DECLARATION FOR THE EXPLANATION OF SIGNIFICANT DIFFERENCES FOR CHANGING THE METHOD OF TREATING CONTAMINATED GROUNDWATER AND FOR CHANGING THE METHOD OF CAPPING THE ON-SITE LANDFILL

SITE NAME AND LOCATION

Stamina Mills Superfund Site
North Smithfield, Rhode Island

STATEMENT OF PURPOSE

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences ("ESD") for the Stamina Mills Superfund Site ("Site") in North Smithfield, Rhode Island.

STATUTORY BASIS FOR ISSUANCE OF THE ESD

Under Section 117(c) of CERCLA, 42 U.S.C. § 9617(c), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision ("ROD") for that site, EPA shall publish an explanation of significant differences between the remedial action being undertaken and the remedial action set forth in the ROD and the reasons such changes are being made. The National Contingency Plan (NCP), 40 C.F.R. §300.435(c), and EPA guidance (Office of Solid Waste and Emergency Response ["OSWER"] Directive 9355.3-02), indicate that an ESD, rather than a ROD amendment, is appropriate where the changes being made to the remedy are significant but do not fundamentally alter the overall remedy with respect to scope, performance, or cost. Because the adjustments to the remedy selected in the ROD are significant but do not fundamentally alter the overall remedy with respect to scope, performance, or cost, the issuance of an ESD is appropriate in this case.

In accordance with Section 300.435(c) of the NCP, this ESD and supporting documentation will become part of the Administrative Record which is available for public review at both the EPA Region I Record Center in Boston, Massachusetts and the North Smithfield Public Library in North Smithfield, Rhode Island.

OVERVIEW OF THE ESD

Based on the information and data generated since the issuance of the September 28, 1990, ROD, several portions of the remedy as described in the ROD have been modified:

Treatment of Contaminated Groundwater using Ultraviolet/Peroxide Oxidation

The ROD calls for the active restoration of the groundwater aquifer contaminated with trichloroethylene (TCE) and other volatile organic compounds (VOCs). Contaminated groundwater was to be extracted and treated using the ultraviolet light and hydrogen peroxide (UV/peroxide) technology. At the time of the ROD, the UV/peroxide technology was considered a relatively new an innovative technology and therefore, had a more limited history of full-scale application. The ROD also evaluated the use of air stripping, a more proven technology, for treating TCE and other VOCs found in the groundwater at the Site. Although both technologies were believed to be very effective in removing VOCs, the UV/peroxide system was selected primarily because of its ability to destroy the contaminants present in the groundwater without producing any residual waste streams which would require further treatment. In the event that this innovative technology was not found to be effective, the ROD identified air-stripping with granulated activated carbon (GAC) for treatment of the vapors as the alternative means of treatment.

In 1994, as part of the pre-design process, the Responsible Party for the Site conducted a pilot-test using a UV/peroxide system to treat groundwater from the Site. The testing revealed that the UV/peroxide system was negatively impacted by the levels of dissolved iron and manganese found in the groundwater at the Site. The presence of these dissolved minerals impaired the effectiveness of the treatment system and necessitated the use of additional pre-treatment steps. The pre-treatment steps would in turn generate a residual waste stream thereby eliminating one of the major perceived advantages of the UV/peroxide system over air stripping.

Then in November 1996, during the design process, the Responsible Party came to EPA with a proposal to use a new innovative photocatalytic oxidation technology to destroy VOCs. There were a number of differences between the photocatalytic oxidation and UV/peroxide systems (e.g., the new system destroyed VOCs present in the air phase while the old system destroyed VOCs present in the liquid phase) but again the perceived advantage of the photocatalytic oxidation system was its ability to destroy the contaminants present without producing any residuals which would require further treatment.

The new technology was tested and operated at the Site from May to November of 1998 and 1999. During that time frame the system was used to treat the vapors from the soil vacuum extraction system and the air stripper. Although the photocatalytic oxidation system was found to be very effective in destroying TCE and the other contaminants of concern at the Site, it was difficult to sustain the operation of the system error-free for any significant period of time. As a result the Responsible Party experienced significant and unexpected costs in manpower and resource management in attempting to maintain the operation of the system. In addition, the photocatalytic oxidation technology in its

current configuration was unable to achieve the primary objective of eliminating the production of a residual waste stream. As a result of these issues, the Responsible Party in December of 1999 proposed to eliminate the use of the photocatalytic oxidation system. In its place, the Responsible Party proposed to use air stripping as the primary means of treating groundwater and activated carbon as the primary means of treating VOCs found in the vapors produced by the soil vacuum extraction system and the air stripper. In January of 2000, EPA concurred with the changes proposed by the Responsible Party. The construction of these changes was completed and the treatment system became operational on May 30, 2000.

The use of air stripping and activated carbon will be protective of human health and the environment and would achieve these goals in a cost-effective manner. This method of treatment was specifically identified in the ROD as the alternative means of treatment in the event that the UV based system was not found to be effective. ARARs identified at the time the ROD was signed will continue to be met by this change. Because the basic pump and treat approach remains unaltered and the cleanup levels specified in the ROD will be met by the alternative technology; the change is significant, but not fundamental.

Consolidation of Landfill Wastes and Construction of a RCRA Cap

The ROD called for the consolidation of sediment and landfill wastes and their placement beneath a new multi-layer cap to be constructed over the existing one-half acre landfill. The portions of the capped landfill which were within the 100-year flood plain of the adjacent Branch River were to be further protected by the placement of a layer of rip-rap.

Landfill capping activities were initiated by the Responsible Party during September of 1998. Shortly thereafter, while trying to excavate landfill debris and sediment located at the base of the landfill in the Branch River, a retaining wall supporting the bulk of the landfill began to collapse. All work ceased at that time because of the concern that a large section of the landfill might slough off into the river. After reviewing their options, the Responsible Party came back to EPA with a proposal to remove all landfill wastes from the Site and take these wastes off-site for disposal at a regulated facility. EPA evaluated the proposal and because of its overall greater long-term protectiveness, approved of the request.

Landfill excavation, grading, and seeding activities were completed in October of 1999. The portions of the excavated landfill which were still located in the 100-year flood plain after the final grading, were further protected by the placement of a layer of rip-rap. As the overall management approach for the wastes remains the same (i.e., disposal in a secure landfill), this change is significant but does not fundamentally alter the remedy selected in the ROD. The change is considered equally protective of human health and the environment. ARARs identified at the time the ROD was signed will continue to be met by this change. An additional benefit of the change is that it will likely increase the

opportunities for the beneficial re-use of the property since long-term land use restrictions associated with having a landfill on-site will no longer be needed .

DECLARATION

For the foregoing reasons, by my signature below, I approve the issuance of an Explanation of Significant Differences for the Stamina Mills Superfund Site in North Smithfield, Rhode Island, and the changes stated therein.

6/27/2000
Date

Patricia L. Meaney, Director
Office of Site Remediation & Restoration

Stamina Mills Superfund Site

Explanation of Significant Differences

for Changing the Method of Treating Contaminated Groundwater

and for Changing the Method of Capping the On-site Landfill

June 2000

Prepared by EPA Region I

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EXPLANATION OF SIGNIFICANT DIFFERENCES
STAMINA MILLS SUPERFUND SITE
NORTH SMITHFIELD, RHODE ISLAND

I. INTRODUCTION

This document constitutes a proposed Explanation of Significant Differences ("ESD") between the remedial actions as specified in the Record of Decision for the Stamina Mills Superfund Site signed by the Regional Administrator on September 28, 1990 ("ROD") and those now planned under this proposed ESD. It also documents the conditions that gave rise to the need for this ESD.

A. Site Name, Location, and Description

Site Name: Stamina Mills Superfund Site

Site Location: North Smithfield, Rhode Island

Site Description: The Stamina Mills Superfund Site (the "Site"), a former textile weaving and finishing mill, is located in the Town of North Smithfield approximately 14 miles northwest of Providence, Rhode Island. The Site comprising approximately 5 acres is bounded to the south by the Branch River. A dam constructed immediately adjacent to the Site forms the Forestdale Pond and the western boundary of the Site. The land to the north and east of the Site is largely residential with some commercial use. The area to the south and southwest of the Site is occupied by industrial and commercial facilities, including a fertilizer plant located directly across the river.

In 1969, an unknown quantity of the solvent trichloroethylene (TCE) was spilled at the Site and has since migrated into the soil and bedrock aquifer beneath the Site. The contaminated groundwater has been shown to be hydraulically connected to areas north of the Site and has affected these areas. The Site has remained vacant since a fire destroyed the mill in 1977.

Site investigations by the State of Rhode Island ("State") and the United States Environmental Protection Agency ("EPA") in the late 1970's and early 1980's helped provide sufficient information to have the Site placed on the National Priorities List ("NPL"). These initial studies identified that contaminants from the Site were impacting nearby groundwater and surface water. Some contamination was detected in the private wells of nearby residences who depend on the groundwater as their sole source of potable water. On December 30, 1982, EPA placed the Site on the "Proposed NPL" of hazardous waste sites, and listed it as a final NPL site in September of 1983. An additional description of the Site can be found in the ROD.

B. Identification of Lead and Support Agencies

Lead Agency: United States Environmental Protection Agency
Contact: Neil Handler
Remedial Project Manager
(617) 918-1334

Support Agency: Rhode Island Department of Environmental Management, Office of Waste Management ("RIDEM")

Contact: Matthew DeStefano
Project Manager
(401) 222-3872 Ext. 7141

C. Citation of the Legal Authority that Requires the ESD

Under Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 ("CERCLA"), 42 U.S.C. § 9617(c), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision for that site, EPA shall publish an explanation of significant differences between the remedial action being undertaken and the remedial action set forth in the ROD and the reasons such changes are being made. The National Contingency Plan (NCP), 40 C.F.R. §300.435(c), and EPA guidance (Office of Solid Waste and Emergency Response ["OSWER"] Directive 9355.3-02), indicate that an ESD, rather than a ROD amendment, is appropriate where the changes being made to the remedy are significant but do not fundamentally alter the overall remedy with respect to scope, performance, or cost. Because the adjustments to the remedy selected in the ROD are significant but do not fundamentally alter the overall remedy with respect to scope, performance, or cost, the issuance of an ESD is appropriate in this case.

D. Summary of Significant Differences

EPA issued this proposed ESD because of changes in the remedy selected in the ROD for the method of treating contaminated groundwater and for the method of capping the on-site landfill.

1. Change in Method of Treating Contaminated Groundwater

The ROD calls for the active restoration of the groundwater aquifer contaminated with TCE and other volatile organic compounds (VOCs). Contaminated groundwater is to be extracted and

treated using the ultraviolet light and hydrogen peroxide (UV/peroxide) technology. At the time of the ROD, the UV/peroxide technology was considered a relatively new an innovative technology and therefore, had a more limited history of full-scale application.

The ROD also evaluated the use of air stripping, a more proven technology, for treating TCE and other VOCs found in the groundwater at the Site. Although both technologies were believed to be very effective in removing VOCs, the UV/peroxide system was selected because of its ability to destroy the contaminants present in the groundwater without producing any residual waste streams which would require further treatment. In the event that this innovative technology was not found to be effective, the ROD identified air stripping with granulated activated carbon (GAC) for treatment of the vapors as the alternative means of treatment.

In 1994, as part of the pre-design process, the Responsible Party for the Site conducted a pilot-test using a UV/peroxide system to treat groundwater from the Site. The testing revealed that the technology was not as effective as originally anticipated because of the presence of dissolved iron and manganese in the groundwater at the Site. These minerals were found to interfere with the UV/peroxide system destruction process. To eliminate the long-term operational impacts of these minerals additional pre-treatment steps would be required. These additional pre-treatment steps would in turn create residuals which would require further treatment, thereby eliminating the major perceived advantage of the UV/peroxide technology over air stripping.

Then in November 1996, during the design process, the Responsible Party came to EPA with a proposal to use a new innovative photocatalytic oxidation technology to destroy VOCs. There were a number of differences between the photocatalytic oxidation and UV/peroxide systems (e.g., the new system destroyed VOCs present in the air phase while the old system destroyed VOCs present in the liquid phase) but again the perceived advantage of the photocatalytic oxidation system was its ability to destroy the contaminants present without producing any residuals which would require further treatment.

The new technology was tested and operated at the Site from May to November of 1998 and 1999. During that time frame the system was used to treat the vapors from the soil vacuum extraction system and the air stripper. Although the photocatalytic oxidation system was found to be very effective in destroying TCE and the other contaminants of concern at the Site, it was difficult to sustain the operation of the system error-free for any significant period of time. As a result the Responsible Party experienced significant and unexpected costs in manpower and resource management in attempting to maintain the operation of the system. In addition, the photocatalytic oxidation technology in its current configuration was unable to achieve the primary objective of eliminating the production of any residual waste streams. As a result of these issues, the Responsible Party in December of 1999 proposed to eliminate the use of the

photocatalytic oxidation system. In its place, the Responsible Party proposed to use air stripping as the primary means of treating groundwater and activated carbon as the primary means of treating VOCs found in the vapors produced by the soil vacuum extraction system and the air stripper. In January of 2000, EPA concurred with the changes proposed by the Responsible Party. The construction of these changes was completed and the treatment system became operational on May 30, 2000.

The use of air stripping and activated carbon will be protective of human health and the environment and will achieve these goals in a cost-effective manner. This method of treatment was specifically identified in the ROD as the alternative means of treatment in the event that the UV based system was not found to be effective. ARARs identified at the time the ROD was signed will continue to be met by this change. Because the basic pump and treat approach remains unaltered and the cleanup levels specified in the ROD will be met by the alternative technology; the change is significant, but not fundamental.

2. Change in Method for Capping On-site Landfill

The ROD calls for the consolidation of sediment and landfill wastes located in the Branch River adjacent to the existing one-half acre landfill at the Site. These materials are to be placed beneath a new multi-layer cap to be constructed over the entire landfill. In addition, the portions of the capped landfill which are within the 100-year flood plain of the Branch River are to be further protected by the placement of a layer of rip-rap.

Landfill capping activities were initiated by the Responsible Party during September of 1998. Shortly thereafter, while trying to excavate landfill debris and sediment located in the Branch River at the base of the landfill, a retaining wall supporting the bulk of the landfill began to collapse. All work ceased at that time because of the concern that a large section of the landfill might slough off into the river. After reviewing their options, the Responsible Party came back to EPA with a proposal to remove all landfill wastes from the Site and dispose of these wastes off-site at a regulated facility. EPA evaluated the proposal and because of its overall greater long-term protectiveness, approved of the request.

Excavation activities were initiated by the Responsible Party in November of 1998. Most of the landfill was excavated to bedrock, except for a few areas along the landfill's north and northwest corners. These two areas were excavated until "clean" or natural soils was encountered. Final confirmation that these areas were clean or below ROD mandated cleanup levels was determined through confirmatory soil sampling.

Upon completion of the work in October 1999, approximately 25,000 tons of landfill wastes, soil, and sediment were excavated and disposed of off-site. The disposal facilities selected and the approximate weight of materials disposed of at each is as follows: 1) the Morrow Hollow Landfill in Wendell, Massachusetts - 20,000 tons, 2) the Bardon Trimount facility in Saugus, Massachusetts- 2,225 tons, and 3) the Aggregate Recycling Corporation in Eliot, Maine - 2,150 tons. The Bardon Trimount and Aggregate Recycling Corporation facilities were used for the disposal of oily wastes which were discovered at lower depths in the landfill.

One apparent source of the oily wastes appears to have been a concrete oil bunker located to the west of the landfill and adjacent to the raceway exit. The concrete oil bunker was emptied in 1988 as part of a EPA Removal Action but the structure itself was left in place. As excavation activities neared the bunker location it became apparent that the soil beneath the structure would also require excavation. Accordingly the concrete oil bunker and underlying soil and sediment were excavated and disposed of off-site as part of the landfill excavation activities.

Approximately 5,000 cubic yards of clean fill was used to replace the material excavated from the landfill and attain the final grade. Upon completion of grading, the area was seeded and those portions of the former landfill which were located in the 100-year flood plain of the Branch River were further protected by the placement of a layer of rip-rap. In addition, two sewer-line manholes which are located within the boundaries of the landfill were lowered to the final grade and new watertight covers were installed.

During landfill excavation activities the raceway exit was further uncovered to allow heavy equipment access to the Branch River and to lower portions of the landfill. A large volume of water was observed to be flowing through the raceway exit even though the raceway entrance had been sealed by the Responsible Party in 1992. It is believed that water from the Forestdale Pond, which is upstream of the landfill is migrating through the basement of the former mill building structure and into the raceway. If the raceway were to be sealed then the water flowing through it would back up thereby raising the groundwater levels at the Site. Higher groundwater levels would make it more difficult to achieve the soil cleanup objectives.

With the removal of all landfill wastes from the Site, one of the major concerns and impetus for sealing the raceway was eliminated. Therefore, efforts to seal the raceway exit were not pursued. Rather, the raceway exit was filled with sufficiently sized rip-rap to prevent physical access but not impede the flow of river water through it. No other raceways were discovered during the excavation of the landfill.

The ROD objectives of protecting human health and the environment were met upon completion of the landfill excavation and grading. At approximately the same cost as that estimated for on-

site capping, all landfill wastes and associated soils were excavated and permanently removed from the 100-year flood plain of the Branch River. The landfill wastes and associated soils were disposed of off-site in either a secure landfill or at a recycling facility. The need for dealing with landfill long-term operation and maintenance issues was eliminated and this change will likely increase the opportunities for the beneficial re-use of the property. ARARs identified at the time the ROD was signed will continue to be met by this change. As the overall management approach for the wastes remains the same (i.e., disposal in a secure landfill), this change does not fundamentally alter the remedy selected in the ROD.

E. Availability of Documents

This ESD and supporting documentation shall become part of the Administrative Record file for the Site (NCP 300.825(a)(2)). Information pertinent to EPA's decision making process in publishing this proposed ESD is available for public review at information repositories at the following locations:

EPA Records Center
1 Congress Street, 11th Floor
Boston, Massachusetts
(617) 918-1440
Hours:
Mon-Fri: 10:00 a.m. - 1:00 p.m. and 2:00 p.m. - 5:00 p.m.

North Smithfield Public Library
20 Main Street
Slatersville, Rhode Island
(401) 767-2780
Hours:
Mon-Fri: 9:00 a.m. - 4:00 p.m.

II. SUMMARY OF SITE HISTORY, CONTAMINATION PROBLEMS, RESPONSE HISTORY, AND SELECTED REMEDY

A. Site History and Contamination Problems

Since the early 1900's, the Site has been operated as a textile (cotton and wool) weaving and finishing mill. As part of the manufacturing process, various chemicals were used at the Site. These included detergents and solvents to clean the wool; acids, bases, and dyes to color fabrics;

pesticides and solvents for moth proofing; and plasticizers to coat fabrics. During the 1930's a fire at the Site destroyed one of the mill buildings. A portion of the burned-out foundation was used as a landfill for process wastes until approximately 1968, when it was made into a parking area.

In March of 1969, a solvent scouring system was installed at the mill. The new scouring system used trichloroethylene (TCE) to remove oil and dirt from newly-woven fabric. Shortly after the system was installed, an unknown quantity of TCE was spilled during the filling of an above-ground storage tank. The mill did not attempt to clean up the spill and some of the TCE infiltrated into the soil and entered the groundwater. The mill continued operating the scouring system until the mill closed in 1975. In 1977 a fire destroyed the mill complex, leaving behind rubble, piles of debris, and the remains of the buildings foundation (including a deteriorating smokestack).

In 1979, TCE was detected off-site in the Forestdale Water Association well, a community water system located approximately 800 feet north of the Site. The sampling was then expanded by the Rhode Island Department of Health (RIDOH) to include an additional 51 private residential wells in the nearby vicinity of the Site. As a result, RIDOH found elevated levels of TCE in 18 of these wells and advised area residents to boil water used for drinking and cooking.

In 1981, the State of Rhode Island Water Resources Board and the Town of North Smithfield financed the construction of a municipal water main to serve the residential area north of the Site that had been affected or had the potential to be affected by contamination from the Site. Between 1981 and 1984, only seven of the approximately 50 affected or potentially affected residences had been connected to the municipal water supply, reportedly because of the costs associated with connecting to the water main.

B. Response History

With the placement of the Site on the final National Priorities List in September of 1983, the Site became eligible for Federal funding. During November of 1984, EPA initiated a removal action to extend the existing water line as well as fund the residents' costs for connecting to the municipal water supply. In July 1988, EPA initiated a second removal action at the Site which dealt with two deteriorating underground storage tanks. The contents of both tanks were removed and then treated and disposed of off-site. In August 1990, EPA initiated a third removal action to remove the contents of an above-ground acid storage tank. The contents were treated and disposed of off-site.

In the absence of an offer by Kayser-Roth Corporation (Kayser-Roth), the Responsible Party for the Site, to perform the Site remediation and reimburse the government for past costs, EPA filed suit against Kayser-Roth in federal district court on May 23, 1988. On October 11, 1989, the district court ruled that Kayser-Roth was liable under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) for cleanup costs at the Site. EPA issued Kayser-Roth a Unilateral Administrative Order on June 4, 1991 to perform the overall Site remedy as described in the ROD, after having the district court's ruling affirmed by the Court of Appeals.

The remedy identified in the ROD consists of four primary components: 1) the demolition and removal of partially standing structures and sealing of raceways used to transport water to the mill buildings, 2) the installation of a soil vacuum extraction system in the TCE spill area, 3) the consolidation of sediments and landfill wastes and placement of these wastes underneath a new multi-layered cap to be constructed over the entire existing landfill, and 4) the extraction and treatment of contaminated groundwater from the aquifer beneath the Site. During the summer of 1992, Kayser-Roth completed the building demolition and raceway sealing activities. At that time, partially standing structures were demolished, debris and building rubble were sorted and disposed of, voids were collapsed and filled in, the raceway entrance was sealed, and a majority of the Site was graded and covered with clean fill. Quarterly groundwater monitoring was initiated at the Site in November 1992. The construction of the soil vapor extraction (SVE) system (including the innovative photocatalytic oxidation system) was completed in December of 1997. The SVE system became operational in May 1998. The excavation and grading of the landfill was completed in October 1999. The construction of the groundwater extraction system began in the Spring of 2000 and the system became operational on May 30, 2000.

C. Summary of the Remedy as Originally Described in the ROD

The ROD described in detail each of the alternatives evaluated for remediating the contamination at the Site and the chosen alternative for each contaminated media of the Site. The chosen remedial alternatives are summarized below.

Source Control Components - 1) Soils in the TCE spill area are to be remediated using in-situ vacuum extraction. This will be accomplished through the installation of a number of shallow wells from which air containing TCE and other VOCs will be withdrawn. The air withdrawn from the soil will be treated using activated carbon prior to being discharged. 2) Approximately 550 cubic yards of a mixture of landfill wastes and sediments from within the 100-year flood plain of the Branch River will be excavated and consolidated under the new RCRA multi-layer cap to be installed over the existing landfill at the Site. A leachate collection system will be installed to handle the generation of any leachate. 3) The on-site septic tanks location will be

confirmed and its contents sampled and then disposed of. 4) Institutional controls in the form of deed restrictions will be obtained, if necessary, to regulate land use at the Site.

Management of Migration Components - 1) Active restoration of the contaminated groundwater beneath the Site will take place with a goal of restoring it to drinking water quality as rapidly as possible. EPA estimated in the ROD that the time frame for groundwater restoration will be 10 to 15 years. Extraction of groundwater will take place through the installation of on-site bedrock wells. 2) Extracted groundwater will be treated using the innovative ultraviolet light and hydrogen peroxide technology. 3) Entrances and exits to the raceways which were used to transport water to the mill buildings will be sealed with impermeable barriers. Sections of the raceways which have not been collapsed will be collapsed and backfilled. 4) Long term environmental monitoring of the groundwater and Branch River will be conducted to ensure the effectiveness of the remedy.

Other Miscellaneous Components - 1) Demolition and removal of partially standing buildings at the Site including a deteriorating smokestack. 2) Grading and vegetation of the site upon conclusion of remedial activities.

III. DESCRIPTION OF SIGNIFICANT DIFFERENCES AND THE BASIS FOR THOSE DIFFERENCES

A. Summary of the Information that Gave Rise to Significant Differences

1. Change in Method of Treating Contaminated Groundwater

The use of the innovative ultraviolet light and hydrogen peroxide (UV/peroxide) technology and air stripping to treat extracted groundwater were both evaluated as part of the detailed analysis for the management of migration component in the June 1990, Feasibility Study (FS) for the Site and the ROD. The technologies were evaluated by EPA for their performance, technical reliability, implementability and constructability, safety, compliance with applicable or relevant and appropriate requirements (ARARs), and protectiveness of human health and the environment. Also given important consideration were the overall costs of each alternative.

The principal differences between these two technologies, as identified in the FS, was that the UV/peroxide technology would not generate any residual waste streams requiring further treatment or off-site disposal and that the innovative UV/peroxide technology would be more cost effective to use. EPA acknowledged in the ROD the innovative nature of the UV/peroxide technology and the limited amount of performance data available from full-scale operating

systems by stating that the technology would be further evaluated during the pre-design activities to occur at the Site. In the event that the technology was not found to be effective in achieving the groundwater cleanup levels, the ROD stated that EPA would select air-stripping with carbon polishing as the means for treating the groundwater.

In accordance with the ROD, the Responsible Party conducted additional pre-design testing of the UV/peroxide technology at the Site in 1994. The testing revealed that the technology was not as effective as originally anticipated because of the presence of dissolved iron and manganese in the groundwater at the Site. These minerals were found to interfere with the UV/peroxide system destruction process. The testing showed that in order to eliminate the long-term operational impacts of these minerals, additional pre-treatment steps would have to be used. These pre-treatment steps would in turn produce an additional residual waste stream requiring further treatment. As a result, the major perceived advantage of the UV/peroxide technology over air stripping was eliminated. Also, the cost advantage of the UV/peroxide technology became less significant when the additional capital and operational costs associated with dealing with dissolved metals and residual levels of hydrogen peroxide were factored in.

Then in November 1996, during the design process, the Responsible Party came to EPA with a proposal to use a new innovative photocatalytic oxidation technology to destroy VOCs. There were a number of differences between the photocatalytic oxidation and the UV/peroxide systems (e.g., the new system destroyed VOCs present in the air phase while the old system destroyed VOCs present in the liquid phase) but again the perceived advantage of the photocatalytic oxidation system was its ability to destroy the contaminants present without producing any residuals which would require further treatment.

The new technology was tested and operated at the Site from May to November of 1998 and 1999. During that time frame the system was used to treat the vapors from the soil vacuum extraction system and the air stripper. Although the photocatalytic oxidation system was found to be very effective in destroying TCE and the other contaminants of concern at the Site, it was difficult to sustain the operation of the system error-free for any significant period of time. As a result the Responsible Party experienced significant and unexpected costs in manpower and resource management in attempting to maintain the operation of the system. In addition, the photocatalytic oxidation technology in its current configuration and stage of development was unable to achieve the primary objective of eliminating the production of additional residual waste streams. For these reasons, the Responsible Party in December of 1999 proposed to eliminate the use of the photocatalytic oxidation system. In its place, the Responsible Party proposed the use air stripping as the primary means of treating groundwater and activated carbon as the primary means of treating VOCs found in the vapors from the soil vacuum extraction system and the air stripper. In January of 2000, EPA concurred with the changes proposed by the

Responsible Party. The construction of these changes was completed and the treatment system became operational on May 30, 2000.

In summary, two different UV based systems were tested at the Site and unfortunately both were unable to achieve their primary objective of treating the wastes without producing additional residual waste streams. In addition, the cost advantage of using these systems never materialized due to the operational problems encountered. As a result air stripping and activated carbon, the alternative means of treatment specifically identified in the ROD, was selected for the Site.

2. Change in Method of Capping the On-site Landfill

The ROD calls for the consolidation of sediment and landfill wastes located in the Branch River adjacent to the existing one-half acre landfill at the Site. These materials were to be placed beneath a new multi-layer cap to be constructed over the entire landfill. In addition, the portions of the capped landfill which are within the 100-year flood plain of the Branch River were to be further protected by the placement of a layer of rip-rap.

Landfill capping activities were initiated by the Responsible Party (RP) during September of 1998. Shortly thereafter, while trying to excavate landfill debris and sediment located in the Branch River at the base of the landfill, a retaining wall supporting the bulk of the landfill began to collapse. All work ceased at that time because of the concern that a large section of the landfill might slough off into the river. After reviewing their options, the RP came back to EPA with a proposal to remove all landfill wastes from the Site and take these off-site for disposal at a regulated facility. EPA evaluated the proposal and because of its overall greater long-term protectiveness, approved of the request in October 1998. Landfill excavation and grading activities began in November 1998 and were completed in October 1999.

In summary, engineering and technical issues prevented the implementation of the remedy as described in the ROD. Instead all landfill wastes and associated soils were excavated, disposed of off-site in a regulated facility, and permanently removed from the 100-year flood plain of the Branch River for approximately the same cost as on-site capping. The need for dealing with landfill long-term operation and maintenance issues was eliminated and this change will likely increase the opportunities for the beneficial re-use of the property.

B. Proposed Change in Technology

1. Change in Method of Treating Contaminated Groundwater

Extracted groundwater will be treated using air stripping and then piped to the local POTW. Off-gases from the air stripper as well as the SVE system will be treated using activated carbon. Spent carbon will be shipped off-site and disposed of and/or regenerated in accordance with all Federal, State, and local regulations.

2. Change in Method of Capping the On-site Landfill

All landfill wastes and associated soils were excavated, disposed of off-site in a regulated facility, and permanently removed from the 100-year flood plain of the Branch River. Upon completion of grading, the area was seeded and those portions of the excavated landfill which were still located in the 100-year flood plain of the Branch River were further protected by the placement of a layer of rip-rap. The existing raceway exit adjacent to the landfill was backfilled with rip-rap sufficiently sized to prevent physical access but not impede the flow of river water. The need for dealing with landfill long-term operation and maintenance issues was eliminated and this change will likely increase the opportunities for the beneficial re-use of the property.

IV. SUPPORTING AGENCY COMMENTS

The Rhode Island Department of Environmental Management Office of Waste Management has participated with EPA in developing the change to the selected remedy which are described herein and concurs with the approach adopted by EPA (See Appendix A).

V. AFFIRMATION OF THE STATUTORY REQUIREMENTS

EPA has determined that the selected remedy specified in the ROD, with the above-described changes, remains protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to this remedial action as identified in the ROD, and is cost-effective. In addition, the revised remedy uses permanent solutions and alternative treatment technologies to the maximum extent practicable for this Site.

VI. PUBLIC PARTICIPATION ACTIVITIES

In accordance with Section 117(d) of CERCLA, this ESD will become part of the Site's Administrative Record which is available for public review at both the EPA Region I Record Center at 1 Congress Street, 11th Floor in Boston, Massachusetts (617/918-1440) and at the North Smithfield Public Library in Slatersville, Rhode Island (401/ 767-2780). Additionally, a notice that briefly summarizes the changes and the reasons for making such changes as described in this ESD, was published in a major local newspaper of general circulation.

ATTACHMENT A

RIDEM Concurrence on the ESD

RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

235 Promenade Street, Providence, RI 02908-5767 TDD 401-831-5508

21 June 2000

Mr. Richard Boynton, Chief
NH/RI Superfund Section
Office of Site Remediation and Restoration
U.S. Environmental Protection Agency - Region 1
One Congress Street – Suite 1100
Boston, MA 02114-2023

RE: Stamina Mills Superfund Site, North Smithfield, Rhode Island

Dear Mr. Boynton,

This Office has conducted a review of the Final Explanation of Significant Differences (ESD), dated 12 June 2000, for the remedy at the Stamina Mills Superfund Site. Pursuant to this review, our agency has no further comments on the document. As a result, this Office would like to extend our concurrence with the ESD.

If you have any questions, please feel free to contact me at (401) 277-3872.

Sincerely,

Leo Hellested, P.E., Chief
Office of Waste Management

cc: W. Angell, RIDEM-OWM
M. DeStefano, RIDEM-OWM
N. Handler, USEPA-Region 1