



Interim Clean Up for Polluted Underground Water Supply

Ottawa Township Flat Glass Superfund Site

Naplate, Illinois

August 2009

Tell us what you think

EPA invites comments on its proposed interim cleanup plan for the “Ground Water South of the Illinois River” portion of the Ottawa Township Flat Glass Superfund site. Public input helps EPA determine the best course of action.

EPA also encourages people to attend the upcoming Public Meeting on Wednesday, August 26, 2009, at La Salle County’s Etna Complex, 707 E. Etna Road, Room 250, Ottawa, Ill., starting at 7 p.m.

If you need special accommodations at the public meeting contact Cheryl Allen (see contact information below). Comments can be presented to EPA from August 19 to September 18, 2009 in many ways:

- Submit an oral or written statement at the public meeting.
- Send us a letter.
- Fill out and mail the enclosed, comment form.
- Send us a comment via the Web at: www.epa.gov/region5/publiccomment/
- Fax your comment to Cheryl Allen at 312-408-2234.

On the Web

<http://www.epa.gov/region5/sites/naplate>

U.S. Environmental Protection Agency is proposing to rework storm water drainage patterns and impose institutional controls on lands south of the Illinois River to help reduce arsenic levels in underground water supplies and prevent human exposure to hazardous waste in a glass factory’s former sand quarries. The purpose of this proposed plan fact sheet is to provide background information about the Ottawa Township Flat Glass (OTFG) Superfund site, describe the various cleanup options that we’ve considered, and identify EPA’s suggested cleanup alternative.¹

EPA typically breaks up complex cleanup sites into smaller parts called “operable units” or OUs. Here, EPA has divided the OTFG site into four OUs. The lands south of the Illinois River with glass-making waste material in several former sand quarries and a polluted underground water supply (ground water) beneath them are known as Operable Unit 3. EPA put together this proposed cleanup plan for OU 3 to help protect people and wildlife from exposure to the glass-making waste in the quarries while eventually reducing arsenic concentrations in the ground water to make it safe enough for drinking.

EPA considered six cleanup alternatives for OU3 and picked a variation of Alternative 4 – costing \$3 million – as its preferred cleanup plan. All the cleanup options are described in more detail later in this fact sheet. The modified Alternative 4 consists of engineering work to modify surface water drainage pathways near the former quarries to lessen the rate that rainwater and snowmelt soaks into the glass-making waste. That, in turn, will reduce the amount of arsenic-contaminated water filtering through the waste into and therefore polluting the ground water below. In addition, redirecting the surface water away from the former quarries will help to speed up the cleanup of the ground water by helping to cause the area ground water to more directly discharge into the Illinois River. EPA plans to monitor the arsenic concentrations in the ground water for many years. The modified Alternative 4 also calls for alternate water supplies to be provided to homes with private wells that are situated over or very near the mass of contaminated ground water. EPA would also apply institutional controls to the lands that would prohibit ground water use to prevent the use of contaminated ground water for drinking purposes. The institutional controls could be ordinances enacted by either the local municipalities or LaSalle County or EPA could decide that the placement of deed notices or restrictions on affected properties would be sufficient. A restrictive covenant would also be placed on the quarry property to prevent the future residential re-use of this land.

¹ Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, known as the Superfund law) requires EPA to provide an opportunity for public input with a meeting and comment period. It also requires a newspaper ad announcing the proposed cleanup plan. This fact sheet summarizes EPA documents called the remedial investigation and feasibility study. The full studies and all other official site documents can be found at the Reddick Library in Ottawa.

Contact EPA

These EPA representatives are available to answer questions and provide more information.

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8:30 a.m. - 4:30 p.m., weekdays

Public comment

The public is encouraged to comment on this cleanup proposal. EPA will be accepting comments starting August 19, 2009, through September 18, 2009. EPA also encourages the public to attend and participate in a public meeting at La Salle County's Etna Complex, 707 East Etna Road, Room 250, Ottawa, Ill., on August 26, 2009. The meeting will be held at 7-9 p.m. (See the box on P.1 for ways to participate in the public comment process.) Your input is important – EPA could alter its proposed plan or choose a new one based on public comments received.

EPA also encourages the public to review the supporting documents for the OTFG site which include the recently completed “remedial investigation” and “feasibility study” reports. A remedial investigation is a study of the nature and extent of contamination at a cleanup site whereas a feasibility study evaluates proposed cleanup options.

These documents are available at the Reddick Library, 1010 Canal St., Ottawa, and at EPA Region 5's offices in Chicago.

About the Ottawa Township Flat Glass site

The OTFG site is located in LaSalle County, Ill., and consists of the former Libbey-Owens-Ford glass manufacturing facility (active Plant #5 and inactive Plant #7) on 228 acres on the north side of the Illinois River and former silica sand quarries and wastewater disposal areas on 122 acres south of the river (see aerial photo below and on P. 7). Pilkington North America Inc. (PNA) now owns the site. PNA signed a legal agreement with EPA in 2001 in which PNA agreed to conduct a remedial investigation and feasibility study under EPA supervision.



Figure 1 – Aerial photo of glass factory and nearby residential area.

EPA divided the OTFG site into four operable units. The OUs include the Residential Soils (OU1), Illinois River Sediment (OU2), Groundwater and Source Areas South of the Illinois River (OU3), and Groundwater and Source Areas North of the Illinois River (OU4). As mentioned previously, this proposed plan fact sheet deals with OU3 only. Last year EPA announced proposed cleanup plans for OUs 1 and 2 and the Agency issued a Record of Decision to select the proposed plan. EPA is still investigating OU4 (on the north side of the river) and plans to propose a cleanup plan for that area late next year.

The plant has been making glass products since about 1907. Arsenic trioxide was a minor ingredient in the manufacturing process from 1907 until 1970 when its use was discontinued. The final step in the flat glass manufacturing process involved grinding and polishing the cast glass with fine silica sand and water. The process generated waste in the form of a slurry (known as “G&P slurry”) consisting of mostly sand, water and glass particles containing arsenic. The G&P slurry was discharged into some of the former quarries (including Quarry 1 in OU3) where the solids settled to the bottom and the overflow water was discharged into the Illinois River. The G&P slurry contains high levels of arsenic and is considered the main source of arsenic contamination in a ground water supply and also poses a potential exposure threat to people and wildlife.

PNA purchased the glass manufacturing facility from LOF in 1986, about 16 years after LOF had discontinued the use of arsenic in the glass-making process.

OU3 investigation results

PNA installed a number of ground water monitoring wells in and around the OTFG site several years ago. The company periodically takes water samples from the monitoring wells along with nearby private wells to determine the nature and extent of the arsenic contamination in the ground water beneath the site. On plant property, PNA also sampled surface soil, sediment (mud) in drainage pathways and at the bottom of the quarries, and surface water in the quarries to track the levels of arsenic contamination in these areas.

Test data shows two ground water aquifers of immediate concern lie below the site (aquifers are water-bearing rock formations in the ground). The upper aquifer is called the St. Peter Sandstone and is a regional unconfined aquifer that has been affected by arsenic contamination from the site. The lower aquifer, called the New Richmond Sandstone, is not contaminated with arsenic. Between the two aquifers lies the Shakopee Dolomite, a 150 to 200-foot thick layer of rock that forms an effective barrier and prevents arsenic contamination from moving between the St. Peter Sandstone and New Richmond Sandstone.

Arsenic levels in ground water in the tainted St. Peter Sandstone (in OU3) range from a few parts arsenic per billion parts soil at the edges of the contaminant plume, to about 350 parts per billion in the center of the plume. (A plume is a mass of contaminated water. A part per billion or ppb is a tiny amount, equal to 1 second in 32 years.) But even these small concentrations found in OU3 are up to 35 times higher than the safety standard for arsenic, which is 10 ppb. The federal Safe Drinking Water Act refers to the safety standard as “maximum contaminant level” or MCL.

The St. Peter Sandstone, however, is not currently used for drinking water in the site area although some private wells penetrate that layer. PNA currently supplies about five residences with bottled water to help prevent consumption of potentially contaminated water. The village of Naplate draws its public water supply from the arsenic-free New Richmond Sandstone aquifer. Ground water in the area generally flows towards the Illinois River. The ground water in the upper portion of the aquifer flows into the river while ground water in the lower reaches of the aquifer flows beneath the river toward the northwest (into OU4).

Quarry 1 in OU3 was used from about 1954 until 1970 to receive G&P slurry that was drained or “dewatered.” When use of the quarry was stopped the G&P slurry was covered with sludge from a wastewater treatment plant and topsoil and then seeded. The quarry contains more than 2 million cubic yards of the slurry material. Much of it lies within the water table and is considered to be the source material for the arsenic-contaminated plume in the ground water of the St. Peter Sandstone. Arsenic levels in the G&P slurry are high.

The other quarries were used as the facility’s wastewater retention ponds from time to time and may contain smaller amounts of grinding and polishing slurry. The quarries are no longer used to store wastewater discharges. But they contain various amounts of surface water in them that contain some arsenic. Sediment at the bottom of these quarries as well as the adjacent drainage ditches and surface soil also contain small amounts of arsenic.

Health risks to people and the environment

Arsenic is a nutrient and very small amounts are needed by the body for growth and for a healthy nervous system. But too much arsenic can cause non-cancer conditions in the body as well as potentially triggering lung or skin cancers. Arsenic can be absorbed through skin contact, breathing or by consuming arsenic-contaminated food or water. EPA conducted a human health risk assessment to determine whether the arsenic levels at OU3 are present in undesirable amounts in the soil, sediment, surface water and ground water.

Except for ground water, three exposure scenarios were examined: A PNA employee working in the quarry area, an adult trespasser (probably a hunter) and an adolescent trespasser. EPA did not consider a residential exposure scenario because OU3 is owned by PNA and the quarries are not suitable for home building. Exposure pathways could include skin contact and swallowing or breathing contaminated dust. For ground water, drinking water use by nearby residents was assumed as a potential exposure pathway because the contaminated underground plume has moved beyond the PNA-owned property.

Area surface soils are not considered contaminated because chemical levels are comparable to naturally occurring arsenic concentrations in soil statewide. Quarry 1, however, contains a 35 to 50-foot layer of G&P slurry that is covered by municipal sludge and topsoil. Quarry 3 holds a small amount of G&P slurry as well. Although the Quarry 1 slurry contains hazardous amounts of arsenic, the material is covered with a layer of soil and is not readily accessible to PNA maintenance workers or trespassers. Quarries 2-4 are filled with open water at depths up to 10 feet or more. Overgrowth and fencing generally restricts access, and the depth of the surface water further helps shield the more contaminated sediment beneath the water from someone who falls or jumps in the quarry.

The health risk assessment concluded the risk of contracting non-cancer illness and cancer from the soil, sediment and surface water of OU3 was low and no cleanup of those three areas is needed. However, the risk study did conclude it would be beneficial to continue to restrict access to soil, sediment and surface water in the area to minimize future exposure to arsenic contamination.

The ground water contamination poses the most serious problem, the health risk study concluded. As mentioned before, the source of much of the arsenic in the ground water supply is the thick layer of G&P slurry in Quarry 1. Should the ground water in the St. Peter Sandstone aquifer be used for drinking, unacceptable health risks would occur over a lifetime of exposure to the arsenic pollution. Because of these potential health risks, EPA is proposing the cleanup plan contained in this fact sheet.

Health risks were also calculated for birds, fish and land animals as well as plant life in the area, but the assessment found little effect from the arsenic because few organisms live on the property.

Cleanup goals

Ground water in the St. Peter Sandstone aquifer under the site is contaminated with arsenic levels above the drinking water standard of 10 ppb. Therefore, a potential adverse health risk exists should residents consume the contaminated water. The objectives for a cleanup action at OU3 would include:

- Prevent the drinking water use of ground water contaminated with arsenic above 10 ppb.
- Reduce the concentration of arsenic in the ground water over time to achieve a level of 10 ppb or less.
- Prevent people from coming in contact with the G&P slurry material in Quarry 1 as well as arsenic-tainted sediment in all of the quarries even though as mentioned above current exposure risks are low.

Cleanup alternatives

EPA considered several options for containing and reducing arsenic contamination on the OU3 site. Each option was evaluated against nine criteria required by law (see box on P. 5 for an explanation of the criteria). EPA's proposals are designed to reduce health risks and meet the cleanup goals. EPA believes its recommended cleanup actions will protect human health and the environment. Costs include construction of equipment and cleanup systems as well as long-term maintenance and operating expenses. Cost figures consider future inflation and are given in a financial calculation called "present worth." Full details are provided in the remedial investigation and feasibility study reports at the Reddick Library. EPA considered the following six cleanup alternatives:

Ground Water Alternative 1: No Action – EPA always considers a no action option as a comparison point for the other alternatives. **Cost – \$0**

Ground Water Alternative 2: Alternate Water Supply, Institutional Controls, and Monitored Natural Attenuation – Under this option, EPA would take action to ensure residences with private wells penetrating the contaminated portion of the St. Peter Sandstone aquifer would continue to receive an alternative water supply until the arsenic levels in the aquifer decline to 10 ppb or below. Institutional controls such as a ground water use ordinance to restrict consumption would be pursued as well. Under Alternative 2 deed restrictions on the PNA-owned property to prevent its use as residential land would also be implemented. The use of institutional controls and alternate water supplies would help reduce the potential health risks that could occur if contaminated ground water were to be consumed.

EPA would also conduct a monitored natural attenuation program at OU3 to track the arsenic contaminated plume over time until concentrations no longer exceed the standard of 10 ppb. Natural attenuation is a scientific term for letting natural processes such as evaporation, decay and dilution lower pollutant levels. This alternative would require additional monitoring wells be drilled and then periodically sampled for arsenic over a minimum 20-year time frame until the health standard is met.

Cost – \$1.45 million

Ground Water Alternative 3: Plume Containment via Pump and Treat, Surface Flow Measures and Alternative 2 – Under this option, EPA would implement the provisions of Alternative 2 plus take measures to contain the arsenic plume in the area around Quarry 1 by installing pumping wells and altering the surface water drainage pathways around the quarries. The additional work will help to change local ground water flow towards the Illinois River and will also speed the rate arsenic levels in most of the plume fall below 10 ppb. This alternative would require additional monitoring wells be drilled and periodically sampled for arsenic over a minimum 20 years until the health standard is met. The use of institutional controls and alternate water supplies would help reduce potential health risks from drinking contaminated water.

Under Alternative 3, pumped water could either be discharged to Quarry 4 without treatment, to the Ottawa municipal treatment facility or treated on-site to remove arsenic before discharging to the Illinois River.

Cost – \$6.25 million (pump to Quarry 4) to \$25 million (on-site treatment)

Ground Water Alternative 4: Surface Flow and Infiltration Reduction Measures and Alternative 2 – Under Alternative 4, EPA would implement Alternative 2 plus take measures to reduce the rate of arsenic escaping from the slurry material by altering the paths of surface water drainage around Quarries 1 and 2. The surface work will help reduce the rate of ground water recharge in the quarries, which in turn slows arsenic movement from the source material into the ground water below. The engineering work will also help change the direction of the ground water so it flows back towards the Illinois River. The drainage alterations will thus speed the rate at which the arsenic level in most of the plume falls below 10 ppb. As in the other options, institutional controls and alternate water supplies would also help reduce health risks. This alternative would require additional monitoring wells be drilled and periodically sampled for arsenic over a minimum 10 to 20 years until the drinking water standard is met. **Cost – \$3 million**

Explanation of evaluation criteria

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

- 1. Overall protection of human health and the environment** examines whether an option protects both human health and the environment. This standard can be met by reducing or eliminating contaminants or by reducing exposure to it.
- 2. Compliance with applicable or relevant and appropriate requirements (ARARs)** ensures that each clean up option complies with federal, state and local laws.
- 3. Long-term effectiveness and permanence** evaluates how well an option will work over the long-term, including how safely remaining contaminants can be managed.
- 4. Reduction of toxicity, mobility or volume through treatment** determines how well the option reduces the toxicity, movement, and amount of contaminants.
- 5. Short-term effectiveness** compares how quickly an option can help the situation and how much health risk there will be while the option is under construction.
- 6. Implementability** evaluates how difficult the option will be to construct and whether materials and services are available in the area.
- 7. Cost** includes not only buildings, equipment, materials and labor but also the cost of maintaining the option for the life of the cleanup. A cleanup is considered cost effective if its costs are proportionate to its overall effectiveness.
- 8. State acceptance** determines whether the state environmental agency – in this case Illinois EPA – accepts the option. EPA evaluates this criterion after receiving public comments.
- 9. Community** acceptance considers the opinions of nearby residents and other stakeholders about the proposed cleanup plan. EPA evaluates this standard after a public hearing and comment period.

Modified Ground Water Alternative 4: Surface Flow and Infiltration Reduction Measures and Alternative 2 except for Monitored Natural Attenuation (this is EPA's preferred alternative) – Under modified Alternative 4, EPA would implement every part of Alternative 4 described above except for monitored natural attenuation. EPA plans to re-examine the use of monitored natural attenuation at OU3 because not enough information is currently available to choose this approach as part of the cleanup remedy. However, new monitoring wells would be drilled and sampled as before, so the estimated cost to implement the remedy remains the same – **\$3 million.**

Ground Water Alternative 5: Ground Water Pump and Treat plus Alternative 2 (without monitored natural attenuation) – Under this option EPA would implement Alternative 2 minus natural attenuation plus install a ground water pump-and-treat system for the entire arsenic plume in OU3. Pumped water would be sent to the Ottawa public treatment plant or treated on-site and discharged to the Illinois River. About 600 gallons of water would be pumped per minute until arsenic levels in the bulk of the plume fall below 10 ppb. This alternative would require additional monitoring wells be drilled and periodically sampled for arsenic over a minimum of 10 years until the drinking water standard is met on non-PNA property. As in the other options, institutional controls and alternate water supplies would also help reduce health risks. It is unknown as to when the ground water cleanup level would be met on PNA property because the arsenic source – the G&P slurry – would remain as a source of contamination for many years. **Cost – \$18 million (for water treatment at the Ottawa facility) to \$36 million (on-site treatment)**

Ground Water Alternative 6: Source Material Removal and Alternative 2 – Under this option, EPA would implement Alternative 2 plus excavate the G&P slurry material from Quarry 1 and dispose of it off-site. Removal of the source material will shorten the time it takes for arsenic levels in the bulk of the plume to fall below 10 ppb. This alternative would require additional monitoring wells and periodic sampling for arsenic over 10 to 20 years until the drinking water standard is met. As in the other options, institutional controls and alternate water supplies would also help reduce health risks. Quarry 1 contains about 2.1 million cubic yards of slurry that would require two years of excavation and removal work. **Cost – \$220 million**

Evaluating the alternatives

EPA compared the six cleanup options with the nine federally mandated criteria and created the chart on P. 7. EPA recommends Modified Ground Water Alternative 4 - Surface Flow and Infiltration Reduction Measures plus Alternative 2 (except monitored natural attenuation) be implemented at OU3. EPA likes this option because it protects human health and the environment and reduces the arsenic plume under non-PNA property within a reasonable amount of time for a reasonable cost. More information, however, is needed to address whether monitored natural attenuation would be plausible for this portion of the site.

The no action alternative does nothing to protect human health and the environment and was rejected. Although it works, Alternative 2 alone is less desirable than Alternative 4 because no action is taken to hasten the reduction of arsenic levels in the plume areas beneath non-PNA property. Alternative 3 does speed the cleanup pace but is more costly than Alternative 4 and yields no time advantage for the extra cost.

Alternatives 5 and 6 take the most action to reduce the arsenic plume but are extremely costly. And the excavation of the source material under Alternative 6 may have adverse short-term effects because the work would run over two years and excavated materials would have to be trucked through Ottawa on the way to an off-site landfill for disposal.

Next steps

EPA will review comments received during the public comment period before making a decision on the cleanup plan. Based on new information in public comments, EPA may change its proposed options or select another alternative presented in this plan. EPA will respond to comments in a “responsiveness summary.” This will be part of a document called an Interim “Record of Decision” or ROD that describes the cleanup plan for the OU3 portion of the OTFG site.

EPA will announce the Interim ROD in a local newspaper, and a copy will be posted on EPA's Web site and placed in the Reddick Library in Ottawa. EPA will then negotiate with PNA, the potentially responsible party, to conduct the cleanup under Agency oversight. The cleanup will then be designed and constructed.

Evaluating the cleanup alternatives

Evaluation Criteria	Alternative 1 No Action	Alternative 2 Natural Attenuation	Alternative 3 Pump & Treat	Alternative 4 Alter Drainage Pathways*	Alternative 5 Pump & Treat w/o Natural Attenuation	Alternative 6 Excavation of Source Material
Overall protection of human health and the environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Compliance with ARARs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Long-term effectiveness and permanence	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Reduction of toxicity, mobility, or volume through treatment	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Short-term effectiveness	<input type="checkbox"/>	12 months to complete	12 months to complete	12 months to complete	12 months to complete	28 months to complete
Implementability	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Cost (millions)	\$0	\$1.45 million	\$6 million - \$25 million	\$3 million	\$18 million - \$36 million	\$220 million
State acceptance	Will be evaluated after the public comment period					
Public acceptance	Will be evaluated after the public comment period					
	<input checked="" type="checkbox"/> Fully meets criteria		<input checked="" type="checkbox"/> Partially Meets Criteria		<input type="checkbox"/> Does not meet criteria	



Figure 2 – An aerial view of OU3 showing the four quarries. Quarry 1 in the middle of the lower half of the photograph is the main source for arsenic contamination in the underground water supplies.

EPA Proposes Cleanup Plan For Underground Water Pollution

LaSalle County, Illinois

Public Comment Period
August 19 – September 18, 2009

Public Meeting
Wednesday, August 26, 2009
(details inside)

A snapshot of the cleanup proposal:


- Alternate water supplies for private wells affected by arsenic contamination.
- Restrictive covenants prohibiting use of underground water on-site and barring residential construction on quarry land.
- Altering drainage paths around quarries to limit rain and snowmelt infiltration.
- Estimated total cost is \$3 million.

This fact sheet is printed on paper made of recycled fibers.

OTTAWA TOWNSHIP FLAT GLASS SITE 03: EPA Proposes Cleanup Plan

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