EPA Region I
Superfund Program
Somersworth Sanitary Landfill Site
Somersworth, New Hampshire

December 1993 figure

EPA Proposes Cleanup Plan for the Somersworth Sanitary Landfill Site

The U.S. Environmental Protection Agency (EPA) is proposing a cleanup plan, also referred to as a preferred alternative, to address contamination at the Somersworth Sanitary Landfill Superfund Site in Somersworth, New Hampshire. This proposed plan identifies EPA's preferred alternative which combines cleanup-options from among those that were evaluated during the Feasibility Study (FS) performed for the Site. In accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), EPA is publishing this Proposed Plan to provide opportunity for public review and comment on the cleanup options, also known as remedial alternatives, under consideration for the Site. EPA will consider public comments as part of the final decision-making process for selecting the cleanup remedy for the Site.

The preferred alternative uses an emerging, innovative technology and therefore includes a contingency alternative if the technology is proven to be ineffective. The major components of the preferred alternative are: (1) the installation of a permeable, chemical treatment "wall"; (2) the extraction of bedrock ground water with discharge upgradient of the treatment wall so that this ground water would receive treatment from the chemical treatment "wall"; (3) the installation of a permeable cover while the chemical treatment "wall" is functioning; and (4) the installation of an appropriate cover at the time of final closure. If the chemical treatment "wall" technology is found to be ineffective, the contingency alternative which will be implemented includes: (1) the installation of a multi-layer cover; (2) the construction of a perimeter slurry wall; (3) the extraction of contaminated bedrock and overburden ground water; and (4) on-site treatment of the contaminated ground water with discharge to the wetlands or off-site treatment of the contaminated ground water at the Somersworth Publicly Owned Wastewater Treatment Works (POTW) with discharge of the treated ground water to the Salmon Falls River. The preferred alternative is described in greater detail on pages 7 through 10 of this document.

*Note: Words that appear in bold print in this document are defined in the glossary on pages 21 through 24.
This Proposed Plan:
1. explains the opportunities for the public to comment on the remedial alternatives;
2. includes a brief history of the Site and the principal findings of Site investigations;
3. provides a brief description of the preferred alternatives and other alternatives evaluated in the FS;
4. outlines the criteria used by EPA to propose an alternative for use at the Site, and briefly analyzes whether the alternatives meet each criteria; and
5. presents EPA's rationale for its preliminary selection of the preferred alternative.

To help the public participate in reviewing the cleanup options for the Site, this document also includes information about where interested citizens can find more detailed descriptions of the remedy selection process and the alternatives under consideration for the Somersworth Sanitary Landfill Site.

The Public's Role in Evaluating Remedial Alternatives

Public Informational Meeting

EPA will hold a public informational meeting on December 14, at 7:00 p.m. at the Somersworth Vocational Education School in Somersworth, New Hampshire to describe the preferred alternative and other alternatives evaluated in the FS. The public is encouraged to attend the meeting to hear the presentations and to ask questions.

Public Comment Period

EPA is conducting a 30-day public comment period, from December 15, 1993, to January 13, 1994, to provide an opportunity for public involvement in the final cleanup decision. During the comment period, the public is invited to review this Proposed Plan and the Remedial Investigation (RI) and FS reports, and to offer comments to EPA.

Informal Public Hearing

EPA also will hold an informal public hearing on January 4, 1994, at 7:00 p.m. at the Somersworth Vocational Education School in Somersworth, New Hampshire to accept oral comments on the remedial alternatives under consideration for the Site. This hearing will provide the opportunity for people to comment on the remedial alternatives after they have heard the presentations made at the public informational meeting on December 14 and reviewed this Proposed Plan. Comments made at the hearing will be transcribed, and a copy of the transcript will be added to the Site Administrative Record available at the EPA Records Center at 90 Canal St. in Boston, Massachusetts, and at the information repository location listed on page 4.
Written Comments

If, after reviewing the information on the Site, you would like to comment in writing on EPA's preferred alternative, any of the other remedial alternatives under consideration, or other issues relevant to the Site cleanup, please deliver your comments to EPA at the Public Hearing or mail your written comments (postmarked no later than January 13, 1994) to:

Roger F. Duwart
Remedial Project Manager
U.S. Environmental Protection Agency
Waste Management Division (HSN-CAN5)
JFK Federal Building
Boston, MA 02203
(617) 573-9628

EPA's Review of Public Comment

EPA will review comments received from the public as part of the process of reaching a final decision on the most appropriate remedial alternative, or combinations of alternatives, for cleanup of the Somersworth Sanitary Landfill Site. EPA's final choice of a remedy will be issued in a Record of Decision (ROD) for the Site in the spring of 1994. A public document, called a Responsiveness Summary, that summarizes EPA's responses to comments received during the public comment period will be issued with the ROD. Once the ROD is signed by the EPA Regional Administrator, it will become part of the Administrative Record, which contains documents used by EPA to choose a remedy for the Site.

Additional Public Information

This Proposed Plan provides only a summary description of the investigation of the Somersworth Sanitary Landfill Site and the remedial alternatives considered. Therefore, the public is encouraged to consult the Administrative Record, which contains the Remedial Investigation/Feasibility Study (RI/FS) reports and other Site documents, for a more detailed explanation of the Site and all the remedial alternatives under consideration.

The Administrative Record is available for review at the following locations:

EPA Records Center
90 Canal Street, 1st Floor
Boston, MA 02114
(617) 573-5729
Site History

The Somersworth Sanitary Landfill is a 26-acre parcel of land located west of the central portion of the city of Somersworth, New Hampshire (see Figure 1). The Site is located approximately 2,000 feet west of the intersection of Blackwater Road and the Maple Street Extension. A portion of the Site (which has been covered) is currently used as a recreational area with a baseball field and tennis courts (see Figure 2). The Site is bordered by a cemetery, gravel pit, and an undeveloped wetlands area on the north; an undeveloped wetlands area and several residential properties on the west; several residential properties on the south; and an apartment building, city fire station, and the National Guard Armory on the east.

The Somersworth Sanitary Landfill is owned and operated by the City of Somersworth. The landfill was constructed in the early 1930s on the Site of a former sand and gravel quarry. The landfill was used to dispose of household trash, business refuse, and industrial wastes. Waste was burned at the landfill until 1958. From 1958 to 1981, the waste material was placed in excavated areas, compacted, and covered with soil. In 1981, use of the landfill stopped when the City of Somersworth began disposing of its municipal waste at a regional incinerator which was operated by the Lamprey Solid Waste Disposal Cooperative. From 1981 to the present, the Somersworth Sanitary Landfill has been used to dispose of those wastes which can not be incinerated at the Cooperative, such as scrap metal, household appliances, and landscape debris (e.g., leaves, brush, and stumps).

In 1981, the City of Somersworth implemented a closure plan for the landfill which involved the covering of a portion of the landfill with clean fill and the installation of four ground water monitoring wells at the landfill. Laboratory analysis of samples collected from the wells indicated that volatile organic compounds (VOCs) were present in the ground water.

In 1982, the Somersworth Sanitary Landfill was evaluated by EPA. Due to the presence of contamination in the monitoring wells, the Site was placed on the National Priorities List (NPL), a list of the nation's most contaminated hazardous waste sites. Placement on the NPL made the Site eligible for federal action under EPA's Superfund program. As a result, the EPA initiated an RI/FS. The RI portion was conducted by the New Hampshire Department of Environmental Services (NHDES) under a cooperative agreement with EPA. In 1984, the NHDES contracted an engineering firm to conduct the RI which was completed in 1989.
SOMERSWORTH SANITARY LANDFILL SITE MAP

WETLANDS

APPROXIMATE LOCATION OF SOMERSWORTH MUNICIPAL LANDFILL PROPERTY BOUNDARY

APPROXIMATE EXTENT OF GROUND WATER CONTAMINATION

PETERS MARSH

APPROXIMATE GROUND WATER FLOW

RECREATION AREA

NATIONAL GUARD ARMORY VEHICLE YARD

APPROXIMATE GROUND WATER FLOW

BLACKWATER

APPROXIMATE EXTENT OF GROUND WATER CONTAMINATION

ROAD

NOT TO SCALE
In 1989, an Administrative Order (AO) was signed by EPA and the Somersworth Landfill Trust, several members of which have been named Potentially Responsible Parties (PRPs), to conduct a study to gather additional data for the RI (presented in the "RI Data Gathering Report") and to perform the FS. The RI Data Gathering Report addressed data gaps identified by EPA and NHDES in the initial RI.

**Results of the Remedial Investigations**

The purpose of the RI was to define the nature and extent of contamination at the Site. Field activities conducted as part of the RI included the installation of additional monitoring wells, and the collection and analysis of ground water, soil, sediment, surface water, and air samples. The RI also included a baseline health risk assessment. The supplemental RI included additional collection and analysis of ground water, air, and soil samples, as well as a wetlands assessment. The findings of the investigations are summarized below.

1. **Ground Water Quality:** Samples collected from numerous on-site monitoring wells indicated the presence of several contaminants (VOCs and metals) at concentrations above federal and/or state safe drinking water levels. The contaminated ground water forms a plume extending approximately 1100 feet northwesterly from the landfill (see Figure 2).

2. **Ground Water Flow:** Generally, the ground water flows from east to north-northwest. Locally, flow patterns may be altered by variations in soil properties.

3. **Soil Quality:** Low levels of VOCs and ABNs were detected in soil samples collected from within the landfill. Inorganic compounds in the soil samples collected from the Site were at or below background levels.

4. **Sediment:** Low levels of VOCs were detected in sediment samples collected from the banks of Peter's Marsh Brook. ABNs were not detected in any sediment samples and inorganic compounds were detected at background levels.

5. **Air Quality.** Ambient air samples were collected from the four corners of the Site and the center of the Site. Analysis of these samples indicated that VOCs were present at acceptable levels as specified by the State of New Hampshire.

6. **Surface Water.** Surface water samples were collected from Peter's Marsh Brook, and from Tate's Brook, up to the point where Tate's Brook meets the Salmon Falls River. Only mercury was detected at levels above the Federal Ambient Water Quality Criteria (AWQC) for the protection of fresh water aquatic life. No other inorganic compounds, VOCs, ABNs, polychlorinated biphenyls (PCBs), or pesticides were detected at levels which exceeded the AWQC. The mercury is not likely to have come from the landfill.
7. Wetlands Assessment. The wetlands system extends from Willand Pond to the Salmon Falls River and has a total area of approximately 390 acres. Although no known rare, unique, or endangered species were identified in the assessment, the area was identified as an important wetlands system in that it provides flood storage for the Somersworth area, vegetation and wildlife support, and socioeconomic value through aesthetic, educational, and recreational functions. While VOCs were detected in groundwater samples collected from beneath the wetlands area downgradient of the Site, the wetlands assessment did not reveal any observable signs of stress-related conditions or mortality in the vegetation downgradient of the landfill.

Summary of Site Risks

A risk assessment was conducted as part of the RI to evaluate present and potential future risks to public health and the environment associated with exposure to contaminants at the Somersworth Sanitary Landfill Site. Based upon that data and updated risk values for ground water ingestion based on data presented in the “Remedial Investigation Data Gathering Report,” EPA has concluded that a potential future risk to public health would result from ingestion of contaminated ground water. This is not a current risk since potentially affected residences obtain their drinking water from an alternative drinking water source, the City water supply. However, if the ground water in the area of Blackwater Road across from the landfill were used as a source of drinking water in the future, there would be carcinogenic (cancer-causing) and noncarcinogenic health risks associated with the ingestion of arsenic, trichloroethylene, and vinyl chloride in the water. There would also be carcinogenic and noncarcinogenic risks associated with ingesting ground water from the area of Peter’s Marsh Brook (should future development occur in that area) as a result of the potential for ingestion of arsenic, 1,1-dichloroethylene, 1,1-dichloroethane, and vinyl chloride in ground water. Also, a carcinogenic health risk could exist for Blackwater Road residents from ingestion of arsenic-contaminated fish caught in Peter’s Marsh Brook or through contact with contaminated sediments or surface water in Peter’s Marsh Brook. It should be pointed out, however, that arsenic has been determined to be naturally occurring and unrelated to the Site.

Based upon a comparison of surface water quality data to AWQC and a review of the wetlands assessment, EPA has concluded that the Site is not likely to pose a risk to the environment. However, actual or threatened release of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health.

For a complete explanation of risks posed by contamination at the Somersworth Sanitary Landfill Site, please refer to the RI and the FS reports which are available at the information repositories at the EPA in Boston and the Somersworth Public Library.

Proposed Cleanup Objectives and Levels

Using the information gathered during the RI/FS and the risk assessment, EPA identified remedial response objectives for the cleanup of the Somersworth Sanitary Landfill Site.

The response has the following cleanup objectives:

* Prevent ingestion of contaminated ground water by local residents:
- Prevent the public from coming into direct contact with contaminated solid wastes, surface soils, surface water, and sediments;
- Reduce or eliminate migration of contaminants from the solid wastes or soils into ground or surface water;
- Reduce or eliminate off-site migration of contaminants in excess of regulated allowable limits; and
- Ensure that the ground water and surface water have residual contaminant levels that are protective of human health and the environment.

To meet these objectives, EPA has established site-specific cleanup levels that will be protective of public health and the environment. The remedial alternative selected for the Site must achieve EPA’s cleanup levels.

During the RI, a number of compounds were initially identified as posing the greatest potential risk to public health and the environment. These compounds, known as indicator compounds, were selected based on their toxicity, persistence, mobility, frequency of detection, and concentration. After evaluation of the more recent data presented in the “RI Data Gathering Report”, cleanup levels for ground water will be based on the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) for the following compounds which exceeded their MCLs and/or had unacceptable risks associated with drinking ground water at the levels found:

- 1,1-Dichloroethylene
- Cis & Trans Dichloroethylene
- Tetrachloroethylene
- 1,1-Dichloroethane
- Trichloroethylene
- Vinyl Chloride

Where no MCL exists (1,1-Dichloroethane), Health Advisories, or State of New Hampshire Drinking Water Standards will be used. Ground water cleanup levels will be attained at and beyond a compliance boundary which is the edge of the Somersworth Sanitary Landfill. There are no cleanup levels established for contaminants in media other than ground water. Arsenic has been found at levels which exceed MCLs, however, it is naturally occurring and unrelated to the Site so no cleanup level has been set.

**EPA's Preferred Alternative**

EPA’s selection of the preferred cleanup alternative for the Somersworth Sanitary Landfill Site, as described in this Proposed Plan, is the result of a comprehensive evaluation and screening process. The FS was conducted to identify and analyze the alternatives considered for addressing contamination at the Site. The FS report and FS Addendum for the Somersworth Sanitary Landfill Site describe the alternatives considered, as well as the process and criteria EPA used to select the preferred alternative from the list of fifteen alternatives. For details on EPA’s screening methodology, see Sections 3.0 and 4.0 of the FS.

After conducting a detailed analysis of the feasible cleanup alternatives (Section 5.0 of the FS and the FS Addendum), EPA is proposing Alternative 5 as the preferred alternative with Alternatives 8c or 8d as a contingency alternative if Alternative 5 is found to be ineffective. These alternatives are described below:
Alternative 5, Limited Action, Landfill Cover, In-Situ Chemical Treatment and Ground Water Diversion, Ground Water Extraction from Bedrock, and Ground Water Monitoring

- institutional controls to prevent use of contaminated ground water
- natural attenuation for the wetlands ground water plume
- ground water monitoring
- a permeable cover during implementation of the in-situ treatment
- a multi-layer, impermeable cover which meets requirements for closure of hazardous waste sites (RCRA C) at the time of final closure, or other cover as appropriate at time of closure
- in-situ chemical treatment "wall" and ground water diversion (see Figure 3)
- bedrock ground water extraction at monitoring well B-12R and downgradient of the edge of the landfill with discharge onto the landfill to enhance "flushing" or upgradient of the "wall" for treatment

The key element of this alternative is the construction of the permeable treatment wall composed of impermeable barrier sections and innovative, permeable, chemical treatment sections to provide in-situ (in-place), flow-through treatment of contaminated ground water at the landfill waste boundary (the compliance boundary). The barrier sections, sheet piling or slurry walls, will divert ground water through the treatment sections where detoxification of VOCs occurs. End products are non-toxic ethenes and ethanes, carbon dioxide, water and chlorides. No residuals are created which require disposal.

The contaminated ground water to be extracted from the bedrock downgradient of the landfill will be pumped at approximately the rate of flow of the bedrock ground water beneath the landfill. An extraction well at monitoring well B-12R will further reduce the amount of contamination in the bedrock ground water. The purpose of collecting this ground water is to prevent additional contaminants from discharging from the bedrock to the ground water in the vicinity of the wetlands to enable that ground water to naturally clean itself and to enable achievement of standards at the compliance boundary, the edge of the landfill, in the shortest time practicable, approximately fifty-five years.

In order to accelerate "flushing" of the landfill, ground water extracted from bedrock will be reapplied to the landfill. Also, to maximize "flushing" by precipitation, an impermeable cover will not be placed on the landfill as long as the chemical treatment "wall" is functioning and contaminants are leaching from the landfill waste. After cleanup levels have been achieved and can be maintained without use of the treatment "wall," EPA will evaluate an appropriate landfill cover to be installed to close the landfill. The extraction of the bedrock ground water and the use of the in-situ chemical treatment "wall" will prevent additional contaminants from entering the wetlands area, thus allowing the ground water to clean itself in the shortest time feasible.

Estimated Time for Design and Construction: 3 years
Estimated Capital Cost (1993 Dollars): $12,744,700
Estimated Operations and Maintenance Costs (1993 Dollars): $2,240,100

Estimated Total Cost (1993 Dollars): $14,984,800
-SCHEMATIC OF AN IN-SITU GROUND WATER CHEMICAL TREATMENT WALL

Source: Canoahe Environmental excerpted from Bask Consultants Ltd. June, 1992

SOMERSWORTH LANDFILL TRUST
SOMERSWORTH, NEW HAMPSHIRE
CONTINGENCY REMEDY

Alternative 8c or 8d: Limited Action, Landfill Cover, Perimeter Slurry Wall with Ground Water Diversion, Overburden Ground Water Extraction within Slurry Wall, Bedrock Ground Water Extraction, On-Site (8c) or Off-Site (8d) Ground Water Treatment and Discharge, and Ground Water Monitoring.

- institutional controls to prevent use of contaminated ground water
- natural attenuation for the wetlands ground water plume
- ground water monitoring
- a multi-layer, impermeable cap which meets requirements for closure of hazardous waste sites (RCRA C)
- perimeter slurry wall with upgradient ground water diversion
- ground water extraction within slurry wall (125 gpm)
- bedrock ground water extraction at B-12R and downgradient of the edge of landfill (15-20 gpm)
- ground water treatment on-site with discharge of the treated ground water onto the wetlands or treatment at the Somersworth Publicly Owned Treatment Works (POTW) with discharge to the Salmon Falls River
- recharge in wetlands of diverted ground water and treated ground water from on-site treatment facility with potential for additional recharge using municipal water if off-site treatment used

For Alternative 8c, the extracted ground water would be conveyed to an on-site wastewater treatment system. This treatment system would include some combination of a metals removal unit, biological waste water treatment unit or activated carbon adsorption unit. Waste sludge generated by the treatment unit, approximately 400 pounds per day, would be properly disposed of at an off-site landfill operating in compliance with all applicable laws. After the extracted ground water is treated on-site, it would be used to recharge the wetlands, as needed. For Alternative 8d, the extracted ground water would be conveyed to the Somersworth POTW through sanitary sewer lines. The integrity of the existing sanitary sewer lines would require verification prior to discharging the extracted ground water. If the extracted ground water does not meet the intake requirements of the Somersworth POTW, a pretreatment system would be required on-site. The pretreatment system would focus primarily on reducing suspended metals and solids. The extracted ground water would then be treated at the Somersworth POTW. It is estimated that the POTW can handle up to about 485 gallons per minute (gpm) of extracted ground water before needing expansion. The estimated bedrock and ground water extracted by implementation of this alternative would be approximately 140 gpm. The actual flow could be lower depending on the ability of the cover and slurry wall to hydraulically isolate the overburden aquifer beneath the landfill. Therefore, it is unlikely that the capacity of the POTW would have to be increased. The POTW-treated ground water would be discharged to the Salmon Falls River.
EPA has selected an innovative technology involving a permeable, chemical treatment "wall" due to the expected benefits which would be achieved by its use over other alternatives: complete detoxification of VOCs, no residuals requiring treatment, low maintenance, and low costs. However, this is an emerging technology whose viability and reliability has not been proven at this scale. Therefore, EPA will allow three years for demonstration of the effectiveness of this technology. During this period the following activities must be accomplished: the technology must meet performance standards in pre-design testing; site-specific information sufficient to design the full-scale system must be collected; the design must be completed; the system must be constructed; and the system must be operational and functional. At the end of the three years, ground water at the compliance boundary must meet the cleanup levels. If this cannot be accomplished, the contingency remedy will be designed and implemented.

Other Alternatives Evaluated in the FS

The public is invited to comment not only on the preferred cleanup alternative, but also on the other thirteen alternatives that EPA evaluated in detail. Each of these alternatives is described briefly below. A more detailed description of each alternative can be found in the FS report and FS Addendum. For comparative purposes, costs have been developed over a thirty year operational period.

Alternative 1: No Action. This alternative was evaluated in the FS to serve as a baseline for all remedial alternatives under consideration. Under this alternative, no action would be taken except for long-term monitoring of ground water near the Site on a semi-annual basis. The results of the ground water sampling from ground water monitoring wells would be reviewed to evaluate any changes that occur and to reassess further remedial actions that may be required.

This alternative is primarily a data collection activity; no treatment or containment of the landfill wastes or contaminated ground water would occur, and no effort would be made to reduce the risk of potential human exposure to contamination. It is possible that a reduction in the level of contaminants in the ground water may occur over an extremely long time period due to natural attenuation; however, the length of time needed to attain cleanup levels in ground water cannot be predicted.

Estimated Time for Design and Construction: None
Estimated Capital Cost (1993 Dollars): $0
Estimated Operation and Maintenance Costs (1993 Dollars): $775,500
Estimated Total Cost (1993 Dollars): $775,500
Alternative 2: Limited Action. This alternative is similar to Alternative 1, except in addition to semi-annual ground water monitoring, it would include institutional controls to minimize the potential of exposure to contamination. Institutional controls would include restricting access to the Site by installing a fence around the Site, providing an alternate water supply to area residents (if necessary), and placing ground water use restrictions on land surrounding the Site.

This alternative would not include treatment or containment of contamination in the disposal area. Though the Limited Action alternative would reduce the potential risk of human exposure to on-site contaminants, some health risk from uncontained contamination would remain. Contaminated ground water migrating into the wetland area would continue to impact the environment. As mentioned in Alternative 1, the natural processes of dilution and degradation may decrease the level of contamination over time. However, without treatment or containment, neither the mobility of the contaminants nor the volume of contamination would be reduced.

Estimated Time for Design and Construction: None
Estimated Capital Cost (1993 Dollars): $100,500
Estimated Operation and Maintenance Costs (1993 Dollars): $775,500
Estimated Total Cost (1993 Dollars): $876,000

Alternative 3: Limited Action, Landfill Cover, Extraction of Bedrock Ground Water with Treatment, Ground Water Monitoring. This alternative combines the Limited Action alternative (identified above) with an engineered landfill cover and extraction of ground water from the bedrock at monitoring well B-12R and from a series of wells in the bedrock downgradient of the landfill. The cover would extend across the 26-acre landfill and would consist of a multi-layer design consistent with the requirements of RCRA Subtitle C. The cover would prevent direct contact with contaminated soil and solid wastes and prevent rain water and snow melt from draining through the landfill. Control points to collect and discharge landfill-generated gas would also be installed, if necessary. The surface would be graded to promote surface water runoff which would, in turn, decrease percolation through the landfill and slow the rate of contaminant entry into ground water beneath the landfill. This would subsequently reduce the quantity of contaminants entering the ground water and surface water, but since wastes currently lie below the ground water table, the migration of contaminants would not be stopped completely, thus allowing contamination to continue to enter the wetland areas.

The ground water to be pumped from the bedrock would be treated at the POTW as in Alternative 3d.

Estimated Time for Design and Construction: 2 years
Estimated Capital Cost (1993 Dollars): $9,520,700
Estimated Operation and Maintenance Costs (1993 Dollars): $1,297,100
Estimated Total Cost (1993 Dollars): $10,817,800
Alternative 4: Limited Action, Landfill Cover, Enhanced In-Situ Biological Treatment, Natural Attenuation, Bedrock Ground Water Extraction with In-Situ Treatment, and Ground Water Monitoring. This Alternative is similar to the preferred in-situ alternative (Alternative 5), but uses enhancement of natural biological processes rather than a permeable wall to treat the contamination flowing through the landfill. Additional, necessary nutrients will be applied to the landfill to hasten the biological degradation processes and naturally detoxify the contaminated ground water entering the wetlands area. As with Alternative 5, in order to accelerate "flushing" of the landfill, ground water extracted from bedrock will be reapplied to the landfill. Also, to maximize "flushing" by precipitation, an impermeable cover will not be placed on the landfill as long as the enhanced biological treatment is functioning.

Estimated Time for Design and Construction: 2 years
Estimated Capital Cost (1993 Dollars): $10,287,700
Estimated Operation and Maintenance Costs (1993 Dollars): $2,535,100
Estimated Total Cost (1993 Dollars): $12,822,800

Alternatives 6a and 6b: Limited Action, Landfill Cover, Slurry Wall (Partial [6a] or Perimeter [6b]), Natural Attenuation, Bedrock Ground Water Extraction with Treatment, and Ground Water Monitoring. These alternatives would add a partial or a perimeter slurry wall to Alternative 3 in order to more effectively contain the waste by lowering the ground water below the waste thus, minimizing migration of contaminants to the wetlands area ground water. Upgradient ground water diversion would be required to prevent the artificial raising of the ground water when it encounters the slurry wall. This diverted ground water would be recharged into the wetlands to lessen the impacts caused by the interruption of flow.

Estimated Time for Design and Construction: 2 years
Estimated Capital Cost (1993 Dollars): 6a - $11,610,200
                                                6b - $12,434,200
Estimated Operation and Maintenance Costs (1993 Dollars): 6a or 6b - $1,296,600
Estimated Total Cost (1993 Dollars): 6a - $12,906,800
                                                6b - $13,730,800

Alternatives 7a and 7b: Limited Action, Landfill Cover, Bedrock and Overburden Ground Water Extraction With On-Site (7a) or Off-Site (7b) Ground Water Treatment, and Ground Water Monitoring. These alternatives provide the remedial action in Alternative 3 with the addition of extraction of contaminated ground water from the overburden aquifer underlying the landfill. For Alternative 7a, the treated ground water would be discharged on-site. Ground water extraction would minimize the migration of landfill-generated contaminants. The on-site treatment system would likely consist of some combination of a metals removal unit, biological waste water treatment unit, or activated carbon adsorption unit. The ground water would be treated at a rate up to 2000 gallons per minute, generating up to 9,600 pounds of waste sludge per day. Actual flows and sludge generation rates would be determined during pre-design studies. The sludge would be properly disposed of at an off-site landfill in accordance with all applicable laws.
The extraction process would dewater between 40 and 190 acres of the downgradient wetlands. To limit this environmental impact for the on-site treatment system, treated water would be discharged downgradient from the extraction location, providing clean ground water to the wetlands. However, significant dewatering would still result. On-site discharge of treated water would also produce a hydraulic barrier that reduces the potential for off-site migration of contaminants.

For the off-site treatment option at the POTW, Alternative 7b, pretreatment might be needed as described in Alternative 8d, above. However, for flows in excess of 485 gpm, major expansion of the POTW would be necessary. In addition, to lessen the wetland impacts, potable municipal water would have to be recharged to the wetlands since treated ground water would be discharged off-site at the POTW. As with option 7a, significant adverse wetland impacts would still result.

Estimated Time for Design and Construction: 2 years
Estimated Capital Cost (1993 Dollars):

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Alternatives 8a and 8b: Limited Action, Landfill Cover, Bedrock and Overburden Ground Water Extraction with On-Site (8a) or Off-Site Ground Water Treatment (8b) and Partial Slurry Wall, and Ground Water Monitoring. These alternatives include the same components as Alternatives 7a and 7b (Limited Action, Landfill Cover, on-site and off-site Ground Water Extraction/Treatment/Discharge) with the addition of a partial slurry wall upgradient from the landfill (8a for on-site treatment and 8b for off-site treatment).

The presence of the partial slurry wall would cause an artificial rise in the ground water table upgradient of the landfill. A drainage system would be installed to prevent this artificial rise in the water table, and to divert water around the buried wastes. The discharge of this diverted water to the wetlands downgradient of the landfill would minimize the impact to the wetlands. However, some impact to the wetlands would remain as a result of the ground water extraction.

The upgradient slurry wall would reduce the amount of ground water entering the landfill area, thereby reducing the amount of water which comes into contact with the wastes. As a result, the ground water extraction rate could be reduced to about 900 gallons per minute and the amount of sludge produced during treatment would be reduced to about 2,900 pounds per day. The sludge would be disposed of at an off-site landfill in accordance with all applicable laws.

Estimated Time for Design and Construction: 2 years
Estimated Capital Cost (1993 Dollars):

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<td>$18,354,700</td>
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Estimated Operations and Maintenance Costs (1993 Dollars):

<table>
<thead>
<tr>
<th>Alternative</th>
<th>O&amp;M Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>8a</td>
<td>$10,332,100</td>
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<tr>
<td>8b</td>
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Estimated Total Cost (1993 Dollars):

<table>
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<th>Alternative</th>
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<tbody>
<tr>
<td>8a</td>
<td>$36,348,800</td>
</tr>
<tr>
<td>8b</td>
<td>$34,599,800</td>
</tr>
</tbody>
</table>
Alternative 9: Complete Excavation, Removal, and Off-Site Disposal of Landfilled Waste, Natural Attenuation, Bedrock Ground Water Extraction with Treatment, and Ground Water Monitoring: Alternative 9 involves the excavation and off-site disposal of solid wastes and surface soils present at the Site. Extraction and treatment of bedrock ground water would be conducted as in Alternative 3.

This alternative would provide a permanent, low-maintenance measure for source control. However, there are high costs associated with the excavation and off-site disposal due to the long distance to be travelled to reach a RCRA-approved disposal facility and the number of trips that would be required to the landfill. The closest RCRA-approved landfill is 250 miles away, and the estimated number of truck trips is 22,500.

Estimated Time for Design and Construction: 1 year
Estimated Capital Cost (1993 Dollars): $259,705,200
Estimated Operations and Maintenance Costs (1993 Dollars): $630,600
Estimated Total Cost (1993 Dollars): $260,335,800

Alternative 10: Limited Action, Landfill Cover, Complete Excavation and On-Site Reconsolidation of Landfilled Waste, Bedrock Ground Water Extraction with Treatment, and Ground Water Monitoring. This alternative would differ from Alternative 9 in that wastes would be completely removed from below the water table, reconsolidated on-site and placed entirely above the water table, then capped with an impermeable cover which meets RCRA Subtitle C requirements for final closure of hazardous waste sites.

Estimated Time for Design and Construction: 1 year
Estimated Operations and Maintenance Costs (1993 Dollars): $1,297,100
Estimated Total Cost (1993 Dollars): $17,635,800

Summary of the Comparative Analysis of Alternatives

EPA uses nine criteria to evaluate each remedial alternative identified in the FS. The nine criteria are used to select a remedy that meets the national Superfund program goals of protecting human health and the environment, maintaining protection over time, and minimizing untreated waste. Definitions of the nine criteria and a summary of EPA's evaluation of the alternatives using the nine criteria are provided below:

1. Overall Protection of Human Health and the Environment addresses how an alternative as a whole will protect human health and the environment. This includes an assessment of how public health and environmental risks are properly eliminated, reduced, or controlled through treatment, engineering controls or institutional controls.

With the exception of Alternative 1 (the no-action alternative) and Alternatives 7a and 7b (overburden ground water extraction with on-site or off-site treatment), each of the alternatives is protective. Alternatives 7a and 7b, which would not employ slurry walls, would result in significant environmental damage to the wetlands due to extensive
dewatering which could not be mitigated through recharge of treated effluent or of municipal water. Furthermore, because the pump and treat technology would not remediate the wetland area ground water faster or more effectively than Alternative 1, protective levels of ground water contamination would not be achieved in the foreseeable future. Alternative 2 would achieve protectiveness through promulgation of institutional controls to limit exposures to contaminated media. However, given the long time necessary to achieve protective levels, the effectiveness of controls could be compromised. Alternative 3 combines the institutional controls of Alternative 2 with a RCRA Subtitle C cover and pumping and treating of bedrock ground water. The cover positively prevents contact with wastes and minimizes leachate generation to shorten the time until ground water achieves protective levels. The pumping and treating of the bedrock ground water will, also, shorten the time to achieve protective levels so that the length of time that institutional controls must be in place will be shortened, thus their likelihood of being effective is enhanced. In addition, the low pumping rates anticipated should have no negative impact on the wetland environment. Alternatives 4 and 5 provide protectiveness from the in-situ treatment methods employed which will provide shorter times to achieve protective levels in ground water by enhancing the rate of remediation through enhancement of biodegradation (Alternative 4) or by effectively eliminating contaminant migration continuing into the wetland area by employing the chemical treatment "wall" (Alternative 5). As with the previous alternatives, institutional controls would prevent exposures until cleanup levels are achieved. Alternative 6 would provide some isolation of the waste through the use of slurry walls and cover (thereby somewhat shortening the time to achieve protective levels of contamination in the ground water) but would result in some adverse impact to the wetlands due to the ground water diversion which could not be completely mitigated by reapplication of the diverted ground water and treated bedrock ground water. Like Alternatives 7a and 7b, Alternative 8 employs pump and treat technologies to remediate the ground water. However, since Alternative 8 employs slurry walls, the impact on the wetlands is somewhat less than the partial slurry wall variations and much less than the perimeter slurry wall variations. With appropriate recharge techniques, the impact on wetlands should be minimal. Therefore, Alternatives 8c and 8d (on-site or off-site treatment with a full slurry wall) are protective. Alternative 9 achieves protectiveness by completely removing waste from the site and relying on institutional controls to prevent ingestion of contaminated ground water. Alternative 10 achieves protectiveness by reconsolidating wastes above the ground water table, under a RCRA Subtitle C cover.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether or not a remedy complies with all state and federal environmental and public health laws and requirements that apply or are relevant and appropriate to the conditions and cleanup options at a specific site. If an ARAR cannot be met, the analysis of the alternative must provide the grounds for invoking a statutory waiver. EPA has determined that a waiver of ARARs is not required at this time.

Most alternatives will meet all ARARs, but there are several exceptions. Alternatives 1 and 2 cannot meet the RCRA Subtitle C closure requirements, principally due to the lack of the required cover and an inability to meet the chemical-specific ARARs (SDWA MCLs) at the compliance boundary (the edge of the landfill). Alternative 3, which includes the requisite cover, would not meet the chemical-specific ARARs at the compliance boundary since contaminants would continue to emanate from the waste located in the ground water. Alternative 10 would have a similar problem in meeting the chemical-specific ARARs at the compliance boundary because of the presence of the existing contaminated ground water beneath the landfill. Alternatives 7, 8a and 8b which employ no slurry walls or only partial slurry walls will probably not be in compliance with
the wetland Executive Order which requires federal agencies to avoid adversely impacting wetlands wherever possible. Since there are alternatives available which may avoid adversely affecting wetlands, it may be concluded that Alternatives 7a, 7b, 8a and 8b would not comply with ARARs. Finally, each of the alternatives which include ground water pump and treat are expected to meet the chemical-specific ARARs, however, the time frame is projected to be on the order of fifty-five years. This is contingent upon natural attenuation of the contamination in the ground water in the wetland areas and on successful extraction and treatment of the bedrock ground water contamination.

3. Long-Term Effectiveness and Permanence refers to the ability of an alternative to maintain reliable protection of human health and the environment over time once the cleanup goals have been met.

Alternatives 1, 2 and 3 would not be effective or permanent in reducing long-term risk since there is no way of determining when or if clean up goals can be met.

Alternatives 4 and 5, would maintain protection since the technologies treat the source of contamination and allow for faster natural attenuation in the wetlands area. Long-term management should be minimal. Alternative 6a would require long-term maintenance of the cover, as well as, the upgradient ground water diversion. Some contaminated ground water would be released to the wetlands since the wastes are left in place and not completely isolated. Alternative 6b, perimeter slurry wall, would be an improvement over 6a because it more effectively prevents ground water from flowing through the waste and would result in a lower volume of contamination entering the wetlands. Alternatives 7a, 7b, 8a, and 8b rely on a proven technology, ground water extraction and treatment, but its application in the wetland area may negate its long-term effectiveness since the contamination may not be able to be removed from the organic, wetland soils using this technology. Recontamination of the wetland ground water would occur. Alternatives 8c and 8d address this problem by isolating the wetlands through the use of a perimeter slurry wall to allow natural attenuation to occur in the wetland areas. Extraction and treatment within the slurry wall will result in a magnitude of residual risk nearly as low as Alternatives 4 and 5, both of which should more directly address the source of contamination in the landfill and not produce treatment residuals requiring management. Long-term management is more complex than for other alternatives which do not employ the added flows from extraction of overburden ground water. Alternative 9 results in the lowest magnitude of residual risk since all waste is to be removed from the Site. Alternative 10 would lower remaining risk somewhat by removing wastes from the ground water.

4. Reduction of Toxicity, Mobility, or Volume through treatment are three principal measures of the overall performance of an alternative. The 1986 amendments to the Superfund statute emphasize that, whenever possible, EPA should select a remedy that uses a treatment process to permanently reduce the level of toxicity of contaminants at the Site, the spread of contaminants away from the source of contamination, and the volume, or amount, of contamination at the Site.

Alternatives 1 and 2 do not employ any treatment technologies. Alternatives 3 through 10 all employ identical extraction systems for bedrock ground water and provide treatment as well. Therefore, all are identical with respect to the degree of reduction of toxicity, mobility, and volume of contaminants in the bedrock ground water. Alternatives 3, 6, 9, and 10 provide no additional reduction through treatment but do provide reduction of mobility by using various means to isolate the wastes. Alternatives 4, 5, 7, and 8 all employ treatment methods to reduce toxicity, mobility, and volume of contamination in the
overburden aquifer. The principal difference among these alternatives is that Alternatives 4 and 5 would result in total destruction of the contamination. Alternatives 7 and 8 generate significant amounts of sludge which would require ultimate disposal.

5. Short-Term Effectiveness refers to two components: the likelihood of adverse impacts on human health or the environment that may be posed during the construction and implementation of an alternative until cleanup goals are achieved; and the time necessary to achieve the cleanup goals.

Alternatives 1 and 2 would have no short-term impacts from construction. However, since no capping of the landfill or cleanup of ground water/leachate will take place under these alternatives, cleanup levels would not be attained in the foreseeable future.

Significant risks to human health and the environment may result from an inadvertent release of contamination during the waste excavation and removal or reconsolidation process which would be utilized in Alternatives 9 or 10. Alternative 9 poses the greatest risk due to the complete excavation and off-site disposal of the landfill wastes. Alternative 10 would be an improvement since wastes will not be disposed of off-site but still would be excavated. Stringent health and safety measures would be required during the implementation of these alternatives to protect construction crews and nearby residents.

Minor releases of VOCs and/or particulates may occur during the regrading of the solid wastes and soils prior to the installation of the cover which is utilized in Alternatives 3, 4, 5, 6, 7, 8, and 10. Dust control measures, the use of interim covers, air monitoring (if necessary), and proper health and safety training would minimize exposures to construction crews and nearby residents.

Minimal incidental exposures to workers would be expected for the construction of any of the ground water extraction and treatment systems. Remedial activities are not expected to adversely impact the community during or after implementation.

Minimal risks to workers are associated with the construction of the upgradient slurry wall and collection drain utilized in Alternatives 6a, 8a and 8b and the perimeter slurry wall and collection drain utilized in Alternatives 6b, 8c and 8d.

Alternative 7 would create the highest level of risk to the environment due to the dewatering of wetlands which would occur even with the use of mitigation measures. Alternatives 8a and 8b would be the next most harmful to the wetlands. Alternatives 8c and 8d would be next but of significantly less impact since mitigation measures should prove to be effective. Alternative 6 is less harmful since wetland impacts could be nearly completely mitigated. Alternatives 2, 3, and 10 would have the next highest level of risk to the environment because of the continued migration of contaminated ground water into the wetlands. Alternatives 4, 5, and 9 would have the lowest level of risk to the environment.

Alternatives 6, 7, and 8 would require about one year to implement and approximately fifty-five years to achieve cleanup goals in the overburden aquifer down-gradient of the edge of the landfill. Alternative 5 would require up to three years to implement and approximately fifty-five years to achieve cleanup goals in the overburden aquifer down-gradient of the edge of the landfill. Alternative 4 would require up to four years to implement and approximately fifty-five years to achieve cleanup goals in the
overburden aquifer down-gradient of the edge of the landfill. Alternatives 9 and 10 would require one year to implement and approximately eighty-three years to achieve cleanup goals in the overburden aquifer down-gradient of the edge of the landfill. Alternative 3 would require up to one year to implement and along with Alternatives 1 and 2 would not achieve cleanup goals in the foreseeable future. As a result of the bedrock ground water extraction and treatment systems, it is expected that the bedrock ground water would achieve cleanup goals at least as quickly as the overburden ground water.

6. Implementability refers to the technical and administrative feasibility of an alternative, including the availability of materials and services needed to implement the alternative.

All of the alternatives can be implemented using standard construction methods. The principal difference among alternatives concerns the reliability of the technology. Neither Alternative 4 nor Alternative 5 has been implemented at the scale proposed. The likelihood that technical problems will occur with the delivery system used to provide nutrients to the landfill in Alternative 4 is high. The potential for preferred pathways developing so that portions of the waste do not receive nutrients is likely. For Alternative 5, the mechanisms which occur that detoxify the contamination within the in-situ chemical treatment wall are not well documented or understood. There is also an unknown potential for fouling, plugging and exhaustion of capacity or effectiveness. However, additional remedial actions could easily be undertaken if required. The reliability of Alternative 7 is questionable given the potential for large-scale dewatering which will prevent the removal of contaminants from within the wetland soils. Implementation of Alternative 9 would be difficult from an administrative basis. The ability of a RCRA-approved landfill to handle the large volumes of waste (approximately 450,000 tons) is unknown. In addition, the large number of truck trips necessary to transport the wastes over long distances may create substantial fugitive dust and fuel emissions. Finally, with the large number of trips, the potential exists for a truck traffic accident which could release contaminated material. All other alternatives are roughly equivalent in their implementability.

7. Cost includes the capital (up-front) cost of implementing an alternative as well as the cost of operating and maintaining the alternative over the long term and net present worth of both capital and operation and maintenance costs.

The capital, operation and maintenance, and total cost for each alternative is provided as part of the Site description in the preceding sections on "EPA's Preferred Alternative" and "Other Alternatives Evaluated in the FS." For comparative purposes, the costs are all based upon thirty years of operation of each alternative. The actual costs would differ somewhat based upon the length of time necessary to achieve cleanup levels.

8. State Acceptance addresses whether, based on its review of the RI/FS and Proposed Plan, the State concurs with, opposes, or has no comment on the alternative EPA is proposing as the remedy for the Site.

The NHDES has reviewed the FS and preferred alternative for the Somersworth Sanitary Landfill Site and will provide comments during the public comment period.
9. Community Acceptance addresses whether the public concurs with EPA's Proposed Plan. Community acceptance of this Proposed Plan will be evaluated based on comments received at the upcoming public meetings and during the public comment period.

Of the nine criteria, protection of human health and the environment and compliance with all ARARs are considered threshold requirements that must be met by all remedies. EPA balances its consideration of alternatives with respect to long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. State and community concerns are considered as modifying criteria factored into a final balancing of all criteria to select a remedy. Consideration of State and community comments may prompt EPA to modify aspects of the preferred alternative or decide that another alternative considered provides a more appropriate balance.

EPA's Rationale for Proposing the Preferred Alternatives

Based on current information and analysis of the RI, the RI Data Gathering Report, and the FS reports, EPA believes that the preferred alternative for the Somersworth Sanitary Landfill Site are consistent with the requirements of the Superfund law and its amendments, specifically Section 121 of CERCLA, and to the extent practicable, the National Contingency Plan (NCP). Alternatives 4 through 6 and 8 through 10 all provide overall protection of human health and the environment. In EPA's analysis, however, Alternatives 5, 8c, and 8d provide the highest reduction of toxicity, mobility, and volume of the contaminated ground water while being comparable in cost to the other alternatives considered.

In addition, among those alternatives that meet the threshold criteria, the preferred alternatives would achieve the best balance among the criteria used by EPA to evaluate the alternatives. The preferred alternatives would provide short- and long-term protection of human health and the environment; would attain all federal and state ARARs; would reduce the mobility, toxicity and volume of contaminated ground water through treatment; and would utilize permanent solutions and alternative treatment technologies to the maximum extent practicable.
For More Information

If you have any questions about the Site or would like more information, you may call or write to:

Roger Duwart
Remedial Project Manager
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Waste Management Division (HSN-CAN5)
JFK Federal Building
Boston, MA 02203
(617) 573-9628

or

Amy Rogers
Community Relations Coordinator
U.S. Environmental Protection Agency, Region I
Superfund Community Relations Section (RPS)
JFK Federal Building
Boston, MA 02203
(617) 565-3574
Glossary

**Acid and Base Neutral Extractable Organic Compounds (ABNs):** A type of volatile organic compound (VOC) that is heavier than and that does not volatilize (or evaporate) as readily as other VOCs.

**Activated Carbon:** A highly adsorbent form of carbon used to remove odors and toxic substances from liquid or gaseous emissions. Activated carbon is widely used in pollution control systems because contaminants adsorb or adhere to the surface of the carbon.

**Activated Sludge:** A mixture of water and microorganisms or “bugs”. In groundwater treatment, the microorganisms degrade or “eat” organic compounds in the ground water. The microorganisms are then settled out in a solid form, forming the sludge.

**Administrative Order (AO):** A legal agreement entered into by EPA and one or more Potentially Responsible Parties (PRPs) that sets forth the studies and cleanup actions to be carried out and funded by the PRPs under the supervision of EPA and the state.

**Ambient Air:** The portion of the atmosphere, outside of buildings, to which the general public has access.

**Applicable or Relevant and Appropriate Requirements (ARARs):** ARARs include any state or federal statute or regulation that pertains to protection of public health and the environment in addressing certain site conditions or using a particular cleanup technology at a Superfund Site. A State law to preserve wetland areas is an example of an ARAR. EPA must consider whether a remedial alternative meets ARARs as part of the process for selecting a cleanup alternative for a Superfund Site.

**Aquifer:** A subsurface water-bearing layer of rock, sand, or gravel that supplies ground water to wells and springs. Aquifers are frequently used as sources of drinking water.

**Arsenic:** A metal used in pesticides and emitted by smelting operations. Arsenic also occurs naturally in soils and sediments. Arsenic is known to cause skin cancer in humans exposed to high concentrations in drinking water.

**Background Level:** The amount or level of any compound in soil, water, or air that occurs naturally or as a result of activities unrelated to the Site. Background levels may vary locally or regionally. For example, the naturally occurring level of arsenic in ground water varies throughout the state of New Hampshire.

**Baseline:** A level established to serve as a starting point for measurement of comparison. With respect to the alternatives evaluated, a baseline is a statement of existing conditions and their relative consequences should no further action be taken.

**Carcinogenic:** A carcinogenic substance is one that causes the development of cancerous growth in living tissue.
**Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA):** A federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act (SARA). The acts created a special tax that goes into a Trust Fund, commonly known as Superfund, to investigate and clean up abandoned or uncontrolled hazardous waste sites. Under the program, EPA can either: 1) pay for site cleanup when parties responsible for the contamination cannot be contacted or are unwilling or unable to perform the work or 2) take legal action to force parties responsible for site contamination to clean up the Site or pay back the federal government for the cost of the cleanup.

**Cover:** A cap placed over a landfill or a hazardous waste facility to prevent surface water and rain water from coming into contact with the buried contaminants. A cover is usually made from clay and/or synthetic liners.

**Feasibility Study (FS):** A study that summarizes the development and analysis of remedial alternatives that EPA considers for the cleanup of Superfund sites.

**Ground Water:** Water found beneath the earth's surface that fills pores between materials such as sand, soil, gravel and cracks in bedrock and often serves as a source of drinking water.

**Health Advisories:** Estimates of acceptable drinking water levels for a chemical substance based on health effects information. A health advisory is not an enforceable federal standard, but serves as guidance.

**Inorganic Compounds:** Chemical substances of mineral origin (e.g., metals), not of basically carbon structure.

**Institutional Controls:** Legal restrictions established to prevent specified activities from occurring in a designated area and/or to control access to the Site. Examples include deed restrictions, zoning, fencing, etc.

**Leachate:** Water which has become contaminated by coming in contact with wastes, pesticides, or fertilizers. Leaching may occur in landfills, farming areas, and feed lots, and may result in hazardous substances entering surface water or ground water.

**Maximum Contaminant Level (MCL):** The maximum permissible level of a contaminant in water that is consumed as drinking water. These levels are determined by EPA and are applicable to all public water supplies.

**Maximum Contaminant Level Goal (MCLG):** The maximum level of a contaminant in drinking water at which no known or anticipated adverse effect on human health would occur, and which allows an adequate margin of safety. Non-zero MCLGs refer to those contaminants which have MCLGs greater than zero.

**National Priorities List (NPL):** EPA's list of the most serious uncontrolled or abandoned hazardous waste sites which have been identified for possible long-term remedial action and eligible for federal funding under Superfund.

**Natural Attenuation:** The lowering of the level of contamination through naturally occurring processes, including dilution, evaporation/volatilization and biological degradation.
**Net Present Worth:** The amount of money necessary to secure the promise of future payment, or series of payments, at an assumed interest rate.

**Non-Zero Maximum Contaminant Level Goal (MCLG):** See Maximum Contaminant Level Goal (MCLG)

**Organic Compound:** Synthetic or animal- or plant-produced substances containing mainly carbon, hydrogen, and oxygen.

**Overburden:** Unconsolidated soil materials found from the surface of the ground down to bedrock.

**Persistence:** Refers to a chemical's resistance to breaking down (biodegrading) in the environment.

**Plume:** A three dimensional zone within the ground water that contains contaminants and generally moves in the direction of, and with, ground water flow.

**Polychlorinated Biphenyls (PCBs):** A group of organic chemicals used since 1926 in electric transformers as insulation and coolants, in lubricants, carbon copy paper, adhesives and caulkling compounds. PCBs are extremely persistent in the environment because they do not break down to new and less harmful chemicals.

**Potentially Responsible Party (PRP):** Those identified by EPA as potentially liable under CERCLA for cleanup costs. PRPs may include hazardous substance generators, present or former owners or operators of hazardous waste sites, as well as those who accepted hazardous substances and transported them to certain facilities.

**Pretreatment:** Treatment of wastewater performed prior to discharge to a public sewer system.

**Publicly Owned Treatment Works (POTW):** A wastewater treatment facility which is owned by a state, municipality, or intermunicipal or interstate agency.

**Record of Decision (ROD):** A public document that explains the cleanup alternative to be used at a National Priorities List (NPL) site. The ROD is based on information and technical analysis generated during the RI/FS and on consideration of the public comments and community concerns.

**Remedial Alternative:** An option evaluated by EPA to reduce the source and migration of contaminants at a Superfund Site to meet health based cleanup goals.

**Remedial Investigation (RI):** An investigation to determine the nature and extent and composition of contamination at a hazardous waste site, and to direct the types of cleanup options that are developed in the Feasibility Study (FS).

**Resource Conservation and Recovery Act (RCRA):** A federal law that regulates the generation, treatment, storage, transportation, and disposal of hazardous wastes.

**Risk Assessment:** A qualitative or quantitative evaluation of human health and/or environmental risk resulting from exposure to a chemical or physical agent (pollutant).
Sediment: The sand or mud found at the bottom and sides of bodies of water, such as creeks, rivers, streams, lakes, swamps, and ponds. Sediments typically consist of soil, silt, clay, plant matter, and sometimes gravel.

Slurry Wall: A deep in-ground wall constructed of clay and/or cement. The wall provides a barrier between clean ground water and contaminated ground water.

Suspended Solids: Very fine materials suspended in water or other solutions.

Surface Water: Bodies of water on the surface of the earth, such as rivers, lakes, and streams.

Volatile Organic Compound (VOC): A group of chemical compounds composed primarily of carbon and hydrogen that are characterized by their tendency to evaporate (or volatilize) into the air from water or soil. VOCs include substances that are contained in common solvents and cleaning fluids. Some VOCs are carcinogenic.

Waste Sludge: A semi-solid residue from various water treatment processes. Sludges generated from water treatment processes contain activated sludge and suspended solids.

Wetlands: Areas such as marshes, bogs, and swamps that are saturated with water long enough each year to affect the type of soil and vegetation found in the area. Wetlands are federally protected because they purify water, prevent floods, feed and shelter fish and wildlife, and offer recreational opportunities.
Mailing List Additions

If you or someone you know would like to be placed on the Somersworth Sanitary Landfill Site mailing list, please fill out and mail this form to:

Amy Rogers
Community Relations Coordinator
U.S. Environmental Protection Agency
Superfund Community Relations Section (RPS)
John F. Kennedy Federal Building
Boston, Massachusetts 02203
(617) 565-3574

Name: ____________________________________________
Address: __________________________________________
Affiliation: __________________________________________
Phone: _____________________________________________

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