.22