EXPLANATION OF SIGNIFICANT DIFFERENCES

WILLIAMS PROPERTY SUPERFUND SITE

Site Name and Location

Williams Property Site
Middle Township, Cape May County, New Jersey

Statement of Purpose

This document presents a summary of the significant differences between the remedy selected for the site in the 1987 Record of Decision (ROD) and the remedial action as designed. A summary of the information upon which the differences are based is presented.

The following documents were reviewed in preparation of the Explanation of Significant Differences (ESD):

- Administrative Record for the Williams Property Site, as supplemented; and

- Record of Decision for the Williams Property Site, September 29, 1987; and

- Williams Property Remedial Design, Phase II - Task 4, Final Design Report (95% Submission), Lawler, Matusky & Skelly Engineers, September 1992. Prepared for the New Jersey Department of Environmental Protection and Energy (NJDEPE).

Summary of the Record of Decision and Significant Differences

Following the completion of a remedial investigation and feasibility study (RI/FS), EPA issued a ROD with the concurrence of NJDEPE. The ROD was signed on September 29, 1987 selecting the cleanup remedy for the Site.

The selected remedy included the following components:

Ground Water

- Extraction of contaminated ground water from the underlying aquifer;

- Treatment of the extracted ground water by air stripping and carbon adsorption to remove volatile and semi-volatile organic contaminants; and

- Recharge of the treated ground water to the underlying aquifer.

Soils

- Excavation of the contaminated soils at the original spill area which are above NJDEPE interim soil action levels;

- Removal of the excavated soils to an approved off-site disposal facility for incineration; and

- Regrading of the excavated area with clean fill, and revegetation and restoration of the Site.

Water Supply

- Provision of an alternate water supply to residents with individual wells impacted by the Site.

All homes in the vicinity of the Site have been connected to a public water supply system with the exception of the home located on the Site itself. However, the residential well located on the Site was taken out of service, and following a fire, the residence was condemned and subsequently vacated.

In 1991, EPA completed the soil excavation portion of the remedy. This ESD addresses a modification to the selected remedy with respect to the Remedial Design and Remedial Action for the ground water treatment system only. The ESD also serves to document and explain the increased cost for implementation of the remedial action.

The 1987 ROD remedy provides for a pump and treat system to address groundwater contamination. The ground water treatment system included air stripping and carbon adsorption. However, as a result of the 1992 design effort including additional ground water investigations and treatability studies, the following new information was obtained:

- Results of ground water investigations revealed that higher concentrations of contaminants are present in the ground water than were detected during the RI/FS;

- Treatability studies revealed that the higher concentrations of contaminants, particularly the following ketones: acetone; 2-butanone (methyl ethyl ketone (MEK)); and 4-methyl-2-pentanone (methyl isobutyl ketone (MIBK)) could not be effectively treated by the system selected in the ROD;

- Results of an evaluation of new alternatives for treating the contaminated ground water indicated that on-site biological treatment was the only viable alternative;

- The ground water in the vicinity of the Site contains high concentrations of hydrogen sulfide and iron;

- The estimated cost of the ground water pump and treat system as designed lead to a revised cost estimate of approximately $9.2 million for construction and operation and maintenance compared to the $800,000 estimated in the ROD.*

However, it should be noted that costs presented in the ROD were developed during the FS to compare the costs of all alternatives in order to select the most cost effective alternative and do not reflect the actual cost of implementing the remedy.

* The difference in cost between the ground water treatment system in the 1987 ROD and the system as designed can be attributed to several factors and is not based solely on the modifications to the selected remedy to provide for biological treatment. EPA has estimated that factors not attributed to the addition of biological treatment have increased the actual cost of the ground water remedy to approximately $5.9 million. The addition of biological treatment raises the total cost of the remedy (construction and operation and maintenance) by an additional $3.3 million to a total of $9.2 million.

Decisions Concerning Significant Differences

After review of the foregoing information, the following evaluation and decisions were made:

- Due to the elevated level of contaminants, specifically ketones, the remedy selected in the 1987 ROD, treatment via carbon adsorption and air stripping, no longer proves to be a protective, cost effective and implementable method of addressing the ground water contamination;

- Based on recent sampling, treatability studies, and analysis of data, EPA believes that the modified remedy that includes biological treatment is more appropriate based on comparable protectiveness, cost, and implementation time, therefore, the remedy has been modified to exclude air stripping and include biological treatment; and

- Based on the results of the treatability studies, the modified remedy also includes the following treatment processes: hydrogen peroxide to control hydrogen sulfide odors; an iron removal system to protect the activated carbon and reinjection wells from clogging; sulfuric acid to reduce the pH prior to ground water reinjection; and ultra violet disinfection to prevent bacterial growth in the injection wells.

Statutory Determination

Although there were significant increases in the cost associated with the implementation of the 1987 ROD from about $800,000 to approximately $9.2 million, the remedy selected in the ROD is not fundamentally changed. The remedy remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD as applicable or relevant and appropriate to this remedial action at the time the original ROD was signed, and is cost effective. Pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan, EPA may publish an ESD without triggering a new comment period. In this case, however, EPA has elected to provide the public with a 30 day comment period in which to respond to the ESD. In addition, in this case EPA will respond in writing to all comments received pertaining to the ESD. Comments on the ESD and EPA's response to such comments will be published in the Administrative Record for the Site.

William J. Muszynski, P.E.
Acting Regional Administrator

2/11/93
Date

APPROVED ✓

DISAPPROVED _____

Williams Property Site
Middle Township, Cape May County, New Jersey

Explanation of Significant Differences

USEPA - Region 2 February 1993

Statement of Purpose

The purpose for this Explanation of Significant Differences (ESD) is to provide the public with an explanation of the nature of the changes made to the groundwater remedy selected in the September 27, 1987 Record of Decision (ROD) for the Williams Property Superfund Site (the Site). The ESD also serves to document and explain the increased cost for implementation of the remedial action. The remedy for the Site has been modified to account for higher concentrations of contaminants in the ground water detected during the design of the selected remedy that otherwise would not be effectively treated by the system defined in the 1987 ROD. The New Jersey Department of Environmental Protection and Energy (NJDEPE) is the remedial lead agency responsible for the cleanup activities at the Site. The U.S. Environmental Protection Agency (EPA) is supporting NJDEPE in the remediation of the Site. This ESD is issued pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. Section 9617(c) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i) which contains provisions for addressing and documenting changes to a remedy that occur after the ROD is signed. An ESD is issued to comply with such provisions.

The following documents were reviewed in preparation of the ESD:

- Administrative Record for the Williams Property Site
- Record of Decision for the Williams Property Site, September 29, 1987
- Site Investigation, Williams Property Site, Weston REAC, 1990. Prepared for the United States Environmental Protection Agency.
- Soil Gas Sampling Activities, Williams Property Site, Weston REAC, 1991. Prepared for the United States Environmental Protection Agency.
- Williams Property Remedial Design, Phase II - Task 2, Report on Soil Gas Study and Recommended Location for Additional Ground water Monitoring Wells, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.
- Williams Property Remedial Design, Phase II - Task 2, Report on Ground water Monitoring and Recommended Location for Pump Test Wells, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.
- Williams Property Remedial Design, Phase II - Task 2, Report on Pump Test on TW91-1 at the Williams Property, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department Environmental Protection & Energy.
- Williams Property Remedial Design, Phase II - Task 2, Report on Bench-Scale Treatability Studies, Lawler, Matusky & Skelly Engineers, March 1992. Prepared

for the New Jersey Department of Environmental Protection & Energy.

- Williams Property Remedial Design, Phase II - Task 2, Report on Pilot-Scale Treatability Studies, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.

- Williams Property Remedial Design, Phase II - Task 2, Report on Ground water Monitoring and Recommended Configuration of Extraction Wells, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.

- Williams Property Remedial Design, Phase II - Task 2, Report on Bench-Scale Biological Treatability Studies, Lawler, Matusky & Skelly Engineers, March 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.

- Williams Property Remedial Design, Phase II - Task 4, Final Design Report (95% Submission), Lawler, Matusky & Skelly Engineers, September 1992. Prepared for the New Jersey Department of Environmental Protection & Energy.

Summary of the ROD and Significant Differences

Following the completion of the remedial investigation and feasibility study (RI/FS), EPA issued a ROD with the concurrence of NJDEPE. The ROD was signed on September 29, 1987 selecting the cleanup remedy for the Site. The selected remedy included the following components:

Ground Water

- Extraction of contaminated ground water from the underlying aquifer

- Treatment of the extracted ground water by air stripping and carbon adsorption to remove volatile and semi-volatile organic contaminants

- Recharge of the treated ground water to the underlying aquifer

Soils

- Excavation of the contaminated soils at the original spill area which are above NJDEPE interim soil action levels

- Removal of the excavated soils to an approved off-site disposal facility for incineration

- Regrading of the excavated area with clean fill, and revegetation and restoration of the Site

Water Supply

- Provision of an alternate water supply to residents with individual wells impacted by the Site

In 1991, EPA completed the soil excavation portion of the remedy. This ESD pertains only to that portion of the remedy contained in the ROD that addresses the groundwater contamination. Specifically, this ESD addresses an increase in the cost of the remedy and a modification to the groundwater treatment system.

Results of recent groundwater investigations conducted during the remedial design (RD) phase revealed higher concentrations of contaminants in the ground water than were detected during the RI/FS. Treatability studies were conducted in 1991 to evaluate the performance levels achievable through the remedial technologies under Site specific conditions, and to establish engineering and design parameters to fully design the system specified in the ROD. These studies revealed that the higher concentrations of contaminants, particularly the following ketones: acetone, 2-butanone (methyl ethyl ketone (MEK)), and 4-methyl-2-pentanone (methyl isobutyl ketone (MIBK)), could not be effectively treated by the system selected in the ROD.

Based on the results of the treatability studies, the remedy identified by the 1987 ROD was reexamined. Several alternatives for treating the contaminated ground water were examined,

including ultraviolet peroxide oxidation, on-site biological treatment, and off-site biological treatment. However, after further examination, it was determined that on-site biological treatment was the only feasible alternative. As a result, additional studies on the biological treatability of the ground water were conducted. The results of these studies indicate that the higher concentrations of contaminants in the ground water, specifically the ketones, are effectively treated in the biological system. The ground water contaminants that are not readily degraded through biological treatment would still require treatment with activated carbon as conceived in the 1987 ROD. Based on the conclusion of the treatability studies, the remedy has been modified to exclude air stripping and include biological treatment.

Furthermore, the modified remedy includes the following treatment processes: hydrogen peroxide to control hydrogen sulfide odors; an iron removal system to protect the activated carbon and reinjection wells from clogging; sulfuric acid to reduce the pH prior to ground water reinjection; and ultra violet disinfection to prevent bacterial growth in the injection wells.

As part of the remedial design, the construction and operating and maintenance (O&M) costs associated with the remedy were calculated. The estimated cost of the groundwater pump and treat system as designed is approximately $9.2 million for construction and operation. EPA projects the current cost to be approximately eleven times that of the 1987 ROD cost estimate which projected the cost of the groundwater portion of the remedy at approximately $800,000. However, it should be noted that the costs presented in the ROD were developed during the FS primarily to compare the relative costs of all of the remedial alternatives to select the most cost-effective alternative. Remedial action cost estimates are typically better defined during the remedial design phase.

The difference in cost between the groundwater treatment system identified in the 1987 ROD and the system as currently designed can be attributed to several factors and is not based solely on the modifications to the selected remedy to provide for biological treatment. EPA estimates that factors not attributed to the addition of biological treatment have increased the actual cost of the ground water remedy by a total of approximately $5.9 million. The addition of biological treatment has caused the remedy to increase by an additional $3.3 million. The reasons for the increased cost of the ground water remedy at the Williams Property site are summarized below. However, EPA cannot reveal detailed cost information concerning the individual components of this remedy, which were described earlier, because of potential conflicts with the Remedial Action contractor selection process.

1) The 1987 ROD estimate for capital costs for all alternatives are not representative of what the remedy would cost to construct based on 1992 market data. The concept of the extraction and recharge well system envisioned in the 1987 ROD (common to all alternatives) included a single extraction well and recharge well, pumps, pipes and controls. The ROD estimated the total cost of the extraction/recharge equipment to be approximately $33,750. The estimate assumed that each well would cost approximately $2000. The cost of the wells alone would exceed approximately five times that amount today. In addition, the ROD estimated the capital cost for the treatment system (air stripper and carbon adsorption) equipment including installation was at approximately $83,500. Estimates based on current designs for similar projects estimate the current cost of air strippers and carbon adsorption units to be approximately three to four times that of the ROD estimate.

2) In addition to the outdated projection of capital costs, the estimates developed in the FS neglected to include the following components of the remedy; cost of clearing, grubbing, removal of site debris and existing structures, final grading, access road, fencing, disposal of drill cuttings, permits, trench construction, disposal of excavated material, backfill, treatment building, and public water supply. Cost estimates associated with these components were incorporated into the remedial design.

Furthermore, the design of the groundwater extraction/ recharge system has significantly changed from the concept originally developed in the FS. As discussed earlier, the concept envisioned in the ROD included one extraction

well, one recharge well, pumps, pipes and controls, whereas during the design phase, it was determined that two extraction wells and five recharge wells would be necessary. Thus, the cost would increase due to the additional wells required as well as the related additional piping, pumps, controls, trenches, etc..

3) The annual O&M cost estimates developed in the FS included only those costs associated with maintenance of the system, energy consumption, and carbon usage. The ROD did not include an estimate of other operating expenses. For an accurate O&M estimate, the following must also be considered: labor costs; sampling and analysis costs; groundwater monitoring costs; public water usage; and waste disposal costs.

Furthermore, the following costs were not included in the ROD estimate; costs associated with special training for Site workers; the cost of liability insurance; additional costs associated with federal and state contract requirements; medical monitoring costs; costs of a dedicated health and safety person; and costs associated with additional environmental monitoring requirements.

4) The spread of contaminants in the ground water has in part contributed to the increased cost of implementing the ground water remedy. Additional costs associated with the continued downgradient spread of contaminants in the ground water are as follows: cost of additional piping required; costs associated with land acquisition and easements (as the contaminant plume has migrated beyond the Williams property boundaries); costs associated with clearing and grubbing a greater amount of land; and costs associated with the installation of an additional access road needed to access the extraction wells which are now located on an adjacent property.

5) As explained by this document, the groundwater remedy selected in the 1987 ROD has been modified. Major design modifications to the treatment process include the elimination of the air stripping unit and the addition of biological treatment. Minor modifications to the treatment process include the addition of hydrogen peroxide to the ground water influent to reduce odors, an iron removal treatment system to prevent clogging of the activated carbon beds and reinjection wells, the addition of sulfuric acid prior to reinjection to reduce pH, and ultra violet disinfection to control bacteria growth in the injection wells.

Design modifications to the treatment system to include biological treatment and iron removal as part of the ground water remedy have contributed to the increased cost of the remedy. The addition of other treatment processes discussed above have also contributed to the cost increase, however, to a lesser extent.

Treatability studies conducted in 1991 revealed that the concentrations of several contaminants, particularly the ketones, acetone, 2-butanone (methyl ethyl ketone (MEK)), and 4-methyl-2-pentanone (methyl isobutyl ketone (MIBK)), could not be effectively treated by the treatment system selected in the ROD.

Ketones such as acetone, MEK and MIBK might be suspected of being highly susceptible to air stripping due to their high volatility in the pure state. However, they also exhibit high aqueous solubilities and therefore, are not effectively treated by air stripping. In addition, isotherm constants suggest that both MEK and MIBK are relatively poorly adsorbed to activated carbon. Furthermore, acetone's high aqueous solubility suggests relatively poor affinity for activated carbon.

Consequently, although acetone, MEK and MIBK could be addressed by the technologies specified in the ROD, neither air stripping nor activated carbon adsorption is an efficient technology for their removal from water. Operating costs associated with carbon replacement and operation of the air stripper would be extremely high.

These ketones, however, are highly susceptible to biodegradation as demonstrated by the studies conducted on the biological treatability of the ground water at the Williams Property site. The results of these studies indicate that the higher concentrations of contaminants in the ground water, including the ketones, are effectively reduced by the biological system. However, groundwater contaminants that are not readily degraded through biological treatment would still require treatment with activated carbon as originally conceived in the 1987 ROD. Based on

the above information the remedy has been modified to include biological treatment.

The addition of biological treatment has contributed to the increased cost of the ground water remedy (both construction and O&M), however, because it has been determined that the remedy as selected in the Record of Decision would not effectively treat the contaminants present in the ground water, incorporation of a biological treatment system into the remedial design is justified and warranted.

The public may review this ESD and the reference documents which support it. The reference documents are cited at the beginning of the ESD and have been included in the Administrative Record for the site. EPA will accept comments regarding the modifications to the remedy as explained in this ESD for a 30 day period. The public comment period will begin on February 15, 1993, the date which notice will appear in the Atlantic City Press. All written comments should be directed to:

Kelley A. Chase
Remedial Project Manager
U.S. Environmental Protection Agency

26 Federal Plaza, Room 711
New York, New York 10278

Comments must be submitted to the above address, postmarked on or before March 17, 1993. The complete Administrative Record is available at the following repositories for public review:

Cape May County Health Department
Crest Haven Complex
Cape May Court House, New Jersey 08210

U.S. EPA - Region II
26 Federal Plaza
New York, New York 10278

Site History, Contamination Problems, and Selected Remedy

The Williams Property Site is located in a rural/residential area of Swainton, Middle Township, Cape May County, New Jersey. The Site encompasses approximately 10 acres. A series of man-made ponds formed in sand and gravel pits are located approximately 500 feet to the south and 200 feet to the west of the Site.

In August 1979, several hundred drums of liquid chemical wastes were emptied onto the ground adjacent to the Williams residence. In response to the release of chemicals, NJDEPE undertook investigations to determine the impact of the spill on the environment and, in particular, on the ground water. These investigations revealed that a wide variety of organic chemicals and several metals were present in the surficial sludge, the underlying soil, and the ground water. In November 1979, NJDEPE sampling and analysis of residential wells confirmed the presence of organic contaminants in the ground water. In June 1980, as a result of its investigations, NJDEPE conducted an emergency cleanup at the Site removing approximately 1200 cubic yards of "sludge" and soil.

On December 30, 1982, the Site was proposed for inclusion on the National Priorities List (NPL). The Site was formally added to the NPL on September 1, 1983.

In July 1987, through a Cooperative Agreement with EPA, NJDEPE completed a RI/FS for the Site. The purpose of the RI was to characterize the Site contamination and to evaluate the actual or potential risk to human health and the environment posed by that contamination. The RI focused on delineating the horizontal and vertical extent of the soil contamination in the former spill area and confirmed the presence of a downgradient groundwater contaminant plume. The RI revealed that a plume of organic contaminants was present in the groundwater beneath the Site. In 1987, the RI estimated that the plume was traveling directly downgradient to the east-northeast, extended approximately 600 feet from the original spill area, and was estimated to be 300 feet wide at the place where it crossed under Sigetown Road (its widest point).

Organics detected in the ground water during the RI included: methylene chloride, acetone, bis(2-ethylhexyl) phthalate, 1,1,1-trichloroethane, trichloroethylene, tetrachloroethene, xylenes, toluene, 1,1-dichloroethane, ethyl benzene, bis(2-chloroethyl) ether, isophorone, 2-methylphenol,

2-butanone (MEK), 4-methyl-2-pentanone (MIBK), di-n-butylphthalate, benzoic acid, benzyl alcohol, 4-methylphenol, chloroform, phenols, and cyanide.

Metals detected included: aluminum, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, silver, sodium, tin, vanadium, and zinc.

A risk assessment (public health evaluation) was conducted to determine the potential risks to public health and the environment posed by contamination at the Site. The risk assessment is based primarily on data gathered during the field investigation phase of the RI. It incorporates conservative assumptions about pollutant toxicity, exposures, intakes and risks.

The chemicals detected at the Site include volatile organic and inorganic compounds. The 1987 risk assessment focused on the contaminants which were likely to pose the greatest potential risks to human health and the environment (contaminants of concern or indicator chemicals). The chemicals of concern selected are as follows: bis(2-chloroethyl) ether, bis(2-ethylhexyl) phthalate, methylene chloride, tetrachloroethene, 1,1,1-trichloroethane, total xylenes, cadmium, chromium, lead, and nickel.

Groundwater migration is the primary transport pathway for contaminants from the Site. Potentially exposed populations include downgradient private well users. However, all local downgradient homes have been connected to a municipal water supply. The municipal wells are not expected to be impacted by Site contaminants. However, if the contaminated groundwater is not treated, it may eventually threaten residents located further downgradient who rely on private wells.

Following the RI, a Feasibility Study Report was prepared to identify, develop, and evaluate remedial alternatives and applicable technologies to remediate the Site. In addition, remedial alternatives were screened for effectiveness, implementability and cost.

On September 29, 1987, based on the findings of the RI/FS, EPA issued a ROD selecting the cleanup remedy for the Site. The selected remedy addressed both contaminated soil and groundwater. The groundwater portion of the remedy included extraction of contaminated ground water, treatment by air stripping and carbon adsorption, and recharge of the treated ground water to the underlying aquifer. In addition, the remedy included a provision for an alternate water supply to residents with individual wells impacted by the Site. However, at the time of the signing of the ROD, all residences in the immediate vicinity of the Site were connected to a public water supply system except for the residential well located on the Site which was taken out of service.

The soil portion of the remedy included, excavation of the contaminated soils at the original spill area which are above action levels, removal of the excavated soils to an approved off-Site disposal facility for incineration, regrading of the excavated area with clean fill, and revegetation and restoration of the excavated area.

In October 1990, EPA initiated actions to address soil contamination remaining at the Site. Activities included: the construction of gates, the disposal of full and empty 55-gallon drums and 5-gallon pails found on the Site as well as the disposal/recycling of gas cylinders, the excavation and off-site incineration of approximately 1500 tons of contaminated soil, and the installation of warning signs around the Site. These activities were completed in July 1991. By conducting the 1990-1991 work, EPA implemented the soil portion of the remedy as defined in the 1987 ROD.

Description of the Significant Difference Between the 1987 ROD and the Modified Remedy

As previously stated, the selected remedy addresses both the contaminated soil and the groundwater contamination at the Site. However, the soil component was addressed in 1990-1991. This ESD explains changes in the remedial approach to the groundwater component of the remedy and the related cost increases.

The results of investigations conducted during the RI/FS, performed prior to the 1987 ROD, confirmed the presence of a downgradient groundwater contaminant plume originating from the original spill area. The RI revealed that a plume of organic contaminants was present in the ground water beneath the Site.

Following the RI, an FS identified, developed, and evaluated remedial alternatives and applicable technologies available to remediate the contaminated ground water. Based on the results of the RI/FS, the ROD selected a groundwater remedy which provides for a pump and treat system to address groundwater contamination via air stripping and carbon adsorption.

However, the results of recent groundwater investigations conducted during the RD phase revealed that higher concentrations of contaminants are present in the ground water than were detected during the RI/FS.

During the RD phase, the range of concentrations in parts per billion (ppb) of acetone, MEK, and MIBK detected were as follows:

Acetone - 51 ppb - 56,600 ppb
MEK - 62 ppb - 20,400 ppb
MIBK - 16 ppb - 18,900 ppb

At the time of the RI, these contaminants in parts per billion (ppb) were found at significantly lower concentrations. The range of concentrations of acetone, MEK and MIBK detected during the RI were as follows:

Acetone - 3.8 ppb - 530 ppb
MEK - 16 ppb - 34 ppb
MIBK - 59 ppb - 72 ppb

Based on the 1991 monitoring well sampling conducted during the RD, the projected concentrations of organics addressed by the groundwater treatment system are as follows:

Toluene - 3,100 ppb
Acetone - 17,000 ppb
MEK - 7,300 ppb
MIBK - 7,200 ppb
1,1-Dichloroethane - 23 ppb
Xylenes - 43 ppb
Ethylbenzene - 27 ppb
Trichloroethylene - 2 ppb
Isophorone - 330 ppb
Bis(2-Chloroethyl)Ether - 36 ppb
Naphthalene - 1 ppb
Diethylphthalate - 1 ppb

Treatability studies conducted during the RD in 1991, to establish treatability and design parameters for the remedy specified in the ROD (air stripping and carbon adsorption), revealed that the higher concentration of several contaminants, particularly the following ketones: acetone, 2-butanone (methyl ethyl ketone), and 4-methyl-2-pentanone (methyl isobutyl ketone), could not be effectively treated by the system selected in the ROD. The results of the treatability studies at the Site indicated that acetone is poorly treated by air stripping and not treated by activated carbon, and MEK and MIBK are poorly treated by air stripping and marginally treated by activated carbon.

Based on the results of the treatability studies, the remedy identified by the 1987 ROD was reevaluated. Several new alternatives for treating the contaminated ground water were examined, including ultraviolet peroxide oxidation, on-site biological treatment, and off-site biological treatment. It was determined that ultraviolet peroxide oxidation would not be effective in treating the contaminants at the Site and, therefore, this alternative was no longer pursued. Off-site biological treatment by the local publicly owned treatment works (POTW) was investigated, however, the POTW refused to accept the ground water without pretreatment by both carbon adsorption and biological treatment. The pre-treatment requirements imposed by the POTW would result in a treatment system identical to the on-site biological system and therefore, the off-site treatment option was eliminated.

As a result, on-site biological treatment was proposed and additional studies on the biological treatability of the ground water were conducted.

The results of these studies indicate that the higher concentrations of contaminants in the ground water, including the ketones, are effectively reduced by the biological system. However, groundwater contaminants that are not

readily degraded through biological treatment would still require treatment with activated carbon as originally conceived in the 1987 ROD. Based on the conclusion of the treatability studies, the remedy has been modified to exclude air stripping and to include biological treatment.

In addition, the following processes have been included in the final design of the ground water treatment system: hydrogen peroxide to control hydrogen sulfide odors caused by the high concentration of hydrogen sulfide in the ground water; an iron removal treatment system to protect the activated carbon and reinjection wells from clogging; sulfuric acid to reduce the pH prior to ground water reinjection; and ultra violet disinfection to reduce the potential for bacterial growth in the injection wells.

As previously indicated, the elevated level of contaminants, specifically ketones, makes treatment through air stripping and carbon adsorption no longer a protective and cost-effective method for addressing the groundwater contamination. Consequently, EPA is issuing this ESD to notify the public that based on recent sampling and analysis, EPA believes that the modified remedy is more appropriate based on comparable protectiveness and cost.

Although there were significant increases in the cost associated with the implementation of the 1987 ROD from about $800,000 to approximately $9.2 million, the remedy selected in the ROD is not fundamentally changed, and remains protective of human health and the environment, complies with federal and state requirements that were identified in the ROD as applicable or relevant and appropriate to the remedial action at the time the ROD was signed, and is cost effective.