United States
Environmental Protection
Agency

EPA Proposes Changes to the Forest Waste Site Cleanup

Forest Waste Disposal
Genesee County, Michigan June 2005

U.S. Environmental Protection Agency Region 5 wants to modify the current cleanup plan for the Forest Waste Disposal site due to continuing problems with contaminated ground water moving off the site. The cleanup changes are detailed in an EPA document called "record of decision amendment" or ROD amendment.[1] You have a chance to comment on these changes at a public meeting **July 20**. You can also provide written comments within 30 days *(see adjacent box)*. The proposed changes may be altered based on comments from the public so your participation is important.

Ground water (underground supplies of fresh water) at the site is contaminated mainly by volatile organic compounds (VOCs). VOCs often pollute ground water because they easily dissolve. VOCs are organic compounds that contain carbon and commonly also contain hydrogen, oxygen and other elements that evaporate easily. There are numerous sources of VOC emissions including gasoline vapors, chemical solvents and consumer products such as paints.

The cleanup changes are meant to stop the VOC-contaminated ground water from seeping off-site to the north and west and will help prevent people from coming in contact with the VOCs. Here is a summary of the cleanup changes proposed in the ROD amendment:

- treat the VOCs in ground water leaving a landfill area on the site (see Figure 1, Page 3) by one of two methods: adding oxygen to the ground water using a privately owned technology called in-situ submerged oxygen curtain (iSOC™) to speed the natural breakdown of VOCs, or remove VOCs by injecting air into a trench across the ground water flow (called air sparging)
- farther away from the landfill, destroy VOCs in the ground water near the borders of the site and off-site by injecting chemical oxidants
- rely on natural processes such as decay and dilution to reduce the contamination remaining in the ground water which has passed the oxidant injections
- increase the size of the site by adding an 80-acre parcel on the northern side (see Figure 2, Page 4)
- prevent drilling new wells that could draw from the contaminated ground water or affect the cleanup and replace any residential wells contaminated by the site

[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 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 full text of the ROD amendment available for viewing at the Forest Township Library in Otisville, Mich.*

For more information

If you are interested in the Forest Waste cleanup, please attend the upcoming public meeting on July 20 at Forest Township Hall from 7 p.m. - 9 p.m.

Written comments on the proposed changes can be mailed or e-mailed prior to midnight Aug. 9, 2005 to:

Richard Boice
EPA Remedial Project Manager
(see address on enclosed comment form)
(312) 886-4740 or
(800) 621-8431,
weekdays 10 a.m. – 5:30 p.m.
boice.richard@epa.gov

Special accommodations or questions about the meeting should be directed to:

David Novak
EPA Community Involvement Coordinator
(312) 886-7478 or
(800) 621-8431,
weekdays 10 a.m. – 5:30 p.m.
novak.david@epa.gov

Site-related documents may be reviewed at:

EPA
Region 5 Records Center, 7th Floor
77 W. Jackson Blvd.
Chicago, Ill.

Forest Township Library
130 E. Main St.
Otisville, Mich.
or
www.epa.gov/region5/sites/

- monitor cleanup progress and verify safety of drinking water by periodic ground-water sampling
- update ground-water cleanup "action levels" (pollution concentrations that must be met at the end of the cleanup to protect ground water for drinking and to protect surface water)

About the Forest Waste Disposal site

The site covers approximately 192 acres. Parts of the site were used for disposal of general refuse and industrial waste from 1973 to 1978. Various wastes were dumped in a 15-acre landfill while liquid wastes were disposed of in nine lagoons east of the landfill (see Figure 1, Page 3). The site was added to EPA's National Priorities List of Superfund sites in 1983. That designation means the site qualifies for special attention from the federal government. EPA installed a fence around the 112-acre original site in 1984.

Following several investigations, EPA with the Michigan Department of Environmental Quality (MDEQ) decided on cleanup plans in 1986 and 1988 with some modifications approved in 1993. EPA reached an agreement with a group of companies to clean up the site. The companies call themselves the Forest Waste Coordinating Committee (FWCC). Under EPA oversight, the FWCC completely removed contaminants from the lagoons in 1988-89, removed some waste barrels and contaminated soil from the landfill in 1993, and capped and fenced the landfill in 1997.

The waste disposed of at the site contained several VOCs that seeped into the ground water creating two "plumes," which are masses or bodies of contaminated water. Monitoring wells were set up to detect ground-water contamination from the landfill and lagoons. It was found that one plume is moving north and west and the other toward the east. The eastern ground-water plume has limited contamination, but EPA continues to monitor it and has a cleanup plan if the contamination exceeds ground-water action levels at the eastern boundary of the site. To date, no ground-water treatment of the east plume has been needed.

However, ground water with contamination exceeding cleanup action levels is moving from the site to the north and west (see Figure 1, Page 3). More sampling and testing to find the boundaries of this northern plume were done from 2002 to 2004. EPA is preparing this ROD amendment to change the original cleanup plan to address this problem.

Risks to people and the environment

Before the lagoons were removed and the landfill was capped, the site posed a health risk to trespassers who might come in contact with the waste. Now that the lagoons are removed and the landfill covered, the only way a person could be exposed to dangerous wastes and contaminants in the soil would be if the landfill cap is disturbed.

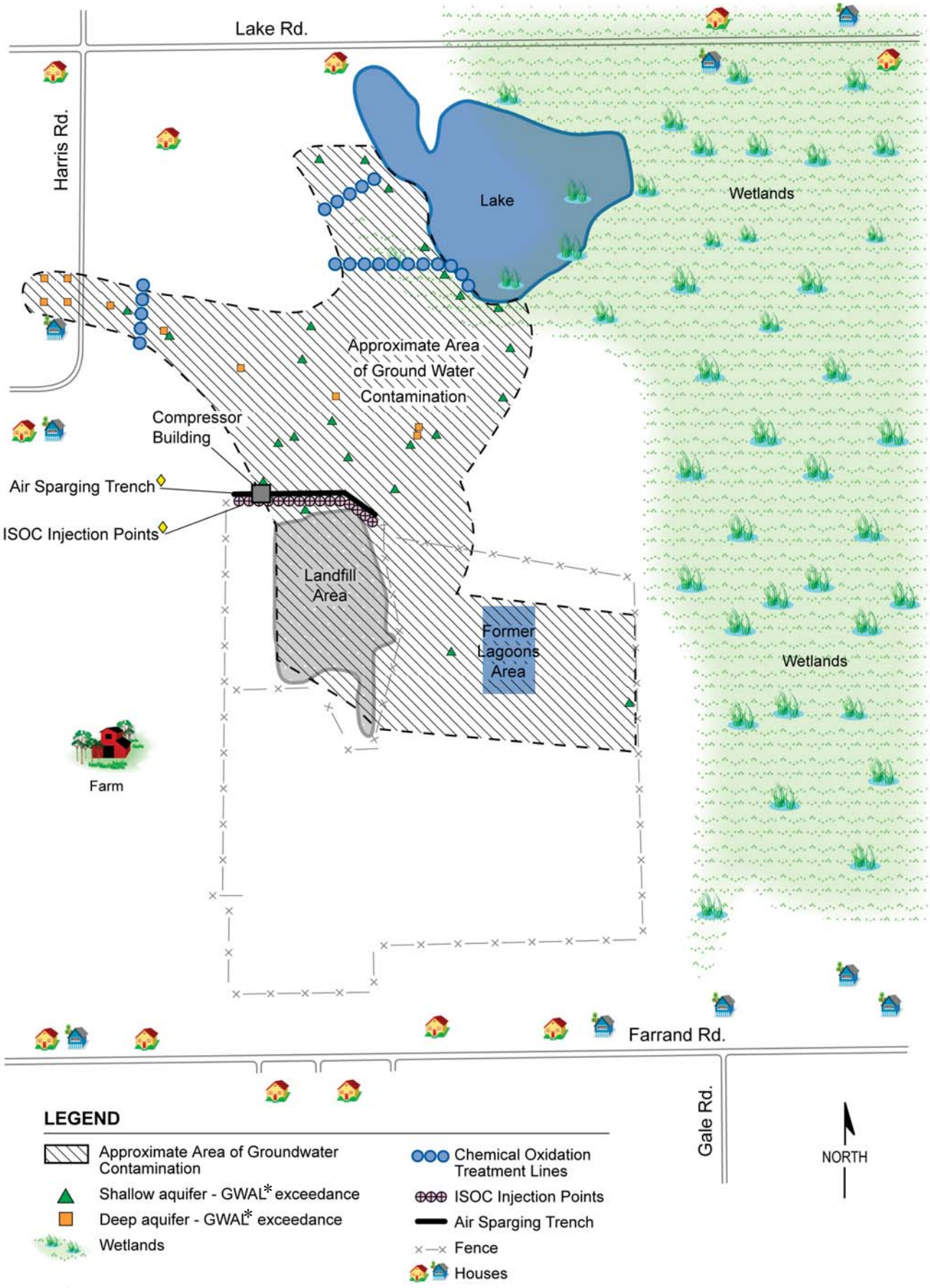
As far as risks from ground-water pollution, VOCs in the northern plume exceed cleanup action levels. In response to this, nearby residential wells have been sampled annually since 2001. VOCs have not been detected in the residential wells. Most of them are protected from the contamination by a layer of bedrock. One well not installed in the bedrock was replaced as a precaution. If cleanup actions are implemented, EPA does not think it is likely that any of the residential wells will be affected by the pollution. However, as a precaution, sampling of selected residential wells will continue.

Cleanup alternatives considered

The goals of this latest cleanup effort are to protect ground water for drinking water usage and to protect surface water quality. To achieve these goals, EPA and MDEQ looked at a wide range of technologies. Five alternatives that include the most promising technologies were reviewed in more detail. EPA checked each alternative against nine criteria established by the Superfund law (see *Nine Criteria* box, Page 5). All of the alternatives expand the site to include an additional 80 acres, continue existing usage and access restrictions on site property, and add restrictions on new wells in certain areas near the site. The restrictions on new ground water wells will be enforced through Genesee County health regulations.

Figure 2 shows the beginning boundaries of the well restriction areas. Two types of restriction areas are planned. Within the "contamination attenuation area," new wells will only be allowed if special construction procedures are followed. Within the "pumping restriction area," new private residential wells will probably be allowed, but larger wells may be restricted. The well restriction areas will be reviewed and updated as necessary. EPA and MDEQ may also work with property owners in these areas to place well restrictions in their deeds.

All of the alternatives also call for extensive monitoring with test wells on and around the site and regular sampling of selected residential wells. All of the alternatives rely to a limited degree on monitored natural attenuation. Natural attenuation is a term for letting natural processes such as decay and dilution reduce or destroy VOCs that are not removed by the active treatment systems. The natural attenuation will be monitored to assure all the VOCs are reduced to safe levels in a reasonable time. In the unlikely event that site-related VOC contamination is found in a



* *Exceeds Michigan drinking water criteria.*

◊ *Either the air sparging trench or iSOC injection points could be used for the cleanup.*

Figure 1. Forest Waste Disposal site source areas, ground water contamination and proposed ground water treatment locations.

residential well, the well will be closed and replaced with a well sunk into a deep aquifer (underground water-bearing rock formation). Cost estimates for 10 years and 30 years are included with each alternative. Here is a summary of the cleanup options:

No Additional Action Alternative – No action would be taken other than continued monitoring. EPA always includes a no action option as a comparison with other alternatives. **Cost -- $600,000**

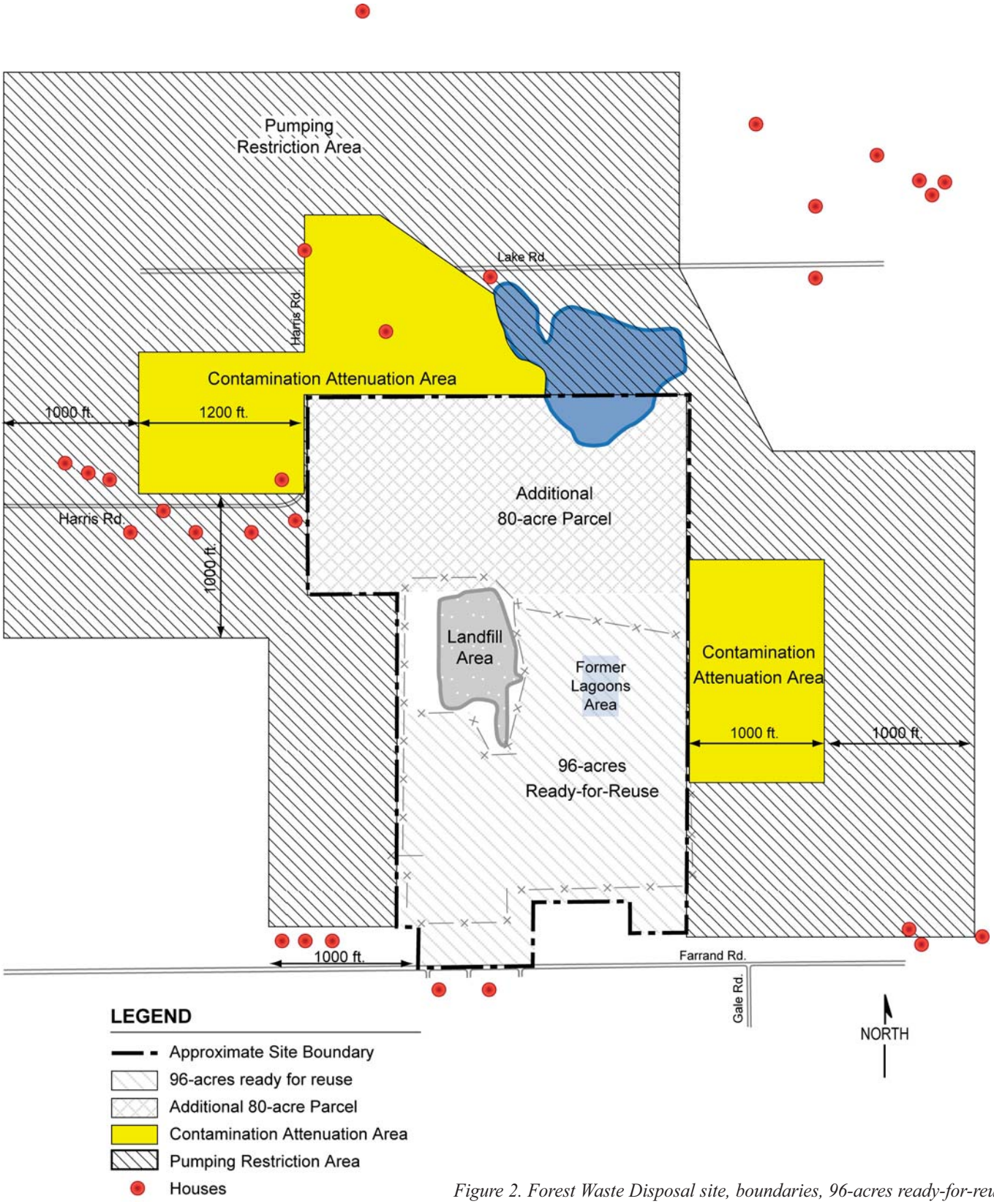


Figure 2. Forest Waste Disposal site, boundaries, 96-acres ready-for-reuse, additional 80-acre parcel, and well restriction areas.

The Nine Criteria

Changes to the cleanup plan were evaluated and identified using EPA's nine criteria to compare and evaluate cleanup options. These criteria are:

1. **Overall Protection of Human Health and the Environment** addresses whether an alternative adequately protects both human health and the environment. This criterion can be met by reducing or eliminating contaminants or by reducing exposures to them.
2. **Compliance with Applicable or Relevant and Appropriate Requirements**, referred to as 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 remaining contaminants can be managed.
4. **Reduction of Toxicity, Mobility, or Volume** through Treatment addresses how well the option reduces the toxicity, movement and amount of contaminants.
5. **Short-Term Effectiveness** is how quickly the project achieves protection, as well as its potential to be harmful to human health and the environment while it is being constructed and operating.
6. **Implementability** addresses how well the alternative can be implemented. It evaluates the technical feasibility and whether materials and services are available to carry out the project.
7. **Cost** includes estimated capital or start-up costs, for example the cost of buildings, treatment systems and monitoring wells. The criterion also considers costs to implement the remedy and operate and maintain it over time. Examples include laboratory analysis, repairing concrete and personnel to operate equipment. A cleanup is considered cost-effective if its costs are proportionate to its overall effectiveness.
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. This criterion addresses how well the option complies with state laws and regulations. EPA evaluates state acceptance after it receives and evaluates public comments on its recommended alternative.
9. **Community Acceptance** evaluates how well the community near the site accepts the option. EPA evaluates community acceptance after it receives and evaluates public comments on its recommendation.

Alternative 1 – Biosparging ground-water treatment near the landfill combined with chemical oxidation ground-water treatment near site boundaries and off-site (see Figure 1, Page 3)**.** Biosparging is a term for injecting air at low pressure into the ground water to add oxygen. Lines of biosparging wells would be installed near the landfill and form a curtain of ground water near the landfill having conditions to promote the breakdown of target VOCs naturally. VOCs that are not removed will be treated near site boundaries and off-site by chemical oxidation. Chemical oxidation is a process where a chemical injected into the contaminated ground water reacts with and destroys the VOCs. All treatment would take place in the subsurface ground water, and there would be no air emissions or surface water discharge. **Cost -- $4.3 million for 10 years of treatment; $4.6 million for 30 years.**

Alternative 2 – iSOC ground-water treatment near the landfill and chemical oxidation. *[One of EPA's preferred alternatives]* High levels of oxygen would be transferred to the contaminated ground water using a patented gas infusion technology (see Figure 4, Page 7). iSOC devices would be placed in a line of wells to create a curtain of ground-water treatment. The increased oxygen should improve the effectiveness of the natural processes and break down the target VOCs in the ground water. Use of this technology is considered new and innovative. Chemical oxidation would also be conducted as described in Alternative 1. All treatment would take place in the subsurface ground water. **Cost -- $4.0 million for 10 years; $4.2 million for 30 years.**

Alternative 3 – Air sparging ground-water treatment in a trench near the landfill and chemical oxidation. *[One of EPA's preferred alternatives]* A trench would be dug to the bottom of the shallow aquifer and backfilled with sand, gravel, crushed rock or other material where the ground water will easily flow. Within this trench, a perforated pipe would be placed and air would be injected through the pipe, creating air bubbles. Because the VOCs evaporate in air more easily than they dissolve in water, the VOCs in the ground water would transfer into the air bubbles. The air bubbles containing the VOCs would then travel to the

surface. This would remove the VOCs from the ground water (see Figure 5, Page 7). Chemical oxidation would be conducted as described in Alternative 1. All treatment would take place in subsurface ground water. There would be minor air emissions but no surface water discharge. **Cost -- $4.8 million for 10 years; $5.2 million for 30 years.**

Alternative 4 – Ground water pump-and-treat system using constructed wetland. Under pump-and-treat, several wells would be installed to collect contaminated ground water and pump it to a specially constructed, lined wetland. The VOCs would evaporate or break down naturally in the wetland. Use of a wetland treatment basin at a Superfund site is considered new and innovative. The main advantage of wetland treatment over conventional pump-and-treat systems would be the cost savings on the upkeep of a treatment plant. There would be minor air emissions and a surface water discharge in compliance with state and federal health standards. **Cost -- $4.7 million for 10 years; $5.5 million for 30 years.**

Alternative 5 – Ground water pump-and-treat using a treatment plant. Same as Alternative 4 except a conventional treatment plant would be constructed instead of a wetland. There would be minor air emissions and

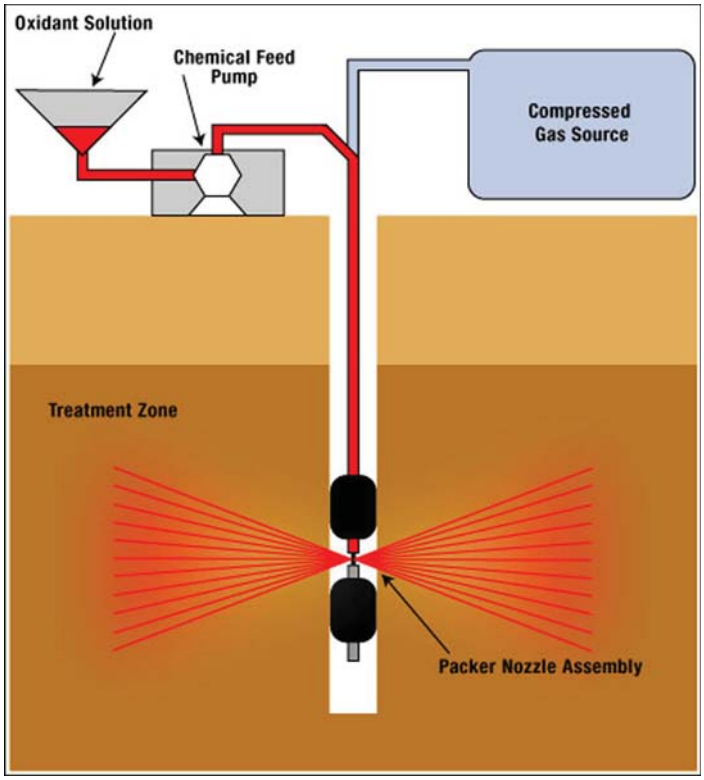


Figure 3. Alternatives 1, 2 and 3 - Chemical Oxidation
The oxidant could also be added by gravity, in which case the compressed gas and packer assembly would not be required.

Evaluation of Groundwater Remedy for the North Plume and Forest Waste Disposal Site

Evalution Criteria	No Additional Action	Alternative 1 Biosparging & Chemical Oxidation	Alternative 2 iSOC™ & Chemical Oxidation	Alternative 3 Air Sparging Trench & Chemical Oxidation	Alternative 4 Pump-and-Treat Using Engineered Wetland	Alternative 5 Pump-and-Treat Using Chemical Processes
1. Overall Protection of Human Health and the Environment	☐	■	■	■	■	■
2. Compliance with ARARs	☐	■	■	■	■	■
3. Long-Term Effectiveness and Permanence	☐	■	■	■	■	■
4. Reduction of Toxicity, Mobility, or Volume Through Treatment	☐	■	■	■	■	■
5. Short-Term Effectiveness	■	?	?	■	■	■
6. Implementability	■	?	?	■	■	■
7. Cost - compared to 1988 ROD (10 year O&M)	$ 600,000	$ 4.3 million	$ 4.1 million	$ 4.8 million	$ 4.7 million	$ 8.5 million
8. State Acceptance	State acceptance of the recommended option will be evaluated after the public comment period.					
9. Community Acceptance	Community acceptance of the recommended option will be evaluated after the public comment period.					

■ Fully meets criteria ☐ Does not meet criteria ? Effectiveness is uncertain

surface water discharge in compliance with state and federal requirements. **Cost -- $8.5 million for 10 years; $13 million for 30 years.**

Evaluation of cleanup alternatives

Taking no further action would be unacceptable because it would not protect human health (Criterion 1) or comply with ARARs (Criterion 2). Alternatives 1-5 should comply with Criteria 1 and 2. After evaluating each alternative using Criteria 1-7, EPA is proposing using either Alternative 2 or 3.

Alternative 2 (iSOC to treat ground water from the landfill and chemical oxidation to treat ground water near site boundaries and off-site) is favored because it may have the lowest cost, and it would treat the pollution on-site without releasing any VOCs to the air. However, there is some uncertainty about the effectiveness of iSOC. The air sparging in Alternative 3 is favored as a backup to iSOC because EPA is confident it will be effective in removing VOCs from ground water near the landfill, and it is relatively inexpensive. Alternative 1 is not favored because EPA is unsure about how well biosparging works. Alternative 5 was eliminated because of the high cost, and because it is the only alternative that would include off-site disposal of treatment by-products. Even though the estimated cost for Alternative 4 is similar to Alternative 2 and Alternative 3, it is not favored because air emissions and impacts on surrounding fish and wildlife are possible.

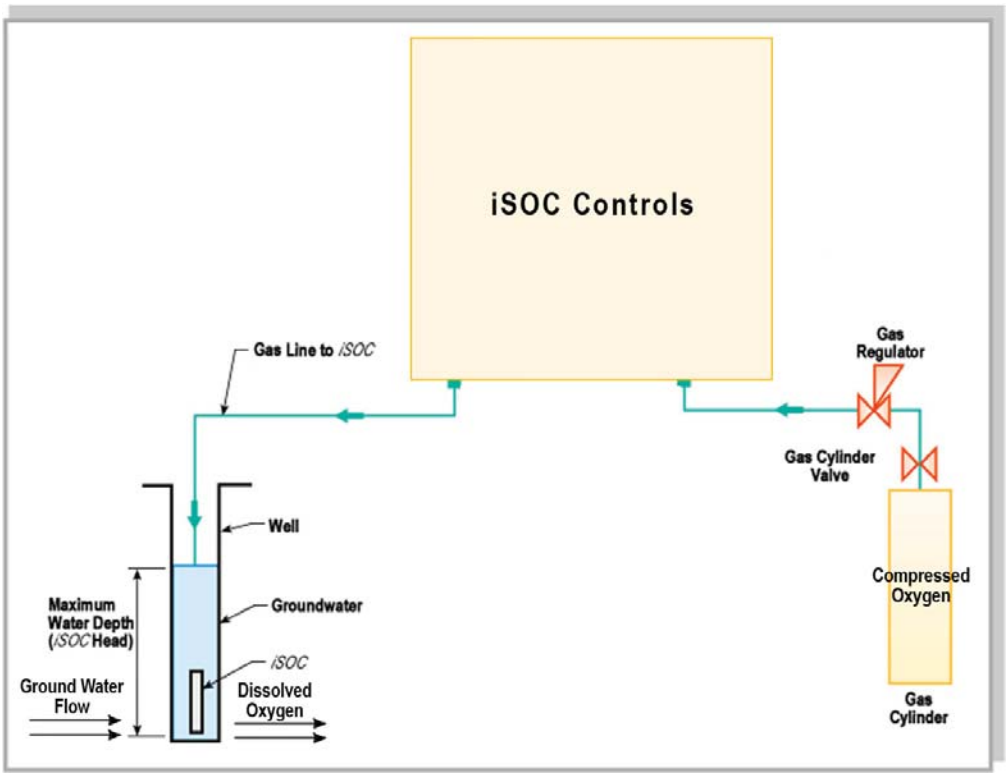


Figure 4. Alternative 2 - iSOC Ground-water Treatment

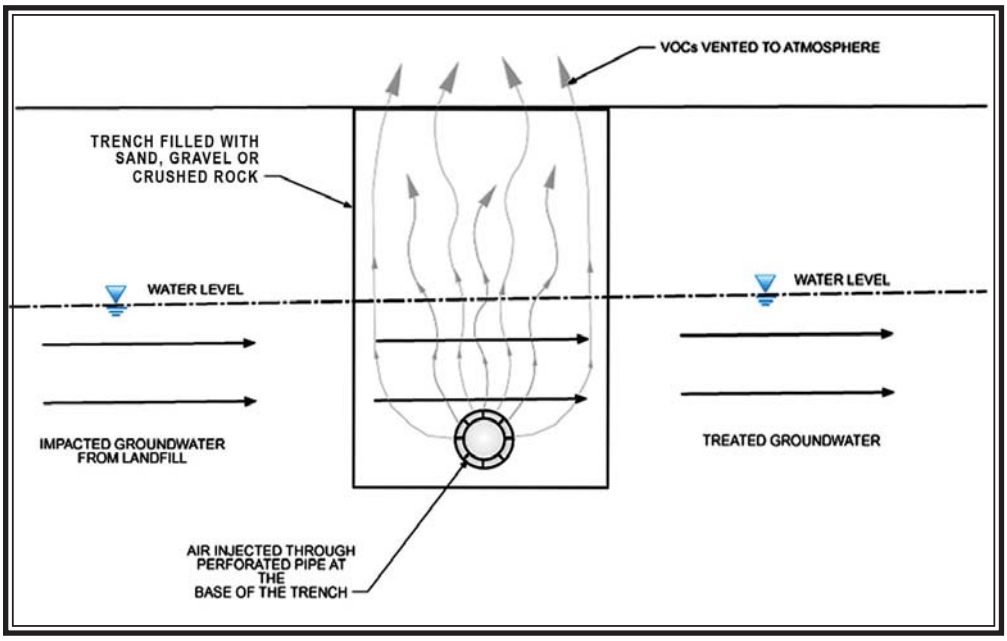


Figure 5. Alternative 3 - Air Sparging

EPA will evaluate each alternative using Criteria 8 and 9 following the public comment period.

EPA thinks the ground water near the landfill will likely remain contamined for decades so its chief goal is to make sure the water that makes it past the site boundaries is clean enough to drink and does not pollute surface waters. Every five years a major review will be done to make sure people are still safe from the contamination.

Public use determination

EPA has also decided 96 acres of the original site (see Figure 2, Page 4) are clean enough to allow non-residential uses. This decision is compatible with the current

United States
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Region 5
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Chicago, IL 60604

FIRST CLASS

FOREST WASTE DISPOSAL:
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activities on the property such as model airplane flying, archery and paintball. Forest Township, which now controls the site, allows recreation on the property through a permit system. In addition, deed restrictions prohibit ground-water usage, construction, soil removal, and other activities that may cause a health risk.

Next steps

People are invited to attend the public meeting where they can provide oral and written comments. Written comments can also be submited to EPA during the 30-day period. EPA will review and respond to all comments on the cleanup changes received at the meeting or during the comment period. A public notice will be run in a local newspaper when the final version of the cleanup plan is available for public reading at the document libraries.

EPA has been working with Genesee County to enforce existing regulations to restrict drilling of new drinking water wells in certain areas near the site. The FWCC is proceeding with on-site testing of the treatment technologies under EPA and MDEQ oversight. After the ROD amendment is officially published, and the on-site testing is completed, the FWCC will design the new cleanup systems. Before full-scale treatment begins, EPA will issue another fact sheet like this one to provide more detailed information on the location and types of treatment systems on the site. At that time if there's enough interest, another public meeting will also be held.

For more information on the changes, please plan to attend the upcoming public meeting:

Wed., July 20

7 p.m - 9 p.m.

Forest Township Hall

Otisville, Mich.

Comment Sheet

U.S. Environmental Protection Agency is interested in your comments on the proposed changes to the Forest Waste cleanup plan. EPA will consider public comments before selecting a final cleanup remedy for the Forest Waste site. Please use the space below to write your comments, then fold and mail this form. Comments must be postmarked by the last day of the comment period. If you have any questions, please contact Richard Boice at (312) 886-4740, or through EPA's toll-free number at (800) 621-8431. Those with electronic capabilities may submit their comments to EPA via the Internet at the following e-mail address: boice.richard@epa.gov or epa.gov/region5/publiccomment.

Name _____

Address _____

City _____ State _____

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