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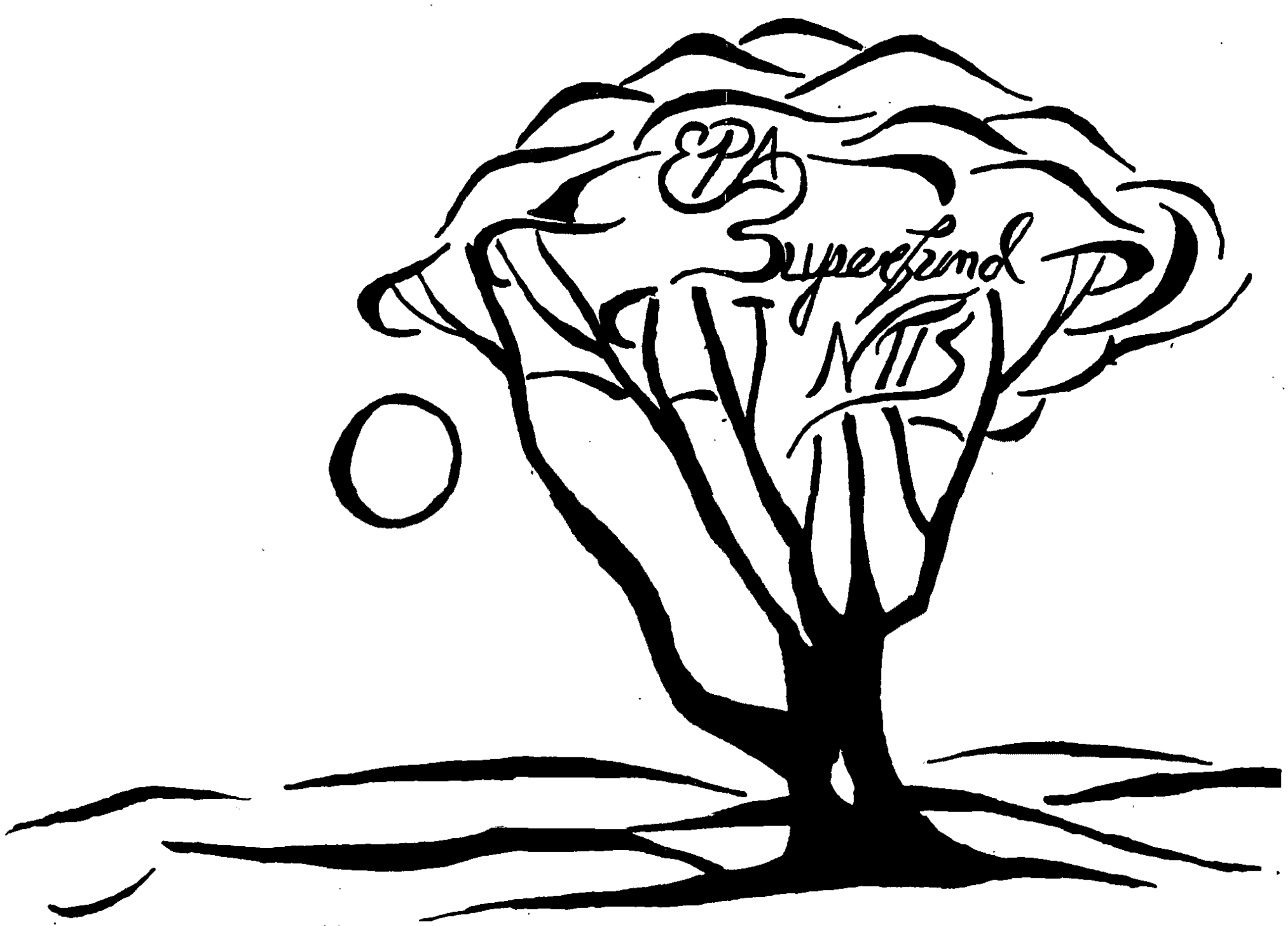
EPA Superfund Record of Decision:

Cortese Landfill Site, Narrowsburg, NY 9/30/1994



RECORD OF DECISION

Cortese Landfill Site

Narrowsburg, Sullivan County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1994

DECLARATION FOR THE RECORD OF DECISION

SITE NAME AND LOCATION

Cortese Landfill Site
Town of Narrowsburg
Sullivan County, New York

STATEMENT OF BASIS AND PURPOSE

This Record of Decision ("ROD") documents the U.S. Environmental Protection Agency's (EPA's) selection of the remedial action for the Cortese Landfill Site in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document summarizes the factual and legal basis for selecting the remedy for this Site.

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy (see Appendix IV).

An administrative record for the Site contains the documents that form the basis for EPA's selection of the remedial action, the index for which is attached as Appendix III.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from the Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The primary objectives of this remedy is to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and environmental impacts.

The major components of the selected remedy include the following:

- A low permeability cover system meeting the requirements of Title 6, NYCRR Part 360-2.15.b for the landfill. This landfill cap, along with storm-water management improvements, will further reduce infiltration of storm water into the landfill and reduce leachate generation thus mitigating impacts to ground water.

- The removal and off-site treatment and/or disposal of the intact-drum disposal areas on the landfill property. Any contaminated soil beneath these drum disposal areas may potentially be removed at this time as well. Refuse overlying the drums would be placed back into the landfill. Drum removal reduces the volume of contaminated material at the Site, thus further decreasing the potential for future impacts to ground water.

- Extraction of contaminated ground water from the landfill through a series of wells aligned along the western (downgradient) perimeter of the landfill. The conceptual treatment process for ground water includes aeration, clarification/filtration, and air stripping. Contaminated ground water will be pumped from the extraction wells at rates that will allow for coordinating an expeditious ground-water remediation. The exact number, depth, pumping rates, and location of extraction wells will be determined during RD. The pumping will continue until MCLs are achieved in the aquifer downgradient of the landfill or until technical impracticability is demonstrated.

- Discharge of treated ground water to the existing Town of Tusten wastewater treatment plant outfall or to the Delaware River, or reinjection to ground water. The specific discharge point will be determined during RD.

- Regrading and storm-water management improvements at the landfill. This component of the remedial action will reduce infiltration of storm water into the landfill and reduce leachate generation, thus reducing impacts of landfill-related contamination to ground water.

- Institutional controls recommended to appropriate authorities. Institutional controls will be recommended in order to protect the integrity of the landfill cover system, to reduce potential exposure to landfill contents, and to reduce the potential future use of ground water within the plume area. Institutional controls may include deed restrictions or other recommendations as appropriate.

- Long-term ground water and surface water monitoring to evaluate the alternative's effectiveness. It is anticipated that monitoring will be conducted on a quarterly basis for the first five years, and then on an annual basis for the duration of the alternative. Monitoring will include several surface water sampling stations west of the embankment, a network of ground-water monitoring wells, and the treated ground-water effluent discharge, all sampled for VOCs, SVOCs, metals, and municipal solid waste leachate indicator parameters. The exact long-term ground-water monitoring program will be determined during remedial design.

- Implementation of long-term maintenance and operation of the landfill cap and ground-water extraction/treatment system to provide for inspections and repairs.

- Reevaluation of Site conditions at least once every five years to determine if a modification of the selected alternative is necessary.

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 technologies to the maximum extent practicable, given the scope of the action. The remedy satisfies the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants at a site. Despite this, hazardous substances, pollutants, or contaminants will remain on-site above health-based levels because the entire landfill mass itself cannot be effectively excavated and treated because of its size. Hence, a review of the remedial action will be conducted at least once every five years after the initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Jeanne M. Fox

Jeanne M. Fox
Regional Administrator

Date 9/30/94

RECORD OF DECISION
DECISION SUMMARY

Cortese Landfill Site

Narrowsburg, Sullivan County, New York

United States Environmental Protection Agency
Region II
New York, New York
September 1994

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ATTACHMENTS

SITE NAME, LOCATION AND DESCRIPTION

The Cortese Landfill Site (the "Site") is located within the Town of Tusten, Sullivan County, New York. The former Cortese Landfill property (the "Landfill") is bounded to the northeast by a steep bedrock escarpment and to the southwest by the Conrail railroad embankment. The northern edge of the Site lies approximately 70 feet south of the Narrowsburg Waste Water Treatment Plant. A small borrow pit (White's Pond) and a small backwater area (the embayment) along the eastern shoreline of the Delaware River are located about 800 feet southwest of the Landfill. The Landfill property boundary encompasses approximately 3.75 acres of land owned by the John Cortese Construction Corp. and another 1.53 acre parcel along the northern margin of the Cortese property owned by the Town of Tusten, which purchased the property from Mr. Cortese in 1973. A Site location map is provided on Figure 1.

On the Landfill side of the railroad embankment, areas to the southeast, east, and northeast are wooded and used for hunting. Areas on and south of the Landfill are seasonally flooded as a result of perched water conditions. In addition, there are several small wetland parcels in the immediate area of the Landfill. An unpaved road between the Landfill and the embankment is used by Conrail employees for access to the railroad tracks.

Six residences and the Narrowsburg Diesel Garage are located between the embankment and the Delaware River. These properties are accessed by Delaware Drive, a paved road which dead ends toward the south at a cul-de-sac. Beyond the residences, and approximately 250 feet southwest of the railroad embankment, lies the Delaware River. The National Park Service classifies the Delaware River in the vicinity of the Site as a Wild and Scenic River. The river in this area is used primarily for recreational boating and fishing. A Site layout map is provided on Figure 2.

The Narrowsburg public water supply is currently provided by a well installed in April 1994 (Town Well #3). This well is located approximately one mile east of the Landfill. Two secondary wells in this system are located approximately 750 feet northwest and approximately one-half mile north-northwest of the Landfill (Town Wells #1 and #2, respectively). Town Well #1 is currently used to supplement the public water supply provided by Well #3. Town Well #2 was removed from service in 1994 due to contamination from an unrelated source. All three wells are hydraulically upgradient of the Site and are thus not affected by site-related contamination.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

The Landfill portion of the Site, which was initially called the Tusten Landfill, received municipal waste at an estimated rate of 3,000 cubic yards per year, from approximately July 1970 to July 1981. Disposal practices at the Landfill were poorly documented, hence records regarding the types and volume of waste received are essentially non-existent. For a six month period in 1973, however, drummed industrial wastes were apparently received at the Site, most of which were transported by Gaess Environmental Services, Inc. (purchased thereafter by SCA Services, Inc. or "SCA"). These wastes apparently included drums containing paint thinners and sludge, solvents, dyes, waste oil, and other petroleum waste products. Disposal is believed to have included the burial and/or emptying of drums in trenches and the emptying of tanker trucks into one of two septage lagoons. The other lagoon was allegedly used exclusively for the disposal of residential septage sludge. A Draft Environmental Impact Statement for the Tusten Landfill (Fink, 1979) was submitted to the New York State Department of Environmental Conservation ("NYSDEC") in order to fulfill part of the data requirements necessary to complete a permit filed by the John Cortese Construction Corp. in order to continue to operate the Landfill. The report concluded that a need existed for the continued operation of the Landfill, and it recommended ground-water monitoring to determine potential adverse effects from previous disposal practices. Subsequent ground-water monitoring revealed elevated concentrations of volatile and semi-volatile compounds. Based on the results of this monitoring, the Site was placed on the National Priorities List ("NPL") in June 1986.

In 1985, New York State and the Town of Tusten filed an action in Federal Court against John Cortese and SCA. As a result of this action, SCA voluntarily entered into a stipulation agreement with NYSDEC to conduct a remedial investigation and feasibility study ("RI/FS") at the Site. Golder Associates was retained by SCA to implement activities stipulated in the agreement. A Phase I RI report was completed in July 1987, followed by a Phase II RI report completed in August 1988.

In April of 1990, after NYSDEC and SCA were unable to agree upon appropriate investigative actions, NYSDEC formally transferred the lead regulatory role to EPA. SCA entered into an Administrative Order on Consent ("AOC") to complete an RI/FS with EPA in September 1990. Completed under this AOC were the following: a test pit program (March 1991); an ecological assessment (May 1992); field sampling, including the sampling of surface soil, subsurface soil, sediment, surface water and ground water (June 1993); a final RI report (March 1994); and a baseline human health and ecological risk assessment (June 1994). A draft FS was received in June 1994.

Sampling at the Site has revealed numerous volatile organic compounds ("VOCs"), most notably toluene, semi-volatile organic compounds ("SVOCs"), primarily polycyclic aromatic hydrocarbons ("PAHs"), and metals detected at varying concentrations in Site media.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The RI report, FS report, Risk Assessment and the Proposed Plan for the Site were released to the public for comment on July 29, 1994. These documents were made available to the public at two information repositories maintained at the Tusten-Cochecton Library in Narrowsburg, New York and at the EPA Region II Office in New York City. The notice of availability for the above-referenced documents was published in the Sullivan County Democrat on July 29, 1994. The public comment period on these documents was held from July 29 to August 27, 1994. In addition, over the last four years EPA has conducted numerous public meetings and maintained contact with local concerned groups as well as the community at large.

On August 16, 1994, EPA conducted a public meeting at the Tusten Town Hall to inform local officials and interested citizens about the Superfund process, to present the Proposed Plan for the Site, including the preferred alternative for remediation of the Site, and to respond to any questions from area residents and other attendees. The comments received at the public meeting generally focused on drinking water contamination, implementation schedule, and Site-related risks. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF RESPONSE ACTION

The primary objectives of the selected action are to remove the intact-drum disposal areas, control the source of contamination at the Site, and reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

For the aquifer beneath the Site, the final remediation goals will be to restore the groundwater to drinking water standards. EPA does not expect that the ground water beneath the Landfill will ever achieve these standards. The aquifer downgradient of the Landfill, however, may achieve drinking water standards upon implementation of one of the alternatives described below. It is also recognized, however, that the final selected remedy may not achieve these standards because of potential technical difficulties associated with removing contaminants from ground water in order to clean that ground water to drinking water standards. The results of the selected remedy will be monitored carefully to determine the feasibility of achieving the remediation goals. The remedial action may require continuous pumping, pulsed pumping, and flexibility in placing pumping wells at strategic locations.

In addition, the Town of Tusten has agreed to conduct a removal action at the Site pursuant to an EPA Administrative Order on Consent signed July 25, 1994. This removal action will address two septage lagoons as well as require the construction of a drainage swale. Levels of contamination in the soil, sediment, and sludge materials within the septage lagoons were found to be significant enough to warrant expedited removal. Additionally, construction of a drainage swale between the Landfill and the escarpment will divert storm water run-off away from the Landfill in order both to aid in the drying of the waste mass and to reduce leachate generation.

SUMMARY OF SITE CHARACTERISTICS

This section summarizes the findings of the RI. A summary of the analytical data collected for the Site, listed by chemical and medium, can be found in Appendix II.

The RI was conducted in three phases. RI sampling was conducted on and around the Site in the following media: surface water, sediment, surface and subsurface soils, soil gas, and ground water.

Twenty-one (21) **surface soil samples** were collected during the RI. VOCs were not detected in surface soils. Trace concentrations of SVOCs (including benzoic acid, phenanthrene, fluoranthene, pyrene, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate) were randomly detected. Elevated concentrations of SVOCs were detected in only one sample at the north end of the Landfill. This location is associated with surface disposal of building debris resulting from a local fire. Several pesticides (heptachlor epoxide, dieldrin, and endosulfan II) were detected at trace concentrations in the vicinity of the septage lagoons. Several metals were detected at concentrations above background levels. Background levels were determined by taking samples at off-site locations. Surface soil sampling data is summarized in Table 1.

Fifteen (15) **subsurface soil** and waste samples were collected, three during the Phase II RI, nine from the March 1991 test pit investigation, and three from borings in the two septage lagoons during the Phase III RI. Elevated concentrations of VOCs, SVOCs, and metals were detected in subsurface soil samples during the test pit program around buried drums under municipal solid waste within the Landfill and in subsurface soil samples collected from the septage lagoons. The highest concentrations of VOCs (including trichloroethene ("TCE"), perchloroethene ("PCE"), toluene, ethylbenzene, and xylene) and SVOCs (predominantly PAHs) were detected in the eastern septage lagoon (sample SL-01). Total VOCs in the eastern septage lagoon were detected at 1,190,000 micrograms per kilogram (ug/kg) and total SVOCs were detected at 725,000 ug/kg. Low levels of pesticides (dieldrin, beta-BHC, 4,4'-DDE, 4,4'-DDD, endrin ketone and gamma chlordane) were also detected in subsurface soils in the septage lagoons. Polychlorinated biphenyls ("PCBs") were not detected in any subsurface soil samples. Several metals were detected at concentrations which were higher in concentration than those detected in surface soil background samples, especially those samples collected from the septage lagoons. Subsurface soil sampling data is summarized in Table 2. Subsurface soil data indicate that the Landfill is the source of contaminants detected in downgradient ground water because subsurface soil samples and ground-water samples contain many of the same constituents.

Water table contour maps were generated to interpret the direction of ground-water flow. The predominant ground-water flow direction is to the southwest, toward (but oblique to) the Delaware River. The direction of ground-water flow is consistent with the topography in the western and southern directions.

It is important in understanding contaminant migration mechanisms to note that the railroad embankment forms a north-south physical barrier approximately 15 feet high between the area of the Landfill and the land and river area to the west. For this reason the sole transport mechanism between the Landfill and downgradient areas of concern across the embankment (i.e., White's Pond, the embayment, and the Delaware River) is by ground water.

A conceptual groundwater flow system was developed for the area of the Site. The Site lies on alluvial deposits within the Delaware River valley. These alluvial deposits are predominantly sand and gravel overlain by fine-grained floodplain deposits which cause perched groundwater conditions and surficial ponding of water in areas of poor drainage. Throughout the entire thickness of unconsolidated sediments, water occurs under water table conditions. The saturated aquifer thickness is approximately 80 feet. Discontinuous lenses of fine-grained deposits occur locally in the sand and gravel, but the sequence of overburden sediments can be considered to be one unconfined hydrogeologic unit. Bedrock forms a second, deeper hydrogeologic unit. Bedrock escarpments rise approximately 400 feet above both sides of the river. Groundwater flows through fractures in the bedrock from these topographic highs to the topographic low (the river) through the overburden sediments. The Delaware River is, therefore, the discharge boundary for the valley. Groundwater flow in the overburden sediments in the Site vicinity is predominantly horizontal to the southwest (i.e., toward the river) at an average velocity of about 25 feet per year (maximum 75 feet per year), but can have a significant vertical component at some locations during the wet season (winter and spring).

The upper sand and gravel unit is a preferential pathway for groundwater flow from the Site to the Delaware River because it is located just below the water table and has a hydraulic conductivity seven times higher than geometric mean for the entire aquifer as a whole, yielding a calculated flow velocity of 167 feet per year (500 feet per year maximum).

Sixty-two (62) **ground-water** samples from seventeen (17) monitoring wells and Tusten Well #1 (one of the three public water supply wells for the Town) were collected over the three phases of the RI. Eleven (11) wells at six (6) locations both on and downgradient of the Landfill revealed levels of VOCs, SVOCs, and metals exceeding the current Federal Safe Drinking Water Act and/or New York State Public Water Supply Maximum Contaminant Levels ("MCLs"), the majority of contamination being in the MW-1 area. Monitoring well MW-1B exhibited the highest concentration of contaminants with levels of total VOCs detected at 16,840 micrograms per liter (ug/l) and total SVOCs at 1,990 ug/l in the July 1989 sampling event. More recent data shows MW-10 to be the most heavily contaminated with levels of 2,050 ug/l total VOCs and 142 ug/l of total SVOCs. Ground water total organic contaminant levels from all sampling events are summarized on Figure 3. VOCs include aromatic hydrocarbons, chlorinated aromatic hydrocarbons, trihalomethanes, chlorinated alkanes/alkenes, ketones, and sulfides; SVOCs include phenols, chlorinated aromatic compounds, PAHs, phthalates and miscellaneous compounds; and metals include arsenic, chromium, cobalt, lead, and zinc. Cyanide, pesticides, and PCBs were not detected above background concentrations. Note that no Site-related contaminants were found in Tusten Well #1 during any round of sampling. Ground-water sampling data for all parameters is summarized in Table 3.

Ground-water data indicate that Site-related contaminants occur in a plume approximately 1,300-feet wide. The Landfill is approximately 400 feet from the river. Ground-water impacts are found in shallow zones adjacent to the western edge of the Landfill and in both shallow and deeper zones downgradient. The majority of contamination was detected in monitoring wells immediately adjacent to the Landfill (i.e., east of the embankment). By comparison, levels in monitoring wells located within the plume area, approximately 200 feet downgradient (west of the embankment), were generally one-tenth or less of those in the monitoring wells east of the embankment. Significantly lower contaminant levels in the downgradient wells indicate that natural attenuation and/or dilution affects the degree of contamination over relatively short distances.

Twenty-four (24) **surface water** samples were analyzed. Samples were collected from surface water on the Landfill side of the railroad embankment and from White's Pond, the embayment, and the Delaware River west of the railroad embankment. Note that no elevated concentrations of pesticides or PCBs have been detected in any surface water samples. Of all surface water samples collected from the Landfill side of the railroad embankment, elevated concentrations of contaminants were detected only near the septage lagoons. Contaminants include the VOCs 1,1-dichloroethane (1,1-DCA), TCE, and xylene; the SVOCs phenol and 4-methylphenol; and the metals iron and manganese. As no elevated concentrations were detected anywhere other than this area, it is concluded that the

Landfill does not affect surface water on this side of the railroad embankment and that the septage lagoons comprise a localized impact.

All three areas sampled west of the railroad embankment reported the presence of Site-related contaminants. In White's Pond, no VOCs, low levels of SVOCs (isophorone, phenol, and pentachlorophenol, none above state and federal standards) and elevated levels of two metals (iron and manganese) were present. In the embayment, VOCs (including 1,1-DCA and TCE, slightly over state standards), low levels of several SVOCs (only dichlorobenzenes were slightly above state standards), and metals (including manganese, iron, and arsenic above state and federal standards) were detected. In the Delaware River, VOCs (including 1,1-DCA, TCE, and benzene, slightly over state standards), SVOCs (only dichlorobenzenes were slightly above state standards), and select metals (including antimony and arsenic above state and federal standards) were detected. Surface water sampling data is summarized in Table 4.

Thirty (30) **sediment** samples were collected from 25 locations, including White's Pond, the embayment, and the Delaware River. Twenty-six (26) of these samples were collected during Phase III. Note also that no federal or state standards exist for contaminants in sediment. In White's Pond, no VOCs, low levels of SVOCs (1,4-dichlorobenzene and 4-methylphenol) and metals (including antimony and cadmium) were present. In the embayment, VOCs (including 1,1-DCA and TCE), low levels of several SVOCs (including dichlorobenzenes and 4-methylphenol), and metals (including antimony and cadmium) were detected. In the Delaware River, VOCs (including 1,1-DCA and benzene), SVOCs (dichlorobenzenes and 4-methylphenol), and metals (including antimony, arsenic, cadmium, and mercury) were detected. Sediment sampling data is summarized in Table 5.

Note that White's Pond, the embayment, and the Delaware River are all subject to both seasonal and periodic flooding, hence the most representative surface water and sediment data is probably reflected in samples collected during the most recent sampling rounds.

One hundred seventy-four (174) **soil gas** samples were analyzed from fifty-four (54) locations on the eastern and western sides of the embankment. In general, higher total VOC concentrations were reported at the sample locations at or adjacent to the Landfill. This data was used in an EPA-generated model to determine the significance of potential residential indoor air concentrations of Landfill-related soil gas. Results of this modelling effort indicate that the calculated levels of potential residential indoor air were 1000 times lower than a concentration that would be of concern. Soil gas sampling data and the calculated indoor air values from this model are summarized in Table 6.

SUMMARY OF SITE RISKS

EPA conducted a baseline risk assessment to evaluate the potential risks to human health and the environment associated with the Site in its current state. The Risk Assessment focused on contaminants in the surface soil, subsurface soil, ground water, surface water, and sediments which are likely to pose significant risks to human health and the environment. A summary of the contaminants of concern in sampled matrices is listed in Table 7.

Human Health Risk Assessment

EPA's baseline risk assessment addressed the potential risks to human health by identifying several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Exposures were assessed for both potential present and future land use scenarios. The health effects which could result from exposure to contamination as a result of current land use were assessed for incidental ingestion of on-site surface soil and sediment, dermal contact with sediment and surface water, and inhalation of VOCs associated with soil gas and surface water. Trespassers, residents, children, and recreationists were considered under current land use conditions. For future land use scenarios, the following exposure routes were considered for hypothetical residents: ingestion, inhalation, and dermal contact with ground water; ingestion and dermal contact with surface soil and sediment; and inhalation of ambient air. While ingestion of groundwater was assessed under future land use, this medium was not assessed under the current land use scenario as all residences potentially affected by site contaminants are connected to the public water supply. A summary of exposure pathways is presented in Table 8. Reasonable maximum exposures were evaluated for all scenarios. The data used to calculate reasonable maximum exposures is listed in Table 9.

Under current EPA guidelines, the likelihood of carcinogenic (cancer-causing) and noncarcinogenic effects as a result of exposure to Site chemicals are considered separately. It was assumed that the toxic effects of the Site-related chemicals would be additive. Thus, carcinogenic and noncarcinogenic risks associated with exposures to individual compounds of concern were summed to indicate the potential risks associated with mixtures of potential carcinogens and noncarcinogens, respectively.

Noncarcinogenic risks were assessed using a hazard index ("HI") approach, based on a comparison of expected contaminant intakes and safe levels of intake (Reference Doses). Reference doses ("RfDs") have been developed by EPA for indicating the potential for adverse health effects. RfDs, which are expressed in units of milligrams/kilogram-day (mg/kg-day), are estimates of daily exposure levels for humans which are thought to be safe over a lifetime (including sensitive individuals). Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water) are compared to the RfD to derive the hazard quotient for the contaminant in the particular medium. The HI is obtained by adding the hazard quotients for all compounds across all media that impact a particular receptor population. An HI greater than 1.0 indicates that the potential exists for noncarcinogenic health effects to occur as a result of Site-related exposures. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media. The reference doses for the compounds of concern at the Site are presented in Table 10. A summary of the noncarcinogenic risks associated with exposure to these chemicals across various exposure pathways is found in Table 11.

It can be seen from Table 11 that the HI for noncarcinogenic effects from the future potential ingestion of Site ground water by area residents is 100, therefore, noncarcinogenic effects may occur under this scenario. The potential noncarcinogenic risk is attributable primarily to manganese, arsenic, and TCE.

Potential carcinogenic risks were evaluated using the cancer slope factors developed by EPA for the contaminants of concern. Cancer slope factors ("SFs") have been developed by EPA's Carcinogenic Risk Assessment Verification Endeavor for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic chemicals. SFs, which are expressed in units of $(mg/kg\text{-}day)^{-1}$, are multiplied by the estimated intake of a potential carcinogen, in mg/kg-day, to generate an upper-bound estimate of the excess lifetime cancer risk associated with exposure to the compound at that intake level. The term "upper bound" reflects the conservative estimate of the risks calculated from the SF. Use of this approach makes the underestimation of the risk highly unlikely. The SF for the compounds of concern are presented in Table 12. Current federal guidelines for acceptable exposures are an individual lifetime excess carcinogenic risk in the range of 10^{-4} to 10^{-6} (a one-in-ten-thousand to a one-in-one-million excess cancer risk).

The results of the baseline risk assessment indicate that the ground water at the Site poses an unacceptable carcinogenic risk to human health. The risk for hypothetical future residents was estimated to be 2×10^{-3}, which is above the EPA's acceptable risk range. This risk number means that 2 additional persons out of 1000 are at risk of developing cancer if the Site is not remediated. This risk is primarily attributable to vinyl chloride and arsenic.

Under a current land use scenario, the risk for exposure to surface water and sediment by children playing in various areas of the Site was determined to be within EPA's acceptable risk range. The potential carcinogenic risk from the inhalation of Site-related VOCs from ground water emitted into basements was estimated to be 2.4×10^{-10}. The potential carcinogenic risk from direct contact with on-site surface soil/sediments by future hypothetical residents was estimated to be 4.9×10^{-6}. For these exposure pathways, the HIs for noncarcinogenic risks were all below 1.0.

Uncertainties

The procedures and inputs used to assess risks in this evaluation, 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; and
- 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. 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.

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 Risk Assessment provides upper-bound estimates of the risks to populations near the Site, and is highly unlikely to underestimate actual risks related to the Site.

An estimate of central tendency risk can be obtained by substituting average or median values for upper bound values. This is most useful for the exposure pathway which results in the highest estimated carcinogenic or noncarcinogenic risk, i.e., ground-water ingestion.

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 Risk Assessment Report.

The greatest potential future carcinogenic risk attributable to the Site is associated with the ingestion of ground water. The cancer risk is based on current levels of ground-water contaminants. If no action is taken with respect to the Landfill, the continued release of contaminants into Site ground water could result in a greater cancer risk at some point in the future. Additionally, significant noncarcinogenic effects from the potential future ingestion of Site ground water by area residents has also been established in the Risk Assessment. Therefore, based on the results of the Risk Assessment, EPA has determined that actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present a potential threat to public health, welfare, or the environment.

Ecological Risk Assessment

Potential risks to environmental receptors associated with the Site were identified in the ecological risk assessment. The media for which relevant ecological exposure pathways were analyzed included sediment, surface soil, and surface water. The ecological risk assessment identified several small, isolated areas of surface water and sediments as the primary exposure points that may potentially impact local species and sensitive environments. These areas include White's Pond, the embayment, and the shoreline of the Delaware River.

The results of the ecological risk assessment indicate that exposure of ecological receptors to Site-related contaminants is limited to these small areas, and that there has been no apparent effect from Site-related contamination on those potential receptors or their respective habitats. In addition, results of extensive bioassessment studies conducted in the Delaware River and embayment area have revealed no impact on aquatic life. However, surface water and sediment concentrations of metals (primarily arsenic, aluminum, iron, and zinc) and SVOCs (primarily 1,4-dichlorobenzene and pentachlorophenol) could result in adverse acute and/or chronic effects in ecological receptors within these areas. Hence, future exposure to ecological receptors remains a possibility if the Site is not remediated.

In accordance with the New York State Natural Heritage Program, no threatened or endangered species or threatened or endangered species habitats are located on the Site. Additionally, no threatened or endangered species or critical habitats were found within a 1/2 mile radius of the Site. The Bald Eagle is the only federally listed endangered or threatened species known to occur in the vicinity of the Site.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives are specific goals to protect human health and the environment. The primary objectives of this action are to control the source of contamination at the Site and to reduce and minimize the migration of contaminants into Site media thereby minimizing any health and ecological impacts.

The following remedial action objectives were established for the Site:

- to restore the aquifer as a potential source of drinking water by reducing contaminant levels downgradient of the Landfill to the federal and state MCLs;
- to reduce or eliminate the potential for migration of contaminants downgradient of the Landfill;
- to reduce or eliminate the potential for source areas to release hazardous compounds to groundwater;
- to reduce or eliminate any Site-related contaminant load on the Delaware River, the embayment, and White's Pond; and
- to reduce or eliminate Site-related contaminant seeps along the eastern bank of the Delaware River.

DESCRIPTION OF REMEDIAL ALTERNATIVES

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, 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. It 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 further specifies that a remedial action must attain a level or standard of control of the hazardous substances, pollutants, and contaminants, which at least attains applicable or relevant and appropriate requirements (ARARs) under federal and state laws, unless a waiver can be justified.

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, negotiate with the responsible parties, procure contracts for design and construction, or conduct operation and maintenance ("O&M") at the Site.

A common element in each remedial alternative outlined below (with the exception of the "No Action" alternative) is long-term ground water and surface water monitoring to evaluate the alternative's effectiveness. It is anticipated that monitoring will be conducted on a quarterly basis for the first five years, and then on an annual basis for the duration of the alternative. Monitoring will include several surface water sampling stations west of the embankment, a network of ground-water wells, and any treated ground-water effluent discharge, all sampled for VOCs, SVOCs, metals, and municipal solid waste leachate indicator parameters. The exact long-term ground-water monitoring program will be determined during remedial design ("RD"). In addition, in accordance with Section 121 of CERCLA, EPA must review any remedial action that leaves hazardous substances above health based levels at a site at least once every five years to assure that the remedy selected continues to be protective of human health and the environment. All of the alternatives presented will require such a five year review. If justified by the review, remedial actions may be implemented to remove or treat the wastes, or to otherwise change the remedial action selected in this ROD.

Another common element (again, with the exception of the "No Action" alternative) is regrading of and storm-water management improvements at the Landfill. This component of the remedial action will reduce infiltration of storm water into the Landfill and reduce leachate generation, thus reducing impacts of Landfill-related contamination on ground water.

For all of the alternatives, institutional controls will be recommended to appropriate authorities in order to restrict any other ground-water withdrawal. Institutional controls (such as deed restrictions) are required to protect the integrity of any Landfill cover system, to reduce potential exposure to Landfill contents, and to reduce the potential future use of ground water on the Landfill property. Institutional controls should also be required to prohibit future use of ground water downgradient of the Site until cleanup goals are attained.

Regarding potential air emissions, New York State Regulation Part 212 states that if the contaminants are less than 1 lb/hr, air emission controls are not mandatory. The application of controls will be determined during RD in accordance with Part 212.

For ground-water extraction alternatives, treated ground water may be discharged to the existing Town of Tusten wastewater treatment plant outfall, discharged to the Delaware River, or reinjected to ground water. EPA will determine the most appropriate discharge option during the design process based on such factors as technical practicability and cost.

The ultimate goal of EPA's Superfund Program approach to groundwater remediation as stated in the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300) is to return usable groundwater to beneficial uses within a reasonable time frame.

EPA's Superfund Program uses EPA's Ground Water Protection Strategy as guidance when determining the appropriate remediation for contaminated groundwater at CERCLA sites. The Ground Water Protection Strategy establishes different degrees of protection for groundwaters based on their vulnerability, use, and value. For the aquifer beneath the Site the final remediation goals will be drinking water standards. However, EPA recognizes that the final selected remedy may not achieve this goal because of potential technical difficulties associated with removing contaminants to ground water cleanup levels. The results of this preferred action will be monitored carefully to determine the feasibility of achieving this final goal. The remedial action may require continuous pumping, pulsed pumping, and flexibility in placing pumping wells at strategic locations.

Recent studies have indicated that pumping technologies may contain uncertainties in achieving the parts per billion (ppb) concentrations required by ARARs within a reasonable period. For this reason, the following ground-water extraction alternatives may include contingency measures, whereby the ground-water extraction system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications may include any or all of the following:

a) at individual wells where cleanup goals have been attained, pumping may be discontinued;

b) alternating pumping at wells to eliminate stagnation points;

c) pulsed pumping to allow for aquifer equilibration and to allow adsorbed contaminants to partition into ground water; and

d) installation of additional extraction wells to facilitate or accelerate cleanup of the contaminant plume.

If it is determined that certain portions of the aquifer cannot be restored to their beneficial uses in a reasonable time frame on the basis of the preceding criteria and the system performance data, all or some of the following measures involving long-term management may occur, for an indefinite period, as a modification of the existing system:

a) engineering controls such as physical barriers, source control measures, or long-term gradient control provided by low level pumping may be utilized as containment measures;

b) chemical-specific ARARs may be waived for the cleanup of those portions of the aquifer based on the technical impracticability of achieving further contaminant reduction;

c) future institutional controls, in the form of local zoning ordinances, may be recommended to be implemented and maintained to restrict access to those portions of the aquifer which remain above remediation goals;

d) continued monitoring of specified wells may be required; and

e) periodic reevaluation of remedial technologies for ground-water restoration may be performed.

The decision to invoke any or all of these measures may be made during a periodic review of the remedial action, which will occur at intervals of no less often than every five years.

Of ten remedial alternatives considered in the FS, eight were retained for further evaluation and comparison in the detailed analysis for addressing the contamination at the Site. Alternatives 7 and 10 were eliminated from further consideration because they combined two ground-water treatment technologies without providing a significant improvement in effectiveness or remediation time frame. The retained alternatives are:

Alternative 1: No Action

The Superfund program requires that the "No Action" alternative be considered as a baseline for comparison of other alternatives. This alternative assumes that no additional activity will occur beyond the current activities at the Site. In accordance with Section 121 of CERCLA, remedial actions that leave hazardous substances at a site are to be reviewed at least once every five years to assure that the remedial action is protective of human health and the environment.

Cost Capital Cost:	$0
Annual O&M:	$0

Present Worth: $0

Time to Implement: None

Alternative 2: Landfill Cap

In this alternative, a low permeability cover system (a "landfill cap") meeting the requirements of Title 6, NYCRR Part 360-2.15.b would be placed over the Landfill. This cover, along with storm-water management improvements (which will divert precipitation-related surface water runoff away from and off of the cover) will reduce infiltration of storm water into the Landfill and reduce leachate generation, thus mitigating impacts to ground water. This alternative provides for reduction of surface water impacts to the Delaware River, the embayment, and White's Pond through source controls and natural attenuation of downgradient ground water.

Cost Capital Cost:	$1,253,690
Annual O&M:	$ 1,364
Present Worth:	$3,798,657

Time to Implement: 1 year

Alternative 3: Landfill Cap, Drum Removal

The cover system in this alternative is identical to that described in Alternative 2. In addition, this alternative provides for the removal and off-site treatment and/or disposal of the intact-drum disposal areas on the Landfill property (considered to be the principal threat at the Site). Intact drum disposal areas are outlined in Figure 4. Any contaminated soil beneath these drum disposal areas may potentially be removed at this time as well. Refuse overlying the drums would be placed back into the Landfill. Drum removal reduces the volume of contaminated material at the Site, thus further decreasing the potential for future impacts to ground water.

Cost Capital Cost:	$3,664,538
Annual O&M:	$ 1,364
Present Worth:	$7,009,907

Time to Implement: 1 year

Alternative 4: Landfill Cap, Drum Removal, In-Situ Vapor Extraction

The cover system and drum removal components in this alternative are identical to those described in Alternative 3. In addition, this alternative provides for aggressive extraction of Landfill vapors. This vapor extraction process would further reduce the impact of Landfill-related VOC contamination on ground water. In-situ vapor extraction reduces the toxicity, mobility, and volume of residual VOCs and offers an alternative to the ground-water extraction/treatment systems outlined in Alternatives 5 through 9.

Cost Capital Cost:	$4,203,883
Annual O&M:	$ 42,864
Present Worth:	$8,053,953

Time to Implement: 1½ years

Alternative 5: Landfill Cap, Ground-Water Extraction

The cover system in this alternative is identical to that described in Alternative 2. In addition, this alternative provides for contaminated ground water from the Landfill to be extracted through a series of wells aligned along the western (downgradient) perimeter of the Landfill. The conceptual treatment process for ground water includes aeration, clarification/filtration, and air stripping. Treated ground water may be discharged to the existing Town of Tusten wastewater treatment plant outfall, discharged to the Delaware River, or reinjected to ground water. The purpose of the ground-water extraction system is to prevent the migration of impacted ground water from the Landfill. This alternative also provides further reduction of surface water impacts to the Delaware River, the embayment, and White's Pond through both ground-water source controls and ground-water extraction and treatment. The effectiveness of the treatment system would be assessed through long-term ground water and surface water monitoring.

Cost Capital Cost:	$1,723,505
Annual O&M:	$ 284,944
Present Worth:	$7,231,270

Time to Implement: 1½ years

Alternative 6: Landfill Cap, Drum Removal, Ground-Water Extraction

The cover system and ground-water extraction components in this alternative are identical to those described in Alternative 5. In addition, this alternative provides further reduction of toxicity, mobility, and volume via the drum removal component described in Alternative 3.

Cost Capital Cost:	$ 4,134,353
Annual O&M:	$ 284,944
Present Worth:	$10,442,520

Time to Implement: 1½ years

<u>Alternative 8: Landfill Cap, Ground-Water Extraction with Vertical Barrier</u>

The cover system and ground-water extraction components in this alternative are identical to those described in Alternative 5, except that in this alternative a 40-feet deep continuous vertical wall (either a slurry wall, grout curtain, or sheet piling) would be constructed slightly downgradient of the extraction well network, thereby further containing contaminated ground water and effectively reducing the volume of ground water which must be extracted.

Cost Capital Cost:	$1,875,975
Annual O&M:	$ 274,204
Present Worth:	$8,372,709

Time to Implement: 2 years

<u>Alternative 9: Landfill Cap, Drum Removal, Ground-Water Extraction with Vertical Barrier.</u>

The cover system and ground-water extraction components in this alternative are identical to those described in Alternative 8. In addition, this alternative provides further reduction of toxicity, mobility, and volume by incorporating the drum removal component described in Alternative 3.

Cost Capital Cost:	$ 4,286,823
Annual O&M:	$ 274,204
Present Worth:	$11,583,958

Time to Implement: 2 years

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), a detailed analysis of each alternative is required. The detailed analysis consists 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:

1. 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.

2. 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:

3. 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.

4. 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.

5. Short-term effectiveness addresses the period 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.

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

7. 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:

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

9. 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

All of the alternatives except Alternative 1 (No Action) provide general protection of human health and the environment since they all provide for a Landfill cover system. Alternatives 1 through 4, however, rely on natural attenuation and dilution with respect to ground water and, hence, allow for the continued release of contamination from the Landfill to ground water for an indefinite time frame. By contrast, Alternatives 6 through 9, which include the ground-water extraction/treatment component, allow for accelerated and predictable ground-water cleanup time frames. Besides restoring ground water to drinking water standards in an accelerated and predictable time frame, by reducing contaminant release to ground water, potential ecological exposure to areas downgradient of the Landfill (including the Delaware River) would be reduced and, ultimately, eliminated. Of the alternatives including this component, Alternatives 5 and 6 have been shown to provide the shortest remediation time frame for ground water.

The "No-Action" alternative is not protective of human health and the environment; therefore, it was eliminated from consideration and will not be discussed further.

- Compliance with ARARs

The principal action-specific ARAR for this Site includes 6 NYCRR Part 360 requirements, which requires the installation of a cover system. All of the alternatives with the exception of no action meet this ARAR.

Since the ground water underlying the Site is a potential future potable water supply source, federal and state MCLs (whichever are more stringent) are ARARs. Both federal and state MCLs are relevant and appropriate for the cleanup of the aquifer. While Alternatives 2 and 3, with no ground-water treatment, may potentially reach ARARs over an extended and indefinite period of time, Alternatives 5, 6, 8, 9, and to a lesser extent, Alternative 4, are designed to actively address these ARARs. Substantive discharge permit requirements (e.g., New York State Pollutant Discharge Elimination System or "SPDES") are applicable only for Alternatives 5, 6, 8, and 9.

Other location-specific ARARs relevant to all of the alternatives include the Wild and Scenic Rivers Act (36 CFR Section 297.4), Executive Order 11990 (Protection of Wetlands), Executive Order 11988 (Floodplain Management), the Delaware River Basin Water Code, the Endangered Species Act, and the National Historic Preservation Act.

o <u>Long-Term Effectiveness and Permanence</u>

Alternatives 6 and 9, which include both the drum removal and ground-water treatment components, would provide superior long-term effectiveness through removal of potential future sources of ground-water contamination and active ground-water treatment. There would be no long-term threat to the environment or human health as it is the intent of these proposed remedial actions to restore the aquifer to drinking water standards. Alternative 4, which includes drum removal with active Landfill gas collection, would be less effective in that only VOC compounds would be removed and only to a limited extent from ground water. Alternatives 5 and 8, with no drum removal component, would be somewhat less effective. Alternatives 2 and 3 involve a passive approach to ground water and are thus considered the least effective in the long term.

The time frame to reach ground-water ARARs was modelled for each of the alternatives. Based upon the results of this modelling effort, it is estimated that Alternatives 5 and 6 would accomplish this goal in approximately 16 years, Alternatives 8 and 9 in 28 years. For Alternatives 2, 3 and 4, which rely to varying degrees on natural attenuation, it is estimated that it would take 43 years.

o <u>Reduction in Toxicity, Mobility, or Volume</u>

Alternatives 6 and 9, which both include drum removal and ground-water treatment, would reduce the toxicity, mobility and volume permanently. Reduction of these parameters would be accomplished to a lesser degree by Alternative 4 (which does not include ground-water extraction/treatment, by Alternatives 5 and 8 (which do not include drum removal), and by Alternative 3 (which includes drum removal but not ground-water extraction). Alternative 2 reduces mobility through containment only and, hence, does not reduce the toxicity or volume of contamination.

o <u>Short-Term Effectiveness</u>

Alternative 2 would have the lowest potential for impact to the surrounding community because it does not include excavation of materials from the drum disposal areas or operation of any mechanical treatment systems. Alternatives 5 and 8 would have a slightly higher impact because of the potential impacts associated with construction and operation of the ground-water extraction/ treatment components. The potential for short-term effects associated with drum removal is considered to be greater than those associated with ground-water extraction/treatment, hence Alternatives 3 and 4 would have a slightly higher impact because of the potential for short-term effects during excavation and off-site transport of materials from the drum disposal areas. Alternative 6, adding the ground-water extraction/treatment components to rum removal would have a higher impact. Alternative 9 would have the highest short-term impact because it includes installation of a vertical barrier in addition to all of the above-mentioned considerations.

o Implementability

All of the alternatives involve the use of commercially available products and accessible technology. The need for long-term O&M makes Alternatives 5 through 9 more difficult to implement than Alternatives 2 through 4. Alternatives 5 and 8 are more easily implemented than Alternatives 6 and 9 because of the absence of the drum removal component. Alternatives 5 and 6 are more easily implemented than Alternatives 8 and 9 because of difficulties and space constraints associated with installation of the vertical barrier system between the Landfill and the railroad embankment.

o Cost

Following are the alternatives in increasing order of total cost: 2, 3, 5, 4, 8, 6, and 9. The combination of drum removal and in-situ vapor extraction in Alternative 4 is more costly than the ground-water extraction/treatment systems included in Alternatives 5 through 9. The vertical barrier included in Alternatives 8 and 9 does not provide overall cost reduction in comparison to Alternatives 5 and 6, respectively, because, in addition to the cost associated with the installation of the vertical barrier, the lower associated ground-water extraction rates lead to a longer ground-water response time and greater O&M costs. Alternatives 2 and 3 represent the lowest total cost because of their not including the ground-water treatment component.

o State Acceptance

The State of New York concurs with the selected alternative. The letter outlining this concurrence is attached to this ROD as Appendix IV.

o Community Acceptance

All significant submitted during the public comment period were evaluated and are addressed in the attached Responsiveness Summary (Appendix V).

SELECTED REMEDY

EPA has determined, after reviewing the alternatives and public comments, that Alternative 6 (Landfill cap/drum removal/ground-water extraction) is the appropriate remedy for the Site, because it best satisfies the requirements of CERCLA and the NCP's nine evaluation criteria for remedial alternatives.

The major components of the selected remedy are as follows:

- A low permeability cover system meeting the requirements of Title 6, NYCRR Part 360-2.15.b for the landfill. This landfill cap, along with storm-water management improvements, will further reduce infiltration of storm water into the landfill and reduce leachate generation thus mitigating impacts to ground water.

- The removal and off-site treatment and/or disposal of the intact-drum disposal areas on the landfill property. Any contaminated soil beneath these drum disposal areas may potentially be removed at this time as well. Refuse overlying the drums would be placed back into the landfill. Drum removal reduces the volume of contaminated material at the Site, thus further decreasing the potential for future impacts to ground water.

- Extraction of contaminated ground water from the landfill through a series of wells aligned along the western (downgradient) perimeter of the landfill. The conceptual treatment process for ground water includes aeration, clarification/filtration, and air stripping. Contaminated ground water will be pumped from the extraction wells at rates that will allow for coordinating an expeditious ground-water remediation. The exact number, depth, pumping rates, and location of extraction wells will be determined during RD. The pumping will continue until MCLs are achieved in the aquifer downgradient of the landfill or until technical impracticability is demonstrated.

- Discharge of treated ground water to the existing Town of Tusten wastewater treatment plant outfall or to the Delaware River, or reinjection to ground water. The specific discharge point will be determined during RD.

- Regrading and storm-water management improvements at the landfill. This component of the remedial action will reduce infiltration of storm water into the landfill and reduce leachate generation, thus reducing impacts of landfill-related contamination to ground water.

- Institutional controls recommended to appropriate authorities. Institutional controls will be recommended in order to protect the integrity of the landfill cover system, to reduce potential exposure to landfill contents, and to reduce the potential future use of ground water within the plume area. Institutional controls may include deed restrictions or other recommendations as appropriate.

- Long-term ground water and surface water monitoring to evaluate the alternative's effectiveness. It is anticipated that monitoring will be conducted on a quarterly basis for the first five years, and then on an annual basis for the duration of the alternative. Monitoring will include several surface water sampling stations west of the embankment, a network of ground-water monitoring wells, and the treated ground-water effluent discharge, all sampled for VOCs, SVOCs, metals, and municipal solid waste leachate indicator parameters. The exact long-term ground-water monitoring program will be determined during remedial design.

- Implementation of long-term maintenance and operation of the landfill cap and ground-water extraction/treatment system to provide for inspections and repairs.

- Reevaluation of Site conditions at least once every five years to determine if a modification of the selected alternative is necessary.

After the selected remedy is in place, it is estimated that ground water in the aquifer will meet the remediation goals in approximately 16 years. As noted above, the pumping will continue until MCLs are achieved in the aquifer downgradient of the Landfill or until technical impracticability is demonstrated. This alternative includes contingency measures, as necessary (outlined in the Description of Remedial Alternatives section of this ROD), whereby the ground-water extraction and treatment system's performance will be monitored on a regular basis and adjusted as warranted by the performance data collected during operation. If it is determined, in spite of any contingency measures that may be taken, that portions of the aquifer cannot be restored to its beneficial use, ARARs may be waived based on the impracticability, from an engineering perspective, of achieving further contaminant reduction. The decision to invoke a contingency measure may be made during periodic review of the remedy, which will occur at intervals of no less often than every five years. EPA may invoke a technical waiver of ground-water ARARs if the remediation program indicates that reaching MCLs in the aquifer downgradient of the Landfill is technically impracticable.

STATUTORY DETERMINATIONS

As previously noted, CERCLA mandates that a remedial action must be protective of human health and the environment, be cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA also establishes a preference for remedial actions which employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified.

For the reasons discussed below, EPA has determined that the selected remedy meets the requirements of CERCLA and provides the best balance of trade-offs among alternatives with respect to the evaluation criteria.

Protection of Human Health and the Environment

The selected remedy is protective of human health and the environment. Contact with Landfill wastes would be eliminated through capping; drum removal eliminates an identifiable source area and principal threat; and potential contaminant migration through ground water and surface water to the surrounding environment would be prevented through the ground-water extraction/treatment system.

Compliance with ARARs

The selected remedy will be in compliance with all ARARs. Action-specific ARARs for the selected remedy include 6 NYCRR Part 360 requirements, state regulations for the control of surface-water runoff, federal air ARARs (40 CFR Part 61) and state air ARARs (6 NYCRR Parts 200-221, and 257). Federal requirements for effluent discharge to a POTW (40 CFR Part 403) will need to be considered should that discharge option be selected during RD. The federal (40 CFR Parts 261 and 268) and state (6 NYCRR Parts 371) Hazardous Waste Regulations are action-specific ARARs for the drum removal. The federal air ARAR 40 CFR Part 50 (including the standard for particulate matter less than 10 microns in size) and state transport permit regulations (6 NYCRR Part 364) are also action-specific ARARs for the drum removal.

Location-specific ARARs for the selected remedy include the Wild and Scenic Rivers Act (36 CFR Section 297.4), the Delaware River Basin Water Code, the Fish and Wildlife Coordination Act (16 USC 661), the Endangered Species Act (16 USC 1531), the National Historic Preservation Act, Executive Order 11990 (Protection of Wetlands), Executive Order 11988 (Floodplain Management). The Site is not located within a coastal zone, coastal barrier, wilderness area, or wildlife refuge, so the Coastal Zone Management Act, the Coastal Barrier Resources Act, and the Wilderness Act are not ARARs for the Site.

Chemical-specific ARARs for ground water include the MCLs promulgated under 40 CFR Part 141.11-141.16 and Part 141.60-141.63, the New York Public Water Supply Regulations MCLs (NYCRR, Title 10, Part 5-1), and New York Water Classifications and Quality Standards for Class GA Ground Water (NYCRR, Title 6, Parts 701-703). For surface water, chemical-specific ARARs include MCLs, the New York State Public Water Supply Regulations, and the State of New York surface water quality standards (NYCRR, Title 10, Part 5-1 and NYCRR, Title 6, Parts 701-703). In addition, the Delaware River Basin Commission has developed Water Quality Standards for the Delaware River Basin (Delaware River Basin Water Code, Article 3, July 1993). Article 3.10, Basinwide Surface Water Quality Standards, applies to all surface waters of the Delaware River Basin. According to Article 3.10.3.A.2.g, the Upper Delaware Scenic and Recreational River, along which the Site is located, is classified as an Outstanding Basin Water. In addition, because this portion of the Delaware River is classified as an Outstanding Basin Water, Section 3.10.3.A.2 of the code establishes a surface water policy that there be "no measurable change in existing water quality except toward natural conditions," and Section 3.40.4.B establishes a policy to prevent degradation which "may be injurious to any designated present or future ground or surface water use." Although these requirements are location-specific, these standards have been tabulated with chemical-specific ARARs because they invoke water quality standards. There are no chemical-specific ARARs for soil, sediment, or air.

<u>Cost-Effectiveness</u>

The selected remedy is cost-effective because it has been demonstrated to provide overall effectiveness proportional to its costs. Although the selected remedy is more expensive than most of the alternatives analyzed, these alternatives did not include both drum removal and groundwater extraction/treatment, which in addition to capping are critical components in meeting the remedial action objectives and satisfying the statutory criteria. Alternative 9, which is more expensive than the selected remedy, includes the installation of a vertical barrier, an element that does not provide any additional protection. The present worth of the selected alternative is $10,442,520.

<u>Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable</u>

The selected remedy utilizes permanent solutions and treatment technologies to the maximum extent practicable. The selected remedy provides the best balance of trade-offs among the alternatives with respect to the evaluation criteria.

Preference for Treatment as a Principal Element

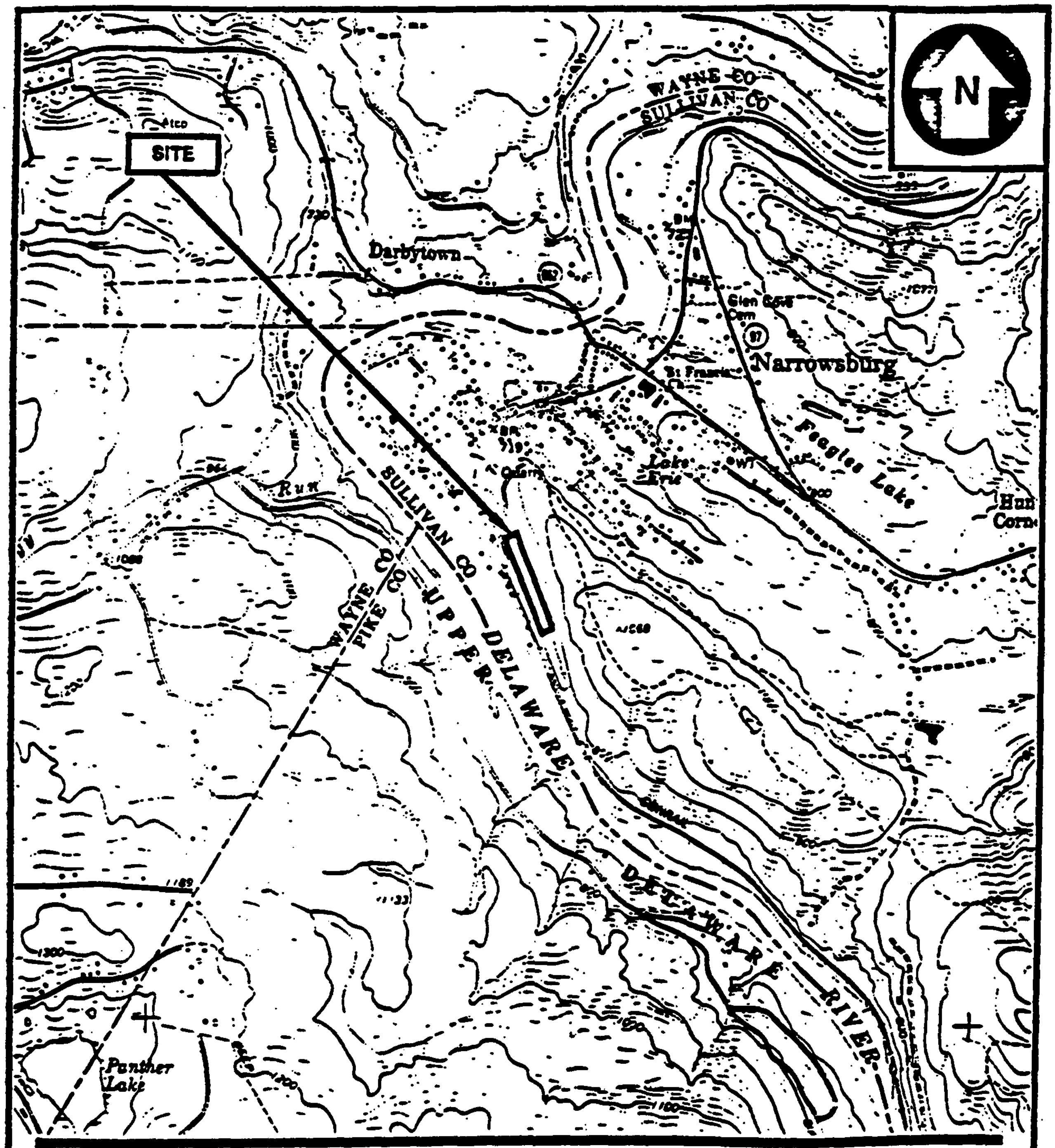
The selected remedy satisfies the statutory preference for remedies that employ treatment to reduce the toxicity, mobility, or volume of the hazardous substances, pollutants, or contaminants at a site. The selected remedy treats hazardous substances, pollutants, and contaminants at the Site through both the drum removal and groundwater extraction components of the selected remedy. Despite this, hazardous substances, pollutants, and contaminants will remain on-site above health-based levels as the entire Landfill mass itself cannot be effectively excavated and treated because of its size. Hence, a review of the remedial action will be conducted five years after the commencement of the remedial action to ensure that the remedy continues to provide adequate protection to human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

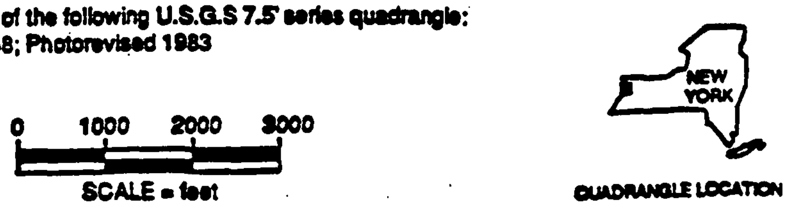
There are no significant changes from the preferred alternative presented in the Proposed Plan.

APPENDIX I - FIGURES

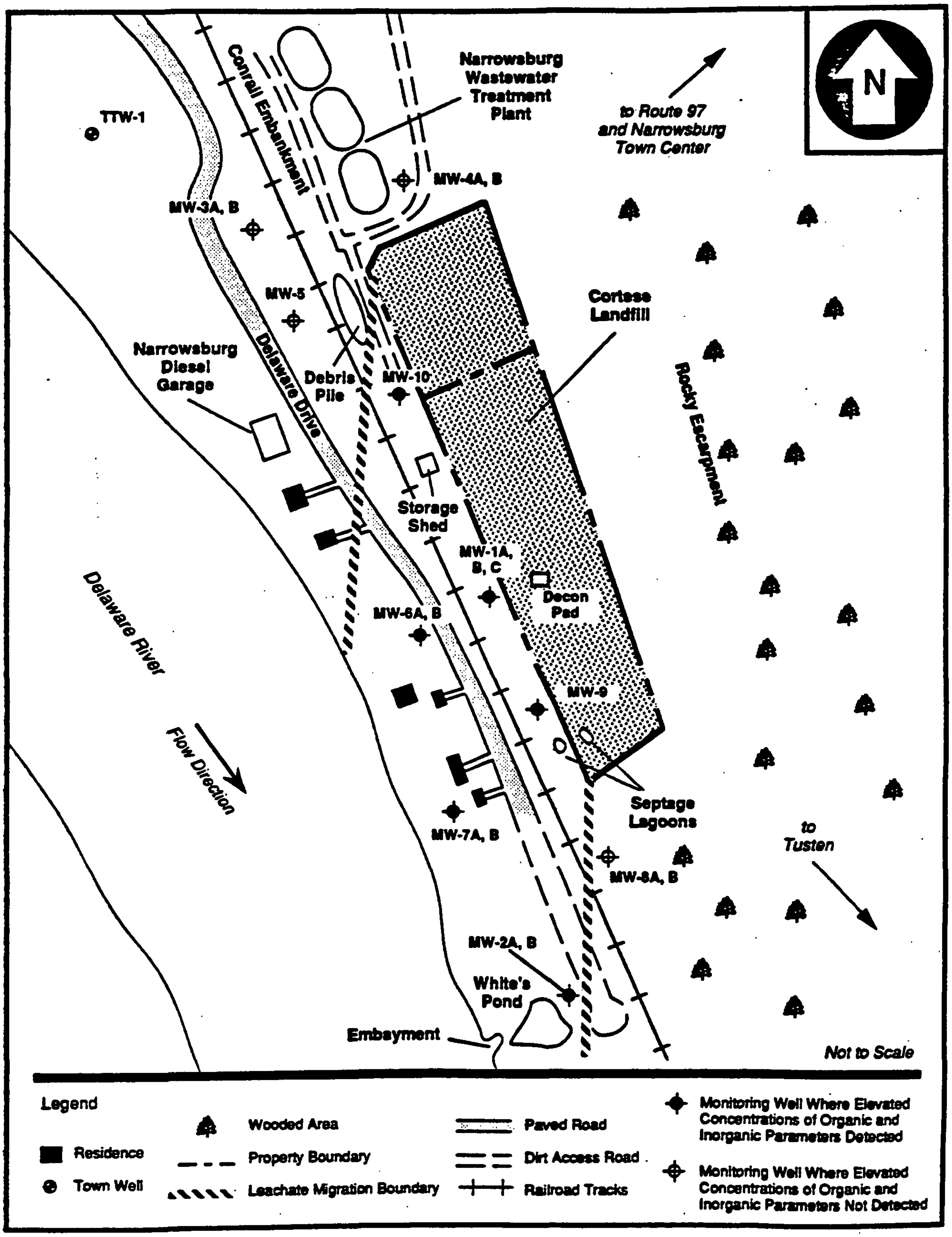
Figure 1.
Location of the Cortese Landfill Superfund Site

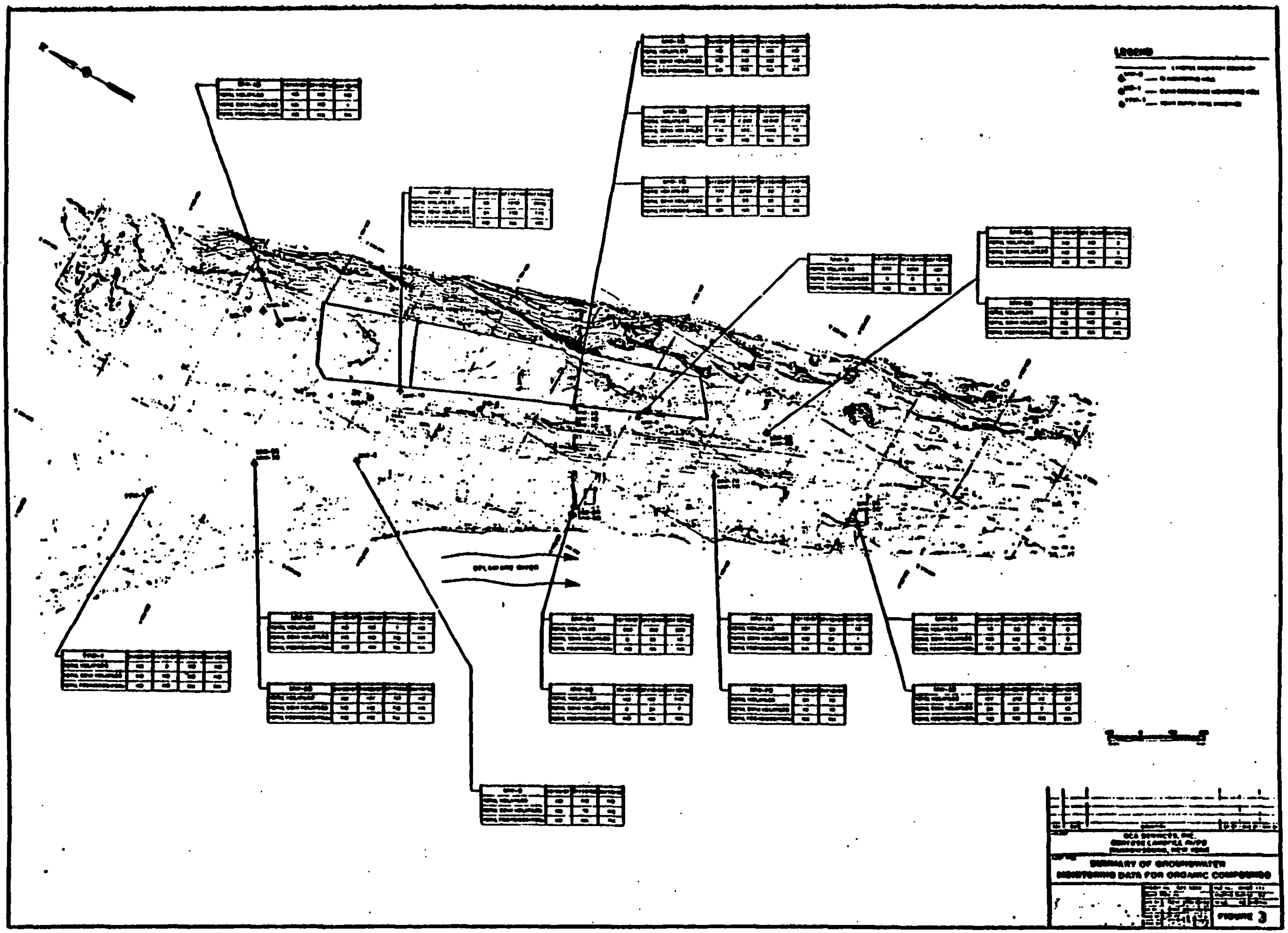


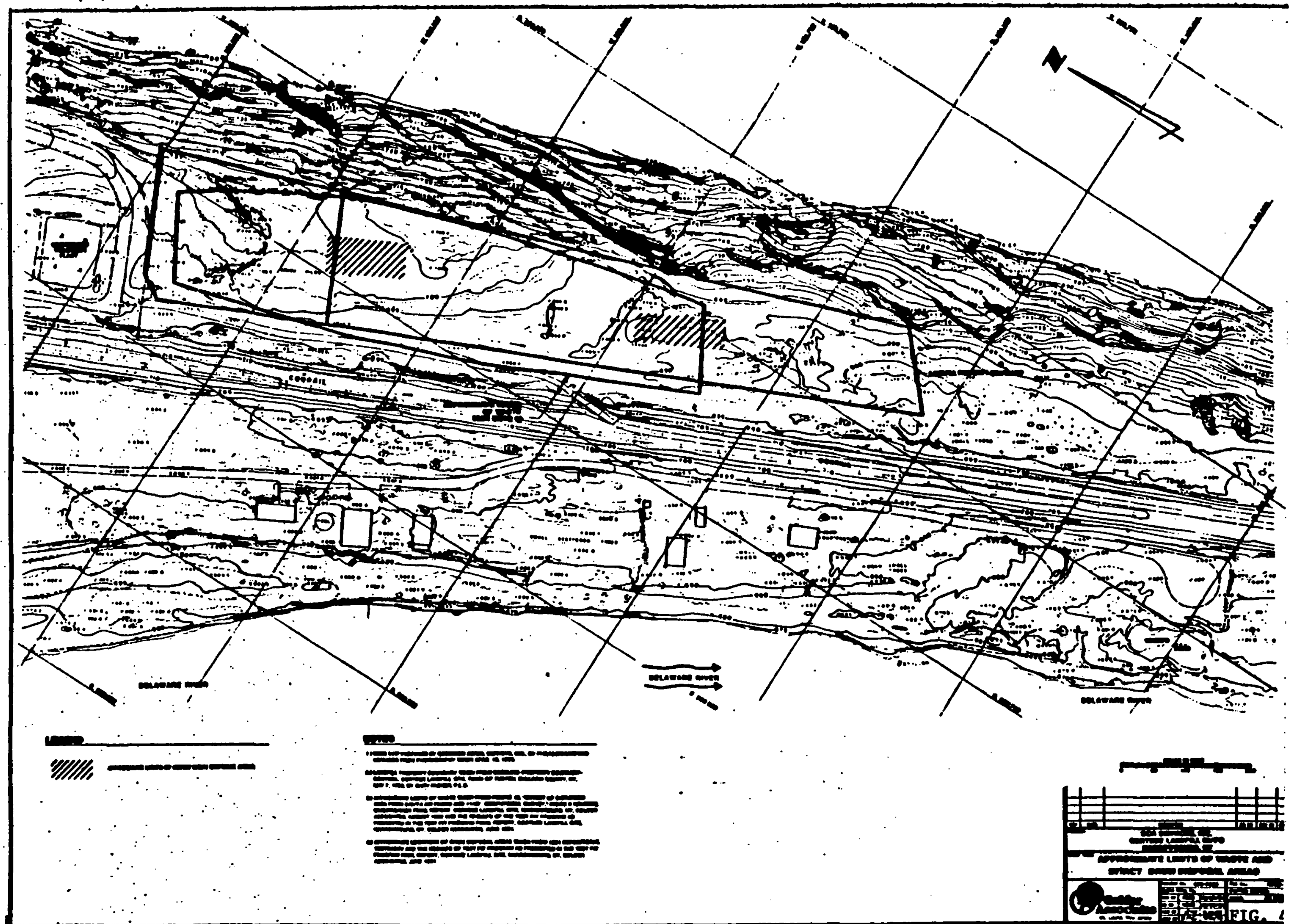
Source: The base map is a portion of the following U.S.G.S 7.5' series quadrangle:
Narrowsburg NY - PA, 1968; Photorevised 1983



Cortese Landfill Site Sketch




SUMMARY OF GROUNDWATER
MONITORING DATA FOR ORGANIC COMPOUNDS
FIGURE 3


DELAWARE RIVER
DELAWARE RIVER
DELAWARE RIVER
APPROXIMATE LIMITS OF WASTE AND
DRUM DISPOSAL AREAS
FIG.

APPENDIX II - TABLES

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT											
PARAMETER	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12
DATE SAMPLED	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/30/87	11/24/87	04/13/93	04/13/93
VOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
TOTAL VOLATILES	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
1,2-Dichlorobenzene												47 J
Benzoic acid		127 J								93.7 J	47 J	130 J
Acenaphthylene												150 J
Fluorene												51 J
Phenanthrene				38.6 J								420
Di-n-butylphthalate		81.5 J		58.3 J						89.7 J		
Anthracene												99 J
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		46 J
Fluoranthene										21.3 J		1800
Pyrene										29.4 J		1900
Benzo(a)anthracene												2000
Chrysene												1300
bis(2-Ethylhexyl)phthalate		563		126 J								
Benzo(b)fluoranthene + Benzo(k)fluoranthene												3100 JN
Benzo(a)pyrene												1500
Indeno(1,2,3-cd)pyrene												840
Dibenz(a,h)anthracene												260 J
Benzo(g,h,i)perylene												900
TOTAL SEMIVOLATILES	ND	771.5	ND	222.9	ND	ND	ND	ND	ND	234.1	47	14,543

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT											
PARAMETER	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12
DATE SAMPLED	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/30/87	11/24/87	04/13/93	04/13/93
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Heptachlor Epoxide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Dieldrin	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
4,4'-DDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Endosulfan II	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
4,4'-DDT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
gamma-Chlordane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	R	
Aroclor-1254	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
TOTAL PESTICIDES/PCBs	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT											
PARAMETER	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12
DATE SAMPLED	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/29/87	10/30/87	11/24/87	04/13/93	04/13/93
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	8870	12500	6450	9200	10700	8160	14200	9420	7580	11300	11100	8200
Antimony		0.48 J	0.69 J		1.1 J	0.71 J		2				
Arsenic	2.7 J	5.4	4.7 J	4.7 J	3.4	4.5 J	9.8	3.7	4	1.8 J	5.8	4.4
Barium	73	73	54	46	81	45	49	51	60	139	48.1	53.2
Beryllium	0.54	0.56	0.4	0.4	0.54	0.34	0.52	0.33	0.31	0.63	0.6	
Cadmium	0.4 J			0.36 J						1.3 J		
Calcium	670	740	980	330	670	550	220	450	530	650	259	448
Chromium	8.3	12	6	9.1	8.5	7	11	6.1	8.2	9	11.6 J	9.4 J
Cobalt	8.1	9.7	6.4	7.5	8.1	9.3	8.2	3.7 J	5.2	5.5	8.6	5.9
Copper	19	15	10	14	30	12	5.7	7.9	10	10	11.2 J	12.4 J
Iron	16800	21600	13100	17000	19600	15000	25100	17100	13000	15200	18100	13900
Lead	9	12	9.1	11	23	13	32	62	19	13	11.6 J	19.1 J
Magnesium	3340	3600	2710	2840	3270	2830	2600	1440	1950	2640	2670	2120
Manganese	516	1190	366	705	710	606	446	165	799	975	511 J	441 J
Mercury	0.048 J	0.048 J	0.04 J	0.056 J	0.056 J	0.04 J	0.076 J	0.076 J	0.056 J	0.055 J		
Nickel	16	19	12	15	16	14	12	8	14	15	14.8	8.7
Potassium	900	860	610	770	1000	570	520	400	560	1500	1430	1130
Sodium	23	25	16 J	19 J	29	16 J	31	11 J	16 J		75.9	74.7
Thallium	6.6	0.59 J	0.59 J	1 J	0.76 J	0.67 J		0.87 J	0.73 J			
Vanadium	9.6	15	6.4	11	12	7.8	22	16	7	12	12.2	9.7
Zinc	63	65	41	50	74	49	63	42	42	61	48.8	48
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT									
PARAMETER	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19	SS-23	SS-24	SS-26
DATE SAMPLED	04/13/93	04/13/93	04/15/93	04/15/93	04/15/93	04/15/93	04/15/93	04/13/93	04/13/93	04/15/93
VOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
TOTAL VOLATILES	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
1,2-Dichlorobenzene								NA	NA	
Benzoic acid					110 J		110 J	NA	NA	
Acenaphthylene								NA	NA	
Fluorene								NA	NA	
Phenanthrene								NA	NA	
Di-n-butylphthalate								NA	NA	
Anthracene								NA	NA	
Carbazole								NA	NA	
Fluoranthene								NA	NA	
Pyrene								NA	NA	
Benzo(a)anthracene								NA	NA	
Chrysene								NA	NA	
bis(2-Ethylhexyl)phthalate								NA	NA	
Benzo(b)fluoranthene + Benzo(k)fluoranthene								NA	NA	
Benzo(a)pyrene								NA	NA	
Indeno(1,2,3-cd)pyrene								NA	NA	
Dibenz(a,h)anthracene								NA	NA	
Benzo(g,h,i)perylene								NA	NA	
TOTAL SEMIVOLATILES	ND	ND	ND	ND	110	ND	110	NA	NA	ND

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT									
PARAMETER	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19	SS-23	SS-24	SS-26
DATE SAMPLED	04/13/93	04/13/93	04/15/93	04/15/93	04/15/93	04/15/93	04/15/93	04/13/93	04/13/93	04/15/93
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Heptachlor Epoxide							5.8 J			
Dieldrin							8.9 JN		6.0 J	
4,4'-DDE				1.7 J	2.6 J	2.2 J	R		5.9 J	2.0 J
Endosulfan II							2.6 J			
4,4'-DDT	4.3 J								20 JN	
gamma-Chlordane							0.88 J			
Aroclor-1254			15 J							
TOTAL PESTICIDES/PCBs	4.3	ND	15	1.7	2.6	2.2	18.18	ND	31.9	2

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 1
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE SOIL SAMPLES

	SAMPLE POINT									
PARAMETER	SS-13	SS-14	SS-15	SS-16	SS-17	SS-18	SS-19	SS-23	SS-24	SS-26
DATE SAMPLED	04/13/93	04/13/93	04/15/93	04/15/93	04/15/93	04/15/93	04/15/93	04/13/93	04/13/93	04/15/93
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	5880	7040	6900	17600	19000 J	16000	17100	NA	NA	14400
Antimony								NA	NA	
Arsenic	4.9	3.9	4.5	6.3	9.3 J	8.9	5.9	NA	NA	7.9
Barium	52.7	38.3	41.3	94.6	145 J	86.7	107	NA	NA	86.5
Beryllium				0.78	0.89 J	0.82	0.78	NA	NA	
Cadmium								NA	NA	
Calcium	939	699	573	1170	1800 J	1170	479	NA	NA	1350
Chromium	9.2 J	8.4 J	10.2 J	18.0	17.2 J	16.2 J	15.6 J	NA	NA	14.3 J
Cobalt	6.9	6.9	5.4	8.0	8.8 J	10.8	7.1	NA	NA	9.1
Copper	12.3 J	9.8 J	14.0 J	36.6	17.3 J	19.7 J	57.6 J	NA	NA	16 J
Iron	13400	14800	13900	21100	24500 J	23500	20400	NA	NA	20200
Lead	11.3 J	6.4 J	13.7 J	26.1 J	31.8 J	18.9 J	21.3 J	NA	NA	18.1 J
Magnesium	2190	2510	2060	2810	3120 J	3310	3010	NA	NA	2900
Manganese	423 J	419 J	346 J	647 J	1200 J	721 J	297 J	NA	NA	728 J
Mercury								NA	NA	
Nickel	11.1	10.1	11.7	12		16.7	15.7	NA	NA	18.3
Potassium	1450	1090	737	2060	1650 J	1690	2170	NA	NA	1970
Sodium	83.9	71.8	87.5	116	134	124	137	NA	NA	120
Thallium								NA	NA	
Vanadium	7	6.8	7.8	21.6	23.1 J	19.8	19.1	NA	NA	18.1
Zinc	44.9	51.8	67	91.9	86.2 J	85.4	128	NA	NA	78.7
Cyanide			0.75					NA	NA	

Notes:
1) Blank spaces indicate the parameter was not detected.
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3) J - Estimated (Semiquantitative) Data, N - Tetative Identification, R - Unusable Data.
4) SS-23 and SS-24 were analyzed for Pesticides/PCBs only.
5) SS-26 is the field duplicate of SS-18.

TABLE 2
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SUBSURFACE SOIL SAMPLES

	SAMPLE POINT														
PARAMETER	SS-0A	SS-0B	SS-0C	TP11-S1	TP12-S1	TP12-S2	TP22-S1	TP22-S2	TP22-S3	TP31-S1	TP32-S1	TP32-S2	SL-01	SL-02	SL-03
DATE SAMPLED	11/20/87	11/24/87	11/24/87	03/01/91	03/08/91	03/08/91	03/05/91	03/05/91	03/05/91	03/06/91	03/07/91	03/07/91	06/09/93	06/09/93	06/09/93
DEPTH SAMPLED (FT)	20-34	~1	~1	11	(4)	8	12	15	(4)	11	~2	13	3-3.5	0.5-1	0.5-1
Methylene Chloride													9600		
Chloroform							6.07								
2-Butanone							144	1320							
1,1,1-Trichloroethane													14000		
1,1-Dichloroethane													8500		
Total 1,2-Dichloroethene													7600		
Trichloroethene							14.2						440000	1300 J	8 J
Benzene													450 J		
4-Methyl-2-Pentanone							26.2	389	8120						
2-Hexanone							11.0	110							
Tetrachloroethene							2.05 J						130000	1300 J	4 J
Toluene	7.84						53.8		3540				180000	96000 J	2800 J
Chlorobenzene															43
1,1,2,2-Tetrachloroethane							6.81 J								
Ethylbenzene							28.3		2036				82000		10 J
m-Xylene							93.4		1682				NA	NA	NA
o+p-Xylenes							79.9		1632				NA	NA	NA
Total Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	320000	3100 J	42
TOTAL VOLATILES	7.84	ND	ND	ND	ND	ND	465.73	1819	17010	ND	ND	ND	1,192,150	101,700	2907

Notes:

1) Blank spaces indicate the parameter was not detected.

2) NA = Not Analyzed; ND = Not Detected.

3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.

4) Sample TP12-S1 taken from spoils pile; Sample TP22-S3 taken from soil inside a drum.

TABLE 2
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SUBSURFACE SOIL SAMPLES

	SAMPLE POINT														
PARAMETER	SS-0A	SS-0B	SS-0C	TP11-S1	TP12-S1	TP12-S2	TP22-S1	TP22-S2	TP22-S3	TP31-S1	TP32-S1	TP32-S2	SL-01	SL-02	SL-03
DATE SAMPLED	11/20/87	11/24/87	11/24/87	03/01/91	03/08/91	03/08/91	03/05/91	03/05/91	03/05/91	03/06/91	03/07/91	03/07/91	06/09/93	06/09/93	06/09/93
DEPTH SAMPLED (FT)	20-34	~1	~1	11	(4)	8	12	15	(4)	11	~2	13	3-3.5	0.5-1	0.5-1
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol											9630				
1,3-Dichlorobenzene														2600 J	3200 J
1,4-Dichlorobenzene							187 J			216 J				7300 J	4800 J
1,2-Dichlorobenzene							354		1360					5200 J	4500 J
2-Methylphenol									1730		226 J				
4-Methylphenol							301 J		1500					5900 J	
Benzoic acid								2490	2291						
1,2,4-Trichlorobenzene							1180	307	5480						2300 J
Naphthalene									1810				260000		
Hexachlorobutadiene									495						
2-Methylnaphthalene													48000 J		
Acenaphthene													51000 J		
4-Nitrophenol															9400 J
Dibenzofuran													37000 J		
Fluorene													40000 J		
Hexachlorobenzene									733						
Phenanthrene													140000 J		
Anthracene													26000 J		
Carbazole	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	17000 J		
Di-n-butylphthalate	70.5 J	100 J	136 J		848 J	882 J	1050 J		2000	706 J	1890	1140			
Fluoranthene													65000 J		
Pyrene													41000 J		
bis(2-Ethylhexyl)phthalate	252 J	306 J	340 J				176 J		18310		253 J	968 J			
Di-n-Octylphthalate	921										1580				
TOTAL SEMIVOLATILES	1243.5	406	476	ND	848	882	3248	2797	35709	922	3949	2108	725,000	21,000	24,200
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/ug)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
beta-BHC				NA	NA	NA	NA	NA	NA	NA		NA	3.2 J		
Dieldrin		31		NA	NA	NA	NA	NA		NA		NA	3.6 J	13 J	
4,4'-DDE				NA	NA	NA	NA	NA		NA		NA	R	33	
4,4'-DDD				NA	NA	NA	NA	NA		NA		NA	R	44	46
Endrin Ketone				NA	NA	NA	NA		NA	NA		NA	R		4.7 J
gamma-Chlordane				NA	NA	NA	NA	NA		NA		NA	R	16 J	
TOTAL PESTICIDES/PCBs	ND	31	ND	ND	NA	NA	NA	ND	ND	NA	ND	NA	6.8	106	60.7

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.
4) Sample TP12-S1 taken from spoils pile; Sample TP22-S3 taken from soil inside a drum.

TABLE 2
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SUBSURFACE SOIL SAMPLES

	SAMPLE POINT														
PARAMETER	SS-0A	SS-0B	SS-0C	TP11-S1	TP12-S1	TP12-S2	TP22-S1	TP22-S2	TP22-S3	TP31-S1	TP32-S1	TP32-S2	SL-01	SL-02	SL-03
DATE SAMPLED	11/20/87	11/24/87	11/24/87	03/01/91	03/08/91	03/08/91	03/05/91	03/05/91	03/05/91	03/06/91	03/07/91	03/07/91	06/09/93	06/09/93	06/09/93
DEPTH SAMPLED (FT)	20-34	~1	~1	11	(4)	8	12	15	(4)	11	~2	13	3-3.5	0.5-1	0.5-1
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	9730	9090	3560	13200	8610	7900	10500	8530	11100	5890	700	4980	12800	17000 J	8240 J
Arsenic	4.9	3.2	2	4.3	2.4	4.5	4.4	5.3	3.3	2.4		2.2	8.1	8.6 J	6.5 J
Barium	70.2	75.4	21	71	32	44	58	27	77	17	11400	18	85.5 J	203 J	179 J
Beryllium	0.57	0.41	0.24	0.51	0.29		0.4	0.33	0.48	0.25		0.17	0.85 B		0.92 J
Cadmium		1.9	0.74 J												
Calcium	900	860	580	480	280	490	320	220	370	440	100	340	1040 B	3680 J	2890 J
Chromium	9.1	10	3.4	11	7.6	7	8.7	7.9	9.1	5	0.95 J	4.2	15.7	20.7 J	9.3 J
Cobalt	8.3	6.4	4.9	9.8	6.8	5.8	8	7.4	7.4	4.8		3.5	12.9 B	10.9 J	5.7 J
Copper	12	18	8	12	11	12	19	12	14	11	1.9	6.7	42.5 J	277 J	203 J
Iron	19800	14500	9620	22300	15900	13900	18600	16700	16800	10500	1300	9470	22000	33200 J	15200 J
Lead	6.6	0.23 J	7	11	5.1	11	11	8.2	11	6.9	0.83	4.4	4.6 J	104 J	78.1 J
Magnesium	3580	2890	1740	2740	2280	1800	2390	2540	2280	1770	210	1520	3610	5020 J	2560 J
Manganese	472	614	180	1650	537	513	621	795	923	210	34	133	R	R	R
Mercury		0.1			0.041 J				0.19				R	R	R
Nickel	18	15	8.4	15	12	11	15	13	14	9.7	1.6 J	7.7	22.9 J	34.9 J	
Potassium	1100	990	660	1100	830	830	920	760	820	520	71	580	2020	2050 J	1160 J
Selenium						0.2 J									
Silver						0.33 J									
Sodium	63	11 J			52 J	47 J	40 J	63	71	19 J	76	32 J	232 B	113 J	85.7 J
Vanadium	9.4	10	4	15	9.7	8.5	11	9.9	11	6	0.93 J	4.7	13.9 B	19.1 J	15.8 J
Zinc	52	70	340	54	40	46	49	38	51	38	16	37	202	466 J	428 J
Cyanide															1.2 J

Notes:

1) Blank spaces indicate the parameter was not detected.
2) NA = Not Analyzed; ND = Not Detected.
3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.
4) Sample TP12-S1 taken from spoils pile; Sample TP22-S3 taken from soil inside a drum.

TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B	MW-01B	MW-01B	MW-01C	MW-01C	MW-01C
DATE	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride							1340				
Chloroethane										7.00	
Acetone				R				R			
Carbon Disulfide											
1,1-Dichloroethane						556	898		11.5	10.6	
cis-1,2-Dichloroethene	NA	NA	NA		NA	NA	NA		NA	NA	NA
Total 1,2-Dichloroethene				NA	803	36.5 J	4500	NA			
Chloroform							119				
2-Butanone				R		1630		R		21.7	
1,2-Dichloroethane											
1,1,1-Trichloroethane						68.9	635				
1,2-Dichloropropane											
Trichloroethene							54.8				
Benzene						42.8	79.5			2.58	
4-Methyl-2-Pentanone				R		72.1	1490	R	13.5		
Tetrachloroethene										3030	
Toluene					5690	4200	6980	610	76.7	98.6	29.7
Chlorobenzene						33.8 J	25.0 J	14 J		4.48	8.68
Ethylbenzene						133	175	24 J	7.37	23.9	15.5
2-Methyl-3-hexanone			NA	NA			NA	NA			NA
m-Xylene				NA		242	276	NA	9.18	23.6	6.14
o+p-Xylenes				NA		241	269	NA	9.74	28.0	15.5
Total Xylenes	NA	NA	NA		NA	NA	NA	79	NA	NA	NA
1,3-Dichlorobenzene	NA	NA	NA		NA	NA	NA		NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA		NA	NA	NA	22 J	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA		NA	NA	NA		NA	NA	NA
TOTAL VOLATILES	ND	ND	ND	ND	6493	7256.1	16841.3	749	127.99	3250.46	75.52

Notes:
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3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.

TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B	MW-01B	MW-01B	MW-01C	MW-01C	MW-01C
DATE	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol							97.6				
1,3-Dichlorobenzene					4.58 J			2 J			
1,4-Dichlorobenzene					62.3	70.2	34.8	15	10.1 J	10.3 J	5.85 J
Benzyl alcohol				NA				NA			
1,2-Dichlorobenzene					20.6	22.2	13.4	4 J		0.852 J	
2-Methylphenol							28.7	9 J			6.06 J
4-Methylphenol							84.4	14			
Isophorone					8.02 J		35.5				
2,4-Dimethylphenol							37.1	6 J			
Benzoic acid					530		1570	2 J			
1,2,4-Trichlorobenzene					36.0	32.8	27.1	6 J			
Naphthalene					36.1	43.9	35.7	10	13.5 J	12.7 J	9.89 J
4-Chloro-3-methylphenol							7.24 J	3 J			
2-Methylnaphthalene					13.4	10.6 J	13.7	4 J	2.6	2.24 J	
4-Nitrophenol											
4-Chlorophenyl-phenylether									4.38 J		
bis-(2-Ethylhexyl)phthalate					2.68 J						
Di-n-Octylphthalate											
Diethylphthalate								3 J			
Di-n-butylphthalate								1 J			
Butylbenzylphthalate											
TOTAL SEMIVOLATILES	ND	ND	ND	ND	713.68	179.7	1985.24	79	30.58	26.092	21.8
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	ND	ND	NA	NA	ND	ND	NA	NA	ND	NA	NA

Notes:
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2) NA - Not Analyzed, ND - Not Detected.
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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B	MW-01B	MW-01B	MW-01C	MW-01C	MW-01C
DATE	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	5330	350	77 J	3860	66200	150		163 B	83300		
Antimony							15 J				19 J
Arsenic	6.0	2.9 J		4 B	160	67	52	57.8	130	94	66
Barium	140	120	120	154 B	4290	1230	1400	862	1040	540	240
Beryllium					13	0.19 J					
Cadmium						1.1 J					
Calcium	43100	43700	48200	44100 J	48400	44600	52000	41100	40200	54300	35900
Chromium			2.1 J	8.7 B	121	3.4 J	4.4 J		62		
Cobalt					167				97	11 J	8.3 J
Copper		2.9 J		6.9 B	274	2.1 J			119		
Iron	8480	1000	940	6120	168000	65100	74700	55400	170000	110000	63100
Lead	11		3.1 J	4.9			1.8 J				2.6 J
Magnesium	19600	15800	16500	16300 J	38100	11700	13400	8150	17200	5880	3400
Manganese	2250	1400	1350	1840 J	56800	18700	19500	14000	9830	5240	2640
Mercury					0.23						
Nickel		3.3 J			176	3.3 J			65	8.1 J	
Potassium	6030	3000	2000	2970 B	43900	21100	22000	15300	40800	14100	11000
Silver			2.4 J			4.4 J	2.1 J				
Sodium	12800	12000	10000	8590 J	31800	23700	35000	10100	11500	8400	4100
Thallium											
Vanadium						8 J				9.8 J	
Zinc	57	6.3 J	11 J	45.1	490	6.8 J	18 J	4.10 B	212	16 J	9.4 J
Cyanide											

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01A	MW-01A	MW-01A	MW-01A	MW-01B	MW-01B	MW-01B	MW-01B	MW-01C	MW-01C	MW-01C
DATE	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89	04/14/93	01/30/87	11/04/87	07/13/89
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum				41.3 B		NA		92.3 B		72 J	
Antimony						NA					30 J
Arsenic	2.2				76	NA	11	60.4 J	85		110
Barium		110	120	144 B	1700	NA	1400	930	580	542	250
Cadmium		1.1 J				NA				1.1 J	
Calcium	39700	44200	47800	51100 J	39200	NA	53800	42700	4920	54700	35700
Chromium		1.9 J				NA	3.2 J				
Cobalt						NA		13.3 B	50	12 J	6.8 J
Copper	22	1.6 J				NA			30	2.5 J	
Iron	202	480	690	305	64200	NA		58500	161000	109000	88000
Lead			2.1 J			NA	3.1 J				
Magnesium	16600	16000	16700	18100 J	13900	NA	13300	8580	6130	5950	3300
Manganese	1880	1370	1300	2040 J	23200	NA		14700	5400	5420	2640
Nickel						NA	4.0 J			8.4 J	5.8 J
Potassium	3530	2900	2100	1590 B	24800	NA	21000	16200	11700	14000	10000
Silver						NA	5.2 J				
Sodium	12600	12000	12000	9790 J	33200	NA	31000	10700	9420	8500	3700
Thallium						NA					
Vanadium						NA				12	
Zinc	44		16 J		56	NA	23	5.4 B	52	14 J	55

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01C	MW-02A	MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B	MW-03A	MW-03A
DATE	04/14/93	01/29/87	11/03/87	07/12/89	04/13/93	01/29/87	11/03/87	07/12/89	04/15/93	01/28/87	11/03/87
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride											
Chloroethane						37.3			3		
Acetone	93 J				R				R		
Carbon Disulfide											
1,1-Dichloroethane		14.8	19.9	20.4	6	50.0	47.4	5.13	23		
cis-1,2-Dichloroethene		NA	NA	NA		NA	NA	NA		NA	NA
Total 1,2-Dichloroethene	NA				NA				NA		
Chloroform					0.6 J						
2-Butanone	R				R				R		
1,2-Dichloroethane									0.8		
1,1,1-Trichloroethane			5.31		1						
1,2-Dichloropropane									0.5 J		
Trichloroethene			1.08 J		0.8 J			5.33			
Benzene							18.9	3.06 J	3		
4-Methyl-2-Pentanone	R										
Tetrachloroethene			29.1								
Toluene	0.7 J						128				
Chlorobenzene	9						6.66		4		
Ethylbenzene	2					7.63	10.3				
2-Methyl-3-hexanone	NA				NA			NA	NA		
m-Xylene	NA				NA	13.0	16.0	NA	NA		
o+p-Xylenes	NA				NA	19.1	22.4		NA		
Total Xylenes	8	NA	NA	NA		NA	NA	NA		NA	NA
1,3-Dichlorobenzene		NA	NA	NA		NA	NA	NA	2	NA	NA
1,4-Dichlorobenzene	5	NA	NA	NA		NA	NA	NA	12	NA	NA
1,2-Dichlorobenzene		NA	NA	NA		NA	NA	NA	2	NA	NA
TOTAL VOLATILES	117.7	14.8	55.39	20.4	8.4	127.03	249.66	13.52	50.3	ND	ND

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01C	MW-02A	MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B	MW-03A	MW-03A
DATE	04/14/93	01/29/87	11/03/87	07/12/89	04/13/93	01/29/87	11/03/87	07/12/89	04/15/93	01/28/87	11/03/87
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol											
1,3-Dichlorobenzene						2.78 J	2.49 J		2 J		
1,4-Dichlorobenzene	4 J					21.8 J	19.2 J	7 J	10		
Benzyl alcohol	NA				NA				NA		
1,2-Dichlorobenzene						4.61	3.91 J		2 J		
2-Methylphenol											
4-Methylphenol	2 J										
Isophorone											
2,4-Dimethylphenol											
Benzoic acid											
1,2,4-Trichlorobenzene							1.17 J		1 J		
Naphthalene	11					4.51 J	3.26 J				
4-Chloro-3-methylphenol											
2-Methylnaphthalene											
4-Nitrophenol											
4-Chlorophenyl-phenylether											
bis-(2-Ethylhexyl)phthalate											
Di-n-Octylphthalate											
Diethylphthalate	2 J										
Di-n-butylphthalate	1 J										
Butylbenzylphthalate					2						
TOTAL SEMIVOLATILES	20	ND	ND	ND	2	33.7	30.03	7	15	ND	ND
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	NA	ND	ND	NA	NA	ND	ND	NA	NA	ND	ND

Notes:
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2) NA - Not Analyzed, ND - Not Detected.
3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.

TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01C	MW-02A	MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B	MW-03A	MW-03A
DATE	04/14/93	01/29/87	11/03/87	07/12/89	04/13/93	01/29/87	11/03/87	07/12/89	04/15/93	01/28/87	11/03/87
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	86.1 B	850	67 J		104 B	2230			93.1 B	3370	610
Antimony								120			
Arsenic	49.8					12	9.0 J	4.5 J		2.8	
Barium	161		71	59	74.8 B	440	392		134 B	120	82
Beryllium											
Cadmium											
Calcium	22800	21500	21700	20800	18900	22700	34700	12000	13000	13600	15200
Chromium										12	2.5 J
Cobalt	11.8 B										
Copper											
Iron	45400	1550	180	81 J	42 B	8160	4500	1300	108	6440	890
Lead			6020	1.9 J					2 J		
Magnesium	1910 B	7320	791	6000	5180	9840	9220	2900	2970 B	6630	4700
Manganese	1830	1060		410	125	12800	11700	2440	1500	883	120
Mercury											
Nickel			4.6 J				4.1 J				
Potassium	4460 B	2540	1100	600		4520	5400	2600	3870 B	4730	2200
Silver											
Sodium	2100 B	5380	3700	3900	3840 B	37200	46900	37000	32200	10800	7600
Thallium											
Vanadium											
Zinc	11.7 B	26	5.8 J	12 J		12		50		145	5.9 J
Cyanide											

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-01C	MW-02A	MW-02A	MW-02A	MW-02A	MW-02B	MW-02B	MW-02B	MW-02B	MW-03A	MW-03A
DATE	04/14/93	01/29/87	11/03/87	07/12/89	04/13/93	01/29/87	11/03/87	07/12/89	04/15/93	01/28/87	11/03/87
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	56.2 B		29 J		54.6 B		210		74.9 B		160
Antimony				19 J							
Arsenic	52.2 J					5.0	7.9 J	2.9 J			
Barium	179 B		73	62	80.9 B	210	390	110	144 B		78
Cadmium							1.9 J				1.2 J
Calcium	24500	39000	22400	21500	20200	17300	34500	12000	13300		15600
Chromium			2.2 J				4.2 J				
Cobalt	11.9 B										
Copper							6.4 J				
Iron	49400		130 J	67 J		2150	4700	1100			
Lead											
Magnesium	2080 B	6700	6200	6200	5540	9250	9240	2800	3070 B	4880	4600
Manganese	2000	1030	819	430	122	11800	11600	2300	1580	718	140
Nickel			2.6 J								2.3 J
Potassium	4600 B	1700	1100	600		4080	5400	2700	3260 B	2400	2200
Silver							2.7 J				
Sodium	2200 B	5660	3900	4600	3980 B	45200	46600	41000	34000	12200	7900
Thallium											
Vanadium											3.3 J
Zinc		33	10 J			54	4.0 J	13 J		85	6.9 J

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-03A	MW-03A	MW-03B	MW-03B	MW-03B	MW-03B	MW-04B	MW-04B	MW-04B	MW-05	MW-05
DATE	07/11/89	04/19/93	01/29/87	11/03/87	07/11/89	04/19/93	12/14/87	07/12/89	04/15/93	12/14/87	07/11/89
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride											
Chloroethane											
Acetone		R				R			R		
Carbon Disulfide											
1,1-Dichloroethane											
cis-1,2-Dichloroethene	NA		NA	NA	NA		NA	NA		NA	NA
Total 1,2-Dichloroethene		NA				NA			NA		
Chloroform											
2-Butanone		R				R			R		
1,2-Dichloroethane											
1,1,1-Trichloroethane											
1,2-Dichloropropane											
Trichloroethene											
Benzene											
4-Methyl-2-Pentanone	6.82 J										
Tetrachloroethene				127							
Toluene											
Chlorobenzene											
Ethylbenzene											
2-Methyl-3-hexanone	NA	NA			NA	NA		NA	NA		NA
m-Xylene		NA				NA			NA		
o+p-Xylenes		NA				NA			NA		
Total Xylenes	NA		NA	NA	NA		NA	NA		NA	NA
1,3-Dichlorobenzene	NA		NA	NA	NA		NA	NA		NA	NA
1,4-Dichlorobenzene	NA		NA	NA	NA		NA	NA		NA	NA
1,2-Dichlorobenzene	NA		NA	NA	NA		NA	NA		NA	NA
TOTAL VOLATILES	6.82	ND	ND	127	ND	ND	ND	ND	ND	ND	ND

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-03A	MW-03A	MW-03B	MW-03B	MW-03B	MW-03B	MW-04B	MW-04B	MW-04B	MW-05	MW-05
DATE	07/11/89	04/19/93	01/29/87	11/03/87	07/11/89	04/19/93	12/14/87	07/12/89	04/15/93	12/14/87	07/11/89
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol											
1,3-Dichlorobenzene											
1,4-Dichlorobenzene											
Benzyl alcohol		NA				NA			NA		
1,2-Dichlorobenzene											
2-Methylphenol											
4-Methylphenol											
Isophorone											
2,4-Dimethylphenol											
Benzoic acid											
1,2,4-Trichlorobenzene											
Naphthalene											
4-Chloro-3-methylphenol											
2-Methylnaphthalene											
4-Nitrophenol											
4-Chlorophenyl-phenylether											
bis-(2-Ethylhexyl)phthalate											
Di-n-Octylphthalate											10.2 J
Diethylphthalate											
Di-n-butylphthalate											
Butylbenzylphthalate									1 J		
TOTAL SEMIVOLATILES	ND	ND	ND	ND	ND	ND	ND	ND	1	ND	10.2
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	NA	NA	ND	ND	NA	NA	ND	NA	NA	ND	NA

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA - Not Analyzed, ND - Not Detected.
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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-03A	MW-03A	MW-03B	MW-03B	MW-03B	MW-03B	MW-04B	MW-04B	MW-04B	MW-05	MW-05
DATE	07/11/89	04/19/93	01/29/87	11/03/87	07/11/89	04/19/93	12/14/87	07/12/89	04/15/93	12/14/87	07/11/89
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	260	98.1 B	9130	43 J	110	444	41 J		128 B	210	110
Antimony											
Arsenic			7.4								
Barium	60	79.7 B	770	562	850	88.2 B	53	50	53.4 B	170	110
Beryllium				0.24 J							
Cadmium								0.61 J			
Calcium	15000	17600	33800	35000	51000	10200	13200	11000	10700	14100	9700
Chromium			18		3.0 J						4.5 J
Cobalt							4.2 J				
Copper			27	3.8 J							
Iron	430	49.5 B	18000	58 J	170	124	43 J	140 J	96.1 B	250	200
Lead	3.8 J		10		2.7 J			1.3 J			
Magnesium	4100	4880 B	17500	10900	13500	1770 B	5580	4000	3870 B	3200	2100
Manganese	45	5.5 B	1020	170	140	51.3 J	1770	711	81.5	81	36
Mercury											
Nickel				7.4 J	5.2 J		4.4 J	4.3 J			
Potassium	2300	1860 B	11200	2900	2900	1820 B	3400	1500	1470 B	1500	1100
Silver											
Sodium	7800	8980 J	42400	33300	68500	28100 J	3500	6700	4220 B	7600	6300
Thallium											
Vanadium				3.9 J							
Zinc	5.0 J	6.4 B	55	6.6 J	67	10 B	9.6 J	30	13.7 B	5.4 J	9.6 J
Cyanide											

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-03A	MW-03A	MW-03B	MW-03B	MW-03B	MW-03B	MW-04B	MW-04B	MW-04B	MW-05	MW-05
DATE	07/11/89	04/19/93	01/29/87	11/03/87	07/11/89	04/19/93	12/14/87	07/12/89	04/15/93	12/14/87	07/11/89
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum		62.4 B		65 J	98 J	129 B			59.1 B		
Antimony											
Arsenic											
Barium	55	86 B	500	549	750	89.6 B	50	49	56.6 B	190	100
Cadmium				1.7 J							
Calcium	14000	19100	36900	34600	48300	10700	12500	11000	11100	16100	9400
Chromium				1.9 J	5.9 J						
Cobalt							4.5 J				
Copper				1.6 J				2.8 J		1.3 J	
Iron	35 J			73 J	53 J		45 J	91 J			
Lead	2.5 J				4.6 J			2.6 J			
Magnesium	3900	5350	13600	11000	13600	1890 B	5270	3900	4040 B	3550	2000
Manganese	22	1.2 B	247	160	130	40.4	3120	722	60.9	41	11
Nickel				7.7 J	6.0 J		6.8 J	4.9 J			
Potassium	2100	1950 B	3080	560	2700	1630 B	3000	1500		1500	1100
Silver											
Sodium	7600	9750	41200	33300	67200	30500	3500	5600	4370 B	8700	6400
Thallium								2.6 J			
Vanadium				3.3 J							
Zinc	34	5.6 B	42	11 J	28	8.6 B	14 J	43	12.3 B	20	16 J

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-05	MW-06A	MW-06A	MW-06A	MW-06B	MW-06B	MW-06B	MW-07A	MW-07A	MW-07A	MW-07B
DATE	04/16/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/19/93	12/15/87
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride		19	40.4	16							
Chloroethane		6.95	9.33 J	8							2.92 J
Acetone	R			R			R			R	
Carbon Disulfide											
1,1-Dichloroethane		84.3	161	100		42.9	11	27.2	11.2	8	55
cis-1,2-Dichloroethene		NA	NA	51	NA	NA		NA	NA	0.6 J	NA
Total 1,2-Dichloroethene	NA	146	141	NA		6.98	NA	10.6		NA	
Chloroform		5.4	7.19	3 J				12	4.78 J	3	
2-Butanone	R			R			R			R	
1,2-Dichloroethane											
1,1,1-Trichloroethane		8.44	9.10	3 J		3.44 J					
1,2-Dichloropropane											
Trichloroethene		9.47	9.55	12		5.28	10				
Benzene		2.97 J	4.32 J			17.2	6 J	57.4	3.73 J	3	11.3
4-Methyl-2-Pentanone											
Tetrachloroethene		3.49 J	4.11 J							0.9 J	
Toluene						78.6	97				
Chlorobenzene		3.69 J	5.66	7		4.7 J					
Ethylbenzene						9.49					
2-Methyl-3-hexanone	NA		NA	NA		NA	NA			NA	
m-Xylene	NA			NA		6.52	NA			NA	
o+p-Xylenes	NA			NA		16.7	NA			NA	
Total Xylenes		NA	NA		NA	NA	13	NA	NA		NA
1,3-Dichlorobenzene		NA	NA		NA	NA		NA	NA		NA
1,4-Dichlorobenzene		NA	NA	13	NA	NA	5	NA	NA	0.5 J	NA
1,2-Dichlorobenzene		NA	NA	7	NA	NA		NA	NA		NA
TOTAL VOLATILES	ND	289.71	391.66	220	ND	191.81	142	107.2	19.71	16	69.22

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-05	MW-06A	MW-06A	MW-06A	MW-06B	MW-06B	MW-06B	MW-07A	MW-07A	MW-07A	MW-07B
DATE	04/16/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/19/93	12/15/87
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol											
1,3-Dichlorobenzene				1 J							1.9 J
1,4-Dichlorobenzene		4.39 J	11.8	10	6.3 J	9 J	4 J				11.1
Benzyl alcohol	NA			NA			NA			NA	
1,2-Dichlorobenzene		3.7 J	8.73 J	6 J		2 J	1 J				2.6 J
2-Methylphenol											
4-Methylphenol											
Isophorone											
2,4-Dimethylphenol											
Benzoic acid											
1,2,4-Trichlorobenzene			2.33 J	2 J		3 J	2 J				
Naphthalene											
4-Chloro-3-methylphenol											
2-Methylnaphthalene											
4-Nitrophenol										1 J	
4-Chlorophenyl-phenylether											
bis-(2-Ethylhexyl)phthalate									27.3		
Di-n-Octylphthalate						20					
Diethylphthalate											
Di-n-butylphthalate											
Butylbenzylphthalate											
TOTAL SEMIVOLATILES	ND	8.09	22.86	19	6.3	34	7	ND	27.3	1	15.6
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	NA	ND	NA	NA	ND	NA	NA	NA	NA	NA	NA

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-05	MW-06A	MW-06A	MW-06A	MW-06B	MW-06B	MW-06B	MW-07A	MW-07A	MW-07A	MW-07B
DATE	04/16/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/19/93	12/15/87
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	120 B	290		167 B	500		730	210		91.6 B	
Antimony						31 J					
Arsenic					38	55	32.7				
Barium	157 B	86	120	118 B	384	690	214	55	27	39.1 B	260
Beryllium											
Cadmium			0.47 J								
Calcium	14100	24400	40000	41600	29300	39200	17000	19700	15000	16300	344400
Chromium					8.1 J	6.5 J					2.1 J
Cobalt					4.7 J	4.8 J					4.6 J
Copper		1.6 J			2.9 J						3 J
Iron	102	420	99 J	180	7800	19300	4880	290			55 J
Lead			1.3 J			1.4 J	3.4		2.8 J		
Magnesium	3090 B	8320	13200	13800	6750	8300	3300 B	7730	5800	6110	7570
Manganese	17.7	300	110	63.4	19900	32100	13200	558	150	22 J	25500
Mercury											
Nickel					6.3 J	6.1 J					5.3 J
Potassium	1620 B	910	1100		2400	2600	2040 B	2100	510		8100
Silver		3.5 J	3.0 J		4.7 J	2.4 J					
Sodium	15900	7900	10000	10800	9700	9800	12100	6200	4100	4490 J	13000
Thallium		2.6 J									
Vanadium											
Zinc	6.6 B	5.3 J	43		9.8 J	22	25.1	20	32	8.2 B	12 J
Cyanide											

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-05	MW-06A	MW-06A	MW-06A	MW-06B	MW-06B	MW-06B	MW-07A	MW-07A	MW-07A	MW-07B
DATE	04/16/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/15/93	12/15/87	07/12/89	04/19/93	12/15/87
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	80.2 B			51 B			68.3 B			62.7 B	
Antimony						18 J					
Arsenic					50	72	32.7 J				
Barium	170 B	83	120	127 B	382	720	253 J	260	28	39.5 B	54
Cadmium											
Calcium	14900	24300	40300	44000	26900	39600	19700 J	34300	16000	17000	19600
Chromium						4.8 J		3.7 J			
Cobalt						5.5 J					
Copper		3.3 J						3 J			4 J
Iron		35 J	43 J		7700	19500	4580	26 J	52 J		
Lead		1.8 J	1.6 J			3.2 J					
Magnesium	3310 B	8160	13300	14700	6140	8500	3680 B	7590	5900	6400	7680
Manganese	18.5	285	110	58.6	18000	32900	15500 J	24800	150	22.1	541
Nickel					4 J	5.0 J		4.2 J			
Potassium	1710 B	860	1100	1470 B	2200	3000	2070 B	4200	500		1000
Silver					3.2 J	4.4 J					
Sodium	16800	8000	10000	11500	9100	11000	14200 J	13000	4500	4810 B	6100
Thallium											
Vanadium											
Zinc		20	30		8.7 J	110		12 J	8.7 J	10.10 B	14 J

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-07B	MW-08A	MW-08A	MW08A	MW-08B	MW-08B	MW-08B	MW-09	MW-09	MW-09	MW-10
DATE	04/13/93	12/16/87	07/13/89	04/20/93	12/16/87	07/19/89	04/20/93	12/16/87	07/12/89	04/16/93	12/16/87
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride									24.7		
Chloroethane	3										
Acetone	R			R			R			R	
Carbon Disulfide				2							
1,1-Dichloroethane	21						1		2.63 J	12 J	
cis-1,2-Dichloroethene		NA	NA		NA	NA		NA	NA	11 J	NA
Total 1,2-Dichloroethene	NA			NA			NA		53.5	NA	
Chloroform											
2-Butanone	R			R			R			R	
1,2-Dichloroethane	1 J										
1,1,1-Trichloroethane									3.28 J	32	
1,2-Dichloropropane	0.5 J										
Trichloroethene	0.5 J								6.54	260	
Benzene	3							118	357	13	10
4-Methyl-2-Pentanone											
Tetrachloroethene									11.5	79	
Toluene	12							390	3910	39	
Chlorobenzene	6										66.7
Ethylbenzene	1								22.4		13.5
2-Methyl-3-hexanone	NA		NA	NA		NA	NA		NA	NA	
m-Xylene	NA			NA			NA			NA	
o+p-Xylenes	NA			NA			NA	191		NA	
Total Xylenes	3	NA	NA		NA	NA		NA	NA	21	NA
1,3-Dichlorobenzene	2	NA	NA		NA	NA		NA	NA		NA
1,4-Dichlorobenzene	14	NA	NA		NA	NA		NA	NA		NA
1,2-Dichlorobenzene	3	NA	NA		NA	NA		NA	NA		NA
TOTAL VOLATILES	70	ND	ND	2	ND	ND	1	699	4391.55	467	90.2

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-07B	MW-08A	MW-08A	MW08A	MW-08B	MW-08B	MW-08B	MW-09	MW-09	MW-09	MW-10
DATE	04/13/93	12/16/87	07/13/89	04/20/93	12/16/87	07/19/89	04/20/93	12/16/87	07/12/89	04/16/93	12/16/87
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol											
1,3-Dichlorobenzene	2 J										
1,4-Dichlorobenzene	9 J							4.02 J	4 J	3 J	10.7
Benzyl alcohol	NA			NA			NA		4 J	NA	
1,2-Dichlorobenzene	2 J										4.84
2-Methylphenol											
4-Methylphenol											
Isophorone											
2,4-Dimethylphenol											
Benzoic acid											
1,2,4-Trichlorobenzene	2 J										
Naphthalene										1 J	8.68
4-Chloro-3-methylphenol											
2-Methylnaphthalene											
4-Nitrophenol											
4-Chlorophenyl-phenylether											
bis-(2-Ethylhexyl)phthalate											
Di-n-Octylphthalate											
Diethylphthalate											
Di-n-butylphthalate				1 J							
Butylbenzylphthalate											
TOTAL SEMIVOLATILES	15	ND	ND	1	ND	ND	ND	4.02	8	4	24.22
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	NA	ND	NA	NA	NA	NA	NA	ND	NA	NA	ND

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-07B	MW-08A	MW-08A	MW08A	MW-08B	MW-08B	MW-08B	MW-09	MW-09	MW-09	MW-10
DATE	04/13/93	12/16/87	07/13/89	04/20/93	12/16/87	07/19/89	04/20/93	12/16/87	07/12/89	04/16/93	12/16/87
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	61.4 B	180		114 B	230	100	173 B	4 J		191 B	61 J
Antimony									31 J		
Arsenic								38	44	34.4	31 J
Barium	264	15	8.1 J	14.8 B	18	14 J	21.1 B	691	380	244	1000
Beryllium											
Cadmium						0.41 J			0.86 J		
Calcium	23800	7200	7500	5060	7500	7300	7140	41800	19000	12000	44900
Chromium								5.3 J	4.1 J		4.9 J
Cobalt											
Copper			5.5 J				4.5 B	2.5 J			2.5 J
Iron	157	200	93 J	74.2 B	290	240	130	30200	22000	12400	61400
Lead			2.1 J			1.2 J					
Magnesium	4410 B	2400	2500	1620 B	2500	2400	2290 B	8160	4400	2520 B	9790
Manganese	21600	140		6.5 B	347	14	21 J	20500	12000	6560	21400
Mercury											
Nickel						13 J					3.4 J
Potassium	4010 B	950	480 J		1300	410 J		9600	4600	2790 B	19300
Silver									4.1 J		4.1 J
Sodium	R	1100	1400	1550 B	1500	1500	1530 B	7900	3700	3820 B	11000
Thallium									2.6 J		
Vanadium											3.3 J
Zinc		11 J	53		5.4 J	5.9 J	5.4 B	8 J	9.3 J	5.9 B	36
Cyanide							12.8				

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT										
PARAMETER	MW-07B	MW-08A	MW-08A	MW08A	MW-08B	MW-08B	MW-08B	MW-09	MW-09	MW-09	MW-10
DATE	04/13/93	12/16/87	07/13/89	04/20/93	12/16/87	07/19/89	04/20/93	12/16/87	07/12/89	04/16/93	12/16/87
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	44.5 B	41 J		75.1 B	53 J		76.70 B	64 J		64.20 B	
Antimony			15 J								
Arsenic	3 J							39	53	35.8 J	31
Barium	282	15	8.1 J	13.1 B	15	10 J	16.50 B	691	380	268	1050
Cadmium			0.63						0.91 J		
Calcium	25000	8100	7600	5390	7300	7500	7380	41200	19000	12600	47700
Chromium					9.4 J						6.8 J
Cobalt											
Copper		6 J			4 J			3.3 J			1.6 J
Iron	98.3 B				41 J			30100	21700	13200	72100
Lead			2.3 J			3.0 J			2.5 J		1.1 J
Magnesium	4650 B	2700	2500	1730 B	2400	2400	2370 B	8100	4400	2610 B	10400
Manganese	22900	140		1.1 B	302		3.90 B	20600	12000	6940	22100
Nickel		2.7 J									
Potassium	4780 B	660	480 J		660	350		9600	4900	3050 B	19900
Silver								4.1 J	3.5 J		4.4 J
Sodium	R	1300	1300	1650 B	1400	1300	1590 B	7800	3500	4000 B	12100
Thallium											
Vanadium											5.4 J
Zinc	6.1 B	7.8 J	26		10 J			22	19 J	5.60 B	9.7 J

Notes:
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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT							
PARAMETER	MW-10	MW-10	MW-12	MW-13	TTW-01	TTW-01	TTW-01	TTW-01
DATE	07/12/89	04/14/93	04/19/93	04/20/93	01/30/87	11/18/87	07/13/89	04/15/93
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Vinyl Chloride		38 J						
Chloroethane								
Acetone		R	R	R				R
Carbon Disulfide								
1,1-Dichloroethane	21.6 J	50						
cis-1,2-Dichloroethene	NA	190			NA	NA	NA	
Total 1,2-Dichloroethene	172	NA	NA	NA				NA
Chloroform								
2-Butanone		R	R	R				R
1,2-Dichloroethane								
1,1,1-Trichloroethane	42.4 J	77						
1,2-Dichloropropane								
Trichloroethene		110						
Benzene	26.3 J	29 J						
4-Methyl-2-Pentanone	129	R						
Tetrachloroethene								
Toluene	666	1100						
Chlorobenzene	115	72						
Ethylbenzene	58.7	76						
2-Methyl-3-hexanone	NA	NA	NA	NA			NA	NA
m-Xylene		NA	NA	NA		2.42 J		NA
o+p-Xylenes		NA	NA	NA				NA
Total Xylenes	NA	270			NA	NA	NA	
1,3-Dichlorobenzene	NA				NA	NA	NA	
1,4-Dichlorobenzene	NA	37 J			NA	NA	NA	
1,2-Dichlorobenzene	NA				NA	NA	NA	
TOTAL VOLATILES	1231	2049	ND	ND	ND	2.42	ND	ND

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TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT							
PARAMETER	MW-10	MW-10	MW-12	MW-13	TTW-01	TTW-01	TTW-01	TTW-01
DATE	07/12/89	04/14/93	04/19/93	04/20/93	01/30/87	11/18/87	07/13/89	04/15/93
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol	7.44 J							
1,3-Dichlorobenzene		2 J						
1,4-Dichlorobenzene	27.1	24						
Benzyl alcohol		NA	NA	NA				NA
1,2-Dichlorobenzene	27.5	7 J						
2-Methylphenol	7.79 J	10						
4-Methylphenol	32.1	24						
Isophorone		3 J						
2,4-Dimethylphenol		7 J						
Benzoic acid		50 J						
1,2,4-Trichlorobenzene		3 J						
Naphthalene	33.6	6 J						
4-Chloro-3-methylphenol	3.81 J							
2-Methylnaphthalene								
4-Nitrophenol								
4-Chlorophenyl-phenylether								
bis-(2-Ethylhexyl)phthalate								
Di-n-Octylphthalate								
Diethylphthalate		4 J						
Di-n-butylphthalate		1 J						
Butylbenzylphthalate		1 J						
TOTAL SEMIVOLATILES	139.34	142	ND	ND	ND	ND	ND	ND
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
TOTAL PESTICIDES/PCBs	NA	NA	NA	NA	ND	ND	NA	NA

Notes:
1) Blank spaces indicate the parameter was not detected.
2) NA - Not Analyzed, ND - Not Detected.
3) J - Estimated (Semiquantitative) Data, B - Acceptable (Quantitative) Data between IDL and CRDL, R - Unusable Data.

TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT							
PARAMETER	MW-10	MW-10	MW-12	MW-13	TTW-01	TTW-01	TTW-01	TTW-01
DATE	07/12/89	04/14/93	04/19/93	04/20/93	01/30/87	11/18/87	07/13/89	04/15/93
INORGANICS (UNFILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	33 J	82 B	107 B	285				105 B
Antimony	27 J						28 J	
Arsenic	16	46.3 J						
Barium	1200	847	79.5 B	15.4 B		58	57	55.9 B
Beryllium								
Cadmium						0.91 J	1.1 J	
Calcium	56200	40600	17600	5020	18300	21500	23500	20700
Chromium	6.1							
Cobalt		11.8 B						
Copper						3.8 J	7.1 J	
Iron	67000	68200				73 J	130	366
Lead							1.4 J	
Magnesium	11300	7740	4890 B	1620 B	6330	6100	6300	5790
Manganese	21600	16700	5.8 B	9.6 B	70	78	74	70.9
Mercury								
Nickel	5.6 J							
Potassium	17000	14100	2410 B	1490 B	1180	1200	1000	1520 B
Silver								
Sodium	16000	12200	8910 J	1610 B	5530	5800	5800	6540
Thallium								
Vanadium								
Zinc	11 J	9.8 B	6.6 B		10	28	53	
Cyanide								

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R - Unusable Data.

TABLE 3
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR GROUNDWATER SAMPLES

	SAMPLE POINT							
PARAMETER	MW-10	MW-10	MW-12	MW-13	TTW-01	TTW-01	TTW-01	TTW-01
DATE	07/12/89	04/14/93	04/19/93	04/20/93	01/30/87	11/18/87	07/13/89	04/15/93
INORGANICS (FILTERED)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum		36.50 B	73.4 B	49 B		18 J		NA
Antimony	40 J							NA
Arsenic	64	61.9 J						NA
Barium	1300	905	85.7 B	13 B		58		NA
Cadmium						1.1 J		NA
Calcium	57700	41500	19000	5360	17500	21300		NA
Chromium	4.4 J							NA
Cobalt		13.3 B						NA
Copper			4.7 B			5.1 J		NA
Iron	112000	70900			58	70 J		NA
Lead	3.1 J							NA
Magnesium	11200	7950	5330	1720 B	5970	6090		NA
Manganese	22100	17400	1.8 B	1.4 B	83	78		NA
Nickel								NA
Potassium	18000	14800 J	2160 B		1240	1200		NA
Silver	3.5 J							NA
Sodium	15000	12200	9770	1550 B	5970	5900		NA
Thallium								NA
Vanadium								NA
Zinc	25	5.60 B	7.4 B		18	9.8 J		NA

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT												
PARAMETER	DR-01	DR-02	DR-03	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07	SW-08	SW-09	SW-10
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	04/15/93	04/15/93	04/13/93	06/08/93
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Chloroethane	12.1												
Acetone											34 J	R	R
Carbon Disulfide										11			
1,1-Dichloroethane	31.5	18.7				25.3							
cis-1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA				
Total 1,2-Dichloroethene						45.5				NA	NA	NA	NA
2-Butanone	3 J									R	R	R	R
1,1,1-Trichloroethane													
Trichloroethene						13.1							
Benzene		4.08 J											
Tetrachloroethene						1.85 J							
Toluene		31.6			4.67	1.72 J							
Chlorobenzene	0.59 J	3.63 J											
Ethylbenzene	0.666 J	3.91 J											
Tetrahydrofuran	23.1	8.96 J		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Xylene		10				5.49				NA	NA	NA	NA
o+p-Xylenes	4.82 J	16								NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA				
1,2-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA				
TOTAL VOLATILES	75.78	96.88	ND	ND	4.67	92.96	ND	ND	ND	11	34	ND	ND

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT												
PARAMETER	DR-01	DR-02	DR-03	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07	SW-08	SW-09	SW-10
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	04/15/93	04/15/93	04/13/93	06/08/93
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol					24.0 J								
1,3-Dichlorobenzene	6.81 J												
1,4-Dichlorobenzene	51.7	6.31 J	2.67 J										
Benzyl Alcohol					8.41 J					NA	NA	NA	NA
1,2-Dichlorobenzene	10 J												
4-Methylphenol					16.0 J								
Isophorone													1 J
Benzoic acid						4.02 J							
1,2,4-Trichlorobenzene	2.17 J												
Naphthalene	11.8												
2-Methylnaphthalene	3.55 J												
4-Nitroaniline													
Pentachlorophenol													2 J
Di-n-butylphthalate						2.50 J	8.21 J	2.29 J					
Butylbenzylphthalate											2 J		
bis(2-Ethylhexyl)phthalate													
TOTAL SEMIVOLATILES	86.03	6.31	2.67	ND	48.41	6.52	8.21	2.29	ND	ND	2	ND	3
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
beta-BHC				NA	NA	NA	NA	NA	NA		0.012 J		
TOTAL PESTICIDES/PCBs	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	0.012	ND	ND

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT												
PARAMETER	DR-01	DR-02	DR-03	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07	SW-08	SW-09	SW-10
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	10/27/87	04/15/93	04/15/93	04/13/93	06/08/93
INORGANICS	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	200	41 J	58 J	260	730	110 J	140 J	62 J		3900	767	69.4	8100 J
Antimony		14 J	16 J										
Arsenic	76	4.9 J	4 J					24	2.4 J			32.2	173 J
Barium	1100	130	130	23	130	40	25	110	74	68.5	25.3	12.8	557
Cadmium	0.86 J												
Calcium	38900	12000	13000	7500	15400	11000	12000	12000	62300	11300	7880	4630	15300
Chromium	14	5 J	4.3 J										8.3
Cobalt			5.3 J	5.2 J	7.1 J	5.2 J							19.10
Copper					10 J	6.3 J			60	7.4	12.8		16.5
Iron	51700	3300	1800	690	41800	8300	4300	7400	400	3870	1260	42	77400
Lead	1.9 J	2.1 J	1.4 J	1.7 J	9.0	1.7 J	2.7 J	1.7 J		8.4			20.5
Magnesium	10100	2800	3100	1800	2300	1900	2000	2700	5180	3440	1540	1460	4310
Manganese	31000	3980	4690	220	2090	1970	110	2640	1890	220	150	1.5	R
Mercury				0.10 J		0.10 J	0.10 J	0.10 J	0.10 J				
Nickel							5.0 J		5.9 J				17.1
Potassium	7700	1500	1500	5400	16500	10500	7500	5900	8000	3680	2850		8510
Silver	4.4 J												
Sodium	14000	6100	6300	900	350	1500	1400	3300	40200	1310	2060	1300	7530
Vanadium													
Zinc	9.3 J			34	47	54	26	21	25	40.5	72.9		107 J

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT											
PARAMETER	SW-11	SW-12	SW-13	SW-15	SW-DRD	SW-DRD	SW-DRD	SW-DRD	SW-DRU	SW-DRU	SW-DRU	SW-DRU
DATE SAMPLED	06/08/93	06/09/93	06/09/93	06/09/93	01/31/87	10/30/87	07/11/89	06/08/93	01/31/87	10/30/87	07/11/89	06/08/93
VOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Chloroethane												
Acetone	R	R	R	R				R				R
Carbon Disulfide			3									
1,1-Dichloroethane		3	0.5 J	4				2				
cis-1,2-Dichloroethene				0.5 J	NA	NA	NA		NA	NA	NA	
Total 1,2-Dichloroethene	NA	NA	NA	NA				NA				NA
2-Butanone	R	R	R	R				R				R
1,1,1-Trichloroethane												0.6 J
Trichloroethene		5		7				2				
Benzene		1		2				0.6 J				
Tetrachloroethene		0.6 J		0.9 J						8.31		
Toluene												
Chlorobenzene		0.9 J		1								
Ethylbenzene												
Tetrahydrofuran	NA	NA	NA	NA			NA	NA				NA
m-Xylene	NA	NA	NA	NA				NA				NA
o+p-Xylenes	NA	NA	NA	NA				NA				NA
1,4-Dichlorobenzene	1	3	0.5 J	3	NA	NA	NA	2	NA	NA	NA	
1,2-Dichlorobenzene		0.6 J		0.7 J	NA	NA	NA		NA	NA	NA	
TOTAL VOLATILES	1	14.1	4	19.1	ND	ND	ND	6.6	ND	8.31	ND	0.6

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT											
PARAMETER	SW-11	SW-12	SW-13	SW-15	SW-DRD	SW-DRD	SW-DRD	SW-DRD	SW-DRU	SW-DRU	SW-DRU	SW-DRU
DATE SAMPLED	06/08/93	06/09/93	06/09/93	06/09/93	01/31/87	10/30/87	07/11/89	06/08/93	01/31/87	10/30/87	07/11/89	06/08/93
SEMIVOLATILES	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Phenol	2 J		2 J	1 J							NA	
1,3-Dichlorobenzene											NA	
1,4-Dichlorobenzene		3 J		3 J				2 J				
Benzyl Alcohol	NA	NA	NA	NA				NA				NA
1,2-Dichlorobenzene												
4-Methylphenol												
Isophorone												
Benzoic acid	7 J											
1,2,4-Trichlorobenzene												
Naphthalene												
2-Methylnaphthalene												
4-Nitroaniline												
Pentachlorophenol	2 J											
Di-n-butylphthalate									2.2 J			
Butylbenzylphthalate												
bis(2-Ethylhexyl)phthalate										3.5 J		
TOTAL SEMIVOLATILES	11	3	2	4	ND	ND	ND	2	2.2	3.5	ND	ND
PESTICIDES/PCBs	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
beta-BHC											NA	
TOTAL PESTICIDES/PCBs	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	NA	ND

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TABLE 4
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SURFACE WATER SAMPLES

	SAMPLE POINT											
PARAMETER	SW-11	SW-12	SW-13	SW-15	SW-DRD	SW-DRD	SW-DRD	SW-DRD	SW-DRU	SW-DRU	SW-DRU	SW-DRU
DATE SAMPLED	06/08/93	06/09/93	06/09/93	06/09/93	01/31/87	10/30/87	07/11/89	06/08/93	01/31/87	10/30/87	07/11/89	06/08/93
INORGANICS	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Aluminum	14700 J	215 J	88.8 J	150 J		79 J				62 J	45 J	
Antimony												
Arsenic	90.6 J	36.6 J						6.6 J				4 J
Barium	662	326	80.5	268		30	28	230		29	17 J	30.2
Cadmium												
Calcium	15400	8860	7360	7500	6870	5100	6600	8930	6410	5000	6800	7360
Chromium	15.7											
Cobalt	18.6											
Copper	27											
Iron	61000	11000	1260	8290	669	110 J	430	4680		77 J	120 J	79.6
Lead	38.4	2.9 J		2.4 J			3.8 J				5.6	
Magnesium	5700	2090	1600	1770	1840	1100	1400	2060	1650	1100	1400	1620
Manganese	R	R	R	R	798	27	450	R	30	15	41	R
Mercury						0.10 J				0.10 J		
Nickel	28.1											
Potassium	9320	5040	1810	4320	1040	950	750	4300	850	920	600	
Silver												
Sodium	7500	4850	5840	4400	4980	2100	4300	4780	4810	2000	5000	6030
Vanadium	8											
Zinc	171 J	68.6	18.10 J	21 J		9.1 J	10 J	24.4 J	14	5.7 J	37	12.8 J

Notes:
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TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENT SAMPLES

	SAMPLE POINT										
PARAMETER	RB-01	RB-02	RB-03	RB-04	WPBS	R1-01	R1-02	R1-03	R2-04	R2-05	R2-06
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/88	10/30/87	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93
VOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloroethane	15.8	6.31 J									
1,1-Dichloroethane	35	22.3	147	36.3							
Trichloroethene											
Benzene	9.56	6.83 J	41 J	8.27 J							
Tetrachloroethene											
Toluene	178										
1,1,2,2-Tetrachloroethane	3.14 J										
Chlorobenzene	24.1										
Ethylbenzene	57.8	20.2	189	4.77 J							
Tetrahydrofuran			208		NA	NA	NA	NA	NA	NA	NA
m-Xylene	140					NA	NA	NA	NA	NA	NA
o+p-Xylenes	148	43.5	335	31.2		NA	NA	NA	NA	NA	NA
TOTAL VOLATILES	611.4	99.14	920	80.54	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol				607 J							
2-Chlorophenol		71.7 J									
1,4-Dichlorobenzene	85.9 J										
Benzyl alcohol		92.3 J				NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene		31.7 J									
4-Methylphenol	1590	1660	3890 J	5000				40 J			
Benzoic acid		200 J		329 J							
1,2,4-Trichlorobenzene		58.2 J									
Naphthalene											
4-Chloro-3-methylphenol		46.6 J									

Notes:
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4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENT SAMPLES

	SAMPLE POINT										
PARAMETER	RB-01	RB-02	RB-03	RB-04	WPBS	R1-01	R1-02	R1-03	R2-04	R2-05	R2-06
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/88	10/30/87	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93
2-Methylnaphthalene		27.1 J									
Fluorene											
Phenanthrene	80 J				521 J					65 J	
Anthracene		51.8 J									
Carbazole	NA	NA	NA	NA	NA						
Di-n-butylphthalate		156 J									
Fluoranthene	146 J	100 J			504 J		45 J			82 J	
Pyrene	133 J	95.1 J			361 J					76 J	
Butylbenzylphthalate								42 J			43 J
3,3'-Dichlorobenzidine											
Benzo(a)anthracene								80 J			
Chrysene								66 J			
bis(2-Ethylhexyl)phthalate			1230 J								
Benzo(b)fluoranthene + Benzo(k)fluoranthene	90.7 J							180 JN		64 JN	
Benzo(a)pyrene								52 J			
Indeno(1,2,3-cd)pyrene											
Benzo(g,h,i)perylene											
TOTAL SEMIVOLATILES	2125.6	2590.5	5120	5329	1386	ND	45	460	ND	287	43
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
TOTAL PESTICIDES/PCBs	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND

Notes:
1)Blank spaces indicate the parameter was not detected.
2) N/A - Not Analyzed, ND - Not Detected.
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4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENT SAMPLES

	SAMPLE POINT										
PARAMETER	RB-01	RB-02	RB-03	RB-04	WPBS	R1-01	R1-02	R1-03	R2-04	R2-05	R2-06
DATE SAMPLED	10/27/88	10/27/88	10/27/88	10/27/88	10/30/87	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	3040	5250	4780	3000	8370	2620		4530	2870	4350	4320
Antimony	3.6 J	5.6 J	4.6 J		0.94 J						
Arsenic	4.9	16	28 J	78	2.3	0.85 J	3.5 J	2 J	1.3	1.8	2.3
Barium	40	86	68	200	131	20.9		33.6	23.8	33.4 J	29 J
Beryllium	0.28 J	0.44	0.36	0.46 J	0.41			0.27			
Cadmium	0.15 J	0.28 J			0.67 J						
Calcium	260	530	480	1900	980	258	17.4	499	278	442	429
Chromium	4.6	7.2	6.2	4.8 J	7.9	2.4		4.8	2.5	2.9	3.4
Cobalt	3.7 J	5.1 J	5.1 J	2.4 J	7.8	3.5		6.8	3.7	3.3	3.7
Copper	5.1	7	6.2	5.4 J	11	2.7	2.9	4.2	3.1		
Iron	6460	18800	17800	47800	15300	5370	42.6	10300	5770	9170	10300
Lead	5.7	5.7	5.4	6.1	17	2.5	5.5	6.4	3.9	5.3 J	3.5 J
Magnesium	1300	2000	2100	1100	2530	1100		2080	1180	1720	1780
Manganese	160	468	533	2140	635	R	R	R	R	R	R
Mercury		0.046 J		0.048 J	0.058 J						
Nickel	6.1	11	9.8	9.7 J	13	5.3		11.6	6.3		9.3 J
Potassium	280	940	700	600	680	442	1960	584	455	693	600
Sodium	67 J	160 J	74 J	150 J	50					49.2	50.3
Thallium					1 J						
Vanadium	2.9 J	5.7 J	4.8 J	7.5 J	11	1.7	4	2	1.9	3.6	3.1
Zinc	33	62	41	120	66	R	R	R	R	R	R
Cyanide	1.2	0.89	8.7	2.2	NA						

Notes:
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4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R3-07	R3-08	R3-09	R4-10	R4-11	R4-12	R4-13	R4-14	R5-15	R5-16	R5-17
DATE SAMPLED	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/09/93	06/09/93	06/09/93
VOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloroethane											
1,1-Dichloroethane											
Trichloroethene	6 J										
Benzene											
Tetrachloroethene	3 J										
Toluene											
1,1,2,2-Tetrachloroethane											
Chlorobenzene											
Ethylbenzene											
Tetrahydrofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o+p-Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL VOLATILES	9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol											
2-Chlorophenol											
1,4-Dichlorobenzene				80 J	55 J	45 J			73 J	190 J	210 J
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene											
4-Methylphenol											
Benzoic acid											
1,2,4-Trichlorobenzene										63 J	69 J
Naphthalene											
4-Chloro-3-methylphenol											

Notes:
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3) J - Estimated (Semiquantitative) Data, N - Tentative Identification, R - Unusable Data.
4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R3-07	R3-08	R3-09	R4-10	R4-11	R4-12	R4-13	R4-14	R5-15	R5-16	R5-17
DATE SAMPLED	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/09/93	06/09/93	06/09/93
2-Methylnaphthalene											
Fluorene											
Phenanthrene	62 J			80 J		47 J	67 J		54 J	160 J	60 J
Anthracene											
Carbazole											
Di-n-butylphthalate											
Fluoranthene	110 J			100 J		60 J	98 J		130 J	210 J	88 J
Pyrene	110 J			93 J		54 J	71 J		130 J	210 J	87 J
Butylbenzylphthalate						43 J	52 J				
3,3'-Dichlorobenzidine											
Benzo(a)anthracene	53 J			57 J					72 J	120 J	52 J
Chrysene									60 J	74 J	47 J
bis(2-Ethylhexyl)phthalate											
Benzo(b)fluoranthene + Benzo(k)fluoranthene	99 JN			92 JN			56 JN		130 JN	160 J	110 JN
Benzo(a)pyrene										70 J	
Indeno(1,2,3-cd)pyrene											
Benzo(g,h,i)perylene											
TOTAL SEMIVOLATILES	434	ND	ND	502	55	249	344	ND	649	1257	723
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
TOTAL PESTICIDES/PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
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2) N/A - Not Analyzed, ND - Not Detected.
3) J - Estimated (Semiquantitative) Data, N - Tentative Identification, R - Unusable Data.
4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R3-07	R3-08	R3-09	R4-10	R4-11	R4-12	R4-13	R4-14	R5-15	R5-16	R5-17
DATE SAMPLED	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/10/93	06/09/93	06/09/93	06/09/93
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	3990	4880	3660	5030	5050	4240	3500	3250	3810	4760	7350
Antimony											
Arsenic	9.2	56.2	17.6	7.7	3	3.8	12.5	16.4	5.9	4.7	5.5
Barium	53.9	77	63.7	70.1 J	38.8 J	47	42.8	45.7	43.3 J	46.3 J	89 J
Beryllium		0.31	0.37			0.24					
Cadmium											
Calcium	451	407	893	419	400	300	318	341	231	227	372
Chromium	4.5	5.5	3.8	4.9	5.1	5	3.2	2.9	2.6	3.7	6.2
Cobalt	5	8.3	6.9	4.4	5.5	6.1	4.8	5.3	3.1	3	4.9
Copper	5.7	7.5	6.3		9 J	5.8	4.8	9			
Iron	10100	30900	14400	9700	9530	9580	9480	11100	7530	7750	12300
Lead	7.4	7.4	7.1	26.7 J	5.9 J	6.3	7.2	5.5	7.3 J	4.6 J	7.2 J
Magnesium	1570	1850	1580	1760	1940	1570	1480	1400	1450	1480	2250
Manganese	R	R	R	R	R	R	R	R	R	R	R
Mercury											
Nickel	8.1	10	9		11.4 J	7.6	8.2	7.9		10.8 J	9.9 J
Potassium	641	590	416	707	552	527	434	454	785	1160	1140
Sodium				64.4	46.5				42.7	55.1	59.7
Thallium											
Vanadium	2.7			4.9	4.2	2.6			3.4	4.6	8.3
Zinc	R	R	R	R	R	R	R	R	R	R	R
Cyanide											3.4

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4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R5-18	R5-19	R6-20	R6-21	R6-22	R6-23	R7-24	SS-20	SS-21	SS-22	SS-27
DATE SAMPLED	06/09/93	06/09/93	06/08/93	06/08/93	06/08/93	06/09/93	06/10/93	06/08/93	06/08/93	06/09/93	06/09/93
VOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Chloroethane											
1,1-Dichloroethane											
Trichloroethene							4 J				
Benzene											
Tetrachloroethene							1 J				
Toluene											
1,1,2,2-Tetrachloroethane											
Chlorobenzene											
Ethylbenzene											
Tetrahydrofuran	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m-Xylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o+p-Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL VOLATILES	ND	ND	ND	ND	ND	ND	5	ND	ND	ND	ND
SEMIVOLATILES	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
Phenol											
2-Chlorophenol											
1,4-Dichlorobenzene									320 J		
Benzyl alcohol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene											
4-Methylphenol										59 J	
Benzoic acid								96 J			
1,2,4-Trichlorobenzene											
Naphthalene											
4-Chloro-3-methylphenol											

Notes:
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2) N/A - Not Analyzed, ND - Not Detected.
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TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R5-18	R5-19	R6-20	R6-21	R6-22	R6-23	R7-24	SS-20	SS-21	SS-22	SS-27
DATE SAMPLED	06/09/93	06/09/93	06/08/93	06/08/93	06/08/93	06/09/93	06/10/93	06/08/93	06/08/93	06/09/93	06/09/93
2-Methylnaphthalene											
Fluorene			62 J					120 J			
Phenanthrene			460		130 J		56 J	590 J	200 J		
Anthracene								130 J			
Carbazole								82 J			
Di-n-butylphthalate											
Fluoranthene			470		220 J		87 J	720 J	540 J		
Pyrene			360 J		180 J		65 J	580 J	600 J		
Butylbenzylphthalate							51 J				
3,3'-Dichlorobenzidine											
Benzo(a)anthracene			150 J		120 J		40 J	460 J	470 J		
Chrysene			100 J		67 J			210 J	260 J		
bis(2-Ethylhexyl)phthalate											
Benzo(b)fluoranthene + Benzo(k)fluoranthene			210 JN		210 JN		71 JN	530 JN	510 JN		
Benzo(a)pyrene			110 J		90 J			270 J	260 J		
Indeno(1,2,3-cd)pyrene									220 J		
Benzo(g,h,i)perylene									290 J		
TOTAL SEMIVOLATILES	ND	ND	2013	ND	1017	ND	370	3788	3670	59	ND
PESTICIDES/PCBs	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)	(ug/kg)
TOTAL PESTICIDES/PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1)Blank spaces indicate the parameter was not detected.

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TABLE 5
CORTESE LANDFILL RI/FS
SUMMARY OF DETECTIONS FOR SEDIMENTS SAMPLES

	SAMPLE POINT										
PARAMETER	R5-18	R5-19	R6-20	R6-21	R6-22	R6-23	R7-24	SS-20	SS-21	SS-22	SS-27
DATE SAMPLED	06/09/93	06/09/93	06/08/93	06/08/93	06/08/93	06/09/93	06/10/93	06/08/93	06/08/93	06/09/93	06/09/93
INORGANICS	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Aluminum	3600	7070	4440	6620	5680	5890	3400	8400 J	7590 J	5720	3900
Antimony											
Arsenic	4.3	74.8	2.6	4.5	5.1	30.2	12.4	8.4 J	9.9 J	2.5 J	2.5
Barium	37 J	49 J	32.3 J	43	44.5 J	65.1 J	57.2	132 J	126 J	108 J	54.5 J
Beryllium				0.57					1.7 J	1.2	0.59
Cadmium											
Calcium	274	541	414	574	535	723	409	1220 J	1060 J	18600 J	420 J
Chromium	3.2	6.4	3.7	5.4	4.5	7.2	3.4	8.2 J	5 J	4.1	4.1
Cobalt	3	6.5	3	6.6	4.9	8.5	4.7	5.9 J		3.2	4.1
Copper					18 J		5.2				
Iron	9530	17500	8200	14100	15400	16400	9570	16100 J	14000 J	10700	9540
Lead	3.8 J	5.5 J	5.4 J	3.8 J	6 J	8.1 J	7.4	21.6 J	20.2 J	1.9 J	8.7 J
Magnesium	1460	2860	1530	2590	2070	3070	1270	2150 J	2040 J	1690	1770
Manganese	R	R	R	R	R	R	R	R	R	R	R
Mercury											
Nickel	10.1 J		10.2 J	12.9	14.9 J	16.3 J	7.2				13.2 J
Potassium	685	1100	851	710	881	725	531	1450 J	1820 J	1080	570
Sodium	48.6	50.7	52.3	45.6	49.1	49.8		111 J	89.5	131	54.7
Thallium											
Vanadium	3.1	5.9	4.6	4.2	5.2	4.4	2	9.9 J	8.8 J	4.5	3.7
Zinc	R	R	R	R	R	R	R	R	R	R	
Cyanide					1.7 J				14.4 J		

Notes:
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4) R7-24 is the field duplicate of R3-07, and SS-27 is the field duplicate of SS-22.

Table 6
Summary of Detections for Soil Gas Samples
Cortese Landfill RI/FS

Volatile Organic Compound	East of Conrail Embankment		West of Conrail Embankment	
	Range of Detected Concentrations (ppmv)	Frequency of Detections	Range of Detected Concentrations (ppmv)	Frequency of Detections
trans-1,2-dichloroethene	ND - 13.6	26/77	ND - 1.0	36/122
Toluene	ND - 18.00	15/77	ND - 0.94	15/122
Ethylbenzene	ND - 11.00	11/77	ND - 0.22	3/122
Chlorobenzene	ND - 1.8	7/77	ND - 0.01	1/122
Benzene	ND - 3.5	11/77	ND - 1.7	18/122
Tetrachloroethene	ND - 25.00	19/77	ND - 0.43	15/122
Total Xylenes	ND - 49.00	15/77	ND - 2.8	8/122
1,4-Dichlorobenzene	ND - 1.2	2/77	ND	--
1,1,1-Trichloroethane	ND - 12.00	7/77	ND - 0.32	2/122
Methylethylketone	ND - 3.00	8/77	ND - 0.67	16/122
Methylene chloride	ND - 18.00	9/77	ND - 7.9	26/122
Acetone	ND - 340	28/77	ND - 4.00	64/122
Vinyl chloride	ND - 1.8	9/77	ND - 0.03	5/122

Note: Frequency of detection includes multiple depths at a given soil gas probe location as well as results for split samples sent to an off-site laboratory.

TABLE 6
CALCULATED VOC FLUX AND CALCULATED INDOOR AIR CONCENTRATIONS USING THE FARMER MODEL AND JULY 1989 GROUNDWATER DATA

VOC	Cw (ug/m3)	Depth (m)	Kh (atm-m3/mol)	Dair (m2/sec)	Pt (dimensionless)	Pair (dimensionless)	VOC Flux (ug/m2/sec)	Basement Area (m2)	Building Volume (m3)	Building Vent. Rate (m3/sec)	Calculated Indoor Air Conc. (ug/cubic meter)
1,1-dichloroethane	42900	5	0.00554	0.0001	0.4	0.1	5.70E-04	140	840	0.12	6.84E-04
1,2-dichloroethene	6980	5	0.0319	0.0001	0.4	0.1	5.34E-04	140	840	0.12	6.41E-04
1,1,1-trichloroethane	3440	5	0.0172	0.0000078	0.4	0.1	1.11E-05	140	840	0.12	1.33E-05
trichloroethene	5280	5	0.0091	0.0000079	0.4	0.1	9.11E-06	140	840	0.12	1.09E-05
benzene	17200	5	0.0055	0.0000088	0.4	0.1	2.00E-05	140	840	0.12	2.40E-05
toluene	78600	5	0.0068	0.0000087	0.4	0.1	1.12E-04	140	840	0.12	1.34E-04
chlorobenzene	4700	5	0.0039	0.0000073	0.4	0.1	3.21E-06	140	840	0.12	3.85E-06
ethylbenzene	9490	5	0.00644	0.0000075	0.4	0.1	1.10E-05	140	840	0.12	1.32E-05
xylenes	23200	5	0.00527	0.000008	0.4	0.1	2.35E-05	140	840	0.12	2.82E-05
1,2-dichlorobenzene	2000	5	0.00194	0.0000069	0.4	0.1	6.43E-07	140	840	0.12	7.71E-07
1,4-dichlorobenzene	9000	5	0.0016	0.0000069	0.4	0.1	2.38E-06	140	840	0.12	2.86E-06
TOTAL	202,790						1.30E-03				1.56E-03

Notes:

1. Cw = groundwater concentration in MW-6B, Depth = distance from water table to basement floor, Kh = Henry's Law constant, Dair = diffusivity in air, Pt = total porosity, Pair = air-filled porosity.
2. Kh and Dair from USEPA (1990), Pt and building ventilation rate from USEPA (1992).
3. Pair calculated using site-specific grain size and moisture content data for surface soil samples.
4. See text for equations to calculate VOC flux and indoor air concentrations.
5. Building area measured for typical residence downgradient from the site. Building volume estimated assuming six vertical meters of basement, attic, and main floors. Fraction of basement area which is cracked (F) = 0.001.

TABLE 6
CALCULATED VOC FLUX AND CALCULATED INDOOR AIR CONCENTRATIONS
USING THE FARMER MODEL AND APRIL 1993 GROUNDWATER DATA

VOC	Cw (ug/m3)	Depth (m)	Kh (atm-m3/mol)	Dair (m2/sec)	Pt (dimensionless)	Pair (dimensionless)	VOC Flux (ug/m2/sec)	Basement Area (m2)	Building Volume (m3)	Building Vent. Rate (m3/sec)	Calculated Indoor Air Conc. (ug/cubic meter)
1,1-dichloroethane	11000	2.4	0.00554	0.0001	0.4	0.1	3.05E-04	140	840	0.12	3.66E-04
1,2-dichloroethene	0	2.4	0.0319	0.0001	0.4	0.1	0.00E+00	140	840	0.12	0.00E+00
1,1,1-trichloroethane	0	2.4	0.0172	0.0000078	0.4	0.1	0.00E+00	140	840	0.12	0.00E+00
trichloroethene	10000	2.4	0.0091	0.0000079	0.4	0.1	3.59E-05	140	840	0.12	4.31E-05
benzene	6000	2.4	0.0055	0.0000088	0.4	0.1	1.45E-05	140	840	0.12	1.74E-05
toluene	97000	2.4	0.0068	0.0000087	0.4	0.1	2.87E-04	140	840	0.12	3.44E-04
chlorobenzene	0	2.4	0.0039	0.0000073	0.4	0.1	0.00E+00	140	840	0.12	0.00E+00
ethylbenzene	0	2.4	0.00644	0.0000075	0.4	0.1	0.00E+00	140	840	0.12	0.00E+00
xylenes	13000	2.4	0.00527	0.000008	0.4	0.1	2.74E-05	140	840	0.12	3.29E-05
1,2-dichlorobenzene	1000	2.4	0.00194	0.0000069	0.4	0.1	6.69E-07	140	840	0.12	8.03E-07
1,4-dichlorobenzene	5000	2.4	0.0016	0.0000069	0.4	0.1	2.76E-06	140	840	0.12	3.31E-06
TOTAL	143,000						6.73E-04				8.06E-04

Notes:
1. Cw = groundwater concentration in MW-6B, Depth = distance from water table to basement floor, Kh = Henry's Law constant, Dair = diffusivity in air, Pt = total porosity, Pair = air-filled porosity.
2. Kh and Dair from USEPA (1990), Pt and building ventilation rate from USEPA (1992).
3. Pair calculated using site-specific grain size and moisture content data for surface soil samples.
4. See text for equations to calculate VOC flux and indoor air concentrations.
5. Building area measured for typical residence downgradient from the site. Building volume estimated assuming six vertical meters of basement, attic, and main floors. Fraction of basement area which is cracked (F) = 0.001.

Table 7

Summary of Chemicals of Potential Concern
for the Cortese Landfill Site

Chemicals	Groundwater	On-site Surface Soil/ Sediment	Surface Water			Sediment	
			Delaware River	Ponded Surface Water South of Landfill	Embayment Area/ White's Pond	Embayment Area/ White's Pond	Delaware River
Organics:							
Acetone				X			
Benzene	X						
beta-BHC				X			
Benzo(a)anthracene		X				X	
Benzo(a)pyrene		X				X	
Benzo(b)fluoranthene		X				X	
Benzo(g,h,i)perylene		X				X	
Dibenz(a,h)anthracene		X					
Indeno(1,2,3-c,d)pyrene		X					
Chlorobenzene	X						
1,4-Dichlorobenzene	X						
1,2-Dichloroethene	X			X			
1,2-Dichloroethane	X						
4-Methylphenol				X			
Naphthalene	X						
Phenanthrene		X				X	
Tetrachloroethene	X			X			
Toluene	X						
Trichloroethene	X			X	X		
Vinyl Chloride	X						
Inorganics:							
Aluminum				X	X		
Arsenic	X				X	X	X
Barium	X			X		X	
Beryllium						X	
Chromium						X	
Cobalt				X	X		
Lead					X		
Manganese	X		X	X	X	X	X
Mercury				X			

Table 8
Potential Human Exposure Pathways for the Cortese Landfill Site
under Current Land-Use Conditions

Exposure Medium	Exposure Point	Potential Receptor	Primary Exposure Routes	Exposure Pathway Complete?	Pathway Selected for Quantitative Evaluation?
Groundwater (Residents and Industrial)	No active residential or industrial wells near the site. Municipal water used as a water source.	None.	None.	No. Residences and industrial plants use municipal water supply.	No. (Evaluated under future land-use conditions)
Groundwater (Municipal)	Inactive municipal well near the site.	None (currently).	None. No CPCs detected in municipal well and well is not downgradient of the site.	No. No CPCs detected in municipal well and well is not downgradient of the site.	No. (Evaluated under future land-use conditions)
Surface soil/sediment on-site	Surface soil/sediment on-site.	Trespassers.	Incidental ingestion and dermal contact.	Yes.	Yes.
Subsurface soil	Subsurface soil	None. No excavation activities expected in a landfill.	None. No direct contact with subsurface soil (evaluated as a potential source to groundwater contamination).	No. No ground-intrusive activities expected on-site (other than for remediation).	No.
Surface water/sediments along Delaware River	Delaware River, Embayment, and White's Pond	Children playing along Delaware River.	Dermal absorption and incidental ingestion of sediments and dermal absorption of chemicals in surface water.	Yes. Children may play along the banks of the Delaware River and White's Pond.	Yes.
Ponded Surface Water South of Landfill	Surface water on-site	Trespassers.	Dermal contact with CPCs in surface water.	Yes. Trespassers may come in direct contact with surface water in on-site trenches.	Yes.
Air	On-site and nearby residential area	Trespassers and nearby residents.	Inhalation of VOCs released from ponded surface water south of landfill and VOCs diffusing into basements.	Yes. Off-site residents may be exposed to VOCs potentially released to basements. On-site trespassers also may be exposed to VOCs released from on-site trenches.	Yes.
Biota	Fish caught in Delaware River	Recreational anglers.	None. No CPCs were selected for fish tissue.	No. No CPCs were selected for fish tissue.	No.

Table 8

Potential Human Exposure Pathways for the Cortese Landfill Site
Under Future Land-Use Conditions

Exposure Medium	Exposure Point	Potential Receptor	Primary Exposure Routes	Exposure Pathway Complete?	Pathway Selected for Quantitative Evaluation?
Groundwater	Groundwater in the Vicinity of the site.	Hypothetical residents.	Ingestion of drinking water and inhalation and dermal absorption of CPCs while showering.	Yes (hypothetically). However, groundwater unlikely to be used as a drinking water source given the availability of municipal water.	Yes.
On-site Soils/Sediments	Surface soil/sediment.	Hypothetical residents.	Incidental ingestion and dermal contact.	Yes (hypothetically). However, landfill unlikely to be developed.	Yes.
Air	On-site ambient air.	Hypothetical residents.	Inhalation of ambient air.	Yes (hypothetically). However, landfill unlikely to be developed.	Yes.
Surface water/sediments	same as current land use at the Cortese Landfill site				
Biota	same as current land use at the Cortese Landfill site				

Table 9

Chronic Daily Intakes (CDIs) Estimated for Children's Direct Contact with Surface Water in the Vicinity of the Site and for Inhalation of VOCs Emitted from Surface Water in the Vicinity of the Site

Area/Chemical (a)	RME Exposure Point Concentration (ug/L)	RME EPC Estimated for Air (ug/m3) (b)	Dermal Permeability Constant (cm/hr)(c)	RME CDIs for Dermal Contact (mg/kg/day) (c)		RME CDIs for Inhalation (mg/kg/day) (d)	
				Carcinogens	Noncarcinogens	Carcinogens	Noncarcinogens
Delaware River							
Manganese	4690.0	---	0.001	---	4.6E-05	---	---
Embayment Area and White's Pond							
Organics:							
Trichloroethene	6.0	0.062	0.23	9.7E-07	1.4E-05	5.6E-08	7.8E-07
Inorganics:							
Arsenic	160.0	---	0.001	1.1E-07	1.6E-06	---	---
Barium	662.0	---	0.001	---	6.5E-06	---	---
Manganese	31000.0	---	0.001	---	3.1E-04	---	---
Ponded Surface Water South of the Landfill							
Organics:							
Acetone	34.0	0.075	0.0025	---	8.4E-07	---	9.4E-07
beta-BHC	0.012	0.00005	0.031	2.6E-10	---	4.5E-11	---
1,2-Dichloroethene(total)	45.5	0.69	0.01	---	4.5E-06	---	8.7E-06
4-Methylphenol	16.0	0.12	0.051	---	8.1E-06	---	1.5E-06
Tetrachloroethene	1.9	0.018	0.37	5.0E-07	7.0E-06	1.6E-08	2.3E-07
Trichloroethene	13.1	0.14	0.23	2.1E-06	3.0E-05	1.3E-07	1.8E-06
Inorganics:							
Barium	130.0	---	0.001	---	1.3E-06	---	---
Manganese	2090.0	---	0.001	---	2.1E-05	---	---
Mercury	0.1	---	0.001	---	9.9E-10	---	---

(a) No toxicity criteria were available for aluminum, cobalt, and lead; therefore, CDIs were not estimated for these chemicals.
(b) See Appendix A.
(c) Dermal permeability constants used are presented in USEPA (1992c). For inorganics, the recommeded default value of 0.001 cm/hr was used. No permeability constant was available for cis-1,2-dichloroethene; therefore, the permeability constant for trans-1,2-dichloroethene was used to evaluate a CDI for dermal absorption of 1,2-dichloroethene (total).
(d) Only VOCs with available toxicity criteria were evaluated for the inhalation exposure pathway.

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of Children via Inhalation of VOCs Released from Ponded Surface Water South of the Landfill

Parameter	Value	Reference
Inhalation Rate (IR)	2.1 m^3/hrs (a)	USEPA 1989b
Time Spent Playing On-site (ET)	2 hrs (b)	USEPA 1989b
Exposure Frequency (EF)	35 days/year (c)	Assumed Value
Exposure Duration (ED)	5 years (d)	USEPA 1989a
Body Weight (BW)	32 kg (e)	USEPA 1985a
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989a
Noncarcinogens	365 days/year x 5 years	USEPA 1989a

(a) Average inhalation rate for 10-year-old child engaged in light and moderate activities (USEPA 1989b).
(b) Mean hours per week spent outdoors playing by children between the ages of 3 to 11 (USEPA 1989b).
(c) Children assumed to play in on-site trenches 2 days per week during the summer months and 1 day per week during early fall and late spring.
(d) Children assumed to play in on-site trenches between the ages of 7 and 12 (i.e., 5 years). Children younger than 7 and older than 12 would be unlikely to engage in this type of activity to a significant degree (USEPA 1989b).
(e) 50th percentile body weight for children between the ages of 7 and 12.

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of Children via Incidental Ingestion of On-Site Surface Soil/Sediment and Off-Site Sediments from the Delaware River, Embayment Area, and White's Pond

Parameter	Value	Reference
Ingestion Rate (IR)	100 mg/day(a)	USEPA 1989a
Fraction Ingested from Study Area (FI)	1(b)	USEPA 1989a
Exposure Frequency (EF)	35 days/year(c)	Assumed Value
Exposure Duration (ED)	5 years(d)	USEPA 1989b
Body Weight (BW)	32 kg(e)	USEPA 1989b
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989a
Noncarcinogens	365 days/year x 5 years	USEPA 1989a

(a) USEPA (1989a) recommends a soil ingestion rate of 100 mg/day for the RME case for children over the age of 6. This soil ingestion rate value was used for this pathway since no sediment ingestion rate data were available.

(b) All sediment ingestion activities were assumed to occur within the study area along the bank of the Delaware River. Therefore, the fraction ingestion from the study area was conservatively assumed to be 1 (i.e., 100%).

(c) Children assumed to play in sediments 2 days per week during the summer months and 1 day per week during early fall and late spring.

(d) Children assumed to play in sediments between the ages of 7 and 12 (i.e., 5 years). Children younger than 7 and older than 12 would be unlikely to engage in this type of activity to a significant degree (USEPA 1989b).

(e) 50th percentile body weight for children between the ages of 7 and 12.

Table 9

Chronic Daily Intakes (CDIs) Estimated for Incidental Ingestion of On-Site Soil/Sediment and Off-Site Sediment by Children (a)

Area/Chemical	RME Exposure Point Concentration (Organics: ug/kg; Inorganics: mg/kg)	RME CDIs (mg/kg/day)	
		Carcinogens	Noncarcinogens
On-Site Surface Soil/Sediment (b)			
Polycyclic Aromatic Hydrocarbons			
Benzo(a)anthracene	490.0	1.0E-08	---
Benzo(a)pyrene	440.0	9.4E-09	---
Benzo(b)fluoranthene	630.0	1.3E-08	---
Dibenz(a,h)anthracene	220.0	4.7E-09	---
Indeno(1,2,3-c,d)pyrene	340.0	7.3E-09	---
Delaware River			
Arsenic	29.0	6.2E-07	8.7E-06
Manganese	2140.0	---	6.4E-04
Embayment Area and White's Pond			
Organics			
Polycyclic Aromatic Hydrocarbons			
Benzo(a)anthracene	470.0	1.0E-08	---
Benzo(a)pyrene	270.0	5.8E-09	---
Benzo(b)fluoranthene	530.0	1.1E-08	---
Inorganics			
Arsenic	9.9	2.1E-07	3.0E-06
Barium	132.0	---	4.0E-05
Beryllium	1.7	3.6E-08	5.1E-07
Chromium	8.2	---	2.5E-06
Manganese	160.0	---	4.8E-05

(a) No dermal permeability constants are currently available for the CPCs in soil and sediment; therefore, CDIs for absorption could not be estimated.

(b) No toxicity criteria were available for benzo(g,h,i)perylene or phenanthrene; therefore, CDIs were not estimated for these chemicals.

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of Off-Site Residents Via Inhalation of Indoor Air

Parameter	Value	Reference
Inhalation Rate (IR)	0.83 m^3/hr (a)	USEPA 1991
Exposure Time at Home (ET)	15 hrs/day (b)	USEPA 1989b
Exposure Frequency (EF)	350 days/year (c)	USEPA 1991
Exposure Duration (ED)	30 years (d)	USEPA 1991
Body Weight (BW)	70 kg (e)	USEPA 1989
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989
Noncarcinogens	365 days/year x 30 years	USEPA 1989

(a) RME inhalation rate for residents (20 m^3/day) converted to m^3/hour (USEPA 1991).
(b) Estimated average time spent at home (USEPA 1989b).
(c) RME exposure frequency value (assumes 15 days spent away from home per year) (USEPA 1991).
(d) RME exposure duration value (90th percentile of time spent in one residential location) (USEPA 1991).
(e) 50th percentile body weight for adults (USEPA 1991).

Table 9

Chronic Daily Intakes (CDIs) Estimated for Potential Worst Case VOC Emissions from Groundwater into Off-Site Basements

Chemical	Concentration of VOCs in Groundwater in MW-6B (ug/L)	RME EPC Estimated for Air (ug/m3)	RME CDIs for Inhalation (mg/kg/day) Carcinogens	Noncarcinogens
1,2-Dichlorobenzene	1.0	6.0E-05	---	1.0E-08
1,4-Dichorobenzene	5.0	1.3E-04	9.5E-09	2.2E-08
1,1-Dichloroethane	11.0	1.4E-05	---	2.4E-09
Toluene	97.0	1.3E-04	---	2.2E-08
1,2,4-Trichlorobenzene	2.0	1.3E-04	---	2.6E-08
Trichloroethene	10.0	1.7E-05	1.2E-09	2.9E-09
Xylenes (total)	13.0	1.9E-05	---	3.2E-09

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of
Future Hypothetical Residents via
Ingestion of Groundwater

Parameter	Value	Reference
Ingestion Rate (IR)	2 L/day (a)	USEPA 1991
Exposure Frequency (EF)	350 days/year (b)	USEPA 1991
Exposure Duration (ED)	30 years (c)	USEPA 1991
Body Weight (BW)	70 kg (d)	USEPA 1991
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989a
Noncarcinogens	365 days/year x 30 years	USEPA 1989a

(a) RME water ingestion rate for adults (90th percentile of water consumption rate) (USEPA 1991).
(b) RME exposure frequency (assumes 15 days spent away from home per year) (USEPA 1991).
(c) RME exposure duration (90th percentile of time spent in one residential location) (USEPA 1991).
(d) 50th percentile body weight for adults (USEPA 1991).

Table 9

Chronic Daily Intakes (CDIs) Estimated for the Ingestion, Dermal Absorption While Showering and Inhalation of VOCs While Showering Using Groundwater from Hypothetical Residential Wells Located at the Cortese Landfill Site

Chemical	RME Exposure Point Concentration (ug/L)	Dermal Permeability Constant (cm/hr)(a)	RME CDIs for Ingestion (mg/kg/day)		RME CDIs for Dermal Absorption (mg/kg/day)		RME CDIs for Inhalation (mg/kg/day) (b)	
			Carcinogens	Noncarcinogens	Carcinogens	Noncarcinogens	Carcinogens	Noncarcinogens
Organics:								
Benzene	18.0	0.11	2.1E-04	---	4.2E-05	---	1.9E-04	4.3E-04
Chlorobenzene	33.0	0.041	---	9.0E-04	---	6.7E-05	---	6.8E-04
1,4-Dichlorobenzene	37.0	0.062	4.3E-04	---	4.8E-05	---	2.8E-04	---
1,2-Dichloroethane	0.7	0.0053	8.2E-06	---	7.8E-08	---	5.9E-06	---
cis-1,2-Dichloroethene	110.0	0.01	---	3.0E-03	---	5.4E-05	---	2.4E-03
Naphthalene	7.4	0.069	---	2.0E-04	---	2.5E-05	---	1.2E-04
Tetrachloroethene	26.0	0.37	3.1E-04	7.1E-04	2.0E-04	4.7E-04	1.9E-04	4.8E-04
Toluene	1100.0	1	---	3.0E-02	---	5.4E-02	---	2.5E-02
Trichloroethene	240.0	0.23	2.8E-03	6.6E-03	1.2E-03	2.7E-03	2.1E-03	4.8E-03
Vinyl Chloride	18.0	0.0073	2.1E-04	---	2.8E-06	---	2.1E-04	---
Inorganics:								
Arsenic	57.8	0.001	6.8E-04	1.6E-03	1.2E-06	2.9E-06	---	---
Barium	500.0	0.001	---	1.4E-02	---	2.5E-05	---	---
Manganese	21600.0	0.001	---	5.9E-01	---	1.1E-03	---	---

(a) Dermal permeability constants used are presented in USEPA (1992c). For inorganics, the recommended default value of 0.001 cm/hr was used. No permeability constant was available for cis-1,2-dichloroethene; therefore, the permeability constant for trans-1,2-dichloroethene was used to evaluate a CDI for dermal absorption of cis-1,2-dichloroethene.

(b) Only volatile organic compounds are considered to be inhaled while showering; therefore, CDIs were not estimated for the other CPCs for this pathway.

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of Future Hypothetical Residents While Showering

Parameter	Value	Reference
Inhalation Rate (IR)	0.014 m^3/min (a)	USEPA 1991
Exposure Time in the Shower (ET)	12 min (b)	USEPA 1989a
Body Surface Area	18,000 cm^2 (c)	USEPA 1989a
Permeability Constant (PC)	chemical-specific (cm/hr) (d)	USEPA 1992b
Exposure Frequency (EF)	350 days/year (e)	USEPA 1991
Exposure Duration (ED)	30 years (f)	USEPA 1991
Body Weight (BW)	70 kg (g)	USEPA 1991
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989a
Noncarcinogens	365 days/year x 30 years	USEPA 1989a

(a) RME inhalation rate for residents (i.e., 20 m^3/day) converted to m^3/min (USEPA 1991).
(b) 90th percentile of time spent showering by adults (USEPA 1989a,b).
(c) 50th percentile of total body surface area of adults (USEPA 1989a,b). The 50th percentile body surface area was used to correspond to the 50th percentile body weight.
(d) Chemical-specific dermal permeability constants (PC) obtained from Dermal Exposure Assessment: Principles and Applications (USEPA 1992b).
(e) RME exposure frequency (assumes 15 days spent away from home per year) (USEPA 1991).
(f) RME exposure duration (90th percentile of time spent in one residential location) (USEPA 1991).
(g) 50th percentile body weight for adults (USEPA 1991).

Table 9

Chronic Daily Intakes (CDIs) Estimated for Inhalation by Future Hypothetical Residents of VOCs Released from Surface Water

Chemical	RME Exposure Point Concentration (ug/L)	RME EPC Estimated for Air (ug/m3)	RME CDIs (mg/kg/day)	
			Carcinogens	Noncarcinogens
Acetone	34.0	0.075	---	1.3E-05
beta-BHC	0.012	0.00005	3.7E-09	---
1,2-Dichloroethene(total)	45.5	0.69	---	1.2E-04
4-Methylphenol	16.0	0.12	---	2.0E-05
Tetrachloroethene	1.9	0.018	1.3E-06	3.1E-06
Trichloroethene	13.1	0.14	1.0E-05	2.4E-05

(a) Only VOCs with available toxicity criteria were evaluated for the inhalation exposure pathway.

Table 9

Exposure Parameter Values Used to Estimate Potential Exposure of Future Hypothetical Residents via Incidental Ingestion of On-Site Surface Soil/Sediment

Parameter	Value	Reference
Ingestion Rate (IR)	120 mg/day(a)	USEPA 1991
Fraction Ingested from Study Area (FI)	1(b)	USEPA 1989a
Exposure Frequency (EF)	350 days/year(c)	USEPA 1991
Exposure Duration (ED)	30 years(d)	USEPA 1991, USEPA 1989a
Body Weight (BW)	59 kg(e)	USEPA 1991, 1989a
Averaging Time (AT)		
Carcinogens	365 days/year x 70 years	USEPA 1989a
Noncarcinogens	365 days/year x 30 years	USEPA 1989a

(a) Age adjusted soil ingestion rate assuming combined exposure of a child and adult (USEPA 1991, 1989a).
(b) All soil/sediment ingestion activities were assumed to occur on-site. Therefore, the fraction ingestion from the site was conservatively assumed to be 1 (i.e., 100%).
(c) RME exposure frequency value (assumes 15 days spent away from home per year) (USEPA 1991).
(d) RME exposure duration value (90th percentile of time spent in one residential location) (USEPA 1991).
(e) Age adjusted body weight assuming combined exposure of a child and adult (USEPA 1991, 1989a).

Table 9

Chronic Daily Intakes (CDIs) Estimated for Incidental Ingestion of On-Site Soil/Sediment by Future Hypothetical Residents

Chemical	RME Exposure Point Concentration (ug/kg)	RME CDIs (mg/kg/day)	
		Carcinogens	Noncarcinogens
Polycyclic Aromatic Hydrocarbons			
Benzo(a)anthracene	490.0	4.1E-07	---
Benzo(a)pyrene	440.0	3.7E-07	---
Benzo(b)fluoranthene	630.0	5.3E-07	---
Dibenz(a,h)anthracene	220.0	1.8E-07	---
Indeno(1,2,3-c,d)pyrene	340.0	2.8E-07	---

(a) No toxicity criteria were available for benzo(g,h,i)perylene and phenanthrene; therefore, CDIs were not estimated for these chemicals.

Table 10

Noncarcinogenic Toxicity Criteria (RfDs) for Chemicals of Potential Concern at the Cortese Landfill Site

Route/Chemical	Chronic RfD (mg/kg/day)	Confidence Level(a)	Target Organ	Uncertainties(b) and Modifying Factors	Source(c)
Oral Route:					
Organics:					
Acetone	1.0E-1	Low	Liver Kidney	UF=1000; MF=1	IRIS
Chlorobenzene	2.0E-2	Medium	Liver	UF=1000; MF=1	IRIS
1,2-Dichloroethene	9.0E-3	---	Liver	UF=1000; MF=1	HEAST
4-Methylphenol	5.0E-3	---	---	UF=100	HEAST
Naphthalene	4.0E-2	---	---	---	HEAST (withdrawn)
Tetrachloroethene	1.0E-2	Medium	Liver	UF=1000; MF=1	IRIS
Toluene	2.0E-1	Medium	Liver Kidney	UF=1000; MF=1	IRIS
Trichloroethene	6.0E-3	---	---	---	ECAO
Inorganics:					
Arsenic	3.0E-4	---	Skin	UF=1; MF=1	IRIS
Barium	7.0E-2	Medium	Blood	UF=3; MF=1	IRIS
Beryllium	5.0E-3	---	---	UF=100; MF=1	IRIS
Chromium (VI)	5.0E-3	Low	---	UF=500; MF=1	IRIS
Manganese	5.0E-3 (water)	Medium	CNS	UF=1; MF=1	IRIS
	1.4E-1 (food)	---	CNS		IRIS
Mercury	3.0E-4	---	CNS	UF=1000	HEAST
Inhalation Route:					
Organics:					
Benzene	5.71E-5	---	---	---	ECAO
Chlorobenzene	5.0E-3	---	Liver Kidney	UF=10,000; MF=1	HEAST
1,2-Dichlorobenzene	5.71E-2	---	---	---	HEAST
1,4-Dichlorobenzene	2.29E-1	---	Liver	UF=100; MF=1	HEAST
1,1-Dichloroethane	1.43E-1	---	---	UF=1000	HEAST
Toluene	1.14E-1	Medium	Liver Kidney	UF=300; MF=1	HEAST
1,2,4-Trichlorobenzene	2.57E-3	---	Adrenal	---	HEAST

--- = No data available

(a) Confidence level, as given by IRIS, which specifies the confidence in the laboratory test used to derive the toxicity criteria.

(b) Uncertainty factors include adjustments for human sensitivity (10); animal-to-human extrapolation (10); extrapolation from subchronic to chronic NOAEL; and/or extrapolation from a LOAEL to a NOAEL. Modifying factors (MFs) are used to adjust the toxicity criteria based on a semiquantitative evaluation of the quality of the toxicity study.

(c) IRIS (USEPA 1993c); HEAST (USEPA 1993d); ECAO (USEPA 1993b).

Table 11

Potential Noncarcinogenic Hazards Associated with Children's Direct Contact with Ponded Surface Water South of the Landfill, Embayment Area, and White's Pond and for Inhalation of VOCs Emitted from Surface Water

Area/Chemical	RME CDI for Dermal Absorption (mg/kg/day)	RfD for Dermal Absorption (mg/kg/day)	Hazard Quotient for Dermal Absorption	RME CDI for Inhalation (mg/kg/day)	RfD for Inhalation (mg/kg/day)(a)	Hazard Quotient for Inhalation
Delaware River						
Manganese	4.6E-05	5.0E-03	9E-03	---	---	---
Embayment Area and White's Pond						
Organics:						
Trichloroethene	1.4E-05	6.0E-03	2E-03	7.8E-07	6.0E-03	1E-04
Inorganics:						
Arsenic	1.6E-06	3.0E-04	5E-03	---	---	---
Barium	6.5E-06	7.0E-02	9E-05	---	---	---
Manganese	3.1E-04	5.0E-03	6E-02	---	---	---
		Hazard Index:	7E-02		Hazard Index by Route:	1E-04
	Total Hazard Index for Pathway:		7E-02			
Ponded Surface Water South of the Landfill						
Organics:						
Acetone	8.4E-07	1.0E-01	8E-06	9.4E-07	1.0E-01	9E-06
1,2-Dichloroethene (total)	4.5E-06	9.0E-03	5E-04	8.7E-06	9.0E-03	1E-03
4-Methylphenol	8.1E-06	5.0E-03	2E-03	1.5E-06	5.0E-03	3E-04
Tetrachloroethene	7.0E-06	1.0E-02	7E-04	2.3E-07	1.0E-02	2E-05
Trichloroethene	3.0E-05	6.0E-03	5E-03	1.8E-06	6.0E-03	3E-04
Inorganics:						
Barium	1.3E-06	7.0E-02	2E-05	---	---	---
Manganese	2.1E-05	5.0E-03	4E-03	---	---	---
Mercury	9.9E-10	3.0E-04	3E-06	---	---	---
	Hazard Index by Route:		1E-02		Hazard Index by Route:	2E-03
	Total Hazard Index for Pathway:		1E-02			

(a) Inhalation RfDs were not available for acetone, 1,2-dichloroethene, 4-methylphenol, tetrachloroethene, or trichloroethene; therefore, oral RfDs were used as surrogates to estimate risks associated with these chemicals.

Table 11

Potential Noncarcinogenic Hazards Associated with Incidental Ingestion of On-Site Soil/Sediment and Off-Site Sediment by Children

Area/Chemical	RME Chronic Daily Intake (mg/kg/day)	RfD (mg/kg/day)	RfD Uncertainty Factor	Hazard Quotient
On-Site Surface Soil/Sediment				
Toxicity criteria not available for CPCs				
Delaware River				
Arsenic	8.7E-06	3.0E-04	1	3E-02
Manganese	6.4E-04	1.4E-01	1	5E-03
			Hazard Index:	3E-02
Embayment Area and White's Pond				
Arsenic	3.0E-06	3.0E-04	1	1E-02
Barium	4.0E-05	7.0E-02	3	6E-04
Beryllium	5.1E-07	5.0E-03	100	1E-04
Chromium	2.5E-06	5.0E-03	500	5E-04
Manganese	4.8E-05	1.4E-01	1	3E-04
			Hazard Index:	1E-02

Table 11

Potential Noncarcinogenic Hazards Associated with Potential Worst Case VOC Emissions from Groundwater into Off-Site Basements

Area/Chemical	RME Chronic Daily Intake (mg/kg/day)	Inhalation RfD (mg/kg/day)(a)	Hazard Quotient
1,2-Dichlorobenzene	1.0E-08	5.7E-02	2E-07
1,4-Dichorobenzene	2.2E-08	2.3E-01	1E-07
1,1-Dichloroethane	2.4E-09	1.4E-01	2E-08
Toluene	2.2E-08	1.1E-01	2E-07
1,2,4-Trichlorobenzene	2.2E-08	2.6E-03	9E-06
Trichloroethene	2.9E-09	6.0E-03	5E-07
Xylenes (total)	3.2E-09	2.0E+00	2E-09

		Hazard Index:	1E-05

(a) Inhalation RfDs were not available for trichloroethene or xylenes (total); therefore, oral RfDs were used as surrogates for estimating hazards associated with these chemicals.

Table 11

Potential Noncarcinogenic Hazards Associated with Ingestion of Groundwater, Dermal Absorption while Showering and Inhalation of VOCs while Showering Using Groundwater from Hypothetical Residential Wells Located at the Cortese Landfill Site

Chemical	RME CDI for Ingestion (mg/kg/day)	RME CDI for Dermal Absorption (mg/kg/day)	RfD for Ingestion & Dermal Absorption (mg/kg/day)	Hazard Quotient for Ingestion	Hazard Quotient for Dermal Absorption	RME CDI for Inhalation (mg/kg/day)	RfD for Inhalation (mg/kg/day)(a)	Hazard Quotient for Inhalation
Organics:								
Benzene	---	---	---	---	---	4.3E-04	5.7E-05	8E+00
Chlorobenzene	9.0E-04	6.7E-05	2.0E-02	5E-02	3E-03	6.8E-04	5.0E-03	1E-01
cis-1,2-Dichloroethene	3.0E-03	5.4E-05	9.0E-03	3E-01	6E-03	2.4E-03	9.0E-03	3E-01
Naphthalene	2.0E-04	2.5E-05	4.0E-02	5E-03	6E-04	1.2E-04	4.0E-02	3E-03
Tetrachloroethene	7.1E-04	4.7E-04	1.0E-02	7E-02	5E-02	4.8E-04	1.0E-02	5E-02
Toluene	3.0E-02	5.4E-02	2.0E-01	2E-01	3E-01	2.4E-02	1.1E-01	2E-01
Trichloroethene	6.6E-03	2.7E-03	6.0E-03	1E+00	5E-01	4.8E-03	6.0E-03	8E-01
Inorganics:								
Arsenic	1.6E-03	2.9E-06	3.0E-04	5E+00	1E-02	---	---	---
Barium	1.4E-02	2.5E-05	7.0E-02	2E-01	4E-04	---	---	---
Manganese	5.9E-01	1.1E-03	5.0E-03	1E+02	2E-01	---	---	---
				-------	-------			-------
			Hazard Index by Route:	1E+02	1E+00			9E+00
			Total Hazard Index:	1E+02				

(a) No inhalation RfDs were available for cis-1,2-dichloroethene, naphthalene, tetrachloroethene, or trichloroethene; therefore oral RfDs were used as surrogates to estimate hazards associated with these chemicals.

Table 11

Potential Noncarcinogenic Hazards Associated with Inhalation by Future Hypothetical Residents of VOCs Released from Surface Water

Chemical	RME Chronic Daily Intake (mg/kg/day)	RfD (mg/kg/day)(a)	RfD Uncertainty Factor	Hazard Quotient
Acetone	1.3E-05	1.0E-01	1000	1E-04
1,2-Dichloroethene(total)	1.2E-04	9.0E-03	1000	1E-02
4-Methylphenol	2.0E-05	5.0E-03	---	4E-03
Tetrachloroethene	3.1E-06	1.0E-02	1000	3E-04
Trichloroethene	2.4E-05	6.0E-03	1000	4E-03
			Hazard Index:	2E-02

(a) No inhalation RfDs were available for acetone, 1,2-dichloroethene, 4-methanol, tetrachloroethene, or trichloroethene; therefore, oral RfDs were used as surrogates to estimate hazards associated with these chemicals.

Table 12

Potential Carcinogenic Risks Associated with Children's Direct Contact with Ponded Surface Water South of the Landfill, Embayment Area, and White's Pond and for Inhalation of VOCs Emitted from Surface Water

Chemical	RME CDI for Dermal Absorption (mg/kg/day)	Slope Factor (mg/kg/day)-1	Potential Cancer Risk for Dermal Absorption	RME CDI for Inhalation (mg/kg/day)	Slope Factor for Inhalation (mg/kg/day)-1(a)	Potential Cancer Risk for Inhalation
Embayment Area and White's Pond						
Organics:						
Trichloroethene	9.7E-07	1.1E-02	1E-08	5.6E-08	6.0E-03	3E-10
Inorganics:						
Arsenic	1.1E-07	1.8E+00	2E-07	---	---	---
	Total Carcinogenic Risk for Route:		2E-07	Total Carcinogenic Risk for Route:		3E-10
	Total Carcinogenic Risk for Pathway:		2E-07			
Ponded Surface Water South of the Landfill						
Organics:						
beta-BHC	2.6E-10	1.8E+00	5E-10	4.5E-11	1.8E+00	8E-11
Tetrachloroethene	5.0E-07	5.2E-02	3E-08	1.6E-08	2.0E-03	3E-11
Trichloroethene	2.1E-06	1.1E-02	2E-08	1.3E-07	6.0E-03	8E-10
	Total Carcinogenic Risk for Route:		5E-08	Total Carcinogenic Risk for Route:		8E-10
	Total Carcinogenic Risk for Pathway:		5E-08			

(a) No inhalation slope factor was available for beta-BHC; therefore, the oral slope factor was used as a surrogate to estimate risk for this chemical.

Table 12

Potential Carcinogenic Risks Associated with Incidental Ingestion of On-Site Soil/Sediment and Off-Site Sediment by Children

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor (mg/kg/day)-1	Weight-of-Evidence	Potential Cancer Risk
On-Site Surface Soil/Sediment				
Polycyclic Aromatic Hydrocarbons				
Benzo(a)anthracene	1.0E-08	7.3E-01	B2	8E-09
Benzo(a)pyrene	9.4E-09	7.3E+00	B2	7E-08
Benzo(b)fluoranthene	1.3E-08	7.3E-01	B2	1E-08
Dibenz(a,h)anthracene	4.7E-09	7.3E+00	B2	3E-08
Indeno(1,2,3-c,d)pyrene	7.3E-09	7.3E-01	B2	5E-09
		Total Carcinogenic Risk:		1E-07
Delaware River				
Arsenic	6.2E-07	1.8E+00	A	1E-06
		Total Carcinogenic Risk:		1E-06
Embayment Area and White's Pond				
Organics				
Polycyclic Aromatic Hydrocarbons				
Benzo(a)anthracene	1.0E-08	7.3E-01	B2	7E-09
Benzo(a)pyrene	5.8E-09	7.3E+00	B2	4E-08
Benzo(b)fluoranthene	1.1E-08	7.3E-01	B2	8E-09
Inorganics				
Arsenic	2.1E-07	1.8E+00	A	4E-07
Beryllium	3.6E-08	4.3E+00	B2	2E-07
		Total Carcinogenic Risk:		6E-07

Table 12

Potential Carcinogenic Risks Associated with Potential Worst Case VOC Emissions from Groundwater into Off-Site Basements

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor (mg/kg/day)-1(a)	Potential Cancer Risk
1,4-Dichlorobenzene	9.5E-09	2.4E-02	2E-10
Trichloroethene	1.2E-09	6.0E-03	7E-12

	Total Carcinogenic Risk:		2E-10

(a) No inhalation slope factor was available for 1,4-dichlorobenzene; therefore, the oral slope factor was used as a surrogate to estimate risk associated with this chemical.

Table 12

Potential Carcinogenic Risks Associated with Ingestion of Groundwater, Dermal Absorption while Showering and Inhalation of VOCs while Showering Using Groundwater from Hypothetical Residential Wells Located at the Cortese Landfill Site

Chemical	RME CDI for Ingestion (mg/kg/day)	RME CDI for Dermal Absorption (mg/kg/day)	Slope Factor for Ingestion & Dermal Absorption (mg/kg/day)-1	Potential Cancer Risk for Ingestion	Potential Cancer Risk for Dermal Absorption	RME CDI for Inhalation (mg/kg/day)	Slope Factor for Inhalation (mg/kg/day)-1(a)	Potential Cancer Risk for Inhalation
Organics:								
Benzene	2.1E-04	4.2E-05	2.9E-02	6E-06	1E-06	1.9E-04	2.9E-02	6E-06
1,4-Dichlorobenzene	4.3E-04	4.8E-05	2.4E-02	1E-05	1E-06	2.8E-04	2.4E-02	7E-06
1,2-Dichloroethane	8.2E-06	7.8E-08	9.1E-02	7E-07	7E-09	5.9E-06	9.1E-02	5E-07
Tetrachloroethene	3.1E-04	2.0E-04	5.2E-02	2E-05	1E-05	1.9E-04	2.0E-03	4E-07
Trichloroethene	2.8E-03	1.2E-03	1.1E-02	3E-05	1E-05	2.1E-03	6.0E-03	1E-05
Vinyl Chloride	2.1E-04	2.8E-06	1.9E+00	4E-04	5E-06	2.1E-04	3.0E-01	6E-05
Inorganics:								
Arsenic	6.8E-04	1.2E-06	1.8E+00	1E-03	2E-06	---	---	---
				-------	-------			-------
			Total Carcinogenic Risk by Route:	2E-03	3E-05			9E-05
			Total Carcinogenic Risk for Pathway:	2E-03				

(a) No inhalation slope factor was available for 1,4-dichlorobenzene; therefore, the oral slope factor was used as a surrogate to estimate risk associated with this chemical.

Table 12

Potential Carcinogenic Risk Associated with Inhalation by Future Hypothetical Residents of VOCs Released from Surface Water

Chemical (a)	RME Chronic Daily Intake (mg/kg/day)	Slope Factor (mg/kg/day)-1(a)	Weight-of-Evidence	Potential Cancer Risk
beta-BHC	3.7E-09	1.8E+00	C	7E-09
Tetrachloroethene	1.3E-06	2.0E-03	B2/C	3E-09
Trichloroethene	1.0E-05	6.0E-03	B2	6E-08
		Total Carcinogenic Risk:		7E-08

(a) No inhalation slope factor was available for beta-BHC; therefore, the oral slope factor was used as a surrogate to estimate risk associated with this chemical.

Table 12

Potential Carcinogenic Risks Associated with Incidental Ingestion of On-Site Soil/Sediment by Future Hypothetical Residents

Chemical	RME Chronic Daily Intake (mg/kg/day)	Slope Factor (mg/kg/day)-1	Weight-of-Evidence	Potential Cancer Risk
Benzo(a)anthracene	4.1E-07	7.3E-01	B2	3E-07
Benzo(a)pyrene	3.7E-07	7.3E+00	B2	3E-06
Benzo(b)fluoranthene	5.3E-07	7.3E-01	B2	4E-07
Dibenz(a,h)anthracene	1.8E-07	7.3E+00	B2	1E-06
Indeno(1,2,3-c,d)pyrene	2.8E-07	7.3E-01	B2	2E-07

		Total Carcinogenic Risk:		5E-06

NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
INORGANIC CHEMICALS
All units are milligrams per liter (mg/l)

CHEMICAL	CAS No.	MCL
Arsenic	7440-38-2	0.05
Asbestos (Longer than 10 microns)	1332-21-4	7.0 MFL
Barium	7440-39-3	2.00
Cadmium	7440-43-9	0.005
Chromium	7440-47-3	0.10
Fluoride	-	2.2
Nitrate (as N)	-	10.0
Nitrite (as N)	-	1.0
Total Nitrate/Nitrite	14797-55-8	10.0
Lead	7439-92-1	0.05
Mercury	7439-97-6	0.002
Selenium	7782-49-2	0.01
Silver	7440-22-4	0.05

MFL - Million Fibers per Liter

TABLE 14
NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
RADIONUCLIDES
All units are in picocuries per liter (pCi/l), unless noted otherwise

Contaminant	MCL
Combined radium 226 and radium 228	5
Gross alpha activity (including radium 226 but excluding radon and uranium)	15
Beta particle and photon radioactivity from manmade radionuclides	Four millirems per year as the annual dose equivalent to the total body or any internal organ. The department shall determine the concentration capable of producing four millirems per year.

NEW YORK DRINKING WATER STANDARDS
(10 NYCRR Part 5, subpart 5-1, 1992)
MICROBIOLOGICAL CONTAMINANTS & TURBIDITY

CONTAMINANT	MCL	DETERMINATION OF MCL VIOLATION
COLIFORM BACTERIA	Any positive sample	A violation occurs at systems collecting 40 or more samples per month when more than 5.0 percent of the total coliform samples are positive. A violation occurs at systems collecting less than 40 samples per month when two or more samples are total coliform positive.
E. coli	Any positive sample	A violation occurs when a total coliform positive sample is positive for Escherichia coli (E. coli) and a repeat total coliform sample is positive or when a total coliform positive sample is negative for Escherichia coli (E. coli) but a repeat total coliform sample is positive and the sample is also positive for Eschericia coli.
Giardia lamblia, Viruses, Legionella, & Heterotrophic plate count bacteria:	Treatment technique requirements in lieu of MCLs. New York State filtration rule in effect 3/31/91.	—
Entry point turbidity (surface water only)	1 Nephelometric Turbidity Units (NTUs) (Monthly average) 5 NTUs (Two-consecutive-day average)	A violation occurs when the average of all daily entry point analyses for the month exceeds the MCL rounded off to the nearest whole number. A violation occurs when the aberage of two consecutive daily entry point analyses exceeds the MCL rounded off to the nearest whole number.
Distribution System Turbidity	5 NTUs (Monthly average)	A violation occurs when the monthly average of the results of all distribution samples collected in any calendar month exceeds the MCL rounded off to the nearest whole number.

(10 NYCRR Part 5, subpart 5-1, 1992)
All units are milligrams per liter (mg/l), unless noted otherwise

CHEMICAL	SMCL
Chloride	250.0
Copper	1.0
Corrosivity	Noncorrosive
Iron*	0.3
Manganese*	0.3
Sodium♦	No Designated Limits
Sulfate	250.0
Zinc	5.0
Color	15 units
Odor	3 units

*If iron and manganese are present, the total concentration of both should not exceed 0.5 mg/l. Higher levels may be allowed when justified by the supplier of water.

♦Water containing more than 20 mg/l of sodium should not be used for drinking by people on severely restricted sodium diets. Water containing more than 270 mg/l of sodium should not be used for drinking by people on moderately restricted sodium diets.

TABLE 17
NYSDEC CLASS GA GROUND WATER QUALITY AND EFFLUENT STANDARDS
(6 NYCRR Part 703.5 and 703.6, 1991)
All units are mg/l unless stated otherwise

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Alachlor	15972-60-8	0.035	0.035
Aldicarb & Methomyl	116-06-3; 16752-77-5	0.00035	0.00035
Aldrin	309-00-2	ND	ND
Aluminum	7429-90-5	-	2.0
Ametryn	834-12-8	0.050	-
Aminocresols	95-84-1; 2835-95-2; 2835-99-6	0.001	-
Ammonia and Ammonium ($NH_3+NH_4^+$ as N)	7664-41-7; 12125-02-9	2.0	-
Arsenic	7440-38-2	0.025	0.050
Atrazine	1912-24-9	0.0075	0.0075
Azinphosmethyl	86-50-0	0.0044	0.0044
Barium	7440-39-3	1.0	2.0
Benefin	1861-40-1	0.035	0.035
Benzene	71-43-2	0.0007	0.0007
Benzo(a)pyrene	50-32-8	ND	ND
Bis(2-chloroethyl)ether	111-44-4	0.001	0.001
Bis(2-ethyhexyl)phthalate	117-81-7	0.050	4.2
Boron	7440-42-8	1.0	-
Bromacil	314-40-9	0.0044	0.0044
Butachlor	23184-66-9	0.0035	0.0035
Butylate	2008-41-5	0.050	-
Cadmium	7440-43-9	0.010	0.020
Captan	133-06-2	0.018	0.018
Carbaryl	63-25-2	0.029	0.029
Carbon tetrachloride	56-23-5	0.005	0.005
Carboxin	5234-68-4	0.050	-
Chloramben	NA	0.050[1]	0.088[1]
Chlordane	57-74-9	0.0001	0.0001

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Chloride	7647-14-5	250.0	500.0
Chloroform	67-66-3	0.007	0.007
Chromium	NA	0.050	-
Chromium (hexavalent)	NA	0.050	0.1
Copper	NA	0.2	1.0
Cyanide	NA	0.1	0.4
Dalapon	NA	0.050	-
DDT, DDD, DDE	50-29-3; 72-54-8; 72-55-9	ND	ND
Diazinon	333-41-5	0.0007	0.0007
Di-n-butylphthalate	84-74-2	0.050	0.770
Dicamba	1918-00-9	0.00044	0.00044
(1,4-) and (1,2-) Dichlorobenzenes	106-46-7; 541-73-1	0.0047	0.0047
2,4-Dichlorophenoxyacetic acid	94-75-1	0.0044	0.0044
Dieldrin	60-57-1	ND	ND
Dimethyl tetrachloro-terephthalate	1861-32-1	0.050	-
Diphenamid	957-51-7	0.050	-
Diphenylhydrazines	122-66-7; 530-50-7	ND	ND
Endrin	72-20-8	ND	ND
Ethylenethiourea	96-45-7	ND	ND
Ferbam	14484-64-1	0.0042	0.0042
Fluometuron	2164-17-2	0.050	-
Fluoride	NA	1.5	3.0
Foaming Agents	NA	0.5	1.0[4]
Folpet	133-07-3	0.050	0.056
Gross Alpha Radiation	NA	15 pCi/l	-

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Gross Beta Radiation	NA	1000 pCi/l	-
Heptachlor and Heptachlor epoxide	76-44-8; 1024-57-3	ND	ND
Hexachlorobenzene	118-74-1	0.00035	0.00035
Hexachlorocyclohexanes	58-89-9; 319-84-6; 319-85-7; 319-86-8; 6108-10-7;608-73-1	ND	ND
Hexachlorophene	70-30-4	-	0.007
Hexazinone	51235-04-2	0.050	-
Iron	NA	0.300	0.6
Iron and Manganese	NA	0.500	-
Kepone	143-50-0	ND	ND
Lead	NA	0.025	0.050
Malathion	121-75-5	0.0070	0.007
Mancozeb	8018-01-7	0.0018	0.0018
Maneb	12427-38-2	0.0018	0.0018
Manganese	NA	0.300	0.6[5]
Mercury	NA	0.002	0.004
Methoxychlor	72-43-5	0.035	0.035
2-Methyl-4-chlorophenoxyacetic acid	94-74-6	0.00044	0.00044
Methyl methacrylate	80-62-6	0.050	0.7
Metribuzin	21087-64-9	0.050	-
Nabam	142-59-6	0.0018	0.0018
Nickel	NA	-	2.0
Nitralin	4726-14-1	0.035	0.035
Nitrate (expressed as N)	NA	-	20.0
Nitrate and Nitrite (expressed as N)	NA	10.0	-
Nitrilotriacetic acid	NA	0.003[2]	0.003[2]
Nitrite	NA	10.0	-
Oil and Grease	NA	-	15.0

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Oxamyl	23135-22-0	0.050	-
Paraquat	4685-14-7	0.0030	0.003
Parathion and Methyl parathion	56-38-2; 298-00-0	0.0015	0.0015
Pentachloronitrobenzene	82-68-8	ND	ND
Pentachlorophenol	87-86-5	0.001	-
pH	NA	-	See Note 6
Phenol	108-95-2	0.001	-
Phenolic compounds (total phenols)	NA	0.001	0.002
Phenols, total chlorinated	NA	0.001	-
Phorate and Disulfoton	298-02-2; 298-04-4	ND	ND
Picloram	NA	0.050[1]	-
Polychlorinated biphenyls	NA	0.0001	0.0001
Principal organic contaminant	NA	0.005	-
Prometon	1610-18-0	0.050	-
Propachlor	1918-16-7	0.035	0.035
Propanil	709-98-8	0.007	0.007
Propazine	139-40-2	0.016	0.016
Propham	122-42-9	0.050	-
Radium 226	NA	3 pCi/l	-
Radium 226 & 228	NA	5 pCi/l	-
Selenium	NA	0.010	0.040
Silver	NA	0.050	0.1
Simazine	122-34-9	0.050	0.075
Sodium	NA	20.0	-
Styrene	100-42-5	0.050	0.930
Sulfate	NA	250.0	500.0
Sulfide	NA	-	1.0
Tebuthiuron	34014-18-1	0.050	-

TABLE 17 (CONTINUED)

PARAMETER	CAS No.	WATER QUALITY STD.	EFFLUENT STD.
Terbacil	5902-51-2	0.050	-
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3.5 X 10^{-6}	3.5 X 10^{-6}
Tetrachloroterephthalic acid	2136-79-0	0.050	-
Thiram	137-26-8	0.0018	0.0018
Toxaphene	8001-35-2	ND	ND
Trichloroethylene	79-01-6	-	0.010
2,4,5-Trichlorophenoxyacetic acid	93-76-5	0.035	0.035
2,4,5-Trichlorophenoxypropionic acid	93-72-1	0.00026	0.00026
Trifluralin	1582-09-8	0.035	0.035
Uranyl ion	NA	5.0	-
Vinyl chloride	75-01-4	0.002	0.005
Zinc	NA	0.3	5.0
Zineb	12122-67-7	0.0018	0.0018
Ziram	137-30-4	0.0042	0.0042

NA = Not Available

NOTES.

1 Includes: related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.

2 Includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less.

3 This standard applies to any and every individual substance that is in the principal organic contaminant classes, except any substance that has a standard for class GA waters listed elsewhere in this table. A less stringent guidance value for an individual substance may be substituted for this standard. If so determined by the Commissioner of the New York State Department of Health, pursuant to 10 NYCRR section 5-1.51(g).

4 Foaming agents determined as methylene blue active substances (MBAS) or other tests as specified by the commissioner.

5 Combined concentration of iron and manganese shall not exceed 1000 ug/L.

6 pH shall not be lower than 6.5 or the pH of the natural ground water, whichever is lower, nor shall be greater than 8.5 or the pH of the natural ground water, whichever is greater.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Status HA	Health Advisories								Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)		One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
ORGANICS													
Acenaphthene	-	-	-	-	-	-	-	-	0.06	-	-	-	-
Acifluorfen	T	zero	-	F	2	2	0.1	0.4	0.013	0.4	-	0.1	B2
Acrylamide	F	zero	TT	F	0.2	0.2	0.01	0.04	0.001	0.04	-	0.001	B2
Acrylonitrile	T	zero	-	D	-	-	-	-	-	-	-	0.006	B1*
Adipate (diethylhexyl)	F	0.4	0.4	-	20	20	20	60	0.6	20	0.4	3	C
Alachlor	F	zero	0.002	F	0.1	0.1	-	-	0.01	0.4	-	0.04	B2
Aldicarb	D	0.007	0.007	D	-	-	-	-	0.001	0.035	0.007	-	D
Aldicarb sulfone	D	0.007	0.007	D	-	-	-	-	0.001	0.035	0.007	-	D
Aldicarb sulfoxide	D	0.007	0.007	D	-	-	-	-	0.001	0.035	0.007	-	D
Aldrin	-	-	-	D	0.0003	0.0003	0.0003	0.0003	0.00003	0.001	-	0.0002	B2
Ametryn	-	-	-	F	9	9	0.9	3	0.009	0.3	0.06	-	D
Ammonium sulfamate	-	-	-	F	20	20	20	80	0.28	8	2	-	D
Anthracene (PAH)	-	-	-	-	-	-	-	-	0.3	-	-	-	D
Atrazine	F	0.003	0.003	F	0.1	0.1	0.05	0.2	0.035	0.2*	0.003*	-	C
Baygon	-	-	-	F	0.04	0.04	0.04	0.1	0.004	0.1	0.003	-	C
Bentazon	T	0.02	-	F	0.3	0.3	0.3	0.9	0.0025	0.09	0.02	-	D
Benz(a)anthracene (PAH)	P	zero	0.0001	-	-	-	-	-	-	-	-	-	B2
Benzene	F	zero	0.005	F	0.2	0.2	-	-	-	-	-	0.1	A
Benzo(a)pyrene (PAH)	F	zero	0.0002	-	-	-	-	-	-	-	-	-	B2*
Benzo(b)fluoranthene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
Benzo(g,h,i)perylene (PAH)	-	-	-	-	-	-	-	-	-	-	-	-	D
Benzo(k)fluoranthene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
bis-2-Chloroisopropyl ether	-	-	-	F	4	4	4	13	0.04	1	0.3	-	D
Bromacil	L	-	-	F	5	5	3	9	0.13	5	0.09	-	C
Bromobenzene	L	-	-	D	-	-	-	-	-	-	-	-	-

* Under review.

NOTE: Anthracene and Benzo(g,h,i)perylene — not proposed in Phase V.

NOTE: Changes from the last version are noted in Italic and Bold Face print.

Drinking Water Standards and Health Advisories

Chemicals	Standards: Status Reg.	Standards: MCLG (mg/l)	Standards: MCL (mg/l)	Status HA	10-kg Child: One-day (mg/l)	10-kg Child: Ten-day (mg/l)	10-kg Child: Longer-term (mg/l)	70-kg Adult: Longer-term (mg/l)	70-kg Adult: RfD (mg/kg/day)	70-kg Adult: DWEL (mg/l)	70-kg Adult: Lifetime (mg/l)	70-kg Adult: mg/l at 10^{-4} Cancer Risk	Cancer Group
Bromochloroacetonitrile	L	-	-	D	-	-	-	-	-	-	-	-	-
Bromochloromethane	-	-	-	F	50	1	1	5	0.013	0.5	0.09	-	-
Bromodichloromethane (THM)	T	zero	*0.1*/0.08⁺*	D	7	7	4	13	0.02	0.7	-	0.06	B2
Bromoform (THM)	T	zero	*0.1*/0.08⁺*	D	5	2	2	6	0.02	0.7	-	0.4	B2
Bromomethane	T	-	-	F	0.1	0.1	0.1	0.5	0.001	0.04	0.01	-	D
Butyl benzyl phthalate (PAE)	P	zero	0.1	-	-	-	-	-	0.2	6	-	-	C
Butylate	-	-	-	F	2	2	1	4	0.05	2	0.35	-	D
Butylbenzene n-	-	-	-	D	-	-	-	-	-	-	-	-	-
Butylbenzene sec-	-	-	-	D	-	-	-	-	-	-	-	-	-
Butylbenzene tert-	-	-	-	D	-	-	-	-	-	-	-	-	-
Carbaryl	-	-	-	F	1	1	1	1	0.1	4	0.7	-	D
Carbofuran	F	0.04	0.04	F	0.05	0.05	0.05	0.2	0.005	0.2	0.04	-	E
Carbon tetrachloride	F	zero	0.005	F	4	0.2	0.07	0.3	0.0007	0.03	-	0.03	B2
Carboxin	-	-	-	F	1	1	1	4	0.1	4	0.7	-	D
Chloral hydrate	T	*0.04*	*0.06***	D	7	1.4	0.2	0.6	0.0002	0.07	0.06	-	C
Chloramben	-	-	-	F	3	3	0.2	0.5	0.015	0.5	0.1	-	D
Chlordane	F	zero	0.002	F	0.06	0.06	-	-	0.00006	0.002	-	0.003	B2
Chlorodibromomethane (THM)	T	*0.06*	*0.1*/0.08⁺*	D	7	7	2	8	0.02	0.7	0.06	-	C
Chloroethane	L	-	-	D	-	-	-	-	-	-	-	-	-
Chloroform (THM)	T	zero	0.1*/0.08⁺	D	4	4	0.1	0.4	0.01	0.4	-	0.6	B2
Chloromethane	L	-	-	F	9	0.4	0.4	1	0.004	0.1	0.003	-	C
Chlorophenol (2-)	-	-	-	D	0.05	0.05	0.05	0.2	0.005	0.2	0.04	-	D
p-Chlorophenyl methyl sulfide/sulfone/sulfoxide	-	-	-	**	-	-	-	-	-	-	-	-	D
Chloropicrin	L	-	-	-	-	-	-	-	-	-	-	-	-
Chlorothalonil	-	-	-	F	0.2	0.2	0.2	0.5	0.015	0.5	-	0.15	B2
Chlorotoluene o-	L	-	-	F	2	2	2	7	0.02	0.7	0.1	-	D
Chlorotoluene p-	L	-	-	F	2	2	2	7	0.02	0.7	0.1	-	D
Chlorpyrifos	-	-	-	F	0.03	0.03	0.03	0.1	0.003	0.1	0.02	-	D
Chrysene (PAH)	P	zero	0.0002	-	-	-	-	-	-	-	-	-	B2
Cyanazine	T	0.001	-	D	0.1	0.1	0.02	0.07	0.002	0.07	0.001	-	C

* Current MCL ⁺ *Total for all THMs combined cannot exceed the 0.08 level.* ** Total for all haloacetic acids cannot exceed 0.06 level.

** A HA will not be developed due to insufficient data; a "Database Deficiency Report has been published.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Health Advisories									Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)	Status HA	One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
Cyanogen chloride	L	-	-	-	-	-	-	-	-	-	-	-	-
Cymene p-	-	-	-	D	-	-	-	-	-	-	-	-	-
2,4-D	F	0.07	0.07	F	1	0.3	0.1	0.4	0.01	0.4	0.07	-	D
DCPA (Dacthal)	L	-	-	F	80	80	5	20	0.5	20	4	-	D
Dalapon	F	0.2	0.2	F	3	3	0.3	0.9	0.026	0.9	0.2	-	D
Di(2-ethylhexyl)adipate	F	0.4	0.4	-	20	20	20	60	0.6	20	0.4	3	C
Diazinon	-	-	-	F	0.02	0.02	0.005	0.02	0.00009	0.003	0.0006	-	E
Dibenz(a,h)anthracene (PAH)	F	zero	0.0003	-	-	-	-	-	-	-	-	-	B2
Dibromoacetonitrile	L	-	-	D	2	2	2	8	0.02	0.8	0.02	-	C
Dibromochloropropane (DBCP)	F	zero	0.0002	F	0.2	0.05	-	-	-	-	-	0.003	B2
Dibromomethane	L	-	-	-	-	-	-	-	-	-	-	-	D
Dibutyl phthalate (PAE)	-	-	-	-	-	-	-	-	0.1	4	-	-	D
Dicamba	L	-	-	F	0.3	0.3	0.3	1	0.03	1	0.2	-	D
Dichloroacetaldehyde	L	-	-	D	-	-	-	-	-	-	-	-	-
Dichloroacetic acid	T	zero	*0.06***	D	1	1	1	4	*0.004*	0.1	-	-	B2
Dichloroacetonitrile	L	-	-	D	1	1	0.8	3	0.008	0.3	0.006	-	C
Dichlorobenzene o-	F	0.6	0.6	F	9	9	9	30	0.09	3	0.6	-	D
Dichlorobenzene m- *	F	0.6	0.6	F	9	9	9	30	0.09	3	0.6	-	D
Dichlorobenzene p-	F	0.075	0.075	F	10	10	10	40	0.1	4	0.075	-	C
Dichlorodifluoromethane	L	-	-	F	40	40	9	30	0.2	5	1	-	D
Dichloroethane (1,1-)	L	-	-	D	-	-	-	-	-	-	-	-	-
Dichloroethane (1,2-)	F	zero	0.005	F	0.7	0.7	0.7	2.6	-	-	-	0.04	B2
Dichloroethylene (1,1-)	F	0.007	0.007	F	2	1	1	4	0.009	0.4	0.007	-	C
Dichloroethylene (cis-1,2-)	F	0.07	0.07	F	4	3	3	11	0.01	0.4	0.07	-	D
Dichloroethylene (trans-1,2-)	F	0.1	0.1	F	20	2	2	6	0.02	0.6	0.1	-	D
Dichloromethane	F	zero	0.005	F	10	2	-	-	0.06	2	-	0.5	B2
Dichlorophenol (2,4-)	-	-	-	D	0.03	0.03	0.03	0.1	0.003	0.1	0.02	-	D
Dichloropropane (1,1-)	-	-	-	D	-	-	-	-	-	-	-	-	-
Dichloropropane (1,2-)	F	zero	0.005	F	-	0.09	-	-	-	-	-	0.05	B2
Dichloropropane (1,3-)	L	-	-	D	-	-	-	-	-	-	-	-	-

* The values for m-dichlorobenzene are based on data for o-dichlorobenzene.

** Total for all haloacetic acids cannot exceed 0.06 level.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Health Advisories									Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)	Status HA	One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
Dichloropropane (2,2-)	L	-	-	D	-	-	-	-	-	-	-	-	-
Dichloropropene (1,1-)	L	-	-	D	-	-	-	-	-	-	-	-	-
Dichloropropene (1,3-)	T	zero	-	F	0.03	0.03	0.03	0.09	0.0003	0.01	-	0.02	B2
Dieldrin	-	-	-	F	0.0005	0.0005	0.0005	0.002	0.00005	0.002	-	0.0002	B2
Diethyl phthalate (PAE)	-	-	-	D	-	-	-	-	0.8	30	5	-	D
Diethylene glycol dinitrate	-	-	-	**	-	-	-	-	-	-	-	-	-
Diethylhexyl phthalate (PAE)	F	zero	0.006	D	-	-	-	-	0.02	0.7	-	0.3	B2*
Diisopropyl methylphosphonate	-	-	-	F	8	8	8	30	0.08	3	0.6	-	D
Dimethrin	-	-	-	F	10	10	10	40	0.3	10	2	-	D
Dimethyl methylphosphonate	-	-	-	F	2	2	2	6	0.2	7	0.1	0.7	C
Dimethyl phthalate (PAE)	-	-	-	-	-	-	-	-	-	-	-	-	D
1,3-Dinitrobenzene	-	-	-	F	0.04	0.04	0.04	0.14	0.0001	0.005	0.001	-	D
Dinitrotoluene (2,4-)	L	-	-	F	0.50	0.50	0.30	1	0.002	0.1	-	-	-
Dinitrotoluene (2,6-)	L	-	-	F	0.40	0.40	0.40	1	0.001	0.04	-	-	-
tg 2,6 & 2,4 dinitrotoluene ***	-	-	-	-	-	-	-	-	-	-	-	0.005	B2
Dinoseb	F	0.007	0.007	F	0.3	0.3	0.01	0.04	0.001	0.04	0.007	-	D
Dioxane p-	-	-	-	F	4	0.4	-	-	-	-	-	0.7	B2
Diphenamid	-	-	-	F	0.3	0.3	0.3	1	0.03	1	0.2	-	D
Diphenylamine	-	-	-	F	1	1	0.3	1	0.03	1	0.2		D
Diquat	F	0.02	0.02	-	-	-	-	-	0.0022	0.08	0.02	-	D
Disulfoton	-	-	-	F	0.01	0.01	0.003	0.009	0.00004	0.001	0.0003	-	E
Dithiane (1,4-)	-	-	-	F	0.4	0.4	0.4	1	0.01	0.4	0.08	-	D
Diuron	-	-	-	F	1	1	0.3	0.9	0.002	0.07	0.01	-	D
Endothall	F	0.1	0.1	F	0.8	0.8	0.2	0.2	0.02	0.7	0.1	-	D
Endrin	F	0.002	0.002	F	0.02	0.02	0.003	0.01	0.0003	0.01	0.002	-	D
Epichlorohydrin	F	zero	TT	F	0.1	0.1	0.07	0.07	0.002	0.07	-	0.4	B2
Ethylbenzene	F	0.7	0.7	F	30	3	1	3	0.1	3	0.7	-	D
Ethylene dibromide (EDB)	F	zero	0.00005	F	0.008	0.008	-	-	-	-	-	0.00004	B2
Ethylene glycol	-	-	-	F	20	6	6	20	2	40	7	-	D
ETU	L	-	-	F	0.3	0.3	0.1	0.4	0.00008	0.003	-	0.03	B2
Fenamiphos	-	-	-	F	0.009	0.009	0.005	0.02	0.00025	0.009	0.002	-	D

* Under review. ** A HA will not be developed due to insufficient data; a "Database Deficiency Report" has been published.
*** tg = technical grade

Chemicals	Standards			Status HA	Health Advisories								Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)		One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
Fluometron	-	-	-	F	2	2	2	5	0.013	0.4	0.09		D
Fluorene (PAH)	-	-	-	-	-	-	-	-	0.04	-	-	-	D
Fluorotrichloromethane	L	-	-	F	7	7	3	10	0.3	10	2	-	D
Fog Oil	-	-	-	D	-	-	-	-	-	-	-	-	-
Fonofos	-	-	-	F	0.02	0.02	0.02	0.07	0.002	0.07	0.01	-	D
Formaldehyde	-	-	-	D	10	5	5	20	0.15	5	1	-	B1
Gasoline, unleaded (benzene)	-	-	-	D	-	-	-	-	-	-	0.005	-	•
Glyphosate	F	0.7	0.7	F	20	20	1	1	0.1	4	0.7	-	E
Heptachlor	F	zero	0.0004	F	0.01	0.01	0.005	0.005	0.0005	0.02	-	0.0008	B2
Heptachlor epoxide	F	zero	0.0002	F	0.01	-	0.0001	0.0001	1E-5	0.0004	-	0.0004	B2
Hexachlorobenzene	F	zero	0.001	F	0.05	0.05	0.05	0.2	0.0008	0.03	-	0.002	B2
Hexachlorobutadiene	T	0.001	-	F	0.3	0.3	0.1	0.4	0.002	0.07	0.001	-	C
Hexachlorocyclopentadiene	F	0.05	0.05	-	-	-	-	-	0.007	0.2	-	-	D
Hexachloroethane	L	-	-	F	5	5	0.1	0.5	0.001	0.04	0.001	-	C
Hexane (n-)	-	-	-	F	10	4	4	10	-	-	-	-	D
Hexazinone	-	-	-	F	3	3	3	9	0.033	1	0.2	-	D
HMX	-	-	-	F	5	5	5	20	0.05	2	0.4	-	D
Indeno(1,2,3,-c,d)pyrene (PAH)	P	zero	0.0004	D	-	-	-	-	-	-	-	-	B2
Isophorone	L	-	-	F	15	15	15	15	0.2	7	0.1	4	C
Isopropyl methylphosphonate	-	-	-	D	30	30	30	100	0.1	4.0	0.7	-	D
Isopropylbenzene	-	-	-	D	-	-	-	-	-	-	-	-	•
Lindane	F	0.0002	0.0002	F	1	1	0.03	0.1	0.0003	0.01	0.0002	-	C
Malathion	-	-	-	F	0.2	0.2	0.2	0.8	0.02	0.8	0.2	-	D
Maleic hydrazide	-	-	-	F	10	10	5	20	0.5	20	4	-	D
MCPA	-	-	-	F	0.1	0.1	0.1	0.4	0.0015	0.05	0.01	-	E
Methomyl	L	-	-	F	0.3	0.3	0.3	0.3	0.025	0.9	0.2	-	D
Methoxychlor	F	0.04	0.04	F	0.05	0.05	0.05	0.2	0.005	0.2	0.04	-	D
Methyl ethyl ketone	-	-	-	F	-	-	-	-	-	-	-	-	•
Methyl parathion	-	-	-	F	0.3	0.3	0.03	0.1	0.00025	0.009	0.002	-	D

• Under review.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Health Advisories									Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)	Status HA	One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
Methyl tert butyl ether	L	-	-	D	3	3	0.5	2	0.005	0.2	0.04	-	D
Metolachlor	L	-	-	F	2	2	2	5	0.15	5	0.1	-	C
Metribuzin	L	-	-	F	5	5	0.3	0.9	0.025	0.9	0.2	-	D
Monochloroacetic acid	L	-	-	D	-	-	-	-	-	-	-	-	-
Monochlorobenzene	F	0.1	0.1	F	2	2	2	7	0.02	0.7	0.1	-	D
Naphthalene	-	-	-	F	0.5	0.5	0.4	1	0.004	0.1	0.02	-	D
Nitrocellulose (non-toxic)	-	-	-	F	-	-	-	-	-	-	-	-	-
Nitroguanidine	-	-	-	F	10	10	10	40	0.1	4	0.7	-	D
Nitrophenol p-	-	-	-	F	0.8	0.8	0.8	3	0.008	0.3	0.06	-	D
Oxamyl (Vydate)	F	0.2	0.2	F	0.2	0.2	0.2	0.9	0.025	0.9	0.2	-	E
Paraquat	-	-	-	F	0.1	0.1	0.05	0.2	0.0045	0.2	0.03	-	E
Pentachloroethane	-	-	-	D	-	-	-	-	-	-	-	-	-
Pentachlorophenol	F	zero	0.001	F	1	0.3	0.3	1	0.03	1	-	0.03	B2
Phenanthrene (PAH)	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	-	-	-	D	6	6	6	20	0.6	20	4	-	D
Picloram	F	0.5	0.5	F	20	20	0.7	2	0.07	2	0.5	-	D
Polychlorinated biphenyls (PCBs)	F	zero	0.0005	P	-	-	-	-	-	-	-	0.0005	B2
Prometon	L	-	-	F	0.2	0.2	0.2	0.5	0.015*	0.5*	0.1*	-	D
Pronamide	-	-	-	F	0.8	0.8	0.8	3	0.075	3	0.05	-	C
Propachlor	-	-	-	F	0.5	0.5	0.1	0.5	0.013	0.5	0.09	-	D
Propazine	-	-	-	F	1	1	0.5	2	0.02	0.7	0.01	-	C
Propham	-	-	-	F	5	5	5	20	0.02	0.6	0.1	-	D
Propylbenzene n-	-	-	-	D	-	-	-	-	-	-	-	-	-
Pyrene (PAH)	-	-	-	-	-	-	-	-	0.03	-	-	-	D
RDX	-	-	-	F	0.1	0.1	0.1	0.4	0.003	0.1	0.002	0.03	C
Simazine	F	0.004	0.004	F	0.07	0.07	0.07	0.07	0.005	0.2	0.004	-	C
Styrene	F	0.1	0.1	F	20	2	2	7	0.2	7	0.1	-	C
2,4,5-T	L	-	-	F	0.8	0.8	0.8	1	0.01	0.35	0.07	-	D
2,3,7,8-TCDD (Dioxin)	F	zero	3E-08	F	1E-06	1E-07	1E-08	4E-08	1E-09	4E-08	-	2E-08	B2

* Under review. NOTE: Phenanthrene — not proposed.

Chemicals	Standards			Status HA	Health Advisories								Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)		One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
Tebuthiuron	-	-	-	F	3	3	0.7	2	0.07	2	0.5	-	D
Terbacil	-	-	-	F	0.3	0.3	0.3	0.9	0.013	0.4	0.09	-	E
Terbufos	-	-	-	F	0.005	0.005	0.001	0.005	0.00013	0.005	0.0009	-	D
Tetrachloroethane (1,1,1,2-)	L	-	-	F	2	2	0.9	3	0.03	1	0.07	0.1	C
Tetrachloroethane (1,1,2,2-)	L	-	-	D	-	-	-	-	-	-	-	-	-
Tetrachloroethylene	F	zero	0.005	F	2	2	1	5	0.01	0.5	-	0.07	-
Tetranitromethane	-	-	-	**	-	-	-	-	-	-	-	-	-
Toluene	F	1	1	F	20	2	2	7	0.2	7	1	-	D
Toxaphene	F	zero	0.003	F	0.5	0.04	-	-	0.1	0.0035	-	0.003	B2
2,4,5-TP	F	0.05	0.05	F	0.2	0.2	0.07	0.3	0.0075	0.3	0.05	-	D
1,1,2-Trichloro-1,2,2-trifluoroethane	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroacetic acid	T	*0.3*	*0.06*++	D	4	4	4	13	0.1	4.0	0.3	-	C
Trichloroacetonitrile	L	-	-	D	0.05	0.05	-	-	-	-	-	-	-
Trichlorobenzene (1,2,4-)	F	0.07	0.07	F	0.1	0.1	0.1	0.5	0.01	0.4	0.07	-	D
Trichlorobenzene (1,3,5-)	-	-	-	F	0.6	0.6	0.6	2	0.006	0.2	0.04	-	D
Trichloroethane (1,1,1-)	F	0.2	0.2	F	100	40	40	100	0.035	1	0.2	-	D
Trichloroethane (1,1,2-)	F	0.003	0.005	F	0.6	0.4	0.4	1	0.004	0.1	0.003	-	C
Trichloroethanol (2,2,2-)	L	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethylene	F	zero	0.005	F	-	-	-	-	-	0.3	-	0.3	B2
Trichlorophenol (2,4,6-)	L	-	-	D	-	-	-	-	-	-	-	0.3	B2
Trichloropropane (1,1,1-)	-	-	-	D	-	-	-	-	-	-	-	-	-
Trichloropropane (1,2,3-)	L	-	-	F	0.6	0.6	0.6	2	0.006	0.2	0.04	-	B2
Trifluralin	L	-	-	F	0.08	0.08	0.08	0.3	0.0075	0.3	0.005	0.5	C
Trimethylbenzene (1,2,4-)	-	-	-	D	-	-	-	-	-	-	-	-	-
Trimethylbenzene (1,3,5-)	-	-	-	D	-	-	-	-	-	-	-	-	-
Trinitroglycerol	-	-	-	F	0.005	0.005	0.005	0.005	-	-	0.005	-	-
Trinitrotoluene	-	-	-	F	0.02	0.02	0.02	0.02	0.0005	0.02	0.002	0.1	C
Vinyl chloride	F	zero	0.002	F	3	3	0.01	0.05	-	-	-	0.0015	A
Xylenes	F	10	10	F	40	40	40	100	2	60	10	-	D

** A HA will not be developed due to insufficient data; a "Database Deficiency Report" has been published.

++ Total for all haloacetic acids cannot exceed 0.06 level.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Health Advisories									Cancer Group
					10-kg Child			70-kg Adult					
	Status Reg.	MCLG (mg/l)	MCL (mg/l)	Status HA	One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk	
INORGANICS													
Aluminum	L	-	-	D	-	-	-	-	-	-	-	-	-
Ammonia	-	-	-	D	-	-	-	-	-	-	30	-	D
Antimony	F	0.006	0.006	F	0.01	0.01	0.01	0.015	0.0004	0.01	0.003	-	D
Arsenic	*	-	0.05	D	-	-	-	-	-	-	-	0.002	A
Asbestos (fibers/l > 10µm length)	F	7 MFL	7 MFL	-	-	-	-	-	-	-	-	700 MFL	A
Barium	F	2	2	F	-	-	-	-	0.07	2	2	-	D
Beryllium	F	0.004	0.004	D	30	30	4	20	0.005	0.2	-	0.0008	B2
Boron	L	-	-	D	4	0.9	0.9	3	0.09	3	0.6	-	D
Bromate	*L*	*zero*	*0.01*	-	-	-	-	-	-	-	-	-	-
Cadmium	F	0.005	0.005	F	0.04	0.04	0.005	0.02	0.0005	0.02	0.005	-	D
Chloramine	T	*4****	*4*	D	1	1	1	1	0.1	3.3	*3/4****	-	-
Chlorate	L	-	-	D	-	-	-	-	-	-	-	-	-
Chlorine	T	4	*4*	D	-	-	-	-	0.08	-	-	-	D
Chlorine dioxide	T	*0.3*	*0.8*	D	-	-	-	-	*0.01*	*0.35*	*0.3*	-	D
Chlorite	L	*0.08*	*1*	D	-	-	-	-	*0.003*	*0.1*	*0.08*	-	D
Chromium (total)	F	0.1	0.1	F	1	1	0.2	0.8	0.005	0.2	0.1	-	D
Copper	F	1.3	TT**	-	-	-	-	-	-	-	-	-	D
Cyanide	P	0.2	0.2	F	0.2	0.2	0.2	0.8	0.022	0.8	0.2	-	D
Fluoride*	F	4	4	-	-	-	-	-	0.12	-	-	-	-
Hypochlorite	T	*4*[1]	-	-	-	-	-	-	-	-	-	-	-
Hypochlorous acid	T	*4*[1]	-	-	-	-	-	-	-	-	-	-	-
Lead (at tap)	F	zero	TT**	-	-	-	-	-	-	-	-	-	B2
Manganese	L	-	-	D	-	-	-	-	0.14/ 0.005	-	-	-	-
Mercury (inorganic)	F	0.002	0.002	F	-	-	-	0.002	0.0003	0.01	0.002	-	D
Molybdenum	L	-	-	D	-	0.08	0.01	0.05	0.005	0.2	0.04	-	D
Nickel	F	0.1	0.1	F	1	1	0.5	1.7	0.02	0.6	0.1	-	D
Nitrate (as N)	F	10	10	F	-	10*	-	-	1.6	-	-	-	*

* Under review. ** Copper — action level 1.3 mg/L; Lead - action level 0.015 mg/L. *** Measured as free chlorine. [1] Regulated as chlorine.

Drinking Water Standards and Health Advisories

Chemicals	Standards			Status HA	Health Advisories									Cancer Group
					10-kg Child			70-kg Adult						
	Status Reg.	MCLG (mg/l)	MCL (mg/l)		One-day (mg/l)	Ten-day (mg/l)	Longer-term (mg/l)	Longer-term (mg/l)	RfD (mg/kg/day)	DWEL (mg/l)	Lifetime (mg/l)	mg/l at 10^{-4} Cancer Risk		
Nitrite (as N)	F	1	1	F	-	1*	-	-	0.16*	-	-	-	*
Nitrate + Nitrite (both as N)	F	10	10	F	-	-	-	-	-	-	-	-	*
Selenium	F	0.05	0.05	-	-	-	-	-	0.005	-	-	-	-
Silver	-	-	-	D	0.2	0.2	0.2	0.2	0.005	0.2	0.1	-	D
Sodium	-	-	-	D	-	-	-	-	-	20***	-	-	-
Strontium	L	-	-	D	25	25	25	90	0.6	90	17	-	D
Sulfate	P	**	**	-	-	-	-	-	-	-	-	-	-
Thallium	F	0.0005	0.002	F	0.007	0.007	0.007	0.02	0.00007	0.002	0.0004	-	-
Vanadium	L	-	-	D	-	-	-	-	-	-	-	-	D
White phosphorous	-	-	-	F	-	-	-	-	0.00002	0.0005	0.0001	-	D
Zinc	L	-	-	F	6	6	3	12	0.3	11	2	-	D
Zinc chloride (measured as Zinc)	L	-	-	F	6	6	3	12	0.3	11	2	-	D
RADIONUCLIDES													
Beta particle and photon activity (formerly man-made radionuclides)	P	zero	4 mrem	-	-	-	-	-	-	-	-	4 mrem/y	A
Gross alpha particle activity	P	zero	15 pCi/L	:	-	-	-	-	-	-	-	15 pCi/L	A
Radium 226	P	zero	20 pCi/L	-	-	-	-	-	-	-	-	20 pCi/L	A
Radium 228	P	zero	20 pCi/L	-	-	-	-	-	-	-	-	20 pCi/L	A
Radon	P	zero	300 pCi/L	-	-	-	-	-	-	-	-	150 pCi/L	A
Uranium	P	zero	20 µg/L	-	-	-	-	-	0.003	-	-	*	A

* Under review.
** Deferred.
*** Guidance.

Secondary Maximum Contaminant Levels

Chemicals	Status	SMCLs (mg/L)
Aluminum	F	0.05 to 0.2
Chloride	F	250
Color	F	15 color units
Copper	F	1.0
Corrosivity	F	non-corrosive
Fluoride*	F	2.0
Foaming agents	F	0.5
Iron	F	0.3
Manganese	F	0.05
Odor	F	3 threshold odor numbers
pH	F	6.5 – 8.5
Silver	F	0.1
Sulfate	F	250
Total dissolved solids (TDS)	F	500
Zinc	F	5

Status Codes: P – proposed, F – final

* Under review.

Microbiology

	Status	MCLG	MCL
Cryptosporidium	L	-	-
Giardia lamblia	F	zero	TT
Legionella	F#	zero	TT
Standard Plate Count	F#	NA	TT
Total Coliforms (after 12/31/90)	F	zero	**
Turbidity (after 12/31/90)	F	NA	PS
Viruses	F#	zero	TT

Key: PS, TT, F, defined as previously stated.

\# Final for systems using surface water; also being considered for regulation under groundwater disinfection rule.

APPENDIX III

ADMINISTRATIVE RECORD INDEX

CORTESE LANDFILL SITE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS

1.0 SITE IDENTIFICATION

1.1 Background - RCRA and other Information

P. 100001 - 100067 Guidance Document: Air/Superfund National Technical Guidance Study Series, Assessing Potential Indoor Air Impacts for Superfund Sites, prepared by Office of Air Quality Standards, United States Environmental Protection Agency, September 1992.

P. 100068 - 100069 Report: Potential Hazardous Waste Site Tentative Disposition, Cortese Landfill, Hamlet of Narrowsburg, Town of Tusten, New York, prepared by Ms. Margery Jacobs, U.S. EPA, June 30, 1981.

P. 100070 - 100071 Report: Potential Hazardous Waste Site Tentative Disposition, Cortese (Tusten) Sanitary Landfill, Hamlet of Narrowsburg, Town of Tusten, Sullivan County, New York, prepared by Mr. George B. Radan, U.S. EPA, May 20, 1980.

P. 100072 - 100085 Log Sheet: Potential Hazardous Waste Site Log, prepared by Mr. George B. Radan, U.S. EPA, February 26, 1980. Attached Report: Potential Hazardous Waste Site Site Inspection Report, prepared by U.S. EPA, December 17, 1979.

P. 100086 - 100087 Report: Hazardous Waste Site Status, Tusten Landfill (Cortese), Hamlet of Narrowsburg, Town of Tusten, New York, prepared by Mr. George B. Radan, December 17, 1979.

P. 100088 - 100089 Report: Cortese Landfill, April 11, 1979.

1.2 Notification/Site Inspection Reports

P. 100090 - 100092 Report: Site Identification, Tusten Landfill (Cortese), Hamlet of Narrowsburg, Town of Tusten, New York, undated.

1.3 Preliminary Assessment Reports

P. 100093 - 100100 Report: Potential Hazardous Waste Site Identification and Preliminary Assessment, Tusten Landfill (Cortese), Hamlet of Narrowsburg, Town of Tusten, New York, prepared by U.S. EPA, December 17, 1979.

1.4 Site Investigation Reports

P. 100101 - 100116 Report: Site Analysis, Cortese Landfill, Narrowsburg, New York, prepared by U.S. EPA, December 1990.

P. 100117 - 100159 Report: Hazardous Waste Site Investigation Report, Tusten (Cortese) Landfill, Hamlet of Narrowsburg, Sullivan County, New York, prepared by Emergency Response and Hazardous Materials Inspection Branch, U.S. EPA, Region II, Edison, New Jersey, December 17, 1979.

P. 100160 - 100163 Report: Cortese Landfill Site Visit, Tuesday & Wednesday, July 16-17, 1991, prepared by Mr. Mark Granger, Remedial Project Manager, U.S. EPA, undated.

3.0 REMEDIAL INVESTIGATION

3.1 Sampling and Analysis Plans

P. 300001 - 300004 Letter to Mr. Mark Granger, Remedial Project Manager, New York/Caribbean Superfund Branch II, U.S. EPA, from Mr. Stephen T. Joyce, Group Remedial Projects Manager, Waste Management of North America - East, re: Administrative Order on Consent, Index #II CERCLA-00217, Cortese Landfill Superfund Site: Sampling of Subsurface Soils in the Vicinity of the Septage Lagoons, May 21, 1993. Attached: Letter to Mr. Stephen Joyce, SCA Services, Inc., from Mr. Robert M. Glazier, Senior Geochemist, and Mr. P. Stephen Finn, C. Eng., Associate, Golder Associates Inc., re: Sampling of Subsurface Soils in the Septage Lagoons, Cortese Landfill Site, Narrowsburg, New York, May 14, 1993.

P. 300005 - 300007 Letter to Mr. Stephen Joyce, Waste Management of North America, Inc., from Ms. Carole Peterson, Chief, New York/Caribbean Superfund Branch II, U.S. EPA, re: Comments on Cortese Landfill SAP (FSP and QAPjP), Revision I, February 12, 1993.

P. 300008 - 300227 Report: Field Sampling Plan, Health and Safety Plan, and Quality Assurance Project Plan, Cortese Landfill, Remedial Investigation/Feasibility Study, Revision 1, prepared by Golder Associates Inc., prepared for SCA Services, Inc., December 1992.

P. 300228 - 300801 Report: Quality Assurance Project Plan, Appendices, Cortese Landfill, Remedial Investigation/Feasibility Study, Revision 1, prepared by Golder Associates Inc., prepared for SCA Services, Inc., December 1992.

3.2 Sampling and Analysis Data/Chain of Custody Forms

P. 300802 - 300837 Report: Comparative Review of Split Sample Data, Remedial Investigation, Cortese Landfill, prepared by TRC Environmental Corporation, prepared for U.S. EPA, January 7, 1994.

3.3 Work Plans

P. 300838 - 300945 Report: RI/FS Work Plan, Cortese Landfill Site, Narrowsburg, New York, Revision 2, prepared by Golder Associates Inc., prepared for SCA Services, Inc., August 1992.

P. 300946 - 301069 Report: Phase II RI Workplan, Cortese Site, Narrowsburg, New York, prepared by Golder Associates Inc., prepared for Waste Management of North America, Inc., October 1987.

3.4 Remedial Investigation Reports

P. 301070 - 301192 Report: Environmental Evaluation Report for the Cortese Landfill Site, Sullivan County, New York, prepared by Tetra Tech, Inc., prepared for Golder Associates Inc., May 16, 1994.

P. 301193 - 301284 Report: Transport of Soil Gas into Residential Structures Adjacent to the Cortese Landfill and Associated Maximum Potential Human Health Risks, prepared by Golder Associates Inc., prepared for SCA Services, Inc., February 1994.

P. 301285 - 302288 Report: Revised Phase III, Remedial Investigation Report, Cortese Landfill Site, Narrowsburg, New York, prepared by Golder Associates Inc., prepared for SCA Services Inc., January 1994. (Attached: Appendices A - I)

P. 302289 - 302382 Report: Field Oversight Summary Report, Cortese Landfill, Sullivan County, New York, RI/FS Compliance Oversight, prepared by TRC Environmental Corporation, prepared for U.S. EPA, July 2, 1993.

P. 302383 - 302523 Report: Field Oversight Summary Report, Test Pit Program, Cortese Landfill, Sullivan County, New York, RI/FS Compliance Oversight, prepared by Alliance Technologies Corporation, prepared for U.S. EPA, April 23, 1992.

P. 302524 - 302823 Report: Final Report on Test Pit Program, Cortese Landfill Site, Narrowsburg, New York, prepared by Golder Associates Inc., prepared for SCA Services, Inc., June 1991.

P. 302824 - 302931 Report: Soil Gas Survey Phase I, Cortese Landfill, Narrowsburg, New York, Volume I of II, prepared by Golder Associates Inc., prepared for SCA Services, Inc., March 1990.

P. 302932 - 303333 Report: Final Report on Phase II Remedial Investigation, Cortese Landfill Site, Narrowsburg, New York, Volume 1 of 2, prepared by Golder Associates Inc., prepared for Waste Management of North America, Inc., August 1988.

P. 303334 - 303703 Report: Final Report on Phase II Remedial Investigation, Cortese Landfill Site, Narrowsburg, New York, Volume 2 of 2, prepared by Golder Associates Inc., prepared for Waste Management of North America, Inc., August 1988.

7.0 ENFORCEMENT

7.3 Administrative Orders

P. 700001 - 700031 Administrative Order on Consent, Index No. II CERCLA-00217, September 28, 1990.

8.0 HEALTH ASSESSMENTS

8.1 Health Assessments

P. 800001 - 800111 Report: Human Health Baseline Risk Assessment for the Cortese Landfill Site, Sullivan County, New York, prepared by Tetra Tech, Inc., prepared for Golder Associates Inc., May 16, 1994.

10.0 PUBLIC PARTICIPATION

10.2 Community Relations Plan

P. 1000001 - 1000036 Report: Community Relations Plan, Community Relations Support, Cortese Landfill, Narrowsburg, New York, prepared by TRC Environmental Corporation, prepared for U.S. EPA, October 4, 1993.

10.9 Proposed Plan

P. 1000037 - 1000050 Plan: Superfund Proposed Plan, Cortese Landfill Site, Narrowsburg, Sullivan County, New York, prepared by U.S. EPA, Region II, July 1994.

APPENDIX IV

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION LETTER OF CONCURRENCE

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233-7010

Langdon Marsh
Commissioner

SEP 2 7 1994

Ms. Jeanne M. Fox
Regional Administrator
U.S. Environmental Protection Agency
Region II
26 Federal Plaza
New York, NY 10278

Re: Cortese Landfill Site ID No. 353001

Dear Ms. Fox:

The New York State Department of Environmental Conservation has reviewed the draft final Record of Decision (ROD) for the Cortese Landfill site and concurs with the remedy outlined in the Declaration for the ROD.

If you have any questions, please contact Jonathan Greco, of my staff, at (518) 457-3976.

Sincerely,

Ann Hill DeBarbieri

Ann Hill DeBarbieri
Deputy Commissioner
Office of Environmental Remediation

cc: A. Carlson, NYSDOH

bcc: A. DeBarbieri (2)
M. O'Toole (2)
C. Goddard
S. Ervolina
M. Chen/File
J. Greco

A:CORTESE.919

APPENDIX V

RESPONSIVENESS SUMMARY

RESPONSIVENESS SUMMARY
FOR THE REMEDIAL ACTION
AT THE
CORTESE LANDFILL SUPERFUND SITE
NARROWSBURG, NEW YORK

RESPONSIVENESS SUMMARY
FOR THE
CORTESE LANDFILL SUPERFUND SITE
TOWN OF NARROWSBURG, NEW YORK

INTRODUCTION

This Responsiveness Summary provides a summary of citizen's comments and concerns and the U.S. Environmental Protection Agency's ("EPA") responses to those comments regarding the Remedial Investigation/Feasibility Study ("RI/FS") Reports and Proposed Plan for the Cortese Landfill Site ("Site"). EPA, in consultation with the New York State Department of Environmental Conservation ("NYSDEC"), will select a final cleanup remedy for the Cortese Landfill Site only after reviewing and considering all public comments received during the public comment period.

EPA held a public comment period from July 29, 1994 through August 27, 1994 to provide interested parties with the opportunity to comment on the RI/FS and Proposed Plan for the Site. A public meeting was held to discuss the remedial alternatives described in the FS and to present EPA's preferred remedial alternative for controlling contamination at the Site. The meeting was held at the Tusten Town Hall, Narrowsburg, New York on August 16, 1994 at 7:00 p.m.

This community relations responsiveness summary is divided into the following sections:

I. **OVERVIEW:** This section briefly outlines the EPA's preferred remedial alternative.

II. **BACKGROUND:** This section provides a brief history of community concerns and interests regarding the Site.

III. **COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES:** This section summarizes oral and written comments received by EPA at the public meeting for the Site.

I. OVERVIEW

At the time of the public comment period, EPA published its preferred alternative for the Site located in the Town of Narrowsburg, New York. EPA generally prefers treatment or removal technologies which reduce the toxicity, mobility, or volume of waste contaminants.

EPA screened possible alternatives, giving consideration to the following nine key criteria:

- Threshold Criteria, including:
  - -- overall protection of human health and the environment; and
  - -- compliance with Federal, State, and local environmental and health laws.
- Balancing Criteria, including:
  - -- long-term effectiveness;
  - -- short-term effectiveness;
  - -- reduction of mobility, toxicity, or volume;
  - -- ability to implement; and
  - -- cost.
- Modifying Criteria, including;
  - -- state acceptance; and
  - -- local acceptance.

EPA weighed State and local acceptance of the remedy prior to reaching the final decision regarding the remedy for the Site.

The Agency's selected alternative for cleaning up contaminated ground water at the Site is Alternative 6 (landfill cap, drum removal, ground-water extraction/treatment). Based on current information, the preferred alternative provides the best balance of trade-offs from among the alternatives with respect to the nine criteria that EPA uses for evaluation.

II. BACKGROUND

Community concern regarding the Site appears to be relatively high. In general, key concerns are related to the effects of ground-water contamination on drinking water and the Delaware River, the economic effects of site cleanup, and the length and complexity of the Superfund process.

EPA's community relations efforts included the following. On March 22 and 23, 1993, EPA met with local officials and interested citizens to initiate community involvement and discuss their concerns regarding the Site. A community relations plan (CRP) was formulated, including an outline of community concerns, required and suggested community relations activities, and a comprehensive list of federal, state, and local contacts. A written CRP was finalized in October 1993 and Site information repositories were established, one located at the EPA Region II office in New York City and the other located at the Tusten-Cochecton Library in Narrowsburg, New York. The information repositories, which contain the RI/FS Report and other relevant documents, were updated periodically. Additionally, the EPA Proposed Plan, describing the Agency's proposed remedial action for the Site, was sent to the information repositories and distributed to citizens and officials on EPA's Site mailing list for review.

To obtain public input on the RI/FS and the proposed remedy, EPA held a public comment period from July 29, 1994 to August 27, 1994. A public meeting notice appeared in the July 29, 1994 edition of the Sullivan County Democrat, and a public meeting was held on August 16, 1994. Approximately 40 people attended the meeting. The audience consisted of local business people, residents, and state and local government officials. The question and answer session lasted approximately 35 minutes, during which time comments/questions were presented pertaining to the following issues: drinking water contamination, cleanup schedule, remedy implementation, and Site-related risks. A summary of these comments/questions is provided in Section III-A.

III. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

This section addresses written and verbal comments received by EPA during the public comment period (July 29, 1994 to August 27, 1994).

A. SUMMARY OF QUESTIONS AND RESPONSES FROM THE PUBLIC MEETING CONCERNING THE CORTESE LANDFILL SUPERFUND SITE

The following **verbal comments**, from the public meeting held at Tusten Town Hall in Narrowsburg, New York on August 16, 1994, are categorized by topic.

Drinking Water Supply Contamination

1. A Narrowsburg Town resident asked if contamination identified in the Town's drinking water supply, identified as 1,1,1-trichloroethane (1,1,1-TCA), was linked to contamination found at the Site. The resident was also concerned about how extensively the direction of ground-water flow at the landfill was studied by EPA, specifically whether ground-water flow was toward the Town wells or the river. The resident asked whether the monitoring well north of the landfill and adjacent to the Narrowsburg Waste Water Treatment Plant (Monitoring Well No. 4) was contaminated.

   EPA Response: The Narrowsburg public water supply is currently provided by a well installed in April 1994 (Town Well #3). This well is located approximately one mile east of the landfill. Two secondary wells in this system are located approximately 750 feet northwest and approximately one-half mile north-northwest of the landfill (Town Well #1 and #2, respectively). Town Well #1 is currently used to supplement the public water supply provided by Well #3. Town Well #2 was removed from service in 1994 as a result of contamination from an unrelated source. As ground-water flow is to the southwest, all three wells are hydraulically upgradient of the Site. Thus, none of these public supply wells are affected by site-related contamination, including the compound 1,1,1-TCA. In addition, 1,1,1-TCA is not a major contaminant of concern at the Site. Regarding Monitoring Well No. 4, no contamination was found in this well in any sampling round.

Schedule

1. A representative from the News Eagle newspaper asked about the time table on the remediation.

EPA Response: The time to construct the remedy is estimated at two years. It will be approximately 1½ to 2 years before construction will begin. EPA must first negotiate with the potentially responsible parties ("PRPs") to determine if they are willing to perform the remedy. Negotiations can take up to 6 months. In addition, the remedial design needs to be performed which can take 1½ to 2 years.

2. The Tusten Town Supervisor wanted confirmation that the work to be conducted by the Town of Tusten as required by the Administrative Order, will begin sooner than the remedy being selected in this ROD.

   EPA Response: The construction of the drainage swale and excavation of the septage lagoons, which is being conducted by the Town of Tusten under an Administrative Order with EPA, is on a separate time frame than the remedial activities selected in the ROD. The Town's work may begin as early as this year, well before the other work is likely to begin. Currently, the work plan for the Town's work is due to EPA by November 1994. While both construction and excavation are somewhat climate and season dependent, it is anticipated that all work to be performed by the Town will be completed, at the latest, by Autumn 1995.

Implementation of the Preferred Remedial Alternative

1. A Narrowsburg Town Councilman asked if the materials (e.g., soil) surrounding the drums would be removed if they were found to be contaminated by drum contents.

   EPA Response: The purpose of the drum removal is to eliminate a known source or "hot spot" of contamination from within the landfill, thereby eliminating the potential for a future release of contamination to ground water as well as to potentially shorten the duration of the ground-water extraction process. Inasmuch as residual subsurface soil contaminants may migrate to ground water, the purpose of ground-water extraction is to remove these contaminants so that they do not move downgradient. The soil deep below the landfill does not pose a direct health risk and does not constitute a known source of contamination. Removal of any soils grossly contaminated by drum contents, however, may be warranted and this will be determined in the field as the drum removal progresses.

2. A Narrowsburg Town resident asked if the drums located at the Site would be able to be taken out after all these years.

   EPA Response: Yes. There are companies who specialize in contaminated drum removal. Standard procedure is to remove the drums and seal them in another drum for subsequent disposal or treatment.

3. A representative from the Cornell Cooperative Extension, Sullivan County, asked what ground-water extraction entails. The Tusten Town Supervisor asked if the ground water, following extraction, would be running through the Narrowsburg Wastewater Treatment Plant.

   EPA Response: Ground-water extraction is implemented by installing a series of wells along the western perimeter (downgradient perimeter) of the Site between the landfill and the railroad embankment. Contaminated ground water will be extracted through the wells. Extracted water is pumped to a treatment system on Site. The treatment system will strip the ground water of volatiles and polish it to remove semi-volatiles and metals. Discharge options for the treated ground water include discharging the treated ground water into the effluent end of the Narrowsburg Wastewater Treatment Plant; provision of a separate outfall underneath the railroad embankment for discharge into the Delaware River; or reinjection of the treated ground water back into the aquifer. One of these options will be selected during the upcoming remedial design phase. The Narrowsburg Wastewater Treatment Plant will not be used to treat Site-related ground water.

Responsible Parties

1. A representative from the News Eagle newspaper asked who would be funding the remedial activities.

   EPA Response: It is premature to say at this time. EPA will conduct discussions with the PRPs and determine if they are willing to volunteer in implementing and funding the remedy that has been chosen by EPA. If the PRPs do not agree to implement the remedy, EPA may unilaterally order them to implement it, EPA can compel compliance with such an order through judicial action, or EPA can implement it and attempt to recover the costs at a later time.

2. A representative from the News Eagle newspaper asked how many responsible parties had been identified.

   EPA Response: Approximately twenty-five (25) "potentially" responsible parties have been identified.

Risk Assessment

1. Two Narrowsburg Town residents asked if the EPA Project Manager could describe the risk assessment findings.

EPA Response: The risk assessment takes the data from the RI and, using standard formulas, identifies those contaminants which may present a risk. Both cancer and noncancer health effects are evaluated. EPA has established for the Superfund program an acceptable risk range, which is conservative. For the risk assessment for the Site, very conservative exposure assumptions were used in calculating a potential risk. For example, EPA assumed that individuals may presently be exposed to contaminants in surface soil, sediment, or surface water. The exposure scenarios yielded risks which were within or below EPA's acceptable risk range. For ground water, the risk assessment only evaluated future ground-water use because no one is presently drinking contaminated ground water downgradient of the landfill (e.g., between the landfill and the river) as all residences are provided with drinking water via public supply. If, in the future, wells were developed downgradient of the landfill and water was consumed, unacceptable risks would be expected. The remedy selected by EPA is intended to reduce ground-water risks.

B. SUMMARY OF WRITTEN COMMENTS AND RESPONSES CONCERNING THE CORTESE LANDFILL SUPERFUND SITE

The following **written comment** was received by EPA from Thomas L. Brand, P.E. of the Delaware River Basin Commission:

Please be advised that remedial measures proposed for the Cortese Landfill would be subject to review and approval by the Delaware River Basin Commission ("DRBC"), if the construction of new wastewater treatment facilities or alterations or additions to existing facilities results in a discharge of 10,000 gallons per day or more to surface waters or ground waters in the drainage area to Outstanding Basin Waters or Significant Basin Waters. DRBC regulations specify that the applicable state environmental agency require compliance with the policies prescribed, unless it can be demonstrated that these requirements are not necessary for the protection of existing water quality. Further, if the Cortese Landfill project involves a withdrawal of 100,000 gallons per day or more during any 30-day period from ground water or from impoundments or running streams (for any purpose), that aspect also would be subject to DRBC review and approval.

EPA Response. Mr. Brand and Mr. Al Bromberg of the NYSDEC SPDES program have both indicated that the proper procedure for determining SPDES parameters in the relevant portion of the Delaware River basin is for DEC to present draft discharge parameters for review and approval to DRBC. EPA will provide support to DEC and DRBC to ensure all proper procedures are followed when setting SPDES discharge parameters for the Site.

The following **written comments** were received by EPA from Mr. Alan Bowers, of the Upper Delaware Council:

While the Upper Delaware Council ("UDC") supports Alternative 6 and the prompt and thorough cleanup of the Cortese Landfill Site, we offer the following comments and concerns about the preferred alternative:

1. Regarding long-term ground water and surface water monitoring, Alternative 6 indicates that "Monitoring will be conducted on a quarterly basis for the duration of the alternative." Based on the known toxic materials at the Site, we question if this frequency of testing is adequate. The National Park Service ("NPS"), DRBC, New York, and Pennsylvania should be consulted on testing procedures and scheduling.

EPA Response. While EPA acknowledges the toxicity of certain contaminants migrating from the Site in ground water and discharging to the Delaware River, toxicity alone does not formulate a significant factor in determining the frequency or method of sampling. The purpose of long-term monitoring is to track the effectiveness of the selected remedial action in order to determine if adjustments or changes are necessary. Note that levels of contaminants in surface water samples from downgradient areas were below or quite close to relevant surface water standards. Note further that the long-term monitoring as presented in the Proposed Plan was stated to be conceptual in nature and that the final plan will be determined during remedial design of the selected remedy.

EPA has maintained and will continue to maintain open communication on all aspects of the Site with NPS, UDC, DRBC, and NYSDEC, including providing the opportunity to review and comment on Site-related plans and reports. As lead agency for the Site, however, EPA will make the final determination as to the long-term monitoring.

2. Alternative 6 mentions regrading and stormwater management improvements at the Site, including the construction of a drainage swale between the landfill and the escarpment. Will the Conrail railroad grade be affected? Will stormwater be held on-site or directed somewhere else (such as adjoining properties and/or the Delaware River)? Perhaps wetlands could be incorporated into the drainage plans.

EPA Response. It is not anticipated that the Conrail railroad grade will be affected by on-site surface water management activities. It is anticipated that surface water will be diverted to an infiltration area away from the landfill mass (but within the Site property boundary) and allowed to naturally drain to ground water. Drainage of surface water to adjoining properties or the Delaware River is not anticipated. Incorporating wetlands into drainage plans is an option that will be considered.

3. Alternative 6 indicates that "institutional controls" may include fencing, deed restrictions, or other recommendations as appropriate. Can these controls be more specifically defined as to exactly what will be necessary?

EPA Response. It is not possible to provide more detail about institutional controls at this time. Institutional controls will be addressed on an ongoing basis during implementation of the selected remedial action and will likely be determined by future use activities related to the landfill.

4. Alternative 6 mentions the removal and off-site treatment of the intact-drum disposal areas on the landfill property plus two feet of soil beneath them. Because it is likely that any remaining drums will be in poor condition, what measures will be taken to ensure that the contents do not further pollute the land, water, and air? How was the two feet of soil to be removed determined, and is it adequate? Where will the material be removed to and treated, and by what means?

EPA Response. Drum removal is one of three components of the proposed remedy. Any contamination remaining after completion of the drum removal will be either contained via the landfill cap or collected via ground-water extraction/ treatment. After the testing of contents, the drummed materials will be disposed of in a landfill licensed to accept that type of waste or treated, as appropriate, to "ensure that the contents do not further pollute the land, water, and air." Drums in poor condition should nevertheless be able to be containerized and disposed of properly. Drums that are disintegrated would have to be assessed for proper handling during removal operations. In this instance it is unlikely that the original contents would still be present. The reference to the removal of "two feet of soil" from beneath the drums was intended as an estimate. The decision as to the actual volume of soil removed from beneath the drums will be determined during the drum removal based on field conditions and observations. It is anticipated that the majority of contamination associated with drums will be removed with the drums. The drum removal in concert with the landfill cap and ground-water extraction/treatment provides protection of human health and the environment. The overall effectiveness of Alternative 6 will not be dependent on the volume of soil removed from beneath the drums, therefore whatever volume of soil is removed will be more than adequate. The location and means of off-site disposal and/or treatment will be determined during remedial design.

5. Under Alternative 6, the contaminated ground water will be extracted from the Site and treated, and as the Proposed Plan indicates, the treated ground water "may be discharged to the Delaware River, or reinjected to ground water." Regardless of which method is used, the treated ground water should meet the new non-degradation water quality standards established by the Delaware River Basin Commission for the Upper Delaware River Basin for Special Protection Waters as of January 1, 1993. The National Park Service, both States, the DRBC, and the Town of Tusten should be consulted on this issue. Who will be responsible for maintenance and daily operation of the ground-water treatment facility for the duration of the project and what guarantees are there?

EPA Response. Discharge parameters will be set by NYSDEC and EPA in consultation with DRBC. EPA will keep the Town, UDC, and NPS informed on these matters as the SPDES process progresses (see also written comment regarding SPDES from DRBC, and EPA response, above). The specification of exact operation and maintenance ("O&M") personnel will be addressed at the time of submittal of the draft Cortese Site O&M plan. Note that if the PRPs agree to implement the remedy, they are responsible for O&M for the duration of the cleanup. "Guarantees" are specified in administrative, consent, or unilateral orders entered into between PRPs and EPA.

6. We agree that there should be a periodic reporting procedure to update all involved parties about the status of the project and a reevaluation process, should the need arise. There should also be a response capability for floods or non-natural disasters, such as train derailments, at this Site.

EPA Response. A health and safety plan, including notification and response plans, are a standard component in the implementation of Superfund remedial actions. Regarding floods, the remedial design must take into consideration the 500-year floodplain per Executive Order 11990 (Floodplain Management. The 100-year floodplain is not applicable to the Site. Regarding train derailments, this possibility will be considered in the Site health and safety plan and remedial design in response to this concern and the appropriate planning and contingencies will be provided therein.

The following **written comments** were received by EPA from Mr. Vincent Lehotsky, a private citizen from Linden, New Jersey:

1. Soil washing is fairly new. Has this been considered?

   EPA Response. This technology is not applicable to the conditions present at the Site as there are no contaminated soils present aside from those beneath or within the large volume of waste material. Landfill units are not typically considered candidates for soil washing and it is not practical or necessary to wash only the soils beneath the Landfill mass.

2. Are diversion and/or collection systems being applied to catch surface waters.

   EPA Response. Yes.

3. Will "incineration" be used?

   EPA Response. Incineration may be considered in the off-site disposal/treatment of drummed wastes and associated contaminated soils, but it will not occur at the Site.

4. Have the polluters been footed the bill and not me and the rest of the taxpayers.

   EPA Response. PRPs have conducted the entire RI/FS process and will be given the opportunity to implement the selected remedy. Should the PRPs decline to implement the selected remedy, EPA may unilaterally order them to implement it or EPA can implement it and attempt to recover the costs at a later time.

5. What is the plan for the future for putting this land back on the tax base (land reclamation).

   EPA Response. Landfills, in contrast to the possibilities inherent in other types of hazardous waste sites, are not typically considered for future land use. While certainly there is no prohibition on the property generating tax revenue in the future, there are limitations because the purpose of the institutional controls cited are intended to ensure that the integrity of the landfill cap is not compromised.