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RECORD OF DECISION
GROUND WATER OPERABLE UNIT

SHIELDALLOY CORPORATION
NEWFIELD BOROUGH
GLOUCESTER COUNTY, NEW JERSEY

SEPTEMBER 1996

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

DECLARATION FOR THE RECORD OF DECISION
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough
Gloucester County, New Jersey

SITE NAME AND LOCATION

Shieldalloy Corporation
Newfield Borough
Gloucester County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the New Jersey Department of Environmental Protection's (NJDEP's) selected remedial action for the ground water operable unit at the Shieldalloy Corporation Superfund site, also kmown as Shieldalloy Metallurgical Corporation (SMC), in Newfield, New Jersey, which was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 U.S.C.§9611 et seq. and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300 et seq. NJDEP maintains the Administrative Record in Trenton and two document repositories located in the Newfield Borough Hall and the Newfield Borough Library. Detailed in Section III, herein, the Administrative Record Index contains a list of the documents which formed the basis of NJDEP's selection of the remedy. This decision document explains the factual and legal basis for selecting the remedy for this site.

The United States Environmental Protection Agency (EPA) concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the preferred remedy or one of the other active measures considered in this Record of Decision (ROD), may present an imminent and substantial threat to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

This ground water operable unit is the first operable unit for the site; all remaining contaminated environmental media will be addressed as one or more additional operable units. The selected remedy, Modified Ground Water Restoration, addresses the principle threat posed by ground water contamination through ground water extraction, treatment and discharge. Since it includes a pump-and-treat action, it will require long-term operation and maintenance until such time as cleanup levels are achieved. In combination with the other operable unit(s) for the site, it will provide an overall site remedy.

The major components of the selected remedy are as follows:

- Modified Ground Water Extraction System to optimize the capture of contaminated ground water;
- Air Stripping to remove volatile organic compounds from the recovered ground water;
- Electrochemical Treatment with Supplemental Treatment (as required) to remove inorganic contaminants, especially metals, from the recovered ground water; and
- Discharge of treated ground water to surface waters of the Hudson Branch of the Maurice River.

DECLARATION OF STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable, and it satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because this remedy will result in hazardous substances remaining on site above health-based levels, a review will be conducted within five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

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DECISION SUMMARY FOR THE RECORD OF DECISION
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough
Gloucester County, New Jersey

I. SITE NAME, LOCATION AND DESCRIPTION

The Shieldalloy Metallurgical Corporation (SMC) site consists of approximately 87.5 acres. The manufacturing facilities and support areas are situated on 67.7 acres of land located in the predominantly in the Borough of Newfield, within Gloucester County. SMC also owns 19.8 acres of farm land located in Vineland, within Cumberland County, approximately 2,000 feet southwest of the Newfield parcel. A site location map is provided as Figure 1, and a local site setting plan is provided as Figure 2.

The SMC Newfield property is bounded by a Conrail rail line to the west and to the north. Wooded areas, residences, and small businesses are located east and west of the site. The Hudson Branch, a tributary to Burnt Mill Branch and the Maurice River, flows along the southern portion of the site, just north of residences located along Weymouth Road. A large portion of the facility
is surrounded by a steel wire fence. The property surrounding SMC is used for a combination of residential and industrial purposes.

Wetlands and open water have been identified and are limited to the area adjacent to the Hudson Branch. The wetlands vary in width from 40 to 400 feet and extend onto undeveloped portions of the site.

The major subsurface geologic feature underlying the site and surrounding area is the Cohansey Sand Formation, part of the New Jersey Coastal Plain Sole Source Aquifer, which serves nearby residences with potable drinking water. The Cohansey Sand Formation typically ranges from 110 to 120 feet in thickness. Data from the Remedial Investigation (RI) indicates that, in general, the Cohansey Sand is comprised of coarse sands in the upper 40 feet, and finer sand, with some silt and clay, in the lower 60 to 80 feet. The Cohansey Sand is underlain by the Kirkwood Formation, the upper portion of which is composed of silt and clay. The upper Kirkwood Formation acts as a corifting layer and restricts the downward flow of ground water from the Cohansey Sand.

The depth to ground water fluctuates seasonally, but generally ranges from 4 feet below the surface in the southern portion of the site to 16 feet below the surface in the northern portion. The ground water flow direction closely corresponds with the general topography of the site, which slopes towards the southwest. Because of the smaller grain size and increased percentage of silt and clay, ground water movement is slower in the lower Cohansey Sand. Since the upper and lower Cohansey Sand have different hydrologic properties, the ground water quality at the site was evaluated separately for the "shallow" (less than 50 feet deep) and "deep" (greater than 50 feet deep) ground water.

The ground water is classified as Class II-A. The primary designated use for Class II-A ground water is potable water and conversion (through conventional water supply treatment, mixing or other similar techniques) to potable water. Secondary designated uses include agricultural and industrial water.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Land Use

SMC has been operating at the Newfield facility since approximately 1955, processing ores and minerals to produce primary metals, specialty metals and ferroalloys. The principal production processes include aluminothermic and reduction smelting of ores which produce metal, slag and other by-products. Raw materials have contained the following metals: chromium, bismuth, copper, titanium, vanadium, calcium, aluminum, zirconium, iron, lead, nickel, silicon, magnesium, manganese, fluoride salts and oxides of niobium (columbium), vanadium, barium, calcium and aluminum.

The SMC facility can be characterized as consisting of four area:

- the Manufacturing Area;
- the Undeveloped Plant Property;
- the By-product Storage Area; and
- the Lagoon Area.

Major site features are indicated in Figure 3. An area of note within the Manufacturing Area is the former location of a metal degreasing unit, referred to as the Manpro-Vibra Degreasing Unit, which was operated from 1965 to 1967 and used trichloroethene as a degreasing compound. The Undeveloped Plant Property includes the location of a 1990 spill of chromium wastewater, referred to as the tank T12 chromium wastewater spill area. The By-product Storage Area is used to store slags and other by-product materials generated as a result of the manufacturing processes. Due to the presence of naturally-occurring thadium and uranium in certain raw materials used at the facility, some of the slags and dusts generated contain low levels of radioactive isotopes. These slags and dusts are stored in a portion of the By-Product Storage Area and are subject to regulation by the United States Nuclear Regulatory Commission. The Lagoon Area consists of nine lagoons which were formerly used to store wastewaters. Untreated wastewater from air pollution control equipment and from a chromium-oxide production operation was discharged into an unlined percolation lagoon, which existed in the location of the nine lagoons, between 1963 and 1970.

Response History

Chromium contamination of the ground water was first observed by the New Jersey Department of Environmental Protection (NJDEP) in early 1970 in a Borough of Newfield municipal well and a private well. Concentrations greater than 100 parts per million (ppm) of hexavalent chromium, the mobile form of chromium, were detected in on-site monitoring wells. Hexavalent chromium is a known carcinogen. As a result, NJDEP directed SMC to perform ground water investigations to determine the extent of the chromium contamination and to develop an appropriate remedial action. Investigations were performed which resulted in the installation and operation of a ground water recovery and treatment system in 1979. That system, which pumped contaminated ground water from one well located in the southwest comer of SMC's plant property, was capable of remediating 80 gallons per minute (gpm) of contaminated ground water using ion exchange technology with discharge of treated water to the Hudson Branch. Subsequent investigations revealed that this system was not sufficient to remedy the known extent of chromium contamination. NJDEP informed SMC of this determination in May 1982.

In June 1983, NJDEP completed a Potential Hazardous Waste Site Inspection Report. This report was applied to the Environmental Protection Agency's (EPA's) Hazard Ranking System which resulted in the facility being placed on EPA's National Priorities List as a Superfund site in September 1983 based on the presence of chromium contamination in the ground water.

In September 1984, NJDEP and SMC entered into an Administrative Consent Order (ACO) which required SMC to conduct a feasibility study for improved remediation of the chromium-contaminated ground water and to continue with the existing remediation program until a new system could be completed.

In addition to chromium, volatile organic compounds (VOCs) were also detected in the ground water which prompted NJDEP to establish a "well restriction area" in 1986, as indicated in Figure 4, and use money available from the New Jersey Spill Fund to extend an existing public water line to affected residents. The establishment of the well restriction area required mandatory connection with the public water system. Since the majority of the chromium contamination lies within the well restriction area, the residents within the restriction area are also protected from using the chromium-contaminated ground water.

In January 1988, SMC completed a report entitled Ground Water Remediation Alternatives which presented alternatives for improvement of the remedial system. The study recommended that ground water recovery and treatment should be increased from 80 gpm, 13 to 16 hours per day, 5 days per week, to 400 gpm, 24 hours per day, 7 days per week to minimize contaminant migration and ensure timely removal of the chromium contamination. The study recommended the continued use of ion exchange technology, and also recommended that four additional recovery wells be installed, with continued discharge to the Hudson Branch. As stated above, the VOC contamination exists in a plume that overlaps with the chromium plume. To remove the VOC

contamination that would be recovered along with the chromium contamination, SMC added an air stripper to the design of the system in response to NJDEP and public concerns. In October 1988, NJDEP and SMC entered into a second ACO which required SMC to initiate operation of the 400 gpm ground water remediation system as an interim remedial measure and to conduct a site-wide remedial investigation and feasibility study (RI/FS).

SMC began operation of the upgraded system in July 1989. However, because of unforeseen difficulties, such as resin fouling by naturally occurring iron in the ground water, the effectiveness of the ion exchange system in treating the ground water at a 400 gpm rate was variable. The system could not operate to design specifications, so it was operated in a manner that required frequent, but temporary, shutdowns. The system had been operating at rates averaging approximately 200 gpm.

Because of the difficulties with the ion exchange system, SMC constructed an electrochemical treatment unit. The electrochemical treatment unit has been in operation since October 1992, replacing the ion exchange system as the primary treatment process for the removal of inorganic contaminants. It has been effective in the treatment of the chromium contamination in the recovered ground water, removing significantly higher amounts of chromium from the ground water than was achievable using the ion exchange system. The electrochemical treatment unit has achieved and maintained the treatment rate of approximately 400 gpm with effluent concentrations of chromium of less than 30 parts per billion (ppb). The ion exchange unit remains on-site but is currently not operated. The air stripper continues to provide VOC treatment. The locations of the existing extraction wells and treatment building are indicated in Figure 5.

SMC has been discharging the treated ground water to the Hudson Branch in accordance with a New Jersey Pollutant Discharge Elimination System (NJPDES) discharge to surface water permit. NJDEP is in process of renewing the permit based on current data and changes in the regulations. Once complete, NJDEP will provide public notice and the draft discharge to surface water permit will be available for public comment

Field work for the RI was initiated in October 1990. The scope of the RI was extensive, addressing ground water, surface and subsurface soils, surface water, sediments and air. In addition to the RI, the ACOs require monthly monitoring of ground water for selected contaminants. As a result, a large amount of ground water data is available for use in designing the remedial action. With the submittal of the RI Report in 1991, NJDEP determined that enough data existed to address the ground water as a separate operable unit, and directed the preparation of a focused feasibility study (FFS) to evaluate remedial actions for ground water. The other contaminated environmental media will be addressed as one or more additional operable units in the near future.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The local community has been concerned and involved in the site investigation and remediation process at the SMC facility. A public meeting was held on January 31, 1989 at Newfield Borough Hall to discuss the remedial actions at the site, predominantly the start-up of the ACO-required ground water remediation system. The initiation of the RI/FS Work Plan was also discussed. Another public meeting was held on October 23, 1990, again at Newfield Borough Hall, to provide the public with an update on the progress of the RI/FS and the ACO-required ground water remediation system.

As required by CERCLA, an Administrative Record was established and includes documents which NJDEP considered or relied on to select the remedial action and documents which demonstrate the public's opportunity to participate in and comment on the selection of the remedial action. The complete Administrative Record for the site is maintained and is available for public inspection at the NJDEP offices in Trenton. Document repositories were established at the Newfield Borough Hall and the Newfield Borough Library to provide the public with copies of the major documents right in town. Included in each of the document repositories is an Administrative Record Index which lists all of the documents in the Administrative Record. The Index is included in this ROD as Appendix F.

The RI Report, FFS Report and the Proposed Plan for the ground water operable unit at the SMC site were released to the public for comment on August 24, 1995 and made available in both the Administrative Record and in the document repositories. The notice of availability for these documents was published in the Daily Journal of Vineland on August 24, 1995. The Human Health Risk Assessment was added to the Administrative

Record and document repositories on August 29, 1995. A public comment period on the documents was held from August 24, 1995 to September 25, 1995. In addition, a public meeting was held on September 13, 1995. At this meeting, representatives from NJDEP, EPA, SMC and TRC Environmental Corporation, environmental consultants for SMC, were available to answer questions about the site and the remedial alternatives under consideration. A response to the comments received during this period is included in the Responsiveness Summary, which is attached as Appendix A to this ROD.

IV. SCOPE AND ROLE OF RESPONSE ACTION

Based upon the risk assessment conducted for SMC, which is discussed in more detail in the following sections, ground water conditions at the site pose a principal threat to human health and the environment, thereby providing the basis for the selected ground water remedial action. This is the first remedial action to be implemented at the site. Other contaminated environmental media, including those that are serving as a source of ground water contamination, will be addressed as part of one or more additional operable units in the near future.

V. SUMMARY OF SITE CHARACTERISTICS

Ground water analytical results from both the RI and the monthly monitoring indicate that volatile organic and inorganic contamination exists beneath and beyond the SMC facility, in excess of the State and Federal maximum contaminant levels (MCLs) for drinking water. Contaminant levels also exceed New Jersey's Ground Water Quality Standards (GWQS) for Class II-A ground water. The contaminants are present in a plume that generally extends from the facility towards the southwest.

Trichloroethene (TCE) is the major VOC detected. Concentrations greater than 800 ppb were detected during the RI, exceeding the New Jersey MCL of 1 ppb. In the upper Cohansey Sands, TCE contamination is centered around the former degreasing unit location (See Figure 3), and extends to the southwest. In the lower Cohansey Sand, TCE is first detected downgradient of the upper plume, extending to the southwest. Contaminant plumes for the upper and lower Cohansey Sands based on April 1995 ground water monitoring data are presented in Figure 6.

Other VOCs detected above MCLs include tetrachloroethene, 1,1-dichloroethene, 1,2-dichloroethene, benzene, toluene and xylene.

Chromium is the major inorganic contaminant in the ground water. The MCL for chromium is 100 ppb, and levels in excess of 100,000 ppb were detected during the RI. In the upper Cohansey Sand, the total chromium plume is centered under the Manufacturing Area and the By-product Storage Area. Downgradient, the chromium plume extends to the southwest. Total chromium levels in the lower Cohansey Sand are greatest south of the Lagoon Area, extending to the southwest. Total chromium contaminant plumes for the upper and lower Cohansey Sand based on April 1995 ground water monitoring data are presented as Figure 7.

Other inorganics commonly detected in ground water samples include lead and antimony. Lead was detected at a maximum concentration of 262 ppb, which is above the GWQS of 10 ppb and the federal drinking water action level of 15 ppb, in an upgradient shallow well located along the northern property line between the By-product Storage Area and the Manufacturing Area. Lead was also detected at levels exceeding the GWQS and federal action level in other wells located throughout the site. Antimony was detected at a maximum concentration of 2,300 ppb, which is above the MCL of 6 ppb, south of the Lagoon Area. A downgradient increase in antimony levels was identified in the same general area in which elevated downgradient TCE levels were detected. Both lead and antimony levels in the, ground water generally decreased to the southwest.

Other inorganic contaminants detected in excess of MCLs include arsenic, beryllium, cadmium, cyanide, mercury, nickel, nitrate, selenium and silver.

Vanadium and boron were also detected in the ground water at concentrations as high as 128,000 ppb and 18,300 ppb, respectively. Since there are no MCLs for these inorganics, risk-based cleanup levels were developed. Vanadium and boron were detected in excess of their risk-based cleanup levels of 260 ppb and 3,000 ppb, respectively, in a limited number of wells.

For ground water contaminants, the major transport mechanism is natural ground water migration. The ground water flow direction under a no pumping condition is to the southwest, which coincides with the shapes of the ground water contaminant plumes presented in Figures 6 and 7. SMC's ground water recovery system has been effective in controlling downgradient migration of contaminated ground water. Operation of this system has clearly reduced the concentrations of contaminants in ground water, as demonstrated by the analyses of ground water samples taken from both on-site and off-site monitoring wells. The presence of the well restriction area downgradient of the facility prevents potential exposures to ground water contaminants in this downgradient area.

VI. SUMMARY OF SITE RISKS

A baseline risk assessment was conducted based on the results of the RI to estimate the potential risks associated with current site conditions under current and potential future land uses. The baseline risk assessment estimates the potential human health and ecological risks which could result from the contamination at the site if no remedial action was taken. While the risk assessment evaluates risks associated with exposures to several media at the site, the summary of the Human Health Risk Assessment (HHRA) presented below focuses on the risks posed by ground water at the site. A more complete description can be found in the HHRA report (August 1995). An environmental evaluation is being conducted to evaluate actual or potential impacts of site-related contamination on plants and animals which are exposed to soil, surface water and sediments. Contaminated shallow ground water has the potential to discharge to and possibly contaminate surface water bodies, although this has not been conclusively shown to occur in relation to ground water near the site. However, because the potential impacts of contaminated soil, surface water and sediment will be further evaluated as part of a separate operable unit, they will not be discussed here.

The HHRA consisted of a four-step process to assess the potential site-related human health risks under both current and potential future exposure scenarios. The four-step process included hazard identification, exposure assessment, toxicity assessment, and risk characterization. Basically, risk characterization combines the estimates of exposure with the dose-response (or toxicity) values to derive estimates of the potential cancer risks and the potential for adverse non-cancer health effects.

The estimated cancer risks and non-cancer Hazard Indices associated with exposures to ground water were evaluated using EPA's established target cancer risk range for Superfund cleanups of 10-6 to 10-4 (1 in a million to 1 in 10,000) and target Hazard Index Ratio value of less than or equal to 1. The State of New Jersey's criteria are based on an acceptable individual lifetime carcinogenic risk of 10-6. The risk assessment process is explained in greater detail below.

Hazard Identification

The hazard identification involved the selection of the contaminants of concern (COCs), which are the detected contaminants that the have inherent toxic/carcinogenic effects that are likely to pose the greatest concern with respect to the protection of human health. The ground water COCs for SMC were chosen based upon the frequency of detection of each contaminant. This approach is consistent with EPA guidance (EPA, 1999), with the exception that the COC list was not reduced on the basis of comparison to background (upgradient) ground water quality. The list of COCs may also be reduced based upon additional factors, such as essential nutrient information and a concentration toxicity screen. However, EPA guidance indicates that this further reduction is optional. Therefore, a reduction of the list of COCs on the basis of factors beyond detection frequency was not applied in this assessment. The ground water COCs selected in the HHRA are presented in Table 1.

Exposure Assessment

The exposure assessment identified the potential pathways and routes for COCs to reach potential receptors, estimated the contaminant concentrations at the points of exposure and characterized the extent of the potential exposures. Contaminant release mechanisms from the environmental media, based on physical, chemical, and other environmental fate parameters, are also resented in the HHRA.

Five potential human exposure scenarios were identified, as listed below:

- Scenario 1 - Trespassing Scenario (Current)
- Scenario 2 - Industrial Use Scenario (Current)
- Scenario 3 - Residential Scenario (Current)
- Scenario 4 - Construction Scenario (Future)
- Scenario 5 - Residential Scenario (Future)

The only scenario which includes exposures to ground water is Scenario 3 - Residential Scenario. While an area near the SMC facility has been designated as a well restriction area (see Figure 4), requiring mandatory connection with public water system and sealing of domestic and supply wells, residences located outside of this well restriction, primarily to the south of the site (along Weymouth Road) may use private wells as a potable drinking water source and thus may potentially be exposed to contaminated ground water. Exposures to both shallow and deep ground water via private wells were evaluated. Data from four on-site monitoring wells located near the potential receptors (see Figure 8) were used in the risk analysis (as discussed in more detail later in this section). Potential exposure pathways included ingestion of ground water, inhalation of VOCs from ground water released into bathroom air during showering, and dermal contact with contaminants in ground water. This scenario assumes the following: 350 days of exposures per year for 30 years; adult ingestion of 2 liters of ground water per day; and 12 minutes of bathing per day.

Risks associated with the potential future on-site residential use of the ground water as a potable drinking water source were not quantified, since risks outside the acceptable carcinogenic risk range and hazard index ratios greater than one were calculated for the potential consumption of ground water under the current residenfial use scenario. Due to the detection of higher concentrations of site-related contaminants in ground water samples that would be used to quantify potential future residential risk than in ground water samples used under the current residential use scenario, it is believed that future use of ground water as a potable drinking water source would also present an unacceptable human health risk.

Exposure point concentrations (EPCs) were calculate d for each COC based upon a statistical method which uses a confidence interval (i.e., the 95% upper confidence limit or UCL) to calculate a theoretical concentration from actual data, per EPA guidance (EPA, 1989). Use of this method provides reasonable confidence that the true site average will not be underestimated (EPA, 1992). The probability that the actual average concentration on the site exceeds the calculated value is estimated to be less than 5%. Therefore, the 95% UCL was calculated for each compound based upon actual detected concentrations. When few data points are available for statistical analysis (e.g., less than 10 data points), the 95% UCL is artificially inflated and exceeds the maximum detected concentration. In these cases, the maximum detected value was used as the EPC rather than the 95% UCL.

For exposures to ground water under Scenario 3, the data from four on-site ground water monitoring well locations (SC-13S/D, SC-22S/D, W2 and D) were assumed to be representative of current contamination south of the SMC facility and the EPCs were developed on the basis of the data from these wells alone. Separate EPC values were developed for shallow and deep ground water data. Given the small number of wells included in the ground water evaluation, most of the EPCs for the COCs in shallow and deep ground water corresponded to the maximum detection concentration rather than the 95% UCL.

Toxicity Assessment

The toxicity assessment summarizes the types of adverse health effects associated with exposures to each COC and the relationship between magnitude of exposure (dose) and severity of toxic effect (response). The dose-response values used in the HHRA were obtained from a combination of the EPA's Integrated Risk Information System (IRIS) database (EPA, 1995) and EPA's Health Effects Assessment Summary Tables (HEAST) (EPA, 1994). The toxicity values used in the HHRA are presented in summary tables in Appendix B.

Cancer potency factors (CPFs), also known as slope factors, have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. CPFs, which are expressed in units of (mg/kg-day)-1, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to provide an upper-bound estimate of the

excess lifetime cancer risk associated with exposure at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the CPF. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Cancer potency factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied. Reference doses (RfDs) have been developed by EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that is likely to be without an appreciable risk of adverse health effects. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) can be compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that the RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

Risk Characterization

As previously stated, the risk characterization combines the estimates of exposure with the dose-response (or toxicity) values to derive estimates of the potential cancer risks and the potential for adverse non-cancer health effects.

Excess lifetime cancer risks are determined by multiplying the intake level with the CPF. These risks are probabilities that are generally expressed in scientific notation (e.g., 1 x 10-6 or 1E-6). An excess lifetime cancer risk of 1 x 10-6 indicates that, as a plausible upper bound, an individual has a one in one million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard quotient (HQ), which is the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's RfD. By adding the Hqs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

The results of the HHRA indicate that residential ground water use, as evaluated under exposure Scenario 3, presents unacceptable human health risks. That is, estimated cancer risks, as presented in Table 2, exceed EPA's established target cancer risk range of 10-6 to 10-4 and the State of New Jersey's acceptable carcinogenic risk of 10-6. The HIs, also presented in Table 2, exceed the target value of 1. Residential exposures to deep ground water are associated with a cancer risk of 7 x 10-3 and an HI of 8,000. Ingestion of ground water accounts for the majority of these estimated risks, with arsenic and beryllium the main contributors to the cancer risk estimate and hexavalent chromium the primary contributor to the HI. Detailed risk estimation tables are presented in Appendix B. Residential exposures to shallow ground water are associated with a cancer risk of 4 x 10-2 and an HI of 600, due mainly to ground water ingestion. The elevated cancer risk value is due primarily to the presence of arsenic and beryllium. The primary contributors to the HI value are arsenic, cyanide and vanadium.

Uncertainties

The procedures and inputs used to assess risks in the HHRA, as in all such assessments, are subject to a wide variety of uncertainties. In general, the main sources of uncertainty include:

- environmental chemistry sampling and analysis
- environmental parameter measurement
- fate and transport modeling
- exposure parameter estimation
- toxicological data

Uncertainty in environmental sampling arises in part from the potentially uneven distribution of chemicals in the media sampled. Consequently, there is significant uncertainty as to the actual levels present. For example, in the HHRA, there are uncertainties associated with the limited amount of data and the infrequent rate of detection of some of the contaminants of concern. Also, environmental chemistry-analysis error can stem from several sources including the errors inherent in the analytical methods and characteristics of the matrix being sampled.

Uncertainties in the exposure assessment are related to estimates of how often an individual would actually come in contact with the chemicals of concern, the period of time over which such exposure would occur, and in the models used to estimate the concentrations of the chemicals of concern at the point of exposure. In this instance, uncertainties in the HHRA are associated with the use of ground water as a potable source in the area south of the facility and the assumption that ground water data from well locations SC-13S/D, SC-22S/D, W2 and D are representative of private well water quality.

Uncertainties in toxicological data occur in extrapolating both from animals to humans and from high to low doses of exposure, as well as from the difficulties in assessing the toxicity of a mixture of chemicals. These uncertainties are addressed by making conservative assumptions concerning risk and exposure parameters throughout the assessment. As a result, the HHRA provides upper-bound estimates of the risks to populations near the site, and is highly unlikely to underestimate actual risks related to the site.

In general, these uncertainties are likely to overestimate, rather than underestimate, the risk.

A sensitivity analysis was conducted to provide insight into the magnitude of uncertainty associated with those exposure pathways which contribute the majority of excess risk. A central tendency risk estimate was calculated using most likely exposure (MLE) parameters. For exposures to ground water, exposure pathways which present unacceptable risks under the reasonable maximum exposure parameters based on the 95% UCL also present unacceptable risks under the MLE parameters.

More specific information concerning public health risks, including a quantitative evaluation of the degree of risk associated with various exposure pathways, is presented in the HHRA. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the remedial action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment; they specify the contaminant(s) of concern, the exposure route(s), receptor(s), and acceptable contaminant level(s) for each exposure route. These objectives are-based on available information and standards such as ARARs and risk-based levels established in the risk assessment.

A feasibility study serves as the mechanism for the development, screening, and detailed evaluation of remedial alternatives for all environmental media affected at a site. Because only one contaminated environmental medium, ground water, is addressed by this operable unit, it was appropriate to conduct a "focused" feasibility study to evaluate alternatives which address only the ground water.

A Focused Feasibility Study (FFS) for ground water remediation was completed in February 1994 and established the objectives of a ground water remedial action, which include:

- Prevent exposure, due to ground water ingestion, to ground water contaminants attributable to the SMC facility which have been detected at levels exceeding applicable or relevant and appropriate requirements (ARARs);
- Prevent migration of ground water contamination; and
- Remediate the ground water contamination attributable to the SMC facility to achieve ARARs.

VIII. DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA §121(b)(1), 42 U.S.C. §9621 (b)(1), mandates that a remedial action must be protective of human health and the environment, cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Section 121(b)(1) also establishes a preference for remedial actions which employ, as a principal element, treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants and contaminants at a site. CERCLA § 121 (d), 42 U.S.C. §9621(d), further specifies that a remedial action must main a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA §121(d)(4), 42 U.S.C. §9621(d)(4). This ROD evaluates, in detail, three (3) remedial alternatives including a number of extraction, treatment and discharge options for addressing the ground water contamination associated with the SMC site. With the exception of the "no action" alternative, the goal of each of the alternatives is to remediate the entire contaminant plume attributable to SMC, to reach the NJGWQC, and the Federal and State MCLs. The remedial alternatives are described individually
below, however, two issues require explanation.

The "time to implement" a remedial alternative reflects only the time required to construct or implement the remedy and does not include the time required to design the remedy, procure contracts for design and construction, or conduct operation and maintenance at the site.

At the time of this Record of Decision, updated surface water discharge standards have not yet been established for a ground water treatment system. Once established, however, the updated discharge to surface water standards may be stricter than existing standards. Therefore, supplemental treatment technologies which could meet the potentially stricter updated standards were included in the remedial evaluation.

The following are the descriptions of the remedial alternatives:

Alternative 1 - No Action:
Capital Cost: $0
Annual Operation and Maintenance (0 & M) Cost: $0
Total Present Worth Cost: $48,000
Time to Implement: None

The Superfund program requires that the "no action" alternative be considered as a baseline for comparison of other alternatives. The "no action" alternative requires no remedial actions to reduce the toxicity, mobility or volume of existing ground water contamination. The well restriction area will continue to provide a means of limiting the exposure of residents in downgradient areas to the ground water contaminants; however, no protection against continued downgradient contaminated ground water migration would be provided. Because this alternative would result in contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires that the site be reviewed every
five years. If justified by the five-year review, additional remedial actions may be implemented to remove or treat contamination. The cost of one round of ground water monitoring prior to conducting a five-year review of the "no action" decision is included in this alternative.

Alternative 2 - ACO-Required Ground Water Restoration:
Capital Cost: $0
Annual 0 & M Cost: $1,300,000
Total Present Worth Cost: $16,000,000
Time to Implement: 12 Months

Alternative 2 consists of the ACO-required ground water restoration and monitoring programs, including operation of the existing five well extraction system at an extraction rate of 400 gpm, the ion exchange/air stripping treatment system and discharge of treated ground water to surface water, continuation of the ground water monitoring program, and enforcement of the well restriction area.

In ion exchange, contaminant ions exchange with other ions as the contaminated ground water flows through special resins. As the available ions in the resins are replaced by the contaminant ions, the effectiveness of the system is reduced and the resins require regeneration. The resins are regenerated on-site using acid and caustic solutions and reused in the system. The regenerant solutions are also treated on-site with the resulting sludge and "brine" disposed off-site as hazardous wastes. The combination of technical problems and compliance issues associated with the ion exchange system prevented attainment of the 400 gpm treatment rate, the result was reduced treatment at approximately 200 gpm. The existing air stripper would continue to treat VOC contamination. Air stripping technology is described under Alternative 3, Option T2, below.

Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the five-year review, additional remedial actions may be implemented to remove or treat the contamination.

Alternative 3 - Modified Ground Water Restoration:

Alternative 3 consists of a modified ground water restoration program including an amended combination of extraction, treatment, supplemental treattrient (as necessary) and discharge technologies. The development of this alternative was based on the re-evaluation of the existing extraction system (including well locations, screened intervals, and individual well extraction rates to optimize the capture of contaminated ground water), the treatment system (to determine the best means of reliably treating the design influent rate), a supplemental treatment system (to ensure that the treated ground water meets updated discharge to surface water ARARs), and the discharge system (to determine the most appropriate means for discharging the effluent). The FFS evaluated the different extraction, treatment, supplemental treatment and discharge options separately. It included two (2) extraction options, eight (8) treatment options, four (4) supplemental treatment options, and three (3) discharge options. Treatment options were divided between those effective for organic contaminants and those effective for inorganic contaminants.
Supplemental treatment options addressed inorganic contaminants and were considered as a polishing step in the event that additional treatment of the ground water is necessary to comply with the updated discharge to surface water standards.

All options were retained for detailed analysis with the exception of two (2) treatment options which were screened out because of cost or effectiveness as compared to the other options. Of the six (6) treatment options retained for detailed analysis, three (3) options address VOC removal and three (3) address inorganics removal from ground water. A summary of each of the options retained for further analysis is presented below. Because this alternative would result in contaminants remaining on-site, CERCLA requires that the site be reviewed every five years. If justified by the five-year review, additional remedial actions may be implemented to remove or treat the contamination.

Alternative 3 - Option E1 - Existing Extraction System
Capital Cost: $25,000
Annual 0 & M Cost: $27,000
Total Present Worth Cost: $360,000
Time to Implement: Minimal

Option E1 consists of ground water extraction at a rate of approximately 400 gpm using the existing five well extraction system with one additional deep extraction well to be paired with existing well RIW2, the southwestern-most extraction well (see Figure 5).

Alternative 3 - Option E2 - Modified Extraction System
Capital Cost: $106,000
Annual 0 & M Cost: $27,000
Total Present Worth Cost: $440,000
Time to Implement: 12 Months

Option E2 is based upon ground water modeling and consists of using the five existing extraction wells with one additional deep well and three additional shallow wells to improve the performance of the extraction system at a pumping rate of approximately 400 gpm. The deep well will provide capture of the ground water

contamination in the lower Cohansey Sand and is paired with the existing shallow recovery well RIW2. The shallow wells are located near potential contamination source areas on-site to provide capture of some of the highest concentrations of chromium, minimizing the potential for additional dispersion and diffusion before extraction. The locations of the existing and proposed wells are shown on Figure 9. Additional shallow and/or deep wells may be required to address the potential discharge of contaminated ground water to the Hudson Branch.

Alternative 3 - Option T2 - Air Stripping
Capital Cost: $0
Annual O & M Cost: $14,000
Total Present Worth Cost: $170,000
Time to Implement: None

Option T2 involves the treatment of organic ground water contaminants using the existing the existing air stripper. In air stripping, VOCs are removed by forcing a stream of air through the extracted ground water. The contaminants are evaporated into the air stream. Initial calculations indicate that vapor phase treatment is not required before the air is released into the atmosphere, however, vapor phase treatment may be required if monitoring of the recovered ground water reveals significant increases in the VOC concentration.

Alternative 3 - Option T3 - Carbon Adsorption
Capital Cost: $290,000
Annual 0 & M Cost: $100,000
Total Present Worth Cost: $1,500,000
Time to Implement: 8 Months

Option T3 involves the treatment of organic ground water contaminants using carbon adsorption. In carbon adsorption, VOCs are removed by forcing the extracted ground water through units containing activated carbon which attracts and retains the contaminants. When spent, the carbon units are sent off-site for regeneration, which thermally destroys the adsorbed contaminants allowing the carbon to be reused. The carbon adsorption units may also act as filters in removing suspended inorganic contaminants.

Alternative 3 - Option T4 - Ultraviolet (UV) Oxidation
Capital Cost: $860,000
Annual 0 & M Cost: $400,000
Total Present Worth Cost: $5,800,000
Time to Implement: 12 Months

Option T4 involves the treatment of extracted organic ground water contaminants using UV oxidation. UV oxidation is a process in which UV light and hydrogen peroxide chemically oxidize VOCs dissolved in water. The oxidation has many operation and maintenance (O&M) requirements, including UV lamp cleaning and replacement, and maintenance of the hydrogen peroxide supply. The toxicity of the contaminants is reduced without significant treatment residues generated by the process. UV oxidation systems are not as readily available as air strippers or carbon adsorption units.

Alternative 3 - Option T6 - Coagulation/Flocculation
Capital Cost: $140,000
Annual 0 & M Cost: $2,300,000
Total Present Worth Cost: $29,000,000
Time to Implement: 9 Months

Option T6 involves the pretreatment of inorganic ground water contaminants using chemical coagulation and flocculation, followed by treatment with the existing ion exchange system. Coagulation is a process which involves the reduction of electrostatic surface charges, causing the contaminant particles to flocculate (adhere t6gether) and precipitate (settle out). A sludge is generated that requires waste classification and off-site disposal. Preliminary treatability studies using this process prior to treatment by the ion exchange system resulted in only marginal success.

Alternative 3 - Option T7 - Membrane Microfiltration
Capital Cost: $730,000
Annual 0 & M Cost: $1,600,000
Total Present Worth Cost: $21,000,000
Time to Implement: 12 Months

Option T7 involves the pretreatment of inorganic ground water contaminants using membrane microfiltration, followed by treatment with the existing ion exchange system. Membrane microfiltration is a physical process for removing undissolved inorganic contaminants from the ground water. Filtered solids accumulate on the membrane forming a filter cake that requires waste classification and off-site disposal. A treatability study was conducted that concluded that this pretreatment would not be effective for all of the extraction wells, as the water quality varies from well to well.

Alternative 3 - Option T8 - Electrochemical Treatment
Capital Cost: $0
Annual 0 & M Cost: $500,000
Total Present Worth Cost: $6,200,000
Time to Implement: None

Option T8 involves the treatment of inorganic ground water contaminants by an electrochemical treatment process. In this system, an electric current is passed through iron electrodes placed in a tank of extracted ground water to produce ferrous (iron) ions and to break down the water to hydrogen gas and hydroxyl ions. The reaction results in the precipitation of inorganic contaminants. After exiting the electrochemical treatment cell, the treated ground water enters a degassing unit where the hydrogen gas is allowed to effervesce from the liquid. The precipitated solids are dewatered in a filter press. The resultant sludge requires waste classification and off-site disposal. Also, to remove the small amounts of solids that do not settle, the ground water may be further treated with a multi-media filtering system.

In addition to removing the hydrogen gas, the degassing process may provide removal of the volatile organic contaminants from the extracted ground water.

The electrochemical treatment system was constructed on-site in 1992 at a cost of $1,500,000.

Alternative 3 - Supplemental Treatment - Ion Exchange
Capital Cost: $150,000
Annual 0 & M Cost: S500,000
Total Present Worth Cost: $6,400,000
Time to Implement: 12 Months

This option involves additional treatment of the already treated ground water using the existing ion exchange system. The process of ion exchange was already discussed under Alternative 2, above. The brine from the resin regeneration and the sludge require waste classification and off-site disposal. Treatability testing indicated that it may be possible to use the existing ion exchange system as a supplemental treatment process to remove chromium and total dissolved solids JDS), if necessary to meet updated discharge to surface water ARARs.

Alternative 3 - Supplemental Treatment - Reverse Osmosis
Capital Cost: $1,000,000
Annual 0 & M Cost: $300,000
Total Present Worth Cost: $4,700,000
Time to Implement: 20 Months

Osmosis is the spontaneous flow of water from a weak solution through a semi-permeable membrane to a more concentrated solution. Reverse osmosis is the application of enough pressure to the concentrated solution to overcome the osmotic pressure and force the net flow of water through the membrane toward the weak solution. This allows contaminants to build up on one side of the membrane while relatively pure water passes through. Advantages of supplemental treatment using reverse osmosis are the potential removal of chromium and TDS to meet updated discharge to surface water ARARs, if necessary. However, a number of

disadvantages exist, such as disposal of a relatively large quantity of a concentrated liquid waste stream.

Alternative 3 - Supplemental Treatment - Microfiltration/Ultrafiltration
Capital Cost: $700,000 to $1,000,000
Annual 0 & M Cost: $100,000 to $500,000
Total Present Worth Cost: $1,900,000 to $7,200,000
Time to Implement: 12 Months

In general, both of these are physical processes for removal of contaminants, with ultrafiltration capable of removing smaller particles than microfiltration. However, neither is capable of removing metal ions without pretreatment. Since this option involves the use of microfiltration/ultrafiltration as a supplemental treatment step, the need for pretreatment should not be an issue. A residual filter cake is generated that requires waste classification and off-site disposal. Available vendor information indicates that removal of chromium to very low levels may be achievable with this technology as a supplemental treatment step.

Alternative 3 - Supplemental Treatment - Modification of Electrochemical Treatment
Capital Cost: $100,000
Annual O & M Cost: $140,000
Total Present Worth Cost: $1,800,000
Time to Implement: 9 Months

This option involves relatively simple modifications to the electrochemical treatment system to increase its efficiency to meet updated discharge to surface water ARARs, if necessary. These modifications may include the installation of additional treatment cells or increasing the electric current to produce and maintain an excess of ferrous (iron) ions. A disadvantage is the increased consumption of iron electrodes resulting in increased sludge generation. The sludge requires waste classification and off-site disposal.

Alternative 3 - Option D1 - Discharge to Ground Water
Capital Cost: $240,000
Annual O & M Cost: $220,000
Total Present Worth Cost: $3,000,000
Time to Implement: 18 Months

Option D1 involves the recharge of treated ground water back to the ground. A recharge system consisting of two open basins is proposed based upon ground water modeling. The combined area of the proposed basins is approximately five acres. Use of the basins could result in flushing the shallow ground water contaminants more rapidly towards the extraction wells, thus reducing the remediation time frame. However, the basins must be maintained to prevent loss of effectiveness due to clogging. Also, this option requires the installation and monitoring of a network of monitoring wells, to ensure the efficient operation of the system.

Alternative 3 - Option D2 - Discharge to Surface Water
Capital Cost: $0
Annual O & M Cost: $210,000
Total Present Worth Cost: $2,600,000
Time to Implement: None

Option D2 involves the discharge of treated ground water to surface water, which in this case is the Hudson Branch. Ground water would be discharged directly via the existing discharge pipe to existing Outfall 001 (see Figure 9).

Alternative 3 - Option D3 - Combined Discharge to Surface Water and Ground Water
Capital Cost: $240,000
Annual 0 & M Cost: $250,000
Total Present Worth Cost: $3,300,000
Time to Implement: 18 Months

Option D3 involves the discharge of treated ground water to both surface water and ground water. The existing

surface water discharge system would be utilized, but construction of the discharge basins and a ground water monitoring system would be required. The basins require physical maintenance to prevent clogging and a network of monitoring wells to ensure efficient operation.

IX. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, NJDEP considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial alternatives pursuant to the NCP,40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual alternatives against each of nine evaluation criteria and a comparative analysis focusing upon the relative performance of each alternative against those criteria.

The following "threshold" criteria must be satisfied by any alternative in order to be eligible for selection:

- Overall Protection of human health and the environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each exposure pathway (based on a reasonable maximum exposure scenario) are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

- Compliance with ARARs addresses whether or not a remedy would meet all of the applicable (legally enforceable), or relevant and appropriate (requirements that pertain to situations sufficiently similar to those encountered at a Superfund site such that their use is well suited to the site) requirements of federal and state environmental statutes and requirements or provide grounds for invoking a waiver.

The following "primary balancing" criteria are used to make comparisons and to identify the major trade-offs between alternatives:

- Long-term effectiveness and permanence refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. It also addresses the magnitude and effectiveness of the measures that may be required to manage the risk posed by treatment residuals and/or untreated wastes.

- Reduction of toxicity, mobility, or volume via treatment refers to a remedial technology's expected ability to reduce the toxicity, mobility, or volume of hazardous substances, pollutants or contaminants at the site.

- Short-term effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation periods until cleanup goals are achieved.

- Implementability refers to the technical and administrative feasibility of a remedy, including the availability of materials and services needed.

- Cost includes estimated capital and operation and maintenance costs, and the present-worth costs.

The following "modifying" criteria are considered fully after the formal public comment period on the Proposed Plan is complete:

- EPA acceptance indicates whether, based on its review of the RI/FS report and the Proposed Plan, the EPA supports, opposes, and/or has identified any reservations with the preferred alternative.

- Community acceptance refers to the public's general response to the alternatives described in the Proposed Plan and the RI/FS reports. Factors of community acceptance to be discussed include

support, reservation, and opposition by the community.

A comparative analysis of the remedial alternatives based upon the evaluation criteria noted above follows.

Overall Protection of Human Health and the Environment

Alternative 3 provides protection of human health and the environment because it provides active restoration of contaminated ground water through an optimized extraction, treatment and discharge system. Alternative 2 does not provide protection of human health because the ion exchange/air stripping system cannot be operated in a manner which provides optimum restoration of ground water quality. The configuration of the existing extraction system is not sufficient to address the ground water contamination in potential source areas on-site or in the lower Cohansey Sand in the vicinity of existing recovery well RIW2. Also, the ion exchange system operates below design specifications because of naturally occurring inorganics in the ground water and the system is not capable of attaining the current discharge to surface water ARARs. Alternative 1 provides no protection of human health and the environment from the continued migration of ground water contamination.

For the ground water extraction options of Alternative 3, Option E2, use of a modified extraction system, provides protection through the use of additional wells to provide added capture of the contaminated ground water in potential source areas and in the lower Cohansey Sand in the vicinity of existing recovery well RIW2. Option E1 is not protective bemuse it does not effectively address all of the contamination. Additional shallow and/or deep wells may be required to address the potential discharge of contaminated ground water to the Hudson Branch.

All three organic treatment options of Alternative 3, Options T2, air stripping, T3, carbon adsorption, and T4, UV oxidation, will provide protection of human health and the environment. Emissions from the air stripping unit do not require treatment. Significant increases in VOC levels that could require treatment of the air emissions would be detected by the monitoring of extracted ground water.

For the inorganic treatment options of Alternative 3, Option T8, electrochemical treatment, is expected to provide the greatest degree of inorganic treatment and, therefore, is protective of human health and the environment. Option T7, membrane microfiltration, is also expected to provide protection, while Option T6, coagulation/flocculation, is not.

For the supplemental treatment options of Alternative 3, which will be employed as necessary to meet updated discharge to surface water ARARs, modification of the electrochemical treatment system and ion exchange are protective of human health and the environment since treatability studies have shown that chemical specific ARARs can be achieved. Electrochemical treatment generates a non-hazardous sludge. Reverse osmosis and microfiltration/ultrafiltration are protective but they generate a large quantity of a concentrated waste stream and require pretreatment, respectively.

All three discharge options for Alternative 3, are protective of human health and the environment because only ground water treated to meet updated ARARs will be discharged.

Compliance with ARARs

Alternative 3 will comply with ARARs. Depending on the extraction and treatment technologies chosen for this alternative, compliance with chemical-specific ARARs for ground water and treated water discharge is expected. The remedial technologies will also comply with action-specific ARARs. Alternatives 1 and 2 will not achieve chemical-specific ARARs.

For the ground water extraction options of Alternative 3, Option E2, modified extraction system, will comply with chemical-specific ARARs for ground water by providing capture of shallow and deep ground water contamination attributable to SMC to meet health-based levels. Option E1 will not comply with chemical-specific ARARs because it will not capture contaminated ground water downgradient of existing extraction well RIW2 or south of the facility. Both options will comply with action-specific ARARs, such as water allocation regulations and well installation permit requirements.

All of the organic treatment options of Alternative 3 will comply with chemical- and action-specific ARARs. For Option T2, the air stripper will be in compliance with the air discharge regulations. For Option T3, handling and tieatment of the spent carbon will be conducted in compliance with the appropriate hazardous waste management regulations. Option T4, UV oxidation, produces no residues which require handling. The treated water will meet the updated discharge to surface water ARARs.

For the inorganic treatment options of Alternative 3, Option T8, electrochemical treatment, may comply with chemical-specific ARARs without supplemental treatment. However, supplemental treatment may be required to meet the updated discharge to surface water ARARs. Option, T7, membrane microfiltration, will not comply with chemical-specific ARARs without supplemental treatment. Option T6, coagulation/flocculation will not comply with chemical-specific ARARs. Operation of any of the treatment systems will be in compliance with action-specific ARARs.

For the supplemental treatment options of Alternative 3, compliance with chemical-specific ARARs is achievable using the ion exchange system. Modification of the electrochemical system may not provide sufficient removal of TDS. Reverse osmosis may provide removal of contaminants, but treatability testing is required. Microfiltration/ultrafiltration does not treat dissolved contaminants.

All discharge options will comply with chemical- and action-specific ARARs, which include at a minimum, the Federal Ambient Water Quality Criteria. Option D2 uses an existing surface water discharge system and, therefore, no location-specific requirements are applicable to its implementation. Options D1 and D3 would have to be designed in accordance with floodplain wetland and farmland protection requirements.

Long-Term Effectiveness and Permanence

Alternative 3 will provide the greatest long-term effectiveness and permanence through optimization of the ground water restoration program. This alternative minimizes residual risk within the shortest time frame by providing extraction, treatment, and discharge of ground water. Alternative 2 is less effective since ground water extraction and treatment are provided at a reduced rate. Exposure risks are limited to some extent due to the existence of the well restriction area downgradient of the facility. Long-term monitoring provides a means of continued evaluation of ground water quality. Alternative I is the least effective since no ground water treatment is provided and no protection against potential exposures is provided, except for the well restriction area. A five-year review is required for all three alternatives since the ground water contamination will not be completely remediated within five years.

For the ground water extraction options of Alternative 3, Option E2, modified extraction system, provides the greatest long-term effectiveness since it provides extraction of shallow and deep contaminated ground water as well as capture nearer to the potential source(s). It is mom likely to achieve ground water ARARs within a shorter time frame than Option E1 and, thereby requires less long-term operation and maintenance (O&M).

For the organic treatment options of Alternative 3, Option 72, air stripping, is expected to have the greatest long-term effectiveness because it treats contaminated ground water on a continual basis, with no residual handling or potential for contaminant breakthrough. Option T3, carbon adsorption, is also expected to be effective. Residual risks are expected to be minimal based on the regeneration and thermal destruction of contaminants adsorbed to the carbon. Option T4, UV oxidation, also results in the destruction of contaminants; however, it requires a greater amount of monitoring during the treatment process to ensure that treatment is achieved.

For the inorganic treatment options, the greatest long-term effectiveness is offered by Option T8, electrochemical treatment, because it provides the greatest degree of contaminant level reduction based upon the treatability studies and operational data. Option T7, membrane microfiltration, is also expected to provide a significant degree of treatment although effluent levels may not be as low as those measured for Option T8. Option T6, coagulation/flocculation, is expected to provide the least degree of long-term effectiveness. All three of these options produce a residual sludge which requires off-site disposal. Option T7 would create the least amount of sludge because it requires no chemical addition.

For the supplemental treatment options, modification of the electrochemical treatment system and the ion

exchange system provide the greatest long-term effectiveness, with the ion exchange system potentially offering better compliance with updated discharge to surface water ARARs for chromium and TDS. Reverse osmosis is less effective because of the membrane's susceptibility to clogging and microbial attack and sensitivity to system upsets.

Microfiltration/ultrafiltration is least effective since it is not capable of removing dissolved contaminants. Electrochemical treatment generates a non-hazardous sludge, while the other options generate sludges that are hazardous.

For the discharge options, Option D2, discharge to surface water, has the greatest long-term effectiveness due to its relative ease of implementation and operation. Long-term O&M would be minimal. It is followed by Option D3, which offers flexibility in terms of operation due to its two discharge scenarios. Option D3 could also provide a degree of hydraulic control via discharge to ground water. Option D1 also provides a degree of hydraulic control but its long-term effectiveness may be affected by potential operational problems such as silting of discharge basins. Also, additional site characterization would be required to confirm the ability of the proposed system to discharge to ground water at the assumed recharge rates.

Reduction in Toxicity, Mobility, or Volume

Alternative 3 provides the greatest reduction of toxicity, mobility and volume through the optimization of a modified ground water restoration systim. Alternative 2 also provides ground water restoration, but not to the same degree because of the lower extraction rates and use of the existing extraction wells. Alternative 1 does not provide any reduction in toxicity, mobility or volume.

For the ground water extraction options for Alternative 3, Option E2, modified extraction system, will provide the greatest reduction in mobility by utilizing extraction wells optimally placed to provide capture of identified ground water contamination close to potential source(s). Option E1 will not provide the same degree of contaminant capture using the existing extraction wells.

For the organic treatment options, Options T3, carbon adsorption, and T4, UV oxidation, provide the greatest protection against the contaminants of concern, with the contaminants ultimately destroyed. Under Option T2, air stripping, the contaminants are not destroyed by the treatment process itself, but they are removed from the ground water prior to discharge, thereby reducing the toxicity of the ground water. Initial calculations indicate that the air emissions do not require treatment prior to release to the atmosphere, but if monitoring data shows otherwise, an air treatment unit would be required.

For the inorganic treatment options, all options produce a sludge requiring off-site disposal. Option T8, electrochemical treatment, is expected to provide the greatest reduction of toxicity by providing the greatest degree of removal of inorganic contamination from the extracted ground water. Option T7, membrane microfiltration, is expected to be effective in the removal of inorganic contaminants which previously fouled the operation of the existing ion exchange but will require supplemental treatment to meet toxicity reduction requirements. For Option T6, coagulation/flocculation, initial studies have indicated that it may not be effective in reducing the toxicity of inorganic contaminants sufficiently to meet updated discharge requirements.

All supplemental treatment options produce a sludge requiring off-site disposal. Modification of the electrochemical system is expected to be most effective at reducing the toxicity of the extracted ground water and it generates a non-hazardous sludge. The ion exchange system is also expected to be effective at reducing toxicity, but it generates a hazardous sludge. Reverse osmosis and micro-filtration/ ultrafiltration are less effective at reducing toxicity because both are physical separation processes that may not remove dissolved contamination.

The discharge options generally have no effect on the toxicity or volume of contaminated ground water, although they may provide some control over contaminant migration. Option D1, discharge to ground water, could potentially enhance the control of contaminant migration by flushing contaminants towards the extraction wells. Option D3 could also provide this effect. Option D2, discharge to surface water, would have little or no impact.

Short-Term Effectiveness

None of the three alternatives result in significant risks to workers, the adjacent community or the environment as a result of the implementation. Therefore, short-term achievement of remedial response objectives provides the main determination of short-term effectiveness.

Alternative 3, which provides an enhanced ground water extraction and treatment system with minimal associated risks and environmental impacts, is considered to offer the greatest short-term effectiveness. Alternative 2, which also provides ground water treatment but at a lower extraction and treatment rate, does not provide the same degree of short-term effectiveness as Alternative 3. Alternative 1 is not effective in the short term.

For the ground water extraction options of Alternative 3, Option E1, the existing extraction system, provides the greatest short-term effectiveness since it requires installation of only one deep extraction well. Implementation of Option E2 requires the installation of one deep and three shallow extraction wells and associated piping. Once operating, however, it would become more effective than Option E1 in meeting the remedial response objectives because it would provide additional downgradient capture of shallow chromium-contaminated ground water as well as capture of contamination within a shorter time frame, closer to the potential contaminant source(s).

For the organic treatment options of Alternative 3, all treatment options are expected to achieve remedial response objectives within comparable time frames. Option T2, air stripping, is expected to have the greatest short-term effectiveness, and because it has already been installed on-site, there are few risks posed by its implementation. Option T2 is followed by Option T3, carbon absorption, a readily available treatment technology that could be quickly employed, and which results in no emissions on-site, thereby presenting minimal risks to the workers, the community or the environment. Option T4 provides for the destruction of most contaminants but, because UV oxidation systems are not as widely available as the other types of units, short-term implementation may not be as easily attained and potential technical problems may arise when implemented.

Of the inorganic treatment options of Alternative 3, Option T6, coagulation/flocculation, is more commercially available than Options T7 or T8, allowing rapid implementation. However, initial treatability studies indicate Option T6 may not be as effective as T8, electrochemical treatment, in meeting short-term remedial objectives.

The supplemental treatment options which involve modification to the electrochemical treatment system or ion exchange are readily available since both already exist on-site. Reverse osmosis and microfiltration/ultrafiltration require design and pilot scale development before meeting the short-term remedial objectives.

For the discharge options of Alternative 3, Option D2, discharge to surface water, has the greatest short-term effectiveness, due to its relative ease of implementation based on the existing discharge piping. It is followed by Options D3 and D1, both of which require construction of a recharge system.

Implementability

Alternative 1, "no action", is the most easily implemented, involving no implementation activities other than one round of ground water monitoring prior to the five-year review. Alternative 2 is also easily implemented because the components are already existing. Alternative 3 is the least easily implemented, but still relatively easy to implement.

For the ground water extraction options for Alternative 3, Option E1 is the most easily implemented because it involves the use of the existing extraction System plus only one additional well. Option E2 requires the installation of four additional extraction wells but is still technically feasible to implement. The administrative implementability of both options is good.

For the organic treatment options, Option T2, air stripping, is expected to be the most easily implemented

since an existing air stripper is available on-site. O&M requirements are limited to blower maintenance and discharge monitoring. Option T3, carbon adsorption, is less easily implemented because a new system must be installed; however, the technology is readily available and easily set-up. Its O&M requirements include replacement and handling of spent carbon. Option T4, UV oxidation, is the least easily implemented based on its more limited availability, additional O&M requirements, and greater potential for implementation problems.

For the inorganic treatment options, Option T8, electrochemical 'treatment, is most easily implemented since an electrochemical treatment system has already been constructed on site. Option T6, coagulation/flocculation, is also relatively easily implemented, based on the availability of unit treatment processes. Option T7, membrane microfiltration, is not as widely available. All options generate a residual sludge which requires handling. The administrative feasibility may be affected by the sludges if they are classified as hazardous waste, otherwise, the administrative implementability for all three options is good.

For the supplemental treatment options, modification of the electrochemical treatment system is the most easily implemented, although additional filtering capability may be required. The existing ion exchange system requires resin replacement and a physical connection to the treatment unit. Reverse osmosis and microfiltration/ultrafiltration require design and pilot testing before construction of the units. The administrative implementability for all options is good.

For the discharge options, Option D2, discharge to surface water, has the greatest technical implementability because the piping already exists. Options D1 and D3 are less technically implementable based on the significant flow rate which must be handled and demonstrated operational problems associated with discharges to ground water. Administrative implementability is the same for all three discharge options, in that all must comply with regulatory requirements.

Cost

Alternative 1, "no action", which consists of a round of ground water monitoring at the time of the five-year review and continued enforcement of the well restriction area, is the least expensive alternative, with a present worth of $48,000. Alternative 2, the ACO required ground water restoration, has a present worth of $16,000,000. Alternative 3, consisting of a combination of extraction, treatment and discharge technologies, has a present worth ranging from $9,300,000 to $39,000,000, depending on the options selected and not including the costs of supplemental treatment. The present worth of each option is presented below.
The two ground water extraction options, which both include ground water monitoring for five years, have a present worth of $360,000 for Option E1, the existing system; and $440,000 for Option E2, the modified system.

The present worth for the organic treatment options are $170,000 for Option T2, air stripper; $1,500,000 for Option T3, carbon adsorption; and $5,800,000 for Option T4, UV oxidation.

The present worth for the inorganic treatment options are $6,200,000 for Option T8, electrochemical treatment; $21,000,000 for Option T7, membrane microfiltration; and $29,000,000 for Option T6, coagulation/flocculation.

The present worth for the supplemental treatment options are $1,800,000 for modification to electrochemical treatment; $4,700,000 for reverse osmosis; $6,400,000 for ion exchange; and $1,900,000 to $7,200,000 for microfiltration/ultrafiltration.

The present worth for the discharge options are $2,600,000 for Option D2, discharge to surface water; $3,000,000 for Option D1, discharge to ground water; and $3,300,000 for Option D3, combined discharge to surface and ground water.

EPA Acceptance

The EPA concurs with the selected remedy.

Community Acceptance

Based upon the concerns and comments received during the public comment period and public meeting, it appears that the community accepts the preferred alternative as presented in the Proposed Plan. The concern and comments are presented in the Responsiveness Summary which is included in Appendix A.

X. SELECTED REMEDY

Based upon an evaluation of the various alternatives and extraction, treatment and discharge options, NJDEP recommends Alternative 3, Modified Ground Water Restoration. Under this alternative, the following extraction, treatment, and discharge options are recommended for implementation to remediate the entire contaminant plume to NJGWQC, and Federal and State MCLs:

Option E2 - Modified Extraction System
Option 77 - Air Stripping
Option T8 - Electrochemical Treatment with Supplemental Treatment (as required)
Option D2 - Discharge to Surface Water

Alternative 3 will consist of implementation of a modified ground water extraction system in which one deep and three shallow extraction wells will be installed to supplement the existing extraction system. This will allow for capture of shallow and deep contaminated ground water while also providing for the extraction of shallow contaminated ground water nearer the potential source(s) of contamination to more quickly attain ARARs. The configuration of the modified extraction system is based on ground water modeling presented in the FFS; however, the exact number and locations of the extraction wells may be modified based on the additional data collected as part of the design phase of the project. The extraction system will be designed to capture VOC contamination attributable to the SMC facility and to address the potential discharge of contaminated ground water to Hudson Branch. Ground-water will be extracted at a rate of approximately 400 gpm. Upon monitoring of the extraction system operation, some variation in the proposed extraction rates may be implemented to achieve the desired extraction results.

The additional capital cost for implementing Options E2, T2, T8 and D2 of Alternative 3 is $106,000, the annual O&M is $750,000 and the present worth is S9,400,000.

Electrochemical treatment provides for removal of inorganic contaminants, with achievement of much lower chromium effluent levels than the existing ion exchange system was capable of achieving. The electrochemical system will be used as the sole inorganic treatment method if updated discharge to surface water limits can be achieved. If the updated discharge limitations are not achievable, supplemental treatment, by either modification of the electrochemical treatment system, or use of the existing ion exchange system, will be used as a means of polishing the effluent prior to discharge. Bench and/or full scale studies will be conducted to determine which option will be used. Similarly, the degassing process in the electrochemical treatment system has the potential to provide removal of the VOCs from the contaminated ground water. The ground water will be treated using the existing air stripper to ensure that the VOCs are removed. Sludge is generated that requires waste classification and off-site disposal. Currently, the operating system generates approximately 32 tons of sludge per month. The modified system may generate a larger amount of sludge.

Discharge to surface water is the preferred method of treated ground water discharge, due to its ease of implementation and its successful operational history. Alternative 3 will meet appropriate surface water discharge limits developed for the protection of surface water bodies and specified in the NJPDES permit. Alternative 3 also includes continued ground water monitoring to confirm its effectiveness in capturing the contaminated ground water. A Classification Exception Area (CEA) will be established by NJDEP for the area of the aquifer impacted by the migrating contaminant plume. The CEA will be defined as the area of the aquifer that is and will be impacted above the applicable Ground Water Quality Standards. The CEA will remain in effect until SMC documents that contaminant concentrations have decreased to the applicable Ground Water Quality Standards. It is unlikely that the alternative will be successful in remediating the ground water within a five-year period; therefore, because contaminants will remain on-site above health-based levels, a five-year review of the selected remedy will be required.

XI. STATUTORY DETERMINATIONS

Under their legal authorities, NJDEP's and EPA's primary responsibility at Superfund sites is to undertake remedial actions that achieve adequate protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under State and Federal environmental laws unless a statutory waiver is justified. The selected remedy also must be cost effective and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principal element.

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate requirements for the remedial action (see Tables 3 and 4) and is cost effective. This remedy utilizes permanent solutions and alternate treatment technologies to the maximum extent practicable for this site. This remedy will require the institution of a CEA. Because it is unlikely that the alternative will be successful in remediating the ground water within a five year period, a review will be conducted every five (5) years after commencement of the remedial action to ensure the remedy continues to provide adequate protection of human health and the environment.

XII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

No significant changes were made to the Preferred Alternative subsequent to the public comment period and public meeting.

APPENDIX A

RESPONSIVENESS SUMMARY FOR THE RECORD OF DECISION
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough
Gloucester County, New Jersey

INTRODUCTION

A Responsiveness Summary is required by Superfund policy. It provides a summary of public's comments and concerns received during the public comment period and the New Jersey Department of Environmental Protection(NJDEP) and United States Environmental Protection Agency (USEPA) responses to those comments and concerns.

All comments summarized in this document have been considered in the NJDEP final decision for selection of a remedial alternative for the Shieldalloy Metallurgical Corporation (SMC) Superfund site.

OVERVIEW

NJDEP has selected a modified ground water restoration alternative for the ground water operable unit at the SMC site. This alternative includes the following components:

Modified Ground Water Extraction System
Air Stripping
Electrochemical Treatment with Supplemental Treatment (as required)
Discharge to Surface Water

This alternative addresses contaminated ground water only. The contaminated soils, surface water and sediments associated with this site will be addressed as a separate Operable Unit in the near future.

SUMMARY OF COMMUNITY CONCERNS

Comments from the public comment period generally supported the remedial alternative chosen to remediate the contaminated ground water. However, dissatisfaction with past practices of SMC and concern over their possible health effects on the community was expressed.

SUMMARY OF COMMUNITY RELATIONS ACTIVITIES

The Remedial Investigation/Focused Feasibility Study (RI/FFS) and the Proposed Plan for site were released to the public for comment on August 24, 1995. These documents were made available to the public in the Administrative Record located at the NJDEP offices in Trenton, New Jersey, as well as in the local information repositories located at the Newfield Borough Hall and the Newfield Borough Library. The notice of availability for the above documents was published in the Daily Journal of Vineland on August 24. 1995. The public comment period for these documents extended to September 25, 1995. On September 13, 1995 NJDEP conducted a public meeting at the Marie D. Durand School, in Vineland, to inform local officials and interested citizens about the Superfund process, to review the findings of the RI/FFS, to review current and proposed ground water remedial activities at the site, and to respond to questions from area residents and other interested parties. A transcript of the public meeting is provided as Appendix D.

SUMMARY OF COMMENTS AND RESPONSES

The following is a summary of the comments provided at the public meeting as well as NJDEP's response to those comments and questions. It should be noted here that no written comments were received during the public comment period. However, one NJDEP Meeting Evaluation Form was returned with a page of comments attached. These comments have been attached to this Responsiveness Summary.

1. Comment/Question: Concerning the volatile organic compound (VOC) emissions from the ground water treatment system, what levels are being released into the air? What level would require an air discharge permit? I would like to receive a copy of the air release monitoring results.

Response: A permit for the VOC release from an air stripper is not required unless the concentration in the water of each toxic volatile substance equals or exceeds 100 parts per billion (ppb) or the total concentration of VOCs in the water equals or exceeds 3,500 ppb. SMC was issued an air pollution control permit based on calculated concentrations of volatile organic compounds in the ground water that would be entering the air stripper (influent). After five years of monthly monitoring of the influent by SMC, the concentrations never exceeded the permit limits, so the permit was deemed unnecessary and terminated by the NJDEP. When the modified extraction system is operational, more highly contaminated ground water from source area will be collected and the need for an air pollution control permit will be reevaluated.

For answers to more specific questions on air permitting issues, please contact Vincent Garbarino, Air & Environmental Quality Program, Southern Region, at (609) 346-8071.

2. Comment/Question: The health risk assessment that was done by SMC's consultant, was that based on contaminated residential wells?

Response: As required by the Superfund law, the Human Health Risk Assessment (HHRA) was conducted to determine the human health risks which could result from the ground water contamination if no remedial action was taken. The HHRA was based on 1990 data from on-site monitoring wells collected during the RI. Data from the on-site wells were used because they contained the highest concentrations of ground water contamination due to their proximity to source areas. This represents the worst case scenario for ground water contamination. Using this data, the HHRA showed that present and future risk to the surrounding human population drinking two liters of water per day for thirty years and using the water for bathing and showering was at an unacceptable level. Therefore, remediation at this site is needed and is, in fact, already occurring. It must be remembered that the HHRA does not evaluate the risks associated with past exposures to contamination; it evaluates the need for remedial action at the site to prevent future exposures. The human health risk assessment is in the local repositories.

3. Comment/Question: Is the Cohansey Aquifer affected?

Response: Yes, the Cohansey Aquifer is affected by the Shieldalloy site. The Cohansey Aquifer lies under most of southern New Jersey, including the Newfield/Vineland area, and is a major part of the New Jersey Costal Plain Sole Source Aquifer. Data from the RI indicates the the VOC and inorganic contamination in the Cohansey Aquifer is centered in the manufacturing area of SMC's property and extends to the southwest. The distribution of the VOC and inorganic contamination in the shallow and deep portions of the aquifer are shown in Figures 5 and 6.

4. Comment/Question: Regarding installation of monitor wells on private property, why are the residents not told why the wells are being installed on their land? Why don't the residents receive the data from the investigations conducted on their land.

Response: The residents should be given a general explanation of the purpose of any investigations conducted on their property. It is not NJDEP policy to send remedial investigation results to individual residents unless the results are from a direct route of exposure to contamination, such as a drinking water well. The monitoring well data is included in the Remedial Investigation/Focused Feasibility Study (RI/FFS) which may be found in the local repositories. However, in this case NJDEP will forward the data to the property owner.

5. Comment/Question: When will the proposed remedial alternative go into effect? Will the residents receive notice of when it does and will they receive a schedule of implementation?

Response: The major components of the preferred remedial alternative are already in place at the site with the exception of the additional recovery wells as was discussed in the Proposed Plan. A notice will be sent out when the final remedy is selected and documented in the Record of Decision. The Record of Decision will

be placed in the information repositories. The implementation schedule is part of the Administrative Record and for easier public access will be placed in the information repositories. In addition, for this site NJDEP will send the schedule to those interested parties that are on the mailing list.

6. Comment/Question: Will more public meetings be held for this site?

Response: The NJDEP will hold another public meeting for the second operable unit which will include the preferred remedy for the soils, surface waters and the sediments. There is no plan a present to hold another public meeting for the Operable Unit 1 ground water remediation.

7. Comment/Question: What has the ground water data shown over time?

Response: The data from on- and off-site monitor wells shows that contaminant concentrations have been drastically reduced over the years. For example, in 1990 - 1991, the maximum levels for chromium in the on-site monitor wells were over 20,000 ppb; the most recent data taken in April 1995 are about 1,000 ppb. The existing system has also been effective at controlling downgradient migration of the contaminated ground water. The additional recovery wells will improve the effectiveness.

8. Comment/Question: Was the human health risk assessment based just on the VOCs or were other chemicals included?

Response: The Human Health Risk Assessment (HHRA) was based on all the chemicals considered to be of health concern associated with the site. This included VOCs, as well as, numerous metals. As previously stated, the HHRA is in the local repositories.

9. Comment/Question: Has a connection between past and/or current activities at Shieldalloy ever been connected with health effects of residents?

Response: Such a study has not been conducted and, therefore NJDEP cannot comment on this question. However, the Agency for Toxic Substance and Disease Control (ATSDR). which assists the USEPA on human health related issues, has completed two "Health Consultations" which am very limited in scope. These reports only addressed cyanide in urine and blood samples of area residents and radionuclides in environmental samples. The reports concluded that the concentrations do not pose a human health threat. For additional information on the Health Consultations, please contact Mr. Arthur Block, ATSDR Region 11 at (212) 637-4305.

10. Comment/Question: Is it true that there may be other responsible parties besides Shieldalloy associated with the VOC ground water contamination? Is it also true that SMC is the only such party that is involved in remediation at this time?

Response: In letters dated November 2, 1995, NJDEP identified SMC and Fisher & Porter as responsible for VOC contamination and the money spent by the New Jersey Spill Fund for extending the water lines, residential hookups and the air stripper on the municipal well affected. SMC has identified themselves as a user of trichloroethene (TCE) and NJDEP has extensive evidence that VOC contamination is emanating from the Shieldalloy property. Fisher & Porter identified themselves as users of tetrachloroethene (PCE). At this time Shieldalloy is the only party actively cleaning up this contamination.

11. Comment/Question: The residents of Newfield Borough want a cancer cluster study conducted for the Area surrounding the Shieldalloy plant.

Response: For issues regarding cancer cluster studies, the residents of Newfield should contact the New Jersey Department of Health, Environmental Health Services, 210 South Broad Street, Trenton, NJ 08625-0360. The contact person is James Pasqualo, who can be reached by telephone at (609) 984-2193. NJDEP does not perform cancer cluster studies. NJDEP can, however, assist the Department of Health by providing the information gathered from the various investigations performed pursuant to our regulations.

12. Comment/Question: Is Shieldalloy tied into the Newfield Municipal water supply?

Response: Yes, SMC is connected to the Newfield water system. However, SMC also uses treated ground water for non-contact cooling purposes on site. SMC water draw from the municipal supply is approximately 25 percent of what it was last year ago since they began recirculating the treated ground water. That is, SMC uses roughly 6 million gallons of municipal water per quarter.

13. Comment/Question: The treated ground water that is discharged into the Hudson Branch, is it still contaminated?

Response: The water discharged into the surface water has to meet strict permit requirements. These requirements are stricter than drinking water standards because the organisms found in this stream may be more sensitive to pollution than humans. So, if any levels of the contaminants remain in the water being discharged, they are minute.

14. Comment/Question: Does the Borough of Newfield have a copy of the ATSDR Health Assessment done for this site?

Response: It is the responsibility of ATSDR to provide to the Borough a copy of the Health Assessment dated November 15, 1988 as well as the Site Review and Update dated September 28, 1992. However, NJDEP will make sure these are added to the local document repositories.

15. Comment/Question: The present administration at SMC seems to want to cooperate with cleaning up its environmental problems. This effort is appreciated by the residents of Newfield. Past management of the plant was uncooperative and secretive.

Response: The NJDEP notes this comment and would like to add that NJDEP also has a much unproved working relationship with the present Shieldalloy administration. Over the past year NJDEP and EPA have been working closely with SMC, and through site visits and weekly telephone conferences the project is proceeding quickly.

16. Comment/Question: It is the general feeling of the residents of Newfield that Shieldalloy has had long term effects on the health of the residents.

Response: Comment noted.

17. Comment/Question: Is any air monitoring conducted at the SMC site?

Response: Yes, air monitoring is conducted in accordance with the various air discharge permits held by the facility for its manufacturing processes. The facility is inspected once a year to ensure compliance. SMC is currently in compliance with these permits and has not been issued a violation for several years.

Comment attached to Meeting Evaluation Form from Ms. Pati Madden, resident, received by NJDEP September 26, 1995.

18. Comment/Question: While working on this case please remember - Most employees working on this caw from both NJDEP and members of Shieldalloy, have not worked for a very long time with this job.

What you have to understand is MOST of the residents in this area have been here for years, generations in fact. I myself, am a 4th generation with my children now making a 5th generation. We, the neighbors and residents of the area, have been drinking this water and breathing this air for years.

So when your survey states "A person would have to drink so much water a day for a certain amount of years before they would be affected", well, we have been doing exactly that. It is most definitely not a comfortable feeling to realize that we are your statistics.

Also, you have to remember for years the residents of this area have been lied to not only by the members of Shieldalloy, but also by members of the NJDEP. To say we do not trust either organization would be an understatement.

At the present time, it does seem that the State is pushing SMC to clean up their act, but it is still difficult to give complete trust in the system.

I truly believe that if we did not discover VOC's in our water, we would still be drinking well water, because it's not the State's responsibility to notify residents of an area when then is a pollution problem, and that is a very scary fact.

Response: NJDEP is aware of the residents' concerns and frustrations regarding this site and appreciates you comments. However, several points made in this comment warrant a response.

First, it was commented that the residents that live near the plant are the statistics used in risk assessments. While we do not wish to diminish the importance of this comment, nor the concern of the residents, it is important to keep in mind that the time estimates used in health risk assessments indicate the amount of time it is estimated it would take to put an individual at risk of an effect from a pollutant. More simply, for example, a risk assessment might state that a person drinkiag water with a specific contaminant in it for thirty years would have an increased risk of an ailment, of a magnitude of, perhaps, one in a million. The risk assessment does not mean to state that a person will get an ailment if they drink the contaminated water for the time frame, but there is an increased risk present.

Second, it was commented that the NJDEP has lied to residents in the past. NJDEP is unaware of any specific instances of deliberate misinformation. We apologize, if in the past, any incorrect information was given out. It is NJDEP policy to be truthful and forthright with information to residents.

Third, it was commented that it is "difficult to trust the system". given that you feel the NJDEP lied to you in the past, this is understandable. It is hoped that as you see progress being made with the cleanup of the SMC site, you will realize that it is the mission of NJDEP to ensure that the citizens of New Jersey have a clean environment to live and work in, and to pursue those who compromise the integrity of the environment using state and federal regulations. Fortunately, the regulations also contain provisions for community participation, of which this Responsiveness Summary is part. Citizens are encouraged to provide comments and questions to the agencies regarding the investigations and cleanup of the site. Unfortunately, the progress of cleaning up a site is not a quick one. There are many difficult decisions to be made and the information needed to make sound decisions takes time to acquire.

Finally, it was stated that "it's not the State's responsibility to notify the residents ... when there is a pollution problem". This is not accurate. It is the NJDEP's responsibility to notify residents of a pollution problem, when it may directly affect them, such as through potable well water. However, NJDEP must know about the contamination in order to inform residents and take action to protect them from exposure. In this case, NJDEP was in the process of investigating the VOC contamination in the ground water when residents alerted the field office that they suspected their well water was contaminated. In addition, NJDEP does not have the ability to sample every potable well in the state. We do recommend that any resident who relies on a private potable well for his or her drinking water to sample the water for VOCs at least every 1-2 years. The local health department also has some involvement with contaminated well issues. So, to make the generalization that the citizens would "still be drinking [contaminated] well water" is not true NJDEP is aware of the resident's concerns and frustrations regarding this case.

APPENDIX B

RISK ASSESSMENT SUMMARY
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey

TABLE B-1
SUMMARY OF TOXICITY VALUES ASSOCIATED WITH CARCINOGENIC EFFECTS: ORAL
SHIELDALLOY METALLURGICAL CORPORATION

Constituent	Oral Slope Factor (Mg/kg-d)-1	Weight of Evidence Class	Type of Cancer	Basis/ Source
INORGANICS				
Aluminum	NA			NA/IRIS,HEAST
Antimony	NA	D	Skin	NA/IRIS,HEAST
Arsenic (a)	1.5E+00	A	Skin	Water/IRIS
Barium	NA			NA/IRIS,HEAST
Baryllium	4.3E+00	B2	Multiple Sites	NA/IRIS,HEAST
Boron	NA			NA/IRIS,HEAST
Cadmium	NA			NA/IRIS,HEAST
Chromium III	NA			NA/IRIS,HEAST
Chromium VI	NA	A		NA/IRIS,HEAST
Cobalt	NA			NA/IRIS,HEAST
Copper	NA	D		NA/IRIS,HEAST
Cyanide	NA	D		NA/IRIS,HEAST
Fluoride	NA			NA/IRIS,HEAST
Lead	NA	B2	Kidney	Oral/IRIS
Manganese	NA	D		NA/IRIS,HEAST
Mercury	NA	D		NA/IRIS,HEAST
Nickel	NA	A		NA/IRIS,HEAST
Niobium	NA			NA/IRIS,HEAST
Selenium	NA	D		NA/IRIS,HEAST
Silver	NA	D		NA/IRIS,HEAST
Strontium	NA			NA/IRIS,HEAST
Titanium	NA			NA/IRIS,HEAST
Vanadium	NA			NA/IRIS,HEAST
Zinc	NA	D		NA/IRIS,HEAST
Zirconium	NA			NA/IRIS,HEAST
VOLATILES				
Acetone	NA	D		NA/IRIS,HEAST
Benzene	2.90E-02	A	Neoplasia	Gavage/IRIS
Butanone, 2-	NA	D		NA/IRIS,HEAST
Carbon disulfide	NA			NA/IRIS,HEAST
Chloroform	6.1E-03	B2	Kidney	Water/IRIS
Chloromethane	1.3E-02	NA	Kidney	Oral/IRIS,HEAST
Dichloroethene,1.2-(Total)	NA	D		NA/IRIS,HEAST
Ethylbenzen	NA	D		NA/IRIS,HEAST
Methylene chloride	7.5E-03	B2	Liver	Water/IRIS
Techtrachloroethene	5.2E-02	B2/C		US EPA
Toluene	NA	D		NA/IRIS,HEAST
Trichoroethene	1.1E-02	B2/C		US EPA
Xylenes (Total)	NA	D		NA/IRIS,HEAST

SEIMIVOLATILES				
Anthracene	NA	D		NA/IRIS,HEAST
Benzoic acid	NA	D		NA/IRIS,HEAST
Benzo(&)anthracene(b)	7.3E-01	B2	Forestomach	Diet/IRIS
Benzo(a)pyrene	7.3E+00	B2	Forestomach	Diet/IRIS
Benzo(b)fluoranthene(b)	7.3E-01	B2	Forestomach	Diet/IRIS
Benzo(g,h,i)perylene	NA	D		NA/IRIS,HEAST
Benzo(k)fluoranthene(b)	7.3E-01	02	Forestomach	Diet/IRIS
Bis(2-ethylhexyl)pohthalate	1.4E-02	B2	Liver	Diet/IRIS
Butylbenzylphthalate	NA	C	Leukemia	Diet/IRIS
Chrysene(b)	7.3E-02	B2	Forestomach	Diet/IRIS
Di-n-butylphthalate	NA	D		NA/IRIS,HEAST
Dinistrotoluene, 2,4-	NA			NA/IRIS,HEAST
Fluoranthene	NA	D		NA/IRIS,HEAST
Indeno(1,2,3-cd)pyrene(b)	7.3E-01	B2	Forestomach	Diet/IRIS
Naphthalene	NA	D		NA/IRIS,HEAST
Nitrophenol, 4-	NA			NA/IRIS,HEAST
Pentachlorophenol	1.2E-01	B2	Multiple, Sites	Diet/IRIS
Phenanthrene	NA	D		NA/IRIS/HEAST
Phenol	NA	D		NA/IRIS,HEAST
Pyrene	NA	D		NA/IRIS,HEAST
Trichlorophenol, 2,4,5-	NA	D		NA/IRIS,HEAST
PESTIICIDES/PCBs				
DDT, 4,4-	3.4E-01	B2	Liver	Diet/IRIS
Aroclor-1248 (c)	7.7E+00	B2	Liver	Diet/IRIS
Aroclor-1254 (c)	7.7E+00	B2	Liver	Diet/IRIS
Aroclor-1260 (c)	7.7E+00	B2	Liver	Diet/IRIS

IRIS = U.S. EPA. 1995, Integrated Risk Information system (IRIS) Database
HEAST = U.S. EPA 1994, Health Effects Assessment Summary Tables (HEAST): Annual Update
US EPA = US EPA (ORD/ECAO), 1992d, Fax from J.S. Dollarhide to K. Michelson, TRC, re PERC and TCE Slope factors, May 20
NA = Toxicity value not available

(a)Estimated from unit risk of 5 x 10-5 (:g/l)-1
(b)Cancer slope factor for benzo(a)pyrene combined with OEHHA's potency equivalency factors (PEFs) for PAHs
(c)Cancer slope factor polychlorinated biphenyis (PCBs)

TABLE B-2
SUMMARY OF TOXICITY VALUES ASSOCIATED WITH CARCINOGENIC EFFECTS: INHALATION
SHIELDALLOY METALLURGICAL CORPORATION

Constituent	Inhalation Slope Factor (mg/kg-d)-1	Weight of Evidence Class	Type of Cancer	Basis/ Source
INOAGANICS				
Aluminum	NA			NA/IRIS,HEAST
Antimony	NA			NA/IRIS,HEAST
Arsenic	5.0E+01	A	Respiratory Tract	Occupat./IRIS,HEAST
Barium	NA			NA/IRIS,HEAST
Beryllium	8.4E+00	B2	Lung	NA/IRIS,HEAST
Boron	NA			NA/IRIS,HEAST
Cadmium(a)	6.3E+00	B1	Respiratory Tract	Occupational/IRIS
Chromium III	NA			NA/IRIS,HEAST
Chromium VI	4.1E+01	A	Lung	IRIS,EAST
Cobalt	NA			NA/IRIS,HEAST
Copper	NA	D		NA/IRIS,HEAST
Cyanids	NA	D		NA/IRIS,HEAST
Fluoride	NA			NA/IRIS,HEAST
Lead	NA	B2	Kidney	NA/IRIS,HEAST
Manganese	NA	D		NA/IRIS,HEAST
Mercury	NA	D		NA/IRIS,HEAST
Nickel(b)	8.4E-01	A	Respiratory Tract	IRIS,HEAST
Niobium	NA			NA/IRIS,HEAST
Selenium	NA	D		NA/IRIS,HEAST
Silver	NA	D		NA/IRIS,HEAST
Strontium	NA			NA/IRIS,HEAST
Titanium	NA			NA/IRIS,HEAST
Vanadium	NA	D		NA/IRIS,HEAST
Zinc	NA	D		NA/IRIS,HEAST
Zirconium	NA			NA/IRIS,HEAST
VOLATILES				
Acetone	NA	D		NA/IRIS,HEAST
Benzene	2.9E-02	A	Leukemia	Occcupat/HEAST
Butanone, 2-	NA	D		NA/IRIS,HEAST
Carbon disulfide	NA			NA/IRIS,HEAST
Chloroform	8.1E-02	B2	Liver	Gavage,IRIS
Chloromethane	6.3E-03		Kidney	HEAST
Dichloroethene, 1,2-(Total)	NA			NA/IRIS,HEAST
Ethylbenzene	NA	D		NA/IRIS,NEAST
Methylene Chloride	1.6E-03	B2	Liver, Lung	Inhalation/IRIS
Tetrachloroethene	2.0E-03	B2/C		US EPA
Toluene	NA	D		NA/IRIS,HEAST
Trichloroethene	6.0E-03	B2/C		US EPA
Xylenes (Total)	NA	D		NA/IRIS,HEAST

SEMIVOLATILES				
Anthracene	NA	D		NA/IRIS,HEAST
Benzoic acid	NA	D		NA/IRIS,HEAST
Benzo(a)anthracene	NA	B2		NA/IRIS,HEAST
Benz(a)pyrene	NA	B2		NA/IRIS,HEAST
Benzo(b)fluoranthene	NA	B2		NA/IRIS,HEAST
Benzo(g,h,i)perylene	NA	D		NA/IRIS,HEAST
Benzo(k)fluoranthene	NA	B2		NA/IRIS,HEAST
Bis(2-ethylhexyl)phthalate	1.4E-02	B2	Liver	NA/IRIS,HEAST
Butylbenzylphthalate	NA	C		NA/IRIS,HEAST
Chrysene	NA	B2		NA/IRIS,HEAST
Di-n-butyl phthalate	NA	D		NA/IRIS,HEAST
Dinitrotoluene, 2,4-	NA			NA/IRIS,HEAST
Fluoranthene	NA	D		NA/IRIS,HEAST
Indeno(1,2,3-cd)pyrene	NA	B2		NA/IRIS,HEAST
Naphthalene	NA	D		NA/IRIS,HEAST
Nitrophenol, 4-	NA			NA/IRIS,HEAST
Pentachlorophenol	NA	B2		NA/IRIS,HEAST
Phenanthrene	NA	D		NA/IRIS,HEAST
Phenol	NA	D		NA/IRIS,HEAST
Pyrene	NA	D		NA/IRIS,HEAST
Trichlorophenol, 2,3,4-	NA	D		NA/IRIS,HEAST
PESTICIDES/PCBs				
DDT, 4.4-	3.4E-01	B2	Liver	Diet/IRIS,HEAST
Aroclor-1248(c)	7.7E+00	B2	Liver	Diet/IRIS
Aroclor-1254(c)	7.7E+00	B2	Liver	Diet/IRIS
Aroclor-1260(c)	7.7E+00	B2	Liver	Diet/IRIS

IRIS = U.S. EPA. 1995, Integrated Risk Information system (IRIS) Database
HEAST = U.S. EPA 1994, Health Effects Assessment Summary Tables (HEAST): Annual Update
US EPA= US EPA (ORD/ECAO), 1992d, Fax from J.S. Dollarhide to K. Michelson, TRC, re PERC and TCE Slope factors, May 20
NA= Toxicity value not available

(a)Inhalation slope factor derived from inhalation unit risk of 1.83E-3(:g/m3)-1
(b)Cancer slope factor for nickel refinery dust
(c)Cancer slope factor for polychlorinated biphenyis (PCBs)

TABLE B-3
SUMMARY OF TOXICITY VALUES ASSOCIATED WITH NONCARCINOGENIC CHRONIC EFFECTS: ORAL
SHIELDALLOY METALLURGICAL CORPORATION

Constituent	Chronic Oral RfD (mg/kg-d)	Confidence Level	Critical Effect	Basis/ Source	Uncertainty Factor	Modifying Factor
INORGANICS						
Aluminum	NA			NA/IRIS,HEAST		
Antimony	4.0E-04	Low	Decreased longevity, blood glucose and cholestrol	Water/IRIS	1000	1
Arsenic	3.OE-04	Medium	Hyperpigmentation, keratosis, possible vascular effect	Water/IRIS	3	1
Barium	7.0E-02	Medium	Increased blood pressure	Water/IRIS	3	1
Beryllium	5.0E-03	Low	None observed	Water/IRIS	100	1
Boron	9.0E-02	Medium	Testicular atrophy	Diet/IRIS,HEAST	100	1
Cadmium (a)	1.OE-03	High	Proteinuria	Diet/IRIS	10	1
Chromium III	1.0E+00	Low	None observed	Diet/IRIS	100	10
Chromium VI	5.0E-03	LOW	None observed	Water/IRIS	500	1
Cobalt	NA			NA/IRIS,HEAST		
Copper (b)	3.7E-02		Local gastroin testinal irritation	Oral/HEAST	NA	NA
Cyanide	2.OE-02	Medium	Weight loss, thyroid effects	Diet/IRIS	100	5
Fluoride	6.0E-02	High	Dental fluorosis	Water/IRIS	1	1
Lead	NA			NA/IRIS,HEAST		
Manganese (c)	1.4E-01		Central nervous system effects	Diet/IRIS	1	1
Mercury	3.0E-04		Kidney effect	Oral/HEAST	1000	NA
Nickel(d)	2.OE-02	Medium	Reduced body and organ weight	Diet/IRIS	300	1
Niobium	NA			NA/IRIS,HEAST		
Selenium	5.0E-03	High	Clinical selenosis, CNS abnormalities	Diet/IRIS	3	1
Silver	5.0E-03	Low	Dermal effects	I.V/IRIS	3	1
Strontium	6.0E-01	Medium	Bone calcium/strontium changes	Diet/IRIS	300	1
Titanium	NA			NA/IRIS,HEAST		
Vanadium	7.OE-03		None observed	Water/HEAST	100	NA
Zinc	3.OE-01	Medium	Anemia	Diet/IRIS	3	1
Zirconium	NA			NA/IRIS,HEAST		

VOLAT1LES						
Acetone	1.0E-01	Low	Increased liver and kidney weight	Gavage/IRIS	1000	1
Benzene	NA			NA/IRIS,HEAST		
Butanone,2-	6.0E-01	Low	Decreased fetal birth weight	Oral/IRIS	3000	1
Carbon disulfide	1.0E-01	Medium	Fatal Toxicity/Teratogenic	Oral/IRIS	100	1
Choroform	1.0E-02	Medium	Liver lesions	Capsule/IRIS	1000	1
Chloromethane	NA			NA/IRIS,HEAST		
Dichloroethene,1.2-(Total)	9.0E-03		Liver lesions	Water/HEAST	1000	NA
Ethylbenzene	1.0E-01	Low	Liver and kidney toxicity	Oral/IRIS	1000	1
Methylene chloride	6.0E-02	Medium	Liver toxicity	Water/IRIS	100	1
Tetrachloroethene	1.0E-02	Medium	Hepatotoxicity	Gavage/IRIS	1000	1
Toluene	2.0E-01	Medium	Changes in liver and kidney weights	Gavage/IRIS	1000	1
Trichloroethene	NA			NA/IRIS,HEAST		
Xylenes (Total)	2.0E+00	Medium	Hyperactivity, decreased body weight, increased mortality	Gavage/IRIS	100	1
SEMIVOLATILES						
Anthracene	3.0E-01	Low	None observed	Gavage/IRIS	3000	1
Benzoic acid	4.OE+00	Medium	None observed	Diet/IRIS	1	1
Benzo(a)anthracene	NA			NA/IRIS,HEAST		
Benzo(a)pyrene	NA			NA/IRIS,HEAST		
Benzo(b)fluoranthene	NA			NA/IRIS,HEAST		
Benzo(g,h,i)perylene	NA			NA/IRIS,HEAST		
Benzo(k)fluoranthene	NA			NA/IRIS,HEAST		
Bis(2-ethylhexyl) phthalate	2.0E-02	Medium	Increased relative liver weight	Diet/IRIS	1000	1
Butylbenzylphthalate	2.OE-01	Low	Effects on body weight gain, testes, liver, kidney	Diet/IRIS	1000	1
Chrysene	NA			NA/IRIS,HEAST		
Di-n-butyl phthalate	1.OE-01	Low	Increased mortality	Diet/IRIS	1000	1
Dinitrotoluene, 2.4-	2.0E-03	High	Neurotoxicity	Diet/IRIS	100	1
Fluoranthene	4.OE-02	Low	Kidney, liver, blood, and clinical effects	Gavege/IRIS	3000	1
Indeno(1,2,3-cd)pyrene	NA			NA/IRIS,HEAST		
Napthalene	4.0E-02		Decreased body wood gain	Gavage/HEAST92	10000	NA
Nitrophenol, 4-	NA			NA/IRIS,HEAST		
Pentachlorophenol	3.0E-02	High	Liver and kidney pathology	Diet/IRIS	100	1
Phenanthrene	NA			NA/IRIS,HEAST		
Phenol	6.OE-01	Low	Reduced fetal body weight	Gavege/IRIS	100	1
Pyrene	3.0E-02	Low	Kidney effects	Gavage/IRIS	3000	1
Trichlorophenol, 2,4,5-	1.00E-01	Low	Liver and kidney pathology	Oral/IRIS	1000	1

PESTICIDES/PCBs						
DDT, 4,4-	5.0E-04	Medium	Liver lesions	Diet/IRIS	100	1
Aroclor-1248	NA			NA/IRIS,HEAST		
Aroclor-1254	NA			NA/IRIS,HEAST		
Aroclor-1260	NA			NA/IRIS,HEAST		

IRIS = U.S. EPA, 1995 (or most recent file, Integrated Risk Information System (IRIS) Database
HEAST = U.S. EPA (ECAO), 1994, Health Effects Assessment Summary Tables (HEAST): Annual Update
HEAST92 = U.S EPA (ECAO) 1992, Health Effects Assessment summary Table (HEAST): Annual Update
NA = Toxicity value not available

(a) Value for food ingestion; RfD for water ingestion is 5E-4 mg/kg-d
(b) Value derived from current drinking water standard of 1.3 mg/l
(c) Value for food ingestion; RfD for water ingestion is 5E-3 mg/kg-d
(d) Value for nickel (soluble salts)

TABLE B-4
SUMMARY OF TOXICITY VALUES ASSOCIATED WITH NONCARCINOGENIC CHRONIC EFFECTS: INHALATION
SHIELDALLOY METALLURGICAL CORPORATION

Modifying Constituent	Chronic Inhalation RfD (mg/kg-d)	Confidence Level	Critical Effect	Basis/ Source	Uncertainty Factor	Modifying Factor
INORGANICS						
Aluminum	NA			NA/IRIS,HEAST		
Antimony	NA			NA/IRIS,HEAST		
Arsenic	NA			NA/IRIS,HEAST		
Barium	1.OE-04		Fetotoxicity	HEAST	1000	
Beryllium	NA			NA/IRIS,HEAST		
Boron (f)	5.7E-03		Bronchitis	HEAST	100	
Cadmium	NA			NA/IRIS,HEAST		
Chromium III	NA			NA/IRIS,HEAST		
Chromium VI	NA			NA/IRIS,HEAST		
Cobalt	NA			NA/IRIS,HEAST		
Copper	NA			NA/IRIS,HEAST		
Cyanide	NA			NA/IRIS,HEAST		
Fluoride	NA			NA/HEAST		
Lead	NA			NA/IRIS,HEAST		
Manganese(a)	1.8E.04	Medium	Respiratory symptoms, psychomotor disturbances	Occupat/IRIS	300	3
Mercury (b)	8.6E-05		Neurotoxicity	Occupat/HEAST	30	NA
Nickel	NA			NA/IRIS,HEAST		
Niobium	NA			NA/IRIS,HEAST		
Selenium	NA			NA/IRIS,HEAST		
Silver	NA			NA/IRIS,HEAST		
Strontium	NA			NA/IRIS,HEAST		
Titanium	NA			NA/IRIS,HEAST		
Vanadium	NA			NA/IRIS,HEAST		
Zinc	NA			NA/IRIS,HEAST		
Zirconium	NA			NA/IRIS,HEAST		

VOLAT1LES						
Acetone	NA			NA/IRIS,HEAST		
Benzene	NA			NA/IRIS		
Butanone, 2-(c)	2.9E-01	Low	Decreased fetal birth weight	IRIS	1000	3
Carbon disulfide (g)	2.9E-03		Fetal Toxicity	Inhalation/Heast	1000	
Chloroform	NA			NA/IRIS,HEAST		
Chloromethane	NA			NA/IRIS,HEAST		
Dichloroethene, 1,2	NA			NA/IRIS,HEAST		
Ethylbenzene (c)	2.9E-01	Low	Developmental toxicity	IRIS	300	1
Methylene chloride (d)	8.6E-01		Liver toxicity	HEAST	100	
Tetrachloroethylene	NA			NA/IRIS,HEAST		
Toluene (e)	1.1E-01	Medium	CNS effects	Occupat/IRIS	300	1
Trochloroethylene	NA			NA/IRIS,HEAST		
Xylenes (Total)	NA			NA/IRIS,HEAST		
SEMIVOLATILES						
Anthracene	NA			NA/IRIS,HEAST		
Benzoic acid	NA			NA/IRIS,HEAST		
Bonzo(a)anthracene	NA			NA/IRIS,HEAST		
Benzo(a)pyrene	NA			NA/IRIS,HEAST		
Benzo(b)fluoranthene	NA			NA/IRIS,HEAST		
Benzo(g,h,i)perylene	NA			NA/IRIS,HEAST		
Bnzo(k)fuoranthens	NA			NA/IRIS,HEAST		
Bis(2-ethylhexl)phthalate	NA			NA/IRIS,HEAST		
Butylbenzylphthalte	NA			NA/IRIS,HEAST		
Chrysene	NA			NA/IRIS,HEAST		
Di-n-butyl phthalate	NA			NA/IRIS,HEAST		
Dinitroluene, 2.4-	NA			NA/IRIS,HEAST		
Fluoranthene	NA			NA/IRIS,HEAST		
Indeno (1,2,3-cd)pyrene	NA			NA/IRIS,HEAST		
Naphthalene	NA			NA/IRIS,HEAST		
Nitrophenol, 4-	NA			NA/IRIS,HEAST		
Pentachlorophenol	NA			NA/IRIS,HEAST		
Phenanthrene	NA			NA/IRIS,HEAST		
Phenol	NA			NA/IRIS,HEAST		
Pyrene	NA			NA/IRIS,HEAST		
Trichlorophenol, 2,4,5-	NA			NA/IRIS,HEAST		

PESTICIDES/PCBs

DDT. 4,4-	NA	NA/IRIS,HEAST
Aroclor-1248	NA	NA/IRIS,HEAST
Aroclor-1254	NA	NA/IRIS,HEAST
Arolcor-1260	NA	NA/IRIS,HEAST

IRIS = U.S. EPA, 1995, Integrated Risk Information system (IRIS) Database
HEAST = U.S. EPA, 1994, Health Effects Assessment Summary Table (HEAST): Annual Update
NA = Toxicity value not available

(a) Value derived from RfC of 5E-05 mg/m3.
(b) Value derived from RfC of 3E-04 mg/m3.
(c) Value derived from RfC of 1E+00 mg/m3.
(d) Value derived from RfC of 3E+00 mg/m3.
(e) Value derived from RfC of 4E-01 mg/m3.
(f) Value derived from RfC of 2.OE-02 mg/m3.
(g) Value derived from RfC of 1.OE-02 mg/m3.
<IMG SRC 0296283B>
<IMG SRC 0296283C>
<IMG SRC 0296283D>
<IMG SRC 0296283E>
<IMG SRC 0296283F>
<IMG SRC 0296283G>

APPENDIX C

LIST OF ACRONYMS
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey

ACRONYM	DESCRIPTION
CEA	Classification Exception Area
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	Contaminant of Concern
CPF	Cancer Potency Factor
EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
FFS	Focused Feasibility Study
gpm	Gallons per Minute
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
MCL	Maximum Contaminant Level
NJDEP	New Jersey Department of Environmental Protection
ppb	Parts per Billion
ppm	Parts per Million
RfD	Reference Dose
TCE	Tricholorethene (Tricholoroethylene)
UCL	Upper Confidence Limit
VOC	Volatile Organic Compound

APPENDIX D

TRANSCRIPTION OF PUBLIC MEETING
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey
<IMG SRC 0296283G1
NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

SITE REMEDIATION PROGRAM

PUBLIC MEETING TO DISCUSS COMPLETION OF THE REMEDIAL INVESTIGATION/FOCUSED FEASIBILITY STUDY AND THE PROPOSED DECISION DOCUMENT FOR REMEDIAITON OF THE GROUNDWATER

PUBLIC MEETING AGENDA

Division of Publicly Funded Site Remediation

SHIELDALLOY SUPERFUND SITE

Wednesday, September 13, 1995

7:00 p.m.

Marie D. Durand School

Vineland, New Jersey

APPEARANCES:

PAMELA LANGE, Section Chief, NJDEP

DONNA GAFFIGAN, Case Manager, NJDEP

JEAN OLIVA, Project Manager, TRC Environmental Corp.

J & J COURT TRANSCRIBERS, INC.
TRANSCRIBER PATRICIA C, REPKO
268 EVERGREEN AVENUE
HAMILTON, NEW JERSEY 08619
(609) 586-2311 FAX NO. (609) 587-3599

<IMG SRC 0296283G2>

MS. LANGE: I think we can got started now. We were waiting a few more minutes to see if some more people came in. Good evening and welcome. My name's Pan Lange. I'm a Section Chief with the New Jersey Department of Environmental Protection, and we're here tonight to discuss the groundwater remediation at the Shieldalloy Facility in Newfield Borough. I just want to let a few people in the audience know that we have a few people here tonight for you to be aware of. One is Ms. Loretta Williams, the Newfield -- Newfield Borough councilwoman, and also, Andrea Edwards, a representative of Senator Lautenberg's Barrington office. We'll be talking about Superfund tonight. As I said, we're here to discuss the completion of a groundwater remedial action at the -- at the Shieldalloy Facility.

We have a handout here tonight. This is the public meeting agenda. In it you will find a schedule of how tonight will run, a summary of what went on at the site, a copy of the proposed plan for a groundwater remedy, a list of -- a glossary of terms, some informational diagrams, a handout on the superfund process, and a questionnaire at the back about meeting evaluation form.

As -- as the meeting goes on, I'd like to you pay attention to the meeting evaluation form, also, so we can be aware of what we're doing here tonight and how we can improve things for the next time.

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Anybody who has not signed in at this time, if you could go to the back room and put your name on the list. This is so that we have your name and address for any future mailings for the site and anything that comes up. Okay. Everybody signed in I guess.

We're here tonight both to share information with you and to receive your comments and questions. This is a part of our commitment to the community involvement which is described in detail in the community -- community relations summary in the handout that you received tonight. On the back sheet is a flow chart that tells you the major steps in a superfund site cleanup. We are at step number six now, and as indicated in the fact sheet that's in your package, the relevant documents for this site are located in local repositories.

The floor is going to be open for questions and comments after the presentations are completed. It you would like to comment or ask a question tonight, please complete a speaker registration card. Well, considering the size of the crowd, that won't be necessary. We're going to skip over that part. All I ask is that if you would like to speak, what we can do later is if you'll just indicate to me that you want to have a question, I'd like you to come up to this microphone, state your name, and spell your name, because we do have a -- we io have a transcriber here this evening that's taking down everything that's being said so we can keep track of whit

on. That is a superfund requlation by the way, and when you want to speak, speak clearly, and we will try to answer your question as best we can, and if we can't answer your question tonight, we will try and find an answer to your question and get back to you as soon as possible.

The comment period on our proposal runs until September 25th, so that means up and until September 25th, if you don't feel comfortable coming up and askinq your questions, you can write your questions into the department, and we will respond in -- to you in the record of decision that will be issued for this site. We're qoing to try and keep the presentation brief but allow sufficient time for your comments and questions. We would also ask that you limit the 1enqth of your comments so that everyone who wants to speak qets a chance, and please, hold all questions and comments until the speakers are done.

Now, I would like to introduce Donna Gaffigan, the Case Manager from the Department of Environmental Protection. She's going to qive you a brief overview of the site history and -- and after Donna, Jean Oliva of the -- representing Shield -- Shieldalloy Metallurgic Corporation, will discuss the remedial investigation and feasibility study objectives and present the remedial alternatives for the site.

I would also like -- like you to know-that other DEP representatives are here toniqht. John Boyer, Technical Coordinator of the site who mainly deals with laboratory issues

and soil issues, and Georqe Nicholas, the geologist, and also, in the back of the room, Liz Mataset is the Community Relations coordinator, and her address and phone number is in this handout, so without further ado.

MS. GAFFIGAN: As said, I'm Donna Gaffigan. I'm a Case Manager up at Department of Environmental Protection, and I'm going to talk about the site background. Okay. The Shieldalloy Facility now known as Shieldalloy Metallurgic Corporation consists of 67 and a half acres near the intersection of West Boulevard and Weymouth Road. The manufacturing plant is located in Newfield. There are railroad tracks to the north and west of the site, wooded areas, homes, small businesses to the east and west, and Hudson Branch, which is a small tributary of the Hudson -- of the Burnt Mill branch which flows into the Maurice River exists to the south, and there's some homes and a small church on the other side of the stream.

Shieldalloy also owns seven and a half acres of farmland located southwest of the plant in Vineland. The farmland was purchased so that Shieldalloy would have access to the property. There's no production or waste disposal practices ever occurred there. Okay. For the remainder of my discussion I'll focus on the manufacturing plant.

This slide shows the major features on the manufacturing plant. This here shows the actual property line and the fence

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line because part of the property is fenced as shown within the property line.

In 1955 Shieldalloy -- in 1955 Shieldalloy began processing ores and minerals to produce primary metals such as chromium, ferroalloys -- ferroalloys are products that contain iron and another metal such as ferro vanadium. Production occurs in these major buildings where large furnaces are used to heat the raw materials hundreds of degrees to produce the metals and the alloys. Byproducts of this processes are known as slags and drosses, and they're stored out here in the byproduct storage area.

These are lined lagoons where waste water was treated. Prior to the construction of those lagoons and in the same location there was an unlined -- untreated waste water from a chromium process was disposed into an unlined lagoon in the 60's. The lined lagoons are currently not used and are scheduled for removal and cleanup.

A degreasing unit was located here in this little square, which was used in the 60's, also, to remove dirt and grease from manufactured metals and raw materials. Trichloroethene, or TCE for short, was the degreasinq solvent used. In the past, TCE was a common solvent used for many industrial and domestic purposes. TCE belongs to a group of chemicals known as volatile organic chemicals, because they evaporate or volatilize very easily, and this buildinq here is the

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groundwater treatment system, and this is the out fall that goes into the stream which I will talk about shortly.

In addition to manufacturing processes Shieldalloy has been involved with site cleanup for quite some time. Chromium contamination of the groundwater was first observed in 1970 as a result of disposing raw waster water in that unlined lagoon that I just talked about. An a result, DEP directed them to perform groundwater studies, determine the extent of the chromium contamination, and to develop appropriate cleanup actions.

The investigations that begun in 1972 resulted in the installation of a groundwater extraction and treatment system in 1979. That system, which pumped contaminated groundwater from one well located on the Shieldalloy site, is capable of remediating 80 gallons per minute of contaminated groundwater using ion exchange technology. Further studies show that this system was not effective in -- in remediating all of the chromium contamination. DEP notified Shieldalloy of this decision in 1982.

In 1983 Shieldalloy was placed on EPA's national priority list as a Superfund site. In 1984, DEP and Shieldalloy entered into an administrative consent order, or ACO, which required Shieldalloy to conduct studies to improve the remediation of the chromium contaminated qroundwater. In addition, Shieldalloy had to continue operating the 80-gallon per minute

system until a new system could be constructed.

Volatile organic compounds, or VOC's for short, were also detected in the groundwater at and near the.facility. This prompted DEP to establish a well restriction area 1986 to prevent people from using contaminated wells for drinking water. Public money was used to extend existing water lines to affected residences.

This slide shows the well restriction area that was established. It includes almost the entire area bounded by West Boulevard, Forest Grove Road, Delsea Drive, and Weymouth Road. The well restriction area included the VOC contamination that existed at the time plus the area where it was predicted to be in ten years based on a worst-case scenario in which no extraction and remediation was occurring. Since the majority of the chromium contamination lies within the well restriction area, the residents within the well restriction area were protected from drinking both chromium and VOC contaminated groundwater.

Low levels of VOC contamination were also detected in the one municipal well located down gradient of Shieldalloy, so in 1986 DEP again used public money to put an airstripper on that well to remove the contamination. DEP has investigated several other sources of VOC contamination in the Vineland-Newfield area based upon an evaluation of production processes, raw materials, and waste disposal practices. The results of this

investigation will be finalized in the near future and will be used by DEP as a basis to require the responsible parties to reimburse the public monies that were spent.

To continue with the history, the study to approve the remediation of the chromium contaminated groundwater was completed in early 1988. The study recommended that the groundwater extraction and treatment should be increased from 80 gallons per minute to 400 gallons per minute and should operate 24 hours a day, 365 days a year to be effective. The study also recommended continued use of ion exchange technology and also recommended that four additional extraction wells be installed to pump contaminated groundwater from off site locations. One of these extraction wells is located on the parcel of farmland that Shieldalloy owns.

To remove the volatile organic contamination that would be recovered along with the chromium contamination since the contamination overlaps, Shieldalloy added an airstripper to the design of the system in response to DEP and public concerns.

Later in 1988 DEP and Shieldalloy entered into a second administrative consent order which required Shieldalloy to initiate operation of that newly proposed 400 gallon per minute ion exchange system. The ACO also required Shieldalloy to conduct a site wide remedial investigation and feasibility study. The RIFS, as it is known, will be discussed in the next presentation.

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In 1989 the new 400 gallon per minute ion exchange system became operational, however, because of unforeseen difficulties the 400 gallon per minute treatment rate was hard to reach, because the system required frequent, but temporary, shutdowns.

In 1990 the field activities for the remedial investigation began. This included extensive sampling of the groundwater. The results of the remedial investigations were submitted to DEP in 19 -- 1992 at which time the focused feasibility study for groundwater was initiated. Meanwhile, because of the difficulties with the ion exchange system, Shieldalloy constructed an electrochemical treatment system in 1992 before the completion of the focus feasibility study. Since then the electrochemical treatment system has been very effective in the treatment of the recovered groundwater. It is achieving much better results than were possible using the ion exchange system. The electrochemical treatment unit has achieved and maintained 400 gallons per minute pumping rate, and an airstripper provide -- continues to provide a VOC contamination printout.

This slide shows the location of the components of the groundwater remediation system that was required by the 1988 ACO. The electrochemical treatment system currently uses the same five extraction wells, which are located at these points, the same building, which is located here, and the same out fall, 0-0-1, that discharges to the Hudson Branch.

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Next, Jean Oliva of TRC representing Shieldalloy will discuss the results of the remedial investigation and feasibility study.

MS. OLIVA: Good evening. As Donna said, my name is Jean Oliva, and I am an engineer with TRC Environmental Corporation, and TRC has been retained by Shieldalloy to conduct the remedial investigation feasibility study activities at the site.

First, I'd like to provide you with an overview of the remedial investigation feasibility study, or RIFS process. The project begins with the development of objectives for the project and is followed by site sampling to characterize the site. As the site is being characterized, the feasibility study process is initiated. The feasibility study uses remedial response objectives which are developed based on the results of the site characterization. Based on those objectives, remedial alternatives are developed and screened and then undergo a detailed analysis, and it's based on this analysis that a remedy is selected from the site.

The objectives for the remedial investigation feasibility study at Shieldalloy are listed here. In general, the intent of the study is to identify impacts of previous site activities. Once those impacts are identified a determination is made how those impacts affect human health and the environment. For contaminants which present unacceptable

impacts to human health and the environment, remedial action alternatives are developed and evaluated.

At Shieldalloy following the initial sampling effort sufficient groundwater data was available to support the development and evaluation of groundwater remedial alternatives, therefore, groundwater is being addressed in a separate phase which is referred to as an operable unit. Recently, additional sampling of other media including the soil, sediment, and surface water has been completed, and those media will be addressed in a separate phase in the future.

This slide look -- shown the locations of-the monitoring wells which were installed either during the RI or during previous site investigations. The wells include shallow monitoring wells, which allows for the characterization of groundwater quality at depths of loss than 50 feet and deep monitoring wells which allow for the characterization of groundwater quality a depth -- of ranging from 50 to over 125 feet. These wells provide information on groundwater quality at various steps within the Cohansey sand. The Cohansey sand is underlain by the Kirkwood formation, whose upper portion is characterized by the presence of a gray clay layer which prevents further downward migration of groundwater contamination.

The arrows on this figure show the direction of groundwater flow which is from the northeast to the southwest. These

monitoring wells have been sampled and analyzed for a variety of potential contaminants. Additionally, some of the wells continue to be sampled on a monthly, quarterly, or annual basis.

The analysis of the groundwater samples has identified the presence of volatile organics and metals in the groundwater. The main volatile organic compound detected in the groundwater is Trichloroethene, or (TCE), which as Donna mentioned earlier, has historically been used for a variety of commercial, industrial, and residential cleaning purposes. The major inorganics detected in the groundwater are chromium, lead, and antimony.

These next few slides will provide you with an indication of the extent of groundwater contamination based on sampling which was conducted in April of this year. This slide shows the extent of chromium contamination in the shallow monitoring wells. For reference purposes, the drinking water standard for chromium is 100 parts per billion. As you can see, the contamination is centered on the manufacturing area and extends to the southwest. Contaminant levels have decreased since the time the RI was conducted. When the RI was conducted, the extraction system was operatinq at 200 gallons per minute rather than 400 gallons per minute and levels as high as 20,000 parts per billion of chromium were detected in some of these wells.

<IMG SRC 0296283H5> 14

This slide shows the extent of chromium contamination within the deep monitoring wells. Again, the contamination is centered down gradient to the lagoon area and extends to the southwest. During the RI contaminant levels as high as 100,000 parts per billion were detected in some of the monitoring wells.

This slide shows the extent of the trichloroethene, or TCE plume in the shallow monitoring wells as of April. The drinking water standard for TCE is one part per billion. The contamination appears to be centered beneath the former location of the degreasing unit and extends to the southwest. Again, contaminant levels have decreased since the RI when levels as high as 800 parts per billion were detected in some wells.

And this slide shows the extent of TCE in the deep aquifer, or in the deep monitoring wells. The contamination is centered down gradient toward the shallow contamination, and again, it extends to the southwest, and as with the shallow monitoring wells, the deep monitoring wells in the plant area have exhibited a decrease in TC -- TCE levels since the RI was conducted.

A human health risk assessment was conducted to evaluate potential risks to human health based on exposures to groundwater. The risk assessment focused on potential exposure to groundwater south of the facility since exposures southwest

of the facility are limited by the present of the well restriction area. The risk assessment was based on a series of conservative assumptions. First, that a home served by a private well is located immediately south of the facility. Second, that concentrations in that well are identical to the concentrations that were detected on site during the RI, although as I presented earlier, concentrations had decreased since the RI was conducted. Third, that person would drink the groundwater for a period of 30 years at the rate of two liters or a little over a half a gallon per day, and that that person would also be exposed to groundwater during showering. The risk estimated to this exposure scenario was above acceptable limits which indicates that a remedial response is appropriate, however, I'd like to emphasize that neither New Jersey DEP, nor Shieldalloy, intend to allow such an exposure to occur, and that the remedial system will be -- is designed to prevent such an exposure from ever occurring, so based on the results of the remedial investigation and the risk assessment, remedial response objectives were developed.

These objectives include preventing exposure due to ingestion of the contaminated groundwater, preventing migration of the contaminated groundwater, and remediating the groundwater contamination which is attributable to Shieldalloy Based on these remedial response objectives, a feasibility study focused on qroundwater renediatign was conducted.

<IMG SRC 0296283H7> 16

This slide shows the elements of a feasibility study. Initially, remedial technologies are identified and screened to determine which technologies are most appropriate for use at the site. The technologies are then assembled into remedial alternatives which undergo a detailed evaluation based on nine criteria which are defined in federal regulations.

The groundwater remedial alternatives developed for the Shieldalloy focused feasibility study are listed here. The first alternative is the no action alternative, and that must be considered under federal regulations. The second alternative is a groundwater restoration alternative which complies with the requirements of the 1988 administrative consent order, and this alternative included ion exchange as the treatment methodology. We also looked at a third alternative which we refer to as a modified groundwater restoration alternative. Under this third alternative, the modified groundwater restoration alternative, we looked at a variety of extraction treatment and discharge actions. Under the extraction operations, we looked at using the existing, groundwater extraction system and using a modified groundwater extraction system in which -- which would be designed on the basis of groundwater modelling to optimize the extraction of the contaminated groundwater.

For the treatment technologies, we looked at organic treatment technologies and inorganic treatment technologies.

Of these technologies listed here, airstripping and electrochemical treatment are the technologies which are currently used at the site, and they've been successful in meeting the current discharge requirements, therefore, they offer some implementational advantages over the other treatment technologies.

The discharge options which were considered include discharge to groundwater, discharge to surface water, and a combined discharge to groundwater and surface water.

Each of the remedial alternatives and the associated extraction, treatment, and discharge options were evaluated based an these nine criteria. The alternatives and their evaluation are defined -- are described in more detail in your proposed plan.

Compliance with this a last criteria and community acceptance will be determined based on the verbal comments that are received here tonight as well as on written comments, which -- as was mentioned earlier, will be accepted through September 25th, but based on the detailed analysis of the alternatives, a preferred remedy was selected for the groundwater operable unit, and Donna Gaffigan of New Jersey DEP will now present that preferred remedy.

MS. GAFFIGAN: Based on an evaluation of the various alternatives, DEP prefers alternative three, modified groundwater restoration. The options under alternative three

include modified extraction system, airstripping for removal of the organic contamination, electrochemical treatment with supplemental treatment if necessary for inorganic contamination, and discharge to the surface water.

This slide shows the modified groundwater extraction system which includes one deep -- this one's deep, and throe shallow monitoring or recovery wells in addition to the five already existing wells. Those additional wells will better capture the contamination and the groundwater down gradient of the site while also providing extraction of contamination near the on site sources of contamination.

The locations of the proposed wells are based on groundwater modelling which was conducted as part of the focused feasibility study, however, the exact number and locations of the wells may be modified based on additional information that will be collected during the design phase of the project. The extraction system will also include remediation of the volatile organic compounds attributable to Shieldalloy. Groundwater will continue to be extracted at a rate of about 400 gallons per minute unless it's modified again during the design phase.

The discharge to surface water is still the preferred method for dealing with the treated groundwater. The treated groundwater will most discharge limits from a permit before it in discharged to the Hudson Branch through out fall 0-0-1

To remove inorganic contamination from the recovered groundwater electrochemical treatment will continue to be used because it has proved to be more effective than ion exchange. This slide shows the basics of the electrochemical treatment system. In electrochemical treatment the groundwater from all the extraction wells is combined into one tank. From there it enters the electrochemical cell where an electric current is passed through an iron electrode that causes a chemical reaction to the contaminants in the groundwater. The water then enters a degassing tank where hydrogen gas in produced by the chemical reactions is released in very low concentrations. After this the groundwater enters a settling tank where the particulates settle out as solid matter. The water is then filtered to remove suspended solids which are the materials that float and did not settle out in the last tank. Then the water, is tested and discharged to the surface water. The solids go through a filter press to remove a lot of the excess water, and then it's properly disposed off site after being tested. The electrochemical treatment system will provide the sole inorganic treatment method if the permit limits can be achieved.

Okay. Removal of some of the volatile organics will occur -- will likely occur during the degassing step of the electrochemical treatment process. Additional VOC removal will be provided by the use of the existing airstripper. This slide

shows the components of the airstripper. An airstripper is a column that is filled with packing material such as these. groundwater containing the volatile organics flows down from the top of the column where it is agitated by passing through the plastic shapes. At the same time a blower blows air up from the bottom which causes more agitation of the water and evaporation of the volatile organics. The treated water then exits out the bottom, and the volatile organics exit out the top. So far the volume or the amount of volatile organics that are released from the top of the stack have not needed a permit. If anything changes in the future, a permit will be evaluated.

Alternative three also includes ongoing monitoring program. Groundwater monitoring is required to confirm that the system is effectively cleaning up the-aquifer. Monitoring of the treated water is required to make sure that the permit limits are met before it is discharged to the Hudson Branch. In addition, this remedial action decision will be reviewed in five years to insure that it remains protective of human health and the environment. This is required by federal regulation. In conclusion, DEP believes that the preferred remedy meets eight of the nine Superfund criteria that Jean had just mentioned. The ninth criteria, community acceptance, is a vital part of the process. The proposed plan and this public meeting provide you with the opportunity to coment on the

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preferred remedial action of the groundwater at Shieldalloy. This concludes my presentation, and I'll turn the meeting back over to Pam.

MS. LANGE: Okay. Next, which isn't on our agenda, right before the -- we get to the question and answer, I would like again to introduce Andrea Edwards of Senator Lautenberg's office. Andrea is the Director of Special Projects of Southern New Jersey. Her office is located in Barrington, and she has a statement that she would like to read to us here tonight.

MS. EDWARDS: Can everyone hear me, or do you want me to use the microphone?

MS. LANGE:(No verbal response.)

MS. EDWARDS: Everybody can hear? Okay. I've worked with a lot of you over the years an the site, and the Senator is not able to here this evening, but as you know, there are a lot of things happening in Washington that don't particularly have to do with this site but the entire superfund program, so I have a statement here from the Senator toniqht that I'd like to read.

"Dear Friends, I'm sorry I could not be here with you this evening. As such as I had hoped to be with you, Senate business requires my presence in Washinqton.

As many of you know, during the last several years, I have worked with members of this community on the cleanup of the Shieldalloy Superfund site. Throuqhout the years, we have

faced many frustrations and attempted to work through then to ensure that the site is cleaned up. I believe that the current Superfund program is not perfect, but we need the program to ensure that toxic waste sites are cleaned up, and the health of the public and the environment are preserved.

The Superfund program is under attack on many fronts. I am especially concerned about proposed budget cuts that will have devastating effect not only on EPA's ability to protect the environment, but also an delaying the cleanup of many Superfund sites in New Jersey. I am actively fighting these cuts in the Senate, and will do my best to ensure sufficient funds up the site, even in the face of a strong desire on the congressional leadership to cut funding for environmental programs.

Tonight's forum is important, because we will be hearing from the experts about the preferred alternative for the groundwater cleanup. Many of you have been involved in ensuring the actions of the responsible parties and the agencies reflect the needs of the community, and I supported your efforts in bringing that mdbsaqo to the State DEP, the EPA and the NRC. I will continue to work with all of you to see that your questions are answered.

While there is still such to be accomplished in order for the cleanup to be declared complete, we have seen a number of successes along the way, thanks to the diligent efforts of many

<IMG SRC 0296283I3>

of you here tonight. I urge you to continue. to be informed and seek answers from the agencies. My staff stands ready to assist you in this effort and in ensuring that the site is cleaned up. And, I will continue to fight for an effective Superfund program while Congress considers reauthorization of the program and will resist efforts to abandon Superfund or turn the cost of the cleanup over to the taxpayers.

I hope that you will remain active in this effort, and I urge you to reach out to your local officials and Congressional representatives to let them know the importance of keeping a responsible Superfund program alive which protects public health and the environment for today and the future generations. I appreciate your activism. Sincerely, Frank R. Lautenberg, United States Senator." Thank you.

MS. LANGE: Thank you, Andrea. Okay. At this time, I would like -- I would urge people who would like to come forward to ask questions concerning the presentation that you have just heard. All --what I ask is that you come up to the microphone in the center of the room, state your name clearly, and spell it so the transcriber can make sure he gets the name right, and we will do our best to answer any questions that you have. At this time is there anybody who would like to come forward? Please do so. Come on up.

MS. MADDEN: Do I have -- can they hear me from here?

MS. LANGE: . Well, it's for the transcriber. We would

really like you to come up to the microphone. It's not to put you on the spot.

MS. MADDEN: I've been there before.

MS. LANGE: Okay.

MS. MADDEN., My name is Pati Madden, P-A-T-I, M-A-D-D-E-N. I have a question about the VOC's that were being released into the air. You said that it's not at a harmful level at this time. What is considered safe, and at what level -- do you know what I's saying? Do You have any numbers? Is that --?

MS. GAFFIGAN: Yes, I don't have the numbers, but the amount that's released is below a limit that would require a permit. I don't have the permit numbers

MS..MADDEN: So would --?

MS. GAFFIGAN: -- of toxic volatile organics handy, but it's below that limit, and as we do the additional recovery put in these other wells, we may be pulling in higher concentrations in the water which may result in higher concentrations being released and at which time we will eval -- reevaluate the need for a permit.

MS. MADDEN: Is there any way that I can get a copy of the numbers that are being released now and what is considered unsafe -- at what time you would start monitoring something?

MS. GAFFIGAN: Yes. I could send you a copy of the regulation that lists three concentrations that are permitable,

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and I could also give you the information of what's being released.

MS. MADDEN: Okay. Does -- is there anybody else? Can -- I have another question? If I can ?

MS. LANGE: State who you are.

MR. VALENTI: Jim Valenti, Shieldalloy. The airstripper had a permit for five years, and that was obtained in anticipation of the numbers that could be seen from the recovery wells. After five years and monitoring the levels monthly, we never exceeded 100 parts per billion total volatile organics, so at the end of five years the permit was up for renewal, and it was terminated it was determined to be not necessary, so the answer to your question would be it never exceeded 100 parts per billion, and therefore, the permit was not renewed.

MS. MADDEN: It never exceeded 100 billion?

MR. VALENTI: Never exceed 100 parts per billion.

MS. MADDEN: So 100 parts per billion is where it would then go into --?

MR. VALETI: That would be into the influent coming into the airstripper.

MS. MADDEN: All right. My next question -- can I do it from here? The health risk assessment. You said that there has been one done. Now, we've discussed this once before in-- in a different meeting, and I'm really not clear an this. The

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health risk assessment that was done, was that done on all the contaminated wells or on the wells after the contamination was -- the wells were restricted, and we got the city water in?

MS. OLIVA: The -- the risk assessment just looked at data from on site monitoring wells and based the risk estimates on that data, --

MS. MADDEN: Only on the--?

MS. OLIVA: -- so it was as if somebody was drinking water from some.of the on site wells.

MS. MADDEN: Okay, so the fact that we were drinking the water with the VOC's are -- we're not considered in that risk assessment. It's just on your monitoring wells that the assessment was done?

MS. OLIVA: The assessment was done on the monitoring wells.

MS. MADDEN: Okay, and then you said something about the amounts have to be identical, so if my well had 3200 parts per billion and yours only had 100 or 10,000, they're not considered identical, and we wouldn't be considered?

MS. OLIVA: Why I'm-- the -- right.

MS. MADDEN: I mean if that's -- I'm confused on that fact, and that's what I --?

MS. OLIVA: Sure. The -- the assumptions that were used in the risk assessment were that someone would be drinking the levels of contaminants that were in those four on site

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wells in 1990 or '91 when the RI was conducted, so it's based on those numbers. You know, if your numbers are different --

MS. MADDEN: Okay. What were the levels at that time?

MS. OLIVA: it -- the risk calculated and the risk assessment -- .

MS. LANGE: Can -- can Donna interrupt you a minute?

MS. OLIVA: Sure.

MS. GAFFIGAN: The reason for the risk assessment is to show that the contaminants are high enough to require remedial action. The assumptions in the risk assessment were based on an site wells, because they exhibited the highest concentrations or some of the highest concentrations which showed, yes, there is a clear need for remediation to go on here. Some of the other wells may have been higher, but using the data that was used showed that the risk was phenomenal; that remedial action needed to be taken.

MS. MADDEN: Okay, and that was done in 1990?

MS. GAFFIGAN: Based an the data from 1990.

MS. MADDEN: And it's done for anybody drinking a half a gallon of water for 30 years?

MS. OLIVA: Two liters of water per day for 30 years. There in also a -- a dermal exposure and an inhalation exposure during showering.

Ms. MADDEN: Now, is this at like the local library, or is this a report that we can get?

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MS. GAFFIGAN: Yes. I think it was put in last month.

MS. MADDEN: 0h, okay. All right, and is the Cohansey aquifer effected?

MS. GAFFIGAN: Yes. That's the aquifer that we're talking about.

MS. MADDEN: That's what I want to -- okay.You did a picture of test wells. In that all the tests wells that you had, because I noted they had been putting more test wells in?

MS. OLIVA: Right. There's one additional test well that was not on that figure that has been installed, and that -- there is no data available for that well yet.

MS. MADDEN: And when you're going into private residence and putting test wells on there, is there a reason why the people were not told why, what the reasons are, or anything like that? Like we're just told the DEP has told us to do this, so you know, I mean if we're supposed to be getting copies of the reports, and I know they never have ?

MS. LANGE: If you have questions, you give us a call. I mean you need to let us know when -- when you're unsure about the answer that you're getting. Okay?

MS. GAFFIGAN: But I thought that we need to -- we need this additional data?

MS. MADDEN: Well, we're supposed to be getting reports, too, and we haven't gotten those yet either, you know?

MS. GAFFIGAN: We'll have to work on that.

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MS. MADDEN: Okay. That's all I have.

MS. LANGE: We'll fix that for you.

MS. MADDEN: Thank you.

MR. LISI: Hi, I'm John Lisi, L-I-S-I. When does the modified plan go into effect? What date?

MS. GAFFIGAN: What date? Well, they're already -- they're already pumping at the 400 gallons per minute using the five existing wells.

MR. LISI: Right.

MS. GAFFIGAN: After this meeting, we have the public comment period as still open till September 25th then we have what's called a record of decision which will take another month to do, and after that Shieldalloy's obligated to perform the rest of the stuff.

MR. LISI: When does that plan get published -- the schedule?

MS. GAFFIGAN: Probably-- well, at least towards the is end of the year when they're going to be installed.

MR. LISI: And how do we get notified of that?

MS. GAFFGAN: Well, it's not really part of the process, but .

MS. LANGE: If you -- if you want either .

MR. LISI: No, I'm talking about the modified plan. You referred to a modified plan going into effect. My question is what is the schedule for it, and how do we get notified?

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MS. GAFFIGAN: Okay. Well, the -- the record of decision is a formal document. EPA, hopefully, will concur with it. Our assistant commissioner will sign it, and that becomes a contract that Shiedalloy has to oblige to then we -- after that we work out a schedule of how and when everything's going to go into place?

MR. LISI: And how does that become public?

MS. LANGE: The record of decision is a public document, but if we can easily -- if you -- you've left your name and address?

MR. LISI: Um-hum. Yes.

MS. LANGE: We'd be more than happy to let you know when that becomes available.

MR. LISI: Okay.

UNIDENTIFIED SPEAKER: Sign up on the mailing list.

MR. LISI: I'm sorry?

MS. LANGE: Not -- not all things go out on the mailing list, but if this -- but if this is something that you would like, if you want to see the schedule, we'd be more than happy to provide a schedule to whatever the sailing list ends up being after this meeting so people know where we're -- where we're going from here as a result of these discussions.

MR. LISI: Okay, so the schedule will be part of the mailing that we get --

MS. LANGE: Yes.

<IMG SRC 0296283J1>

MR. LISI: -- as part of the mailing list?

MS. LANGE: Sure.

MR. LISI: Will there be ongoing public meetings like this?

MS. GAFFIGAN: There will be another public meeting held for the other operable unit which is soils, surface water, and sediment, but not for the groundwater.

MR. LISI: So we need to depend on the mailing to notify us of the schedule?

MS. LANGE: And also the record of decision will be put in the repository, --

MS. GAFFIGAN: Yes, it's in the repository.

MS. LANGE: -- so it will be in the local library.

MR. LISI: Okay.

MS.LANGE: Okay, and that's part of it -- part of the whole process.

MR. LISI: I got here somewhat late, so It's not sure I saw all the presentation, but were there any results in the presentation? I mean you talked about the plan, but what I didn't see are results. You know, what is the curve of concentrations over the number of years that the monitoring has been going on, and where -- where is that a matter of public record?

MS. OLIVA: That -- that shows that poster board shows TCE levels in April of 1991, and in your handout you have

<IMG SRC 0296283J2>

a -- a very similar figure showing TCE levels in --

MR. LISI: For '95.

MS. OLIVA: -- April, 1995, so if you want to get an idea, you can compare those two.

MR. LISI: Is there a copy of that available?

MS. OLIVA: It is in the remedial investigation report, which is at the library.

MS. LISI: What I'm really interested in is how do we track the results along with you? You know the plan's great, but the bottom line in what the result is, and that's in a --

MS. GAFFIGAN: A part -- a lot of these documents go into the repository, so you're welcome to come and look at them, and I don't send out a formal mailing every month of what's happened on the site.

MR. LISI: No, I don't expect every month. I mean once a year, once every two years, but some regular tracking so that the public can participate in the process.

MS. LANGE: Well, those things will go into the -- will-- will go into the repository. What we will decide is the frequency of the monitoring like are we going to monitor it quarterly or every six months, for how long, and look at the-- how the plume develops, or, hopefully, you know, is --

MR. LISI: Undevelops.

MS. LANGE: -- is taken in by, and those reports will required to be sent to the department, and in turn the

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department will put those in the repository for you to take a look at.

MR. LISI: Thank you.

MS. OLIVA: I guess if you'd like, I can give you an example for the chromium, that's the TCE, but for the chromium in the shallow monitoring wells, at the same time those samples were collected in 1990 -- 91, the maximum levels were over -- let me make sure I get this right -- 20,000 parts per billion, and now our maximum levels are over ten -- I'm sorry over 1,000 parts per billion, so that gives you an idea.

MR. LISI: And that's right on site? That is right on site?

MS. OLIVA: On Site and to the southwest.

MR. LISI: And to the southwest. Um-hum. Okay. Thank you.

MS. CAVANAUGH: My name is Suzanne Cavanaugh, C-A-V-A-N-A-U-G-H, and I wanted to know if the risk assessment was based just on the VOC's, or did you include the other chemicals in the risk assessment?

MS. OLIVA: It was based an all the chemicals that were detected at the site. Those chemicals which were considered to be of concern with respect to health.

MS. CAVANAUGH: Okay. Thank you.

MR. PUGH: Ken Pugh, P-U-G-H. As a Vice President, General Manger for Shieldalloy, I want to thank DEP, TRO, and

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others for their -- their work, and by way of a couple of questions I want to clarify some items. Has there ever been a connection between past activities or current activities at Shieldalloy and any public health concerns to your knowledge?

UNIDENTIFIED SPEAKER: Certainly, if you're a neighbor the answer's yes.

MS. GAFFIGAN: Yes, but to my knowledge and based on the documents that I've read, no.

MR. PUGH: I think that's an important point, that although we certainly recognize their concerns that there's not a documented situation where the public has been harmed in any way, although there is certainly risk.

MS. LANGE: I -- I don't want -- I don't know if you can say that as a fair statement, because it depends on your definition of harm, and I don't think that we're here tonight to talk about the definition of harm, because someone not being able to use their well may be considered harm to them, so that's -- so I would say that that's not a .

MR. PUGH: I'm talking about a public health -- I'm talking about a public health risk.

MS. LANGE: Well, even so. If people can't use their wells to drink their water, ultimately, that's a public harm --

MR. PUGH: But not if they're .

MS. LANGE: -- and a -- and a public health risk to them.

<IMG SRC 0296283J5>

MR. PUGH: But not if they're connected to a public system however.

MS. LANGE: I'm not disagreeing with that. What I'm saying is though the activities of Shieldalloy and the discharges that occurred especially from the chromium and the degreasing areas, did indeed contaminate the aquifer which made the well water around the area unavailable --

MR. PUGH: No question.

MS. LANGE: -- for use by the citizens.

MR. PUGH: No question about that.

UNIDENTIFIED SPEAKER: See, now this--.

MS. LANGE: Can you please hold it until Mr. Pugh is done and then --?

UNIDENTIFIED SPEAKER: (No verbal response.)

MS. LANGE: Thank you.

MR. PUGH: There was a mention of some high -- potential higher levels of VOC's in -- in wells. I believe Ms. Madden expressed that opinion.

UNIDENTIFIED SPEAKER: Can we get the microphone turned up? We can't hear anything back here.

MS. LANGE: You're going to have to talk loud. That microphone isn't hooked up.

MR. PUGH: That's dead, huh?

MS. LANGE: That's for the transcriber.

MR. PUGH: Yes, I understand.

<IMG SRC 0296283J6>

UNIDENTIFIED SPEAKER: Why don't you pick up one of the microphones on the table?

MS. LANGE: Well, it's only this one.

MR. PUGH: My question revolves around the-- the higher levels of VOC's that Ms. Madden referred to in -- in essentially her wells or others, and this ore obvious areas outside of SMC, and I know you've got an investigation going on as far as other potential sources, but isn't it true that some of these higher levels in areas outside of SMC may not be associated with SMC at all?

MS. GAFFIGAN: It's true that they say not, but we haven't conclusively shown that yet.

MR. PUGH: I understand, and isn't it also true that only SMC has been identified at this point, and only SMC is involved in remediation of -- of not only the site but -- but also the groundwater as opposed to possibly other potential sources for VOC's?

MS. GAFFIGAN: Shieldalloy identified itself as a user of a TCE.

MR. PUGH: Correct.

MS. GAFFIGAN: We have extensive data showing contamination at and emanating from your site.

MR. PUGH: Absolutely, but we are the only ones that are cleaning it up at this point.

MS. GAFFIGAN: At this point, yes.

<IMG SRC 0296283J7>

MS. LANGE: Yes.

MR. PUGH: Yes. I guess I just wanted to point out that we are committed to the plan. We appreciate all the work that's been done. As you mentioned, we've been in the process for a number of years. We do believe it's a good system, and we will be committed to cleaning it up. We certainly recognize that we did contaminate many years ago when it was legal to have those activities at that time. Obviously, since then we've all learned a lot as far as environmental is concerned, but you will get the commitment of Shieldalloy. We certainly appreciate the commitment of the DEP. Thank you.

MS. LANGE: Sir?

MR. LISA: Yes, I just wanted to challenge the premise that there's never been any detrimental effects. You know, perhaps today with the better operational aspects of the plant, they're much, much reduced, but years ago you could not even drive down the boulevard on certain nights when there were discharges in the air, and I realize this is a water meeting, but the data's here with regard to the water, also, so to claim that there haven't ever been any detrimental effects I think is wrong.

MS. LANGE: Thank you.

MR. PUGH: If I may? I -- I would never claim that there were never any detrimental effects. That -- that would be ludicrous, but what I -- what I wanted -- the point I want

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to get across is there's been no connection between a public health illness, cancer, deaths, increased deaths, etc., and the activities of Shieldalloy. That's all I'm trying to get across.

MS. MADDEN: Yet. Yet it has not been proven.

MR. PUGH: Yet, there has not been proven. Absolutely. Okay. There have been studies, and it's not been proven, but you're correct. You know it's never finished. I agree with you. My point is that it's not been proven that there has been any connections.

MS. MADDEN: They haven't done any health studies yet.

MR. BOYER: If I can clarify that. I work for the State. My name's John Boyer. I'm the technical coordinator. I think what the gentlemen is saying is we're trying to compare apples and oranges. Our job in investigating this site and coming up with the remedial alternative is not designed to determine whether there's been a public impact of the type where we have documented cancer cases where we have documented illnesses. That's -- that's not a role we play. That's usually something that's done by the department of health or the county health departments. We look at it from a perspective of are there contaminants? Is there a potential that they may be exposed to receptors, people, or environmental receptors, and then based an that, do we need to clean it up. so I don't want us to get confused or -- or get off the the

<IMG SRC 0296283J9>

subject here, but our role is to determine whether we have to clean it up or not. We do not look at -- directly at public health concerns, cancer studies, and the like, so it's -- it's -- it's a little bit of comparing apples and oranges, so I think we need to -- it would be best if we just leave the subject alone, because we can't answer that. The State cannot say that, because we did not look at that.

MS. MADDEN: In -- just'to say smething on that, and I don't mean to keep pushing it in, but the residents of Vineland and Newfield have at many occasions at these meetings stressed a deep concern to have a cancer cluster study done, to have a health risk study done, and this is the first one in 1990 that I am getting results that there was actually one done. We keep getting that there's no cause for it, but if you live in the area and do know people in the area, there has been a lot of people that have died recently and long ago from cancers, but we have never been able to get a study done.

MS. GAFFIGAN: Last year I sent you a letter summarizing sons of the results that our health department had done or at least that -- with names of people who are working on .

MS. MADDZN: I never got it.

MS. GAFFIGAN: It was February, '94 that the agency for toxic substance and disease registry as part of Superfund does a health assessment, I believe it's called. They've

<IMG SRC 0296283K>

reviewed that. I believe the -- the person's name is Arthur Block who you could contact about getting the draft of that. It was my understanding at that tine that ATSDR, as the agency is known, was thinking of other -- like an addendum to that study which in not a cancer cluster study. It's a health assessment, and I don't remember the exact definition of what their health assessment is.

At the same time, our Department of Health was looking at some information that they had contacted the Vineland Health Department and looked at some information. The person -- the people who -- the contacts over at our Department of Health, 1 don't remember their names, but I could easily get then for you as well an the person at ATSDR to follow up an some of that information.

MS. MADDEN: I remember talking to Mr. Cochran.

MS. GAFFIGAN: Mr. Block. Arthur Block. Yes.

MS. MADDEN: I remember talking to him, but that was like--.

MS. GAFFIGAN: Like I said, our risk assessment that is required by us under Superfund shows that whether or not remedial action is necessary to prevent future risks we don't necessarily focus on past risks, which is part of what, you know, ATSDR and the Department of Health can look at. Health departments could focus more on that. Unfortunately that's the -- that's the different roles of all the different players.

<IMG SRC 0296283K1>

MS. MADDEN: But You can understand our frustrations?
MS. GAFFIGAN: Yes. Yes.
MS. LANGE: If you didn't get the letter, --
MS. MADDEN: I don't remember that letter.
MS. LANGE: -- that's -- Donna-can can send you a copy of it- She still has it.
MS. GAFFIGAN: The names of the people may have changed.
MS. LANGE: But the -- the phone numbers and addresses should all be the same.
MS. GAFFIGAN: You know everyone changes,
MS. NIUK: I an a new resident. my name, -- Marcy Niuk, M-A-R-C-Y, N-I-U-K. I an a new resident of Newfield, and I want to know from where we have now water, and what about the toxic waste?
MS. GAFFIGAN: Of the well water?
MS. NIUK: No. No. No. I don't have the well -- well water. I have the city water, and from where we have water now, and what about this water, and what about the toxic -- toxic Waste?
MS. GAFFIGAN: Okay. The water that's supplied by the city --
MS. NIUK: Yes?
MS. GAFFIGAN: -- either from the Newfield Water Department or the Vineland Water Department -- I'm not sure

<IMG SRC 029628K2>

where you're located. Which?

MS. NIUK: Hampton on the west side.

MS. GAFFIGAN: okay. Well, probably -- probably Newfield water. As public purveyor of water, they have to test it and insure that it meets all the safe drinking water requirements, so the water that you're drinking is safe, and the toxic waste, I'm not sure what you mean by that.

MS. NIUK: About the toxic waste -- what Shieldalloy has on the backyard.

MS. GAFFIGAN: Oh, the materials stored in the back?

MS. NIUK: Yes.

MS. GAFFIGAN: A lot of that is regulated by the nuclear regulatory commission, and they're the ones that have to answer questions an that specifically.

MS. NIUK: Okay. Thank you.

MS. MATASET: I'm Liz Mataset, Community Relations. Just to give you a little.more information, if you have city water, you should be able to call the purveyor. If you have city water you should be able to call whoever you pay your bill to and ask then where their wells are located, and they'll tell you that, if they treat the water, and what they treat it for, so you should be able to get that information from then.

MS. LANGE: And also the water company on its site will have all the records of all the testing --

MS. NATASET: Right.

<IMG SRC 0296283K3>

MS. LANGE: -- that they do on -- on a daily, monthly, quarterly basis. They have to keep that information at the water, and it is available to you to look at.

MR. LISI: I'm not sure who this question should be directed to, but is Shieldalloy still tied into the -- the water -- you know, the department in Newfield? Is there still a tie there? Yes? No?

UNIDENTIFIED SPEAKER: Yes.

MR. LISI: We are tied in?

UNIDENTIFIED SPEAKER: Yes.

MR. LISI: Are you still using the water or the processed water, or is the treated water we use the processed water?

MR. PUGH: We use both.

MR. LISI: Both.

MR. PUGH: We treat it as well as .

MR. LISI: How is that regulated? What -- you know, what determines what is used?

MR. PUGH: We attempt to use the treated water for, noncontact -- what's called noncontact water based on exchanging. The borough water in used for some of the facilities discussed. There are times when the borough water pressure could be low in our system and wil'll work off the borough's supply.

MR. LISI: Because I'm a property owner adjacent to

<IMG SRC 0296283K4>

your property down there.

MS. LANGE: Excuse me. Could you just speak up a little bit, so the transcriber -- the transcriber needs to hear you. That's the problem here. I want to sake sure we get everything down, so

MR. LISI: Fine. See I'm a property owner adjacent to your property, and at times there are wide fluctuations in pressure. Nowhere near as bad as it used to be, so I was just wondering what the connection is, because it has an adverse effect on the quality of the water coming into our house from Newfield Borough because of the -- apparently the churning in the mains.

MR. PUGH: Well, we -- we certainly don't know what causes it, but certainly, about six-eight months ago this was an issue that was raised with Shieldalloy that it was thought that our large draws of water at times would lower the pressure in that end of the system. It was the major reason why we put in the recirculating water system using our -- our cleaned up water. At this point, our water draw is only about 70 to 70 -- excuse as -- 25 percent of what it used to be, so if you're continuing to have troubles, I would suggest that you contact someone within the water department, because frankly, I don't -- I don't think that's -- that's the way it -- .

MR. LISI: No. it's -- its much better recently the last, like you say, eight or nine months.

<IMG SRC 0296283K5>

MR. PUGH: Right.

MR. LISI: There's a very significant difference in the quality of the water upwards so I thank.you for that.

MR. PUGH: Right.

MR. LISI: I do have pressure gauges on my system so I could see exactly when the system is changing and by what magnitude, also.

MR. PUGH: Yes. by the way, we have problems at -- a while back they were going through and opening up the hydrants to flush the system, and we had a similar problem with low pressure. I don't know if that night have been the periods that you had problems.

MS. LANGE: Just state your name again for the --

MS. MADDEN: Pati Madden. When the water is being discharged back into the Hudson Branch, does that still have VOC's and chromium in it, or is that totally clear? Is that now considered safe, or does that still havis levels in it?

MS. GAFFIGAN: It's meeting this permit requirements, so it's .

MS. MADDEN: it's meeting the requirements, --

MS. GAFFIGAN: Permit requirements.

MS. MADDEN: -- so in other words, it still does have some of the --?

MS. GAFFIGAN: but it's less than drinking water standards, so that's tremendously inferior.

<IMG SRC 0296283K6>

MS. LANGE: It -- the -- the discharge limits would be based on its effect in the stream and the critters that live there, and it has to be .

MS. MADDEN: Do they have to have permits in order to dump this back into the stream?

MS. LANGE: Oh, yes.

MS. GAFFIGAN: Oh, yes.

MS. LANGE: Yes, and those and those permit limits are determined by what the water quality in the stream is, and the environmental receptors are usually extremely more sensitive than we would be, and so those numbers are lower than drinking water standards usually are.

MS. GAFFIGAN: And the concentrations that have been discharged are below the detection limits for the chromium.

MS. WILLIAMS: Loretta Williams, 310 Oakwood Drive, Newfield. My name is spelled W-I-L-L-I-A-M-S. You said that there was a health assessment.

MS. LANGE: Speak up a little bit. The people can't hear you.

UNIDENTIFIED SPEAKER: Can you have the microphone very loud, please? We don't hear anything on this whole meeting.

MS. LANGE: Here you go. Step right up.

MS. WILLIAMS: You said there was a health -- a health assessment done by the State of New Jersey?

<IMG SRC 0296283K7>

MS. GAFFIGAN: It was by the Agency of Toxic Substance and Disease control Which is an arm of EPA.

MS. WILLIAMS: Has the borough of Newfield and the City of Vineland gotten any information -- written information about that?

MS. GAFFIGAN: They should've been sent copies of it. I had received copies of it way back, and I'm pretty sure that the distribution list included -- .

MS. WILLIAMS: I was wondering if it could be sent again, because I -- .

MS. GAFFIGAN: Sure.

MS. WILLIAMS: -- I didn't know. When -- when was this supposed to be sent -- sent? I mean last year?

MS. GAFFIGAN: Probably a year or so ago. It was a while back. They wore supposed to do an update on it a couple years ago, so-- .

MS. WILLIAMS: I had -- last year I visited Shieldalloy, and I toured their water filtering system, and they explained it. I don't know if I understood all of it, but I think I have to say I think they're doing a good job at this point. For years they were terrible polluter. With their other administration -- this administration, in my opinion, is trying. I don't know if it's -- I can't -- you know, I'm not sure it's not 100 percent. I'm sure that, you know, in time they can improve it even more, but they really are trying, but

<IMG SRC 0296283K8>

I -- I don't believe that there hasn't been any health affects over the years from Shieldalloy, because I know that there were many people that died from cancer. I know a family -- about six members of their -- their family had cancer, so I mean I don't think the truth should be distorted here. I think there are health risks, and I believe this Gloucester County Health Department of some years -- a few years back did a don't know if was Gloucester County or the State or State Health Department had done some kind of they say cluster study. They sent a copy of it. I don't remember the date, but what they did when they evaluated it, they went by the overall cancer rate in the State, and I guess they went by population - - size of town. To mia that's not a cluster study. A cluster study Would be street by street. You know? Now many people died of cancer? How zany people have contracted cancer, you know, over the years in the particular areas particularly closer to Shieldalloy.

There are other.polluters, also. There was a glass company -- Andrews Glass a few years back. I think they were cited for -- for polluting. Marshall Service was also fined about three or four years ago. Shieldalloy isn't the only polluter. but unfortunately, over the years there was administrations in that company that just didn't care, and on time; I guess, it was legal to put it in the ground before the environmental laws, and I can't fault them for that, but even after, I mean people

<IMG SRC 0296283K9>

-- myself and other people have called Shieldalloy , over the years, and this present administration is the only one that will go on the phone and talk to you. You know other ones won't even -- didn't even got on the phone, and they were very secretive. Even with the governing body, they were very secretive. You know even the mayor, public safety director, couldn't get information out of them, and this administration is forthcoming on -- you know, in that way, and I do have to command them for the improvements that they made, although I think that, you know, there should be a cluster study, and I really feel that, possibly, in time, they could even improve the system even more. okay? Thank you.

MS. GAFFIGAN: We've had a very good working relationship with the company in the last year.

MS. WILLIAMS: Yes. Yes.

MS. GAFFIGAN: We have weekly telephone conferences with thou to discuss this site and also the -- the soil, surface water, and sediment that we're, working on next. I've mentioned that we're -- those lagoons on the site were scheduled for closure. Actually, as we speak, same of then are being worked on -- well, not in the dark, but they started last week an closing those up.

MS. WILLIAMS: How about air monitoring? Is there any air monitors?

MS. GAFFIGAN: There's air monitoring based on the

<IMG SRC 0296283L>

permits that they have, but you know, I don't see any problem. we don't really -- I don't'really deal with active permits except for the water that goes out, but I naven't heard --

MS. WILLIAMS: Also, --?

MS. GAFFIGAN: -- you know, I spoke to the air person today to see if he had any issues, and he said there were no violations or anything.

MS. WILLIAMS: And also there was the ---the Newfield Landfill which was closed in1980. There -- there's like shallow wells there. Has any of is there any -- any of the groundwater pollution -- is any of that as a result of the -- what was put in the landfill?

MS. GAFFIGAN: That's hard to say, because that landfill was under DEP regulation, and then a court decision came out where landfills closed prior to '84 no longer needed to be monitored.

MS. WILLIAMS: Yes. Oh, I see.

MS. GAFFIGAN: I had looked at the year to data that was generated --

MS. WILLIAMS: They monitored quite a few years though.

MS. GAFFIGAN: But it wasn't -- they were shallow wells or water table wells, and they were monitored for landfill parameters, iron, nitrates, nitrites, different things that, really, we weren't looking for at the site.

<IMG SRC 0296283L1>

MS. WILLIAMS: And also gases -- also gases like methane gas? No?

MS. GAFFIGAN: No, not even that.

MS. WILLIAMS: Oh, okay.

MS. GAFFIGAN: It was just -- you know, contamination that's typically found in municipal landfills, so looking at the data didn't really help anything. We do have some upgradient data that'we call background data from Shieldalloy, but it doesn't really show a whole lot.

MS. WILLIAMS: And there was also, years back, Kimble Glass in Vineland had used our landfill, and there had been rumors that they found something toxic. I don't know how true that is, and then after that the landfill was closed due to -- they were supposed to put in wells, and they -- they eventually did put the wells in, and I know that they were monitored, and it was costing quite a bit to monitor. They never found anything, you know.

MS. GAFFIGAN: And anything that would -- because the groundwater flows through -- from the landfill through Shieldalloy, we would've seen that coming through the site. We really didn't see anything unusual.

MS. WILLIAMS: Okay. Thank you.

MS. GAFFIGAN: As for the health assessment, I'll give the -- the Health Department a call and tell then that, you know, there's still a lot of concerns, and either I or someone

<IMG SRC 0296283L2>

from the Health Department will got back to you about what they've-done, what they should be, or what they can do.

MS. LANGE: Are there any other questions? Okay. In closing -- in closing, I want to reiterate that this meeting is part of the ongoing community relations commitment and outreach that we have in this program. We have a very strong commitment to two-way communications with you, and if you haven't already done so, please complete the meeting evaluation form, and sign the attendance shoot, so we can have you on the mailing list so you can be updated from time to time on what goes on at the site.

There is going to be a second public meeting that's going to be hold upon completion of the current remedial investigation feasibility study that's going an on the site proper for the soil and the sediments and the surface water. We're calling that this was for the groundwater portion of the site -- this particular meeting. We will, at that time, present a summary of the results of that study, and -- and give you a review of remedial action alternatives for cleanup of those media.

After the comments are received during this public conatnt period, the Department and EPA will select a remedial alternative. The final selected remedy will be presented in a record of decision. This record of decision will be available in the same repositories that all of the other documents that

<IMG SRC 0296283L3>

have led up to this decision are found. One of those repositories is at the library. The other one is at the town hall. Just to remind you all, that's where these documents will be.

An announcement of the decision will be sent to everyone on a the mailing list, and if everything goes according to plan, the next time you'll bear from us, after receiving notice of the record of decision, will probably be in the winter, which is when we expect to have results of the -- the soil, sediment, and surface water investigation at the site.

I want to emphasize that question and comments are always welcome at any time. You can direct your comments to Liz Mataset at the back, Community Relations Coordinator for the site. Her number is 609/984-3081. Donna and I are also available to answer any questions that you night have, and our phone number is 609/633-1455, and I want to thank everyone for coming tonight.

<IMG SRC 0296283L4>

APPENDIX E

EPA LETTER OF CONCURRENCE
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey

Robert C. Shinn, Jr., Commissioner
New Jersey Department of
Environmental Protection
401 East State Street, CN 402
Trenton, New Jersey 08625-0402

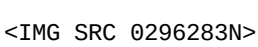
Re: Draft Record of Decision
Shieldalloy Corporation Superfund Site
Ground Water Operable Unit
Newfield Borough, Gloucester County, New Jersey

Dear Commissioner Shinn:

The United States Environmental Protection Agency, Region II (EPA) has reviewed the August 1996 draft Record of Decision (ROD) for the Ground Water Operable Unit of the Shieldalloy Corporation Superfund Site (Site) located in the Borough of Newfield, Gloucester County, New Jersey.

EPA concurs with the "Modified Ground Water Restoration" remedy presented in the ROD. EPA's concurrence is based upon the determination that the remedy will provide for protection of human health and the environment through the upgrade of an existing ground water extraction and treatment system. The ground water extraction and treatment system will provide for the capture and treatment of contaminated ground water attributable to the Site, and will satisfy the applicable or relevant and appropriate requirements of federal and state environmental statutes.

Sincerely,



APPENDIX F

ADMINISTRATIVE RECORD INDEX
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey
Remedial Investigation

DATE	DOCUMENT
8/31/88	Historical VOC Usage at the SMC Newfield, NJ Facility
1/89	Remedial Investigation Work Plan
9/6/89	Letter NJDEP to SMC: comments on 1/89 document
10/5/89	Letter SMC to NJDEP: response to 9/6/89 letter
10/31/89	Letter NJDEP to SMC: response to 9/6/89 letter
12/7/89	Letter SMC to NJDEP: modified list of potential contaminants of concern
12/7/89	Letter SMC to NJDEP: VOC usage letter
12/89	Revised Remedial Investigation Work Plan
5/21/90	Letter NJDEP to SMC: comments on 12/89 document
6/12/90	Letter NJDEP to SMC: summary of meeting discussing the 12/89 document and the 5/21/90 letter
7/6/90	Revision 1 Remedial Investigation Work Plan
7/20/90	Field and Laboratory QA/QC Plan
9/21/90	Letter NJDEP to SMC: conditional approval of 7/6/90 and 7/20/90 documents
10/19/90	Revision 2 Remedial Investigation Work Plan
11/15/90	Letter NJDEP to SMC: field changes to to Remedial Investigation Work Plan
2/13/91	Letter NJDEP to SMC: hexavalent chromium re-analysis
3/4/91	Letter SMC to NJDEP: response to 2/13/91 letter
4/25/91	Letter SMC to NJDEP: Second Ground Water Sampling Event work Plan
7/91	Draft Final Remedial Investigation Report
3/11/92	Letter NJDEP to SMC: comments on 7/91 document
4/20/92	Letter SMC to NJDEP: response to 3/11/92 letter and revisions to 7/91 document
4/30/92	Letter TRC to NJDEP: additional information in response to 3/11/92 letter
8/17/92	Letter NJDEP to SMC: conditional approval of the ground water portion of the Remedial Investigation Report
10/1/92	Letter SMC to NJDEP: response to 8/17/92 letter

ADMINISTRATIVE RECORD INDEX

SHIELDALLOY METALLURGICAL CORPORATION
GROUND WATER OPERABLE UNIT

Focused Feasibility Study

DATE	DOCUMENTS
4/29/92	Feasibility Study Work Plan
8/17/92	Letter NJDEP to SMC: conditional approval of 4/29/92 document
10/2/92	Revised Feasibility Study Work Plan
12/92	Draft Focused Feasibility Study Report
3/17/93	Letter NJDEP to SMC: comments on 12/92 document
4/27/93	Letter NJDEP to SMC: additional comments on 12/92 document
4/27/93	Letter NJDEP to SMC: format of revised focused feasibility study report
5/3/93	Revised Draft Focused Feasibility Study Report
6/93	"Final" Focused Feasibility Study Report
8/31/93	Letter NJDEP to SMC: comments on 6/93 document
2/25/94	Revisions to Final Focused Feasibility Study
8/18/95	Letter NJDEP to SMC: approval of 6/93 and 2/25/94 documents
12/94	Cultural Resource Reconnaissance, Addendum to Final Focused Feasibility Study Report
7/26/95	Letter NJDEP to SMC: comments on the 12/94 document

Ground Water Monitoring

DATE	DOCUMENT
1989-1995	Monthly ground water monitoring reports

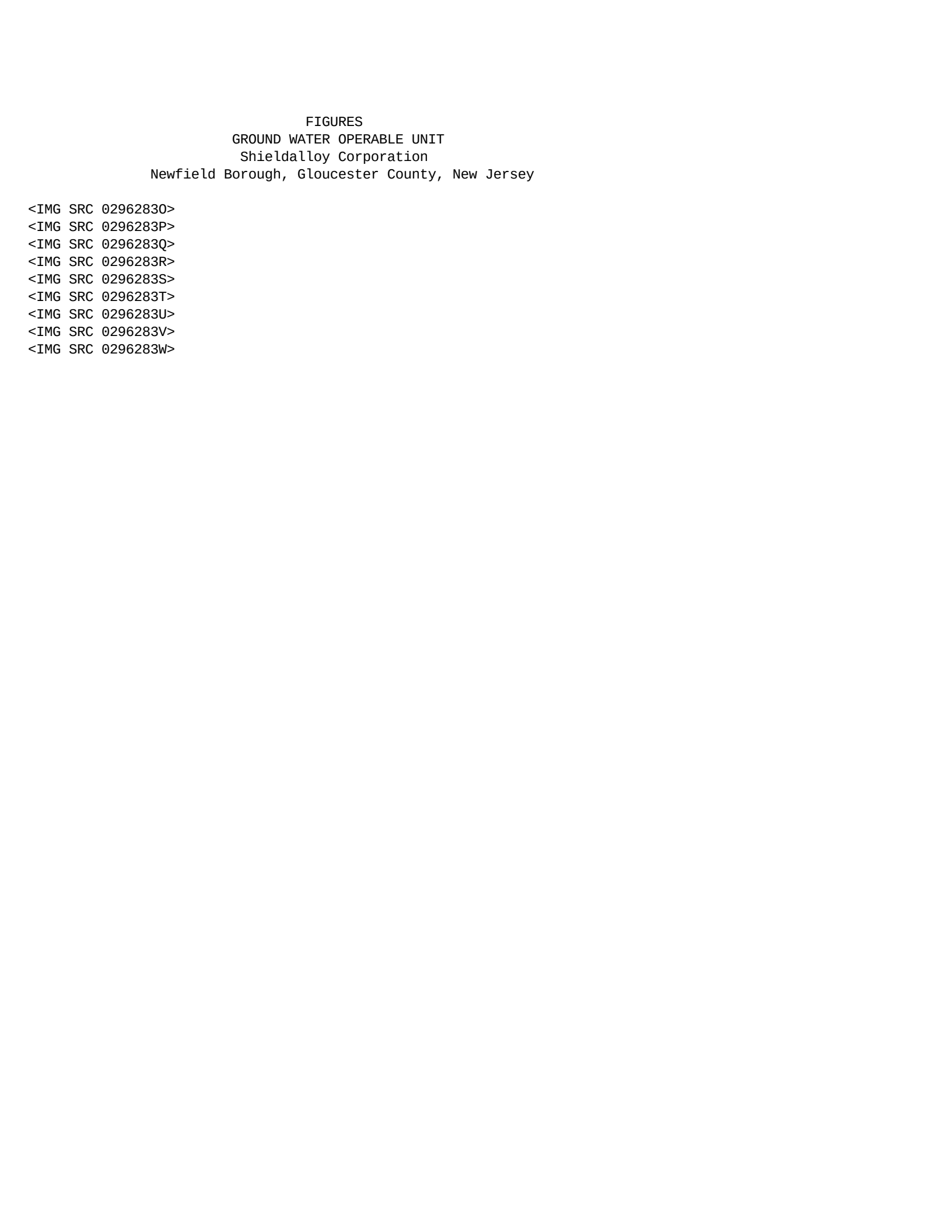
ADMINISTRATIVE RECORD

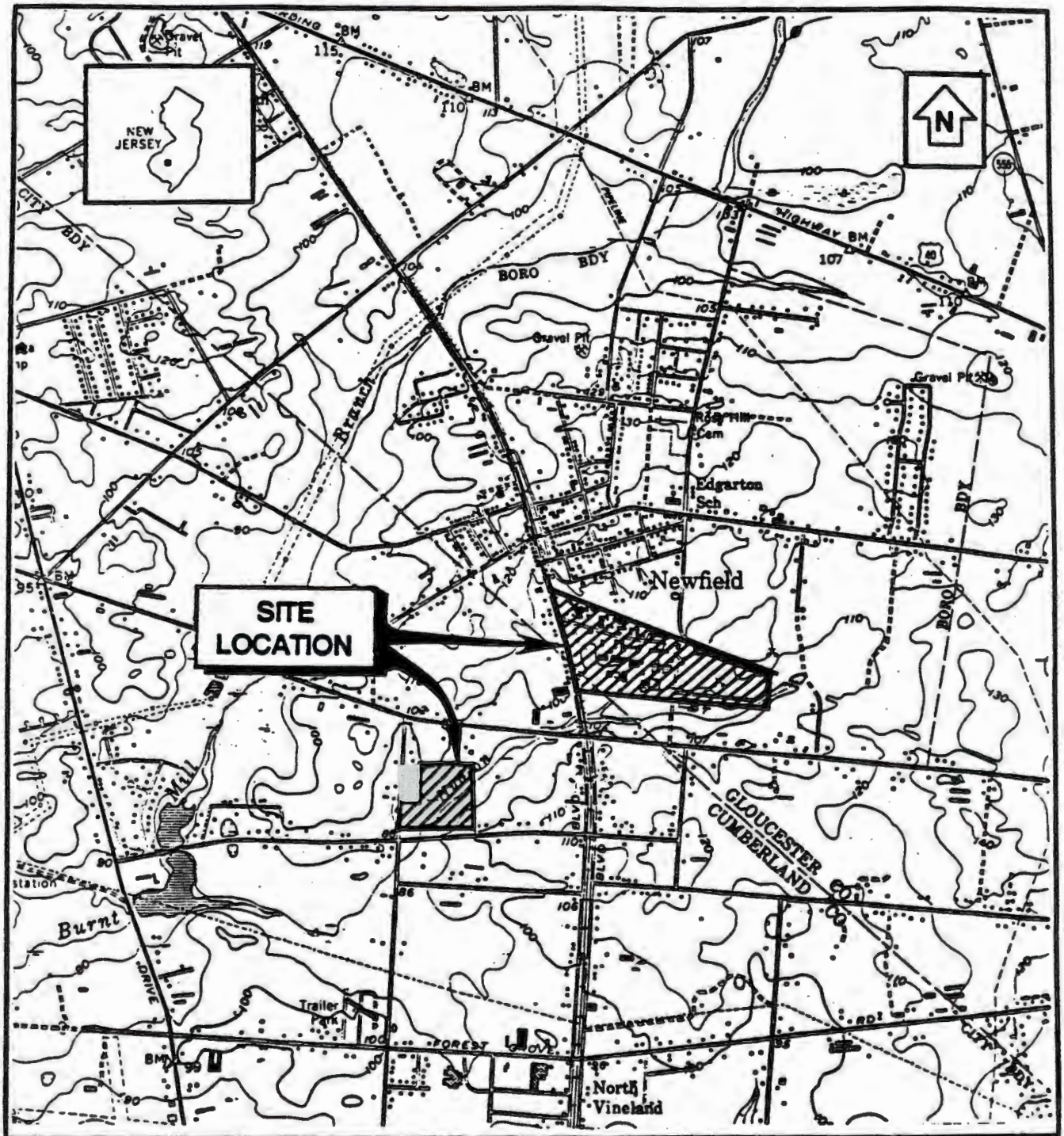
SHIELDALLOY METALLURGICAL CORPORATION
GROUND WATER OPERABLE UNIT

Risk Assessment
(Human Health and Environmental)

DATE	DOCUMENT
4/92	"Final Report" Risk Assessment
8/17/92	Letter from NJDEP to SMC: recalculate risk for chromium based upon alkaline digestion data
9/9/92	Letter from SMC to NJDEP: extension request for submittal of risk assessment addendum
9/23/92	Letter from NJDEP to SMC: qranting extension to 10/1/92
9/30/92	Draft Addendum to Risk Assessment Report
11/15/93	Letter from NJDEP to SMC: comments on 4/92 and 9/30/92 documents
2/16/94	Letter SMC to NJDEP: response to 11/15/93 letter
3/8/95	Letter NJDEP to SMC: response to 2/16/94 letter
3/22/94	Letter SMC to NJDEP: response to 3/8/94 letter
4/15/94	Letter NJDEP to SMC: response to 3/22/94 letter
4/94	Revised Draft Environmental Evaluation Report
4/94	Revised Final Human Health Risk Assessment
6/94	Environmental Evaluation Addendum
8/16/95	Letter NJDEP to SMC: comments on 4/94 Revised Final Human Health Risk Assessment
8/95	Final Human Health Risk Assessment
10/24/95	Letter NJDEP to SMC: approval of 8/9S Final Human Health Risk Assessment
2/14/95	Letter SMC to USEPA: Environmental Evaluation and Feasibility Study Approach
3/20/96	Letter NJDEP to SMC: response to 2/14/96 letter, comments on 4/94 and 6/94 Environmental Evaluation documents and requirement to conduct a environmental risk assessment

FIGURES
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey





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SCALE

FROM NEWFIELD, NJ 7 1/2' USGS
TOPOGRAPHIC MAP, 1953
PHOTOREVISED 1986

SHIELDALLOY METALLURGICAL CORPORATION
NEWFIELD, NEW JERSEY

Figure 1.

Site Location Map

Local Site Setting

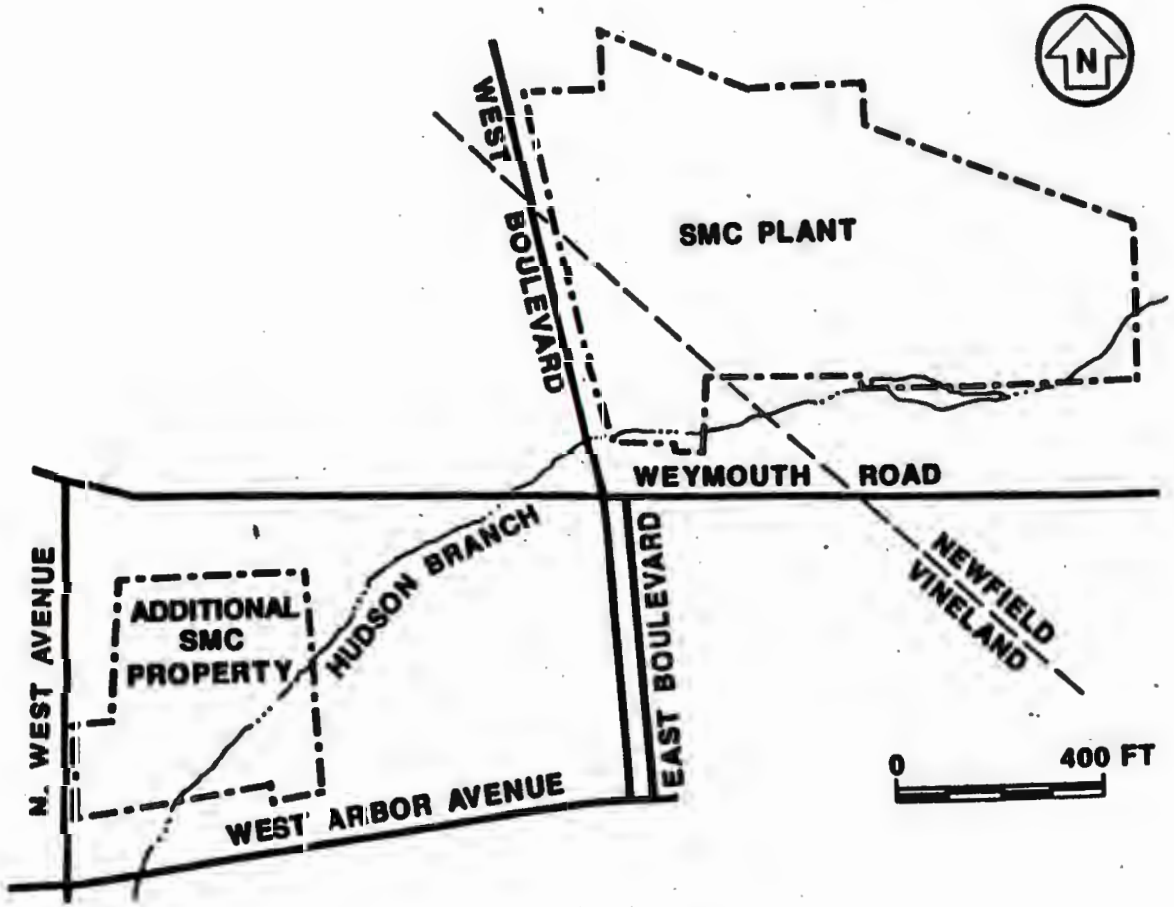


Figure 2.

Major Site Features

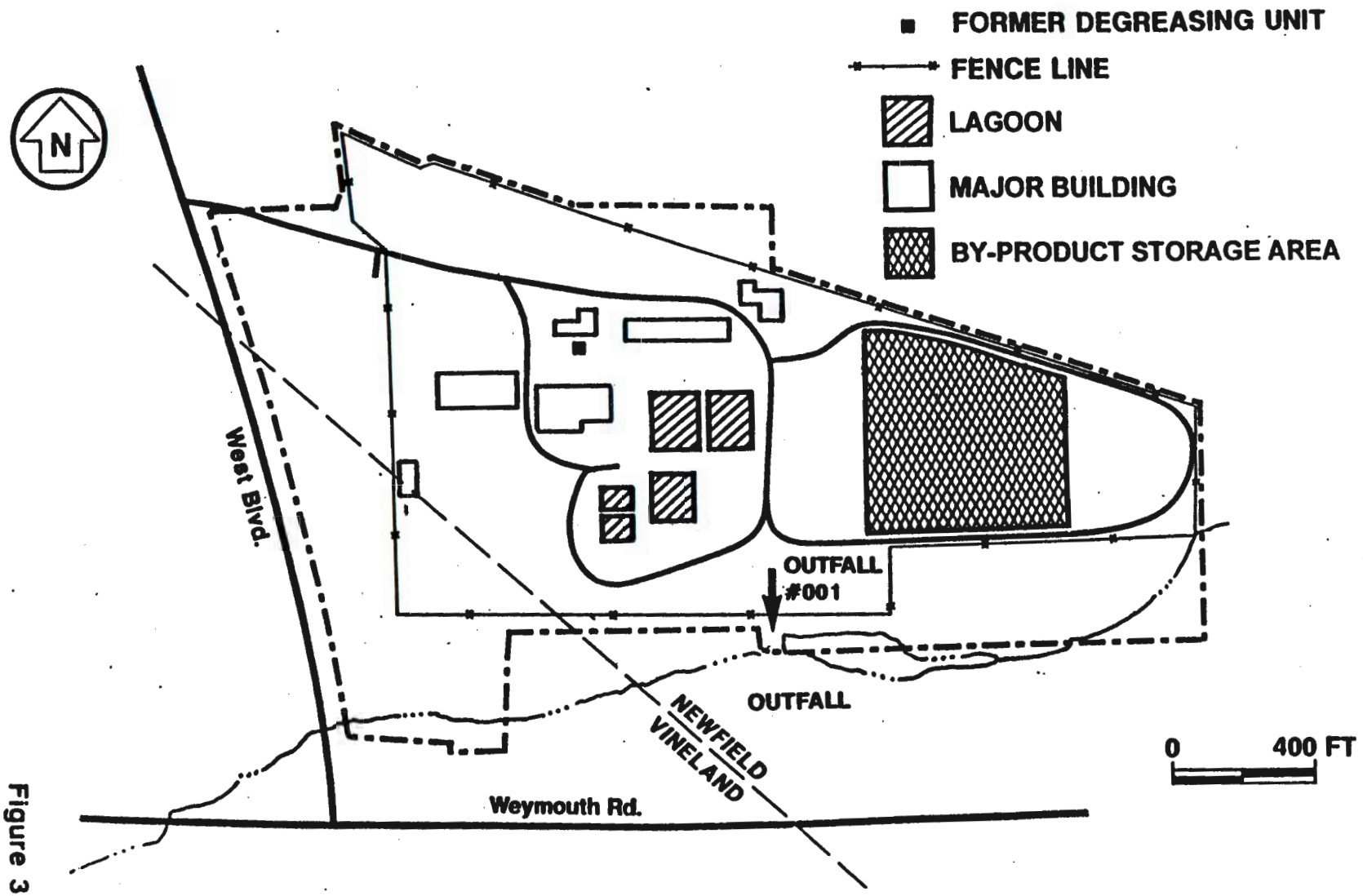


Figure 3.

Well Restriction Area

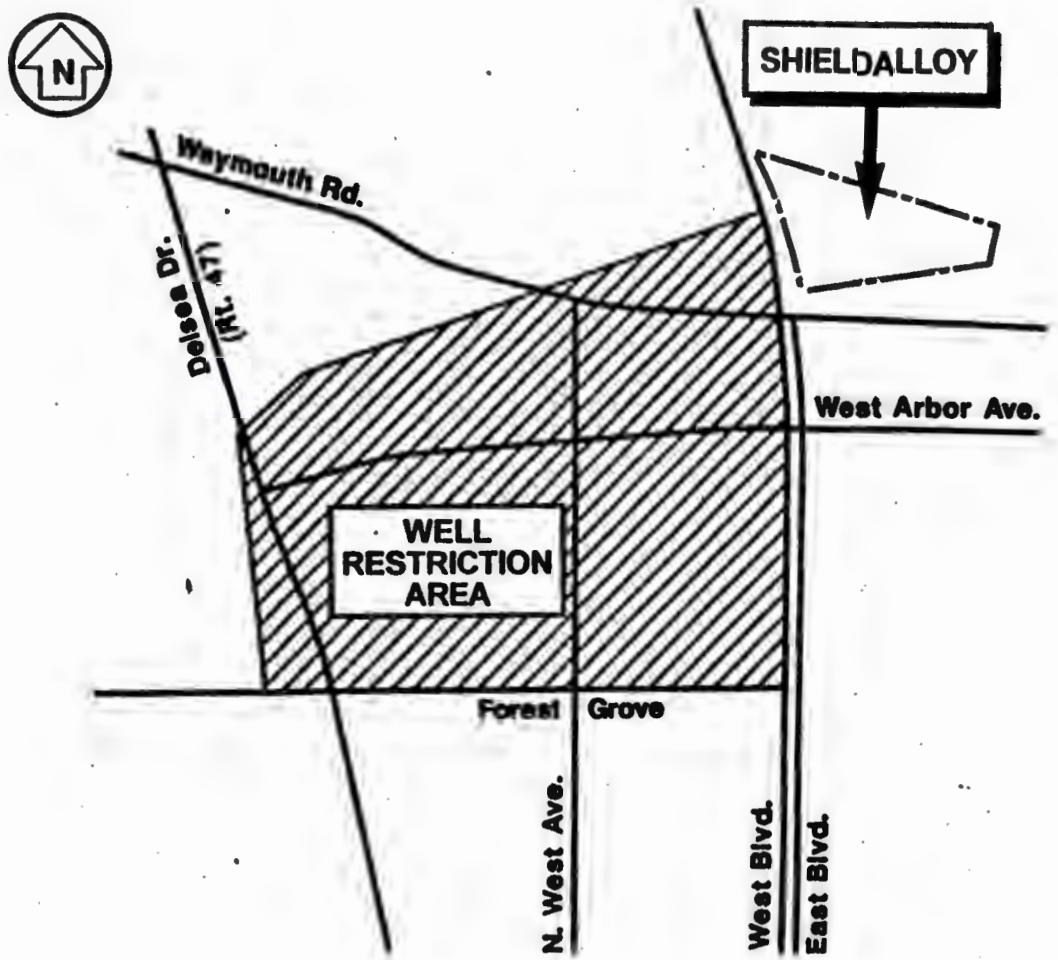


Figure 4.

Existing Extraction, Treatment and Discharge Plan

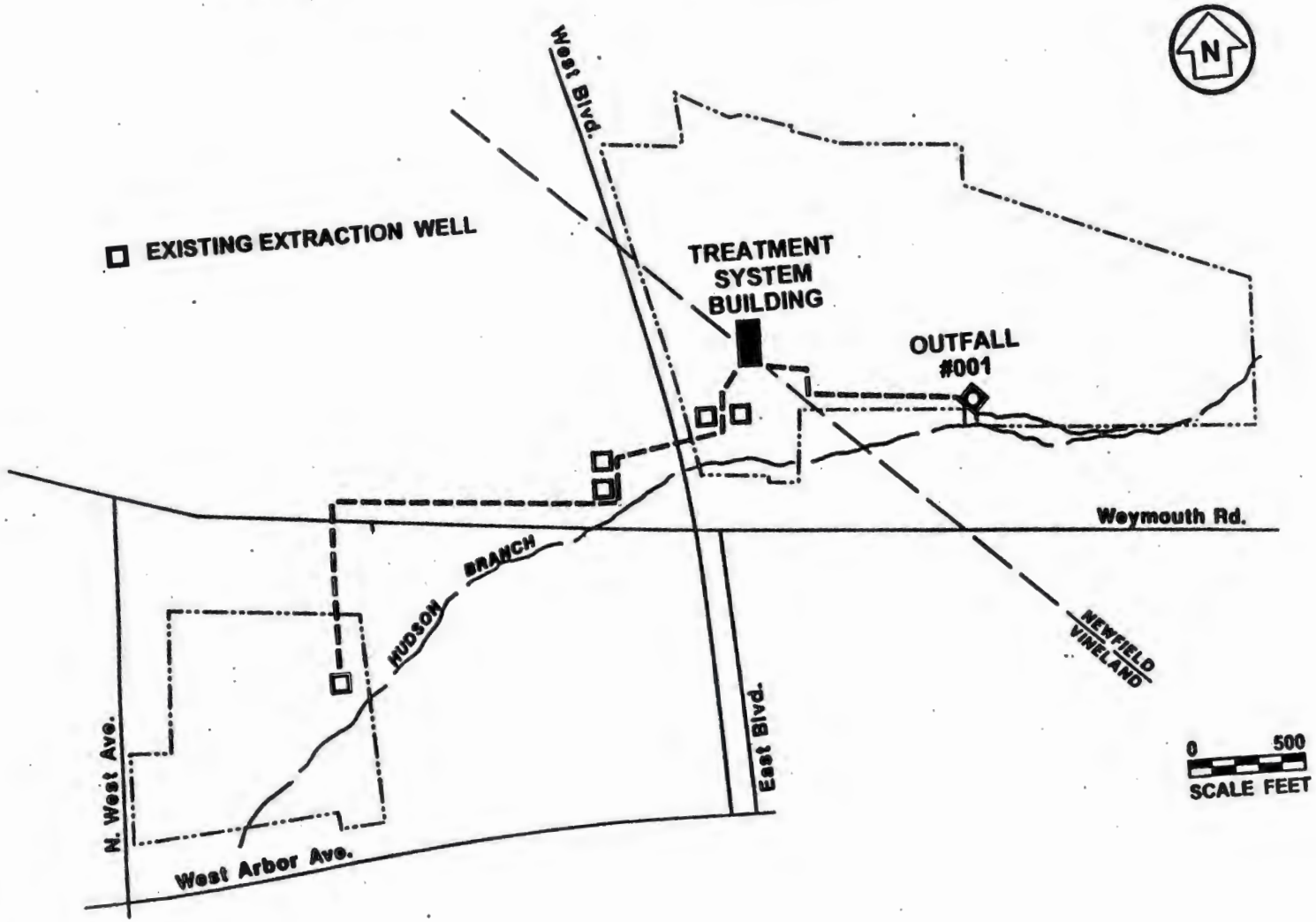
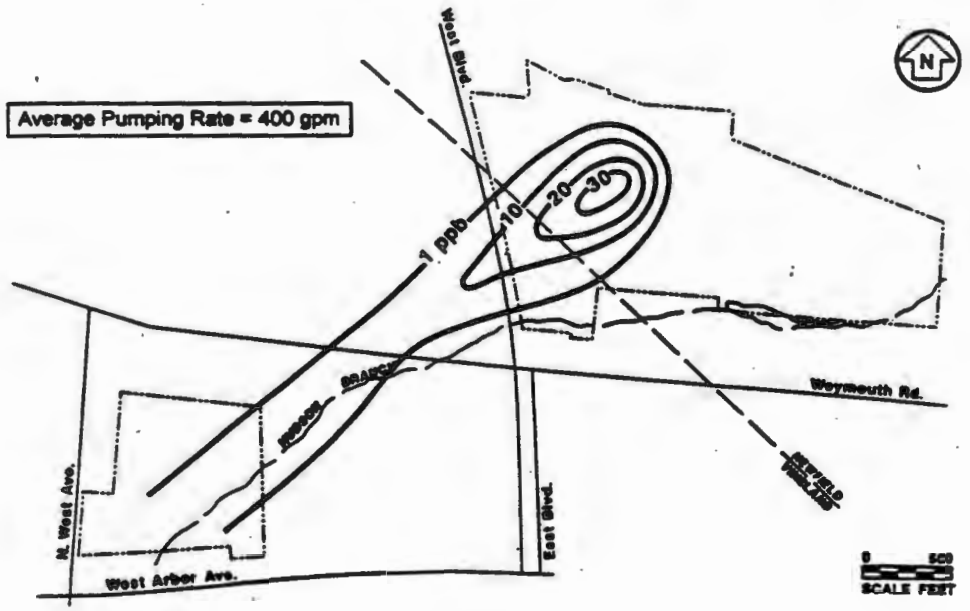


Figure 5.

Extent of TCE Plume - Shallow Aquifer, April 1995



Extent of TCE Plume - Deep Aquifer, April 1995

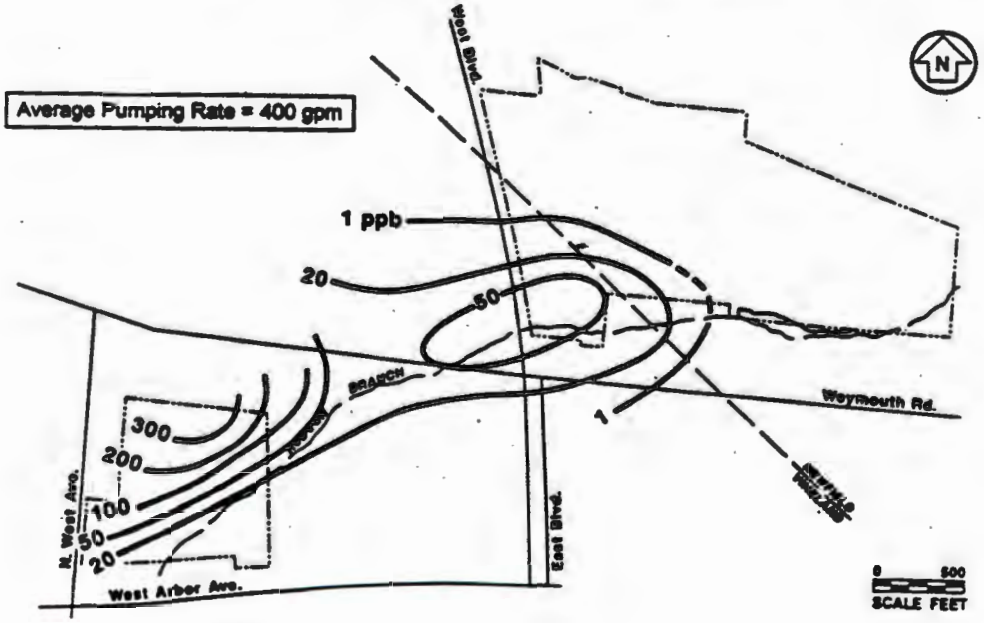
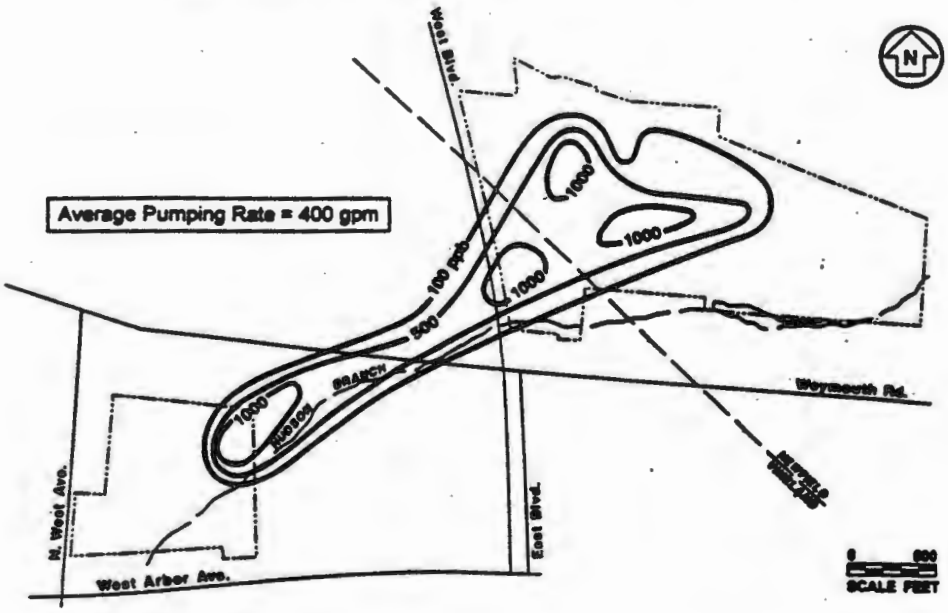


Figure 6.

Extent of Chromium Plume - Shallow Aquifer, April 1995



Extent of Chromium Plume - Deep Aquifer, April 1995

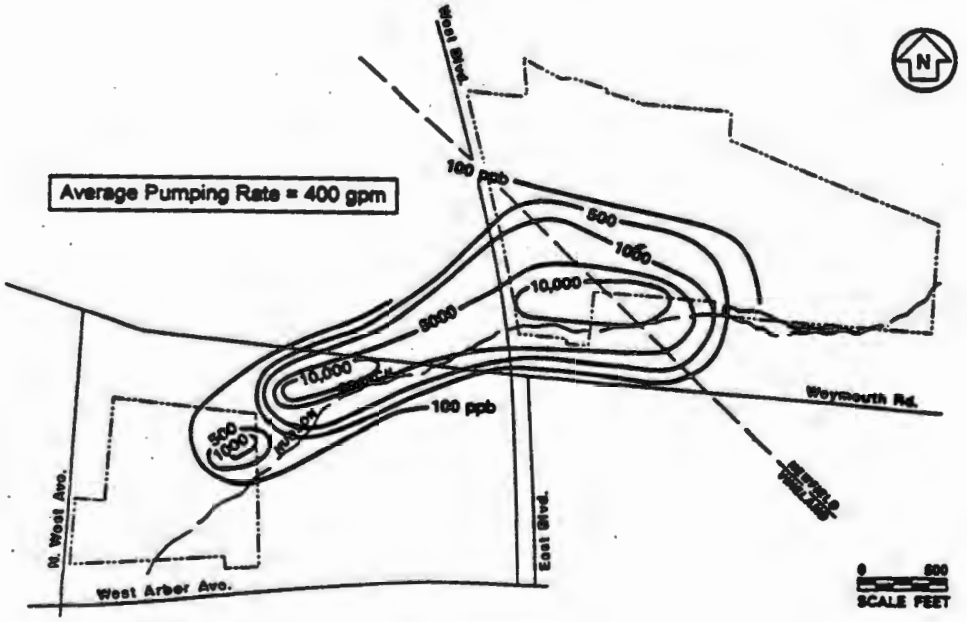


Figure 7.

Risk Assessment Scenario 3
Monitoring Well Locations

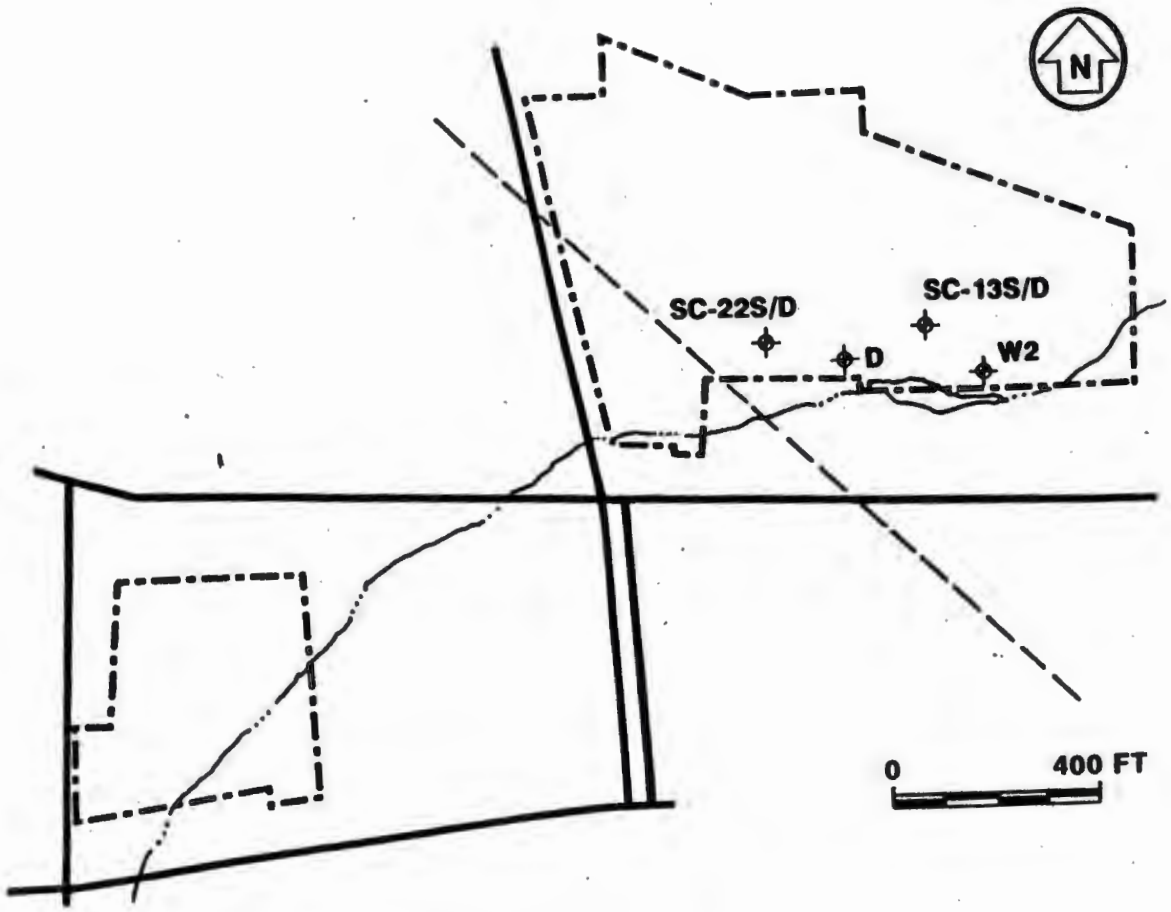


Figure 8.

Modified Extraction, Treatment and Discharge Plan

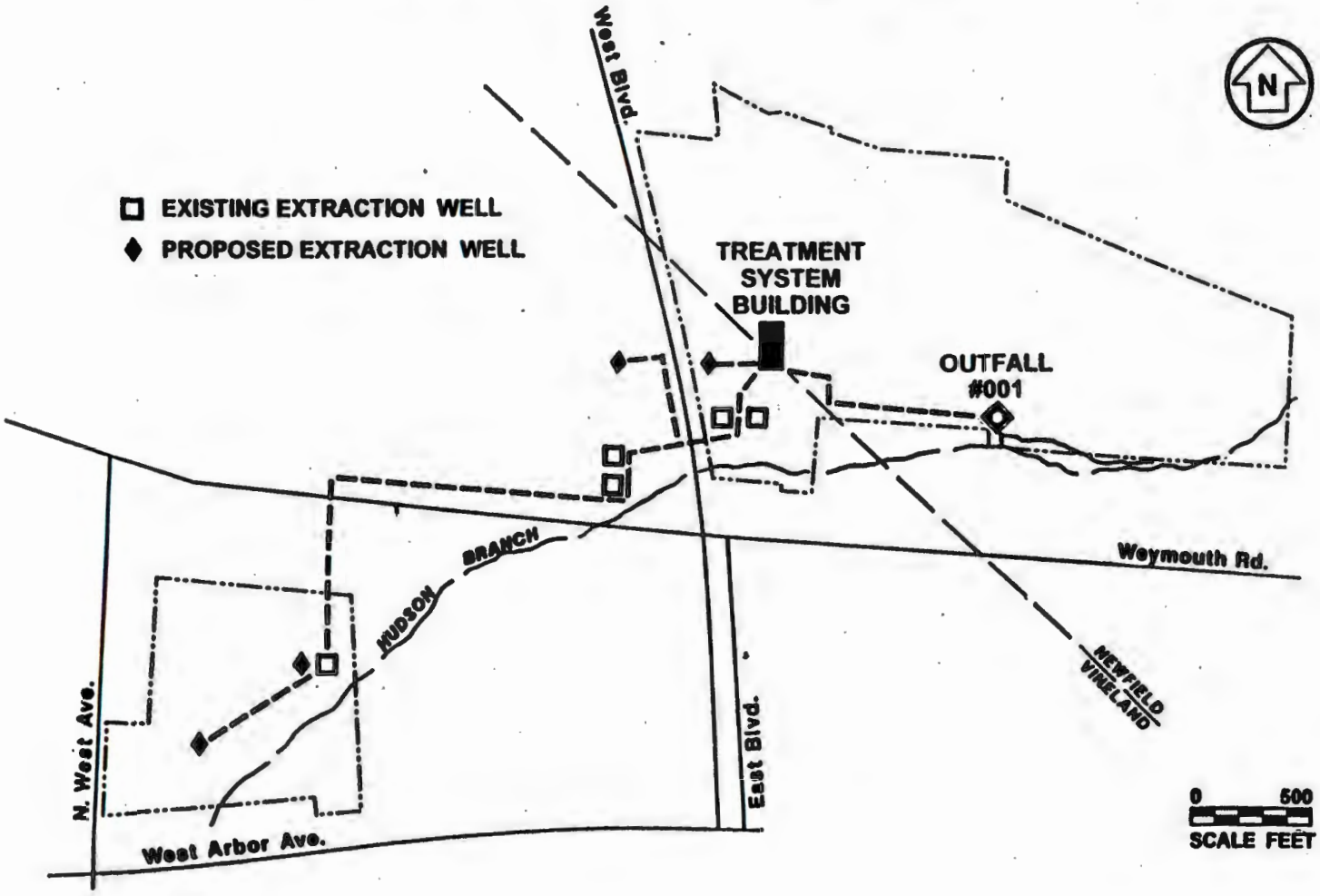


Figure 9.

TABLES
GROUND WATER OPERABLE UNIT
Shieldalloy Corporation
Newfield Borough, Gloucester County, New Jersey

TABLE 1

GROUND WATER CONTAMINANTS OF CONCERN
SHIELDALLOY CORPORATION

Inorganics	Volatile Organics	Base Neutral/Acids
Aluminum	Trichloroethene	Bis(2-ethylhexyl)phthalate
Antimony	Tetrachloroethene	
Arsenic		
Barium		
Beryllium		
Cadmium		
Chromium III		
Chromium VI		
Cobalt		
Copper		
Lead		
Manganese		
Mercury		
Nickel		
Selenium		
Silver		
Vanadium		
Zinc		
Cyanide		
Boron		
Strontium		
Titanium		

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TABLE 3

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
FOR THE GROUND WATER REMEDIAL ACTION
SIIIELDALLOY CORPORATION

CHEMICAL-SPECIFIC ARARS (Also see Table 4)

A Safe Drinking Water Act
Maximum Contaminant Levels (MCLs) [40 CFR 141.11 -.16, and 141.60-.63)
Federal maximum permissible contaminant levels allowable for public water systems; applicable to the remediation of ground water

A NJ Safe Drinking Water Act
NJ Maximum Contaminant Levels [N.J.A.C. 7:10-5 and -16]
State maximum permissible contaminant levels allowable for public water systems; applicable to the remediation of ground water

A NJ Water Pollution Control Act
NJ Ground Water Quality Standards [N.J.A.C. 7:9-6]
State-designated levels of constituents which, when not exceeded, will not prohibit or significantly impair a designated use of water; applicable to the remediation of ground water

A NJ Water Pollution Control Act
NJPDES Discharge to Surface Water Permit Conditions [N.J.A.C. 7:14A-3]
State-designated maximum contaminant levels in treated ground water discharge

LOCATION-SPECIFIC ARARS

No location-specific ARARs were identified as being applicable to the ground water remedial action

ACTION-SPECIFIC ARARS

A Clean Water Act
Ambient Water Quality Criteria [40 CFR 131.36(b)(1)].
Federal surface water quality standards; applicable in the determination of surface water discharge limitations

A NJ Water Pollution Control Act
NJPDES Permit/Discharge Requirements [N.J.A.C. 7:14A-2.1]
State standards for discharges to surface water; applicable to the discharge of treated ground water to surface water

TABLE 3 (Continued)

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMIENTS
FOR THE GROUND WATER REMEDIAL ACTION
SHIELDALLOY CORPORATION

A NJ Water Pollution Control Act
Ground Water Quality Standards [N.J.A.C. 7:9-6.6]
Procedures and standards for the establishment of a Classification Exception Area

A Clean Air Act
New Source Performance Standards [40 CFR 60, Subpart A]
National Emissions Standards for Hazardous Air Pollutants [40 CFR 61, Subpart A]
Federal standards for sources of emissions such as an air stripping system; applicable if VOC levels in extracted ground water increase and cause air emissions to exceed acceptable levels

A NJ Air Pollution Control Act
Air Pollution Control Regulations [N.J.A.C. 7:27-8 and -16]
State requirements for sources of emissions such as an air stripping system; applicable if VOC levels in extracted ground water increase and cause air emissions to exceed acceptable levels

A NJ Water Supply Management Act
General Water Supply Management Regulations [N.J.A.C. 7:19-1.4, 1.5, 1.6(b) and 2.2]
Well Drilling Permits [N.J.S.A. 58:4A-14]
Well Certification Forms [N.J.A.C. 7:8-3.11]
State regulations governing the extraction of ground water at a rate which exceeds 100,000 gallons per day and the drilling and construction of new wells; applicable to the operation of the ground water extraction system at a rate of approximately 400 gpm and to the installation of additional ground water extraction wells

A NJ Solid Waste Management Act
NJ Hazardous Waste Regulations [N.J.A.C. 7:26-8.5]
Procedures for waste classification of the residuals (sludges) from the ground water treatment system

A Resource Conservation and Recovery Act
Identification and Listing of Hazardous Waste [40CFR 261]
Procedures for waste classification of the residuals (sludges) from the ground water treatment system

TABLE 4

CHEMICAL-SPECIFIC GROUND WATER ARARS
SHIELDALLOY CORPORATION

	Federal ARARS (ppb)	State ARARS (ppb)	
Parameter	MCL (1)	NJMCL(2)	GWQS(3)
VOLATILE ORGANICS			
1,1-Dichloroethene	7	2	2
1,2-Dichloroethene (total)	70(a)	10(a)	10(a)
	100(b)	10(b)	100 (b)
Trichbroethene	5	1	1
Benzene	5	1	1
Toluene	1000		1000
Xylene (total)	10,000	44	40
Tetrachloroethene	5	1	1
INORGANICS			
Aluminum			200
Arsenic	50	50	8
Beryllium	4		20
Cadmium	5	5	4
Chromium (total)	100	100	100
Cyanide	200		200
Iron			300
Mercury	2	2	2
Manganese			50
Sodium			50000
Nickel			100
Lead	15*		10
Antimony	6		20
Selenium	50	50	50
Chloride			250000
Fluoride			2000
Nitrate	10,000	10,000	10000
Sulfate	Deferred		250000

(1) MCL - Maximum Contaminant Level. National Primary Drinking Water Regulations, Final Rule
(2) Maximum Contaminant Level for Drinking Water; NJ Safe Drinking Water Act, NJAC 7:10-16.7
(3) Ground Water Quality Standards; based on Class II-A ground water; NJAC 7:9-6.1 et seq.
(a) cis-1,2-Dichloroethene
(b) trans-1,2-Dichloroethene