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Superfund Record of Decision:

Tinkham's Garage, NH

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16. Abstract (Limit: 200 words)

The Tinkham's Garage site includes 375 acres of residential and undeveloped land in Londonderry, New Hampshire. EPA site investigations in 1981 revealed onsite soil and ground water contaminated with VOCs resulting from onsite surface dumping of liquids and sludge in 1978 and 1979. The major contaminated soil area is in a field behind Tinkham's Garage. Two other source areas include a soil pile behind a condominimum complex and soil overlying the condominimum complex leachfields. The ground water underlying the major source areas and the bedrock aquifer underlying the site are contaminated as well. Approximately 400 people residing in a condominium complex on the western border of the site, residents of numerous single family homes to the north of the site, and nearby wetlands may be potentially impacted by onsite contamination. The first remedial action selected for the site was documented in a 1986 Record of Decision (ROD), which included excavation of approximately 10,800 cubic yards of contaminated soil with onsite treatment using either thermal aeration, composting or soil washing. Local wetlands impacted by soil excavating activities and contaminated ground water were also to be remediated. Information generated during a pre-design study led EPA in 1988 to propose this amendment to the 1986 ROD. As a result of the pre-design study findings, the remedial action selected in the
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - Tinkham's Garage, NH
First Remedial Action (Amendment)
Contaminated Media: soil, gw
Key Contaminants: VOCs (PCE, TCE)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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EPA/ROD/R01-89/046
Tinkham's Garage, NH
First Remedial Action (Amendment)

Abstract (continued)

1986 ROD. As a result of the pre-design study findings, the remedial action selected in the 1986 ROD was never implemented. The primary contaminants of concern affecting the soil and ground water are VOCs including TCE and PCE.

The selected remedial action for this site includes onsite treatment of approximately 9,000 cubic yards of contaminated soil from all three source areas using a dual vacuum extraction method designed to extract vapors from unsaturated soil and to pump shallow ground water; treatment of the soil pile and leachfield soil will be in situ or the soil will be excavated, consolidated and treated with the garage soil; extraction of contaminated ground water from the shallow zone via extraction wells and treatment onsite before combining with ground water pumped from the deep zone, followed by discharge to a POTW; and monitoring of wetland water levels. Present worth or total capital costs were not specified.

AMENDED RECORD OF DECISION

SITE

Tinkham's Garage Site
Londonderry, New Hampshire
March, 1989

STATEMENT OF PURPOSE

This document formally specifies changes to the Record of Decision issued for the Tinkham's Garage Site in September 1986. The Amended Record of Decision describes the changes adopted, presents an evaluation of treatment technologies, and presents the rationale for amending the 1986 Record of Decision.

This decision was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §§ 9601 et seq., and to the extent practicable, the National Contingency Plan (NCP), 40 C.F.R. Part 300 (1988). The Regional Administrator has been delegated the authority to approve this decision.

STATE CONCURRENCE

The State of New Hampshire has concurred on the selected remedy and determined that the selected remedy is consistent with New Hampshire laws and regulations.

STATEMENT OF BASIS

This decision is based on the Administrative Record which was developed in accordance with Section 113(k) of CERCLA and which is available for public review at the Leach Public Library (Londonderry, New Hampshire) and the EPA Region I Records Center (Boston, Massachusetts). An index identifying the components of the Administrative Record is attached as Appendix A.

RECORD OF DECISION AMENDMENT SUMMARY

As a consequence of information generated during the Tinkham's Garage Site Pre-Design Study, EPA proposed in August 1988 to amend the Record of Decision signed September 1986. The "Londonderry Site Proposal to Amend the Record of Decision" has been presented to the public and an opportunity for public comment has been provided.

The changes to the 1986 Record of Decision address primarily the nature of the soil treatment technology. The 1986 decision specified either composting, soil washing, or thermal aeration as the soil treatment technologies for site remediation. The Amended Record of Decision specifies the following remedial actions for the Tinkham's Garage Site:

- Areas of the Site having soil with greater than 1 mg/kg (ppm) volatile organics including the garage area, condominium leachfields I/J and K/L, and the soil pile located behind the condominium complex will be remediated to 1 mg/kg or less total volatile organics (VOCs). Remediation of the soils will utilize vacuum extraction wells equipped to pump shallow groundwater and simultaneously extract vapors from the unsaturated soils. The degree of remediation will be determined following evaluation of operational and sampling data. At a minimum, soil will be treated to 1 mg/kg total VOCs.

- Remediation of the soil pile and leachfield will utilize vacuum extraction either <u>in situ</u> or the contaminated soil will be excavated, consolidated with other source material at the garage area, and treated using vacuum extraction as determined during the design phase.

- When evaluation of systems operation data suggests that the soil has been remediated to a total mass VOC of 1 mg/kg or less, the soil will be sampled in accordance with an EPA approved sampling and analysis plan to evaluate the status of soil remediation. If the sampling results indicate that soils have not been remediated below the 1 mg/kg VOC threshold, a decision will be made to either continue vacuum extraction for a specified length of time and resample or to complete the remedy with some other suitable technology. The decision on the ultimate degree of treatment (treatment level) by vacuum extraction will be based on the technical feasibility, reliability, and cost effectiveness of continued treatment to below 1 mg/kg total VOCs. Treatment levels of less than 1 mg/kg will be selected if they can be achieved without substantial increases in remediation costs.

- Treatment of contaminated groundwater will be achieved in accordance with the 1986 Record of Decision except that shallow groundwater underlying contaminated source material behind the garage will be extracted using the dual extraction wells which simultaneously draw air through the contaminated soils and extract shallow groundwater. The groundwater remediation objectives are 5 ug/L of Trichloroethylene and Tetrachloroethylene, respectively, in both the shallow and bedrock aquifers.

DECLARATION

The remedy selected and described in this Record of Decision Amendment is protective of public health and the environment, attains federal and state requirements that are applicable or relevant and appropriate and is cost effective. This remedy satisfies the statutory preference for treatment that permanently and significantly reduces the volume, toxicity, and mobility of the hazardous substances, pollutants and contaminants as a principal element. Finally, it is determined that this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

3/10/89
Date

Michael R. Deland
Regional Administrator

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I. INTRODUCTION

A. Site Background

The Tinkham's Garage Site (Site) includes 375 acres of undeveloped and residentially developed property located near the intersection of Interstate Route 93 and State Route 102 in Londonderry, New Hampshire. EPA evaluated the Tinkham's Garage Site between 1981 and 1986 prior to the issuance of the September 1986 Record of Decision. From its investigations, EPA identified soils and groundwater that were contaminated with volatile organic compounds. The major soil source area is located in a field behind the Tinkham's Garage. Two other source areas identified include a soil pile located behind the Woodland Village Condominium Complex, and soils overlying the condominium complex leachfields. Shallow groundwater underlying the source area behind the garage is contaminated with volatile organics as is the bedrock aquifer underlying the Site. A more detailed description of contaminant distribution can be found in the Tinkham's Garage Remedial Investigation and the Tinkham's Garage Site Pre-Design Study.

The Record of Decision issued in September 1986 specified:

- Source remediation of contaminated soil: Contaminated soils containing greater than 1 mg/kg total volatile organic compounds (VOCs) will be treated by one of three treatment technologies (thermal aeration, composting, or soil washing). Soils will be treated to a level that will be determined by EPA based on technical feasibility, reliability, and cost effectiveness. At a minimum, soil will be treated to 1 mg/kg total VOCs.

- Management of migration: Groundwater will be pumped from deep bedrock wells and from shallow recovery trenches and discharged to the Derry, New Hampshire Publicly Owned Treatment Works (POTW). Groundwater will be pumped to the Derry POTW until the indicator compounds, Trichloroethylene and Tetrachloroethylene, have been reduced to 5 ug/L (ppb) each.

B. Enforcement History

The PRPs and the state and federal governments have been involved in negotiations regarding the Tinkham's Garage Site and three related Superfund Sites since May 1, 1986. Following issuance of the Record of Decision, EPA negotiated an agreement to have a group of PRPs conduct Pre-Design studies. An Administrative Consent Order was entered into on September 11, 1987 by EPA and a group of PRPs that required them to conduct the following studies:

- Bench and pilot scale evaluations on the effectiveness of soil treatment technologies;
- Generation of data on the full extent of soil contamination at the Site; and
- Hydrologic and chemical evaluations of groundwater.

The results of this study are presented in the Pre-Design Study Report and summarized in Section III of this document.

On August 3, 1988, a Consent Decree was lodged containing a comprehensive settlement of the Cannons Engineering Corporation Superfund Case (Cannons Case) in the United States District Court in Boston. The Cannons Case includes four Superfund hazardous waste sites:

1. The Cannons Engineering Corporation Bridgewater Site, Bridgewater, MA
2. The Cannons Engineering Corporation Plymouth Harbor Site, Plymouth, MA
3. The Tinkham's Garage Site, Londonderry, NH
4. The Gilson Road Site, Nashua, NH

The settlement includes cash payments of approximately $17 million and commitments by the Settling Parties to conduct the remedies at the Cannons Bridgewater Site, the Tinkham's Garage Site, and a removal of soils from the Plymouth Site.

At the Tinkham's Garage Site, the Settling Parties have agreed to undertake the remedial action selected by EPA in the 1986 Record of Decision and any amendments thereto. The major change to the Record of Decision that will be implemented by the Settling Parties is selection of vacuum extraction as the soil treatment technology for volatile contaminated soils at the Site. This revised approach to soil treatment is described herein and in the Pre-Design Study Report and the Londonderry Site Proposal to Amend the Record of Decision.

C. Purpose of the Amended Record of Decision

The purpose of the Amended Record of Decision is to formally specify changes to the previously issued Record of Decision. The Amended Record of Decision describes the changes adopted, presents an evaluation of technologies which were considered pursuant to the original Record of Decision and

those that were proposed in the Proposal to Amend the Record of Decision. In addition, it presents the rationale for changing the Record of Decision, the state and public perspectives on the change, an explanation of how the change differs from the original Record of Decision, and a Responsiveness Summary which is EPA's response to public comment on the change.

The Amended Record of Decision specifies soil treatment by a dual vacuum extraction method. This decision contains no significant changes from the previously issued Proposal to Amend the Record of Decision.

II. Amendments to the 1986 Record of Decision

As a result of the information generated during the Pre-Design Study, EPA proposed to amend the Record of Decision in the "Londonderry Site Proposal to Amend the Record of Decision; August, 1988." That document describes the proposed changes to the 1986 Record of Decision and describes the significant differences between what was specified in the 1986 Record of Decision and what was being proposed. The remedial action selected and specified in this ROD amendment does not contain any significant changes from that proposed in August 1988. The amended remedy includes:

- Source remediation of contaminated soils containing greater than 1 mg/kg total VOCs from the garage area, leachfields I/J and K/L, and the soil pile down to a treatment level that will be determined following evaluation of field operation and sampling data. The degree of cleanup will be based on technical feasibility, reliability, and cost effectiveness. At a minimum, soils will be treated to a total mass volatile organic concentration of 1 mg/kg. Treatment levels less than 1 mg/kg will be selected if they can be attained without substantial increase in remediation cost. Remediation of the soils will utilize vacuum extraction wells equipped to pump shallow groundwater and simultaneously extract vapors from the unsaturated soils. Remediation of the soil pile and leachfield soils will be treated by <u>in situ</u> vacuum extraction or these soils will be excavated, consolidated and treated by vacuum extraction in conjunction with the garage area soil remediation. When evaluation of systems operation data suggests that the soil has been remediated to a total mass VOC of 1 mg/kg or less, the soil will be sampled in accordance with an EPA approved sampling and analysis plan. If the sampling results indicate that soils have not been remediated below the 1 mg/kg VOC threshold, a decision will be made to either continue vacuum extraction for a specified length of time

and resample or to complete the remedy with another suitable technology.

- Management of migration remediation will be accomplished in a manner similar to that identified in the September 1986 ROD. Groundwater will be remediated by pumping the two condominium wells, identified as LGAW and LGSW, as well as extracting shallow groundwater via the dual vacuum extraction system from the garage area. The contaminated shallow groundwater extracted with the dual extraction wells during soil remediation will be treated on-site before being mixed with the water from the condominium wells. Shallow and deep groundwater will be pumped via town sewers to the Derry POTW where it will be treated. Shallow and deep groundwater remediation will continue until the groundwater remedial objective of 5 ug/L PCE and TCE has been reached for all on-site wells or for two years, at which time an evaluation of remediation status, and a determination of whether to continue pumping, will be made.

The amended Record of Decision specifies changes to the soil treatment technology by selecting vacuum extraction, a technology not specified in the 1986 ROD. The soil cleanup levels have been retained from the 1986 ROD which specified that soils would be remediated to a level chosen following selection of the treatment technology. The 1986 ROD first established the 1 mg/kg cleanup threshold as a level that would significantly reduce the contaminant mass in source areas, was protective of public health for direct contact exposures, and would result in reduced contaminant loading to groundwater during remediation. The ultimate treatment level would be determined based on technical feasibility, reliability, and cost effectiveness and be selected consistent with RCRA Delisting procedures, but would, at a minimum, require total VOCs to be reduced to 1 mg/kg.

The Delisting procedures were established for RCRA hazardous wastes. A review of the contaminants of concern indicate that there are no identifiable RCRA hazardous wastes at the Tinkham's Garage site. In addition, there are no EP TOX criteria for any of the Tinkham's Garage site contaminants of concern. Therefore, the Delisting procedures, which are RCRA waste specific and compound specific, will not be applicable to establishing treatment levels for this site.

As specified in the 1986 ROD, the ultimate degree of treatment will be based on technical feasibility, reliability, and cost effectiveness, and be at least to 1 mg/kg total VOC. Treatment levels less than 1 mg/kg total VOCs will be selected if they can be attained without substantial increase in remediation costs.

The management of migration component of the 1986 Record of Decision has essentially been embodied in the amended ROD. One modification to the 1986 ROD is the use of dual extraction wells

to simultaneously draw air through the contaminated soils and pump shallow contaminated groundwater. The 1986 ROD had specified use of trenches to capture the shallow groundwater. The groundwater treatment goals of 5 ug/l TCE and PCE have been retained from the 1986 ROD.

III. SUMMARY - TREATMENT TECHNOLOGIES SPECIFIED IN THE SEPTEMBER 1986 RECORD OF DECISION

A. Source Control

The Record of Decision signed for the Site in September 1986 specified excavation of contaminated soils with on-site treatment as the source control alternative. The components of this action included:

- Soil treatment by either thermal aeration, composting, or soil washing. Treatability studies are to be performed to evaluate these technologies.
- Excavation and treatment of soil located behind the Tinkham's Garage by one of the above technologies. Some of the soils to be treated are located in a wetland. Best engineering practices will be employed to minimize adverse impacts to the wetland as well as restoration activities following excavation and treatment.
- Posting of hazard signs in the field area behind the Garage.
- Sampling of potential soil source areas in the Woodland Village Condominium Complex (leachfields, soil pile and swale) to determine the need for remediation.
- Returning treated soils to the excavation locations followed by regrading and revegetating.

On-site soil treatment will proceed to a level that will be determined by process optimization studies. The extent of treatment (treatment level) will be based on technical feasibility, reliability, and cost-effectiveness. The level will be determined consistent with RCRA delisting procedures and remedial objectives. At a minimum, soil will be treated to 1 ppm of total volatile organics.

B. Management of Migration

The management of migration component of the Record of Decision signed for the Site in September 1986 addressed remediation of contaminated groundwater. The Record of

Decision specified removal of contaminated groundwater from the shallow aquifer underlying the garage area soils and the bedrock aquifer underlying the condominium complex, and off-site treatment at the Town of Derry POTW, which may be preceded by on-site pretreatment with monitoring.

Groundwater treatment is to proceed until treatment goals are met or for a two year period from the date pumping of shallow and deep groundwater begins. At the end of the two-year period, an evaluation will be made by EPA to assess progress in meeting objectives for the cleanup of groundwater at the Site. If steady state conditions have been reached, and it is evident remedial objectives are not achievable, EPA will re-evaluate the objectives and its approach to groundwater remediation. Groundwater remediation will cease upon achieving 5 ug/L (ppb) of tetrachloroethylene and trichloroethylene, respectively, in every well on-site and in the collection trench for shallow groundwater collection behind the garage. Upon achieving these goals a final determination will be made to determine if water quality is protective of public health and the environment.

Wetlands will be monitored to ensure no detrimental effects occur as a consequence of groundwater extraction.

IV. PRE-DESIGN STUDY SUMMARY

A. Pre-Design Study Purpose

The Pre-Design Study was conducted by a group of potentially responsible parties with EPA oversight to determine more definitively the extent of soil and groundwater contamination associated with the Site and to evaluate soil treatment technologies. Specifically, the following issues were addressed:

1. Delineation of the volume and characteristics of soil that requires remediation;

2. Collection of analytical data concerning the chemical and hydrogeological characteristics of the leachfields;

3. Bench-scale and pilot-scale tests of soil remediation technologies;

4. Characterization and evaluation of treatment requirements of groundwater to be remediated; and

5. Verification of groundwater pumping effects on local aquifers.

B. Extent of Soil and Groundwater Contamination

The study concluded that approximately 9,000 cubic yards of soil would require remediation: 6,500 cubic yards of garage area soils; 2,000 cubic yards of leachfield overburden soils associated with two condominium leachfield systems; and 500 cubic yards making up the soil pile behind the condominium complex.

Pumping of the condominium complex supply wells verified that a connection exists between the garage area intermediate/deep bedrock aquifer and the pumping wells due to a major fracture set in the bedrock. This fracture set hydraulically connects the garage source area to the condominium supply wells. Wells located perpendicular to the fracture set such as those along Ross Drive showed little or no hydraulic connection to the contaminated deep aquifer. At this time, the residential wells along Ross Drive appear to be at low risk to contamination from the garage area.

C. Soil Treatment Technology Evaluation

Four soil treatment technologies were evaluated. A field pilot study of vacuum extraction was conducted in the soils behind the garage. In addition, laboratory studies of soil washing (water extraction) and biological treatment (composting as identified in the 1986 ROD is considered analogous to biological treatment) were conducted with site soils. Data from these studies along with existing data from thermal aeration studies were used to evaluate the technologies which were contemplated in the 1986 ROD as well as vacuum extraction. Vacuum extraction was not selected in the original ROD.

Current data indicates that thermal aeration is capable of treating soils to 1 mg/kg (ppm), which is the minimum treatment level specified in the 1986 ROD. The bench and pilot scale studies indicated that vacuum extraction and biological treatment can treat contaminated soil to 1 ppm total volatiles within a two year time frame. Laboratory studies of water extraction indicated that this approach was less feasible than other approaches considered due primarily to the large quantities of water that would be required to reach treatment goals and the process complexities resulting from the excessive quantities of water which would be required.

V. EVALUATION OF SOIL TREATMENT TECHNOLOGIES

A. Statutory Requirements

Prior to the passage of the Superfund Amendments and Reauthorization Act of 1986 (SARA), Pub. L. No. 99-499, 100 Stat. 1613 (October 17, 1986), actions taken in response to releases of hazardous substances were conducted in accordance with CERCLA as enacted in 1980 and the revised National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, dated November 20, 1985. The September 30, 1986 Record of Decision for the Tinkham's Garage Site was selected in accordance therewith.

Pursuant to an Administrative Order entered into by EPA and a group of PRPs, a Pre-Design Study of the Site was conducted. The study included, among other design and field analyses, an evaluation of the source control remedial technologies identified in the 1986 ROD. In addition, the PRPs conducted, on their own initiative, a field pilot test of vacuum extraction to remediate site soils.

Section 117(c)(3) of CERCLA requires that after adoption of a final remedial action plan, if any settlement or consent decree is entered into, and if such action, settlement, or decree differs in any significant respect from the final plan, an explanation of the significant differences and the reasons such changes were made must be published for public review. Section 121(b) of SARA requires that any ROD that is reopened to modify or supplement the selection of the remedy subsequent to the enactment of SARA, shall be subject to the requirements of SARA. Because EPA is reopening the ROD to modify or supplement the selection of the source control treatment technology at the Site, its selection must be in accordance with Section 121. Until the NCP is revised to reflect SARA, the procedures and standards for responding to releases of hazardous substances, pollutants and contaminants shall be in accordance with Section 121 of CERCLA and to the maximum extent practicable, the current NCP.

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with applicable and relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery

technologies to the maximum extent practicable; and a statutory preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances over remedies that do not achieve such results through treatment.

B. Response Objectives/Technology and Alternative Development and Screening

The purpose of the technology evaluation conducted as part of the Pre-Design study was to identify the most cost-effective remedial action that will effectively mitigate and minimize environmental threats and provide protection of public health and the environment consistent with the environmental standards set forth in the 1986 ROD and Section 121 of CERCLA. Section 121(b)(1) of CERCLA presents several factors that at a minimum EPA is required to consider in its assessment of alternatives. In addition to these factors and the other statutory directives of Section 121, the evaluation and selection process was guided by the EPA document "Additional Interim Guidance for FY '87 Records of Decision" dated July 24, 1987. This document provides direction on the consideration of SARA cleanup standards and sets forth nine factors that EPA should consider in its evaluation and selection of remedial actions. The nine factors are:

1. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs).
2. Long-term Effectiveness and Permanence.
3. Reduction of Toxicity, Mobility or Volume.
4. Short-term Effectiveness.
5. Implementability.
6. Community Acceptance.
7. State Acceptance.
8. Cost.
9. Overall Protection of Human Health and the Environment.

C. Analysis of Technologies

1. Vacuum Extraction

The vacuum extraction process is an in situ treatment process which uses enhanced vacuum driven volatilization to remove volatile organic compounds from unsaturated soil. The process utilizes dual vacuum extraction wells equipped to simultaneously pump groundwater, thus lowering the groundwater table and inducing a vacuum on the resultant unsaturated soils. Subsurface vacuum propagates laterally, causing in situ volatilization of compounds absorbed to the soil particles. The volatilized compounds follow the air flow through the soils to the extraction wells, then subsequently to a vapor phase activated carbon absorber for volatile constituent capture.

a. Compliance with ARARs. This technology will attain all applicable relevant and appropriate regulations and standards. See Appendix C for a list of state and federal ARARS.

b. Reduction of Toxicity, Mobility or Volume. Vacuum extraction satisfies CERCLA's preference for treatment as a principal element. Use of this technology will significantly and permanently reduce the volume and toxicity of contaminated soil by lowering the volatile contaminant concentration throughout the Site to the treatment level of 1 ppm or less. This level, for the constituents encountered on this Site, is protective of human health and the environment as stated in the September 30, 1986 ROD and its attainment will minimize the potential for further releases to groundwater. Residuals that are left in the soil at this low concentration will continue to biodegrade and/or volatilize over time. The mobility of the contaminants found at the Site will be significantly and permanently reduced by their capture on the activated carbon associated with the vacuum extraction process.

c. Short-Term Effectiveness. The rate of contaminant removal from the soil is concentration dependent. Therefore, the bulk of the contaminants will be removed most quickly in the beginning when the concentration is highest, and the concentration gradient is greatest. The effect of this is to significantly reduce the risk associated with the soils in a very short period of time. The vacuum extraction technology has the added benefit of also remediating groundwater at the source through the dual operational mode of the extraction wells, which extract both organic vapors and contaminated groundwater.

The risk due to implementation of this remedy is considered low. It will not require excavation or any other major disturbance of the soils which could cause a potentially significant release of volatile compounds into the air in the garage area. Because excavation is not required in the area behind the garage, the short term impact on wetlands will be less for this technology than the others considered. Excavation may be necessary at the leachfields and soil pile. However, this approach would be required by the other source control technologies as well. Once the remedy is operational, volatile compounds will be captured on activated carbon. The exhaust air will be monitored to detect carbon breakthrough, and back-up carbon units will be employed for added reliability and protection.

Because the system operates on negative pressure, any leaks in the system will have the effect of bringing ambient air into the system, rather than releasing volatile constituents.

d. Long-Term Effectiveness and Permanence. Remediation of the soils is expected to be achieved within two years. Because the volatile constituents will actually be removed from the soils, the remediation is permanent.

The Tinkham's Garage Site soils consist of a shallow, low permeability clay layer, 2 feet in depth which is underlain by a medium grained sand 9 to 13 feet in thickness. The clay layer is the more highly contaminated of the geologic strata. Due to the lower permeability and the possible channelling of recharge air through preferential pathways, it is uncertain how long it will take to remediate the clay layer using this technology. An appropriate sampling program, including sampling of the clay layer, to confirm the efficacy of the vacuum extraction approach should minimize the potential for unremediated hot spots. Continued operation of the vacuum extraction unit beyond two years, or application of another remedial technology will ensure that the treatment goals are met for both soil types.

e. Implementability. In recent years, numerous pilot and full-scale vacuum extraction systems have been constructed at sites where soil types have ranged from fine sand to sandy loam to clayey silt and silty clay soils. The depth to groundwater has also varied. Contaminants such as chlorinated solvents, alcohols, ketones and petroleum products have been successfully recovered. The pilot test conducted on the Tinkham's

Garage Site during the Pre-Design Study demonstrated the ability of this technology to be installed and operated at this Site and to extract significant quantities of volatile organic compounds from the soils.

The equipment associated with this technology, PVC pipe, vacuum pumps, vapor phase activated carbon, manometers, well screens, groundwater pumps and other hardware are readily available. Well drillers, engineering services and specialty contractors should also be readily available. An off-site commercial facility will be required for the regeneration or disposal of the spent activated carbon. Because these facilities are numerous and available, their short-term availability will have little or no impact on the execution of remedial activities at the Site.

The installation and operation of a vacuum extraction system will not limit additional remediation at the Site. If a subsequent technology is needed to address hot spots, or as a polishing step, the vacuum manifold, vacuum pumps and carbon system could be removed relatively easily.

f. Cost. Capital and O & M costs for this alternative are summarized in Table 3-6 of the Pre-Design Study Report. The unit cost for this technology is approximately $130 per cubic yard exclusive of permitting and oversight costs. Because the cost of treatment of contaminated soil by this technique is areally and time dependent, changes in the volume of soil to be treated may or may not affect the unit cost of this technology depending on whether the increased volume of contamination is with depth or area. In addition, this technology utilizes a dual extraction system which will address the most contaminated shallow groundwater. Directly addressing shallow groundwater contamination with the dual extraction system should result in a reduced bedrock pumping regimen, resulting in cost savings for the management of migration alternative.

g. Protection of Human Health and the Environment. A 1 ppm total mass volatiles cleanup standard for site soils was developed in the September 30, 1986 ROD. This cleanup level was selected because it resulted in significant reduction in the mass of contaminants in the source area behind the garage, was protective of public health for direct contact exposures, and would help accelerate cleanup of the contaminated bedrock aquifer.

Vacuum extraction has been demonstrated as an innovative technology and is capable of achieving the treatment level of 1 ppm or less. Further, because the contaminated groundwater under the garage area soils will be remediated simultaneously, overall groundwater remediation will be expedited. In addition, the vacuum extraction process has inherent design characteristics that minimize the potential for inadvertent release of hazardous substances to the environment during the treatment process. Any leaks that might develop would draw clean air into the system rather than letting contaminated air out due to the vacuum which drives the system.

h. Community Acceptance. The public was given a 30-day period to comment on the proposal to amend the Record of Decision. No comments from the community were received during the comment period.

i. State Acceptance. The State of New Hampshire concurs with EPA that vacuum extraction should be implemented to treat soils at the Site.

2. Thermal Aeration

Low temperature thermal aeration is an on-site process in which excavated soils are passed through a materials dryer where volatile contaminants are transferred to the gas phase. The process gases are then passed through appropriate abatement equipment to capture the volatile contaminants and particulates.

a. Compliance with ARARs. This technology will attain all ARARs.

b. Reduction of Toxicity, Mobility or Volume. Thermal aeration satisfies CERCLA's preference for treatment as a principal element by stripping off volatile organic compounds down to the treatment level of 1 ppm or less. Exhaust gases laden with VOCs and particulates are passed through appropriate abatement equipment to prevent the release of contaminants to the atmosphere.

The mobility and toxicity of the volatile contaminants captured by the activated carbon abatement equipment will be further reduced or eliminated after their disposal or treatment. The captured particulates are recycled through the aeration equipment until the action level is attained.

Treated soils will be used as backfill on-site. Residuals that are left in the soil at low concentrations will continue to biodegrade and/or volatilize over time.

c. Short-Term Effectiveness. Implementation of this remedial technology will require excavation and transport of site soils. Although precautions will be taken to minimize the disruption of the soil, particularly in the garage area, volatiles and particulate will be released. The excavation of wetlands soils may also have a short-term detrimental effect on the wetlands. This effect will be minimized by the wetlands' fairly rapid recovery following backfilling with treated soils.

The excavated contaminated soils will be passed through the aeration unit until the remediation goal of 1 ppm is attained. Thus discrete volumes of soils will be remediated in a relatively short period of time. The risk posed by site soils will decrease in proportion to the volume of soil left to be remediated.

Upon start-up and operation, the process will be adequately monitored to prevent fugitive emissions or ignition of the soils. As previously mentioned, appropriate abatement equipment will be in place to prevent the release of volatile organic contaminants or particulates.

Treated soils will be sampled and screened to validate the attainment of the remedial goal. Soils will be recycled as necessary, and operation parameters adjusted accordingly to ensure the proper level of treatment.

d. Long-Term Effectiveness and Permanence. The remediation of the soils is expected to be achieved within a two-year period. Because the volatile constituents will actually be removed from the soils, the remediation is permanent.

e. Implementability. Several aeration units have been constructed and operated in recent years, both in the pilot and full scale modes. The process has been proven for the removal of volatile organic compounds for soils, and can be expected to attain the treatment level of 1 ppm or less total VOCs at this Site.

The major implementation concern with this alternative is tailoring the process operation to the Site. Thermal aeration is the most complex technology considered, as it involves multiple mechanical systems,

each of which will require precise control to ensure proper operation. Feed requirements of the heating unit, soil moisture content, and maximum particle size must be taken into consideration.

Use of this technology requires specialized equipment as well as skilled personnel. The equipment and appurtenances are mobile in the sense that they are truck-mounted and can be easily brought to the Site. While the number of contractors experienced in this technology is limited, availability does not appear to be a problem at this time.

f. Cost. Capital and O & M costs for this alternative are summarized in Table 3-6 of the Pre-Design Study Report. The unit cost for this technology was reported to be between $248-$288 per cubic yard, with a total cost for soil remediation at this Site of $2,233,000-$2,593,000 for 9,000 cubic yards of soil, exclusive of any permitting requirements and oversight costs. More recent estimates suggest that low temperature aeration of soils may be as low as $160 per cubic yard of soil.

g. Protection of Public Health and the Environment.

It has been demonstrated at other Superfund sites that thermal aeration is capable of attaining the soil treatment level of 1 mg/kg or less. Some air releases of volatile compounds may occur during excavation; however, this occurrence can be minimized through proper engineering controls.

h. Community Acceptance. The public was given an opportunity to express its assessment of this technology during the public comment period for the proposal to amend the ROD. No comments were received from the community during the comment period.

i. State Acceptance. The State of New Hampshire recognizes thermal aeration as a proven technology for the treatment of volatile contaminated soils.

3. Biological Treatment

Biological treatment is an in situ treatment process that utilizes indigenous aerobic microorganisms to degrade the organic contaminants of concern in the soil. By providing an optimal environment for indigenous microorganisms, their growth and chemical degrading activity can be enhanced. Volatilization of

the contaminants is another process that occurs concurrently with the biological treatment and acts to reduce contaminant levels in soils treated by this process.

a. Compliance with ARARs. This technology will attain all ARARs.

b. Reduction of Toxicity, Mobility or Volume. Biological treatment satisfies CERCLA's preference for treatment as a principal element. Use of this technology will significantly and permanently reduce the volume and toxicity of contaminated soil by lowering the volatile contaminant concentration throughout the Site to the treatment level of 1 ppm or less. The contaminant removal mechanism for this technology includes both a biodegradation and a volatilization component. Although the more highly chlorinated organics are the most resistant to biodegradation, thus favoring persistence of compounds such as PCE and TCE in the soil, these compounds will be volatilized and removed through aeration. The contaminants that are biologically degraded are metabolized to carbon dioxide, water and cell biomass, thus permanently reducing their mobility, toxicity and volume. The portion of the contaminants that are volatilized are released either to the ambient air or captured and treated. Based on current information there is no evidence that indicates that "hazardous" end products will be formed as a result of biodegradation. Residuals left in the soil, including volatile compounds at low concentrations and cell biomass, will continue to biodegrade and/or volatilize over time.

c. Short-Term Effectiveness. The rate of contaminant biological degradation from the soil is concentration dependent. Therefore, the bulk of the contaminants will be removed most quickly in the beginning when the concentration is highest, and the concentration gradient is greatest. The effect of this is to greatly reduce the risk associated with the soils in a very short period of time.

The risk due to implementation of this remedy is considered low. It will require controlled tilling, followed by excavation of the remediated soils for stockpiling and finally, replacement of the soils. Air modeling indicates that volatile emissions will not exceed applicable air quality standards.

Each lift of tilled soil will be sampled in accordance with an approved sampling plan to verify that the soils

have been sufficiently treated. When the remedial goal is attained, the treated lift of soil will be removed and stockpiled and treatment of the underlying lift will commence. It is anticipated that two lifts will be required.

d. Long-Term Effectiveness and Permanence. The remediation of the soils is expected to be achieved within two years. Because the volatile constituents will actually be removed from the soils, the remediation is permanent.

e. Implementability. Both pilot and full-scale biological treatment systems have been successfully demonstrated in recent years for a variety of soil types and chemical constituents. The laboratory scale evaluation conducted during the Pre-Design Study demonstrated the ability of this technology to remove significant quantities of volatile compounds from the site soils. The equipment associated with this technology, agricultural vehicles, temporary structures, pumps, piping and vapor phase carbon are readily available. Engineering and specialty remediation contractor services are also readily available.

f. Cost. Capital and O&M costs for this alternative are summarized in Table 3-6 of the Pre-Design Study Report. The unit cost for this technology is $133 per cubic yard, with a total cost for soil remediation at this Site of $1,199,000 for 9,000 cubic yards of soil, exclusive of any permitting requirements and oversight costs.

g. Protection of Public Health and the Environment. It was demonstrated in the laboratory scale biotreatment evaluation, performed as part of the Pre-Design Study, that biological treatment is capable of attaining the soil treatment level of 1 mg/kg or less. Further, the removal mechanisms (biodegradation and volatilization) will ensure that no reaction products of concern remain in the soils. Some releases of volatile compounds are expected to occur during excavation of the soil lifts to address deeper soils; however, these potential releases can be minimized through appropriate engineering controls.

h. Community Acceptance. The public was given an opportunity to express its assessment of this technology during the public comment period for the Proposal to Amend the ROD. No comments were received from the community during the comment period.

i. State Acceptance. The State of New Hampshire recognizes biological treatment as an effective technology for the treatment of volatile organic contaminated soils.

4. Water Extraction

The water extraction process consists of contacting the contaminated soils with water. Through mass transfer, the contaminants are transferred to the water phase where they are treated.

a. Compliance with ARARs. This technology will attain all ARARs.

b. Reduction of Toxicity, Mobility, or Volume. Soil washing satisfies CERCLA's preference for treatment as a principal element. Reduction of site contaminants in soil to 1 mg/kg or less is theoretically achievable although it has not been demonstrated. The bench scale study indicated that high water to soil ratios would be required to achieve the soil treatment level of 1 mg/kg or less, thereby significantly increasing volume. The contaminants that are removed are transferred to the water phase where they are removed, destructed, or degraded with a subsequent technology.

Assuming the specified treatment level is met, treated soils will be used as backfill on-site. Residuals that are left in the soil at low concentrations will continue to biodegrade and/or volatilize over time.

c. Short-Term Effectiveness. Implementation of this remedial technology will require excavation and transport of site soils. Although precautions will be taken to minimize the disruption of the soil, volatiles and particulate will be released.

d. Long-Term Effectiveness and Permanence. Theoretically the concentration of volatile contaminants could be reduced to below 1 ppm total volatile organics in the soil; however, this was not demonstrated by the bench scale tests conducted as part of the Pre-Design Study, which used water-to-soil ratios as high as 20:1 and resulted in total VOC levels in the soil greater than 1 ppm.

Treated soils will be sampled and screened to validate the attainment of the target treatment level. Soils above the target treatment level will require further treatment. There is no experiential information on

which to base estimates of time to cleanup. However, it is likely that the cleanup could occur within a two year period. Remediation of the soils is expected to be achieved within a time frame consistent with implementation of the management of migration component of the remedy. Soils will be permanently treated to levels below the cleanup goal. Thus, the soil washing approach is considered permanent.

e. Implementability. Water extraction has only been used as a remedial technology in a limited number of cases. Its capability to remove volatile organic compounds from soils down to a treatment level of 1 ppm has not been demonstrated. The bench test conducted during the Pre-Design Study indicated that a water-to-soil ratio of 20:1 or greater would be required for the site soils. This translates to greater than 7,000 gallons per cubic yard of contaminated soil. The disposition or treatment of this volume of water is a serious drawback of this technology. Equipment associated with this technology, such as tanks, pumps, and dewatering equipment are commonly used in industry, and thus, should be available.

f. Cost. The water extraction process developed in the Feasibility Study (FS) used water-to-soil mass ratios ranging from 3:1 to 6:1, with the water phase containing 20 percent methanol. A present worth unit cost of $340 per cubic yard was reported. The FS present worth estimate is low for this technology because it was based on the assumption that methanol, which increases the extraction efficiency of the wash, would be used. However, because of methanol's toxic properties, it is not likely that it will be used. In addition, the FS estimate is low because the estimate assumed lower water-to-soil mass ratios than indicated by the bench scale study.

g. Protection of Public Health and the Environment. It is theorized, but has not been demonstrated, that water extraction is capable of attaining the soil treatment level of 1 mg/kg or less total VOC. The soil washing technology will be protective if it attains the treatment goal. Some release of volatile organics is likely during excavation of site soils. The release of volatiles during excavation can be minimized through application of appropriate engineering controls.

h. Community Acceptance. The public has been given an opportunity to express its assessment of this technology during the public comment period for the Proposal to Amend the ROD. No comments were received from the community during the Public Comment period.

i. State Acceptance. The State of New Hampshire feels that this technology is less implementable than the other technologies under consideration.

D. Rationale for Selection of Vacuum Extraction

The vacuum extraction approach has been selected to remediate site soils at the Tinkham's Garage Site. Although not one of the three technologies specified in the Record of Decision for the Site, the viability of vacuum extraction has been demonstrated through the work undertaken during the Pre-Design Study. In particular, the pilot study conducted on site soils and summarized in the Pre-Design Study Report indicates that the vacuum extraction technology will achieve the target treatment level specified for the Site. Implementation of this technology will result in environmental conditions which are protective of public health and the environment.

Vacuum extraction will comply with applicable or relevant and appropriate requirements identified for the remedial action. Vacuum extraction is an in situ treatment process that will permanently reduce the toxicity, volume and migration potential of source areas identified in the RI/FS and refined in the Pre-Design Study.

The processes associated with biological treatment, thermal aeration, and soil washing are likely to be more complex to implement than vacuum extraction, owing to the additional operational parameters such as soil chemistry and nutritional optimization (biological treatment), mechanical, control and feed requirements (thermal aeration), and water quantity and batch dewatering requirements (soil washing). Because of the relative simplicity of the vacuum extraction process it will be easier to implement than the other technologies. The short-term effectiveness and implementability of vacuum extraction is also unique among the technologies under consideration in that implementation does not require excavation of contaminated soils behind the garage thus eliminating the potential for air releases of contaminants during excavation. In addition, EPA believes that vacuum extraction will provide increased dewatering of site soils as compared to the other technologies under consideration at the Site, thus increasing the quantity of soil that can be remediated and causing the most contaminated groundwater to be extracted. EPA also believes that treatment of contaminated soils in situ will minimize cost.

Although in situ processes, such as vacuum extraction, may be less likely than a process that employs excavation followed by batch treatment, such as thermal aeration, to uniformly treat all contaminated areas, appropriate sampling and verification processes can minimize the potential for unremediated hot spots left by the vacuum extraction approach. Continued operation of the in situ process or application of an alternative treatment technology will ensure appropriate remediation of any hot spots to levels identified in the ROD, ensuring the long-term effectiveness and permanence of the remedy.

VI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Tinkham's Garage Site is consistent with CERCLA and, to the extent practicable, the NCP. The selected remedy is protective of public health and the environment, attains ARARs and is cost-effective. Further, the selected remedy satisfies the statutory preference for a permanent solution and for treatment which reduces the mobility, toxicity or volume of hazardous substances as a principal element. Finally, the selected remedy utilizes treatment technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment

The selected remedy will achieve the treatment level of 1 mg/kg or less total mass volatiles concentration in site soils. Residuals that are left in the soil at this low concentration will continue to biodegrade and or volatilize over time. In the event that the vacuum extraction process is not able to reduce total mass volatiles to less than 1 ppm total VOCs, the selected remedy requires the implementation of contingency measures such as the implementation of a thermal aeration finishing process.

Because groundwater under the garage area soils will be remediated during the vacuum extraction process, groundwater remediation at the Site will be expedited. The vacuum extraction process is expected to preferentially strip PCE, thus accelerating groundwater remediation at the Site. Finally, the vacuum extraction process has inherent design characteristics that will minimize the potential for inadvertent release of hazardous substances to the environment during its operation, thus providing an effective and protective remedy in the short term. In sum, EPA has determined that the selected remedy at this Site is protective of human health and the environment.

B. The Selected Remedy Attains ARARs

The selected remedy will attain all applicable or relevant and appropriate federal and state environmental requirements at the Site. Federal and State of New Hampshire environmental laws which are applicable or relevant and appropriate to the selected source control action at the Site are presented in Appendix C.

C. The Selected Remedial Action is Cost Effective

Once EPA identifies alternatives that are protective of public health and the environment and attain ARARs (unless a waiver is invoked), EPA evaluates each of those alternatives to determine their cost-effectiveness. Capital and Operation and Maintenance costs were estimated for each alternative. On the basis of the cost information compiled by EPA and the potentially responsible parties, and EPA's evaluation of the alternatives as described above, EPA has determined that the selected remedy is cost-effective. The unit treatment cost for Vacuum Extraction is as low or lower than other technologies evaluated, and the process has inherent efficiencies relative to groundwater remediation due to the dual extraction process which also pumps shallow contaminated groundwater.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

Vacuum extraction is an in situ treatment process that uses enhanced vacuum driven volatilization to remove volatile organic compounds from unsaturated soils. Remediation of site soils is expected to be achieved in two years. Because the vacuum extraction process will remove volatile constituents from site soils the remedy will be permanent. In light of these considerations, EPA has determined that the selected remedy utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.

E. The Selected Remedy Satisfies the Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment as a principal element. Use of vacuum extraction at the Site will significantly and permanently reduce the volume and toxicity of contaminated soil by lowering the total mass volatile level throughout the Site to 1 mg/kg or less.

VII. Community Relations

Prior to commencement of the Pre-Design Study, a fact sheet describing the study activities was sent to area residents in September 1987. Upon release of the Pre-Design Study Report, an informational meeting was held August 4, 1988, to describe the results and findings of the study.

The proposal to amend the Record of Decision was issued for public comment from August 5, 1988, to September 9, 1988, during which the public was asked to comment on the proposal. A public hearing was held on September 8, 1988, in Londonderry, New Hampshire to formally accept oral comment from the public on the proposal. A summary of comments on the proposal and EPA responses to the comments are provided in the Responsiveness Summary (Appendix B).

VIII. STATE ROLE

The State of New Hampshire has reviewed the various alternatives and has indicated its support for the selected remedy. The State of New Hampshire has also reviewed the Pre-Design Study Report to determine if the selected remedy is in compliance with applicable or relevant and appropriate State environmental laws and regulations. On the basis of these analyses, the State of New Hampshire concurs with the selected remedy for the Tinkham's Garage Site. A copy of the declaration of concurrence is attached as Appendix D.

APPPENDIX A Administrative Record Index

ADMINISTRATIVE RECORD INDEX

for the

CANNONS LONDONDERRY (TINKHAM'S) Site

This Administrative Record supports the remedial actions determined by the Record of Decision (ROD) dated September 30, 1986, and the Amended Record of Decision, dated March 10, 1989.

1.0 PRE-REMEDIAL

1.2 Preliminary Assessment

1. Potential Hazardous Waste Site Identification and Preliminary Assessment Form, EPA Region I (May 12, 1982).

1.7 Correspondence Related to Proposal of a Site to the NPL

1. Letter from Donald W. Stever, Jr., Day, Berry & Howard (Attorney for Fred Tinkham and Tinkham Investments) to Russel H. Wyer, EPA Region I (February 25, 1983). CLD-001-1457-1461

1.18 FIT Technical Direction Documents (TDDs) and Associated Records

1. Field Investigation Report, Rebecca Cleaver, NUS Corporation to EPA Region I (January 13, 1984). CLD-001-2160-2404

2. Field Investigation Report Volume I: Report, Rebecca Cleaver, NUS Corporation to EPA Region I (March 7, 1984). CLD-001-1940-2028

3. Field Investigation Report Volume II: Appendices, Rebecca Cleaver, NUS Corporation to EPA Region I (March 7, 1984). CLD-001-2029-2159

3.0 REMEDIAL INVESTIGATION (RI)

3.1 Correspondence

1. Memo regarding March 21, 1980 inspection of the site stating oil contaminated debris and soil is still present, William E. Evans, New Hampshire Water Supply and Pollution Control Commission, to Lynn A. Woodard, State of New Hampshire (March 27, 1980). CLD-001-1323

2. Memo stating results of surface and groundwater samples in the vicinity of the Tinkham's Garage Site in Londonderry, Dave Cook, Ecology & Environment to John F. Zipeto, EPA Region I (October 11, 1982). CLD-001-0588

3. Memo providing comment on soil and groundwater contamination, Georgi A. Jones, U.S. Department of Health & Human Services to John E. Figler, EPA Region I (August 23, 1985). CLD-001-0233

3.2 Sampling and Analysis Data

The Sampling and Analysis Data for the Remedial Investigation (RI) may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.

3.4 Interim Deliverables

1. Alternate Water Supply Evaluation for the Tinkham Site Vicinity, Patrick C. Falvey, NUS Corporation (March 1, 1983). CLD-001-0188-0213

2. Remedial Action Master Plan, John A. George, NUS Corporation (September 1983). CLD-001-0001-0112

3.6 Remedial Investigation (RI) Reports

1. Remedial Investigation Report Volume I: Report, Barbara Buckley, NUS Corporation (January 15, 1986). CLD-001-1468-1601

2. Remedial Investigation Report Volume II: Appendices, Barbara Buckley, NUS Corporation (January 15, 1986). CLD-001-1602-1939

3.9 Health Assessments

1. Health Assessment for the Tinkham's Garage Site, Londonderry, New Hampshire, SI-86-164 (September 8, 1986).

3.10 Endangerment Assessments

1. Tinkham's Garage Site Endangerment Assessment Report, Kathryn A. Rosica, NUS Corporation (May 7, 1986). CLD-001-0250-0413

4.0 <u>FEASIBILITY STUDY (FS)</u>

4.6 Feasibility Study (FS) Reports -- 1986 Record of Decision

1. Tinkham's Garage Site Draft Feasibility Study, Camp Dresser & McKee (June 16, 1986). CLD-001-0663-0934

2. Tinkham's Garage Site Draft Feasibility Study Appendix, Camp Dresser & McKee (June 16, 1986). CLD-001-0935-1322

4.6 Feasibility Study (FS) Reports -- 1989 Amended Record of Decision

3. Tinkham's Garage Site Pre-Design Study, Cannons Steering Committee, Malcolm Pirnie, Inc. (July 1, 1988). CLD-002-0075-0193

4. Tinkham's Garage Site Pre-Design Study, Appendices: Volume I (April 1988) and Volume II (July 1988), Malcolm Pirnie, Inc. (July 1, 1988). CLD-002-0194

4.9 Proposed Plans for Amended Remedial Action

1. Londonderry Site Proposal to Amend the Record of Decision, EPA Region I (July 1, 1988). CLD-002-0001-0035

5.0 <u>RECORD OF DECISION (ROD) -- 1986</u>

5.3 Responsiveness Summary for the 1986 ROD

1. Cross Reference: Responsiveness Summary is found in the Record of Decision [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

Comments

2. Draft Feasibility Study Review and Comment, Malcolm Pirnie, Inc. to Four Sites Steering Committee (September 1986). CLD-001-0415-0471

3. Letter forwarding report concerning the Draft Feasibility Study for Tinkham's Garage Site and requesting copies of test results of current sampling, Margaret R. Tribble, Four Sites Steering Committee to David P. Frasca, EPA Region I (September 26, 1986). CLD-001-0414

5.4 Record of Decision (ROD)

1. Record of Decision, Michael R. Deland, EPA Region I (September 30, 1986). CLD-001-0472-0587

5.0 AMENDED RECORD OF DECISION (ROD) -- 1989

5.1 Correspondence

1. Letter providing update of remediation costs contained in the Pre-Design Study Report, Diane M. Leber, Ciba-Geigy Corporation to Gregory A. Roscoe, EPA Region I (October 24, 1988). CLD-002-0205

2. Cross Reference: Letter from John A. Minichiello, New Hampshire Department of Environmental Services expressing agreement with the Amended Record of Decision is Appendix D of the Amended Record of Decision [Filed and cited as entry number 1 in 5.4 Amended Record of Decision (ROD)].

5.2 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Cross Reference: Applicable or Relevant and Appropriate State Requirements is Appendix C of the Amended Record of Decision [Filed and cited as entry number 1 in 5.4 Amended Record of Decision (ROD)].

2. Cross Reference: Applicable or Relevant and Appropriate Federal Requirements is Appendix C of the Amended Record of Decision [Filed and cited as entry number 1 in 5.4 Amended Record of Decision (ROD)].

5.3 Responsiveness Summary for the Amended ROD

1. Cross Reference: Tinkham's Garage Site Amended ROD Responsiveness Summary is Appendix B of the Record of Decision [Filed and cited as entry number 1 in 5.4 Amended Record of Decision (ROD)].

Comments

2. Letter on behalf of the Cannons Sites Group forwarding attached comments regarding the proposed Amendment to the Record of Decision, Laurie Burt, Foley, Hoag & Eliot to Gregory A. Roscoe, EPA Region I (September 9, 1988). CLD-002-0199-0203

3. Letter on behalf of the Cannons Sites Group amending opinion expressed in September 9, 1988 comments regarding Proposed ROD Amendment, Laurie Burt, Foley, Hoag & Eliot to Gregory A. Roscoe, EPA Region I (September 29, 1988). CLD-002-0204

5.4 Amended Record of Decision (ROD)

1. Amended Record of Decision for the Tinkham's Garage Site, March 10, 1989.

9.0 STATE COORDINATION

9.1 Correspondence

1. Letter stating position of the NHWSPCC and the Town of Derry with respect to the water mains to be constructed in connection with the Londonderry waste problem, William A. Healy, New Hampshire Water Supply and Pollution Control Commission to Merrill S. Hohman, EPA Region I (June 20, 1983). CLD-001-0611

10.0 ENFORCEMENT

10.7 EPA Administrative Orders

1. Order #2303 ordering action to prevent further pollution of public surface and groundwaters from site, William A. Healy, State of New Hampshire to John Tinkham, Tinkham Enterprises (May 31, 1978). CLD-001-0215

2. Administrative Order by Consent, Michael R. Deland, EPA Region I to Potentially Responsible Party (PRP) (September 11, 1987). CLD-002-0036-0074

10.8 EPA Consent Decrees

1. Consent Decree, United States v. Cannons Engineering Corporation, Docket Number 88-1786-WF; Massachusetts v. Cannons Engineering Corporation, Docket Number 88-1787-WF; New Hampshire v. Cannons Engineering Corporation, Docket Number 88-1788-WF (D. Mass) (August 3, 1988) (Partial Consent Decree).

11.0 POTENTIALLY RESPONSIBLE PARTY (PRP)

11.7 PRP Steering Committee Documents

1. Letter and attached PRP proposal for source remediation by in situ vacuum extraction at the site, Laurie Burt, Foley, Hoag & Eliot to Jeremy Firestone, EPA Region I (May 27, 1988). CLD-001-0642-0662

13.0 COMMUNITY RELATIONS

13.1 Correspondence

1. Letter responding to August 1, 1986 letter confirming Town of Derry's support for use of the publicly owned treatment works in the cleanup effort, Rodney A. Bartlett, Town of Derry, New Hampshire to David P. Frasca, EPA Region I (September 8, 1986). CLD-001-1466-1467

2. Memo regarding July 12, 1988 meeting with Derry Town Council concerning the intended use of the publicly owned treatment works to treat groundwater at the site, Gregory A. Roscoe, EPA Region I to file, EPA Region I (July 15, 1988). CLD-001-1465

13.3 News Clippings/Press Releases

1. Press Release regarding investigation of possible groundwater contamination from site and precautions being taken to insure protection of public health, Michael P. Donahue, New Hampshire Water Supply and Pollution Control Commission (October 29, 1982). CLD-001-0589

2. Newspaper article titled "EPA Hosts Session at Londonderry on Contamination," Manchester Union Leader, Manchester, New Hampshire (March 29, 1983). CLD-001-0228-0229

3. Newspaper article titled "Water for Londonderry Subject of PUC Hearing," David Raposa, Derry News, Derry, New Hampshire (July 28, 1983). CLD-001-0226-0227

4. Newspaper article titled "PUC Sets Second Public Hearing on Water Franchise," Derry News, Derry, New Hampshire (August 18, 1983). CLD-001-0232

5. EPA Environmental News Release announcing November 16, 1983 public meeting involving presentation of plans for cleanup study at site, Debra Prybyla, EPA Region I (October 20, 1983). CLD-001-0222

6. Newspaper article titled "EPA Hearing on Waste Site Open to Public," John M. Peter, Derry News, Derry, New Hampshire (November 10, 1983). CLD-001-0225

7. Newspaper article titled "Contamination Site on R102 to be Discussed at Hearing," Derry News, Derry, New Hampshire (April 19, 1984). CLD-001-0230

8. EPA Environmental News Release announcing public meeting to be held May 14, 1984 regarding the results of the Superfund study of the site, Peter McGlew, EPA Region I (April 24, 1984). CLD-001-0214

9. Notice of a public meeting to be held May 14, 1984 regarding results of a Superfund study at the site, EPA Region I (April 30, 1984). CLD-001-0607

10. Newspaper article titled "Meeting to Air Results of Garage Site Testing," Derry News, Derry, New Hampshire (May 3, 1984). CLD-001-0231

11. Newspaper article titled "EPA Holds Hearing on Auburn Road," David Raposa, Derry News, Derry, New Hampshire (July 5, 1984). CLD-001-1462-1464

12. EPA Environmental News Release announcing public meeting to be held on February 5, 1986 to explain results of a Remedial Investigation of groundwater, soil, surface water, and surface water sediments, Patty D'Andrea, EPA Region I (January 22, 1986). CLD-001-0613

13. EPA Environmental News Release announcing public meeting to be held August 4, 1988 to discuss the results of a Pre-Design Study and to propose amending the site cleanup plan, Paul Knittel, EPA Region I (July 29, 1988). CLD-002-0195-0196

13.4 Public Meetings

1. List of Attendees at Tinkham/Londonderry Green Public Meeting (April 13, 1983). CLD-001-0175-0176

2. Public Meeting Agenda (April 13, 1983). CLD-001-0187

3. EPA Agenda of Public Meeting held on November 16, 1983 to discuss Remedial Action Master Plan, EPA Region I (November 16, 1983). CLD-001-0220

4. Agenda for the Tinkham's Garage Superfund Site Public Meeting held on February 5, 1985, EPA Region I (February 5, 1985). CLD-001-0612

5. Summary of Public Meeting, EPA Region I (February 5, 1986). CLD-001-0246-0249

6. Cross Reference: Final Community Relations Summary for the public hearing held on September 8, 1988 (includes hearing transcript) is Appendix B of the Amended Record of Decision [Filed and cited as entry number 1 in 5.4 Amended Record of Decision (ROD)].

13.5 Fact Sheets

1. Superfund Program: EPA Progress and Plans, EPA Region I (December 1985). CLD-001-0241-0243

2. Superfund Program Feasibility Study Fact Sheet, EPA Region I (August 1986).

3. "Superfund Program Information Update," Tinkham's Garage Site, Londonderry, New Hampshire, EPA Regio I (September 1987).

4. Fact Sheet - EPA Proposal to Amend Site ROD, EPA Region I (July 1988). CLD-002-0197

5. Tinkham's Garage Site Public Health and Environmental Concerns Fact Sheet.

17.0 SITE MANAGEMENT RECORDS

17.8 State and Local Technical Records

1. Memo regarding site visit and discussing waste water dumping (April 17, 1978). CLD-001-1454

2. Memo regarding complaint from resident Ann Miller about contamination of brook and drinking water near site, Stewart Parker, NUS Corporation to Russell A. Nylander, NUS Corporation (April 27, 1978). CLD-001-0217

3. Memo regarding May 1, 1978 site visit and discussion with John Tinkham concerning oil residue at the site (May 1, 1978). CLD-001-1455

4. Memo regarding site visits of June 5, 1978 and June 28, 1978 and discussions concerning oil dumped at the site (June 28, 1978). CLD-001-1456.

APPENDIX B Responsiveness Summary

RESPONSIVENESS SUMMARY

A summary of the public hearing held September 8, 1988 for the EPA Proposal to Amend the Tinkham's Garage Site Record of Decision is presented in the "Responsiveness Summary for the Public Hearing Held September 8, 1988 for the Tinkham's Garage Site, Londonderry, New Hampshire" prepared by Booz, Allen & Hamilton (Appendix E). No oral comments were presented for the record at the Public Hearing.

One written comment was submitted during the comment period by counsel to the Settling Parties which recommended that EPA amend the Record of Decision to allow either vacuum extraction or low temperature thermal aeration. The Settling Parties had received additional cost information in the course of their inquiries with potential remedial contractors which indicated that thermal aeration was more cost competitive with vacuum extraction than what was previously believed. Based on this new information, the Settling Parties recommended selection of both soil treatment technologies in the amendment to the ROD. This comment is attached.

Subsequent to the comment period, the Settling Parties reached closure on their evaluation of vendor bids for soil remediation and concluded that based on all factors vacuum extraction was the most appropriate technology. This conclusion was conveyed to EPA in a letter to Gregory A. Roscoe dated September 29, 1988 (attached).

Refinements to the technology cost assessment were conveyed to EPA from the Settling Parties technical contact, in a letter to Gregory A. Roscoe dated October 24, 1988 (attached). The letter indicated that there were factors associated with each technology that affected total cost of site remediation which made a direct cost comparison difficult.

EPA RESPONSE

EPA reviewed cost information presented in the Pre-Design Report and concluded that although there may be some inherent cost savings associated with vacuum extraction, there were not dramatic differences in cost between it and thermal aeration.

Vacuum Extraction was selected as the soil treatment technology because it was shown to be able to remediate site soils in a timely fashion to the target treatment levels. In addition, two positive attributes are unique to this technology:

1. The technology is capable of being implemented in the garage area without the need for excavation of contaminated soils. The Vacuum Extraction technology can be implemented with the soils in place, minimizing environmental disturbance and the potential for volatilization of soil contaminants to the ambient air.

2. Utilization of a dual extraction system will simultaneously extract contaminated shallow groundwater from underneath the soil source area. This approach will aggressively address contaminated groundwater in the garage area which should result in a reduction in time required to treat the bedrock aquifer.

Based on an overall analysis of performance, vacuum extraction was determined to possess several desirable and unique features, and found to be cost-effective. Therefore, it did not seem appropriate to leave any further ambiguity in the amended ROD by selecting two technologies. Thus, for the Tinkham's Garage site, Vacuum Extraction was selected as the soil treatment technology.

FINAL COMMUNITY RELATIONS SUMMARY
FOR THE PUBLIC HEARING HELD
SEPTEMBER 8, 1988

TINKHAM'S GARAGE SITE
Londonderry, New Hampshire

January 20, 1989

Prepared for:

Region I
United States Environmental Protection Agency

Prepared by:

Booz, Allen & Hamilton Inc.
Under Subcontract No. TESK-TEAM-013, Work Assignment 541
EPA Contract No. 88-01-7331

FINAL COMMUNITY RELATIONS SUMMARY
TINKHAM'S GARAGE SITE
LONDONDERRY, NEW HAMPSHIRE
SEPTEMBER 8, 1988

INTRODUCTION

In accordance with the U.S. Environmental Protection Agency's (EPA) Community Relations policy and guidance, the EPA Region I Office held a public hearing on September 8, 1988, to record oral comments on the proposed amendment to the Record of Decision (ROD) on the Tinkham Garage Superfund site. The public hearing took place from 7:30 p.m. to 8:45 p.m. at the Londonderry Public High School Cafeteria in Londonderry, New Hampshire. Approximately 15 people attended and Mr. Greg Roscoe, EPA's site Project Manager, served as the hearing chairman. Two public notices were placed in area newspapers: one published in The Derry News, Wednesday, September 7, 1988, a second published in The Nashua Telegraph, Sunday, September 4, 1988. A fact sheet describing the vacuum extraction technology proposed in the amendment to the ROD was distributed in July 1988 and a public information meeting explaining the technology was held on August 4, 1988. The 30-day public comment period on the ROD amendment ran from August 5, 1988, through September 9, 1988.

This responsiveness summary was prepared by Booz, Allen & Hamilton Inc., a subcontractor to CDM Federal Programs Corporation, under a technical enforcement support (TES) contract to provide community relations support to EPA Region I. The summary is divided into three major sections. Section 1 provides a brief background on the site and the community relations activities carried out by EPA. Section 2 identifies public comments that EPA received on the ROD amendment. Section 3 provides a summary of questions asked and answers provided at the conclusion of the hearing. An official verbatim transcript of the hearing, prepared by a court reporter, is included in this document as Appendix A.

1.0 BACKGROUND

This section presents a summary of the site status and provides details on recent community relations activities conducted for the Tinkham Garage site.

A. Site Status

The Tinkham Garage site in Londonderry, New Hampshire, was added in September 1983 to the National Priorities List (NPL), EPA's list of most serious hazardous waste sites

that are eligible to receive cleanup funds under the Superfund Program. The site was listed after inspection by EPA and the New Hampshire Water Supply and Pollution Control Commission revealed that the site posed a threat of contamination to the primary drinking water supply of over 400 residents in the site vicinity. The compounds considered to be posing a potential threat to ground and surface water, soils and sediment, and wetland areas were primarily volatile organic compounds (VOCs -- carbon-containing compounds that vaporize or evaporate readily).

A remedial investigation and feasibility study (RI/FS) was undertaken by an EPA contractor between 1984 and 1986 to determine the nature and extent of contamination, and to identify and assess the alternatives for remedying problems due to contamination. An endangerment assessment for the site was also conducted in 1986. Based on information in the endangerment assessment and data reported by the RI and the FS reports, the ROD selected three remedial technologies as possible cleanup alternatives for the site. These included: thermal aeration, biological treatment, and soil washing. The ROD selecting these alternatives was signed in September 1986. Since the ROD was signed, the potentially responsible parties (PRPs) have conducted studies which have indicated the efficacy of the vacuum extraction process to source control remediation at the site. EPA agreed to propose an amendment to the 1986 ROD to implement vacuum extraction and presented this proposal to the public in August 1988. EPA's public meeting on August 4, 1988, took place to provide the community with information on the various source control alternatives, including the vacuum extraction technology.

B. Community Relations

As part of its responsibility to include citizens in the Superfund decision-making process for the Tinkham Garage site, EPA held a public comment period in 1986 when the initial ROD for the site was proposed. A second 30-day public comment period on the 1988 proposal to amend the ROD was held from August 5, 1988, through September 9, 1988. The 1988 public comment period opened with the public information meeting held in Londonderry on August 4, 1988, and closed on September 9, 1988, the day following EPA's public hearing on the proposed amendment. EPA arranged the public hearing to receive oral comments on the proposal. In addition, a fact sheet on EPA's proposal to amend the ROD was distributed to the site community in July 1988 (See Appendix C for site fact sheet.) The Site Information Repositories also house documents associated with the site

and are located at the the Londonderry Public Library and Londonderry Town Hall. Interested persons can review reports, fact sheets, and other site information sent by EPA to these repositories.

2.0 SUMMARY OF COMMENTS FROM THE PUBLIC AND AGENCY RESPONSES

EPA received one written comment during the 30-day public comment period. The Cannons Site Group submitted a letter recommending that the ROD be amended to permit the selection of either thermal aeration or vacuum extraction for source remediation of contaminated soils at the Tinkham Garage site. The group based their recommendation upon the fact that both thermal aeration and vacuum extraction are superior technologies when compared on the basis of compliance with environmental requirements and standards; reduction of toxicity, mobility, or volume; cost; and protection of human health and the environment. They also stated that both technologies are capable of remediating the soils to a level of 1 part per million total VOCs, are roughly equivalent technically, and are equally applicable to the site, although each has its advantages and disadvantages. Additionally, recent information based on technological refinements indicates that thermal aeration is more cost-competitive with vacuum extraction than indicated in the Pre-Design Study.

3.0 SUMMARY OF QUESTIONS FROM THE PUBLIC AND AGENCY RESPONSES

At the close of the official public hearing, during which no oral comments regarding the proposal to amend the ROD were registered, the site Project Manager responded to oral questions about the site. The following section summarizes the questions asked and responses provided. Questions and responses have been paraphrased and grouped by subject into the following three categories:

- Preferred Remedial Alternatives
- Cleanup Objectives
- Logistical and Scheduling Issues.

A. Preferred Remedial Alternatives

Several questions were raised pertaining to the remedial alternative technologies. One attendee asked how effective the previous three technologies are and whether they are more or less effective than the fourth proposed alternative, vacuum extraction. Greg Roscoe, the site Project Manager, explained that the vacuum extraction technology has been proven effective and provided information on how the technology works. He explained that mechanically, vacuum extraction is a simpler process than

the others, primarily because it does not require soil excavation and that the treatment will use the Derry wastewater treatment plant to decontaminate ground water.

Mr. Roscoe also identified reasons why the other three alternatives are less desirable than vacuum extraction. Soil washing is a more complicated physical system and requires large amounts of water. Biological treatment shows promise, but requires soil excavation and involves a more complicated decontamination process converting organic contamination metabolically into carbon dioxide, water, and biomass. Thermal aeration, although mechanically a relatively simple process, requires soil excavation, like biological treatment.

A few questions were asked about the mechanics of vacuum extraction technology, including what kind of pumps will be used to extract contaminated ground water from the aquifer, how the system will be powered, and how noisy it will be. Mr. Roscoe explained that a series of submersed pumps will draw contaminated ground water from the aquifer and one large vacuum extraction pump will draw contaminated air through the treatment process and release treated air into the atmosphere. Mr. Roscoe said that the contractor will probably run electric power lines into the area to run the pumps, and stated that he is confident that the pumps are not loud and that precautionary measures will be taken to minimize the public's inconvenience.

B. Cleanup Objectives

Another attendee asked about the cleanup goals, specifically, whether all four technologies are capable of meeting the cleanup goals; and how EPA will ensure that cleanup goals are achieved. Mr. Roscoe explained that a prerequisite in proposing remedial alternatives is that the technology must achieve the established cleanup objectives, and stated that the objective is one part per million (ppm) total VOCs in soil. He explained that EPA will conduct a comprehensive sampling program to evaluate soil contamination throughout the implementation phase and during operation and maintenance of the technology.

One attendee asked whether area residents will be able to use their residential wells again. Mr. Roscoe explained that EPA's goal is to make the aquifer usable. The Agency will continually monitor the aquifer; he explained, however, that because this site presents a unique problem -- the contamination is in a bedrock aquifer -- EPA is not sure whether contamination can be eliminated completely.

One attendee asked about the concentration of contamination in the soil at and around the site, specifically in the leach fields for the condominium complex that is located on-site, south of Tinkham's garage. Mr. Roscoe quoted VOC results from the latest sampling, stating that the contaminant levels in leach fields in the vicinity of Monitoring Wells I, J, and K are in the range of 50 to 70 part per million (ppm); the leach field in the vicinity of Monitoring Well L is lower, in the range of 3 to 6 ppm. (See Map in Appendix C.)

C. Logistical and Scheduling Issues

One attendee raised questions pertaining to contractual arrangements, specifically who bids for the work and how. Mr. Roscoe indicated that, in the case of this site, EPA has reached a settlement with the responsible parties (RPs), who agreed to finance the site cleanup. This means the RPs are responsible for obtaining a contractor and establishing the contract terms.

One attendee asked about the cleanup schedule. Mr. Roscoe stated that work at the site may start as early as the Spring of 1989. He said that soil treatment will be complete in the first two years, while ground-water treatment and monitoring will continue for at least two years and perhaps longer, depending on water quality. He indicated that, as the contractor achieves cleanup milestones, EPA will provide the community with updated information.

One attendee asked whether at any time during the cleanup residents will be asked to leave their homes, and if so, who will subsidize the accommodations. Mr. Roscoe stated that it is unlikely that residents will have to leave their homes, but if this situation arises, EPA has procedures for reimbursing affected families for costs.

UNITED STATES

ENVIRONMANTAL PROTECTION AGENCY

REGION ONE

In the Matter of:

AMENDMENT TO THE RECORD OF DECISION)
)
RE:)
)
TINKHAM'S GARAGE SUPERFUND SITE)

Thursday
September 8, 1988

Cafeteria
Londonderry High School
295 Mammoth Road
Londonderry, NH

Whereupon the above entitled matter came on for hearing pursuant to Notice at 7:42 P.M.

PRESENT:

GREGORY ROSCOE
Environmantal Protection Agency
Region One
J.F.K. Federal Building
Boston, MA 02203

P R O C E E D I N G S

(7:42 A.M.)

REMEDIAL PROJECT MANAGER: Okay, I guess we'll start the Public Hearing for the Tinkham's Garage Superfund Site now. I'd like to begin the hearing and welcome everybody.

My name is Gregory Roscoe and I'm an environmental scientist with the Environmental Protection Agency here, Region No. 1, in Boston, and my position is environmental scientist in the New Hampshire Superfund Section of the Waste Management Branch and my duties and responsibilities include implementation of the Superfund Program here in the State of New Hampshire.

I will serve as Chairman of this hearing and I want to welcome you all here this evening. The purpose of the hearing is to formally accept your comments on the proposal to amend the Record of Decision for the Tinkham's Garage Site located in Londonderry, New Hampshire.

Also present here today is Charlie Berube from the New Hampshire Department of Environmental Services, and Charlie, you can raise your hand.

Before beginning, I'd like to briefly describe the format of the hearing. As many of you know, I was here last month and described a proposal to amend the "ROD" at an informational meeting we held at the high school

August 4th. Those of you wishing to make comments on the record concerning the proposal to amend the "ROD" should have already indicated your desire to do so by filling out the index cards available from the EPA representative located at the entrance to the doorway. If you have not completed a card and wish to comment, please do so now or at anytime during the course of the hearing. I will call out the names of those of you wishing to make a statement from the list of those who have signed in this evening. When called on, I ask that you come to the front of the room and comment using the microphones provided. So that everyone will have a chance to speak, we'd like to limit the comments to a reasonable amount of time. I think that we'll have plenty of time to accomodate everybody's comments so we won't put a time limit on that.

Following your comment, I or another member of this panel will have the opportunity to ask you clarifying questions regarding your comment that may assist us in considering your statement. After all comments have been heard, I will close the formal hearing. EPA and State representatives will then be available to answer any questions you may have on issues raised this evening.

As you know, the public comment period for the proposed plan opened on August 5th and runs through September 9th. If you wish to submit written comments, and

I encourage you to do so, they must be postmarked no later than September 9th and mailed to our office in Boston. The appropriate address can be found on the proposal to amend the "ROD" and the fact sheet which are both located in the information repositories here in Londonderry.

At the conclusion of the meeting, please see myself or Charlie if you have any questions on the process for making written comments. Actually, I'd probably be the most appropriate person to see concerning submitting written comments. All oral comments that we receive tonight and those we receive in writing during the comment period will be responded to in a Responsiveness Summary and this summary will be included with a Decision Document, which would be the amended Record of Decision if the "ROD" is so amended which the EPA prepares at the conclusion to the comment period. Are there any questions on the format for the meeting this evening?

Okay, again I encourage any of you wishing to comment to do so now or in writing before September 9th and before we take any comments on the record I'll just briefly give an overview of what we talked about last month and the purpose of this.

On August 4th, when I was here last, we discussed proposal to amend the Tinkham's Garage Record of Decision and basically what that proposal is the result of

is the Record of Decision which was originally signed identified three candidates soil treatment techr-logies for the site. They were thermal aeration, soil washing and composting.

A group of potentially responsible parties that we've been negotiating with undertook a predesign study on their own initiative to evaluate soil treatment technologies and several other technical factors that need to be taken into consideration prior to going into design. As a consequence of that study, a fourth candidate soil treatment technology was identified which had previously only been briefly addressed in the feasibility study. That fourth candidate was vacuum extraction utilizing a dual extraction system which included a combination of a groundwater pump and a vacuum pump whereby the groundwater pump would serve to lower the water table in the area behind the garage to increase the volume of soil which could be treated by the vacuum process and also to pump the most contaminated portion of the shallow ground water for treatment at the Derry Wastewater Treatment Plant. The vacuum part of the extraction system would create a negative vacuum in the soils which would draw air through the contaminated soils carrying contaminants to the extraction wells which would then be carbon filtered and discharged into the surrounding air.

That is a quick summary of the vacuum extraction process and the agency based on the results of the predesigned study has issued a proposal to amend the "ROD" to utilize this dual vacuum extraction system for soil treatment for the Tinkham's Garage Site. At this time I will now take public comments, oral comments on the proposal to amend. Does anybody have any desire to make comments at this time?

Okay, I'd like to thank you all for your participation and I now hearby declare this hearing closed, and we'll take any questions, Charlie and I will take any questions.

(Whereupon the hearing concluded at 7:48 A.M.)

CERTIFICATE OF REPORTER AND TRANSCRIBER

This is to certify that the attached proceedings before: United States Environmental Protection Agency

in the Matter of:

AMENDMENT TO THE RECORD OF DECISION

RE:

TINKHAM'S GARAGE SUPERFUND SITE

Place: Londonderry, New Hampshire

Date: August 8, 1988

were held as herein appears, and that this is the true, accurate and complete transcript prepared from the notes and/or recordings taken of the above titled proceeding.

V. Rasmussen
Reporter

8/8/88
Date

J. Rasmussen
Transcriber

8/12/88
Date

APPENDIX B

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
PUBLIC HEARING ON THE AMENDMENT TO THE RECORD OF DECISION
for
Tinkham's Garage Superfund Site

September 8, 1988
Hearing Attendees

(Please Print)

Name	Address	City	State	Zip	Phone	Representing
Diane Rietman	16 Manning St	Derry	NH	03038		Manchester Union Leader
FRED PLISSEY	1 CHARLESTON AVE.	LONDONDERRY	N.H.	03053		SELF
E. Feinberg	Booz Allen	Bethesda	MD			EPA/Booz Allen
Fred Tinkham	RT 102 4 Wheeler Ave	Londonderry	N. H.	03053		SELF
Karen Corriveau	Salem, NH N.H. DES.			03079		Derry News
CHARLIE BERUBE	6 HAZEN DR.	CONCORD	NH	03301		N.H. DES.
Peggy Forrest	L-160 CAPITOL HILL DR	LONDONDERRY	N.H.	03053		self
ARTHUR E. RUGG	208 MAMMOTH RD.	LONDONDERRY	N.H	03053		TOWN OF LONDONDERRY
M. IANNACONE	11 Mercury Dr	Londonderry	N.H.	03053		self
Peggy IANNACONE	" "	"	"	"		self
Mark Litteris	7 Mercury Dr	Londonderry	NH	03053		Self ✓

Superfund Program Fact Sheet

EPA
Region I

Tinkham's Garage Site
Londonderry, New Hampshire

July 1988

EPA Proposes Use of Vacuum Extraction Process to Treat Contamination at the Tinkham's Garage Superfund Site

On September 30, 1986, EPA signed a Record of Decision (ROD)* for the Tinkham's Garage Superfund site designating either thermal aeration, biological treatment, or soil washing as the remedial alternative that EPA would use to address soil contamination at the site. Contaminated groundwater would be treated at the Derry, New Hampshire Publicly Owned Wastewater Treatment Works (POTW).

In September 1987, EPA entered into an agreement with 23 of the Potentially Responsible Parties (PRPs) at the Tinkham's Garage Superfund site to conduct a pre-design study to address remaining groundwater issues, define further the extent of soil contamination, and evaluate the soil treatment technologies identified in the ROD. In addition, the PRPs conducted an on-site pilot study of the effectiveness of in-situ vacuum extraction, an innovative technology for treatment of contaminated soils. These studies are now complete.

As a result of the information gathered in the pre-design study and the pilot study of vacuum extraction, EPA is proposing to amend the ROD for the Tinkham's Garage Superfund site to designate the use of vacuum extraction to treat contaminated soils at the site. The results of the study, EPA's proposed amendments, and the rationale for amending the ROD are presented in this information update.

Results of the Pre-Design Study

As part of the pre-design study, the PRPs collected additional data to characterize the extent of contamination at the site. The results are described briefly below. (For locations of areas described below, please refer to Figure 1).

Leaching Fields: Sampling for soil contamination was conducted for all thirteen condominium leaching fields. Significant levels of VOC contamination were found only in fields I/J and K/L. No contamination was detected in significant amounts in the other leaching fields. Soil contamination in fields I/J and K/L is limited to soils overlying the leachfields. Approximately 2,000 cubic yards of soil from the leachfields will require treatment.

Garage Area Soil: The pre-design study found that approximately 6,500 cubic yards of soils in the garage area are contaminated with volatile organic compounds (VOCs) at levels requiring treatment. The VOC contamination appears to be limited to the upper garage area and is concentrated in the top four feet of soil.

Soil Pile: The soil pile contains soil that was removed during earlier excavations of leaching field soils. It averages six feet in depth and encompasses an area approximately 30 feet by 70 feet. Four to five hundred cubic yards of soil in the pile are contaminated with volatile organic compounds at levels requiring treatment.

Solvent Swale: No contaminants at levels requiring remediation were detected in the solvent swale.

Groundwater Evaluation: The pre-design study confirmed a direct connection between groundwater beneath the garage area and the wells formerly used by the condominium complex. Contamination levels in the two bedrock production wells were evaluated for compli-

The Public's Role
See page 2.

*Words in bold type are defined in a glossary on page 5.

ance with the pre-treatment standards for the Derry POTW. The groundwater contaminants from these wells were well below the pre-treatment standards and, therefore, can be pumped directly to the POTW without pre-treatment.

Results from the garage area monitoring wells indicate that contaminated shallow groundwater will require on-site pre-treatment to reduce contaminant levels prior to transferral to the Derry wastewater treatment facility.

No significant contamination was detected in residential wells on Ross Drive. The hydrologic evaluation found that the bedrock aquifer does not flow in the direction of the Ross Drive wells.

Analysis of Remedial Alternatives for Treatment of Contaminated Soils

Soil Washing: Soil washing is a treatment technology that uses water, or a water/solvent mixture, to extract chemicals from soil. In soil washing, contaminated soils are excavated and placed in a series of closed containers where they are repeatedly mixed with water to "wash" the organic contaminants from the soil. At the Tinkham's Garage site, the decontaminated soil would then be backfilled to the excavated areas, and the wash water would be cleaned to remove contaminants.

Soil washing was found to be less effective for treating contamination at the Tinkham's Garage site than the other alternatives that were evaluated. Although soil washing theoretically has been demonstrated to be effective over time, the process would not result in an efficient removal of contaminants due to the large quantities of water required to achieve the required reduction in contamination. The State of New Hampshire considers this alternative the least implementable option among those evaluated in the FS and pre-design studies.

Thermal Aeration: In thermal aeration, excavated contaminated soils would be heated to high temperatures and mixed with air. Heating the soil causes the VOCs to vaporize into the air. The air would be collected and treated by an appropriate air pollution control method prior to release into the atmosphere.

It is believed that thermal aeration would meet federal and state public health and environmental standards, would reduce the mobility, volume, and toxicity of the contaminants, and would provide both short- and long-term protection of public health and the environment. Engineering controls would be required to prevent the emission of contaminants during excavation of contaminated soil. It is believed that thermal aeration could be accomplished in less than two years. The estimated total cost of thermal aeration is $2,600,000.

Biological Treatment: In biological treatment, naturally-occurring aerobic, or oxygen-using, bacteria are used to biodegrade, or break down, contaminants into harmless materials such as carbon dioxide and water. The action of the bacteria is enhanced by selective tilling of the surface soils to increase oxygen levels in the soil.

At the Tinkham's Garage Site, the pre-design study determined that biological treatment is likely to be effective in permanently reducing the toxicity, mobility, and volume of the contaminants. Biological treatment at the site would be conducted in two phases. The first phase would decontaminate the first two to three feet of soil. Once this phase was completed, the decontaminated layer would be excavated and stored on the site. The remaining lower layer of contaminated soil then would be exposed to the air and tilled to encourage biodegradation. Any run-off from the site that occurred during biological treatment would be collected and used either in the biodegradation

The Public's Role in Evaluating Remedial Alternatives

EPA Seeks Public Comment

From August 5 to September 9, 1988, EPA is conducting a public comment period to obtain community input on EPA's proposal to amend the ROD at the Tinkham's Garage site. During the comment period, the public is invited to review the "Proposal to Amend Record Of Decision" as well as other site documents, and to offer written or oral comment to EPA.

Public Informational Meeting

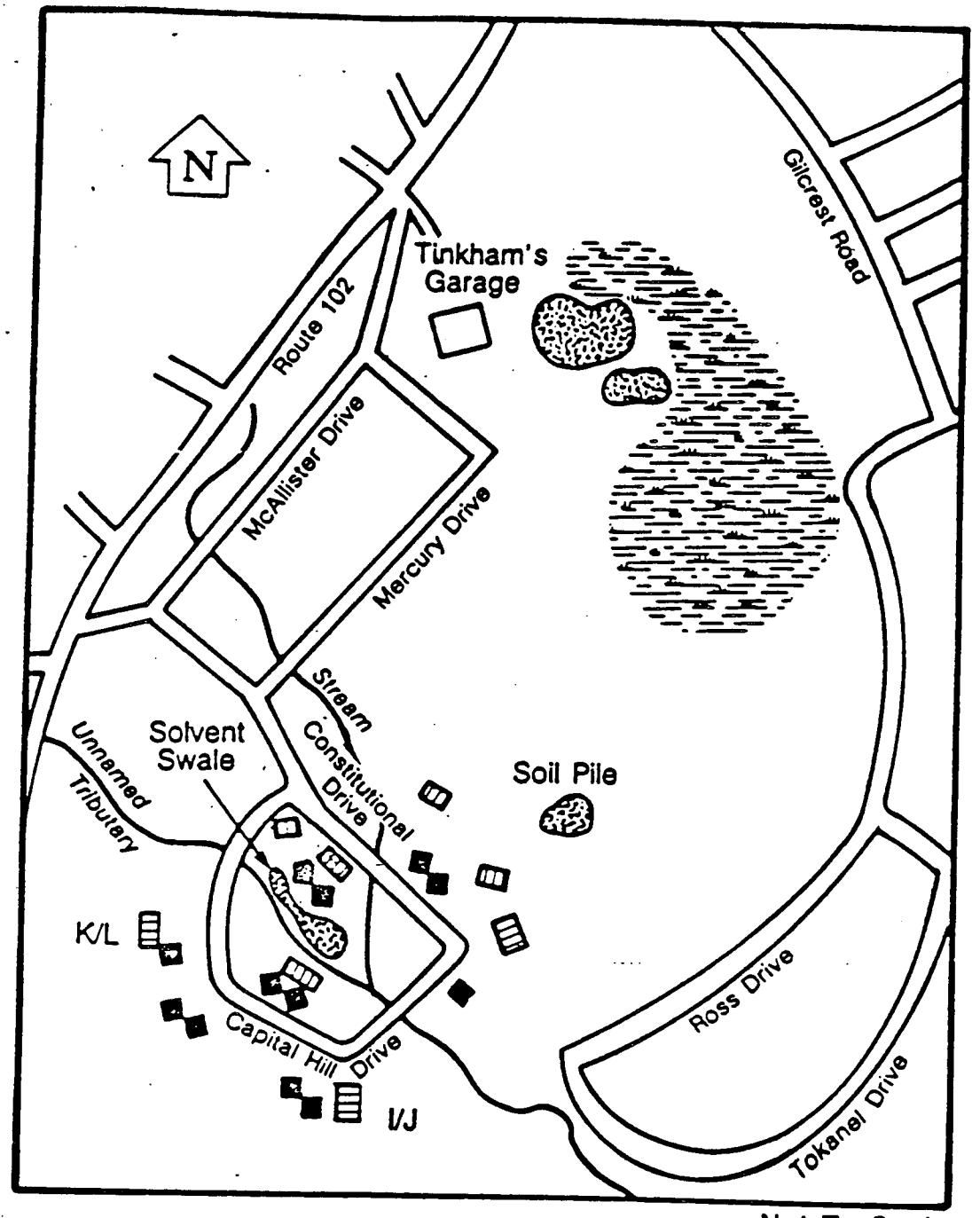
EPA will hold a public informational meeting on Thursday, August 4 at 7:30 p.m. at the Londonderry High School Cafeteria on Mammoth Road to discuss the result of the pre-design study and the proposed amendment to the ROD. The public is encouraged to attend the meeting and ask questions.

Written Comments

If you would like to comment in writing on EPA's Proposal to Amend the ROD, please mail your written comments (postmarked no later than August 19) to:

Gregory Roscoe, Remedial Project Manager
U.S. Environmental Protection Agency
Waste Management Division
J.F.K. Federal Building (HSN-CAN5)
Boston, Massachusetts 02203-2211
(617) 573-9624

Figure 1: Map of Study Area, Tinkham's Garage Site, Londonderry, NH



process or treated with groundwater collected from other parts of the site.

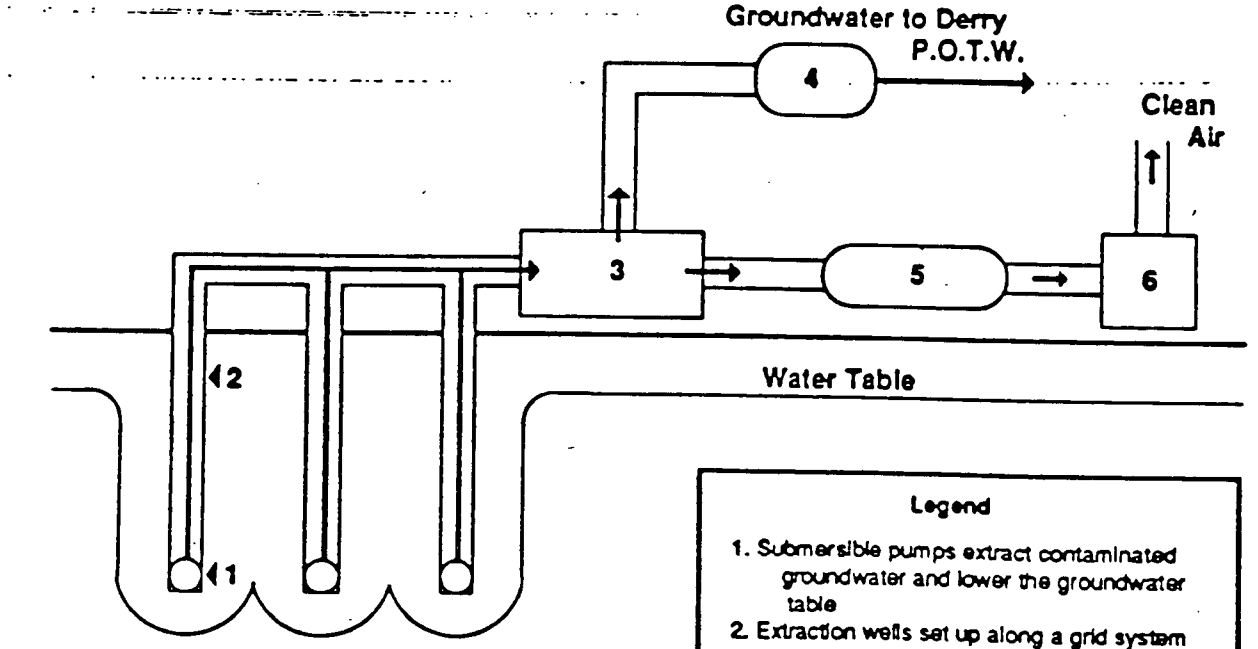
It is believed that biological treatment would meet federal and state public health and environmental standards, would reduce the mobility, volume, and toxicity of t[illegible]ntaminants, and would provide both short- and lo[illegible]g-term protection of public health and the environment. Engineering controls would be required to prevent the emission of contaminants during excavation of contaminated soil. The total cost of implementing biological treatment is estimated at $1,200,000.

In-Situ Vacuum Extraction: After evaluating the results of the pre-design study and the pilot study test of vacuum extraction, EPA is proposing to amend the ROD to require the use of vacuum extraction to treat contaminated soil. Vacuum extraction would involve pumping air from the unsaturated zone through a network of extraction wells to create a vacuum within the ground. The vacuum draws VOCs out of the soils and into the wells. The VOCs would be captured in activated carbon filters, after which the treated air would be released into the atmosphere.

At the Tinkham's Garage site, 35 wells would be used to create the required vacuum and collection system. To increase the size of the unsaturated zone and allow for effective vacuum extraction of soil contamination, submersible pumps would be placed in each well to extract the shallow groundwater lower the groundwater table. Because contaminant levels in the shallow groundwater are above the requirements of the Derry POTW, the extracted groundwater would be pre-treated to reduce contaminant levels to meet the POTW standards (see Figure 2). All contaminated groundwater, including the pre-treated garage area groundwater, would be piped to the Derry, New Hampshire POTW in conformance with the 1986 ROD.

Vacuum extraction, the soil treatment technology being proposed by EPA for use at the Tinkham's Garage site, is believed to meet federal and state public health and environmental standards, would reduce the mobility, volume, and toxicity of the contaminants, and would provide both short- and long-term protection of public health and the environment. It is believed that vacuum extraction could reduce contaminant levels in soils to cleanup goals in two years or less. This alternative would not require excavation of contaminated soils and, therefore, would not pose the risk of a release of VOCs due to excavation. A positive safety consideration associated with this remedial alternative is that, in the event of electrical or mechanical breakdown, the vacuum would draw air into the extraction system, limiting the possibility of the escape of contaminants into the air. The estimated total cost of vacuum extraction is $1,045,000.

Figure 2: Typical Schematic of Vacuum Extraction



For More Information

Information Repositories

Because this information update provides only a brief description of the results of the pre-design study, the vacuum extraction pilot study, and the proposal to amend the ROD, the public is encouraged to consult these and other documents in the site administrative record directly to obtain a more detailed explanation. Site-related information is available for public review at information repositories at the following locations:

Londonderry Town Hall
268 Mammoth Road
Londonderry, NH 03053
(603) 432-1120
Hours:
M-F: 8:30 a.m. - 5:00 p.m.

Leach Public Library
270 Mammoth Road
Londonderry, NH 03053
(603) 432-1132
Hours:
Mon., Wed., Fri.: 9:30 a.m. - 5:00 p.m.
Tues., Thurs.: 1:00 p.m. - 8:00 p.m.
Sat., Sun.: Closed July - September

Glossary

Activated Carbon: A powdered or granular form of carbon that has been treated to increase its surface area and adsorptive properties. Activated carbon is widely used in pollution control systems because many contaminants readily adsorb, or adhere, onto it.

Potentially Responsible Parties (PRPs): Any individual(s) or company(ies) (such as owners, transporters, or generators) potentially responsible for, or contributing to, the contamination problems at a Superfund site. Whenever possible, EPA requires PRPs, through administrative and legal actions, to clean up hazardous waste sites.

Pre-Design Study: A study undertaken to gather additional site information prior to implementing design of the remedial alternative(s) designated in the ROD.

Record of Decision (ROD): A legal document signed by EPA that describes the final cleanup action, or remedy, selected for the site; the basis for EPA's choic of that remedy; public comment on alternative remedies; and the cost of the remedy.

Swale: A low section of moist or marshy ground.

Unsaturated Zone: A layer of soil located above the groundwater table. In the unsaturated zone, spaces between soil particles are not completely filled with water as they are below the groundwater table.

Volatile Organic Compounds (VOCs): 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 known to cause cancer.

Mailing List Additions

If you or someone you know would like to be placed on the Tinkham's Garage Site Mailing List, please fill out and mail this form to:

Paul Knittel
U.S. Environmental Protection Agency, Region I
Office of Public Affairs (HSV-2203)
John F. Kennedy Federal Building
Boston, Massachusetts 02203-2211

Name: _____

Address: _____

Affiliation: _____ Phone: _____

United States
Environmental Protection
Agency

Region I
Office of Public Affairs-2203
John F. Kennedy Federal Building
Boston, MA 02203

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Agency
EPA-335

U.S. MAIL

Inside: Information on Tinkham's Garage Site

U.S.ENVIRONMENTAL PROTECTION AGENCY - REGION I

Tinkham's Garage Superfund Site

The U.S. EPA announces that they will hold a public hearing Thursday, September 8 at 7:30 p.m. on the proposal to amend the Record of Decision (ROD) on the Tinkham's Garage Superfund site, in Londonderry, New Hampshire. The hearing will be held in the Cafeteria of the Londonderry Public High School, located on Mammoth Road in Londonderry. The hearing is intended to receive oral comments from the public on the proposal to amend the ROD. The public comment period ends close-of-business on September 9, after which time no additional comments can be accepted.

FOLEY, HOAG & ELIOT

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LAURIE BURT

September 9, 1988

BY HAND

Gregory A. Roscoe, Esquire
U.S. Environmental Protection Agency
Waste Management Division HSN/CAN 3
J.F.K. Federal Building
Boston, MA 02203

Re: Cannons Engineering Superfund Matter
Londonderry ROD Amendment

Dear Mr. Roscoe:

On behalf of the Cannons Site Group, I enclose herewith for inclusion in the record written comments with respect to the proposed amendment to the Tinkham Garage Record of Decision. As you know, the Cannons Sites Group is currently evaluating vendors' bids for both thermal aeration and vacuum extraction with respect to soil remediation at the Londonderry Site. We expect to be in a position to select a vendor within the next week and a half and will advise you promptly of our decision.

Sincerely yours,

Laurie Burt
Project Coordinator
Cannons Sites Group

RSS:lk

enclosure

cc: E. Michael Thomas, Esquire
Cannons Sites Group Executive Committee
Cannons Sites Group Technical Committee
Judy Tinkham

September 9, 1988

Comments on the
Proposed Amendment of the Tinkham Garage ROD

Submitted by: The Cannons Sites Group

After a careful review of the U.S. Environmental Protection Agency's Proposal to Amend the Record of Decision ("ROD") with respect to the Tinkham's Garage Superfund Site in Londonderry, New Hampshire (the "Site"), it is the view of the Cannons Sites Group, a group of 25 potentially responsible parties, that the ROD should be amended to permit the use of either thermal aeration or vacuum extraction for source remediation of contaminated soils at the Site.

During the course of the Pre-Design Study, thermal aeration, vacuum extraction, biological treatment and solvent washing were evaluated for application at the Tinkham Garage Site. When compared on the basis of compliance with ARARs; reduction of toxicity, mobility or volume; short and long-term effectiveness, implementability; cost; and protection of human health and the environment, vacuum extraction and thermal aeration were clearly superior over the other two. Furthermore, recent cost information makes these technologies more equivalent.

Both thermal aeration and vacuum extraction are capable of remediating the soils to 1 ppm total volatiles, although each technolgy has certain advantages over the other. Low temperature

thermal aeration processes batches under controlled conditions such that the level of cleanup is assured throughout the batch. Each batch is sampled for cleanup verification before it is backfilled on site. A passive downgradient collector trench will collect contaminated shallow groundwater for treatment. On the other hand, excavation of soils will be required during which some release of volatile organic compounds will occur. Any disturbed wetlands will take time to reestablish themselves.

Vacuum extraction will treat the entire site at once; however, remediation of some of the clay soils may require a longer treatment time. Vacuum extraction is advantageous in that it would treat the entire soil profile rather than just the upper four to six feet and without disturbing the soils. It would also aggressively remove contaminated shallow groundwater from the source area for treatment through the use of dual extraction wells.

With respect to cost-effectiveness, the Pre-Design Study indicated that vacuum extraction was far more competitive, that is less costly, than thermal aeration. The information upon which this cost evaluation was based was provided by expert consulting firms with extensive experience in development and operation of these two technologies in the field.

In light of the completion of the Pre-Design Study report and the pendency of the parties' settlement agreement in the Cannons Superfund matter, the Cannons Sites Group voluntarily has begun the selection process for remedial action contractors, even though the settlement embodied in the Consent Decree has not received final court approval. In preparing to implement the settlement as expeditiously as possible, the Group has recently received cost information that suggests that thermal aeration is more cost-competitive with vacuum extraction than had been previously thought at the time the Feasibility Study was developed. This appears to be the result of recent refinements in the thermal aeration technology based on the extensive experience with that technology at the McKinn Superfund site in Grey, Maine.

As we have advised EPA's technical staff, the Technical Committee is working very closely with potential vendors of those two technologies to better determine the cost and performance implications, as well as the capabilities of each vendor. The Committee expects to complete its evaluation of vendor proposals in the very near future and to make its final recommendation. It is our current belief that both technologies are technically equivalent and appropriate for use at the site, and final selection between the two can be made on the basis of refined cost analysis in the contractor selection process. In light of

the technical equivalance of these technologies, we would request that the Tinkham Garage Site Record of Decision be amended to allow for use of either vacuum extraction or low temperature thermal aeration.

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LAURIE BURT

September 29, 1988

BY HAND

Gregory A. Roscoe, Esquire
U.S. Environmental Protection Agency
Waste Management Division HSN/CAN 3
J.F.K. Federal Building
Boston, MA 02203

Re: Cannons Engineering Superfund Matter
Londonderry ROD Amendment

Dear Mr. Roscoe:

As you know, the Cannons Site Group submitted comments to EPA earlier this month expressing the opinion that both vacuum extraction and thermal aeration appeared to be acceptable technologies for soil remediation at the Londonderry Site. The Group noted, however, that it was in the process of evaluating vendors' bids for both thermal aeration and vacuum extraction with respect to soil remediation at the Londonderry Site.

Having completed that evaluation, the Cannons Site Group has come to the conclusion that based on all of the factors, including the dual extraction capabilities of vacuum extraction and its cost effectiveness, that the most appropriate technology for soil remediation at the Londonderry Site is vacuum extraction. Accordingly, the Cannons Site Group urges that the Record of Decision with respect to the Londonderry Site be amended to select vacuum extraction as the technology for soil remediation at the Site.

Sincerely yours,

Laurie Burt
Project Coordinator
Cannons Sites Group

LB:rs
cc: E. Michael Thomas, Esquire
Cannons Sites Group Executive Committee
Cannons Sites Group Technical Committee
Judy Tinkham

Environmental Protection Department
CIBA-GEIGY Corporation
Ardsley, New York 10502-2699
Telephone 914 478 3131

CIBA-GEIGY

October 24, 1988

EMERY EXPRESS MAIL

Mr. Greg Roscoe
EPA REGION I
J. F. K. Federal Building
Boston, MA 02203

Re: Tinkham Garage Site - Londonderry, NH
Update of Remediation Costs

Dear Greg:

I have reviewed the cost information for remedial technologies contained in the Tinkham Garage Pre-Design Study Report. Since the submission of this report, the technical committee has received turn key bids for both vacuum extraction and low temperature thermal aeration. When compared purely on the basis presented in Table 3-6, that is, 9,000 cubic yards of soil and collection and treatment of contaminated shallow ground water in the garage area, the unit cost of vacuum extraction is $130/cu. yd. and the unit cost of low temperature thermal aeration is $160/ cu. yd.

It is difficult to perform a true cost comparison of these technologies as there are factors which affect the total cost of remediation which are not easily quantified. For instance, while the volume of soil treated by aeration can be quantified exactly and each additional cubic yard of soil over the 9,000 cubic yards can be assigned a unit cost, vacuum extraction is areally and time dependent, and an increase in the volume of contaminated soil may or may not increase the cost. It would depend on whether the increase in contamination is with depth or area. Similarly, it is felt that the dual vacuum extraction wells will more aggressively capture contaminated ground water from the shallow aquifer in the garage area. This should translate to a reduction in the time required for pumping the bedrock wells, and a cost savings. Such a savings would not be reflected in Table 3-6 which provides cost information for soil treatment independent of groundwater remediation.

I hope this information fulfills your request. Please contact me if additional information is required.

Sincerely yours,

Diane M. Leber

Diane M. Leber
Supervisor, Environmental Protection

DL5:gg:04

cc: J. McGuire/Monsanto
R. Sanoff/Foley Hoag & Eliot
M. Walters/Polaroid

APPENDIX C Federal and State ARARS

Applicable or Relevant and Appropriate Federal Requirements

Requirement	Applicable	Relevant and Appropriate
RCRA 40 CFR Part 264		
- Subpart G		X
- Subpart L		X
- Subpart N		X
National Ambient Air Quality Standards	X	
Clean Water Act - Section 404 Part 230 CFR 40	X	
Fish & Wildlife Coordination Act	X	
OSHA - 29 CFR Parts: 1910 1904	X	
E.O. 11990 (Wetlands)	X	

Federal ARAR Analysis

RCRA 40 CFR Part 264

- Subpart G: Closure and Post Closure

  The Site shall be closed consistent with appropriate subsections in a manner that minimizes the need for further maintenance and; the closure minimizes or eliminates to the extent necessary to protect human health and the environment, post closure escape of hazardous substances into the environment.

- Subpart L: Waste Piles

  Closure of the waste pile behind the condominium complex shall comply with the appropriate components of 264.258 including removal of all residues, contaminated containment system components, and all equipment contaminated with waste and leachate.

- Subpart N: Landfills

  The Site shall be closed consistent with appropriate subsections of this subpart based on the nature of the contaminant distribution as determined by post remedial action sampling and analysis.

National Ambient Air Quality Standards (NAAQS)
40 C.F.R. Part 50, promulgated pursuant to the Clean Air Act

- The appropriate discharge standards in this statute will apply to air discharges from the vacuum extraction process and the groundwater air stripper (if utilized).

Section 404 of the Clean Water Act
33 U.S.C. Section 1344 and 40 C.F.R. Part 230

- The applicable subparts of this section will apply to operations which may impact the wetlands and surface water bodies on or near the Site. No activity that adversely affects a wetland is permitted if a practicable alternative exists.

Fish and Wildlife Coordination Act
16 U.S.C. subsection 661 et seq

- Requires action to protect fish and wildlife from actions modifying streams or areas affecting streams. EPA consulted with the Department of Interior and the State

of New Hampshire which oversees administration over wildlife resources prior to the selection of the remedy. EPA will implement the action in accordance therewith.

Worker Safety Regulations
29 CFR Part 1904 promulgated pursuant to the Occupational Safety and Health Act (OSHA)

- This applicable regulation requires recordkeeping of occupational illness and injury

29 CFR Part 1910 (OSHA)

- This applicable regulation covers work operations conducted at the Site.

Executive Order 11990, Protection of Wetlands
40 CFR Part 6

- The Protection of Wetlands Executive Order and this EPA regulation are applicable and were weighed in the evaluation and development of remedial alternatives. The selected remedial action will be undertaken in such a manner to avoid or minimize the destruction, loss and degradation of site wetlands and to preserve and enhance the natural and beneficial use of wetlands.

I. CONTAMINANT AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	Applicable[2]	Relevant & Appropriate[2]
A. GROUNDWATER:		
1. RSA 149:8,III; N.H. Admin. Ws Ch. 410 - Protection of Groundwater.	X	
a. Ws 410.05(a) Discharges to Groundwater.	X	
b. Ws 410.09 Groundwater Discharge Criteria, incorporating by reference Ws Part 302 (Maximum Contaminant Levels [MCL's] and Suggested No Adverse Response Levels [SNARLS])	X	

1 See Appendix A for synopsis of each requirement and discussion of action necessary to attain ARAR's.

2 The absence of any symbol in the columns designated "Applicable" or "Relevant and Appropriate" indicates that, in the circumstances present at this site, the requirement is applicable or relevant and appropriate.

I. CONTAMINANT AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, A' 'DED RECORD OF DECISION
TINKHAM GARAGE SITE, L ONDERRY, NEW HAMPSHIRE

	Applicable	Relevant & Appropriate
c. Ws 410.10, Additional Groundwater Criteria.	X	
d. Ws 410.05(e) Groundwater Quality Criteria; Health-based groundwater protection standards.	X	
e. Ws 410.05(g) Groundwater Quality Criteria; Nondegradation of Surface Water.	X	

I. CONTAMINANT AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
B. SURFACE WATER		
1. RSA 149:8,I - Enforcement of Surface Water Classifications.	X	
2. Ws Ch. 400, Part 437 - Water Quality Standards - Fish Life	X	
3. Ws Ch. 400, Part 439 - Antidegradation Policy.	X	
C. WETLANDS IMPACT		
1. RSA 149:8-a, Dredging and Control of Run-Off; Ws Ch. 400 Part 415, Dredging Rules.	X	

I. CONTAMINANT A LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, AMENDED RECORD OF DECISION
TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
2. Fill and Dredge in Wetlands, RSA Ch. 483-A and Wt. Ch. 300, Criteria and Conditions.	X	
D. AIR EMISSIONS		
1. RSA Ch. 125-C, Air Pollution Control; N.H. Admin. Code Air Ch. 100 Parts 604 through 606; Part 1002.	X	
E. HISTORIC PRESERVATION		
1. New Hampshire Historic Preservation Act, RSA 227-C.		
2. Local Historic Districts, RSA 31:89-a-31:89-k.		

I. CONTAMINANT AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	Applicable	Relevant & Appropriate
E. HAZARDOUS WASTE REQUIREMENTS		
N.H. Hazardous Waste Management Act, RSA Ch. 147-A; Hazardous Waste Management Rules, N.H. Admin. Rules He-P Ch. 1905.	X	
G. SOLID WASTE REQUIREMENTS		
N.H. Solid Waste Management Act, RSA Ch. 149-M; Solid Waste Management Rules, N.H. Admin. Rules He-P Ch. 1901.	X	

ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, AMENDED RECORD OF DECISION
TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
A. HAZARDOUS WASTE REQUIREMENTS	
1. RSA Ch. 147-A, New Hampshire Hazardous Waste Management Act; N.H. Admin. Code He-P Ch. 1905.	X
a. Hazardous Waste Facility Security requirements, He-P 1905.08(d), incorporating by reference 40 C.F.R. §264.14.	X
b. General Inspection Requirements, He-P 1905.08(d)(4)(d)	X

KEY: X - Applicable
O - Relevant and Appropriate

The absence of any symbol in the column below a designated alternative indicates that the requirement is not applicable, or relevant and appropriate, with regard to the alternative.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, AMENDED RECORD OF DECISION
TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
incorporating by reference 40 C.F.R. §264.15.		
c. Personnel Training, He-P 1905.08(d)(4)(e) incorporating by reference 40 C.F.R. §264.16.	X	
d. Location standards, He-P 1905.08(d)(4)(g) incorporating by reference 40 C.F.R. §264.18 and He-P 1905.08(2)j.	X	
e. Preparedness and Prevention Requirements, He-P 1905.08 (d)(4)(h) incorporating by reference 40 C . §264, Subpart C.	X	

11. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, AMENDI RECORD OF DECISION
TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

	SOURCE CONTROL: VACUUM EXPRACTION MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
f. Contingency Plan, He-P 1905.08(d)(4)(i)incorporating by reference 40 C.F.R. 264, Subpart D.	X
g. Groundwater Protection, He-P 1905.08 (d)(4)(j), incorporating by reference 40 C.F.R. 264, Subpart F.	X
h. Closure and Post-Closure, He-P 1905.08(d)(4)(k)incorporating by reference 40 C.F.R. §264, Subpart G.	X
i. Transfer of facility, He-P 1905.08(d)(5).	X

II. ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
j. Monitoring, He-P 1905.08(d)(6);	X	
k. Public Notification Plan, He-P 1905.08(d)(9).	O	
l. General environmental standards, He-P 1905.08(d)(1).	X	
m. General design standards, He-P 1905.08(d)(2).	X	
n. Technical Standards for Landfills, He-P 1905.08(f)(1)(f) incorporating by reference 40 C.F.R. §264, Subpart N, and He-P 1905.08(f)(2)(d)		

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, AMENDED RECORD OF DECISION
TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
o. Additional Technical Standards for Treatment He-P 1905.08(f)(2)(a).	X	
p. He-P 1905.08(f)(2)(c) Storage Standards.	X	
q. Technical Standards for Waste Piles, He-P 1905.08(f)(1)(d) incorporating by reference 40 C.F.R. 264 Subpart L.	X	
r. Technical Standards for Use and Management of Containers, He-P 1905.08(f)(1)(a) incorporating by reference 40 C.F.R. 264, Subpart I.	X	

II. ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
s. Technical Standards for Tanks, He-P 1905.08(f)(1)(b) incorporating by reference 40 C.F.R. 264, Subpart J.	X	
t. Standards for Generators, He-P 1905.06.	X	
u. Manifesting Requirements He-P 1905.04.	X	
v. Packaging and Labelling Requirements, He-P 1905.05, incorporating by reference N.H. Admin. Code Saf-C-600 and 40 C.F.R. §§ 172, 173, 178, and 179.	X	

II. ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

		SOURCE CONTROL: VACUUM EXPRACTION MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
B.	SOLID WASTE REQUIREMENTS	
1.	RSA Ch. 149-M, New Hampshire Solid Waste Management Act; N.H. Admin. Code He-P Ch. 1901.	X
C.	ACTION-SPECIFIC AIR EMISSION LIMITS	
1.	N.H. Admin. Code Air Parts 604 through 606.	X
2.	Fugitive Dust Emission Control, N.H. Admin. Code Air Part 1002.	X
D.	ACTION-SPECIFIC GROUNDWATER PROTECTION STANDARDS	

II. ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, AMENDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
1. RSA 149:8,III; N.H. Admin Code Ws Ch. 410.	X	
E. ACTION-SPECIFIC SURFACE WATER PROTECTION STANDARDS		
1. RSA Ch. 149; N.H. Admin Code WS Ch. 430.	X	
2. RSA 149:4-a; N.H. Admin. Code Ws Ch. 900, Part 904, Pretreatment		

II. ACTION-SPECIFIC APPLICABLE OR REL VT AND APPROPRIATE STATE REQUIREMENTS, A..NDED RECORD OF DECISION TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE[1]

	SOURCE CONTROL: VACUUM EXPRACTION	MANAGEMENT OF MIGRATION: GROUNDWATER PUMPING AND TREATMENT
Standards for publicly owned treatment works (POTW).	X	
F. STANDARDS FOR PUBLIC WATER SYSTEMS		
1. N.H. Safe Drinking Water Act, RSA 148-B; Ws Part		

APPENDIX A

I. CONTAMINANT- AND LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
A. GROUNDWATER:		
1. RSA 149:8,III; N.H. Admin. Code Ws Ch. 410 - Protection of Groundwater.	These provisions regulate discharges to groundwater and provide for groundwater protection. No substance designated in Ws Ch. 410, or presenting a potential threat to health or the environment pursuant to Ws 410.05, may be discharged to groundwater so as to exceed water quality criteria at or beyond any compliance boundary, as defined by Ws 410.04(c) and Ws 410.13(a)(3). Corrective action may also be required if groundwater degradation occurs at any point within an intervention zone, as defined under Ws 410.13. See Ws 410.14(b)(2).	Site must be remediated to prevent release of contaminants in violation of these provisions. See below for discussion of specific water quality criteria pursuant to Ws Ch. 410.
a. Ws 410.05(a) Discharges to Groundwater	Ws 410.05(a) prohibits discharge of hazardous waste to groundwater	Remedial action to eliminate the uncontrolled discharge of hazardous waste constituents, volatile organic compounds (VOC's), and inorganic contaminants to the groundwater acquifer below the site.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
A. GROUNDWATER: (Continued)		
b. Ws 410.09 Groundwater Discharge Criteria, incorporating by reference Ws Part 302 (Maximum Contaminant Levels [MCL's] and Suggested No Adverse Response Levels [SNARLS])	Ws 410.09 establishes groundwater discharge criteria which include the MCLs and SNARLS adopted by the Water Supply and Pollution Control Division and codified at Ws Part 302, Drinking Water Regulations. Standards applicable to contaminants found at at the site include SNARLS for lifetime exposure to toxic contaminants, Ws 302.08(a); SNARLS for contaminants associated with cancer risk, Ws 302.08(b); and MCL's, Ws 302.02, Ws 302.04, and Ws 302.11.	Remedial action to eliminate discharge of contaminants, including VOC's and inorganic contaminants, resulting in groundwater contamination above State MCL and SNARL levels.
c. Ws 410.10, Additional Groundwater Criteria	Ws 410.10 provides that groundwater shall not be altered so as to render it unsuitable for drinking water. Drinking water standards applicable to the site pursuant to Ws 410.10 include both state and federal minimum requirements. See, eg.; N.H. Safe Drinking Water Act, RSA Ch. 148-B; N.H. Admin Code Ws Part 302; federal MCLs for volatile	Remedial action to eliminate discharge of contaminants rendering groundwater unsuitable for drinking water.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
A. GROUNDWATER: (Continued)		
	organic contaminants, 52 Fed. Reg. 25,716 (July 8, 1987)(to be codified at 40 C.F.R. §141.61(a)).	
d. Ws 410.05(e) Groundwater Quality Criteria; Health-based groundwater protection standards.	Ws 410.05(e) provides that groundwater shall not contain any substance which the Water Supply and Pollution Control Division (WSPCD) determines may be harmful to human health or the environment. In determining applicable standards under Ws 410.05(e), WSPCD refers to health advisory limits established by the New Hampshire Division of Public Health Services (DPHS). See RSA 148-B:V,IV.	Remedial action to eliminate discharge of substances which may be harmful to health or the environment, which may include substances exceeding the 10^{-6} cancer risk health advisory limits established by DPHS.
e. Ws 410.05(g) Groundwater Quality Criteria; Nondegradation of Surface Water.	Ws 410.05(g) provides that groundwater quality shall not be degraded such that it results in a violation of surface water standards in any surface water body within or adjacent to the site, and therefore incorporates surface water standards set forth at RSA 149:3 and Ws Ch. 400 Parts	Remedial action to eliminate any discharge to groundwater resulting in a violation of surface water quality at adjacent surface waters, including Beaver Brook. Class B standards include dissolved oxygen, coliform and pH limits, see RSA 149:3,II and Ws 432.02; limits on potentially toxic concentrations or

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SIT[illegible] ONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
A. GROUNDWATER: (Continued)		
	431-439. The unnamed brook at the Tinkham Garage site discharges into Beaver Brook, a Class B surface water; See Laws 1957, 130:1 (designation as Class B-1 of all Beaver Brook tributaries in specified towns including Londonderry) Laws 1967 147:15 (reclassifying Class B-1 waters as Class B). Therefore, standards applicable to the Tinkham Garage site include standards for the preservation of Class B waters set forth in RSA 149:3,II and N.H. Admin. Code Ws 432.01 - 432.16.	combinations of substances, Ws 432.03; and limits on the discharge of phenols, Ws 432.14. Discharge of inadequately treated wastes into Class B surface waters is prohibited, and Class B waters are to be maintained as acceptable for use, after adequate treatment, as water supplies. RSA 149:3,II.
B. SURFACE WATER		
1. RSA 149:8,I	RSA 149:8 prohibits the disposal of wastes in such a manner as will lower the quality of any surface water below the minimum requirements of the surface water classification. Standards applicable to the Tinkham Garage site include standards for the preservation of Class B waters. See discussion at I,A,1,e above.	Remedial action to eliminate any discharge to surface waters in or adjacent to the site which lowers the quality of any surface water body below the applicable classification requirements. See discussion at I,A,1,e above.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
B. SURFACE WATER: (Continued)		
2. Ws Ch. 400, Part 437 - Water Quality Standards - Fish Life	Ws Ch. 400, Part 437 provides that state surface waters shall be free from chemicals or conditions inimical to fish life, see Ws 437.02, and shall be preserved as potential cold water fisheries, Ws 437.01.	Remedial action to eliminate discharge of substances, including VOC's and inorganic contaminants, which may cause conditions inimical to aquatic life.
3. Ws Ch. 400, Part 439 - Anti-degradation Policy.	Ws Ch. 400, Part 439 establishes the state policy against degradation of existing water quality, and requires protection of in-stream beneficial uses.	Remedial action to ensure that surface water quality is not degraded due to discharge of contaminants from the site.
C. WETLANDS IMPACT		
1. RSA 149:8-a, Dredging and Control of Run-Off; Ws Ch. 400 Part 415, Dredging Rules.	RSA 149:8-a and Ws. Ch. 400 Part 415 establish criteria for conducting any activity in or near state surface waters which significantly alters terrain or may otherwise adversely affect water quality, impede natural runoff or create unnatural runoff. Activities	Wetlands and surface waters are located in and adjacent to the site. Remedial activities on the site must comply with these criteria for the protection of state surface waters.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
C. WETLANDS IMPACT: (Continued)		
	within the scope of these provisions include excavation, dredging, and grading of topsoil in or near wetland areas.	
2. Fill and Dredge in Wetlands, RSA Ch. 483-A and Wt. Ch. 300, Criteria and Conditions.	RSA 483-A and Ws Ch. 300 regulate filling and other activities in or adjacent to wetlands, and establish criteria for the protection of wetlands from adverse impacts on fish, wildlife, commerce and public recreation.	Wetlands are located in and adjacent to the site. Remedial activities on the site must comply with these wetlands protection requirements.
D. AIR EMISSIONS		
1. RSA Ch. 125-C, Air Pollution Control; N.H. Admin. Code Air Ch. 100 Parts 604 through 606; Part 1002.	These provisions establish standards for the release of air emissions, including VOC's and hazardous air pollutants. Applicable standards include the most stringent of the following requirements: (1) New Source Performance Standards, (40 C.F.R. Part 60);	Remedial action may be necessary to prevent unpermitted air emissions from the site, including volatilization of soil contaminants, and to prevent the release of fugitive dust, during remedial activities.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
D. AIR EMISSIONS: (Continued)		
	(2) National Emission Standards for Hazardous Air Pollutants (40 C.F.R. Part 61); and (3) New Hampshire State Implementation Plan limits. See RSA 125-C:6; N.H. Admin. Code Air 101.09 and Air 606.01.	
E. HISTORIC PRESERVATION		
1. New Hampshire Preservation Act, RSA 227-C	This provision governs the identification and protection of state historic resources and properties.	Site activities which affect any historic property must comply with the provisions of this statute.
2. Local Historic Districts, RSA 31:89-a-31:89-k.	This provision authorizes municipalities to establish historic districts and to regulate construction, alteration, other activities affecting historical properties and districts.	Site activities which affect historic properties or districts should take into consideration local historical preservation provisions.

CONTAMINANT- AND LOCATION-SPECIFIC
APPLICABLE OR RELE[illegible] AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE [illegible]TE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
F. HAZARDOUS WASTE REQUIREMENTS		
N.H. Hazardous Waste Management Act, RSA Ch. 147-A; Hazardous Waste Management Rules, N.H. Admin. Rules He-P Ch. 1905.	These provisions establish requirements for the treatment, storage, transportation and disposal of hazardous waste.	Hazardous wastes on site must be managed and disposed of in accordance with these requirements. See Section II, supra.
G. SOLID WASTE REQUIREMENTS		
N.H. Solid Waste Management Act, RSA Ch. 149-M; Solid Waste Management Rules, N.H. Admin. Rules He-P Ch. 1901.	These provisions establish requirements for the treatment, storage, and disposal of solid wastes.	Solid wastes on site must be managed and disposed of in accordance with these requirements. See Section II, supra.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
A. HAZARDOUS WASTE REQUIREMENTS		
1. RSA Ch. 147-A, New Hampshire Hazardous Waste Management Act; N.H. Admin. Code He-P Ch. 1905.	These provisions establish standards applicable to the treatment, storage, transport and disposal of hazardous waste and the closure of hazardous waste facilities. See He-P 1905.02(a).	Hazardous waste on site must be managed, stored, transported and disposed of in accordance with the Hazardous Waste Management Act and the rules thereunder. See below for additional discussion of these requirements.
a. Hazardous Waste Facility Security requirements, He-P 1905.08(d), incorporating by reference 40 C.F.R. §264.14.	This provision incorporates federal RCRA requirements for the adoption of security measures to protect the public from exposure to hazardous wastes.	The facility would be required to be fenced, posted, and operated in compliance with this provision.
b. General Inspection Requirements, He-P 1905.08(d)(4)(d), incorporating by reference 40 C.F.R. §264.15.	This provision incorporates federal RCRA requirements for the regular inspection of hazardous waste facilities.	The facility would be required to implement regular inspections, maintain written records, and remedy operational problems in accordance with this provision.
c. Personnel Training, He-P 1905.08(d)(4)(e), incorporating by reference 40 C.F.R. §264.16.	This provision incorporates federal RCRA requirements for the training of hazardous waste facility personnel to ensure compliance with applicable standards and effective emergency response.	The facility would be required to implement a personnel training program and to maintain written records in accordance with this provision.

II. ACTION-SPECIFIC

APPLICABLE OR RELEVANT AND APPROPRIATE

STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
d. Location standards, He-P 1905.08(d)(4)(g), incorporating by reference 40 C.F.R. §264.18 and He-P 1905.08 (2)j.	He-P 1905.08(d)(4)(g) restricts the siting of hazardous waste facilities near geological fault areas and flood plains. He-P 1905.08(2)(j) sets forth the State procedure for identifying the boundaries of flood plains.	The location and design of any hazardous waste facility must meet the requirements of He-P 1905.08(d)(4)(g).
e. Preparedness and Prevention Requirements, He-P 1905.08 (d)(4)(h) incorporating by reference 40 C.F.R. §264, Subpart C.	This provision incorporates federal RCRA requirements for prevention and response to releases of hazardous waste.	Facility construction and operation must include provisions for internal communication, equipment, emergency response capability, and arrangements with local emergency response authorities in accordance with his provision.
f. Contingency Plan, He-P 1905.08(d)(4)(i), incorporating by reference 40 C.F.R. 264, Subpart D.	This provision incorporates federal RCRA requirements for contingency plans and emergency procedures.	The facility would be required to develop and maintain written contingency plans and emergency procedures in accordance with this provision.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
g. Groundwater Protection, He-P 1905.08 (d)(4)(j), incorporating by reference 40 C.F.R. 264, Subpart F.	This provision, which incorporates federal RCRA standards, supplements N.H. Admin. Code Ws Ch. 410 by establishing additional standards for groundwater monitoring and appropriate remediation at hazardous waste facilities. The provision prohibits the discharge of constituents into groundwater above federal RCRA limits for such contaminants at the compliance point, which is defined as the boundary of each waste management unit under 40 C.F.R. §264.95.	The facility would be required to implement a groundwater monitoring and protection program in accordance with this provision.
h. Closure and Post-Closure, He-P 1905.08 (d)(4)(k) incorporating by reference 40 C.F.R. §264, Subpart G.	This provision, incorporating federal RCRA requirements, sets forth design and performance standards for hazardous waste facility remediation and closure.	The facility would be required to develop and implement a written plan for site closure and post-closure care in accordance with this provision.

II. ACTION-SPECIFIC

APPLICABLE OR RELEVANT AND APPROPRIATE

STATE REQUIREMENTS, TINKHAM GARAGE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
i. Transfer of facility, He-P 1905.08 (d)(5).	This provision establishes requirements for notifying the Division and future owners or operators when the facility is transferred.	Compliance with this provision would be required prior to any transfer of facility ownership or operation.
j. Monitoring, He-P 1905.08 (d)(6).	These provisions establish groundwater monitoring requirements and authorize the Division to require other appropriate environmental monitoring.	Operation of the facility would require groundwater monitoring; additional monitoring, including air emissions testing, may be necessary to detect releases of fugitive dust or VOC's during remedial activities.
k. Public Notification Plan, He-P 1905.08 (d)(9).	This provision authorizes the Division to require development of a program to inform the public of the status of facility activities. A public notification plan is appropriate to ensure that the public will receive on-going information as to the implementation of the selected remedy and the status of site closure.	A program for regular notification of the public as to the status of site remediation should be developed.
l. General environmental standards, He-P	This provision requires facilities to comply with specified state and federal	Facility operation must comply with environmental and occupational safety requirements.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT		REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
	1905.08(d)(1).	environmental standards and to provide protection to workers in accordance with state and federal occupational health and safety requirements. Applicable occupational standards include 29 C.F.R. Ch. 1910 (industry standards); 29 C.F.R. Ch. 1926 (safety and health standards); N.H. RSA Ch. 277-A (Worker's Right-to-Know Act); N.H. Admin. Rules He-P Ch. 1800, Part 1803 (Toxic Substances in the Workplace).	
m.	General design standards, He-P 1905.08(d)(2).	This provision establishes general facility design standards to prevent release of hazardous constituents.	Plans for the facility would be required to incorporate these design standards to control releases of hazardous constituents.
n.	Technical Standards for Landfills, He-P 1905.08(f)(1)(f), incorporating by reference 40 C.F.R. §264, Subpart N, and He-P 1905.08 (f)(2)(d).	He-P 1905.08(d)(1)(f) incorporates federal RCRA requirements for landfills, supplemented by additional state standards set forth in He-P 1905.08(f)(2)(d). He-P 1905.08 (f)(2)(d) requires a demonstration that landfill disposal is the only practical way to dispose of wastes, and a description of how the facility will meet specified design requirements.	Disposal by landfill in the State of New Hampshire must be deemed to be the only practical way to dispose of hazardous wastes, after assessing all available waste management alternatives and must meet all other standards set forth in He-P1905.08(d)(1)(f). However, this alternative does not involve on-site disposal of hazardous waste, and these standards would not be applicable unless hazardous waste such as spent activated carbon is designated for in-state landfill disposal.

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
o. Additional Technical Standards for Treatment HE-P 1905.08 (f)(2)(a)	He-P 1905.08(f)(2)(a) requires a demonstration that proposed treatment methods will meet specified design and construction requirements.	A treatment facility must demonstrate that the technology will be effective, will include automatic controls to stop inflow in any continuous flow process, will control toxic gases or fumes, and will meet other design requirements of this provision.
p. He-P 1905.08(f) (2)(c), Storage Standards.	This provision sets forth specified design and construction requirements for facilities which store hazardous wastes.	The storage of hazardous wastes, groundwater treatment residuals, and contaminated soils must minimize any danger to human health or environment, must include mechanisms to prevent and detect releases to the environment, and must otherwise comply with design standards set forth in this provision. This provision, as well as those set forth in paragraph q. through v. below, will be applicable to spent activated carbon and other treatment residuals when stored, transported or recycled.
q. Technical Standards for Waste Piles, He-P 1905.08(f)(1) (d), incorporating by reference 40 C.F.R. 264 Subpart L.	This provision incorporates federal RCRA requirements for waste piles.	Waste piles must be operated in compliance with 40 C.F.R. 264 Subpart L.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
r. Technical Standards for Use and Management of Containers, He-P 1905.08(f)(1)(a), incorporating by reference 40 C.F.R. 264, Subpart I.	This provision incorporates federal RCRA requirements for facilities that store containers of hazardous waste.	The design and management of hazardous waste containers must comply with this provision.
s. Technical Standards for Tanks, He-P 1905.08 (f)(1)(b), Incorporating by Reference 40 C.F.R. 264, Subpart J.	This provision incorporates federal RCRA requirements for facilities using tanks to treat or store hazardous wastes.	The design and maintenance of tanks must comply with this provision, and the facility must implement regular tank inspection and maintenance in compliance with these requirements.
t. Standards for Generators, He-P 1905.06.	This provision establishes requirements applicable to generators, including persons transporting hazardous wastes or treatment residues off-site.	A facility generating wastes for transport offsite must comply with these requirements, including the performance of hazardous waste determinations and the maintenance of records regarding facility activities.
u. Manifesting Requirements He-P 1905.04.	The transport of any hazardous wastes off-site must comply with the manifesting and record-keeping requirements set forth in this provision.	Shipments of hazardous wastes, including treatment residuals, from the site for further treatment or disposal must be properly manifested and handled in accordance with this provision.

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
v. Packaging and Labelling Requirements, He-P 1905.05, incorporating by reference N.H. Admin. Code Saf-C-600 and 49 C.F.R. §§ 172, 173, 178, and 179.	Hazardous wastes transported off-site must be packaged and labelled in accordance with New Hampshire Department of Safety rules and federal transportation requirements.	The packaging and handling of hazardous waste, including treatment residuals, must comply with this provision. Requirements include provisions that containers of hazardous waste must be clearly marked, and transport vehicles placarded prior to transport off-site.
B. SOLID WASTE REQUIREMENTS		
1. RSA Ch. 149-M, New Hampshire Solid Waste Management Act; N.H. Admin. Code He-P Ch. 1901.	These provisions establish standards applicable to the treatment, storage, and disposal of solid waste and the closure of solid waste facilities.	Non-hazardous solid waste onsite must be managed, stored, treated and disposed of in accordance with the Solid Waste Management Act and the rules thereunder.
C. ACTION-SPECIFIC AIR EMISSION LIMITS		
1. N.H. Admin. Code Air Parts 604 through 606.	These provisions establish limits for the emission of air pollutants. See discussion at Section I,D. above.	A hazardous waste facility must comply with the standards set forth in these provisions, including limits on the release of volatile contaminants into the environment.
2. Fugitive Dust Emission Control N.H. Admin. Code Air Part 1002.	This provision requires precautions to prevent, abate and control fugitive dust during specified activities including construction, excavation, and bulk hauling. See N.H. Admin. Code Air 1002.02.	Precautions to control fugitive dust emission during and after site remediation are required under this provision.

II. ACTION-SPECIFIC
APPLICABLE OR RELEVANT AND APPROPRIATE
STATE REQUIREMENTS, TINKHAM GARAGE SITE, LONDONDERRY, NEW HAMPSHIRE

STATE REQUIREMENT	REQUIREMENT SYNOPSIS	ACTION TO BE TAKEN TO ATTAIN ARAR
D. ACTION-SPECIFIC GROUNDWATER PROTECTION LIMITS		
1. RSA 149:8,III; N.H. Admin Code Ws Ch. 410	These provisions establish criteria for groundwater protection. See discussion at Section I, A. above.	Remedial alternative must eliminate discharges to groundwater which do not comply with these standards.
E. ACTION-SPECIFIC SURFACE WATER PROTECTION STANDARDS		
1. RSA Ch. 149, N.H. Admin. Code Ch. Ws 430	These provisions establish criteria for surface water protection. See discussion at Section I, B above.	Remedial alternative must eliminate the discharge to surface water of contaminants, treated effluents or treated groundwater which does not comply with these standards.
2. RSA 149:4-a; N.H. Admin Code Ws Ch. 900, part 904, Pretreatment Standards for Publicly Owned Treatment Works (POTW).	These provisions establish standards for discharges to publicly owned sewage treatment facilities.	The discharge of treated groundwater or other effluent to any POTW must comply with these standards.
F. N.H. SAFE DRINKING WATER ACT		
1. RSA Ch. 148-B; N.H. Admin. Code Ws Part 300	These provisions establish state drinking water standards and govern the location and operation of public water systems.	Remedial alternatives involving the establishment of alternative public drinking water supplies must comply with these standards.

APPENDIX D State of New Hampshire Declaration of Concurrence

State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES
WASTE MANAGEMENT DIVISION
6 Hazen Drive, Concord, NH 03301-6509
603-271-2900

ALDEN H. HOWARD, P.E.
COMMISSIONER
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DIRECTOR
MICHAEL A. SILLS, Ph.D., P.E.
CHIEF ENGINEER

January 13, 1989

Mr. Merrill Hohman
Waste Management Division
USEPA
JFK Federal Building
Boston, MA 02203

Re: Amended Record of Decision (ROD) (December 1988)
Tinkham's Garage Site
Londonderry, NH

Dear Mr. Hohman:

The New Hampshire Department of Environmental Services has reviewed the above referenced amended Record-of-Decision (ROD) and is in agreement with the ecommended amendment. The recommended alternative to utilize vacuum extraction for soil source remediation is consistent with the rules and regulations of applicable or relevant and appropriate state standards (ARARs). Because all the ROD activities at the Tinkham Site will now be completed by the Potentially Responsible Parties (PRP's) under an enforcement lead with EPA, no further State matches will be necessary.

Sincerely,

John A. Minichiello,
Director

Alden H. Howard,
Commissioner

JAM/AHH/jd/02900
cc: Michael A. Sills, Ph. D., P.E., DES-WMD
Carl W. Baxter, P.E., DES-WMD
G. Dana Bisbee, Esq., NHAGO
Gregory Roscoe, EPA - Region I