STATEMENT OF BASIS
BRIDGEPORT-PIEDMONT MANUFACTURING COMPANY
ALTAVISTA, VIRGINIA

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BRIDGEPORT-PIEDMONT MANUFACTURING COMPANY ALTAVISTA, VIRGINIA

I. Introduction

This Statement of Basis explains the proposed corrective measure alternatives for remediating contaminated groundwater at the Bridgeport-Piedmont Manufacturing Company ("Piedmont"), located in Altavista, Virginia ("Facility"). This document summarizes the corrective measure alternatives that the United States Environmental Protection Agency ("EPA") and Piedmont have evaluated under an Administrative Consent Order ("Order"), entered into between EPA and Piedmont on December 31, 1990, Docket Number RCRA-III-035-CA, pursuant to Section 3008(h) of the Resource Conservation and Recovery Act ("RCRA"), as amended, 42 U.S.C. Section 6928.

In accordance with the Order, Piedmont completed the tasks described in the EPA-approved RCRA Facility Investigation ("RFI") Workplan. The RFI Workplan outlined the procedures for implementation of the RFI at the Piedmont Facility. The goal of the RFI was to characterize the hydrogeology underlying the Facility and determine the nature and extent of releases of hazardous waste and/or hazardous constituents at or from the Facility and conduct a risk assessment to evaluate the potential risk to human health and the environment. The investigative portion of the RFI was approved by EPA in a letter to Piedmont dated March 1, 1995. EPA did not accept the risk assessment portion of Piedmont's RFI; instead, EPA itself performed a risk assessment of the Facility, based on the information included in Piedmont's RFI and other information that EPA believed was relevant to the Risk Assessment.

In accordance with the Order, Piedmont also conducted a Corrective Measure Study ("CMS") and completed a CMS Report. The CMS Report was approved by EPA on September 13, 1995. The purpose of the CMS was to evaluate corrective measure alternatives to address contamination revealed at the Facility as part of the RFI. The CMS Report sets forth an evaluation of these alternatives.

During the RFI, Piedmont initiated RCRA closure activities for an area of the facility consisting of the former Polishing Lagoon, the former Upper Impoundment and the former Sludge Drying Tank. For purposes of Closure, this area of the Facility has been defined by the Virginia Department of Environmental Quality ("VDEQ") as a Waste Management Area ("WMA") (Figures 1 and 2 for location of WMA). In order to coordinate regulatory requirements, the VDEQ has allowed Piedmont's CMS to also serve

as the Engineering and Feasibility Study ("EFS") required by Piedmont's post-closure permit for the Waste Management Area. The VDEQ determined that this CMS adequately fulfills the requirements for the EFS for corrective action required by Piedmont's post-closure permit, with the exception of a groundwater monitoring list. In the interest of coordinating efforts, VDEQ is allowing Piedmont to submit the groundwater monitoring list and any other elements of VDEQ's corrective action program required by Piedmont's post-closure permit in accordance with a Section 3008(h), 42 U.S.C. § 6928, Corrective Measures Implementation (CMI) Administrative Order. After EPA evaluates comments received on this Statement of Basis, and selects a final remedy for the facility, EPA may enter into negotiations with Piedmont for a CMI Order. If negotiations become unproductive, EPA may opt to issue Piedmont a Unilateral Administrative Order directing the Facility to implement the final remedy.

This document describes the corrective measure alternatives considered for the Facility, presents EPA's preferred corrective measure alternative and explains EPA's rationale for selecting that alternative. This document also summarizes information that can be found in greater detail in the workplans and reports submitted by the Facility to EPA during the RFI. As required by the Order, the following RFI documents were submitted to EPA:

- Description of Current Conditions
- Pre-Investigation Evaluation of Corrective Measures Technologies
- RFI Workplan and Addenda
- RFI Bimonthly Progress Reports
- Waste Minimization Plan
- Interim Measures ("IM") Workplan and Design Documents
- IM Operation and Maintenance Plan
- Report of Sampling and Analysis TW-13 Solid Waste Disposal Area
- RFI Appendix IX Data Validation Report
- RFI CLP Data Validation Report
- RFI Ecological Assessment Report
- RFI In-Plant Inspection Report
- RFI CLP Data Validation Report II
- IM B-1 Soil and Addendum 3 Groundwater Sample Event Data Validation Report
- Final IM Implementation Report
- Addendum 5 Data Validation Report
- RCRA Facility Investigation Report
- Corrective Measures Study

To gain a more comprehensive understanding of the RCRA activities that have been conducted at the Facility for this matter, EPA encourages the public to review these documents, which are found in the Administrative Record for the Bridgeport-

Piedmont Facility. The Administrative Record is located at:

The Staunton River Memorial Library
500 Washington Street
Altavista, VA 24517

and at

The U.S. Environmental Protection Agency
Region III
841 Chestnut Street Building
Philadelphia, Pennsylvania 19107

EPA is issuing this Statement of Basis consistent with the Public Participation provision, Section VI.B, of the 3008(h) Administrative Order Docket Number RCRA-III-035-CA. EPA will select a final corrective measure for the Facility after information submitted during a thirty (30) day public comment period is considered.

EPA may modify the proposed alternative or select another alternative based on new information and/or public comments. Therefore, the public is encouraged to review and comment on the alternatives described in this document and/or any additional options not previously identified and/or studied. The public may participate in the remedy selection process by reviewing the documents contained in the Administrative Record and submitting written comments to EPA during the public comment period. Written comments may be submitted to:

Ms. Deborah R. Goldblum (3HW90)
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-6688
FAX (215) 597-8174

II. Proposed Remedy

EPA is proposing construction and implementation of a groundwater recovery pump and treatment system to address contaminated groundwater at the Piedmont Facility. This alternative would include:

- Continued implementation of the current pump and treat system that consists of eight recovery wells;
- The addition of six new recovery wells to the current pump and treat network;

- A three month evaluation period of the new recovery system network of 14 wells to determine its effectiveness in containing and remediating the plumes;

- Installation of additional recovery wells, if EPA determines that the results of the evaluation period indicate that the network of recovery wells is not containing the plumes;

- Periodic monitoring and reporting of groundwater data to evaluate effectiveness of the system in removing hazardous constituents, ensure containment of the plumes, determine attainment of the established media clean-up standards (See Section IX.B., below) and verify the absence of the degradation products of PCE and TCE above their respective MCLs;

A more detailed discussion of the proposed remedy is set forth in Section VIII, below.

III. Facility Background

The Bridgeport-Piedmont Manufacturing Company, a division of Bridge Products, is located in the southern part of Campbell County, Virginia, north of the town of Altavista and the Roanoke River. The Facility covers an area of approximately 25 acres. The plant was originally constructed in 1966 by the National Distillers Corporation, currently known as Quantum Chemical Corporation. Bridge Products purchased the Facility from National Distillers Corporation in December 1983.

The Facility manufactures fluid control devices, such as tire valves and charging ports for refrigeration and air conditioning systems. Manufacturing operations at Piedmont include machining of rods and coils of several metals and degreasing, cleaning, electroplating and finishing. Various rubber compounds are also mixed and molded at the Facility.

IV. Previous Investigations

In 1985, Piedmont initiated a series of environmental studies to evaluate hydrogeological conditions at the Facility. These studies included the installation of about thirty wells to assess hydrogeologic characteristics of the Facility and groundwater quality. These early investigations revealed elevated concentrations of perchloroethylene ("PCE") in monitoring wells in the vicinity of the Polishing Lagoon and Sludge Filter Beds (Figure 1). Piedmont determined that this groundwater contamination was a result of releases from underground floor drains, located within the plant building, and associated underground pipelines which carried soapy water PCE mixtures to Piedmont's wastewater treatment train, which included the Clarifier, the Sludge Filter Beds and the Polishing Lagoon.

Prior to 1985, Piedmont used the floor drains to periodically dispose of soapy water PCE mixtures generated during cleaning of the PCE vapor degreaser and distillation unit.

V. Summary of the RCRA Facility Investigation

The RFI activities included: 1) installation of an additional 48 monitoring wells; 2) collection of soil gas, soil, groundwater, surface water and sediment samples; 3) an in-plant inspection; 4) implementation of Interim Measures to remove source areas; 5) an ecological assessment; 6) a baseline human health risk assessment.

Data gathered during the RFI confirms that there has been a release of hazardous constituents to the environment from the Facility. Table 1 includes a list of the hazardous constituents detected at the Facility in groundwater, soil, surface water and sediment media during the RFI. The releases principally consist of volatile organic constituents ("VOCs"), specifically PCE and trichloroethylene ("TCE"), to soil and groundwater.

Elevated concentrations of some inorganic constituents were also detected sporadically in groundwater, surface water, sediment and soil; however, few of the inorganic analytical results exceed health based screening action levels and their sporadic occurrence at the Facility suggests that the affected areas are very limited in extent.

The RFI focused on determining the horizontal and vertical extent of PCE and TCE contamination occurring in surface water, sediment, soil and groundwater at the Facility. During the investigation, Piedmont determined that the soil in the area between the plant building and the warehouse ("B-1 Area") was a major source of PCE contamination. As an Interim Measure activity, Piedmont established a Facility-specific health-based clean-up level for PCE of 210 parts per billion ("ppb"), and excavated soil in the B-1 Area exceeding that concentration. All analytical data from soil samples collected from outside the B-1 Area was below the Interim Measure clean-up level for PCE.

Groundwater is the other source of contamination at the Facility. The RFI defined the areas of groundwater impact into five distinct plumes, labelled A through E (Figures 4, 5 and 6). At a few sampling locations, elevated concentrations of VOCs were detected in sediment and the unnamed intermittent streams that are located northeast of the plant building. The source of the VOCs in the sediment and surface water, however, is the contaminated groundwater which recharges these streams. Therefore, remediation of the groundwater will result in amelioration of the sediment and surface water quality as well. The sediment and unnamed streams will be sampled after implementation of the corrective measure to ensure the

effectiveness of the remedy.

Since impacted soil in the B-1 Area was removed as an Interim Measure, EPA has determined groundwater to be the only remaining source of contamination at the Facility. The contaminants of concern are dissolved PCE and TCE in groundwater at the Facility. The following are likely sources of the elevated concentrations of PCE and TCE detected in the groundwater:

- The PCE vapor degreaser, distillation unit and associated floor drains where soapy water with PCE was disposed; the connective underground piping along which the soapy PCE mixtures were transported; and the Clarifier, Sludge Filter Beds, and Polishing Lagoon where the soapy PCE mixtures were discharged.

- A leaking PCE transfer pump located in the vicinity of the former aboveground storage tanks along the northeast exterior plant building wall.

- Historical spillage of PCE in the vicinity of the former drum storage pad (Unit 11) where waste PCE and waste oil was stored; at the rear (southwest side) of the plant building near wells OW-77/OW-78/OW-84; in the vicinity of the dumpster (Unit 10) located at the southwest corner of the plant building; and at a former drum storage area (which was identified in a historical aerial photograph) located approximately 50 feet due south of the south corner of the plant building. See Figure 1 for the location of Solid Waste Management Units ("Units") and monitoring wells.

- Historical spillage of TCE on the northeastern side of the plant building.

All known soil source areas (except for a small area immediately adjacent to the northeast wall of the plant building where the integrity of the building foundation prohibited further soil removal) are being regulated pursuant to the Virginia Hazardous Waste Management Regulations, have undergone clean-closure pursuant to Virginia Hazardous Waste Management Regulations Section 9.6, or have been excavated and disposed of in accordance with the Interim Measures program conducted under the EPA Order.

A. Groundwater Investigation

As part of the investigation, the Facility installed 48 wells to evaluate groundwater flow directions, hydrogeologic characteristics and groundwater quality. Piedmont determined that the Facility is underlain by approximately fifty feet of highly weathered residual soil (saprolite) on top of polydeformed

crystalline rock. The groundwater table occurs within the saprolite. Groundwater flow is primarily restricted to fractures, with limited interconnectedness, within the crystalline rock and overlying saprolite. Groundwater flowing within the upper 0-100 feet below ground surface (herein referred to as "shallow flow regime") moves toward the northeast and east (Figure 3). This groundwater recharges the intermittent streams that lie northeast of the Facility. Groundwater flow in rocks greater than 100 feet below ground surface (herein referred to as "deep flow regime"), is influenced by the Roanoke River, which is located about 4500 feet south of the Facility, and moves in a south-southeasterly direction (Figure 3).

Although sporadically elevated concentrations of inorganic constituents were detected in groundwater at the Facility, the most prevalent, mobile and toxic constituents detected were PCE and TCE. The RFI delineated the PCE and TCE groundwater contamination into five impacted areas, referred to as Plumes A-E. Figures 4 through 6 show the locations of the contaminated groundwater plumes. Plume A and B both appear to extend approximately 50-100 feet below ground surface, Plume C appears to extend to over 100 feet below ground surface, and Plumes D and E appear to extend to less than 50 feet below ground surface. Piedmont has determined through sampling and analysis of monitoring wells that the plumes have not migrated outside of the Facility boundaries.

B. Surface Water and Sediment

The RFI Report compared concentrations of constituents detected in downstream surface water and sediment samples with the upstream concentrations of those constituents. For any constituent detected at a concentration greater than five times the upstream concentration, Piedmont collected another sample and analyzed it for that constituent. The resampling collection point was located 100 feet downstream from the original location. Chromium, copper, and nickel are inorganic constituents which were used at the Facility and detected at levels greater than five times the background levels in sediment and surface water samples (Table 1). However, for each of these constituents detected in sediment, the maximum concentration detected was less than the concentration included in the Region III Risk Based Concentration ("RBC") Table using a residential soil scenario. (The RBC Table provides screening concentrations for single constituents in a single medium using standard exposure assumptions, which is protective of human health.) Similarly, maximum surface water concentrations for these inorganic constituents were all below Maximum Contaminant Levels ("MCLs") (or in the case of copper, where no MCL has been promulgated, the health-based action level). Maximum Contaminant Levels are the maximum permissible level of a contaminant in water used for public consumption as defined in 40 C.F.R. Part 141, Subpart B.

The following VOCs were detected in sediment and/or surface water in the intermittent streams at the Facility: carbon disulfide, 1,2 dichloropropane, chloroform, toluene and PCE. For each VOC detected in sediment, the maximum concentration detected was less than the RBC for residential soil. For surface water, PCE was the only constituent detected at a concentration exceeding a health-based action level (MCL or RBC as appropriate). PCE was detected at a concentration of 11 ppb at one location, SW-2 (Figure 7), which lies within the boundaries of Plume B. The source of the elevated concentration of PCE detected at SW-2 is associated with the contaminated groundwater from Plume B discharging to the stream. This occurrence of PCE is not an immediate concern because the intermittent stream where the PCE was detected contains water only during storm events, is not a potable source and is not used for recreational purposes. In the long-term, remediation of groundwater within Plume B should eliminate the elevated concentration of PCE detected in the stream.

C. In-Plant Inspection

An in-plant inspection was conducted by Virginia Geotechnical Services to determine if PCE and TCE contamination detected in monitoring well OW-39 (located adjacent to the plant building) was related to possible in-plant sources. The plant inspection included two Facility visits, interviews with Piedmont employees, review of facility floor plans, review of employee interviews on present and past waste handling practices at the Facility, and a review of a report describing the 1986 removal of underground pipelines at the Facility. The In-Plant Inspection Report, submitted by Piedmont to EPA on December 15, 1992, concludes that some in-plant sources of PCE contamination may have existed, but there are no present sources of PCE from the plant building.

D. Soil Gas Survey and Soil Sampling

A soil gas survey was performed to provide data on the identity and concentration of any chlorinated VOCs that could be present in the subsurface. A total of 103 soil gas samples were collected from depths of 2.5 to 4 feet adjacent to the northeast and southwest walls of the plant building. Soil gas data indicated that significant levels of PCE were present in the shallow subsurface near the southeastern corner of the manufacturing building, just south of the southwestern corner of the building and near the center of the western side of the building (Figure 8).

Upon completion of the soil gas survey, soil samples were collected to confirm the results of the soil gas survey. Piedmont collected soil samples from "hot spot" locations, which were locations identified during the soil gas survey where VOCs

were detected and "non hot-spot" locations, which were locations identified during the soil gas survey as locations where no VOCs were detected. A total of 11 soil samples were collected from six borings in "hot spot" areas; and a total of 11 samples were collected from 11 borings in "non-hot spot" areas. The "non hot-spot" collection points were located adjacent to "hot spot" locations. The soil gas confirmation samples results substantiated the absence of VOCs at all eleven "non hot-spot" locations, and confirmed the presence of VOCs at two of the "hot spot" locations. None of the soil samples collected exceeded the facility-specific soil clean-up level for PCE, 210 ppb, established during the Interim Measures.

Piedmont also collected and analyzed soil samples from the area between the plant building and the warehouse ("B-1 Area") and from two locations within the plant building adjacent to the B-1 Area. Results from these sampling activities showed that soil within the B-1 Area was a major source of PCE contamination, but that this contamination did not extend under the plant building. Piedmont removed soils in the B-1 Area exceeding the site-specific soil clean-up goal. See Interim Measures discussion below.

All other areas of known soil contamination at the Facility are being regulated in accordance with Virginia Hazardous Waste Management Regulations ("VHWMR") or were clean-closed for soils in accordance with VHWMR Section 9.6 either prior to, or during, the RFI.

E. Interim Measures

During drilling of soil borings, Piedmont determined that the soil in the vicinity of Piezometer B-1 was impacted by PCE. Pursuant to the Order, Piedmont conducted Interim Measure activities for soil in the B-1 Area. These Interim Measures included defining the nature and extent of soil contamination in the B-1 Area, establishing a site-specific clean-up goal of 210 ppb for PCE, and removing soil exceeding this clean-up goal. Piedmont excavated and disposed of all soil in the B-1 Area exceeding the clean-up goal with the exception of the soils along the southwestern wall of the excavation area, immediately adjacent to the plant building, where undermining of the foundation wall prohibited further removal. Soil sampling was also conducted inside the plant building foundation, at two locations and four depths, to determine if contamination had migrated under the building. Analytical results from inside the plant building were all non-detect for PCE or below the 210 ppb clean-up goal. The sampling activities conducted inside the plant building demonstrate that the volume of impacted soil left in place is limited in extent.

A total of 1,980 cubic yards of soil containing PCE was

excavated from the B-1 area, between November 1992 and September 1993, and sent off-site to a hazardous waste landfill. The sites of excavation (Figure 1) within the B-1 Area were backfilled with clean soil from an off-site borrow source.

During the investigation Piedmont also removed soil from a former Solid Waste Disposal Area (Unit 12, Figure 1). This area was used as a disposal area for inert solid waste from the plant due to a disruption of routine Facility waste collection and disposal services in the early to mid-1970's. Piedmont excavated approximately 2000 cubic yard of soil and other materials, including six drums, from the ravine running through the area. This unit was not a source of PCE soil or groundwater contamination. Samples collected from the base of the excavation indicated that tested compounds were below applicable regulatory threshold levels and did not require additional investigation. This area was backfilled and reseeded.

Prior to signing of the Consent Order with EPA, Piedmont designed and installed a groundwater pump-and-treat system. The system was designed to capture the known contaminated groundwater at the downgradient side of the Facility and to minimize off-site migration of the contaminated groundwater. The system has been operating since 1990. The system consists of eight pumping wells and one "Airpurge" air stripper. Treated effluent is pumped to Altavista's Publicly Owned Treatment Works ("POTW") sewer in accordance with a pre-treatment permit issued to Piedmont by the Town of Altavista.

F. Ecological Assessment

An ecological assessment was performed at the Facility in order to evaluate contaminant impacts on ecosystems in, and adjacent to, the Facility. The assessment collected information regarding the vegetation, wildlife species, and habitats in the vicinity of the Facility to determine if these ecosystems had been adversely impacted by activities at the Facility. The Phase I Ecological Assessment Report and the Ecological Assessment Report Addendum I were both approved by EPA on February 5, 1993. The reports conclude that no obvious external signs of stress, which could potentially or reasonably be attributed to the existing identified contamination at the Facility, are apparent. Therefore the second phase of the ecological assessment, which would have involved collection of potentially impacted biotic species for tissues studies, was not necessary.

VI. Summary of Facility Risks

Based on the findings of the RFI, VOC-contaminated groundwater has been identified as the medium of concern at the Facility. PCE and TCE were detected in groundwater in excess of Maximum Contaminant Drinking Water Levels (MCLs). MCLs are

defined in 40 C.F.R. Part 141 Subpart B as the maximum permissible level of a particular contaminant in water used for public consumption.

EPA considers PCE and TCE to be probable carcinogens. For carcinogens, risks are expressed (in scientific notation) as probabilities resulting from lifetime exposure. An excess lifetime cancer risk of 1E-06 indicates that one extra cancer case would be expected in a population of one million people exposed during their 70 year lifetime. Remediation at a facility is indicated when the facility related lifetime cancer risk for an individual exceeds the range of 1E-04 to 1E-06, or one extra cancer case in a population of 10,000 to a million. However, to ensure protection of human health, EPA prefers facilities to implement remedial activities when the total carcinogenic risks exceed the more protective end of this range, 1E-06.

EPA calculated the potential cancer risk associated with exposure to the highest concentrations detected of PCE and TCE for Plumes A, B and C (Table 2). The risk level for each plume exceeds EPA's acceptable risk range of 1E-04 to 1E-06. The greatest potential cancer risk is associated with Plume C with a risk level of 8E-03. An 8E-03 risk level means there is a probability that 8 persons out of every 1000 persons of average weight who come in contact with the contaminated groundwater through exposure via ingestion, inhalation, and dermal contact may develop cancer.

PCE and TCE can also cause toxic effects other than cancer. EPA has developed Reference Doses (RfDs) for chemicals to predict if chronic exposure is likely to produce any noncarcinogenic adverse health effects. The RfD, expressed in units of mg/kg-day, is an estimate of a lifetime daily exposure level that would not result in adverse health effects, even in the most sensitive human population exposed over a lifetime. If exposure to a chemical is less than the RfD, then it is unlikely the exposure would produce any adverse health effect, even in the most sensitive human population.

To evaluate the noncarcinogenic risk from a facility, calculated exposures or intakes of a chemical from all environmental media (e.g. groundwater, soil, air) are compared to the RfD. The ratio of the exposure to the RfD is called the Hazard Index ("HI") for a chemical, which is used to gauge the noncarcinogenic risk of a chemical. If the HI is less than 1, then it is unlikely that exposure to that chemical would have any adverse health effect on any group of people, even if exposure continued over a lifetime. If the HI is greater than 1, then EPA considers the constituent at the facility to pose a potential risk to human health.

Potential chronic health effects from exposure to mixtures

of chemicals are more difficult to analyze than from exposure to a single compound. If the toxic effect from two constituents is on the same organ system, the HIs can be added. For PCE and TCE the chemical specific HIs were added to determine a facility Hazard Index.

EPA calculated the HI for Plumes A, B and C (Table 3). The Facility HI associated with groundwater contamination within each plume exceeds 1 (EPA's definition of acceptable risk) and ranges up to 149 for Plume C. The health risk estimate was derived from exposure to PCE and TCE via ingestion, inhalation, and dermal contact.

EPA has determined that at the present time there are no on-site human receptors because currently groundwater at the Facility is not used for any purpose. However, the aquifer beneath the facility can yield a sufficient volume of water such that it has the potential for future use as a potable source.

VII. Scope of Corrective Action

Based on the findings of the RFI, groundwater has been identified as the only environmental medium requiring corrective measures. EPA is proposing that Piedmont construct and implement a groundwater recovery pump and treat system in order to contain and remediate the contaminated groundwater plumes. This would include: 1) continued implementation of the current recovery system; 2) the addition of a minimum of six new pumping wells which will be hooked-up to the current treatment system; 3) an evaluation period of the recovery system to determine the network's effectiveness in containing and remediating the plumes; 4) installation of additional recovery wells, beyond the six described, if the EPA determines that the results of the evaluation period warrant their inclusion; 5) periodic monitoring and reporting of groundwater data to evaluate effectiveness of the system, ensure containment of the plumes, and determine attainment of the established media clean-up standards.

VIII. Summary of Alternatives

During the CMS, the following corrective measure alternatives to remediate contaminated groundwater at the Facility were evaluated:

Alternative 1: No action with monitoring

Alternative 1 would only require a site-wide groundwater monitoring network. Groundwater monitoring would not remove the mass of contaminants in groundwater, and would result in the continued release of PCE to the intermittent stream near Plume B. Some contaminant concentration reduction would result from dilution through rain, but an indeterminable amount of time would

be required before a significant reduction in contaminant concentrations would occur.

Alternative 2: Current Pump-and-Treat System

Alternative 2 consists of using the existing pump-and-treat system as it is currently configured. Presently the facility has a total of eight pumping wells, ranging in depths from 49 to 70 feet below ground surface. Six of these wells are located in the vicinity of the former Polishing Lagoon area (Plume C), and two of the recovery wells, PW-4 and PW-8, are located within Plume B. Groundwater from these wells is pumped to an air stripper for treatment, and the effluent is discharged to the Altavista POTW. Alternative 2 would treat limited portions of Plumes B and C, and not any of Plumes A, D or E (Figure 9).

Alternative 3: Current Pump-and-Treat with Additional Pumping Wells

Alternative 3 includes the existing pump-and-treat system with a minimum of six additional pumping wells and long term monitoring. This alternative includes the hook-up of PW-11, an existing pumping well which has not been used to date, and the initial installation of five additional pumping wells. The location of PW-11 and the five additional wells is shown in Figure 9. Piedmont did not perform a groundwater/contaminant flow model to determine the optimum pumping well locations because a groundwater model does not have practical application for this Facility due to the subsurface conditions (fractured crystalline rock). Once these wells are installed and operational, Piedmont will conduct a three-month quantitative evaluation of the network's effectiveness in controlling and remediating the plumes and submit a report of the results obtained during the evaluation period to EPA for review and approval. If EPA determines that additional wells are necessary to control contaminant migration, Piedmont will install additional recovery wells.

Groundwater from these wells will be pumped to Piedmont's air stripper, and the effluent will be discharged to the Altavista POTW. Groundwater is currently pumped from eight recovery wells at a rate of approximately 1.5 gallons per minute per recovery well. This flow rate results in approximately 12 gallons of influent per minute ("gpm") to the air-stripper where the water is treated to concentration levels that are within the discharge limitations for the Altavista POTW permit issued to Piedmont. The initial addition of six recovery wells will increase the influent flow rate to approximately 20 gallons per minute to the air-stripper. Since the air-stripper is rated to treat between 30 to 60 gallons per minute, Piedmont expects that current air-stripper will be sufficiently sized to remediate the increased volume of groundwater associated with Alternative 3.

IX. Evaluation of the Proposed Remedy and Alternatives

In accordance with EPA guidance, "Guidance on RCRA Corrective Action Decision Documents: The Statement of Basis-Final Decision and Response to Comments," February 1991, each corrective measure alternative must be evaluated using four general standards and five remedial decision factors. This section profiles the performance of the proposed corrective measure alternatives against these four general standards for corrective measures (overall protection, attainment of media clean-up standards, source control and compliance with waste management standards) and these five remedial decision factors (long term reliability, reduction in toxicity, mobility or volume of waste, short term effectiveness, implementability and cost). Based on the discussion below, EPA has preliminarily identified Alternative 3 as the preferred remedy because Alternative 3 is the most effective in protecting human health and the environment.

A. Overall Protection

Alternative 1, 2 and 3 all provide for periodic monitoring and reporting of groundwater data to track compliance with established media clean-up standards. Alternative 1 only provides monitoring, and is not designed to provide any protection to human health and the environment. Alternative 2 would treat limited portions of Plumes B and C, but would not restrict migration of contaminated groundwater off-site. Alternative 3 would provide the best overall protection through the establishment of a network of recovery well configured to capture all of the contaminated groundwater, and its associated groundwater monitoring system which will ensure that the system continues to effectively capture and remediate the contaminated groundwater throughout its operation.

B. Attainment of Media Clean-Up Standards

EPA has established media clean-up standards for groundwater at the Facility. The media clean-up standards established for the Facility are MCLs for the identified contaminants of concern, PCE and TCE. The MCL for both PCE and TCE is 5 ppb. Attainment of media clean-up standards will be reached when Piedmont demonstrates, through sampling at a sufficient number of locations, that all of the contaminated groundwater has been remediated to the media clean-up standard.

The goal of the proposed corrective measure is to restore the groundwater to its beneficial use, which is as a drinking water source. Alternative 1 will not attain media clean-up standards. Alternative 2 could attain media clean-up standards in limited areas of the Facility, but not all of the impacted areas. Alternative 3 is the alternative most likely to attain

the media clean-up standards because Alternative 3 provides a pump-and-treat network designed to contain and remediate all of the contaminated groundwater. Data from the groundwater monitoring system will be evaluated periodically to ensure that the system continues to capture and effectively remediate the groundwater plumes.

EPA acknowledges that due to the hydrogeologic conditions beneath the Facility, it may be technically impossible to attain the media clean-up standards. It is possible that after years of pumping, concentrations of VOCs may level-off at concentrations greater than the media clean-up standards. If this should occur, and if at such time no applicable alternative remedial technologies exist, Piedmont may petition EPA to modify the media clean-up standards.

When EPA agrees that Piedmont has achieved the media clean-up standards, or the modified media clean-up standards ("Clean-Up Standards"), Piedmont may cease operation of the recovery system. However, to ensure that concentrations of VOCs in groundwater do not rebound, Piedmont must continue to monitor the groundwater quality until Piedmont can demonstrate that the Clean-Up Standards are not exceeded for a period of three consecutive years. If the concentrations of PCE or TCE rebound in excess of the Clean-Up Standards during the three-year monitoring period, Piedmont must begin operating the recovery system again, or an alternative system approved by EPA, to address those areas exceeding the Clean-Up Standards. When Piedmont collects enough data to demonstrate to EPA that the concentration of the contaminants of concern have stabilized below the Clean-Up Standards, Piedmont may petition EPA to cease operation of the system and begin the three-year post-operation monitoring program again.

C. Controlling the Sources of Releases

Alternative 1 would not remediate the contaminated groundwater beneath the Facility or the elevated concentrations of PCE detected in the intermittent stream proximate to Plume B. The PCE and TCE groundwater contamination would spread laterally and vertically on-site and could contaminate the unnamed intermittent streams which lie northeast of Piedmont's plant building.

Alternative 2 only addresses remediating a limited volume of groundwater in Plumes B and C, and does not address contaminated groundwater in Plumes A, D, and E. Alternative 2 would provide some beneficial effects in Plumes B and C such as retarding "shallow" (0-50 feet) groundwater migration of the contaminants in the vicinity of the former Polishing Lagoon. However, Alternative 2 would not prevent the vertical migration of contaminants in groundwater that recent monitoring data indicates

is occurring in the vicinity of the former Polishing Lagoon, the lateral and vertical spread of groundwater contamination beneath the Facility, the potential for groundwater contamination to migrate beyond the Facility's boundaries (above MCLs), and the potential release of elevated concentrations of the contaminants of concern to the intermittent streams that lie northeast of Piedmont's plant building.

Alternative 3 would be the most technologically effective for controlling migration and will provide the maximum amount of contaminant mass reduction of the alternatives available at this time. This alternative will significantly reduce the lateral and vertical extent of contamination, prevent off-site migration of contaminants, and reduce the contaminant levels over time to protect human health and the environment.

D. Complying with Standards for Management of Waste

Corrective measures alternatives must comply with federal and state regulations and EPA policy. Alternative 1, 2 and 3 will require the management of waste associated with groundwater sampling in accordance with RCRA regulations. In addition, Alternative 2 and 3 would both result in VOC emissions discharging from the air stripper.

Piedmont collected samples of influent and effluent air-stripper water to estimate the mass of PCE emitted from operating the current pump and treat system, as described in Alternative 2, and projected the expected PCE emissions from Alternative 3 using an extreme worst-case scenario (maximum concentrations and maximum flow rate). Based on the current removal efficiency the mass of PCE discharged per hour from the air-stripper through the implementation of Alternative 2 or 3 would be well below the VDEQ limits for requiring an air permit.

Piedmont also modeled the effect of air dispersion on the emissions from the air stripper to evaluate the potential risk to the nearest receptors resulting from implementation of Alternatives 2 and 3. Based on Piedmont's modeling, the resultant air emissions from implementation of Alternative 2 or 3 would not exceed EPA's acceptable risk level.

The effluent water from the air-stipper must meet the requirements of Piedmont's pre-treatment permit from the Alatvista POTW. Compliance with all applicable federal and state regulations will be ensured through an administrative order requiring implementation of the selected corrective measure alternative.

E. Long Term Reliability and Effectiveness

Alternative 1 does not have long-term reliability since it requires only monitoring and does not include any action to contain and remediate the contaminated groundwater. Alternative 2 will not be effective in the long-term because the RFI documented that the current configuration of wells is not sized or distributed appropriately to recover all the contaminants in each of the plumes. Alternative 3 will be effective over the long-term since it will increase the number of recovery wells and distribute them in appropriate locations to prevent contaminant migration and remove the mass of contaminants.

F. Reduction of Toxicity, Mobility or Volume of Waste

Alternative 1 will not reduce the toxicity, mobility, or volume of contaminants of concern because it only requires monitoring, and therefore is not designed to remove any such contaminants. While Alternative 2 provides for some contaminant mass removal, the network of wells is too limited to provide for containment of the plumes, thus allowing the plumes to migrate both laterally and vertically. Alternative 3 will be the most effective in reducing the toxicity, mobility and volume of contaminated groundwater, because it provides for containment, removal and treatment of all contaminated groundwater.

G. Short-Term Effectiveness

Alternative 1 is not effective in the short term since it will not contain or remediate the contaminated groundwater plumes, and will allow for the continued release of elevated concentrations of PCE to an intermittent stream northeast of Piedmont's plant building. Alternative 2 will not reduce the current risk associated with Plumes A, D, and E and only mitigate some lateral spread of Plumes B and C. Alternative 3 is effective in the short-term because it will contain and treat the entire volume of contaminated groundwater beneath the Facility.

H. Implementability

Implementability of any corrective measure alternatives is related to the activities required to make such alternative operational. Alternative 1 is currently operational. Alternative 2 has been installed and is currently operational. The only construction required for implementation of Alternative 3 is the installation of five recovery wells, and possibly additional monitoring wells to evaluate the capture zones associated with the recovery wells. Well installation is a fairly routine environmental construction activity. No construction is associated with the treatment system, since Piedmont demonstrated in the CMS that Piedmont's current air-stripper is sufficiently sized to treat the estimated increased

volume of groundwater from the additional recovery wells. Consequently Alternative 3 is readily implementable.

I. Cost

The following are estimated present value costs for each alternative.

	ALT-1	ALT-2	ALT-3
1-YEAR			
CAPITAL COSTS	$14,867	$14,867	$198,376
O&M COSTS	$75,000	$88,329	$94,149
TOTAL PROJECT COSTS	$89,867	$103,196	$292,525
30-YEARS			
CAPITAL COSTS	$50,010	$50,010	$50,010
O&M COSTS	$2,250,000	$2,625,870	$2,800,470
TOTAL PROJECT COSTS	$2,314,877	$2,690,747	$3,048,856

Alternative 1 and 2 are both less costly than Alternative 3, however only Alternative 3 is protective of human health and the environment; it is therefore the preferred alternative.

X. Public Participation

On February 28, 1996, EPA placed an announcement in the Altavista Journal to notify the public of EPA's preferred corrective measure alternative and of the location of the Administrative Record. Copies of this Statement of Basis will be mailed to anyone who requests a copy. The Administrative Record, including this Statement of Basis, is available for review during business hours at the following two locations:

U.S. Environmental Protection Agency
Region III (3HW90)
841 Chestnut Street Building
Philadelphia, Pennsylvania 19107
Telephone Number: (215) 597-6688
Attn: Ms. Deborah R. Goldblum

and

Staunton River Memorial Library
500 Washington Street
Altavista, Virginia 24517
Telephone Number: (804) 369-5140
Attn: Ms. Barbara Burton

EPA is requesting input from the public on the three corrective measure alternatives and on EPA's preliminary identification of Alternative 3 as the preferred corrective measure alternative to remediate the contaminated groundwater at the Facility. The public comment period will last thirty (30) calendar days beginning March 1, 1996 and ending April 1, 1996. Comments on, or questions regarding, EPA's preliminary identification of a preferred corrective measure alternative may be submitted to:

Ms. Deborah R. Goldblum (3HW90)
U.S. EPA, Region III
841 Chestnut Building
Philadelphia, PA 19107
(215) 597-6688 FAX (215) 597-8164

Following the thirty (30) day public comment period, EPA will hold a public meeting on EPA's preferred corrective measure if sufficient public interest indicates that a meeting would be valuable for distributing information and communicating ideas. After evaluation of the public's comments, EPA will prepare a Final Decision Document and Response to Comments which identifies the selected Corrective Measure Alternative. The Response to Comments will address all significant written comments and any notable oral comments generated if a public meeting is held. This Final Decision Document and Response to Comments will be made available to the public. If, on the basis of such comments or other relevant information, significant changes are proposed to be made to the corrective measures alternative identified by EPA in this Statement of Basis, EPA will seek additional public comments.

Upon consideration of public comments, EPA will select a final corrective measure alternative for the Bridgeport-Piedmont Facility. Thereafter, EPA will seek implementation of the final corrective measure alternative using available legal authorities, including RCRA Section 3008(h) 42 U.S.C. §6928(h).

2/13/96
Date

Thomas C. Voltaggio, Director
Hazardous Waste Management Division