Burgess Brothers Landfill
Bennington and Woodford, VT

U.S. EPA | HAZARDOUS WASTE PROGRAM AT EPA NEW ENGLAND

THE SUPERFUND PROGRAM *protects human health and the environment by locating, investigating, and cleaning up abandoned hazardous waste sites and engaging communities throughout the process. Many of these sites are complex and need long-term cleanup actions. Those responsible for contamination are held liable for cleanup costs. EPA strives to return previously contaminated land and groundwater to productive use.*

YOUR OPINION MATTERS: OPPORTUNITIES TO COMMENT ON THE PLAN

EPA is accepting public comment on this cleanup proposal **until Monday, August 29, 2011**. You don't have to be a technical expert to comment. If you have a concern or preference regarding EPA's proposed cleanup plan, EPA wants to hear from you before making a final decision on how to protect your community.

Comments can be sent by mail, e-mail, or fax **between Friday, July 29, 2011 and August 29, 2011**. People also can offer oral or written comments at the formal public meeting/hearing.

CERCLA Footnote:
In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act, the law that established the Superfund program, and the National Contingency Plan, this document summarizes EPA's cleanup proposal for a change to the cleanup approach currently implemented at the Burgess Brothers Landfill Superfund Site. For detailed information on the options evaluated for use at the Site, see the Burgess Brothers Landfill Superfund Site Focused Feasibility Study available for review online at www.epa.gov/region1/superfund/sites/burgess or at the information repositories at the Bennington Free Library, Bennington, Vermont and at EPA's 5 Post Office Square office in Boston.

TUESDAY
AUGUST 16, 2011
7 PM

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The meeting space is fully accessible. If you have any questions, special needs or require translation, please contact:

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SUMMARY OF THE PROPOSED PLAN

Based on information collected at the Burgess Brothers Superfund Site (the Site) since the placement of a cap over the landfill and the operation of the soil vapor extraction system, EPA is proposing to amend the 1998 Record of Decision (ROD) to change the cleanup approach for addressing contaminated groundwater. At the time of the ROD, it was thought that these actions would prevent migration of contaminated groundwater beyond the landfill boundary by controlling the source of the contamination. This in turn would allow for the contaminated groundwater beyond the landfill boundary to attenuate (decrease) naturally (i.e., without active treatment) to drinking water standards before reaching the Site boundary. The ROD estimated that the groundwater cleanup levels would be attained within seven years after capping the landfill and operating the soil vapor extraction system.

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Contrary to this expectation, however, the levels of contaminants in the groundwater increased and moved farther beyond the landfill. Therefore EPA is proposing a fundamental change in the selected remedy (clean up) to address site contamination.

- First, a barrier wall will be constructed at the edge of the landfill cap to prevent further movement of contaminated groundwater from flowing from beneath the landfill (at the downgradient edge of Area A in Figure 1).
- Second, an additional barrier wall will be constructed near the leading edge of the groundwater contamination that has migrated since the time of the ROD in order to prevent movement of this contamination from spreading (at the downgradient edge of Area B in Figure 1).
- Third, monitored natural attenuation (MNA) for Area B and Area C (where groundwater contaminant concentrations are approaching drinking water standards, depicted in Figure 1). Long-term monitoring will continue to ensure the effectiveness of the clean up remedy. Institutional controls (for example deed restrictions and ground water use prohibitions) already in place will continue to minimize the potential for human exposure to contaminants in the groundwater until drinking water standards are achieved. The estimated total present value cost for this proposed change is approximately $3,950,000.

A CLOSER LOOK AT EPA'S ORIGINAL CLEANUP APPROACH

Starting in the early 1950's the Site was used as a metal salvage facility and disposal area. Metals, sludge, rejected small appliance and military specialty batteries were also disposed at the Site. Site investigations indicated that the landfill also received other waste material including newspaper and building demolition debris. Two lagoon cells (unlined earthen pits) within the landfill area received liquid wastes and sludge from approximately 1967 to 1976. These wastes included lead sludge, lead contaminated wastewater, spent solvents (primarily trichloroethene, TCE, and tetrachloroethene, PCE), and battery wastes.

In 1989 EPA placed the Site on the National Priorities List (a list that includes Superfund Sites). A Remedial Investigation was conducted to determine the nature and extent of contamination at the Site. This investigation indicated that the groundwater in the upper thirty feet of soil has been impacted by the landfill and the disposal of wastes into the former lagoon cells. In addition to TCE and PCE, other volatile organic compounds, including vinyl chloride, chloroethane, 1,1 dichloroethene (1,1-DCE), 1,2 DCE, methylene chloride, and benzene, and metals were detected at elevated levels in the shallow groundwater. The groundwater within the bedrock remains unaffected by the landfill.

In 1998, EPA issued a Record of Decision (ROD) for the Site that documented EPA's selected remedy to address landfill waste and impacts to groundwater, surface water and sediment. The major components of the selected remedy included:

- placement of caps over the landfill and adjacent marshy area where the contaminated groundwater discharged into a stream;
- installation and operation of a soil vapor extraction/air sparging system (SVE/AS) to remediate hot spot source areas (the two former lagoon cells within the landfill area);
- long-term monitoring to determine the effectiveness of natural attenuation of contaminated groundwater beyond the landfill boundary;
- institutional controls; and
- five-year reviews to assess the protectiveness of the selected remedy.

In addition to these components, the ROD provided that if EPA determined that the selected remedy was not effective and that groundwater cleanup levels were not attained within seven years, then an alternate cleanup action would be evaluated and implemented. This timeframe was considered acceptable at the time and was based, in part, upon computer modeling conducted for the Site.

The placement of the caps over the landfill and adjacent marshy area and the installation and operation of the SVE/AS system were successfully implemented in 1999, and institutional controls were put in place in 2003. The first five-year review was completed in 2005. This review indicated that while the remedy was protective at that time, the capping of the landfill and marshy area and operation of the SVE/AS system had not prevented the movement of contaminated groundwater beyond the landfill boundary and groundwater contaminant concentrations were still increasing farther downgradient of the landfill. Therefore the five-year review recommended that an alternate cleanup action be evaluated and implemented if necessary. The 2010 five-year review concluded that implementation of an alternate cleanup action was necessary.

SCOPE AND ROLE OF THIS PROPOSAL

In the summer of 2007, the Potentially Responsible Parties performing the cleanup submitted a draft Focused Feasibility Study (FFS). Following revisions and additional monitoring of groundwater and surface water, the FFS was completed in 2011. The FFS evaluated five clean up alternatives to address the contaminated groundwater both at and beyond the landfill boundary at the Site.

EPA'S PREFERRED ALTERNATIVE

Based on the alternatives evaluated in the FFS, EPA is now proposing the following additional remedial action for the Site:

Alternative 4: Barrier System at the Landfill Compliance Boundary, a Second Barrier System at the Downgradient Edge of Area B, and MNA in Area C

This alternative involves constructing a barrier system at the landfill boundary and a second one near the downgradient edge of Area B to treat the more highly contaminated groundwater that has migrated since the time of the ROD. These barrier systems will be trenches approximately 150-200 feet long and will be installed to the bottom of the shallow soils through which the contaminated groundwater flows (approximately 25 feet). The landfill boundary barrier will either be a permeable reactive barrier (PRB), which is a trench filled with zero-valent iron (iron particles that are electronically neutral) that chemically breaks down the contaminants as the groundwater flows through it, or a groundwater collection trench that incorporates a series of wells to capture the contaminated groundwater, pumps it through an aboveground treatment system, and then re-injects the treated back into the soils or discharges to the on-site stream. The second barrier system will be a PRB.

Pre-design studies will be conducted to determine whether a PRB would be more effective than a groundwater collection trench at the landfill boundary. If a PRB is chosen for the landfill boundary, a groundwater collection trench will remain as a contingency remedy if the PRB does not effectively treat the contaminated groundwater flowing from beneath the landfill. Implementation of the contingency would occur if after adjustments to the PRB efforts (for example, widening the trench to allow for more iron particles or other enhancements) the PRB is not meeting its design goal of meeting drinking water standards.

Active *in situ* (meaning in place) remediation of Area B (described in more detail below) is included as a remedy enhancement. This enhancement would be implemented in the event that the estimated cleanup timeframe for Area B between the two barrier systems exceeds the expected lifespan of the iron particles in the second PRB. The goal of remedy enhancement would be to ensure that contaminated groundwater within Area B attains cleanup levels within the estimated restoration timeframe and to avoid replacing the iron in the second PRB.

This alternative will use a long-term monitoring process to track the progress of meeting the drinking water standards for the groundwater downgradient of the landfill and to determine when the cleanup has been completed. The time estimated for the operation of the first barrier system is 100 years for Area A, and restoration timeframes of 35 years and 22 years, respectively for groundwater within Areas B and C.

Five-year reviews will continue in the preferred cleanup plan. The operation of the SVE will cease as the landfill boundary wall will contain the contamination flowing from beneath the landfill. The estimated total present worth cost for this preferred cleanup plan, including construction, operation and maintenance, and long-term monitoring, is approximately $3, 950,000.

SITE DESCRIPTION & HISTORY

The Site is located in southern Vermont in the towns of Woodford and Bennington, between Burgess Road and the Walloomsac Brook. Industrial, commercial and residential properties are located along Burgess Road, approximately one-half mile southwest of the Site. Approximately fifteen hundred feet to the northwest is a residential development along Barney Road, which is connected to public water.

The Site itself consists of approximately three acres located in the northeastern section of a sixty-acre parcel owned by the Burgess Brothers Construction Company. The landfill occupied approximately one and a half acres and included two former lagoon cells that covered an area of approximately 4,000 square feet. Access to the Site is through the Burgess Brothers Construction Company's facility on Burgess Road, approximately 1.1 miles southeast of the junction of Burgess Road and State Highway 9. The Green Mountain National Forest borders the sixty-acre parcel to the north and east.

Surface water flow from the landfill area flows southwesterly into a stream that originates next to the landfill. This stream flows southwesterly into Barney Brook, which empties into the Walloomsac River. Both Barney Brook and the Walloomsac River are classified by the State of Vermont as Class B waters (i.e., waters of a quality that consistently exhibit good aesthetic value and provide high quality habitat for aquatic biota, fish and wildlife). The permissible use of Class B waters include public water supplies (with filtration and disinfection), irrigation and other agricultural uses, swimming and recreation.

IMPACTS TO THE LOCAL COMMUNITY

Impacts to the community during implementation of the proposed alternative are expected to be minimal. With its location in the northeastern portion of the Burgess Brothers Construction Company property, the Site is not directly visible to the community. The additional traffic needed to deliver the supplies for the barrier systems is expected to be insignificant. Standard construction practices will be followed to control any dust from the installation of the barrier systems. Should the groundwater collection trench be the barrier system installed, noise from the operation of the aboveground treatment system is not expected to be heard beyond the Burgess Brothers property.

WHY CLEANUP IS NEEDED

As discussed above, the remedy selected in the 1998 ROD called for capping the landfill and operation of a SVE/AS system to remediate hot spot source areas. The expectation was that

BURGESS BROTHERS LANDFILL SUPERFUND SITE HISTORY

1940s	Location of the Site was a sand and gravel operation
1950s – 1976	Site was used as a metal salvage facility and disposal area for industrial waste, including solid, semi-solid and liquid wastes
1967 – 1976	Portion of Site used for a liquid waste and sludge lagoon
1976	Disposal operations ceased
1984 – 1989	Preliminary environmental investigations and monitoring performed by VTDEC, EPA, and Union Carbide Corporation
1985	VTDEC conducted Preliminary Site Assessment
1988	EPA added Site on National Priorities List (NPL)
1991	EPA entered into Administrative Order by Consent with potentially responsible parties (PRPs) to conduct a Remedial Investigation/Feasibility Study (RI/FS). Multi-phase RI begun.
1997	RI and Baseline Risk Assessment completed
1998	FS completed and EPA issued ROD
1999	EPA and PRPs entered into Consent Decree for Remedial Design/Remedial Action. Remedial Design completed; construction of remedy completed. Operation and Maintenance activities began.
2001	Full-scale operation of SVE/AS system began
2002	AS component of SVE/AS system shut down (SVE operation continued)
2003	Groundwater Reclassification Petition approved by Vermont Agency of Natural Resources
2004	Final Year 2 Remedy Evaluation Report issued
2005	Grant of Environmental Protection Easement and Declaration of Restrictive Covenants recorded on property deed. SVE system shut down.
2005	First Five-Year Review Report issued, and PRPs submit ted response to its recommendations
2007	EPA requested that a Focused Feasibility Study (FFS) be prepared to address groundwater contaminant plume and that the SVE system be restarted
2010	Second Five-Year Review Report issued

this would prevent exposure to landfill waste, prevent further migration of contaminated groundwater, and allow groundwater beyond the landfill boundary to be restored to drinking water standards through the process of natural attenuation. During the time needed for the groundwater to be cleaned up, institutional controls would be implemented to prevent human exposure to contaminated groundwater. It was expected that the groundwater contaminant concentrations would decrease and drinking water standards would be attained within seven years after installation of the cap and commencement of the SVE/AS operation. Additionally, extension of the cap over the marshy area adjacent to the landfill was designed to eliminate the potential impact to wildlife.

While much of the selected remedy has functioned as it was expected to, VOC contaminant concentrations in groundwater have nevertheless greatly increased south of the landfill in the direction of groundwater flow. Figure 2 shows the extent of PCE contamination before the 1998 ROD and Figure 3 shows the current extent of PCE contamination (PCE is the most prevalent of contaminants in the groundwater and is representative of overall conditions at the Site). As can be seen in these figures, highly contaminated groundwater has moved farther downgradient from the landfill boundary and toward the boundary of the area subject to groundwater restrictions under the institutional controls. This may be due in part to a shift in the groundwater flow to a more southerly direction as a result of the installation of the cap on the landfill and over the marshy area adjacent to the landfill. Additionally, the amount of waste in the landfill was underestimated and notwithstanding the continued operation of the SVE system, the landfill continues to be a source of groundwater contamination. Therefore, EPA determined that the remedy selected in the 1998 ROD was not effective and would not attain the groundwater cleanup goals and another cleanup approach needed to be implemented.

CONTAMINANTS

The ongoing long-term monitoring results indicate that groundwater beyond the landfill boundary is contaminated with TCE, PCE and other VOCs at levels that exceed Federal and State drinking water standards.

CONTAMINATED MEDIA

Capping of the landfill and marshy area successfully addressed the direct contact and ingestion exposure risks posed (see below) by soils in the landfill area and ongoing air monitoring has found no inhalation risks associated with the ambient air. Additionally, monitoring of the bedrock groundwater has affirmed that the landfill has not impacted bedrock water quality. Shallow groundwater (upper 25 feet of the soils) remains impacted, with increased contamination since the 1998 ROD. Elevated VOC concentrations are detected in the stream near the edge of the landfill but farther downstream and prior to the institutional control boundary the Site surface water quality standards are being met.

RISK AND EXPOSURE PATHWAYS CONSIDERED

Exposure occurs when people eat, drink, breathe or have direct skin contact with a substance. Based on existing or reasonably anticipated future land use, EPA develops different exposure scenarios or pathways to determine potential risk, appropriate cleanup levels, and potential cleanup approaches to meet site cleanup goals.

Baseline human health and ecological risk assessments for the Site were prepared in 1997 during the Remedial Investigation to determine whether contaminants detected at the Site posed a current or future risk to human health or the environment.

The human health risk assessment considered risks associated with contaminants detected in groundwater, surface and subsurface soils, sediments, surface water, landfill leachate, and in ambient air. Both carcinogenic and noncarcinogenic risks were evaluated. Residential consumption of shallow groundwater at the Site was the only exposure pathway that represented a risk above EPA target levels. Important contributors to this risk included TCE, PCE, 1,1-DCE, and vinyl chloride. Cleanup goals were established in the ROD for contaminants based upon Federal and State drinking water standards.

The ecological risk assessment focused on potential environmental receptors associated with streams and seeps and a wet meadow habitat located in the vicinity of the landfill. Based on data collected during the Remedial Investigation, the risk assessment concluded that exposure to contaminants in surface soils outside of the landfill boundary might impact some wildlife species foraging in those areas.

CLEANUP ALTERNATIVES CONSIDERED

Once areas of risk have been identified at a site, cleanup alternatives are developed to address the identified risks and to achieve site-specific cleanup objectives. A short synopsis of each alternative considered is outlined below.

A more detailed description and analysis of each alternative developed to reduce risks from contaminated groundwater is presented in the Focused Feasibility Study.

Cleanup objectives developed to address groundwater contamination are summarized below:

- Prevent further migration of contaminated groundwater from the landfill
- Restore the shallow groundwater at the landfill edge and downgradient of the capped area of the landfill and marshy area to Federal and State drinking water standards

By meeting these objectives, contaminated groundwater will be prevented from flowing into the stream and thus a separate cleanup objective for the stream is not necessary.

Alternative 1: No Further Additional Action
The "No Further Additional Action" alternative is provided for comparison purposes. Operation of the SVE system as appropriate to achieve its intended objectives, long-term monitoring, and five-year reviews would continue under this alternative.

Alternative 2: Areas A and B *In Situ* Remedy, and MNA in Area C
Alternative 2 would provide active groundwater remediation to Areas A and B, with MNA in Area C. Technologies that were considered for active remediation include:

- *In situ* (in place, below the ground surface) bioremediation by enhanced reductive dehalogenation (ERD),
- *In situ* chemical oxidation (ISCO) using permanganate,
- *In situ* soil mixing (ISSM) using amendments (e.g., a mixture of zero-valent iron and ERD substrate), and
- A combination of ERD, ISCO, or ISSM.

Contaminated groundwater outside of the areas of active remediation would be remediated through MNA.

***In situ* enhanced bioremediation** would promote remediation of the chlorinated VOCs in groundwater by enhanced reductive dehalogenation (ERD). Under anaerobic (meaning without oxygen) conditions, a variety of naturally occurring bacteria can convert tetrachloroethene (PCE) and trichloroethene (TCE) to cis-1,2-dichloroethene (cis-DCE), subsequently to vinyl chloride, ethene/ethane, and ultimately to carbon dioxide, water, and inorganic chloride. ERD technology provides a carbon food source to the naturally occurring bacteria in order to accelerate the conversion of the contaminants.

***In situ* chemical oxidation (ISCO)** is an environmental remediation technique used for soil and/or groundwater remediation to reduce the

concentrations of targeted environmental contaminants to acceptable levels by breaking them down to carbon dioxide, water, and inorganic chloride. ISCO is accomplished by injecting or otherwise introducing strong chemical oxidizers directly into the contaminated medium (soil or groundwater) to destroy chemical contaminants in place.

***In situ* soil mixing (ISSM)** has been used for a number of years in the construction industry, where cement grout is typically mixed with soil to create a foundation system or barrier wall. The proposed ISSM approach for the Site includes addition of a mixture of ERD substrate and zero-valent iron to promote biotic and abiotic reduction of VOCs.

Enhanced bioremediation or chemical oxidation amendments would be added in Areas A and B by a series of injection wells placed at pre-determined spacing and depth intervals. Appropriate amendment(s) and amounts used would be determined based on the results of the laboratory treatability study and/or field pilot test performed as part of the pre-design investigation.

Natural attenuation relies on natural processes to achieve site-specific cleanup objectives. The natural processes consist of a variety of physical, chemical or biological processes that act together to reduce the mass, toxicity, mobility, volume or concentration of contaminants in soil or groundwater. These processes include volatilization, dilution, sorption, biodegradation, dispersion, chemical or biological stabilization, transformation or abiotic degradation of contaminants.

Five-year reviews will continue under this alternative. The operation of the SVE will cease as the *in situ* remediation will address the residual contamination beneath the landfill cap.

Alternative 3: Area A Containment Remedy, Barrier System at the Landfill Compliance Boundary, Area B *In Situ* Remedy, and MNA in Area C

Alternative 3 would include a barrier system at the landfill compliance boundary to control contaminant migration from Area A, active *in situ* remediation in Area B (using ERD, ISCO, ISSM, or a combination) and MNA in Area C. Two barrier system technologies are considered under Alternative 3: groundwater collection trench with onsite treatment and onsite discharge, and zero-valent iron permeable reactive barrier (PRB).

Approximately 200 feet of trench would be excavated at the compliance boundary and would extend to the bottom of the water-bearing shallow soils (approximately 25 feet). The groundwater collection trench would be backfilled with a permeable gravel/sand material to capture contaminated groundwater flowing from Area A. Contaminated groundwater would be collected by pumping from wells and/or sumps installed within the permeable backfill. The collected groundwater would be treated ex situ (above ground) by an air stripper and/or activated carbon in an on-site treatment system. Effluent from the groundwater treatment plant would be discharged either to an appropriate on-site surface water location or re-injected into the shallow soils to aid in the flushing of contaminants.

The second barrier system under consideration is a zero-valent iron permeable reactive barrier (PRB). In this system, the trench would be backfilled with permeable materials (such as iron particles) mixed with gravel/sand material. The iron particles would neutralize VOCs in the groundwater and allow the passage of groundwater downgradient of the trench, effectively restricting migration of the contaminants from Area A. The thickness of the PRB trench will be determined during the design phase.

Pre-design studies will be conducted to determine whether a PRB would be more effective than a groundwater collection trench at the landfill boundary. If a PRB is chosen, a groundwater collection trench will remain as a contingency remedy if the PRB does not effectively treat the contaminated groundwater flowing from beneath the landfill. Implementation of the contingency would occur if after adjustments to the PRB efforts (for example, widening the trench to allow for more iron particles or other enhancements) the PRB is not meeting its design goal of meeting drinking water standards.

The active technologies for Area B and MNA for Area C are the same as described for Alternative 2.

Five-year reviews will continue under this alternative. The operation of the SVE will cease as the landfill boundary barrier will contain the contamination flowing from beneath the landfill.

Alternative 4: Areas A and B Containment Remedy, Barrier System at the Compliance Boundary, a Second Barrier System at the Downgradient Edge of Area B, and MNA in Area C

Alternative 4, the proposed alternative, would include a barrier system at the landfill compliance boundary and a second barrier system near the leading edge of the groundwater contamination that has migrated since the time of the ROD (downgradient edge of Area B) to control contaminant migration from Areas A and B, respectively. MNA would address Area C. Technologies considered for the two barrier system under Alternative 4 are the same as those described for Alternative 3: a groundwater collection trench with on-site treatment and a zero-valent iron PRB. A potential enhancement remedy included in Alternative 4 is active *in situ* remediation of Area B with the same technologies as those described for Alternative 2.

Pre-design studies will be conducted to determine whether a PRB would be more effective than a groundwater collection trench at this Site. As with Alternative 3, if a PRB is chosen for the edge of the landfill boundary, a groundwater collection trench will remain as a contingency remedy if the PRB does not effectively treat the contaminated groundwater flowing from beneath the landfill. The contingency remedy would be implemented under the same conditions described for Alternative 3.

MNA for Area C is the same as described for Alternative 2.

Five-year reviews will continue in the preferred cleanup plan. The operation of the SVE will cease as the landfill boundary barrier will contain the contamination flowing from beneath the landfill.

Alternative 5: Area A Containment Remedy, PRB Barrier System at the Landfill Compliance Boundary, Area B Excavation, and MNA in Areas B and C

Alternative 5 would include a PRB barrier system at the landfill compliance boundary, excavation of the saturated soils in Area B, and MNA in Area C. The barrier system would control contamination migration from Area A. The excavation and either treatment or removal of the saturated soils in Area B would quickly remove the elevated groundwater VOC concentrations and associated contaminant mass partitioned onto the soils that have migrated beyond the landfill compliance boundary since the time of the ROD. Aeration of groundwater due to excavation may reduce the natural biological degradation of the VOCs in Area C; however, the positive effects of dilution and flushing with less impacted groundwater from Area B are expected to increase.

The PRB technology for the barrier system for this alternative is the same as that described under Alternative 3. As with Alternatives 3 and 4, a groundwater collection trench will remain as a contingency remedy if the PRB does not effectively treat the contaminated groundwater flowing from beneath the landfill. The contingency remedy would be implemented under the same conditions described for Alternative 3.

The overburden (unsaturated) soils in Area B would be excavated, sampled and stockpiled so that they can be returned into the excavated area. The saturated soils in Area B would be excavated to remove the elevated groundwater VOC concentrations and associated contaminant mass partitioned onto the soils beyond the landfill compliance boundary. The PRB barrier system will be installed after the excavation in Area B to prevent potential structural damage to the PRB due to excavation.

The excavation would extend to the bottom of the overburden aquifer, approximately 25 feet belowground surface. The excavated soils would be allowed to drain to reduce moisture. Off-site disposal of the excavated soil is assumed; however, on-site treatment using thermal treatment technology may be evaluated during pre-design investigations based on the level of contamination detected in Area B soils. Further, dewatering of the excavation would be necessary, and because of the high groundwater concentrations detected in Area B, the water generated during the dewatering process and draining of the excavated soils would need to be appropriately handled and disposed. Similar to the handling of the excavated soils, off-site disposal of the water to a waste water treatment plant is assumed. Area B would then be backfilled with clean fill.

MNA for Area C is the same as described for Alternative 2.

Five-year reviews will continue under this alternative. The operation of the SVE will cease as the landfill boundary barrier will contain the contamination flowing from beneath the landfill.

EPA'S NINE CRITERIA FOR CHOOSING A CLEANUP PLAN

EPA uses nine criteria to evaluate alternatives and select a final cleanup plan (called a remedial action) that meet the statutory goals of protecting human health and the environment, maintaining protection over time, and minimizing contamination.

The nine individual criterion:

Threshold Criteria

1. Overall protection of human health and the environment: Will it protect you and the plant and animal life on and near the site? EPA will not choose a plan that does not meet this basic criterion.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs): Does the alternative meet all federal and state environmental statutes, regulations and requirements? The chosen cleanup plan must meet this criterion.

Balancing Criteria

3. Long-term effectiveness and permanence: Will the effects of the cleanup plan last or could contamination cause future risk?

4. Reduction of toxicity, mobility or volume through treatment: Using treatment, does the alternative reduce the harmful effects of the contaminants, the spread of contaminants, and the amount of contaminated material?

5. Short-term effectiveness: How soon will site risks be adequately reduced? Could the cleanup cause short-term hazards to workers, residents or the environment?

6. Implementability: Is the alternative technically feasible? Are the right goods and services (i.e., treatment machinery, space at an approved disposal facility) available for the plan?

7. Cost: What is the total cost of an alternative over time? EPA must find a plan that gives necessary protection for a reasonable cost.

Modifying Criteria

8. State acceptance: Do state environmental agencies agree with EPA's proposal?

9. Community acceptance: What objections, suggestions or modifications do the public offer during the comment period?

COMPARATIVE ANALYSIS OF THE ALTERNATIVES

The alternatives were compared with each other to identify how well each alternative met the evaluation criteria. A detailed comparative analysis, consistent with CERCLA requirements, is included in the FFS and a summary of that analysis is provided below. A detailed discussion is provided in the FFS and summarized below and in Table 1.

1. Overall Protection of Human Health and the Environment

Site data have shown that high concentrations of groundwater contamination are moving farther away from the landfill toward the institutional control boundary. It is uncertain whether these

concentrations will continue to attenuate to drinking water standards prior to reaching the institutional control boundary. Therefore, while all five alternatives are currently protective of human health because of the institutional controls, it is uncertain whether Alternative 1 would provide long-term protection. Additionally, as Alternative 1 relies on institutional controls, it provides no protection for ecological receptors.

Alternative 2 at its completion will be protective of human health and the environment and potentially could be the most protective as it would seek to address all remaining groundwater contamination at the Site, including what remains beneath the landfill cap through active *in situ* treatment.

Alternatives 3, 4, and 5 at their completion will be protective of human health and the environment. In the interim, Alternatives 2, 3, 4, and 5 are protective of human health through the existing institutional controls.

2. Compliance with ARARs

Because it is uncertain whether VOCs in the groundwater would continue to attenuate to drinking water standards prior to and within the institutional control boundary, Alternative 1 may not comply with ARARs. The other four alternatives would eventually attain cleanup goals, and comply with ARARs at that time. Alternative 5 would attain the ARARs more quickly in Areas B than the other alternatives, however, post-excavation and post-remediation MNA timeframes for these alternatives are similar.

3. Long-Term Effectiveness and Permanence

The residual risk remains high under Alternative 1 as the volume of remaining waste beneath the landfill cap is unknown and therefore could act as a source of groundwater contamination for an indefinite period.

Alternatives 2, 3, 4, and 5 would offer the highest degree of long-term effectiveness and permanence. Alternative 2 achieves long term effectiveness and permanence in Area A more quickly that the other alternatives through active remediation upgradient of the landfill compliance boundary. The barrier systems in Alternatives 3, 4, and 5 provide treatment that is dependent on groundwater extraction or passive flow through the barrier. The capture or destruction of the contaminants is ensured at barrier system locations. Alternatives 2, 3 and 5 achieve long-term effectiveness and permanence in Area B more quickly than Alternative 4 through active remediation (Alternative 2 and 3) and excavation (Alternative 5). The permanence provided by MNA in Area C would be achieved in slightly less time under Alternatives 4 and 5 (approximately 22 years) compared to Alternatives 2 and 3 (approximately 23.5 to 27 years).

4. Reduction of Toxicity, Mobility, or Volume through Treatment

All five alternatives would gradually reduce the toxicity and volume of contamination through natural attenuation processes. Alternative 2 for Areas A and B, and Alternative 3 for Area B (and Alternative 4 for Area B if the enhancement is implemented) would provide significant reduction in toxicity, mobility, and volume through active *in situ* treatment. Alternative 5 would provide significant reduction in toxicity, mobility, and volume for Area B through excavation and off-site treatment. Alternatives 3, 4, and 5 would provide significant reduction in toxicity, mobility, and volume through passive *in situ* treatment with a permeable reactive barrier or through above-ground treatment from a groundwater collection trench.

5. Short-Term Effectiveness

As no further additional action would be taken under Alternative 1, there are no short-term impacts to the community, workers, or the environment. No risk reduction would occur in the short term.

Under Alternatives 3, 4, and 5, construction and operation of the barrier system would not have significant impacts on the local community or site workers. The remote location of the Site will minimize any effects from Alternative 5 excavation of Area B on the community but there will be a temporary increase in truck traffic associated with the off-site transport of the excavated soils. Standard procedures appropriate with the excavation of source soils will be implemented to minimize impacts on site workers.

No environmental impacts are expected with Alternative 1. Adverse environmental impacts could occur from the barrier system trenching adjacent to the stream with Alternatives 3, 4, and 5. Therefore appropriate safeguards would need to be followed to prevent potential adverse environmental effects from the construction of the barrier systems. Alternative 5 would require additional measures as it would involve more excavation and thereby potentially impact a longer reach of the stream.

As stated above, the volume of waste that remains beneath the landfill is unknown and therefore a timeframe estimate for Alternative 1 to reduce Site risks through natural attenuation was not developed. The Alternative 2 timeframe to reach groundwater cleanup goals in Areas A and B is estimated to be approximately 12 to 15 years and 23 to 27 years in Area C.

Alternatives 3, 4, and 5 would reach groundwater cleanup goals at the landfill boundary in 2.5 to 3.5 years, as a result of implementing the compliance boundary barrier system. Continued maintenance and operation of the barrier system will be necessary for an assumed period of 100 years to maintain the remediation goals. Alternative 3, *in situ* active remediation, would make significant reductions in VOC concentrations in Area B through active remedy implementation in approximately 3.5 to 7 years. Alternative 4, two barrier systems, would make significant reductions in VOC concentrations in Area B through passive remedy implementation in approximately 35 years (PRB technology is considered passive as it relies on the groundwater flow to move contaminants to the wall whereas *in situ* technology is considered active as amendments are added throughout the entire contaminated groundwater). Alternative 5, excavation, would approach drinking water standards in Area B in approximately 2 years.

The timeframe for Alternatives 2, 3, 4, and 5 for achieving groundwater cleanup goals in Area C using MNA is estimated to be 22 -27 years.

6. Implementability

Work (i.e., SVE operation, as appropriate to achieve its intended objective, and monitoring) proposed under Alternative 1 is ongoing at the Site, and therefore, Alternative 1 is readily implementable. Alternatives 2, 3, 4, and 5, would require some or all of the following steps prior to full-scale implementation: pre-design investigation, bench-scale/treatability testing, development of an active remedial approach, field pilot testing, and remedial design. Because the volume of waste remaining beneath the landfill cap is both unknown, and its distribution not as well characterized as the contamination in Area B, the feasibility of Alternative 2 is more problematic than the other treatment alternatives. It could also require multiple openings in the landfill cap and thereby possibly affect its ability to prevent infiltration of water. In addition, the type of soils at the Site could require an extensive infrastructure to add amendments into the soils for Alternatives 2 and 3 (and 4 if the enhancement component is implemented). These conditions could require multiple applications of the ERD or ISCO amendments and increase costs.

Equipment and supplies needed for Alternatives 2, 3, 4, and 5 are readily available.

7. Costs

Alternative 1 (No Further Additional Action) is the least costly alternative with a net present worth of $1,192,700. Alternative 5 (Area A containment with a PRB at the Landfill Compliance Boundary, Area B excavation and MNA in Area C) is the most costly alternative with a net present worth of 12,375,700.

Alternative 4 (Areas A and B containment, and MNA in Area C) with net present worth ranging from 3,481,400 to 3,957,200 is more costly than Alternative 1 (No Further Additional Action), however, is the least costly of the remaining alternatives. Alternative 3 (Area A containment, Area B in-situ remedy, and MNA in Area C) with net present worth ranging from $4,655,200 to $6,797,000 is more costly than Alternatives 1 and 4. Alternative 2 (Areas A and B in-situ remedy, and MNA in Area C) with net present worth ranging from $5,399,400 to $10,315,100 is the second most costly alternative after Alternative 5.

Table 1: Comparison of Alternatives

Nine Criteria	Burgess Brothers Remedial Alternatives				
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5
Protects Human Health & Environment	N	Y	Y	Y	Y
Meets Federal & State Requirements	N	Y	Y	Y	Y
Provides Long-Term Protection	N	Y	Y	Y	Y
Reduces Mobility, Toxicity & Volume through Treatment	N	Y	Y	Y	Y
Provides Short-Term Protection	Y	Y	Y	Y	Y
Implementable	Y	Y	Y	Y	Y
Cost (Millions of Dollars)	1.193	5.399-10.315	4.655-6.797	3.48-3.957	12.376
State Agency Acceptance	To be determined after the public comment period				
Community Acceptance	To be determined after the public comment period				

Alt 4 EPA's preferred alternative
Y Meets or exceeds criterion
N Does NOT meet criterion

If implementation of the contingency remedy for Alternatives 3, 4, and 5 (replacement of the landfill compliance boundary PRB with a groundwater collection trench) is necessary, additional cost for the contingency remedy is estimated to be $2,266,000.

If enhancement of Alternative 4 is necessary, additional cost for the enhancement remedy implementation ranges from $1,919,300 to $3,682,400. For Alternative 2, if additional source area requiring treatment is identified, the incremental cost for the in-situ treatment of the additional area ranges from $1,822,600 to $2,789,500.

8. State Acceptance

VTDEC has been involved with the review of the FFS and has had substantive discussions with EPA regarding the Site and the cleanup approach.

9. Community Acceptance

Community acceptance will be evaluated based on the feedback received during the public hearing and the public comment period.

WHY EPA RECOMMENDS THIS CLEANUP PROPOSAL CHANGE

Based on the results of the Remedial Investigation, the human health risk assessment, the assessment of current data and review of the FFS, EPA recommends this proposed plan for the Burgess Brothers Landfill Superfund Site because EPA believes it achieves the best balance among EPA's nine criteria used to evaluate various alternatives.

The proposed plan is protective of both human health and the environment while, at the same time, is cost effective. This cleanup plan provides both short- and long-term protection of human health and the environment; attains federal and state applicable or relevant and appropriate requirements (ARARs); and utilizes permanent solutions and institutional controls to prevent unacceptable exposure.

NEXT STEPS

During the summer of 2011, EPA expects to have reviewed and evaluated all comments received on this proposal and will sign an Amended ROD, which is a document that describes the chosen cleanup plan. The Amended ROD and a summary of responses to any public comments (the Responsiveness Summary) will then be made available to the public at the Bennington Free Library and at EPA's Records Center in Boston, and via the internet. EPA will announce the final decision on the cleanup plan through the local media and via EPA's website.

After the Amended ROD is signed, EPA will begin to negotiate with the Potentially Responsible Parties for the purpose of reaching an agreement with them to conduct the cleanup under EPA supervision. Before the cleanup work begins, each major component of the cleanup plan must be designed. That design process is expected to take one to two years.

WHAT IS A FORMAL COMMENT?

During the 30-day formal comment period, EPA will accept formal written comments and hold a hearing to accept oral comments. EPA uses public comments to improve the cleanup proposal.

To make a formal comment you need only speak during the Public Hearing on August 16, 2011 or submit a written comment during the comment period which runs from July 29, 2011 to August 29, 2011. Although EPA cannot respond to comments submitted at this Public Hearing, EPA will respond to both your oral and written comments in the written Responsiveness Summary that will be included with the Amended ROD. EPA will review the transcript of all formal comments received at the hearing, and all written comments received during the formal comment period, before making a final cleanup decision.

The fact that EPA responds to formal comments in writing at the time the Amended ROD is issued, does not mean that EPA cannot answer questions. EPA will make an informational presentation prior to the start of the formal hearing on August 16, 2011. During the informational presentation and additionally, once the meeting moderator announces that the formal hearing portion of the meeting is closed, EPA can respond to informal questions.

Your formal comment will become part of the official public record. The transcript of comments and EPA's written responses will be included in the Responsiveness Summary when EPA releases the final cleanup decision.

FOR MORE INFORMATION

To help the public understand and comment on the proposal for the Burgess Brothers Landfill Superfund Site, an administrative record has been prepared for the Site. The administrative record includes all documents EPA has considered or relied upon in making this proposal. All of the technical and public information publications prepared to date for the Site that are part of the administrative record are available at the following information repositories:

U.S. EPA Records Center
5 Post Office Sq., Suite 100
Mail Code: OSRR02-3
Boston, MA 02109-3912
Phone (617) 918-1440
Hours: 9:00 a.m.-5:00 p.m.
Monday through Friday

Bennington Free Library
101 Silver Street
Bennington, VT 05201
Phone (802) 442-9051

Information is also available for review online at:
www.epa.gov/region1/superfund/sites/burgess.

Or call or contact:

Terrence Connelly
EPA New England
ME/VT/CT Superfund Section
(617) 918-1373
connelly.terry@epa.gov

Sarah White
EPA New England
Community Involvement Coordinator
(617) 918-1026
white.sarah@epa.gov

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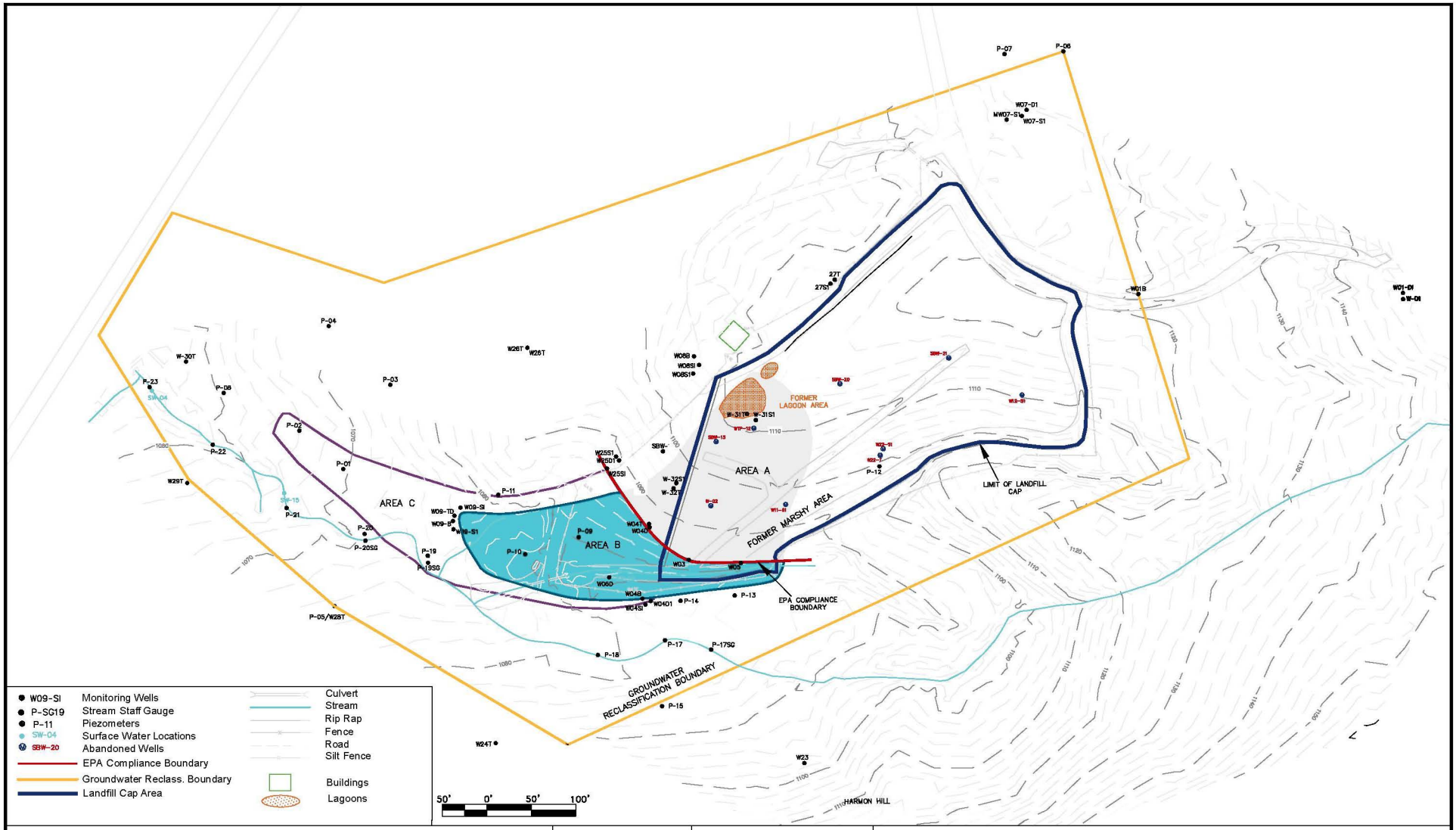
Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, VT 05671
Phone: 802-241-3877
Email: gerald.noyes@state.vt.us

SEND US YOUR COMMENTS

Provide EPA with your written comments about the Proposed Plan for the Burgess Brothers Landfill Superfund Site. Please mail your comments postmarked **no later than Monday, August 29, 2011 to:**

Terrence Connelly
EPA New England
ME/VT/CT Superfund Section
5 Post Office Square, Suite 100
Mail Code OSRR07-1
Boston, MA 02109-3912

Submit comments by e-mail to:
connelly.terry@epa.gov



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April 8, 2011
106-0901
Scale As Shown

Figure 1: Site Base Map With Remedial Evaluation Areas

Burgess Brothers Superfund Site, Proposed Plan Summer 2011

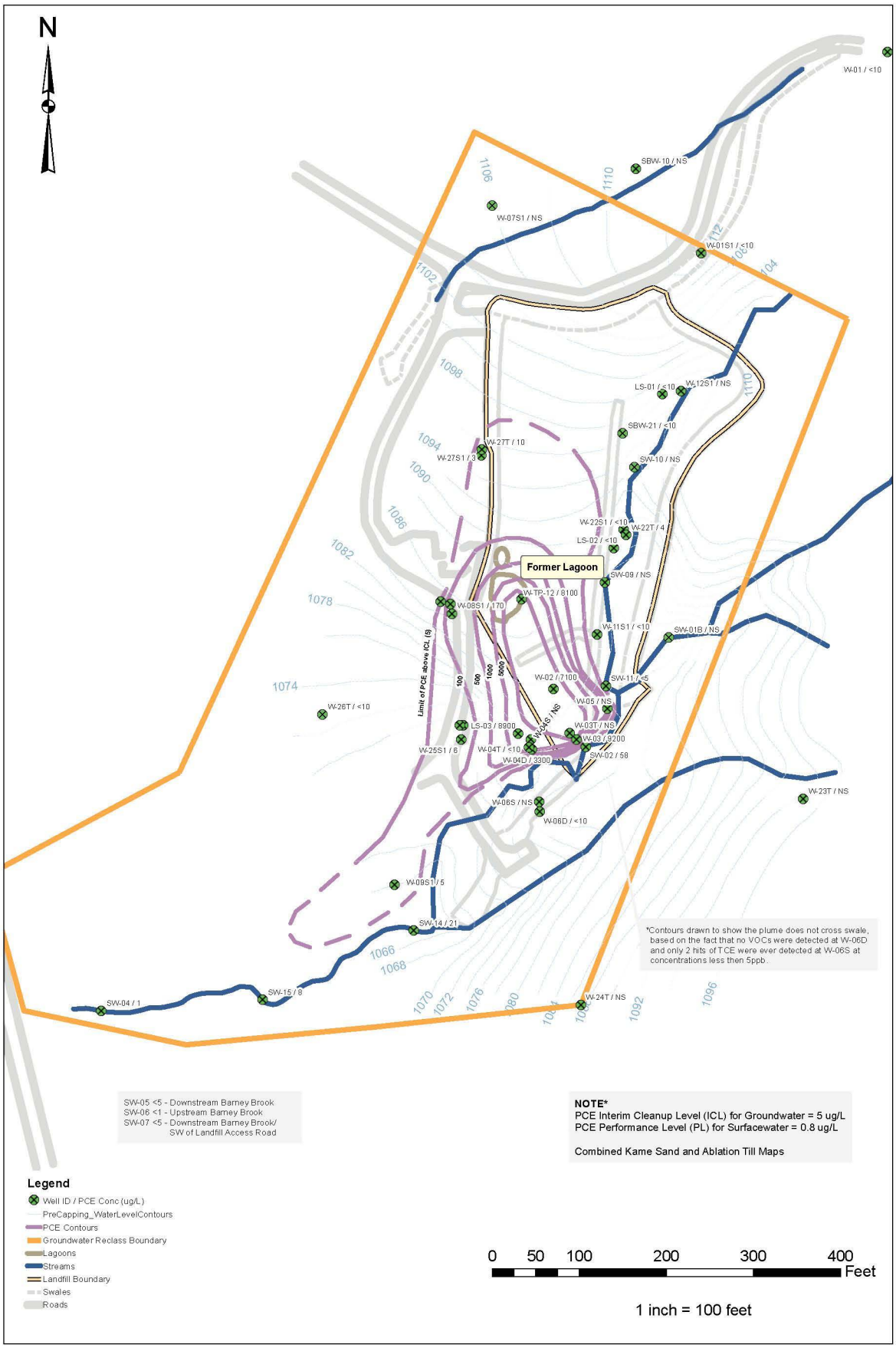

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Figure 2
PCE Concentration in Groundwater at 1998 Record of Decision
Burgess Brothers Superfund Site
Proposed Plan Summer 2011

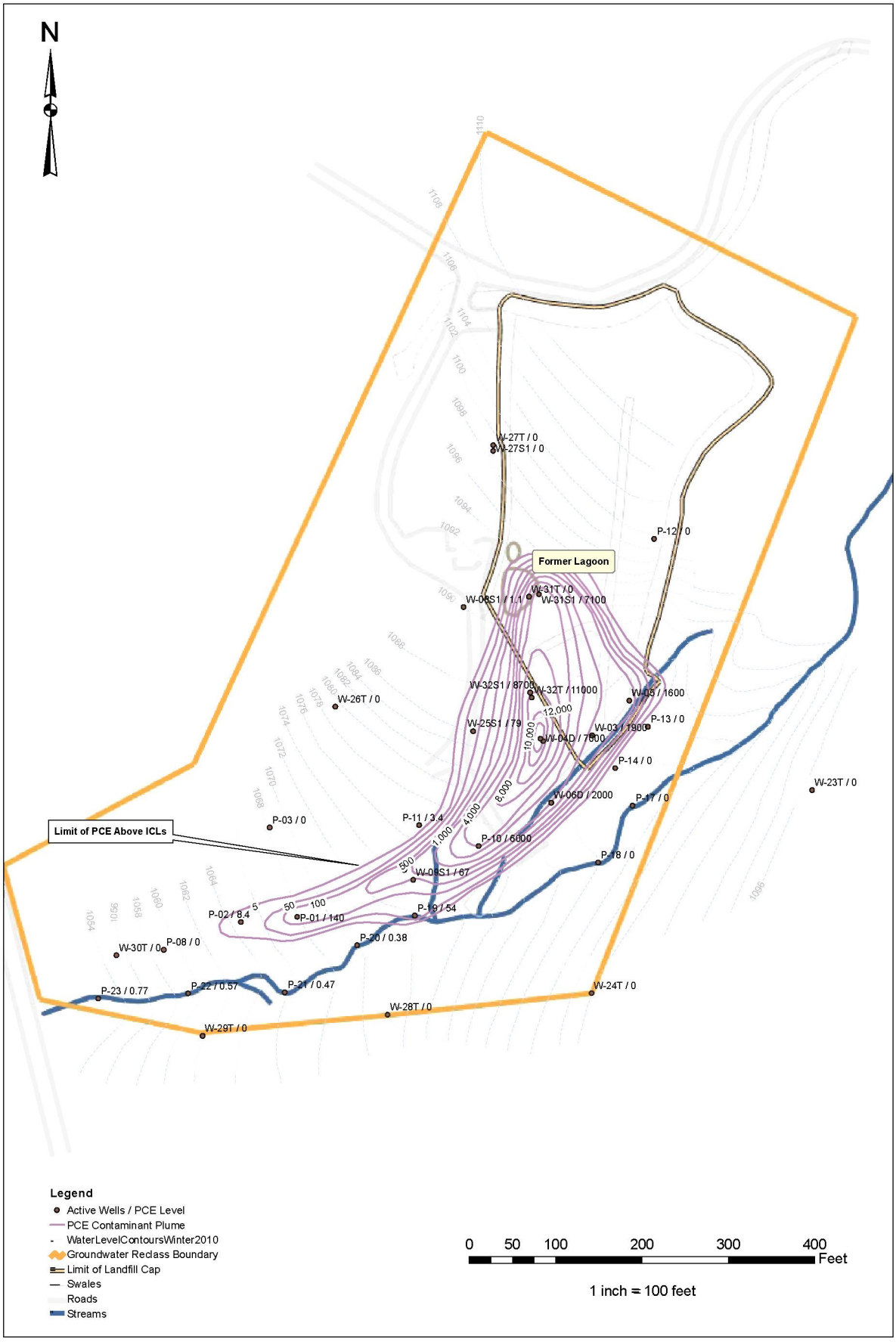

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Figure 3
PCE Concentration in Groundwater Fall 2010
Burgess Brothers Superfund Site
Proposed Plan Summer 2011