

**RESOURCE CONSERVATION AND RECOVERY ACT
RECORD OF DECISION**

FACILITY NAME AND LOCATION

Atlantic Research Corporation
5945 Wellington Road
Gainesville, Virginia 22065

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected Corrective Measure for the ARC Facility in Gainesville, Virginia. This decision is based on the Administrative Record file for this facility.

DESCRIPTION OF THE CORRECTIVE MEASURE

This action addresses on site soil and groundwater contamination.

The major components of the selected Corrective Measure are the continued pumping and treatment of groundwater at the Facility, shredding approximately 2000 cubic yards of soil contaminated with VOCs to volatilize the soil and placing it back on site and excavating and disposing of approximately 20 cubic yards of inorganic contaminated soil at a RCRA subtitle "C" hazardous waste landfill.

DECLARATION

The selected Corrective Measure is necessary to protect human health or the environment from releases of hazardous waste within the meaning of Section 3008(h) of RCRA, 42 U.S.C. Section 6928(h), from the ARC facility to the environment. The selected Corrective Measure will attain soil and groundwater cleanup standards, will reduce or eliminate to the maximum extent possible further releases of hazardous waste, and provides for proper management of wastes generated during implementation of the Corrective Measure. Furthermore, the selected Corrective Measure will be effective and reliable, both in long term and short term; will result in the reduction of toxicity, mobility or volume of hazardous waste; and will be implementable and cost effective in comparison to the other corrective measure alternatives presented in the EPA approved Corrective Measure Study for the Facility.

Finally, the selected Corrective Measure utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

for 

EDWIN B. ERICKSON
REGIONAL ADMINISTRATOR
U.S. EPA, REGION III

9-30-91
DATE

ATLANTIC RESEARCH CORPORATION
5945 Wellington Road
Gainesville, Virginia 22065

Purpose of EPA's Record of Decision

On May 25, 1989, EPA and Atlantic Research Corporation (ARC) entered into a Consent Order pursuant to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. § 6928(h). Under the terms of this Consent Order, ARC was required to complete an on-site and off-site investigation in order to determine the nature and extent of contamination from the ARC Facility located at 5945 Wellington Road, Gainesville, Virginia and to conduct a study which evaluates various clean-up alternatives.

ARC has completed these investigations and has submitted to EPA for approval a RCRA Facility Investigation (RFI) report a Risk Assessment report and a Corrective Measures Study (CMS), which evaluated the use of several remedial technologies. Five (5) Corrective Measures Alternatives (CMAs) were evaluated in detail for contaminant remediation.

This Record of Decision describes the five CMAs and presents EPA's justification for selecting the preferred Corrective Measures Alternative for the Facility. This document will summarize the findings of the contaminant investigations and the Corrective Measures Study conducted by ARC as well as EPA's rationale for its selection of the EPA preferred Corrective Measure.

On August 26, 1991, a Public Notice soliciting public comment regarding EPA's preliminary identification of a combination of CMAs 1, 3, and 5 as the preferred Corrective Measure appeared in the Gainesville newspaper the Journal Messenger. In addition, on September 12, 1991, EPA held a public meeting at the Stonewall Middle School in Manassas, Virginia to respond to oral comments. As a result of these activities, EPA received written and oral comments. All comments received are addressed in this Record of Decision.

The Regional Administrator, EPA Region III, has made a final determination selecting a combination of CMAs 1, 3 and 5 as the corrective Measure to be implemented at the ARC Facility. This ROD presents EPA's justification for the selection of CMAs 1, 3 and 5.

FACILITY BACKGROUND

The Atlantic Research Corporation Facility, located in Gainesville, Prince William County, Virginia, is depicted on the location map (Attachment 1).

The 420-acre ARC Facility began operations in 1951. ARC is a Department of Defense contractor that tests and manufactures rocket motors and gas generators at its Gainesville Facility. The Facility is comprised of administrative/office buildings, solid rocket propellant and rocket motor production and testing operations, research laboratories, and design technology areas.

Pursuant to Section 3010 of RCRA, 42 U.S.C. § 6930 ARC notified EPA of its hazardous waste activity. In its notification, dated August 18, 1980, ARC identified itself as a generator of hazardous waste and as an owner and operator of a hazardous waste treatment, storage, and disposal facility, for the following hazardous waste: Hazardous waste exhibiting the characteristic of ignitability identified at 40 C.F.R. § 261.21, specifically, hazardous waste no. D001. The Facility submitted a Part B permit application to EPA in November, 1988, for the operation of open burning pits referred to as thermal treatment units at the Facility. ARC is currently responding to comments on the Part B permit.

Numerous and varied waste streams have been generated at the Facility as a result of plant processes. ARC has undertaken several remedial measures to address past disposal and releases of chemical constituents. Two preliminary investigations for volatile organic compounds (VOCs) at the Facility were conducted prior to a study referred to as the "Plan of Action for Environmental Investigation and Interim Remedial Action" (POA) dated November 13, 1987. The first investigation was conducted by ARC in connection with the Prince William County Health Department (December 1986 through mid-February 1987). The second investigation was performed by Groundwater Technology, Inc. (GTI) in conjunction with ARC (March 1987 through May 1987). The GTI preliminary investigation concluded that an environmental and interim remedial program would be required. This conclusion led to the development of the POA which was approved by EPA as an equivalent of an RFI Workplan. ARC also prepared an RFI a Risk Assessment and a CMS report.

The results of these studies are as follows:

- VOC (tetrachloroethene (PCE) and 1,1 - dichloroethene (1,1-DCE) trichloroethene (TCE) contamination exists in groundwater in the north central portion of the facility;
- There is inorganic (metals) arsenic, chromium VI, lead and mercury) contamination in a localized area of soils in the vicinity of Bldg. 28;

- There is VOC (PCE, TCE and 1,1-DCE) contamination in soils in localized areas of Bldgs. 40 and 28;
- The majority of contamination appears to be confined to shallow soils and groundwater. Some surface water contamination is present near the downgradient Facility boundary at the southeastern boundary of the Facility;
- The majority of the soil and groundwater contamination was found in localized areas surrounding select Facility buildings, and;
- Surface runoff and shallow groundwater flow are the major recharge and contaminant transport mechanisms to the Facility streams and surface water bodies.

SUMMARY OF FACILITY RISKS

During the CMS, ARC conducted a Risk Assessment (RA) to assess any threats to human health and the environment and to establish remediation goals. The potential human receptors identified in the RA were workers at the Facility and nearby residents. The most sensitive environmental receptors include the small streams, ponds, and associated wetlands identified at the site.

Based on risk calculations, tetrachloroethene (PCE), 1,1-dichloroethene (1,1-DCE) methylene chloride, hexachlorobenzene, chromium and arsenic are the primary constituents of concern. Chemical constituents have been released to the shallow and bedrock aquifers, and constituents in the shallow groundwater are discharging to the small tributaries on-site at several locations. Chemical constituents releases from the Facility have been documented in surface water; however, concentrations are reduced below detection limits within 4,000 feet downstream.

Current risks to a child (age 6 to 15) playing in the creek downstream of the site were determined to be low: cancer risk of 2×10^{-7} , and a hazard index of 0.06. The cancer risk level of 2×10^{-7} means that two additional persons out of ten million are at risk of developing cancer if the facility is not cleaned up. A hazard index (the ratio of the level of exposure to an acceptable level) greater than 1.0 indicates that the exposure level exceeds the protective level for a particular chemical. The total average hazard index at the Facility is 0.06. There are no individual chemicals at the Facility whose hazard index is greater than 1. Wetland areas and small streams are the ecosystems most sensitive to continued constituent release.

Soil remediation levels are health based and were developed based on the ability of remediated soil to contaminate the shallow groundwater and also to be protective of the direct

contact potential for an onsite worker. Groundwater remediation levels are Maximum Contaminant Levels (MCLs). An MCL is the maximum permissible level of a contaminant in drinking water delivered by a public water system. See 40 C.F.R. § 141.2. The remediation levels for soil are for 4 parts per million (ppm) of PCE at Building 40 and 2 ppm of PCE at Building 28, 0.5 ppm of 1,1-DCE at Building 28 and 0.9 ppm at Building 28. The reason that the remediation levels are different for the same contaminant is because the depth to the groundwater table at Building 40 is greater than that at Building 28, therefore, it would take a smaller concentration of a chemical to contaminate the groundwater at Building 28.

The contaminated groundwater is a potential threat at the site because of the potential for direct ingestion of untreated water through the Facility drinking water wells. The contaminated soil is a potential threat to the on-site worker, because of potential contact and ingestion of soil and inhalation of volatilized contaminants.

Actual or threatened releases of hazardous constituents from this Facility, if not addressed by the proposed remedy or one of the other remedies considered, may present a current or potential threat to human health and the environment.

SCOPE OF CORRECTIVE ACTION

- Remediation of VOC-contaminated soils in localized areas of Bldgs. 40 & 28;
- Remediation of inorganic (metals) contaminated soil in the area of Bldg. 28; and
- Remediation of VOC-contaminated groundwater in the north central portion of the Facility.

The cleanup objectives of the proposed Corrective Measure Alternatives are to prevent current or future exposure to the contaminated groundwater and soils through well pumping and treatment, soil treatment and/or excavation, and to reduce the likelihood of groundwater contamination migrating to drinking water wells and the contamination from the soil to the groundwater.

SUMMARY OF ALTERNATIVES

The proposed Corrective Measure Alternatives (CMAs) are as follows:

No Action

The "no action" alternative is often evaluated to establish a baseline for comparison. Under this alternative no additional remedial actions would be undertaken and the existing groundwater recovery and treatment system would be stopped. Also, the soil contamination, both the VOCs and the inorganic metals contamination would be left in place. This CMA is not being considered as the CMA because stopping the groundwater pump and treat system would result in an increase in contamination in on-site drinking water wells and possibly increase the size of the existing plume to include off-site wells. Leaving soil contamination in place would also present a inhalation and dermal contact risk to workers at the Facility. Contaminated soil could also leach to the groundwater causing additional environmental impacts to drinking water at the Facility.

SOIL WITH VOC REMEDIATION

CMA-1 Excavation and Soil Shredding with On-Site Redeposition (VOC Removal from Soils)

The 2000 cubic yards of VOC contaminated soils from the areas of Buildings 40 & 28 would be excavated. To remove the highly mobile VOCs, the soil would be subjected to grinding and vibratory screening in order to bring about volatilization. Volatilization can be enhanced by inducing air flow during the process. Pollution control equipment would be used to prevent any atmospheric emissions. The actual shredding of the soil would take place in a enclosed pugmill unit. The shredder would be a containerized unit and not a land based system. The soil would be redeposited on site as clean-fill. If the average residual level of PCE in soil after shredding is above the remediation level, the soil would be vented in a treatment cell until average residual levels are below remediation levels. The cost of this alternative is approximately \$1,152,000. The soil shredding process is expected to be completed in one to two weeks. Venting of treated soil if required, is expected to be completed in one to six months.

CMA-2 Vacuum Extraction
(VOC Removal from Soils)

Vacuum extraction would be performed on the contaminated soil for the removal of VOCs from the vadose (unsaturated zone) of soils. Once a contaminated area is defined, an extraction well(s) would be installed. The vacuum system induces air flow through the soil, stripping and volatilizing the VOCs from the soil matrix into the air stream. Some groundwater is generally extracted along with the contaminated air, either through entrainment or by using a separate groundwater pump. The two phases groundwater and air would flow to a vapor/liquid separator which would separate contaminated water from contaminated air. Contaminated air streams would be treated via activated carbon canisters. An air stripper may be used to treat the VOCs in groundwater. Air effluent from the air stripper, if used, would also be treated with activated carbon. The cost for this alternative is approximately \$1,447,000 for one year of treatment, and approximately \$2,334,000 and \$3,191,000 for two and three years of treatment, respectively. This alternative would require at least a minimum of one year to complete.

SOIL WITH INORGANICS (METALS) REMEDIATION

CMA-3 Excavation Off-Site Treatment and Disposal
(Inorganics in soil)

Approximately 20 cubic yards of contaminated soil from the area of Bldg. 28 would be excavated and transported from the Facility to an off-site treatment facility where it would be solidified; the solidified soil would then be disposed in a RCRA Subtitle "C" hazardous waste landfill. The excavated area would be backfilled with approximately 20 cubic yards of clean soil. Confirmation samples would be collected from the walls and floor of the excavated area to ensure that soils contaminated with inorganics at levels above the Soil Remediation Levels are removed. The cost for this alternative is approximately \$55,000 and is expected to be completed in two weeks to one month.

CMA-4 Excavation and Solidification with Redeposition On-Site
(inorganics Removals from Soils)

Contaminated soil from the area of Bldg. 28 would be excavated and then solidified. Solidification, also known as stabilization or fixation, facilitates a chemical or physical reduction of the mobility of hazardous constituents. In other words, hazardous constituents in the soil would be stabilized and thus, would be less likely to migrate. This immobilization occurs by one or more of the following processes: encapsulation, adsorption, and incorporation into the crystalline structure of the solidified material. The result of the solidification process is that the hazardous constituents are bound into a solid mass with a low permeability that resists leaching. The primary

design specifications are that the treated soil would pass the TCLP extraction test for inorganics and have a hydraulic conductivity of less than 1×10^{-6} cm/sec. The mix agents required to achieve these design specifications will be established by a bench scale treatability study conducted during the corrective measures design phase of the project. The cost for this alternative is approximately \$92,000 for one year and an additional cost of \$150,000 for 30 years of monitoring. The total cost of this alternative is \$242,000. The alternative is not being considered by ARC because it would be difficult to implement at the Facility and solidified soil over time would eventually breakdown through natural physical processes.

GROUNDWATER WITH VOCs REMEDIATION

CMA-5 Pumping and Treatment for VOC Removal in Groundwater

This alternative would utilize an existing pump and treat system which was installed as an interim measure to provide drinking water to the Facility operations. The deep groundwater would be pumped from existing wells, which have been shown to capture the contaminant plume. The current treatment system consists of air strippers and carbon adsorption units. Recovered water would be treated by air stripping to remove VOCs and achieve discharge permit limitations. Treated water would then be discharged to on-site streams. The cost for this alternative is approximately \$75,000 for the first year and \$55,000 per year there after. Costs include operations and maintenance costs. This alternative would take approximately 10 years to remediate the contamination in the groundwater below MCLs.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

The proposed remedy for remediating soils contaminated with VOCs is Alternative-1 (Excavation and soil shredding with on-site redeposition). The proposed remedy for soil contaminated with inorganics (metals) is (Alternative-3 Excavation off-site treatment and disposal. The proposed remedy for groundwater contaminated with VOCs is Alternative-5 (Pump and Treat Groundwater utilizing air strippers and carbon adsorption units). EPA prefers the combination of CMAs 1, 3 and 5 because they are proven technologies and are protective of human health and the environment. Alternatives 2 and 4 are also proven technologies, however, the time needed to remediate the site using these alternatives is not as expeditious as Alternatives 1, 3 and 5. This section profiles the performance of the proposed remedy against the four general standards and the five remedy decision factors noting how it compares to the other options under consideration.

1. Overall Protection - All of the alternatives, with the exception of the "no action" alternative, would provide adequate protection of human health and the environment by eliminating, reducing, or controlling risk through treatment, engineering controls, or institutional controls. The proposed remedy would treat the volatile organic compounds in the soils, excavate and transport the inorganic contaminated soil off site and pump and treat the VOC-contaminated groundwater. These (3) three alternatives used in tandem would reduce the risks associated with direct contact of the soils and minimize the migration of contaminated groundwater.

Because the "no action" alternative is not protective of human health and the environment, it is not considered further in this analysis as an option for this Facility.

2. Attainment of Media Cleanup Standards - All alternatives would meet their respective health-based, Maximum Contaminant Level (MCL), and 10^{-6} cancer risk-based level cleanup standards of Federal and State environmental laws. Because the proposed remedy would involve the excavation and placement of hazardous waste, compliance with all applicable land disposal restrictions (LDR) standards would be achieved.

3. Controlling the Sources of Releases - All of the alternatives would be effective in reducing, to the maximum extent practicable, further releases of contaminants to the groundwater, surface water, air and other soils. The proposed remedy would remove the VOC contamination in the soils through volatilization and remove the inorganic (metals) contaminated soils by excavation off-site treatment and disposal. Groundwater contamination would be effectively reduced by pumping and treatment.

4. Compliance with Waste Management Standards - Alternatives 1, 2, 3 and 4 which involve soil excavation, shredding, vacuum extraction and either treatment, placement, or off-site disposal, would comply with the applicable requirements for the management of solid waste. This would assure that the management of wastes is conducted in a protective manner. Alternative 5, which involves pumping and treating of contaminated groundwater would also comply with the requirements for the management of contaminated groundwater. ARC will also be required to comply with all applicable Virginia Department of Waste Management Hazardous Waste Management Standards.

5. Long-term Reliability and Effectiveness - Alternative 1 would permanently and effectively remove VOCs from the soil matrix. If the average residual level of PCE in soil after shredding is above the remediation level, the soil will be vented in a treatment cell until average residual levels are below remediation levels.

Alternative 2 would also permanently remove inorganic contamination exceeding soil remediation levels. No long-term controls would be required because the soil would be transported for off-site disposal. The remedy would completely remove the contaminants in the soil thus eliminating a potential source of contamination. Also, the remedy would prevent exposure to workers and possible migration of inorganics to groundwater.

The long-term effects of Alternative 5 is the steady reduction of concentrations of contaminants of concern and the corresponding reduction in potential dispersion and migration of the contaminants of concern.

The long term reliability and effectiveness of Alternatives 1 and 3 will be evaluated through continuous monitoring of the treated soil and the points of compliance established in the groundwater pump and treat system.

The two remedies that are not being considered both have long-term reliability and effectiveness, however, the constant monitoring required with vacuum extracted and solidified soil would reduce its effectiveness.

6. Reduction of Toxicity, Mobility, or Volume of Wastes ("TMVW") - Alternative 3 would eliminate the toxicity, mobility, or volume of the inorganics because the inorganic contaminated soil would no longer be on Facility property. Alternative 1 would reduce the toxicity of the waste via volatilization of VOCs at the site. Use of treatment cells would reduce the mobility of the waste. Alternative 5 would reduce the toxicity, mobility, or volume of waste by stripping the VOCs from the groundwater and capturing the effluent with carbon adsorption units. Alternatives 2 and 4 would both reduce the toxicity, mobility, or volume of wastes. Alternative 2 would reduce the concentration of VOCs in the soils and Alternative 4 would reduce the toxicity and mobility of the inorganics by solidifying the soil.

7. Short-term Effectiveness - Alternative 1 would rapidly achieve an overall reduction of concentrations of contaminants of concern. The soil shredding process would reduce concentrations of VOCs more quickly than natural attenuation. Alternative 3 would rapidly eliminate concentrations of contaminants of concern (inorganics) and migration. Alternative 5 would steadily reduce the concentrations of the contaminants of concern (VOCs) and immediately reduce the migration of the contaminants of concern. Alternative 2 would not have short-term effectiveness because the reduction in VOC concentration would not occur immediately after the implementation of the extraction system. Alternative 4 would rapidly bind chemicals even more tightly to the mass in place, however, constituents of concern would remain in the environment they are not removed only immobilized.

8. Implementability - Alternative 1 must recognize and comply with LDRs. The shredder system would include an enclosed pugmill where conditioning of the soil would occur and would use air to strip the VOCs from the soil. Alternative 3 can be readily implemented since no construction is involved with the exception of possible structural impacts to nearby buildings. The logistics of excavating soil so close to an existing building will need to be determined prior to initiation of excavation. A backhoe used for excavation is easily accessible and several RCRA-permitted landfills are available to accept the soil. Since the pumping wells, points of compliance wells and treatment system are already in place, Alternative 5 can be easily implemented. However, depending on the performance of the groundwater pump and treat system it may have to be modified or additional wells may need to be added. Alternative 2 could also be implemented at the Facility. Vent points would be installed and pipes would run above ground to a treatment area, where air would be treated and water would be treated or stored for removal. Alternative 4 would be difficult to implement at the Facility.

9. Costs - The combined present worth cost of the proposed remedy which consists of Alternatives 1, 3 and 5 is \$1,282,000. The cost of Alternative 2 is approximately \$1,447,000 for one year of treatment, and approximately \$2,334,000 and \$3,191,000 for two and three years of treatment respectively. The cost of Alternative 4 is approximately \$92,000 for one year, and an additional cost of \$150,000 for 30 years of monitoring, with a total cost is \$242,000.

In summary, Alternatives 1, 3, and 5 would achieve substantial risk reduction through treatment of the VOC-contaminated soil, total excavation of the inorganic (metals) contaminated soil and pumping and treatment of the VOC-contaminated groundwater. Because they would achieve risk reduction more quickly than any other combination of alternatives EPA has selected Alternatives 1, 3 and 5 as the selected remedy. Based on information currently available, the proposed remedy provides the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. EPA believes that the proposed remedy would be protective of human health and the environment; attain media cleanup standards consistent with those proposed under 40 C.F.R. § 264.525(d) and (e); control the sources of releases so as to reduce or eliminate to the maximum extent practicable, further releases; and comply with applicable standards for management of waste.

FINAL DECISION AND RESPONSE TO COMMENTS ATLANTIC RESEARCH CORPORATION

Introduction

This document will provide a response to all significant comments received by the U.S. Environmental Protection Agency (EPA) regarding the proposed corrective measures for remediating contaminated soil and groundwater at the Atlantic Research Corporation (ARC) Facility located in Gainesville, Virginia.

The comments addressed by EPA in this Response to Comments were raised during the public comment period for the Facility. The public was encouraged to review and comment on all remedial alternatives because EPA can modify the proposed remedy or select another remedy based on new information or public comments.

All comments received by EPA during the public comment period have been reviewed and considered by EPA prior to the issuance of the Record of Decision for the ARC Facility. These comments/questions, as well as EPA's responses, are recorded in the following sections.

The Selected Remedy

EPA's selected remedy for remediation of contaminated soil and groundwater at the ARC Facility is a combination of three of the proposed Corrective Measures Alternatives (CMA) for the Facility. The selected remedy calls for: 1) excavating approximately 2,000 cubic yards of soil, shredding and treating the soil in a closed tank system and redepositing the soil in the same area it was excavated on the Facility Property (CMA-1; Soil with Volatile Organic Compounds (VOCs)); 2) excavating approximately 20 cubic yards of soil and treating it at an off-site treatment facility and disposing the soil in an off-site RCRA subtitle "C" hazardous waste landfill (CMA-3; Soil with Inorganics (Metals)); 3) pumping and treating groundwater utilizing air strippers and carbon adsorption units (CMA-5; Groundwater with Volatile Organic Contaminants (VOCs)).

These selected corrective measures, as well as all of the proposed remedies, were evaluated by EPA using these nine criteria: 1) Overall Protection; 2) Attainment of Media Cleanup Standards; 3) Controlling the Sources of Releases; 4) Compliance with Waste Management Standards; 5) Long-term Reliability and Effectiveness; 6) Reduction of Toxicity, Mobility or Volume of Wastes; 7) Short-term Effectiveness; 8) Implementability; 9) Costs.

After evaluating all of the proposed remedies against the nine criteria listed above, EPA determined that a combination of Alternatives 1, 3 and 5 will achieve substantial risk reduction through treatment of the VOC-contaminated soil, total excavation of the inorganic (metals) contaminated soil and pumping and treatment of the VOC contaminated groundwater. EPA selected this combination of remedial alternatives because they will achieve risk reduction more quickly than any other combination of alternatives. The proposed remedy provides the best balance among the alternatives with respect to the evaluation criteria. EPA has determined that the proposed remedy will be protective of human health and the environment; attain media cleanup standards consistent with those proposed under 40 C.F.R. 264.525(d) and (e); control the sources of releases so as to reduce or eliminate, to the maximum extent practicable, further releases; and comply with applicable standards for management of waste.

Public Participation Activities

EPA held a public comment period to receive comments on the corrective measures evaluated for the Facility from August 26, 1991 through September 25, 1991. EPA also held a public meeting on the proposed corrective measures on September 12, 1991 at the Stonewall Middle School, 10100 Lomond Drive, Manassas, Virginia. Both the commencement of the public comment period and the date and location of public meeting were advertised in The Journal Messenger on August 26, 1991.

The majority of the comments received by EPA at the public meeting and in writing were raised by Vulcan Lands Company, owner of land located to the south of the ARC Facility and by Gainesville Associates, owner of the property on which the ARC Facility is located. The following section summarizes comments received and is divided into the following subsections: comments received from the Virginia Department of Waste Management, comments received from ARC, comments receiving during the public meeting, comments received from Gainesville Associates, and comments received from Vulcan Lands Company.

Comments by the Commonwealth of Virginia Department of Waste Management (VDWM)

1. On Page 1 of the Statement of Basis (SB) entitled Proposed Remedy, subsection entitled CMA-1: Soil with VOCS, "The proposed unit would have to meet all Virginia Hazardous Waste Management Regulations (VHWMR) standards for treatment of hazardous waste in a tank including change during interim status or a final permit, secondary containment, closure plan, subsequent VHWMR closure, etc."

EPA Response: Implementation of the selected corrective measure does not obviate the requirement to obtain all necessary permits to implement the Corrective Measures.

2. On Page 4 of the SB, section entitled: Summary of Facility Risks, "The discussion regarding health based remediation levels for contaminated soils are only applicable to in-situ treatment of in-place soils. Health based cleanup levels would not be acceptable as a criteria for redepositing soils contaminated with listed hazardous wastes that have been excavated and treated. Any such soils would have to be de-listed and a permit under the Virginia Solid Waste Management Regulations would have to be obtained prior to redeposition."

EPA Response: According to EPA's RCRA Contained-In Policy developed at EPA headquarters in Washington, health-based remediation levels for contaminated soils can be redeposited after treatment. Also according to an EPA memo of October 9, 1990 Lawrence to Ulrich states that if soil is treated such that concentrations of the listed wastes are at or below health base levels, the soil would no longer "contain" the hazardous wastes, and therefore would longer be subject to Subtitle C regulation. Also, refer to the March 26, 1991 letter from Sylvia K. Lowrance of EPA to John Ely Enforcement Director of the VADWM.

3. On Page 5 of the SB, section entitled: Soil With VOC Remediation, subsection entitled: CMA-1 Excavation and Soil Shredding With On-Site Redeposition (VOC Removal From Soils) VDWM comments that "as stated under #1, all VHWMR tank standards would have to be complied with. Treated soils that were contaminated with hazardous wastes may not be redeposited unless a delisting and appropriate permits are first obtained."

EPA Response: Atlantic Research Corporation will obtain all appropriate permits to implement the Corrective Measures.

4. VDWM comments that on Page 6, section entitled: Soil With VOC Remediation, subsection entitled: CMA-2 Vacuum Extraction (VOC Removal From Soils), "Activated carbon from the vacuum extraction unit would be regulated as listed hazardous waste and must be managed as such."

EPA Response: If Alternative 2 had been selected, the activated carbon would be managed as hazardous waste. EPA did not, however, select Alternative 2 as part of the remedy.

5. VDWM comments that on Page 6, section entitled: Soils with Inorganics (Metals) Remediation (CMA-3), "This alternative appears to assume that metals are the sole contaminants of concern. All contaminated soils removed from the site should be evaluated for presence of listed hazardous waste constituents and a complete hazardous waste determination must be made. Treatment of such soils must utilize all applicable Best Demonstrated Available Technologies (BDAT) and disposal must comply with all applicable Land Disposal Restrictions (LDR)."

EPA Response: Atlantic Research Corporation plans to use the BDAT technologies and disposal will comply with LDR.

6. VDWM comments that on Page 6, section entitled: Soils with Inorganics (Metals) Remediation (CMA-4), "Although this is not a recommended alternative, the Facility must first request and receive interim status (or a final permit) to operate any hazardous waste treatment unit on-site. The Facility would have to comply with all applicable VHWMR Part IX (or Part X, as applicable) standards including follow-up closure. A permit under the Virginia Solid Waste Management Regulations would also be necessary prior to redeposition of treated soils."

EPA Response: EPA did not select Alternative 4 as part of the remedy at the Atlantic Research Corporation Facility.

7. VDWM comments that on Page 7, section entitled: Groundwater With VOCS Remediation (CMA-5), "Spent packing material (if any) and/or spent carbon contaminated with listed hazardous waste would be regulated as listed hazardous waste and must be managed as such in accordance with all applicable VHWMR requirements."

EPA Response: Atlantic Research Corporation will obtain all appropriate permits to implement the Corrective Measures.

8. VDWM comments that on Page 8, Item 4, Compliance With Waste Management Standards, "This section should include a clear statement which requires the Facility to comply with all applicable Virginia Hazardous Waste Management Regulations."

EPA Response: EPA will include such a statement.

9. VDWM comments that on Page 9, Long-term Reliability and Effectiveness (Paragraph 1), "The Department requests that an appropriate statistical methodology be utilized to determine the effectiveness of any remediation alternative. Utilization of "average" residual levels to assess the effectiveness of treatment alternatives could result in unacceptably high levels of contamination being left after completion of the corrective action activities."

EPA Response: Atlantic Research Corporation will implement the statistical methodology to determine the effectiveness of any remediation alternatives. The approach to this concept will be addressed during the CMI stage.

10. VDWM comments that on Page 11, beginning with In Summary..." The Department requests that "Commonwealth of Virginia" be deleted from the

language in this paragraph. It is not appropriate to include an endorsement from the Commonwealth unless the order/agreement is a joint EPA/Commonwealth action. Although there has been some discussion related to the proposed actions between EPA and the Department staff, Department involvement has been minimal and a thorough technical review by staff has not been completed. EPA, as signatory to the Corrective Action Consent Order, has had sole authority to prepare and review all documents and proposals pursuant to the corrective action requirements."

EPA Response: EPA will delete the phrase "Commonwealth of Virginia". The Commonwealth of Virginia had received copies of all deliverables pursuant to the Consent Order at the same time as EPA. EPA had requested comments on these deliverables from the Commonwealth throughout the investigation and selection process.

Comments Submitted by ARC on the Statement of Basis

1. In the Administrative Record File, Index of Documents, a reference is made to the Facility Remediation Corrective Measure Study (CMS) as a "final" report.

ARC would like to clarify that the CMS was not final at the time EPA published the public notice and made the Statement of Basis and administrative record available to the public (August 26). Rather, EPA had submitted preliminary comments to ARC based on their review of the CMS as submitted by ARC on April 15, 1991, and had requested a meeting in late June or early July to discuss these comments. The meeting took place on July 18, during which ARC addressed all comments provided by EPA and agreement was reached as to what changes were required to the CMS. Since the meeting, ARC received formal comments from EPA dated August 29, 1991, requesting the CMS be revised and submitted within 30 days. ARC is submitting a revised CMS in late September, along with a "response to comment" document that addresses each of EPA's formal comments and refers to changes made in the CMS and/or to agreement reached with EPA at the July 18 meeting.

EPA Response: EPA made its decision based on information contained in the current CMS report. The Statement of Basis reflects the changes that EPA and ARC discussed.

2. Page 1, Introduction - There is no specific reference made to the Risk Assessment report.

The Risk Assessment was required under the 3008(h) Corrective Action Consent Order, the performance of which assessed any threats to human health and the environment. This report, and the accompanying addendum, are the basis for the determination of remediation requirements and health-based cleanup levels at the facility. As such, ARC believes it is important to note that the risk assessment was conducted in conjunction with the RCRA Facility Investigation (RFI) and the CMS, and to identify the existence of the document in the Introduction.

EPA Response: EPA will make reference to the Risk Assessment in its final Record of Decision.

3. The Administrative Record File, Index of Documents - the Interim Risk Assessment Report Addendum (December 13, 1991) was not included in the list of documents.

EPA Response: The Statement of Basis reflects the information contained in the Interim Risk Assessment Report Addendum and will be referred to in the Record of Decision.

4. Page 3, Facility Background (top of page) - The statement that "the Plan of Action (POA) which was approved by EPA as an equivalent of an RFI report" is incorrect.

The POA was approved by EPA and accepted as a RCRA Facility Investigation (RFI) and Interim Measures (IM) work plan, and as such, was incorporated into the 3008(h) order. The report was not the equivalent of an RFI, which the consent order required to be conducted. Possibly, what was meant was the POA was accepted as a RCRA Facility Assessment (RFA).

EPA Response: The statement should read "The POA was approved by EPA as an RFI Work Plan Report."

5. Page 3, Facility Background - A brief summary of the results of the studies conducted at the facility is presented, but again, there is no reference to the risk assessment that was conducted.

ARC believes that this summary is in fact so brief as to be potentially misleading. The results should be restated such that reference is made to contaminants in the various media at the areas identified exceeding the health-

based remediation levels that were developed based on the risk assessment conducted to assess any threats to human health and the environment at or near the facility. There are obviously other areas of contamination onsite that do not require remediation because the levels of contamination are below remediation levels and pose no threat to human health and the environment, as determined by risk assessment. That the risk assessment was required by EPA and followed available EPA guidance, which is highly conservative in its approach, and that the remediation requirements and cleanup levels have been accepted by EPA, are important points to emphasize to alleviate potentially unnecessary public concern.

EPA Response: The reference to the Risk Assessment will be included in the Record of Decision.

6. Page 4, Summary of Facility Risks - There is a statement that "Contaminated groundwater is a potential threat at the site because of the potential for direct ingestion of contaminants through the Facility drinking water wells."

ARC believes that this statement requires clarification. The potential threat is from ingestion of untreated water directly from the drinking water wells. There is, however, a water treatment system that was installed at the facility to remove any contaminants and provide potable water meeting all drinking water criteria. This existing pump and treat system, consisting of air stripping and carbon adsorption units, is Corrective Measure Alternative (CMA) #5. Also, there will be a switch to the County supplied water system once the County system is operating in that area. This is scheduled for late 1991 or early 1992.

EPA Response: EPA will clarify the Statement to read "The potential threat is from ingestion of untreated water directly from the drinking water wells." EPA will also include in that statement a reference to the existing pump and treat system at the facility.

7. Page 5, Soil with VOC Remediation, CMA-1 - The cost presented for this alternative is underestimated.

Based on comments from EPA and the Virginia Department of Waste Management (VDWM), the CMS is being revised to reflect the requirement that soil treatment, as described in CMA-1, is to be conducted in a tank system meeting RCRA requirements rather than in a land-based RCRA unit meeting minimum technology requirements, as proposed in the CMS submittal of April 15. This requirement will increase the cost of the treatment, as will be reflected in the revised CMS. Air pollution control equipment, if

determined to be necessary, will also increase the cost of this alternative.

EPA Response: EPA stated that cost was an estimate, not the final cost.

8. Page 6, Vacuum Extraction (VOC Removal from Soils), CMA-2 - Reference is made specifically to the Terra Vac vacuum extraction process.

ARC would like to clarify that Terra Vac has a patented process for vacuum extraction, but there are other vendors/contractors that can provide this technology. Terra Vac was referred to in the CMS because they provided useful information on the design and operation, as well as costs of their system, for use in screening and evaluation of the technology in the CMS. This does not imply that should CMA-2 be the preferred remedial alternative, that the Terra Vac process would be implemented.

EPA Response: EPA understands and concurs with ARC's assessment of the Terra Vac system.

9. Page 8, Evaluation of the Proposed Remedy and Alternatives, Subsection 2, Attainment of Media Cleanup Standards - The statement is made that "All alternatives would meeting their respective health-based, Maximum Contaminant Level (MCL), and 10^{-6} cancer risk-based cleanup standards of Federal and State environmental laws."

This statement, although correct in general, is potentially misleading. First, not all of the final EPA-accepted cleanup standards are at or below the 10^{-6} cancer risk-based levels. The Interim Risk Assessment Report and Addendum established a range of remediation levels representing a cancer risk 10^{-6} to 10^{-4} , within which the final remediation levels were likely to be established by EPA. EPA initially accepted the lower, more conservative levels for all constituents of concern. ARC then submitted a letter report (Geraghty & Miller, February 8, 1991) that reviewed those levels and repropose, with justification, remediation levels for certain constituents of concern above the 10^{-6} cancer risk but within the range established in the Interim Risk Assessment, based on more reasonable, site-specific, considerations. Additional clarification of the remediation levels was provided in a second letter report (Geraghty & Miller, March 8, 1991). Both of these letter reports are presented in Appendix A of the CMS. Although the majority of cleanup standards are based on the 10^{-6} cancer risk, EPA accepted several of the repropose remediation levels as final cleanup standards, including arsenic, trivalent chromium, 1,1-dichloroethane and 1,1-dichloroethene in surface water and sediment.

EPA Response: The 10^{-6} cancer risk base level was meant to state EPA's acceptable range.

10. Page 10, Evaluation of the Proposed Remedy and Alternatives, Subsection 9, Costs - The costs for CMA-1 are underestimated.

As noted in Comment #7 above, the costs for CMA-1, as presented in the original CMS submittal and summarized in the Statement of Basis, are underestimated, and are being revised in the CMS to reflect additional requirements of EPA and the State for the soil shredding/venting treatment system. Air pollution control equipment, if determined to be necessary, will also increase the cost of several alternative, with the exception of CMA-2, which already considers this.

EPA Response: EPA stated that cost was an estimate, not the final cost.

11. EPA's Public Notice does not accurately reflect the current pump and treat system described as CMA-5. The contaminated groundwater is pumped from two wells at the facility and the VOCs are removed from the water by air stripping and carbon adsorption units.

EPA Response: EPA concurs with the statement regarding the current pump and treatment system.

12. EPA's Statement of Basis (SB) is based upon the contained in policy and health-based cleanup criteria. This policy should be stated explicitly as the predicate of the SB, as was suggested by EPA in the formal comments to ARC on the CMS (pg. 7, Comment #3, The "Contained In" Policy Applicability).

The Consent Order of May 25, 1989, provides that after public comment, "EPA shall notify... ARC ... of the final corrective measure selected by EPA." The Order further provides that " ... EPA shall provide a 60 calendar day period for negotiation of an administrative order on consent... for implementation of the final corrective measure. ... If Agreement is not reached ... EPA reserves all rights ... to ... issuance of a unilateral administrative order directing the Respondent to implement the final corrective measure."

As reflected in Comment #13 below, Virginia has rejected health-based standards for cleanup, and takes the position that State permits will require delisting and non-detect cleanup standards.

It has been suggested orally that the force majeure provision of the Consent Order affords relief. In the circumstance that Virginia requires and issues a permit rejecting the health-based standards which are the predicate of the EPA administrative order, the force majeure provision affords no relief.

ARC believes that EPA should specifically cover this eventuality and expressly provide that the administrative order in such event will be reconsidered and renegotiated with ARC, or its implementation deferred until the Virginia inconsistency is resolved by acceptance of health-based standards.

EPA Response: EPA is well aware of its contained-in policy and would defend the policy if needed. Inclusion of this policy was not necessary in the Statement of Basis but will be referred to in the final Record of Decision. EPA will discuss the remedy selected with ARC before it becomes a final Agency decision. EPA also acknowledges ARC's concern about obtaining permits from the Virginia Department of Waste Management that embody the cleanup goals. The CMI Order will include language that addresses the possibility of the VDWM rejecting ARC's permit submittals.

13. Rebuttal to the Policy of the Virginia Department of Waste Management (VDWM) that Does Not Accept EPA's "Contained In" Policy and Health-Based Cleanup Standards.

VDWM has stated that it is their policy not to accept health-based cleanup levels as a criteria for redepositing soils contaminated with listed hazardous wastes that have been excavated and treated to levels below the health-based standards. Virginia stated that any such soils would have to be delisted and a permit from the State obtained prior to redeposition.

The Virginia position is contrary to EPA policy and counterproductive in achieving appropriate environmental goals.

ARC believes that the inconsistency of the Virginia policy should be resolved by EPA or at least, as stated above, the administrative order should provide for reconsideration or deferral of implementation until Virginia accepts the health-based standards.

EPA Response: The CMI Order will provide for reconsideration in the event that ARC does not receive the appropriate permits from VDWM. However, EPA will not defer implementation of a selected remedy.

Comments and Question Raised During the Public Meeting

(Many of the comments raised at the public meeting on behalf of the Vulcan Lands Company were reiterated in a letter to EPA. Such comments are addressed in the section which follows this section.)

1. A resident asked how the area of contamination at the Facility was established?

EPA Response: To delineate the extent of contamination, wells are sampled in the area where contamination is expected. You continue sampling outward until you find the suspected contamination source area. You then continue to sample outward until you get to an area where there is no contamination. This is how the areas of contamination at the Facility were identified.

2. What is the direction of groundwater flow on the Site?

EPA Response: Groundwater flows toward the south.

3. Where did the contamination in the groundwater come from?

EPA Response: The contamination is a result of past waste handling practices at the ARC Facility. Before environmental regulations were established, industry just did not know what to do with their hazardous waste. These disposal practices in the 1950s and '60s created the contamination problems we are dealing with now.

4. A resident asked at what level was groundwater contamination found and also is the soil above the groundwater contaminated.

EPA Response: The water table in this region is anywhere from 50 to 100 feet down. So the contaminants are fairly deep. However, because the source area is so old and has been so intensely leached for decades, the bulk of the contamination is now within the aquifer system, not in the soils.

5. A resident questioned whether contaminants in surface water/streams eventually ends up in the Occoquan Reservoir.

EPA Response: It is true that these surface waters eventually end up in the Occoquan Reservoir. In this case, however, the contaminants at issue, chlorinated solvents, migrate from soils to surface streams and very quickly into atmosphere where they are broken down by sunlight. It is not possible for these chlorinated solvents to migrate 15 miles downstream to the Occoquan River.

6. The attorney for Vulcan stated that the Corrective Measures Study (CMS) indicated cleanup of the groundwater taking place for ten years and asked if EPA expects site clean up will take a long time.

EPA Response: Yes. The ten years indicated in the CMS was the estimated amount of time that ARC believes will be needed to bring the contaminant levels down to the Maximum Contaminant Levels. The pump and treat

system will continue at the Facility for decades. It is going to take a long time to clean up.

7. The attorney for Vulcan asked "Just what, if any, precautions are going to be taken to address the volatilization of volatile organic compounds during your remedial efforts?"

EPA Response: Pollution control equipment will be used to catch all volatiles that come from the soil shredding of the volatile contaminated soil. The particular type of pollution control that will be used has not been developed yet but there will be no direct discharge to the atmosphere.

8. A resident asked "Who owns the land, the contaminated area?"

EPA Response: ARC owns approximately 12 acres of the land. The remaining 415 acres is leased from the estate of Mr. DiFrancis, a private land owner who has died. The land is leased until the year 2012.

9. A resident asked how long it will take before the remedies will be in place.

EPA Response: The work could begin in the summer of 1992.

10. A resident asked "Is there a deadline for soil cleanup?"

EPA Response: Excavation and transport of the soils off-site will take from two weeks to one month at most.

11. After some discussion by EPA regarding bioaugmented soil venting, which will take place if the soil venting does not bring the soil down to necessary remediated levels, a resident asked what will be released from the soil during this process and if this has been done by EPA before.

EPA Response: This technology is the secondary technology to be used only if the soil shredding does not bring the soil levels down to safe levels. During bioaugmented soil venting VOC's--tetrachloroethylene, trichlorethylene will be released. Yes, there is a proven track record with this type of innovative technology.

12. A resident asked "Are all these sources of contamination no longer sources of contamination. Are they all old sources or is there new contamination coming into the area?"

EPA Response: They are all old sources of contamination which resulted from the 1950s and 1960s waste handling practices. As previously stated,

before environmental regulations were established, industry did not know how to properly dispose of their hazardous waste.

13. The attorney for Vulcan stated that "13,000 cubic yards of hazardous soil was noted in the RFI. There is only 2,000 cubic yards that you are going to address here. What happened to the other 11,000?"

EPA Response: There is no current health risk level associated with that soil which is why it is not being addressed in the CMS. The soil being remediated is above health-based levels. The other 11,000 cubic yards of soil are below health-based levels.

14. The attorney for Vulcan stated that he would like EPA "to address the chemical warfare agents, where they are and what's being done to prevent those from getting off of the property. Has anyone found the containers that haven't been accounted for?"

EPA Response: The container that had been reported as buried was removed in 1976. No other areas on the premises were found to contain any buried containers.

15. A resident asked about what happens if ARC leaves the property before the cleanup is completed. Who will pay for the cleanup and will EPA let ARC leave the contamination?

EPA Response: If ARC leaves the property, ARC would still have to pay for the cleanup and deed restrictions will be in place prior to implementation of the remedy. Also a Financial Assurance section will be included in the CMI order.

16. A resident asked how the contamination was discovered at the Facility.

EPA Response: Testing by ARC in 1987 showed contamination of the groundwater in the parts per billion range. Appropriate local, state and Federal authorities were notified at that time.

17. The attorney for Vulcan asked "What will this property be suitable for after ARC leaves?"

EPA Response: When the remediation is project completed and if when ARC leaves the property it will not pose a threat to human health and the environment.

18. The attorney for Vulcan asked if there is potential for any groundwater plume to migrate off of the ARC property?

EPA Response: ARC has been pumping and treating groundwater for a long time. This pumping pulls the plume in on itself. If there was no groundwater pumping treatment then the contamination could migrate off-site. However, since the remedy is already in place, the contamination will not migrate further.

Comments Submitted on Behalf of the Vulcan Lands Company and the Vulcan Materials Company

1. Several comments were made claiming violation of due process by alleged insufficient public participation opportunities, inadequate notice, lack of public comment period extension, the number of public meetings held and the information presented at the public meeting.

EPA Response: EPA provided a reasonable opportunity for submission of written and/or oral comments and an opportunity for a public meeting on the proposed remedy at the ARC Facility in full accordance with EPA's Guidance on RCRA Corrective Action Decision Documents: Statements of Basis and Response to Comments, OSWER Directive 9902.6, February 1991. On August 26, 1991, EPA placed a display advertisement in a local daily newspaper announcing both the public comment period and the public meeting. EPA also made a copy of the Administrative Record file available at the library located nearest to the ARC facility and at the EPA regional office in Philadelphia. The library is open for business until 7 p.m. four evenings a week and all day Friday and Saturday. Nevertheless, due to concern expressed at the public meeting, EPA placed a copy of the Administrative Record file in the Manassas regional library on September 13, 1991.

Additionally, although EPA is only required to offer the public an opportunity for a public meeting, EPA scheduled a public meeting precisely to encourage public participation. EPA disagrees with the statement that "This Hearing was the one and only opportunity to provide meaningful comments on Agency actions." A full 30-day comment period was held to allow written comments to be submitted to EPA in addition to those comments made at the public meeting.

Further, EPA takes issue with the assertion that Vulcan had only two days to submit comments. Notice of the commencement of the 30-day comment period was published on August 26 1991. Because Vulcan's attorney attended the public meeting held on September 12, 1991, EPA infers that Vulcan had knowledge of the comment period since at least the date of the public meeting

-- a full thirteen days before the expiration of the comment period, which afforded Vulcan with substantially more than two days claimed by Vulcan in which to provide comments to EPA.

2. Several comments were made regarding the extent of contamination at the Site and how these areas are being addressed.

EPA Response: EPA's corrective measures for remediation at RCRA facilities are driven by the Baseline Risk Assessment. EPA concurs that there are areas of the Facilities where low levels of contamination exist which are not being remediated. These areas do not pose a threat to human health or the environment and thus they are not being addressed by EPA at this time. The proposed corrective measures will address all areas of contamination that need to be remediated to protect human health or the environment.

3. Several comments were made that the proposed corrective measures may not adequately address any different uses of the Facility that may occur in the future.

EPA Response: EPA's studies and decisions are based on current factual data as collected and analyzed. EPA cannot base its studies and decisions on conjecture as to what may occur in the future, including future land use. EPA considers the current land use and zoning of the area. Should changes actually occur in the future, EPA would re-evaluate the situation at such time. Such re-evaluation is included as part of EPA's five-year monitoring plan at facilities implementing corrective measures.

4. A comment was made that VOC contamination had been found in one residential drinking water well and there did not appear to be sufficient information to determine whether the contamination was related to ARC.

EPA Response: It has been determined that ARC is not the source of the contamination of the residential drinking water well. The RFI sampling found no levels of VOC contamination.

5. A comment was made regarding the completeness of the Administrative Record, i.e., "Certain attachments to the CMS, the Plan of Action and the Statement of Basis were not included in the Administrative Record." A comment was also made that "Vulcan and the interested public did not receive the requisite time to properly inspect" the Administrative Record.

EPA Response: There were no attachments to the CMS. The Statement of Basis was included as part of the Administrative Record. The RCRA Facility Investigation, the Corrective Measures Study and the Statement of Basis

reflect all studies performed at ARC. The Administrative Record was available for review by the public for 30 days during the public comment period.

6. A comment was made that EPA did not respond to Vulcan's letter of March 13, 1991 requesting information and the opportunity to comment as part of the public participation activities at the Facility.

EPA Response: EPA responded to the March 1991 letter as required by the Freedom of Information Act. EPA provided a 30 day public comment period and a public meeting for all members of the general public to comment on the proposed actions.

7. A comment was made that "The investigation disclosed in the RFI does not appear to be adequate to fully investigate the nature, extent and migration of the contamination."

EPA Response: EPA disagrees with this statement. As stated previously, EPA is addressing all areas identified in the Risk Assessment which pose a threat to human health or the environment. EPA believes its selected remedies adequately address the contamination at the Facility. Appendix 9 scans were conducted for all samples taken at the Facility and the Baseline Risk Assessment concluded that the areas of contamination not associated with the Corrective Measures Study pose no risk to human health or the environment.

8. A comment was made that "It does not appear that the nature, extent or migration of groundwater contamination has been adequately evaluated. ARC has installed only four groundwater monitoring wells during its investigation of this 500+ acre facility and it did not install any new wells off-site." A comment was made that "Neither the RFI nor the CMS appears to provide for additional monitoring especially at the boundaries of the ARC Facility and on the neighboring properties, to assure that the plume(s) of groundwater contamination released from the ARC Facility will not endanger human health or the environment in the future."

EPA Response: The monitoring will be addressed during the design and specification portion of the Corrective Measure Implementation phase. Additional wells will be added as required to the monitoring well system.

9. A comment was made that there appears to be inadequate monitoring of potential offsite impacts.

EPA Response: The studies performed to date have not shown any contamination at levels of concern in groundwater, sediment or soil off-site. Again, the monitoring plan will be developed during the design and specification portion of the Corrective Measure Implementation phase. Off-site impacts will also be monitored as part of EPA's five-year review program of remedies implemented at RCRA facilities.

10. A comment was made as to whether the investigations performed to date have been adequate to evaluate the nature, extent and migration of the contamination.

EPA Response: EPA's believes its chosen corrective action measures will protect human health and the environment from all current threats, both onsite and offsite. As previously stated, if changes occur in the future, EPA will address them at that time.

11. A question was raised regarding the soil standards proposed and the potential impact of contaminated sediments on the water column.

EPA Response: EPA has chosen the corrective action measures which will be protective of human health and the environment and adequately remediate the site along with natural attenuation. EPA determined that the risk assessment adequately defined the area below the water table and concluded that remediation of the zone below water table is not practicable, however, natural attenuation is occurring below the water table and this zone will be remediated. CMA-1 will also expedite the natural attenuation of the zone below the water table.

12. A comment was made that "It does not appear that ARC or EPA adequately addressed the potential impact on air quality or the potential for the airborne transmission of contamination."

EPA Response: This issue is addressed as part of the design and specification phase. Air monitors will be installed along property boundaries during the excavation process to ensure adequate protection of human health and the environment.

13. A comment was made that "it is not clear how the cleanup standards recommended by ARC or adopted by EPA were established."

EPA Response: EPA's corrective measures are driven by the information contained in the Baseline Risk Assessment. The remediation of the Facility is designed to address the areas of contamination that are a threat to human health or the environment. ARC proposed less stringent levels based on more

reasonable site specific considerations; however, the less stringent levels are still within EPA's established acceptable range.

14. A comment was raised as to the criteria for protection of aquatic life and wildlife.

EPA Response: ARC performed an ecological assessment as part of the Risk Assessment which has been reviewed and approved by EPA. No impact was identified or anticipated.

15. A comment was made that "The Risk Assessment incorrectly assumed that the risk of exposure to contamination on the neighboring Properties would be limited because they would be used only for industrial purposes."

EPA Response: The portion of the Risk Assessment which evaluated onsite threats utilized an industrial use scenario as this is how the property is currently zoned. If a change occurs in the future, EPA would re-address the facility. The portion of the Risk Assessment which evaluated offsite threats used a residential scenario as there are residences in the vicinity. Thus EPA is confident that its Risk Assessment fully addressed all threats to human health and the environment and provided a sound basis for the corrective measures chosen.

16. A comment was made that "ARC and EPA have focused on a limited subset of the hazardous constituents, contamination pathways and sources of contamination which may be present."

EPA Response: EPA has focused on the threats to human health and the environment currently posed by the Facility and on hazardous constituents that require remediation.

17. A comment was made that Vulcan objected to the discharge of contaminated wastewaters into streams and other pathways.

EPA Response: The wastewater which will be discharged will be treated water that has gone through the air stripping tower so that any contaminants are below the Maximum Contaminant Levels and ambient water quality criteria and do not pose a threat to human or environmental receptors.

18. A comment was made that "Vulcan is concerned by EPA's apparent failure to obtain appropriate enforceable financial assurances from ARC to guaranty its performance."

EPA Response: EPA obtains such assurances as part of the Corrective Measures Implementation phase.

19. A comment was made regarding coordination with State and local agencies.

EPA Response: EPA is coordinating Facility actions with State and local agencies. The County has been copied on all studies related to the Facility. All corrective action measures will comply with Federal, state and local guidelines.

Comments Submitted by Gainesville Associates

1. A comment was made that "The site soils, beneath a depth of several feet below ground surface, are generally much more granular and pervious than characterized by GTI. There is an apparent discrepancy between the conditions generally depicted on the logs of shallow borings and GTI's characterization of site soils (overlying the diabase) as being predominantly silty or clayey. This characterization affects the assumptions made regarding the predominant direction of shallow groundwater flow and contaminant transport (i.e., either laterally discharging at surface streams or vertically recharging fractured bedrock). Furthermore, fine grained soils derived from the in-situ weathering of diabase are not expected to exhibit substantially higher horizontal hydraulic conductivity compared to their vertical hydraulic conductivity as assumed by GTI, due to the depositional history of the diabase. In fact, because of remnant bedrock features such as near vertical joints, fine grained soils weathered from diabase may exhibit greater vertical than horizontal hydraulic conductivity. Finally, because of these and other considerations, the one double ring infiltrometer test GTI conducted on these soils does not adequately characterize the potential for chemical surface spills to infiltrate the subsurface. The heterogeneity of these soils due to factors such as variable weathering, remnant bedrock features, high shrink-swell potential, seasonal influences, or man-made disturbances caused during site development/use, can also lead to substantial variations in the infiltration rate."

EPA Response: With respect to the Corrective Measures proposed by EPA for the ARC Facility, the actual hydraulic conductivity of soils overlying the igneous diabase in particular near buildings 40 and 28, is essentially a moot point. Rather, the Corrective Measure focuses on remediation of the facility. The igneous is essentially monolithic in that the primary porosity is zero and the secondary is extremely limited. EPA feels this is supported by the three attempts to install wells exclusively screened in the igneous bedrock and all three wells were absolutely dry. EPA concludes that the diabase is impenetrable and therefore contaminants which exist in the shallow water

table aquifer are prevented from migration vertically beyond the diabase/saprolite interface. Also, the direction of groundwater flow in the shallow water table aquifer has clearly been determined, as demonstrated in the EPA approved RFI reports. All shallow groundwater overlying the diabase in the vicinity of buildings 40 and 28 discharge to the nearby surface stream.

2. A comment was made that "The SB is somewhat misleading because it fails to consistently distinguish between remediation of contamination versus remediation of contamination above remedial levels, and between shallow groundwater and deep groundwater. This may leave some reviewers with the impression all contamination is being remediated, which in fact is not the case. Actually, only a small segment of the site in which contamination was detected will be addressed by the recommended corrective measures. Although this is conceivably adequate to protect public health and the environment under current site conditions, it may not be under possible future site development scenarios."

EPA Response: EPA concurs with this assertion. However, EPA is allowing soils beyond buildings 40 and 28 where low levels of VOC exist to be naturally remediated, e.g., biodegradation, hydraulic reaction with water, attenuation due to infiltration of precipitation, etc. Likewise, EPA is not requiring excavation of soils which exist in the saturated zone, i.e., the water table aquifer. Rather, the natural mechanisms of attenuation will be allowed to operate in the saturated soils above the igneous bedrock. Finally, EPA's selected remedy is in accordance with the Baseline Risk Assessment which outlines the areas of contamination which are a current threat to human health or the environment and which require remediation. Soil action levels are being met in all soils above the water table. By remediating the primary source of contamination, natural attenuation methods will provide protection to human health and the environment. EPA believes that by implementing the selected remedy any releases in the future will not be at levels that are a threat to human health and the environment. EPA cannot speculate on all possible future site development scenarios. As changes occur in the future, EPA will respond appropriately.

3. A comment was made regarding the logic for the chosen soil remediation levels.

EPA Response: EPA concurs with some of the observations made. As stated previously, the conclusions of the Baseline Risk Assessment form the basis of EPA's decision. Many of the technical issues related to implementation of EPA's corrective measures will be addressed in the design plans and specification as required by the CMI order. These will be available to the

public.

4. A comment was made regarding pollution control equipment.

EPA Response: EPA has addressed this issue by requiring ARC to install air monitors along property boundaries during the excavation process. Further details will be developed during the design phase.

5. A question was raised as to "Why was low temperature thermal aeration not considered as a potential corrective measure for these soils?"

EPA Response: Hydraulic conductivity of these soils is so low as to make thermal aeration an impractical technology.

6. A comment was made on the residual levels of contaminants, and the concern that contaminated soil could be redeposited on site.

EPA Response: The efficiency of the shredder which will be utilized is very high and therefore the actual volume of contaminated soils redeposited on-site would be extremely low.

7. A comment was made that the CMS does not provide for a long term monitoring plan for treated soils. A question was also raised as to what kind of monitoring will be done in the stream to continually evaluate potential off-site impacts.

EPA Response: A monitoring program will be developed during the design and specifications phase. In addition, EPA's five-year review program of implemented remedies will provide additional monitoring. The onsite streams will be continuously monitored to evaluate the potential off-site impacts.

8. The attorney also commented that "The averaging of analytical results for samples collected outside the area of contamination with chemical test results from samples collected within the area of contamination is inappropriate, and must be carefully reviewed."

EPA Response: EPA finds that these areas of contamination are so very finite compared to the proposed excavation areas that the concentration of contaminants leached from these areas to the groundwater would be insignificant.

Future Actions

Several questions and comments made during the public meeting addressed aspects of the ARC Facility which were beyond the scope of the proposed corrective measures for the remediation of contaminated soils and groundwater. The Facility will be thoroughly reviewed as part of EPA's five year monitoring program and if any new discoveries are made, EPA will address them and re-propose additional work to be performed. Any future corrective measures at the Facility will be addressed by their own Corrective Measures Studies and public participation will be encouraged at that time.

Declarations

In summary, EPA has determined that the corrective measures selected to remediate the contaminated soils and groundwater at the Atlantic Research Corporation Facility are appropriate and will be protective of human health and the environment.

Atlantic Research Corporation
EPA Docket No. RCRA-III-056-CA

ATTACHMENT F

Explanation of Significant Differences, dated July 31, 1992

**EXPLANATION OF SIGNIFICANT DIFFERENCES
ATLANTIC RESEARCH CORPORATION
GAINESVILLE, VIRGINIA**

Introduction

The Atlantic Research Corporation ("ARC") owns and operates a facility located at 5945 Wellington Road in Gainesville, Prince William County, Virginia ("Facility"). The U.S. Environmental Protection Agency ("EPA") issued a Statement of Basis for the Facility on August 26, 1991. The Statement of Basis described EPA's preferred corrective measure alternatives for the Facility and was discussed at a public meeting held on September 12, 1991. The public comment period on the Statement of Basis began on August 26, 1991 and ended on September 25, 1991. EPA subsequently signed a Record of Decision ("RCRA ROD") on September 30, 1991 which detailed EPA's selected corrective measures for the Facility.

This Explanation of Significant Differences ("ESD") is being issued for the following reasons: (1) to correct an error and accurately reflect that 1,1,1-trichloroethane ("1,1,1-TCA") and not trichloroethylene ("TCE") contamination exists in ground water in the north central portion of the Facility; (2) to correct an omission that TCE is the constituent of concern at Building 28 where the remediation level (cleanup standard) is 0.9 parts per million ("ppm"); (3) to list the cleanup standards for all constituents of concern; (4) to describe remediation of the newly discovered constituent chlorobenzene which was found in soil after the RCRA ROD was issued; and (5) to provide ARC with the right to petition EPA to revise the ground water cleanup standards at the selected points of compliance provided that certain requirements described in detail below are met.

This ESD will become part of the Administrative Record for the Facility. The Administrative Record is available to the public for review from 9 a.m. to 5 p.m. at the following two locations:

U.S. Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107
Attn: Mr. Robert W. Stroud (3HW61)
(215) 597-6688

Prince William Central Branch Library
8601 Mathis Avenue
Manassas, VA 22111
(703) 361-8211

EPA notes that the Administrative Record includes correspondence regarding the decision of the Virginia Department of Waste Management to defer to EPA all corrective action

jurisdiction over activities undertaken pursuant to the Administrative Order on Consent that EPA is currently negotiating with ARC for the Corrective Measure Implementation at the Facility.

Summary of Site History, Contamination Problems, and Selected Corrective Measures

The 420-acre ARC Facility began operations in 1951. ARC tests and manufactures rocket motors and gas generators at its Facility. The Facility is comprised of administrative/office buildings, solid rocket propellant and rocket motor production and testing operations, research laboratories, and design technology areas.

Past activities and solvent handling practices have resulted in the following contamination problems at the Facility:

- Volatile organic compound ("VOC") (tetrachloroethene ("PCE"), 1,1-dichloroethene ("1,1-DCE"), and 1,1,1-TCA) contamination in ground water in the north central portion of the Facility;
- Inorganic metals (arsenic, chromium, lead and mercury) contamination in a localized area of soils in the vicinity of Building 28;
- VOC (methylene chloride ("MEC"), PCE, TCE and 1,1-DCE) contamination in soils in localized areas of Buildings 28 and 40; and
- VOC (chlorobenzene) contamination in soils in the vicinity of Building 201.

In the RCRA ROD signed on September 30, 1991, EPA selected the following corrective measures to be implemented at the Facility:

1. To remove VOCs from soils, excavation and soil shredding with on-site redeposition (Corrective Measure Alternative-1 or "CMA-1");
2. To remove inorganics from soils, excavation, off-site treatment and disposal (CMA-3); and
3. To remove VOCs from ground water, pumping and treatment (CMA-5).

A detailed description of the selected corrective measures can be found in the RCRA ROD which is located in the Administrative Record.

Explanation of Significant Differences and the Basis for those Differences

1. 1,1,1-TCA contamination exists in ground water in the north central portion of the Facility. The RCRA ROD inaccurately states that TCE contamination exists in ground water in the north central portion of the Facility. The error in the RCRA ROD is most likely based upon the fact that Table 1 (Corrective Measures Recommendations) of the Corrective Measures Study Report ("CMS Report") contains a typographical error. Table 1 of the CMS Report states that 1,1-TCE (a non-existent compound) is a constituent found in Deep Well DW-72A. The table should have stated that 1,1,1-TCA is a constituent found in Deep Well DW-72A. Other supporting documentation in the Administrative Record, including Table 2-4 (Deep Ground Water Corrective Action Objectives) of the CMS Report, reflects that 1,1,1-TCA is a constituent of concern in the north central portion of the Facility. Thus in the RCRA ROD, 1,1,1-TCA was incorrectly reported as TCE.

2. TCE is the constituent of concern at Building 28 with a soil remediation level (cleanup standard) of 0.9 ppm. The RCRA ROD did not specify which constituent of concern at Building 28 had a soil remediation level of 0.9 ppm.

3. All cleanup standards were not stated in the RCRA ROD. The cleanup standards which shall be met at the Facility are presented in Tables 1 and 2 below. The soil cleanup standards presented in Table 1 are health-based, will be protective of the direct contact potential for an onsite worker, and were developed based on the ability of remediated soil to contaminate the shallow ground water. The ground water cleanup standards presented in Table 2 are Maximum Contaminant Levels ("MCLs"). An MCL is the maximum permissible level of a contaminant in drinking water delivered by a public water system. See 40 C.F.R. § 141.2.

With the exception of the cleanup standard for chlorobenzene, the cleanup standards presented in Tables 1 and 2 are also the lowest (most conservative) value for each constituent stated in Table 1 (Corrective Measures Recommendations) of the CMS Report and Table 61 (Comparison of Interim Soil Remediation Levels and Constituent Concentrations by Site, Atlantic Research Corporation, Gainesville, Virginia) of the Interim Risk Assessment Report Addendum. The cleanup standard for chlorobenzene is based on the presence of a diabase formation in the bedrock below the ground surface, and this level was developed during the Risk Assessment.

Table 1 - Soil Cleanup Standards

PCE ¹	2 ppm	
PCE ²	4 ppm	
MEC	0.04 ppm	
1,1-DCE	0.005 ppm	5 ppm
TCE	0.9 ppm	
Chlorobenzene	70 ppm*	
Arsenic	5 ppm	→ 15 ppm
Chromium	10 ppm	chrom VI
Lead	100 ppm	
Mercury	30 ppm	

PCE¹ represents PCE contamination at Building 28

PCE² represents PCE contamination at Building 40

*Represents an area where depth to ground water exceeds 3.5 meters.

Table 2 - Ground Water Cleanup Standards

PCE	5 parts per billion ("ppb")
1,1-DCE	7 ppb
1,1,1-TCA	200 ppb

4. On October 31, 1991, after the RCRA ROD was signed, S.W. Rodgers, a contractor employed by ARC, began excavating soil at the Facility for the installation of a subgrade pipeline and encountered an odor in the soil approximately 200 feet south of Building 201. ARC sampled the area from November 15, 1991 to November 21, 1991. Subsequent laboratory tests revealed the presence of chlorobenzene in the soil. ARC prepared a document entitled "Interim Measures Workplan for Remediation of Chlorobenzene Contaminated Soil in the Vicinity of Building 201" which identified the quantity of soil containing chlorobenzene and requiring remediation as approximately 50 cubic yards. ARC

submitted this workplan to EPA on December 16, 1991. EPA subsequently approved the workplan on January 16, 1992. This chlorobenzene will be remediated utilizing CMA-1 as described in the RCRA ROD.

5. Based on the information obtained during the RCRA Facility Investigation and EPA's analysis of the corrective measure alternatives for ground water remediation, EPA believes that the selected corrective measure for ground water will be able to achieve the ground water cleanup standards set forth in Table 2 of this ESD. However, EPA acknowledges that due to the high concentrations of VOCs in the ground water monitoring well network and the kinetics of chemical and physical desorption of contaminants in soils and ground water, the VOCs in ground water may reach an equilibrium concentration, making it technically impracticable for ARC to attain the ground water cleanup standards at all of the selected points of compliance. Therefore, EPA hereby gives ARC the right to petition EPA to revise the ground water cleanup standards at the selected points of compliance.

In its petition to EPA, ARC shall include the following information:

(a) A statistical analysis of data from the pump system during a five (5) consecutive year period, demonstrating that an equilibrium concentration of VOCs in ground water has been reached, provided that the five (5) consecutive year period begins no earlier than the beginning of ARC's implementation of CMA-5 pursuant to the RCRA ROD;

(b) A detailed description of ARC's efforts to achieve compliance with the ground water cleanup standards; and

(c) An explanation of whether other currently available or new and innovative ground water pump and treat methods or technologies could practicably achieve compliance with the requirements.

If, based on the information contained in ARC's petition and any other information then available to EPA, EPA determines that compliance with the ground water cleanup standards is not technically practicable, EPA may revise the ground water cleanup standards and/or specify further measures that may be required of ARC to control exposure of humans or the environment to residual contamination, as necessary to protect human health and the environment. EPA reserves the right to use its own initiative to revise the ground water cleanup standards and/or specify further measures that may be required of ARC to control exposure of humans or the environment to residual contamination, as necessary to protect human health and the environment. Any actions taken by EPA pursuant to this paragraph will be made in accordance with

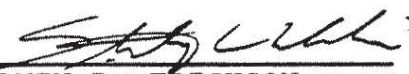
all applicable public participation requirements in EPA's regulations, guidelines, and policies.

Public Participation Activities

This ESD is part of the Administrative Record for the Facility and is located at both EPA Region III offices and the Prince William Central Branch Library. The Administrative Record is available for review from 9 a.m. to 5 p.m. Monday through Friday. All comments on this ESD postmarked within 30 days of the advertisement of this document will become part of the Administrative Record, as will EPA responses to the significant comments.

Declaration

Although clarifications have been made to the RCRA ROD and an additional area needs to be remediated, the selected Corrective Measures will remain the same. The selected Corrective Measures are necessary to protect human health or the environment from releases of hazardous waste within the meaning of Section 3008(h) of RCRA, 42 U.S.C. Section 6928(h), from the ARC Facility to the environment. The selected Corrective Measures will attain soil and ground water cleanup standards, will reduce or eliminate to the maximum extent possible further releases of hazardous waste, and provide for proper management of wastes generated during implementation of the Corrective Measures. Furthermore, the selected Corrective Measures will be effective and reliable, both in the long term and short term; will result in the reduction of toxicity, mobility or volume of hazardous waste; and will be implementable and cost effective in comparison to the other corrective measure alternatives presented in the EPA approved Corrective Measure Study for the Facility.


EDWIN B. ERICKSON
REGIONAL ADMINISTRATOR
U.S. EPA, REGION III

7/31/92
DATE

350472

Atlantic Research Corporation
EPA Docket No. RCRA-III-056-CA

ATTACHMENT G
Second Explanation of Significant Differences,
dated September 24, 1992

**SECOND EXPLANATION OF SIGNIFICANT DIFFERENCES
ATLANTIC RESEARCH CORPORATION
GAINESVILLE, VIRGINIA**

Introduction

The Atlantic Research Corporation ("ARC") owns and operates a facility located at 5945 Wellington Road in Gainesville, Prince William County, Virginia ("Facility"). The U.S. Environmental Protection Agency ("EPA") issued a Statement of Basis for the Facility on August 26, 1991. The Statement of Basis described EPA's preferred corrective measure alternatives for the Facility and was discussed at a public meeting held on September 12, 1991. The public comment period on the Statement of Basis began on August 26, 1991 and ended on September 25, 1991. EPA subsequently signed a Record of Decision ("RCRA ROD") on September 30, 1991 which detailed EPA's selected corrective measures for the Facility.

On August 4, 1992, EPA issued an Explanation of Significant Differences ("first ESD") for the following reasons: (1) to correct an error and accurately reflect that 1,1,1-trichloroethane ("1,1,1-TCA") and not trichloroethylene ("TCE") contamination exists in ground water in the north central portion of the Facility; (2) to correct an omission that TCE is the constituent of concern at Building 28 where the remediation level is 0.9 parts per million ("ppm"); (3) to list the cleanup standards for all constituents of concern; (4) to describe the remediation of the newly discovered constituent chlorobenzene which was found in soil after the RCRA ROD was issued; and (5) to provide ARC with the right to petition EPA to revise the ground water cleanup standards at the selected points of compliance provided that certain requirements described in the first ESD are met.

This Second ESD is being issued for the following reasons: (1) to adjust the soil cleanup standards for 1,1-dichloroethene ("1,1-DCE") from 0.005 ppm to 0.5 ppm and for arsenic from 5 ppm to 15 ppm; and (2) to correct an error and accurately reflect that chromium VI and not chromium is the constituent of concern with a soil cleanup standard of 10 ppm.

This Second ESD will become part of the Administrative Record for the Facility. The Administrative Record is available to the public for review from 9 a.m. to 5 p.m. at the following two locations:

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**Summary of Site History, Contamination Problems, and Selected
Corrective Measures**

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Past activities and solvent handling practices have resulted in the following contamination problems at the Facility:

- Volatile organic compound ("VOC") (tetrachloroethene ("PCE"), 1,1-DCE, and 1,1,1-TCA) contamination in ground water in the north central portion of the Facility;
- Inorganic metals (arsenic, chromium, lead and mercury) contamination in a localized area of soils in the vicinity of Building 28;
- VOC (methylene chloride ("MEC"), PCE, TCE and 1,1-DCE) contamination in soils in localized areas of Buildings 28 and 40; and
- VOC (chlorobenzene) contamination in soils in the vicinity of Building 201.

In the RCRA ROD signed on September 30, 1991, EPA selected the following corrective measures to be implemented at the Facility:

1. To remove VOCs from soils, excavation and soil shredding with on-site redeposition (Corrective Measure Alternative-1 or "CMA-1");
2. To remove inorganics from soils, excavation, off-site treatment and disposal (CMA-3); and
3. To remove VOCs from ground water, pumping and treatment (CMA-5).

A detailed description of the selected corrective measures can be found in the RCRA ROD which is located in the Administrative Record.

Explanation of Significant Differences and the Basis for those Differences

1. On July 31, 1992, EPA issued an ESD ("first ESD") for the RCRA ROD. The first ESD provided for a 30-day public comment period. During the public comment period, ARC submitted to EPA comments which included a request that EPA adjust the soil cleanup standards for 1,1-DCE and arsenic to 0.5 ppm and 15 ppm, respectively. Table 1 of the first ESD listed the soil cleanup standards for 1,1-DCE and arsenic as 0.005 ppm and 5 ppm, respectively.

As described on page 3 of the first ESD, with the exception of the cleanup standard for chlorobenzene, the cleanup standards presented in Tables 1 and 2 of the first ESD represent the lowest (most conservative) value for each constituent stated in Table 1 (Corrective Measures Recommendations) of the Corrective Measures Study Report ("CMS Report") and Table 61 (Comparison of Interim Soil Remediation Levels and Constituent Concentrations by Site, Atlantic Research Corporation, Gainesville, Virginia) of the Interim Risk Assessment Report Addendum. In a letter dated October 18, 1991 from EPA to ARC, EPA approved the final CMS Report and the proposed remediation goals that were included in the risk assessment and the CMS Report. EPA was therefore justified in selecting the lowest (most conservative) values for 1,1-DCE and arsenic established in Table 61 of the Interim Risk Assessment Report Addendum.

EPA acknowledges that Tables 1, 2-1, and 2-5 of the approved CMS Report contain higher soil cleanup standards for 1,1-DCE and arsenic than those presented in Table 1 of the first ESD. In light of this fact and in response to ARC's request for higher cleanup standards for 1,1-DCE and arsenic, EPA has recently reviewed the suggested cleanup standards of 0.5 ppm for 1,1-DCE and 15 ppm for arsenic. EPA has consequently determined that the suggested cleanup standards for 1,1-DCE and arsenic are protective of human health and the environment. EPA has therefore revised the soil cleanup standards for 1,1-DCE to 0.5 ppm and for arsenic to 15 ppm.

2. Table 1 of the first ESD inaccurately listed chromium as the constituent of concern with a soil cleanup standard of 10 ppm. EPA acknowledges that the term "chromium" implies total chromium, while the term "chromium VI" implies hexavalent chromium. As indicated in Tables 1, 2-1, and 2-5 of the approved CMS Report, 10 ppm is the correct soil cleanup standard for chromium VI, and not (total) chromium. EPA has therefore revised the name of the constituent of concern with a soil cleanup standard of 10 ppm listed in Table 1 of the first ESD to chromium VI.

Public Participation Activities

This Second ESD is part of the Administrative Record for the Facility and is located at both EPA Region III offices and the Prince William Central Branch Library. The Administrative Record is available for review from 9 a.m. to 5 p.m. Monday through Friday.

Declaration

Although clarifications have been made to the RCRA ROD and an additional area needs to be remediated, the selected Corrective Measures will remain the same. The selected Corrective Measures are necessary to protect human health or the environment from releases of hazardous waste within the meaning of Section 3008(h) of RCRA, 42 U.S.C. Section 6928(h), from the ARC Facility to the environment. The selected Corrective Measures will attain soil and ground water cleanup standards, will reduce or eliminate to the maximum extent possible further releases of hazardous waste, and provide for proper management of wastes generated during implementation of the Corrective Measures. Furthermore, the selected Corrective Measures will be effective and reliable, both in the long term and short term; will result in the reduction of toxicity, mobility or volume of hazardous waste; and will be implementable and cost effective in comparison to the other corrective measure alternatives presented in the EPA-approved Corrective Measure Study for the Facility.



EDWIN B. ERICKSON
REGIONAL ADMINISTRATOR
U.S. EPA, REGION III

SEP-24 1992
DATE