



United States
Environmental Protection
Agency

Proposed Changes Let Natural Processes Clean Pollution

West KL Avenue Landfill Superfund Site

Kalamazoo, Michigan

April 2005

Opportunities for public involvement

EPA welcomes your input as it makes changes to the cleanup plan for the West KL Avenue Landfill site. Oral and written comments about the proposed changes will be accepted at a public meeting scheduled for:

Wednesday, April 20

7 p.m.

Oshtemo Township Hall

7275 W. Main St.

Kalamazoo, Mich.

Your participation is important to the process because EPA may modify its proposal based on comments received from the public.

EPA will also accept written comments on the proposed changes during a 30-day public comment period from April 13 and postmarked by midnight May 13. If you wish, you may use the enclosed comment sheet. Mail, e-mail or fax your comments to:

Tim Prendiville

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Superfund Division (SR-6J)
EPA Region 5
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Chicago, IL 60604-3590
(800) 621-8431, Ext. 65122
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U.S. Environmental Protection Agency Region 5 wants to modify the current cleanup plan for the West KL Avenue Landfill site by letting natural processes break down contamination previously released from the landfill to the ground water moving underground to the west of the site. This modification will not alter other aspects of the site cleanup plan, such as replacing an outdated landfill cover with a more protective cover. The more protective cover will prevent rainwater and snow melt from seeping through the landfill and carrying pollution into the ground water. The cleanup changes are detailed in a document called a “focused feasibility study.”

Whatever cleanup changes are approved will be explained in an EPA document called a “record of decision amendment” or ROD amendment.¹ The modifications will be discussed at a public meeting on April 20, and the public has 30 days to file written comments with EPA about the proposal (*see adjacent box*). EPA along with its state partner, Michigan Department of Environmental Quality, could alter the proposed changes further or even choose a new plan based on public comments.

Pollution formed a plume

Chemicals from industrial waste disposed of in the landfill seeped into ground water (underground supplies of fresh water) moving slowly deep underneath the landfill site. The polluted ground water then formed a “plume” or body of contaminated water and flowed underneath the western landfill boundary (*see map on Page 3*). Dozens of residential wells west and northwest of the landfill were threatened by the pollution moving underground in the water. The main plume traveled to Dustin Lake, but contamination has been detected as far west as Second Street. Most of the homes threatened by the contamination have been hooked up to the city water system and the residential wells were plugged. The remaining hookups that need to be done to protect residents near the landfill will be completed this spring.

EPA in 1990 proposed a more protective landfill cover and an elaborate treatment system to clean up the ground water and discharge it to a specially designed pool on the landfill property or to the Kalamazoo sewage treatment plant. Extensive monitoring and sampling has shown that natural processes such as dilution and decay are doing a good job of treating the ground-water pollutants. EPA decided an active treatment system is no longer necessary so the Agency is proposing changes that will save \$20 million and be just as effective in protecting people’s health as the more elaborate plan.

¹ Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA known as the Superfund law) requires publication of a notice announcing the proposed ROD Amendment and a brief analysis. It also requires an opportunity for a public hearing and comment period. This fact sheet summarizes the changes detailed in the Focused Feasibility Study, which is available for viewing at the Oshtemo Branch Library in Kalamazoo, Mich.

A summary of the cleanup plan with the proposed changes:

- replace an outdated landfill cap with an engineered cap (multiple layers of soil, clay, plastic and fabric)
- allow the natural processes to continue treating the ground-water contamination but closely monitor the ground water to make sure the chemicals are breaking down
- supply municipal water to the remaining homes west and northwest of the landfill where wells are threatened by the pollution and abandon any residential well at a home hooked up to the city water supply
- ban the drilling of new wells on and west of the landfill property within the “restriction boundary” on the enclosed figure

About the West KL Avenue site

The landfill site covers 87 acres and operated as a private dump from about 1950 until 1960 when Oshtemo Township leased the property for use as a sanitary landfill. In 1968 Kalamazoo County bought the area for use as a county landfill. The county disposed of commercial and industrial waste there until 1979 when it was closed because nearby water wells were being contaminated. That year the county installed safer, deeper wells for 11 residences, and Oshtemo Township installed a water main along KL Avenue to supply clean water to residents.

In 1980 the township capped the landfill with soil and clay, which helped reduce snow and rain from soaking through the landfill waste. The 1980 cap, however, does not meet current EPA or state standards. Currently the landfill is fenced and deed restrictions have been placed on the property. Grass, shrubs and trees have grown over the 1980 cap. Landfill vents were installed to manage the gases generated by the decomposing waste.

EPA placed the site on the National Priorities List in 1982. The sites on this list are among the nation’s most hazardous waste areas and are eligible for cleanup under the EPA Superfund program. A group of parties held legally responsible for the pollution (KL Group) have been paying for the monitoring, sampling and testing on and around the area. This group will pay for the proposed cleanup changes if enacted.

In 1990 EPA chose its original cleanup plan for the landfill requiring an engineered cap, and for contaminated ground water to be pumped out of the ground, treated and discharged. The KL Group agreed to do these activities. The treatment system was never built because finding a place to discharge the treated water would have been difficult.

Natural processes breaking down pollution

The ground west of the landfill is dotted with more than 100 monitoring wells and test wells and borings, and sampling from those wells appeared to indicate levels of contaminants in the ground water were lessening. For example, in 1988 when the first ground-water studies were completed at the site, there were 11 major organic contaminants detected. Now only benzene, tetrahydrofuran (THF) and 1,4 diethylene dioxide (1,4 DD) are regularly found in ground water at levels not meeting drinking water health standards. There has also been a decrease of about 82 percent in the total mass of contaminants in the ground water. Another piece of evidence showing natural processes are working is the fact that the breakdown products of the major contaminants have been regularly detected in the ground-water monitoring system.

While several chemicals are found in the ground-water plume between the landfill and Dustin Lake, only one chemical, 1,4 DD, is found in unsafe concentrations in wells along Second Street, between Sunnywood and Almena. Sample results from residential wells near First Street show that the western edge of the main contamination plume is located between First and Second streets, but more sampling is needed to better pinpoint the western plume boundary.

Contamination from inorganic substances such as metals and ammonia is much less than the organic chemical contamination. The most recent ground-water sampling shows that the only inorganic contaminants detected that do not meet drinking water standards were ammonia, methane, chloride and iron. Concentrations of iron and the other pollutants should drop significantly after the new landfill cap is installed.

In 2003 EPA approved a change to the original cleanup plan providing municipal water to residents in the area. At the same time, tests were being finished to determine if natural processes were eliminating the chemicals acetone and toluene from the ground water and slowing or stopping the movement of benzene and THF.

All about 1,4 Diethylene Dioxide

Within the last year 1,4 diethylene dioxide or 1,4 DD has been detected at this site. Thanks to improvements in laboratory methods, lower levels of the chemical can now be detected, which led to its discovery near the KL Avenue Landfill. In the past, 1,4 DD could only be found reliably at 20 parts per billion or more, but now as little as 1 part per billion is detectable in ground water. 1,4 DD is an organic compound generally used to stabilize other chemicals. It dissolves easily in water and does not readily break down. 1,4 DD is often found along with THF in the same ground-water samples along Second Street between Sunnywood and Almena, but unlike THF, the concentrations of 1,4 DD do not meet drinking water health standards. The Michigan drinking water standard for 1,4 DD is 85 parts of chemical per billion parts of water.

Cleanup options

EPA considered three alternatives to change the cleanup plan for contaminated ground water. The Agency compared each option with nine criteria set by law (*see box for explanation of criteria and the table for a quick comparison of alternatives on Page 7*). The official documents in the site information file and the focused feasibility study provide complete details of the cleanup options, but the following text is a summary:

Alternative 1 – No action

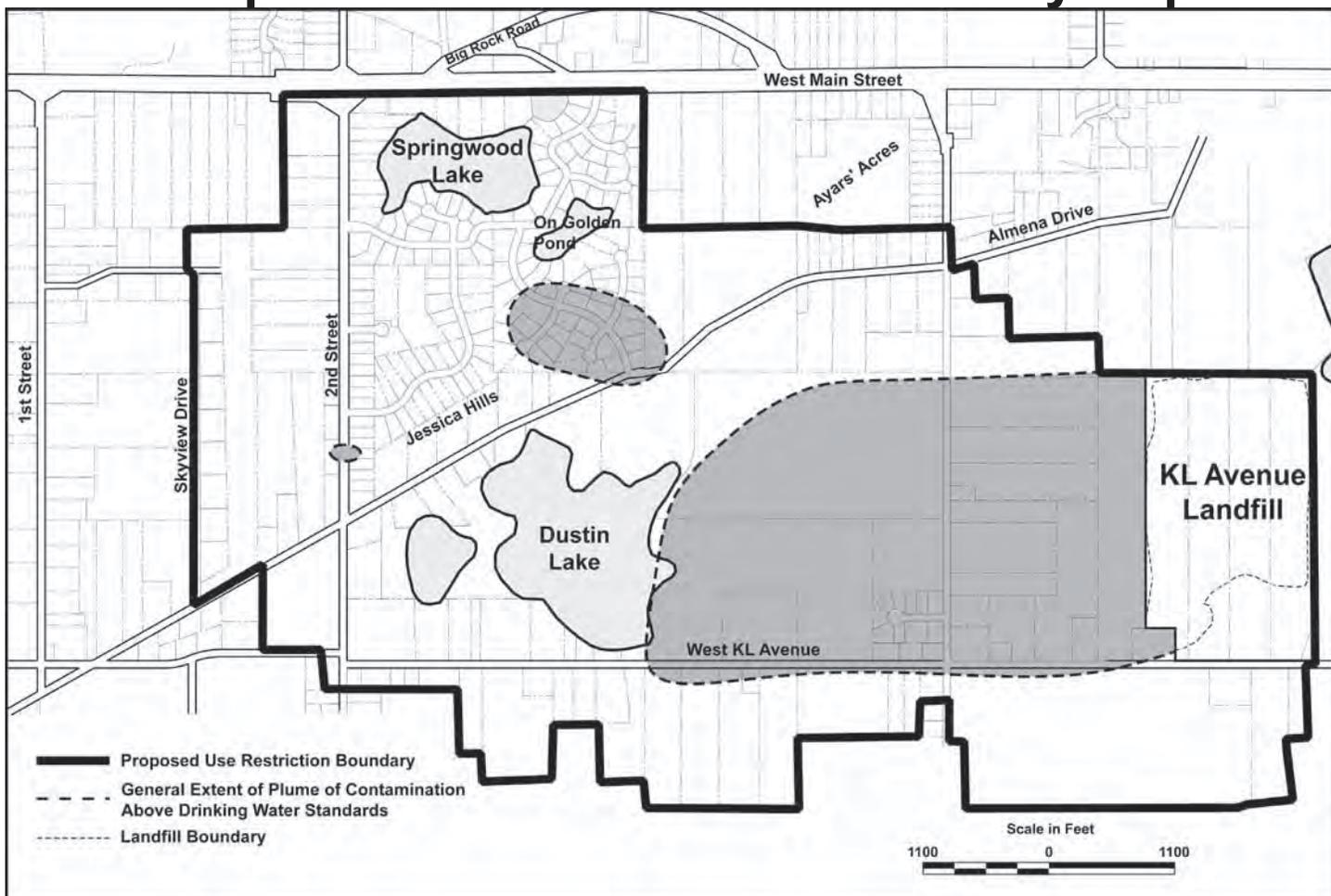
Evaluation of a no-action alternative is required by law to give EPA a basis for comparison.

Cost: \$0

Alternative 2 – Active treatment system as outlined in the original cleanup plan

Contaminated ground water would be pumped from a series of extraction wells to an above-ground treatment system. The ground water would be treated through bioremediation and other technologies until the water

Proposed Use Restriction Boundary Map



meets state drinking water standards. Bioremediation is the use of tiny living organisms to break down chemicals. The ground water would then be put back into the shallow aquifer (underground formation that holds water), sent to the city of Kalamazoo treatment plant or discharged to an on-site treatment pond. Alternative 2 includes continued monitoring of the ground water and supplying municipal water service to the homes within the area (ground water use-restriction zone). It also includes abandonment of the existing well at any home in the ground water use-restricted zone connected to the municipal water supply. A multi-layer cap would be placed over the landfill which would consist of a 2-foot thick clay layer or a similar type of material, a 60-mil (60/1000 inch) thick plastic liner, a 12-inch drainage layer, a geotextile filter fabric, a 2-foot layer of clean fill for frost protection and drainage, and a 6-inch layer of seeded topsoil. Gas venting and monitoring is included in the cap design. Alternative 2 includes installation of a fence around the site and placing deed restrictions on the landfill property, but both actions have already been done.

Cost: \$52 million

Alternative 3 – Monitored natural attenuation of ground water and landfill cap (*this is EPA's recommended cleanup option*)

Monitored natural attenuation is a fancy term for natural processes breaking down pollutants in ground water, and under this alternative the process would be closely

tracked by monitoring wells. Under this choice, a landfill cap as described in Alternative 2 would be installed and the current landfill fence and deed restrictions would be maintained. Additional ground-water studies would also be performed to better define the limits of the contamination. If natural attenuation does not work, or the landfill cap does not lessen the amount of contamination leaving the landfill, a backup or contingency cleanup plan would then be carried out. The backup plan may include additional source controls within the landfill waste or the aquifer at the landfill boundary. These source controls may include improved landfill gas extraction, sulfate injection and ozone injection. A contingency plan may also include ground-water pumping and above-ground treatment at select locations. The effectiveness of natural attenuation will be evaluated continually until ground-water cleanup standards are met in the whole aquifer. The effectiveness of the landfill cap will be evaluated in five years and again 10 years after the cap is constructed to determine whether the backup plans are needed. Alternative 3 also includes supplying municipal water service to threatened homes and abandonment of the existing wells at any such home connected to city water. This option also requires that the ground-water user restriction zone be at least 1,000 feet away from any well contaminated by site-related pollutants that fail to meet drinking water health standards.

Cost: \$29.5 million

Evaluation of the alternatives

The evaluation table shows why Alternative 3 appears to be the best choice. Both Alternatives 2 and 3 guard people's health in the short term. Alternative 2 would be very difficult to carry out because of the large volume of water that would need to be treated. Alternative 3 can be constructed quicker and easier than the second option and will cause less disruption to the community because it does not require construction of a treatment system. The table on Page 7 shows that the no-action choice meets none of the cleanup criteria.

Next steps

EPA and Michigan DEQ will consider the comments received during the comment period before choosing a final cleanup plan. The cleanup changes will be announced in the local newspaper and described in the ROD amendment that will be available for public review.

A summary of all comments and EPA's responses will be contained in a section of the ROD amendment called a "responsiveness summary," which will also be available for viewing. After a final plan is chosen, it will go through a design phase and then be implemented by the KL Group.

West KL Avenue Landfill Site Comment Sheet

Detach, fold, stamp, and mail

Name _____
Address _____
City _____ State _____
Zip _____

Place
Stamp
Here

Tim Prendiville
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Superfund Division (SR-6J)
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This table compares the three cleanup options with the nine evaluation criteria. The state and community acceptance factors will be evaluated after public comments are received by EPA and Michigan DEQ. EPA's recommended option, Alternative 3, compared more favorably to the evaluation criteria than did the other choices. The degree to which all alternatives meet the evaluation criteria is shown in the table.

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Overall Protection of Human Health and the Environment	☐	■	■
Compliance with ARARs	☐	■	■
Long-Term Effectiveness and Permanence	☐	■	■
Reduction of Toxicity, Mobility, or Volume through Treatment	☐	■	■
Short-Term Effectiveness	☐	■	■
Implementability	☐	☐	■
Cost	Not Applicable	\$52 million	\$29.5 million
State Acceptance	☐	Will be evaluated after the comment period	
Community Acceptance	Will be evaluated after the comment period.		

■ = Meets Criteria ☐ = Does Not Meet Criteria

Evaluation criteria

EPA uses nine criteria to evaluate and compare cleanup options. See the table comparing the alternatives against these criteria.

- 1. Overall protection of human health and the environment** addresses whether an alternative adequately protects both human health and the environment. This factor can be met by reducing or eliminating contaminants or by reducing people's exposure to them.
- 2. Compliance with applicable or relevant and appropriate requirements (ARARs)** assures that each project complies with federal, state and local laws and regulations.
- 3. Long-term effectiveness and permanence** evaluates how well an option will work in the long term, including how safely contaminants left in place can be managed.
- 4. Reduction of toxicity, mobility or volume through treatment** addresses how well the option reduces the toxicity (potential health danger), movement and amount of contaminants.

5. Short-term effectiveness compares the time needed to implement a cleanup option and the health risks posed to cleanup workers and nearby residents while the alternative is under construction.

6. Implementability assesses how difficult the cleanup alternative will be to construct and operate, and whether technology, materials and services are readily available.

7. Cost compares the expense of each alternative over time. Includes capital expenditures such as buildings, machines and wells plus operation and maintenance costs.

8. State acceptance is whether the state environmental agency, in this case Michigan Department of Environmental Quality, agrees or disagrees with EPA's recommended alternative. EPA evaluates state acceptance after it receives public comments on its recommended option.

9. Community acceptance looks at how well the community near the site accepts the option. EPA also waits to consider this factor until it sees the public comments.

For more information

If you would like to learn more about the comment period, public meeting, proposed changes in the cleanup plan or any other aspect of the West KL Avenue Landfill project, please contact these EPA and MDEQ representatives:

For meeting questions or special arrangements:

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For technical details:

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Read the documents

EPA has established a West KL Avenue Landfill information file at the Oshtemo Branch of the Kalamazoo Public Library. The file contains specific information related to the site such as the focused feasibility study that studied the proposed changes, and the file also contains general information about the Superfund cleanup process.

Kalamazoo Public Library
Oshtemo Branch
7265 W. Main St.

You can also read about the West KL Avenue site on the Internet. Go to www.epa.gov/region5/sites/ click on “Michigan” and scroll down to “West KL Avenue.”

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