SDMS Document
99361

DECLARATION FOR THE RECORD OF DECISION

Site Name and Location

Ramapo Landfill, Town of Ramapo, Rockland County, New York

Statement of Basis and Purpose

This decision document presents the selected remedial action for the Ramapo Landfill site (the "Site"), located in the Town of Ramapo, Rockland County, New York, which was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601-9675, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300. This decision document explains the factual and legal basis for selecting the remedy for the Site. The information supporting this remedial action decision is contained in the administrative record for the Site. The administrative record index is attached (Appendix III).

The New York State Department of Environmental Conservation (NYSDEC) concurs with the selected remedy. (See Appendix IV.) NYSDEC will also concur with the contingent remedy, should the confirmatory studies determine that the contingent remedy is appropriate.

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 Record of Decision (ROD), may present a significant and substantial endangerment to public health, welfare, or the environment.

Description of the Selected Remedy

This operable unit represents the entire remedial action for the Site. It addresses the principal threats to human health and the environment at the Site by controlling the source of contamination and the generation of contaminated leachate, as well as by treating contaminated groundwater.

The major components of the selected remedy include:

- Installation of a cap on the tops of the landfill using a multi-media system, including layers of fill material, a gas-venting system and an impermeable membrane. The landfill side slopes will be capped using a multi-media system without an impermeable membrane, if confirmatory studies

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demonstrate that this approach meets remedial action objectives. Should the confirmatory studies indicate that the overall remedy's effectiveness would be significantly reduced by not including an impermeable barrier in the multi-media cap on the sideslopes, then an impermeable barrier would be included in the cap on some or all of the side slopes of the landfill;

- Installation of groundwater extraction wells to supplement the existing leachate collection system;

- Collection and diversion of leachate seeps to the leachate collection system for off-site treatment;

- Installation of a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water run-off;

- If groundwater pretreatment is needed (pursuant to the requirements of the off-site treatment facility), construction of a pretreatment facility which would be tied into the existing leachate collection and discharge system;

- Performance of air monitoring prior to, during, and following construction at the Site to ensure that air emissions resulting from the cap construction meet applicable or relevant and appropriate requirements. Perimeter air monitoring in the groundwater monitoring wells, piezometers, and additional gas monitoring wells to be installed between the landfill and the Baler Building will be performed. Landfill gas emissions will be controlled, if necessary;

- Imposition of property deed restrictions which will include measures to prevent the installation of drinking water wells at the site, and restrict activities which could affect the integrity of the cap;

- Performance of a maintenance and sampling program upon completion of closure activities. The monitoring program will provide data to evaluate the effectiveness of the remedial effort. Additional monitoring points will be established as needed to detect any future movement of site contaminants toward drinking water sources off-site;

- Development of a contingency plan for rapid implementation of additional measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.

Declaration

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. In keeping with the statutory preference for treatment as a principal element of the remedy, the contaminated leachate and groundwater will be collected and treated. The landfill material, however, cannot be excavated and treated effectively, because of the size of the landfill and because there are no on-site "hot spots" that represent the major sources of contamination.

A review of the Site will be conducted no later than five years after commencement of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment, because this remedy will result in hazardous substances remaining on-site above health-based levels.

Constantine Sidamon-Eristoff
Regional Administrator

3/31/95
Date

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RECORD OF DECISION

Ramapo Landfill Site
Town of Ramapo
Rockland County, New York

United States Environmental Protection Agency
Region II
New York. New York

RAM 002 0004

ROD FACT SHEET

SITE

Name:	Ramapo Landfill
Location:	Town of Ramapo
HRS Score:	44.73

ROD

Date Signed:	March 31, 1992
Remedy:	Landfill Cap/Leachate & GW Collection/Off-site Treatment
Capital Cost:	$18,390,000 - $21,640,000
O & M Cost:	$319,800 - $678,600
Present Worth Cost:	$21,410,000 - $28,050,000

LEAD

NYSDEC

Primary Contact:	Robert Nunes (212) 264-2723
Secondary Contact:	Joel Singerman (212) 264-1132
Main PRPs:	Town of Ramapo

WASTE

Type:	Volatiles, Semi-Volatiles, Inorganics
Medium:	Soil, groundwater, surface water
Origin:	Municipal and hazardous wastes
Est. Quantity:	Municipal Landfill Size: 60 acres

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DECISION SUMMARY
RAMAPO LANDFILL SITE

TOWN OF RAMAPO
ROCKLAND COUNTY, NEW YORK

United States Environmental Protection Agency
Region II
New York, New York
March 1992

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ATTACHMENTS

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SITE NAME, LOCATION AND DESCRIPTION

The Site is located on a 96-acre tract in the Town of Ramapo, Rockland County, New York, about 35 miles northwest of New York City, and 1 mile northeast of the Village of Hillburn, New York. The Site location is shown on Figure 1 and a Site plan is depicted in Figure 2. The Site is situated at the western base of the Ramapo Mountains off Torne Valley Road east of the New York State Thruway, Route 17, and Route 59. Utility corridors lie on three sides of the Site, high voltage power transmission lines to the east and west, and a high-pressure gas line to the south. A power substation is located just north of the Site.

Approximately 50 acres of the Site are covered with fill material. The landfill portion of the Site is mounded into two major lobes (northern and southern), and slopes steeply toward the west with grades ranging from less than one percent to greater than 30 percent. Figure 3 depicts the location and depth of the landfill lobes. Both landfill lobes consist of mixed refuse. Substances reportedly disposed of in the landfill portion of the Site include industrial sludge and other wastes from a pharmaceutical company, sewage sludge, municipal refuse, asbestos, construction and demolition debris, yard debris, paint sludge, and liquid wastes from a paper company. Vegetative cover, although generally thick, varies from young trees to a mix of grasses and underbrush to bare ground. Areas along the Site boundaries consist of mature hardwood forest.

An on-site leachate collection system consists of 4 main conduits located along the northern and western boundaries of the Site as shown in Figure 4. Three conduits are located in the subsurface using perforated drain pipes. A 6-inch toe drain was installed just beneath the ground surface at the toe of the landfill, using 2,933 feet of perforated pipe. An 8-inch shallow underdrain was installed at a depth 8 to 10 feet below grade using 4,023 linear feet of perforated pipe on the upslope side of Torne Valley Road. A 12-inch deep underdrain was installed between 10 and 25 feet deep using 4,259 linear feet of both perforated and nonperforated pipe. The fourth conduit consists of a concrete surface-water collector at the base of the landfill which enters a stormwater catch basin located in the southwestern part of the Site near MH-A-5. The catch basin was constructed and is maintained to prevent silt and other debris from entering the leachate-collection system. This conduit handles surface seeps from the landfill and surface runoff during storm events. The 4 collectors tie together near MH-A-5 (see Detail A on Figure 4). A 6-inch force main connects to the leachate holding pond, while a 48-inch pipe leads to Torne Brook (Former Outfall 002). This 48-inch pipe is designed to convey overflow during heavy-water runoff from the concrete collector.

The Site is currently being used as a compaction and transfer facility by the Town of Ramapo. Trash and debris are weighed at a weigh station/guard house along Torne Valley Road, compacted at a baler facility in the northeastern corner of the Site, and transferred to the Al Turi Landfill in Goshen, New York. A pistol range utilized by the Town of Ramapo Police Department is also located in the northeastern area of the Site.

The main surface waters in the vicinity of the Site are the Ramapo River, Torne Brook,

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and Candle Brook (see Figure 2). The Ramapo River, located approximately 300 feet from the southwest corner of the Site, is a NYSDEC Class "A" waters, which may be used as a source of water supply for drinking, culinary, or food-processing purposes. Torne Brook, which flows near the western boundary of the Site, and Candle Brook, a tributary of Torne Brook, are NYSDEC Class "B" waters, suitable for primary contact recreation and any other use, except as a source of water supply for drinking, culinary, or food-processing purposes. Figure 5 depicts the 100-year and 500-year floodplain boundary for Torne Brook.

There are no NYSDEC-regulated or federal jurisdictional wetlands preliminarily identified on-site. However, the United States Geological Survey (USGS) has identified an area of less than ten acres near the headwaters of Candle Brook and located east of the Baler Building as a wetland (see Figure 6). No NYSDEC-regulated wetlands occur within 9 miles downstream of the Site, though several occur within a 2-mile radius, either upstream of the Site or on a different watershed. All wetlands on or adjacent to the Site will be definitively delineated as one of the remedial design activities for the Site.

Groundwater is withdrawn from the area south and west of the Site for residential use. Ten water supply wells, operated by the Spring Valley Water Supply Company and serving a population of over 200,000, are located along the Ramapo River both upstream and downstream of the Site. Four of these wells, SV-93, SV-94, SV-95, and SV-96 (see Figure 2), are located within 1,500 feet of the landfill. The closest of these wells lies approximately 500 feet west of the Site on the west bank of the Ramapo River. Torne Brook Estate, a residential apartment complex of 25 units, has a water well, PW-1, 450 feet from the landfill. A 2-unit apartment building maintains a water well, PW-2, about 1,200 feet from the landfill.

SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site History

Prior to landfill operations in the 1950s and 1960s, portions of the Site were excavated as a source of gravel.

In 1971, the Rockland County Department of Health granted a permit to the Town of Ramapo for the operation of the sanitary landfill. At that time, the Site was owned by the Ramapo Land Company and the contract-operator was the Torne Mountain Sand and Gravel Co., Inc.

In 1976, a contract was awarded to Carmine Franco of Sorgine Construction Services of New York, Inc., for operation and maintenance of the landfill. The contract was terminated by the Town of Ramapo in 1979, when the Town began operating the landfill directly. Municipal waste was accepted in the landfill until 1984. The Town of Ramapo

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continued to accept construction and demolition debris at the Site until 1989.

In September 1983, the Ramapo Landfill site was placed on the Superfund National Priorities List.

The leachate collection and treatment system was constructed along the downgradient edge of the landfill in 1984 and 1985. Surface water and groundwater were conducted to a wastewater treatment pond in the Site's southwest corner. The pond's discharge was initially to the Ramapo River after aeration and settling in the pond.

From April 1989 through May 1990, the first phase (Phase I) of Remedial Investigation field work was carried out. From August to September 1990 the second phase (Phase II) of field work was conducted.

As of November 1, 1990, leachate is no longer treated at the Site and discharged to the Ramapo River. Leachate from the pond is being discharged to the Village of Suffern Wastewater Treatment Plant, approximately 1.8 miles south of the Site, via a sewer line of approximately 7,900 feet in length running along the shoulders of Torne Valley Road and Route 59. The present contract with the Village of Suffern anticipates an average daily flow of 80,000 gallons per day, for a maximum yearly flow of 29,200,000 gallons. The contract runs for 5 years, and is renewable for an additional 5 years.

Enforcement Activities

On June 4, 1980, the first of four Orders on Consent concerning the Ramapo Landfill was entered into between the Town of Ramapo and the NYSDEC. The first order required the Town of Ramapo, as Respondent, to: (a) determine the extent of leachate movement and the feasibility of leachate collection; (b) construct a surface-water and groundwater-diversion system; (c) construct a leachate-collection system; (d) construct a system capable of transporting or treating the collected leachate; (e) phase out operation of the landfill, and (f) meet other related requirements and schedule of compliance specified in the Order.

On May 20, 1983, a Modified Order on Consent was signed, requiring the Town of Ramapo to comply with a modified Schedule of Compliance, which required construction of a leachate-collection system, maintenance of an interim surface-water diversion system, construction of an Initial Treatment System with effluent monitoring, a subsurface investigation program, the phase-out of the existing site for refuse disposal and submission of a closure plan.

On February 8, 1985, an Order on Consent was signed which required that the Initial Treatment System be completed by June 30, 1985 and construction of a Final Treatment System by October 31, 1986.

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On February 1, 1988, the Town entered into its fourth and current (Title 3 1986 Environmental Quality Bond Act) Order on Consent (Index No. W3-0083-8707) with NYSDEC. This Order requires that a remedial investigation and feasibility study (RI/FS) and remedial program be developed and implemented for the Site, subject to approval from NYSDEC.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

On September 20, 1989, the Town of Ramapo and NYSDEC conducted a public meeting at the Town of Ramapo Town Hall, Ramapo, New York, to inform local officials and interested citizens about the Superfund process, to review current and planned remedial activities at the Site, and to respond to any questions from area residents and other attendees.

The RI report, FS report, and the Proposed Plan for the Site were released to the public for comment on February 18, 1992. These documents were made available to the public in the administrative record file at the EPA Docket Room in Region II, New York and the information repositories at NYSDEC, Albany, New York, the Finkelstein Public Library, Spring Valley, New York, and the Suffern Free Public Library, Suffern, New York. The public comment period on these documents was held from February 19, 1992 to March 19, 1992.

During the public comment period, a public meeting was held in the Ramapo Town Hall, Ramapo, New York on March 3, 1992, to present the RI/FS reports and the Proposed Plan, answer questions, and accept both oral and written comments. At this meeting, representatives from the EPA, NYSDEC, and the New York State Department of Health (NYSDOH) answered questions about problems at the Site and the remedial alternatives under consideration. Responses to the comments received during the public comment period are included in the Responsiveness Summary (see Appendix V).

SCOPE AND ROLE OF OPERABLE UNIT

This response action applies a comprehensive approach and, therefore, only one operable unit is required to remediate the site.

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

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The following remedial action objectives were established: 1) prevent inhalation of vapors from the landfill; 2) prevent human and animal contact with contaminated soil from the landfill surface; 3) prevent erosion of contaminated surface soil through surface-water runoff; 4) minimize the infiltration of rainfall or snow melt into the landfill, thus reducing the quantity of water percolating through the landfill materials and leaching out contaminants; and 5) reduce the movement and toxicity of the contaminated landfill leachate into groundwater, and subsequent downgradient migration of contaminants.

NYSDEC is the lead agency for this project; EPA is the support agency.

SUMMARY OF SITE CHARACTERISTICS

RI field work was carried out in two phases: Phase I from April 1989 through May 1990; Phase II from August to September 1990. Media sampled during the RI included surface and subsurface soil, waste samples, groundwater, surface water, sediments, and air. All RI Phase I and II sampling locations, excluding air monitoring points, are depicted in Figure 7.

Volatile compounds were detected in 3 waste sample locations, SPS-3, SPS-4, and SPS-5, at concentrations ranging from 2 micrograms per kilogram (ug/kg) to 110 milligrams per kilogram (mg/kg) (total xylenes at SPS-5). No volatile compounds were detected in any of the surface soil samples including the background sample, SPS-9. Semi-volatile compounds, including polycyclic aromatic hydrocarbons (PAHs), were detected in waste samples and surface soil samples at concentrations ranging from 42 ug/kg to 16 mg/kg (naphthalene at SPS-5). No semi-volatile compounds were detected in the background sample. Antimony, barium, beryllium, cadmium, calcium, chromium, copper, lead, selenium, and zinc were detected in surface soil and waste samples at concentrations exceeding background by an order of magnitude. Acetone was detected in 4 subsurface soil samples, MW-1-SB, MW-2-SB, MW-3-SB, and MW-5-SB, at concentrations ranging from 13 to 28 ug/kg. Six semi-volatile compounds, acetone, and toluene were detected in one monitoring well boring (MW-3-SB).

All five waste samples, (waste samples include landfill material and one paint sludge sample), were analyzed for RCRA hazardous waste characteristics and extraction procedure (EP) toxicity parameters, for which there are regulatory levels. A comparison between the EP Toxicity Criteria and levels detected from the samples is presented in Table 1. No measurements exceeded the EP Toxicity Criteria. As part of RCRA testing, the samples were also analyzed for the characteristics of ignitability, corrosivity, and reactivity. Test results indicated that none of the waste samples were classified as a RCRA characteristic waste.

During the installation of monitoring well MW-10, a leachate seep was observed. LSMW-10 is a sample of the surface soil in this area. No volatiles were detected in this sample.

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Ten semi-volatiles were detected at concentrations up to 130 ug/kg (flouranthene). One pesticide, gamma-chlordane, was detected at 4.5 ug/kg. Four inorganic compounds, beryllium, cadmium, calcium, and mercury, were detected at concentrations greater than an order of magnitude above background.

NYSDEC Water Quality Standards and Guidelines and/or EPA Primary Drinking Water Standards are currently being contravened in groundwater monitoring wells installed in the overburden, intermediate layer, and bedrock aquifers. Standards were exceeded for arsenic, chromium, iron, lead, magnesium, manganese, mercury, sodium, benzene, chlorobenzene, di-n-octyl phthalate, and total organic carbon. Maximum groundwater concentrations of contaminants are compared with drinking water standards on Table 2. A summary of the number of data which exceeded state and federal drinking water standards is given in Table 3. No federal or state drinking water standards were exceeded in samples taken from the nearby public or private water supply wells.

Phase I and Phase II surface water samples were collected on Torne Brook, on the Ramapo River near the confluence of Torne Brook, a drainage swale on an adjacent property, and from 2 leachate seeps emanating from the landfill. New York State surface water standards were exceeded for vinyl chloride, antimony, arsenic, iron, manganese, mercury, nickel, zinc, ammonia, sulfide, copper, and lead. The highest frequency of the detections above the standards occurred at SW-1, near the confluence of Torne Brook and the Ramapo River, when leachate from the treatment pond was still being discharged to the Ramapo River. Maximum surface water concentrations of contaminants are compared with surface water standards on Table 4. Table 5 includes a summary of the number of data which exceeded state and federal surface water standards.

On July 12, 1991, NYSDEC sampled Torne Brook upgradient from the site, and at 3 locations on the Ramapo River. The 3 samples were collected roughly 150-feet upstream of the former Outfall 001, at the confluence with the former outfall, and roughly 150 feet downstream. The samples were analyzed for Target Analyte metals, cyanide, total organic carbon and ammonia. Analytical results indicated that no standards were exceeded for ammonia or any of the inorganic compounds previously noted as contravening standards.

No volatile or pesticide compounds were detected in any of the sediment samples collected in Torne Brook or the Ramapo River. Three semi-volatile compounds were detected in a sediment sample collected in Torne Brook, SS-3, at concentrations below NYSDEC sediment cleanup criteria. (See Table 6.) Inorganic compounds detected in sediments which exceeded background concentrations by at least an order of magnitude included manganese at SS-1, calcium and thallium at SS-3, antimony and manganese at SS-4, and calcium at SS-8.

An air monitoring study was conducted during the second phase of field activities to determine methane quality and Target Compound List (TCL) organic gas emissions. Air

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monitoring locations are depicted in Figure 8. The highest airborne concentration of a volatile organic compound (VOC) detected on-site was recorded at a piezometer, P-2, located in the northern lobe, west of the Baler Building. The results from the sample collected indicated a total xylenes concentration of 7.7 milligrams per cubic meter, which exceeded the NYSDEC Ambient Guideline Concentration (AGC) for this compound. AGCs assume continuous exposure, however, and ordinarily are compared to annual averages of air sample results. TCL organic emissions and AGCs are presented in Table 7. No other air sampling data exceeded NYSDEC AGCs.

SUMMARY OF SITE RISKS

A Baseline Risk Assessment was conducted to evaluate the potential risks to human health and the environment associated with the Ramapo Landfill Site in its current state. The Baseline Risk Assessment focused on contaminants in the soil, groundwater, and air which are likely to pose significant risks to human health and the environment. A list of the contaminants of potential concern in groundwater, soil, and air is found in Table 8.

The Baseline Risk Assessment identified several potential exposure pathways by which the public may be exposed to contaminant releases at the Site under current and future land-use conditions. Five exposure scenarios were evaluated under current and future land-use conditions. These pathways included: ingestion of soil; dermal contact with soil; inhalation of vapors from the landfill; ingestion of groundwater; and inhalation of vapors during showering. These exposure pathways were evaluated separately for adults and children and are listed in Table 9. Under the current land-use scenario, five potential receptors were identified, namely, adult and child (ages 6-11) trespassers, adult and child residents living downgradient and off-site, and employees (workers) at the landfill. Under the future land-use scenario, three receptors were identified, namely adult and child (ages 0-6) residents living on-site, and workers. The reasonable maximum exposure scenario was evaluated.

Under current EPA guidelines, the likelihood of carcinogenic (cancer causing) and noncarcinogenic effects due to 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 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

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amount of a chemical ingested from contaminated drinking water) are compared with the RfD to derive the hazard quotient for the contaminant in the particular medium. The reference doses for the compounds of concern at the Ramapo Landfill site are presented in Table 10.

The hazard index is obtained by adding the hazard quotients for all compounds across all media. A hazard index greater than 1 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.

Under current land-use conditions, the total site HI exceeded one for workers and child trespassers. Under future land-use conditions, the HIs exceeded 1 for all scenarios evaluated. Primary chemical contributors to noncarcinogenic health risks were xylenes (total) and chlorobenzene for inhalation of vapors from the landfill, and manganese and arsenic for ingestion of groundwater. A summary of the noncarcinogenic risks associated with the chemicals evaluated across various exposure pathways is found in Table 11.

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.

For known or suspected carcinogens, EPA considers excess upper bound individual lifetime cancer risks of between 10^{-4} to 10^{-6} to be acceptable. This level indicates that an individual has not greater than a one in ten thousand to one in a million chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year period under specific exposure conditions at the Site. Under current land-use conditions, the risk characterization showed that cancer risks for all receptors evaluated (i.e., adults, children, and workers) were less than or within the acceptable cancer risk range of 10^{-4} to 10^{-6}. Under future land-use conditions, cancer risks for children and workers were within the NCP acceptable range. However, the sum of future cancer risks for all exposure pathways assessed for adults (2×10^{-4}) were marginally outside the range. Arsenic and benzene were the chemicals responsible for the highest carcinogenic risks from groundwater ingestion and inhalation of vapors, respectively. A summary of the carcinogenic risks for the chemicals evaluated across various exposure pathways is found on Table 13.

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The calculations were based on the contaminants detected in soils, on-site monitoring wells, and air. It was assumed that in the future, on-site monitoring wells would be used for residential purposes. Risk estimates were developed by taking into account various conservative assumptions about the likelihood of a person being exposed to the various contaminated media.

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
- 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 Landfill, and is highly unlikely to underestimate actual risks related to the Site.

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 RI Report.

Environmental Assessment

The environmental assessment evaluated exposure risks to aquatic life. Comparison of

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the results obtained from sediment samples with NYSDEC sediment cleanup criteria indicate that no contaminant concentrations found exceed the cleanup criteria. Therefore, sediments are not expected to pose a risk to aquatic life. In reviewing the surface water contaminant concentrations, aquatic surface water standards were exceeded for copper, iron, lead, mercury, sulfide, and zinc.

The ecological studies also indicated that there are no federally listed threatened or endangered species identified at the Site. The landfill is in the historical range of a sub-species of the Eastern Woodrat, Neotoma floridana magister, listed by NYSDEC as endangered in New York State. However, because the species' habitat is within rock outcrops or boulder fields, it is unlikely to occur on or in the immediate vicinity of the landfill. No other NYSDEC rare, threatened, or endangered species or critical habitats are known to occur within a 2-mile radius of the landfill, or within 9 miles downstream of the landfill.

In summary, actual or threatened releases of hazardous substances from this Site, if not addressed by the preferred alternative or one of the other active measures considered, may present a current or potential threat to public health, welfare or the environment.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA requires that each selected site remedy be protective of human health and the environment, be cost-effective, comply with other statutory laws, and utilize permanent solutions, alternative treatment technologies and resource recovery alternatives to the maximum extent practicable. In addition, the statute includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility, or volume of the hazardous substances.

This Record of Decision evaluates in detail, 5 remedial alternatives for addressing the contamination associated with the Ramapo Landfill site. The time to implement 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, or procure contracts for design and construction.

These alternatives are:

Alternative 1: No Further Action with Monitoring

Capital Cost: $0
Operation and Maintenance (O & M) Cost: $345,700
Present Worth Cost: $3,260,000
Time to Implement: 3 months

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The Superfund program requires that the "no-action" alternative be considered as a baseline for comparison with the other alternatives. However, since leachate collection and off-site treatment of collected leachate and surface water are part of the ongoing operations at the Site, the requirement for a "no-action" alternative is not relevant for this Site. Therefore, a no further action alternative was considered.

The no further action alternative does not include any additional physical remedial measures that address contamination at the Site. However, this alternative does include maintaining the existing leachate collection system and continuing to send the collected groundwater and surface water to the Suffern Wastewater Treatment Plant at a rate of approximately 80 thousand gallons per day. It includes further long-term monitoring of on-site monitoring wells and nearby residential wells for target compound list (TCL) compounds, surface water in Torne Brook and the Ramapo River for TCL compounds, and air for VOCs and landfill gases.

In addition, the no further action alternative would include the development and implementation of a public awareness and education program to enhance the community's knowledge of the conditions existing at the Site. This alternative would require the involvement of local government, and several health departments and environmental agencies.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative 2: Limited Action (with Option for Alternate Water Supply)

Capital Cost: $190,000 - $710,000
O & M Cost: $345,700
Present Worth Cost: $3,380,000 - $3,970,000
Time to Implement: 6 months

To date, results obtained from sampling of nearby private wells indicate that the wells are not being adversely impacted by the landfill. Therefore, no provision for an alternate water supply is warranted at this time. However, should future groundwater monitoring data indicate that drinking water standards are being contravened in nearby wells, then an alternate water supply may be deemed necessary. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residental wells, and detected concentations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an

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interim measure until an alternate water supply could be constructed.

Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property. This alternative would also include deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. The existing leachate collection system would be maintained, and the collected groundwater and surface water would continue to be sent to the Suffern Wastewater Treatment Plant. Similar to Alternative 1, this alternative would also include long-term monitoring of groundwater, surface water in Torne Brook and the Ramapo River, and air.

The higher end of the capital cost range ($710,000) and present-worth cost range ($3,970,000) for this alternative reflect the additional cost for the alternate water supply which is considered an optional item.

As in Alternative 1, this alternative would include a public awareness and education program.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative 3: Installation of Groundwater Extraction Wells

Capital Cost: $1,040,000 - $3,300,000
O & M Cost: $547,300 - $1,156,000[1]
Present Worth Cost: $6,206,000 - $14,210,000
Time to Implement: 6 months

Alternative 3 includes the installation of groundwater extraction wells to supplement the existing leachate collection system and restore contaminated groundwater aquifers. Groundwater extraction wells would be installed in areas where the groundwater table may be below the reach of the existing leachate collection system. Portions of the existing deep leachate collector would be plugged or grouted and new solid piping would be laid in areas where the withdrawal wells are to be added, to avoid leakage of the existing system. Collected leachate, groundwater and surface water would be sent to a publicly owned treatment works (POTW) for off-site treatment. The off-site treatment

[1]The O&M costs for Alternatives 3, 4, and 5 assume continued treatment of leachate and treatment of groundwater at the Suffern Wastewater Treatment plant. The Town of Ramapo, however, is pursuing arrangements for treatment of leachate and groundwater at the Rockland County Sewer District No. 1 publicly-owned treatment works.

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facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and pretreatment requirements for the specific POTW.

If deemed necessary by future groundwater monitoring data, an alternate water supply would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during Remedial Design, of a contingency plan for rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply, to the extent that public water could be provided to nearby users within one year of determination of its need based on monitoring results. As an interim measure, if drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residents, and detected concentations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system.

It is estimated that the proposed improvements to the leachate collection system would increase the amount of groundwater collected and sent for treatment. Long-term monitoring of groundwater and surface water would be included under this alternative. Air monitoring for VOCs and landfill gases would be included, along with deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property.

The higher end of the capital cost range ($3,300,000) and present-worth cost range ($14,210,000) for this alternative reflect the additional costs for the alternate water supply and groundwater pretreatment, which are optional items.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative 4: Landfill Cap; Installation of Groundwater Extraction Wells

OPTION A:

Capital Cost: $26,170,000 - $29,310,000
O & M Cost: $319,600 - $622,600
Present Worth Cost: $29,190,000 - $35,760,000
Time to Implement: 2 years

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OPTION B:

Capital Cost: $21,870,000 -$25,010,000
O & M Cost: $319,600 - $622,600
Present Worth Cost: $24,890,000 -$30,880,000
Time to Implement: 2 years

Alternative 4 would involve the installation of a multi-media cap complying with New York State Part 360 Solid Waste Regulations over the entire 60 acres of the landfill, improvements to the existing leachate collection system, a surface water drainage and diversion system, and relocating and/or raising of Torne Valley Road to allow for filling rather than excavating the landfill side slopes in order to achieve stable slopes. With a cap, there would be less infiltration into the landfill, and therefore, less potential for off-site migration of contaminated groundwater. Option A costs reflect estimated costs for a multi-media cap that meets all requirements of the New York State Part 360 Solid Waste Regulations. Option B costs reflect estimated costs for a multi-media cap which is identical to that in Option A, except that it would require a 12-inch thick fill layer above the impermeable barrier as opposed to a 30-inch thick fill layer as required in Part 360. Both fill layers would be covered by a 6-inch thick layer of topsoil. The reduced fill layer in Option B would provide equivalent protection for the impermeable membrane, provided that the impermeable membrane not be damaged by frost or root action. The selection of the Option B cap would require approval from the NYSDEC for a variance of the Part 360 regulations.

The installation of groundwater extraction wells to supplement the existing leachate collection system would be implemented as described in Alternative 3. However, with the addition of a cap over the landfill, surface water would no longer have to be collected and sent for treatment. Collected leachate and groundwater would be sent to a POTW for off-site treatment. The off-site treatment facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and POTW-specific pretreatment requirements.

Long-term monitoring of groundwater and surface water would be included under this alternative. Air monitoring for VOCs and landfill gases would be included, and landfill gases would be vented to the atmosphere or controlled, as needed. This alternative also includes deed restrictions with respect to the future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property. Contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area.

If deemed necessary by future groundwater monitoring data, an alternate water supply

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would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residental wells, and detected concentations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

The higher end of the capital cost range ($29,310,000 for Option A and $25,010,000 for Option B) and present-worth cost range ($35,760,000 for Option A and $30,880,000 for Option B) reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, and treatment of landfill gases.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

Alternative 5: Landfill Cap with Soil Cover on Side Slopes; Installation of Groundwater Extraction Wells

Capital Cost: $18,390,000 - $21,640,000
O & M Cost: $319,800 - $678,600
Present Worth Cost: $21,410,000 - $28,050,000
Time to Implement: 2 years

Alternative 5 includes a landfill cap and improvements to the existing leachate collection system. The landfill cap would be similar to the cap described in Alternative 4, Option B, except for the absence of an impermeable membrane on the side slopes of the landfill. While, the exclusion of the impermeable membrane from the cap on the side slopes would result in an increase in the quantity of leachate generated, most of the leachate is expected to be collected by the existing leachate collection system and a proposed groundwater extraction well network. The side slopes, where the existing slopes are greater than 20 percent, are estimated to represent about 25 of the 60 acres. As New York State Part 360 Solid Waste Regulations require an impermeable membrane under the entire capped surface, this alternative would require approval from the NYSDEC for a variance from New York State Part 360 regulations. This approval would be contingent upon the ability of this alternative to collect leachate before it infiltrates into the groundwater aquifers or migrates off-site. As in Alternative 4, Option B, this alternative would also require a variance from New York State Part 360 regulations for the selection of a fill layer of less than 30 inches in thickness overlying the impermeable barrier. Also as in Alternative 4, contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area. Also, landfill gases would be vented

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to the atmosphere or controlled, as needed.

The installation of groundwater extraction wells to supplement the existing leachate collection system would be implemented as described in Alternative 3. However, with the addition of a cap over the landfill, surface water would no longer have to be collected and sent for treatment. Surface water runoff on the tops of the landfill lobes where the impermeable membrane is present would be collected by a perimeter drain and diverted so as to prevent infiltration from these areas. Collected leachate and groundwater, and leachate seeps, if they occur, would be sent to a POTW for off-site treatment. The off-site treatment facility could be the Suffern Wastewater Treatment Plant, which is currently receiving wastewater discharged from the Site, or an alternate POTW. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the wastewater discharged from the Site would have to meet all federal, state, local, and POTW-specific pretreatment requirements.

With a cap, there would be less infiltration into the landfill, and therefore, less potential for off-site migration of contaminated groundwater. Long-term monitoring of groundwater and surface water as discussed in Alternative 2 would be included, along with deed restrictions with respect to future use of the Site, and the prohibition of on-site groundwater extraction for potable use. Posting and fencing of the landfill would be included in order to reduce the frequency of trespassers on the landfill property.

If deemed necessary by future groundwater monitoring data, an alternate water supply would be provided for nearby users as discussed in Alternative 2. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residental wells, and detected concentations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

The higher end of the capital cost range ($21,640,000) and present-worth cost range ($28,050,000) for this alternative reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, treatment of landfill gases.

Because this alternative would result in contaminants remaining on-site above health-based levels, CERCLA requires that the Site be reviewed every five years. If justified by the review, remedial actions may be implemented to remove or treat the wastes.

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SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

During the detailed evaluation of remedial alternatives, each alternative was assessed utilizing nine evaluation criteria as set forth in the NCP and OSWER Directive 9355.3-01. These criteria were developed to address the requirements of Section 121 of CERCLA to ensure all important considerations are factored into remedy selection decisions.

The following "threshold" criteria are the most important, and 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 or relevant and appropriate 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 through treatment is the anticipated performance of a remedial technology, with respect to these parameters, that a remedy may employ.

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

6. Implementability is 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.

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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

The no further action alternative, Alternative 1, would be the least protective of human health and the environment. Although it does provide for leachate collection and off-site transport of collected leachate and surface water, it does not address any of the remedial action objectives established for the Site. Alternative 2 would be more effective than Alternative 1 in protecting human health and the environment, since fencing and posting implemented under Alternative 2 would limit access to the Site by trespassers and children and would provide for an alternate water supply to nearby users, if needed. Alternative 3 would be more effective than Alternatives 1 and 2, since it would include extraction and off-site treatment of contaminated groundwater. Alternatives 1, 2, and 3, however, do not include any provision for a landfill cap and therefore do not reduce the generation of leachate, prevent human and animal contact with contaminated soil from the landfill surface, prevent erosion of contaminated surface soil, nor provide a means of treating landfill gas emissions. Hence, Alternatives 1, 2, and 3 provide limited protection of human health and the environment.

Alternative 4 is most protective of human health and the environment. Ingestion of contaminated groundwater would be prevented by groundwater collection and off-site treatment. The combination of the leachate collection system, off-site groundwater extraction wells, and a multi-media cap would mitigate groundwater contamination. The multi-media cap would reduce the amount of infiltration into the landfill, as well as the water level within the landfill. This would lower the potential for downward migration of contaminants through the bedrock aquifer and for off-site migration of contaminated groundwater. A cap in compliance with New York State Part 360 Solid Waste Regulations would reduce infiltration to an overall 1.2 percent of precipitation. Alternative 4 Option B would be equally protective as Alternative 4 Option A, provided that the synthetic material selected for the impermeable membrane would not be damaged by frost or root action.

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Alternative 5 is more protective than Alternatives 1, 2, and 3, and may provide a comparable degree of protection as Alternative 4. With the soil cap in Alternative 5, which would not include a cap with an impermeable barrier over 25 of the 60 acres, infiltration would be reduced to an overall 7 percent of precipitation. Although this infiltration rate is about 6 times greater than the infiltration rate associated with Alternative 4, most of the leachate generated by infiltration of precipitation would occur under the side slopes, and would likely be collected. This is because of the relative proximity of the side slopes to the existing leachate collection system and to the proposed groundwater extraction well network.

With a properly engineered soil cover, Alternative 5 should be as effective as Alternative 4 in controlling landfill gas emissions, since both cap designs include a gas venting system that can be retrofitted, if necessary, with gas treatment. Potential difficulties with gas venting on the soil cap side slopes (e.g., from clogging) could be circumvented with a more frequent placement of vent standpipes.

Direct contact with the waste would be equally mitigated by the caps proposed in Alternatives 4 and 5.

Compliance with ARARs

A New York State Part 360 landfill cap is an action-specific ARAR for landfill closure[2]. Alternatives 1, 2, and 3 would not meet this ARAR, since they do not include any provisions for a landfill cap. Alternative 4 Option A would meet this ARAR, since it includes a cap which would be constructed according to New York State Part 360 regulations. Alternative 4 Option B would meet this ARAR only with a variance for a reduced amount of fill material covering the impermeable layer. The concept of a variance is approvable, if an appropriate synthetic impermeable barrier were used and all other requirements of New York State Part 360 Solid Waste Regulations for landfill closure were met. Alternative 5 would only meet this ARAR with a variance for a reduced amount of fill material covering the impermeable layer, and for the elimination of the impermeable layer on the steep side slopes of the landfill.

Alternatives 4 would be the most effective in reducing groundwater contaminant concentrations below maximum contaminant levels (MCLs) because of the lower infiltration rate of precipitation associated with capping the entire landfill including the side slopes. Alternative 5 may be nearly as effective as Alternative 4 in reducing groundwater contaminant migration, if leachate and contaminated groundwater are effectively captured by the improved leachate collection system and the proposed groundwater extraction

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[2] Installing a cap will reduce infiltration of precipitation through the landfill, thereby reducing the generation of contaminated groundwater which might exceed ARARs.

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wells. Alternative 3 would provide for improvements to the leachate collection system and off-site treatment of leachate and extracted groundwater. However, Alternative 3 would not include a Site cap, and, therefore, would not be in compliance with the New York State landfill closure regulations. Alternatives 1 and 2 provide no measures for containing wastes in the landfill, nor for addressing contaminated groundwater.

Under all alternatives, collected leachate and groundwater would be sent to a POTW for off-site treatment. The selected POTW must be in compliance with all federal and state permit requirements. In addition, the collected leachate and groundwater would have to meet all federal, state, local, and pretreatment requirements for the specific POTW.

Long-Term Effectiveness and Permanence

Alternative 1 does not include any additional permanent measures for containing, controlling, or eliminating any of the on-site contamination, or reducing the potential of exposure to the contaminated landfill materials.

Alternatives 2 and 3 would provide limited protection including posting, fencing, deed restrictions, and, if needed, an alternate water supply for nearby users. Alternative 3 would also provide for improvements to the existing leachate collection system. However, these alternatives include no further measures to control or remediate Site contamination.

The closure caps proposed in Alternatives 4 and 5 represent a permanent measure that could be maintained at regular intervals to ensure their structural integrity and impermeability. Alternative 5 may require additional monitoring and maintenance to ensure integrity of the cap, and to prevent leachate seeps.

Reduction in Toxicity, Mobility, or Volume Through Treatment

None of the alternatives proposed reduce the toxicity or volume of waste present in the landfill.

All of the alternatives include off-site treatment of collected leachate and groundwater. The installation of extraction wells, included with Alternatives 3 through 5, to supplement the Site's existing leachate collection system would further reduce the toxicity, mobility, and volume of contaminated groundwater than would Alternatives 1 and 2. The addition of the proposed caps in Alternatives 4 and 5 would further reduce the toxicity, mobility, and volume of contaminants by limiting or reducing infiltration of precipitation through the landfill. The soil cap in Alternative 5 would not be as effective as the cap in Alternative 4, designed in compliance with New York State Part 360 Solid Waste Regulations, in limiting generation of leachate.

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Short-Term Effectiveness

Since no construction is required to implement Alternative 1, the no further action alternative, there would be no associated short-term impacts to the community, workers, or the environment. However, while no increases in risks result in the short-term, no protection against the principal Site threats would be achieved.

Alternative 2 would have the least short-term impact of the remaining alternatives, as it involves the smallest construction effort on-site in potentially contaminated areas. Alternative 3 would have the second lowest short-term impact, with limited construction activities in potentially contaminated areas. However, these alternatives would provide little protection against the principal Site threats.

Alternatives 4 and 5 contain multiple components, which increase the construction effort as well as the time required for implementation. Both alternatives include caps, which would involve clearing, grubbing, and re-grading of the landfill. Potential hazards to the surrounding community, and environment may include airborne dust and particulate emissions and an increase in noise levels. These impacts would be mitigated in part through the employment of proper construction techniques and operational procedures. Risks to on-site workers due to inhalation of contaminants adsorbed to fugitive dust would be minimized through the use of personal protection equipment. Once the surface soils are covered, the short-term impacts to the community, workers, and the environment would no longer be present.

Implementability

Alternative 1, the no further action alternative, would be the easiest of the alternatives to implement because it requires only additional monitoring of groundwater and surface water.

Alternative 2 is the second easiest alternative to implement. The construction of water supply lines and the installation of a fence would be easily implemented. Alternative 3 is the third easiest alternative to implement. The installation of extraction wells and the improvements to the leachate collection system, are not expected to be difficult to implement.

Alternatives 4 and 5 involve capping the landfill, as well as improvements to the leachate collection system. Construction methods for capping are well established, although some technical problems, particularly for large construction projects such as this, may be encountered. The potential for design and construction problems would be reduced under Alternative 5, since the soil cap would not require the installation of a synthetic impermeable barrier on steep side slopes. Stress situations such as bridging over subsidence and friction between the synthetic impermeable barrier and other cover components, especially on side slopes, may require special laboratory tests to ensure the

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design meets required performance standards. The synthetic liner specified in Alternatives 4 and 5 requires a special handling during installation to ensure integrity.

All of the alternatives would involve some degree of institutional management. Alternative 1 would require administrative coordination of the groundwater monitoring program and the 5-year Site status reviews, along with the development of the public education program. Alternative 2 would require a similar effort for those activities, and also for maintenance of the security fence and for installation of a water supply line to nearby residents.

In addition to the above activities, administrative requirements for Alternative 3 would include operation and maintenance of the improved leachate collection system and a pretreatment facility, if needed. Collected leachate and surface water discharged from the Site would have to be in compliance with the receiving POTW's pretreatment requirements.

Administrative requirements for Alternatives 4 and 5 include the management of the groundwater-monitoring program, improved leachate collection system, and alternate water supply and pretreatment facility, if needed. In addition, the structural integrity and impermeability of the closure cap must be maintained through a program of periodic surveillance and necessary repairs. Because of the relatively large area of the landfill, this effort and its associated cost may be fairly substantial.

Most services and materials required for implementation of all of these potential remedial alternatives are readily available. Standard construction equipment and practices can be employed for the fence installation of Alternatives 2 through 5 and the extensive construction activities of Alternatives 4 and 5. Most of the materials and equipment required for these alternatives may be obtained locally.

Because the work would be taking place on a Superfund site, all on-site personnel must have approved health and safety training. Many companies are available to provide this training to contractors. The engineering and design services required for implementation of Alternatives 3 through 5 would be available from many vendors.

Cost

Present-worth cost estimates consider a 10% discount rate and a 30-year operational period. The present-worth costs are as follows:

Alternative 1	$3,260,000
Alternative 2	$3,380,000 - $3,970,000
Alternative 3	$6,206,000 - $14,210,000
Alternative 4, Option A	$29,190,000 - $35,760,000
Alternative 4, Option B	$24,890,000 - $30,880,000

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Alternative 5	$21,410,000 - $28,050,000

The higher range for the present-worth cost in Alternative 2 reflects the additional costs for the alternate water supply which is considered an optional item. The higher range of capital costs and present-worth costs in Alternatives 3, 4, and 5 reflect additional costs for the optional items which include an alternate water supply, groundwater pretreatment, and treatment of landfill gases. Table 14 presents capital costs and annual O&M costs, as well as present-worth cost estimates for all the alternatives.

State Acceptance

NYSDEC concurs with the selected remedy. NYSDEC will also concur with the contingent remedy, should the confirmatory studies determine that the contingent remedy is appropriate. See Appendix IV.

Community Acceptance

The community's comments and concerns received during the public comment period are identified and addressed in the Responsiveness Summary which is attached as Appendix V to this document.

SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, both NYSDEC and EPA have determined that Alternative 5 is the appropriate remedy, with Alternative 4, Option B as a contingent remedy for the Site.

While, the exclusion of the impermeable membrane from the landfill cap on the side slopes, as discussed in Alternative 5, would result in an increase in the quantity of leachate generated, most of the leachate is expected to be collected by the existing leachate collection system and a proposed groundwater extraction well network. Therefore, the selection of Alternative 5 is contingent upon its ability to adequately collect leachate before it infiltrates into the groundwater aquifers or migrates off-site. Confirmatory studies will be performed during the remedial design phase to determine whether Alternative 5 will attain a standard of performance equivalent to Alternative 4, Option B in reducing migration of contaminated groundwater, preventing leachate outbreaks, and restoring contaminated aquifers. Should the confirmatory studies indicate that Alternative 5 would not meet these objectives, then Alternative 4, Option B would be implemented at the Site, or in those Site areas where needed. Confirmatory studies may include additional groundwater flow modelling and pump tests to determine the hydraulic relationship between the upper and lower aquifers.

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The selected alternative, Alternative 5, is expected to achieve substantial risk reduction through source control and a leachate and groundwater collection system.

The major components of the selected remedy are as follows:

- Installation of a cap on the tops of the landfill using a multi-media system, including layers of fill material, a gas-venting system and an impermeable membrane. The landfill side slopes will be capped using a multi-media system without an impermeable membrane, if confirmatory studies demonstrate that this approach meets remedial action objectives. Should the confirmatory studies indicate that the overall remedy's effectiveness would be significantly reduced by not including an impermeable barrier in the multi-media cap on the sideslopes, then an impermeable barrier would be included in the cap on some or all of the side slopes of the landfill;

- Regrading and compacting of the landfill mound to provide a stable foundation for the placement of the cap prior to its construction;

- Contaminated off-site soils resulting from leachate seeps would be removed and consolidated within the capped area.

- Installation of groundwater extraction wells to supplement the existing leachate collection system;

- Collection and diversion of leachate seeps to the leachate collection system for off-site treatment;

- Installation of a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water runoff;

- If groundwater pretreatment is needed (pursuant to the requirements of the POTW), construction of a pretreatment facility which would be tied into the existing leachate collection and discharge system;

- Performance of air monitoring prior to, during, and following construction at the Site to ensure that air emissions resulting from the cap construction meet applicable or relevant and appropriate requirements. Perimeter air monitoring in the groundwater monitoring wells, piezometers, and additional gas monitoring wells to be installed between the landfill and the Baler Building will be performed. The gas monitoring wells will be monitored quarterly for explosive gas concentrations.

- Performance of air dispersion modeling to estimate ambient air concentrations of contaminants. Landfill gas emissions will be controlled,

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if necessary.

- Imposition of property deed restrictions by the appropriate State or local authorities. The deed restrictions will include measures to prevent the installation of drinking water wells at the site, and restrict activities which could affect the integrity of the cap.

- Performance of a maintenance and sampling program upon completion of closure activities. The monitoring program will fulfill the requirements of 6 NYCRR Part 360 for post-closure landfill monitoring in addition to monitoring parameters of concern found at the Site. Additional wells will be added where needed to detect any movement of site-related contaminants toward nearby private wells, including production wells of the Spring Valley Water Company.

- Development of a contingency plan for rapid implementation of measures to protect nearby residents and users of groundwater if those measures are determined to be necessary.

- Samples will be collected on a quarterly basis for site-related parameters from nearby residential wells and from new and selected existing monitoring wells. If increases are noted through this monitoring program at or immediately upgradient of the residences, the State and EPA will make a determination as to the need for appropriate action (i.e., extension of a public water line) to remedy the situation.

- Development and implementation of a dust control plan. The plan will contain all possible sources of fugitive dust emissions including intrusive field activities such as excavation or regrading of waste. Normal dust suppression techniques for handling of soils and road materials will be addressed in the plan. The plan should also include how each of these potential dust sources will be controlled by addressing the control methods that will be conducted.

- Spring Valley Water Company (SVWC) production well Nos. 93, 94, 95, and 96 will be monitored quarterly for the site parameter list, if site parameters are not already being monitored by SVWC. After one year, if the monitoring program does not show trends suggesting an impact from site-related contaminants, the monitoring schedule for these wells can be adjusted to conform with the minimum monitoring requirements specified under Chapter 10, Subpart 5-1 of the New York State Sanitary Code.

- Delineation and evaluation of any wetlands on or adjacent to the Site or impacted by the Site consistent with the Federal Manual for Identifying and

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Delineating Jurisdictional Wetlands (1989);

- Performance of a Stage 1A cultural resources survey, as early as possible during Remedial Design, on-site and in off-site areas where there is a potential impact to cultural resources.

The purpose of this response action is to reduce the present risk to human health and the environment due to contaminants leaching from the landfill mound. The capping of the landfill will minimize the infiltration of rainfall and snowmelt into the landfill, thereby reducing the potential for contaminants leaching from the landfill and negatively impacting the wetlands habitat and groundwater quality. Capping will prevent direct contact exposure to contaminated soils, and as such will result in risks which are less than EPA's target levels of 10^{-6} and 1 for carcinogenic risks and the noncarcinogenic hazard index, respectively.

Pumping and treating the groundwater will contain the groundwater contamination within the Site boundary and will ensure that groundwater beyond the Site boundary meets applicable or relevant and appropriate state and federal standards for groundwater. The extracted leachate and groundwater will be discharged to a POTW for off-site treatment.

The response action also reduces the movement and toxicity of the contaminated landfill leachate into groundwater, and subsequent downgradient migration of contaminants.

STATUTORY DETERMINATIONS

Under its legal authorities, EPA's primary responsibilities at Superfund sites is to undertake remedial actions that achieve protection of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences. These specify that when complete, the selected remedial action for this site must comply with applicable or relevant and appropriate environmental standards established under federal and state environmental laws unless a statutory waiver is justified. The selected remedy also must be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. Finally, the statute includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes, as available. The following sections discuss how the selected remedy meets these statutory requirements. The contingent remedy will also meet these requirements.

Protection of Human Health and the Environment

Alternative 5 and Alternative 4, Option B are fully responsive to this criterion and to the

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identified remedial response objectives. Capping the landfill protects human health and the environment by reducing the mobility of contaminated materials, in that the leaching of contaminants into the aquifers will be significantly reduced. In addition, capping the landfill will eliminate threats posed to adults, children, trespassers, and wildlife who come in contact with the Site. The extraction and treatment of contaminants in groundwater will prevent the off-site groundwater from being contaminated above drinking water standards, thereby ensuring that the community continues to have a potable supply of drinking water.

Compliance with ARARs

The selected remedy would require approval from the NYSDEC for a variance from New York State Part 360 Solid Waste Regulations for the elimination of the impermeable layer on the side slopes of the landfill. NYSDEC approval of this variance is contingent upon the results of the confirmatory studies to determine the effectiveness of Alternative 5.

Both cap designs in the selected and contingent remedies specify a 12-inch fill layer overlying the impermeable barrier. The selection of a 12-inch fill layer would require approval from NYSDEC for a variance from New York State Part 360 Solid Waste Regulations in order to meet frost protection requirements. NYSDEC considers this variance to be approvable at this site, providing that a synthetic membrane meeting appropriate performance standards is used as an impermeable barrier.

Attainment of chemical-specific ARARs for groundwater will be hastened due to reduced leaching following construction of the cap and the extraction and treatment of leachate and groundwater. The source of surface water contamination (leachate seeps) will be eliminated. Action- and location-specific ARARs will be complied with during implementation.

Action-specific ARARs:

- New York State Solid Waste Management Facilities 6 NYCRR Part 360
- National Emissions Standards for Hazardous Air Pollutants (NESHAPs)
- 6 NYCRR Part 257 Air Quality Standards
- 6 NYCRR Part 212 Air Emission Standards
- 6 NYCRR Part 373 Fugitive Dusts
- 40 CFR 50 Air Quality Standards
- SPDES - Discharge

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- Resource Conservation and Recovery Act (RCRA)

Chemical-specific ARARs:

- SDWA MCLs
- 6 NYCRR Part 703.5 Groundwater Quality Regulations
- 6 NYCRR Part 702 Surface Water Standards
- 10 NYCRR Part 5 State Sanitary Code

Location-specific ARARs:

- Clean Water Act Section 404, 33 USC 1344
- Fish and Wildlife Coordination Act, 16 USC 661
- National Historic Preservation Act, 16 USC 470
- New York State Freshwater Wetlands Law ECL, Article 24, 71 in Title 23
- New York State Freshwater Wetlands Permit Requirements and Classification, 6 NYCRR 663 and 664
- New York State Endangered and Threatened Species of Fish and Wildlife Requirements, 6 NYCRR 182

Other Criteria, Advisories, or Guidance To Be Considered:

- Executive Order 11990 (Protection of Wetlands)
- Executive Order 11988 (Floodplain Management)
- EPA Statement of Policy on Floodplains and Wetlands Assessments for CERCLA Actions
- New York Guidelines for Soil Erosion and Sediment Control
- New York State Sediment Criteria, December 1989
- New York State Air Cleanup Criteria, January 1990

RAM 002 0035

- SDWA Proposed Maximum Contaminant Levels (PMCLs) and Maximum Contaminant Level Goals (MCLGs)

- Sole Source Aquifer (SSA) Petition under review for the Ramapo River Watershed

- NYSDEC Technical and Operational Guidance Series 1.1.1, November 1991

Cost-Effectiveness

The selected remedy and the contingent remedy provide overall effectiveness proportional to their costs. The total capital and present worth cost ranges for the selected remedy are estimated to be $18,960,000 - $22,210,000, and $19,890,000 - $26,423,000, respectively. For the contingent remedy, the corresponding cost ranges are $22,440,000 - $25,580,000 and $23,230,000 - $29,230,000, respectively.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

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

The extraction and subsequent treatment of groundwater will permanently and significantly reduce the toxicity, mobility, and volume of contaminants in the groundwater. Confirmatory studies will be performed to demonstrate that the selected remedy meets all remedial action objectives. If the confirmatory studies indicate that the selected remedy is not effective in meeting remedial action objectives, then the contingency remedy will be implemented, where needed.

The selected remedy and contingent remedy will require construction of a landfill cap. No technological problems should arise since the technologies and materials needed for capping the landfill are readily available. With the construction of the landfill cap, the direct contact risk to the landfill surface will be eliminated.

Preference for Treatment as a Principal Element

The statutory preference for remedies that employ treatment as a principal element cannot be satisfied for the landfill itself, since treatment of the landfill material is not practicable. The size of the landfill and the fact that there are no identified on-site hot spots that represent the major sources of contamination preclude a remedy in which contaminants could be excavated and treated effectively. However, the selected remedy and the

RAM 002 0036

contingent remedy call for the treatment of contaminated groundwater at the Site and, hence, satisfy the preference for treatment for this portion of the remedy.

DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes from the preferred alternative presented in the Proposed Plan, other than a modification of the capital, O&M, and present worth costs associated with Alternatives 3 - 5.

In the Proposed Plan, the O&M costs associated with Alternatives 1 and 2 reflected continued treatment of the leachate from the landfill at the Suffern Wastewater Treatment plant, while Alternatives 3 - 5 reflected O&M costs associated with treatment of the leachate and groundwater at an alternative facility. The costs in ROD, however, reflect treatment of the leachate and groundwater for all of the alternatives at the Suffern Wastewater Treatment plant. The Town of Ramapo, however, is pursuing arrangements for treatment at the Rockland County Sewer District No. 1 POTW.

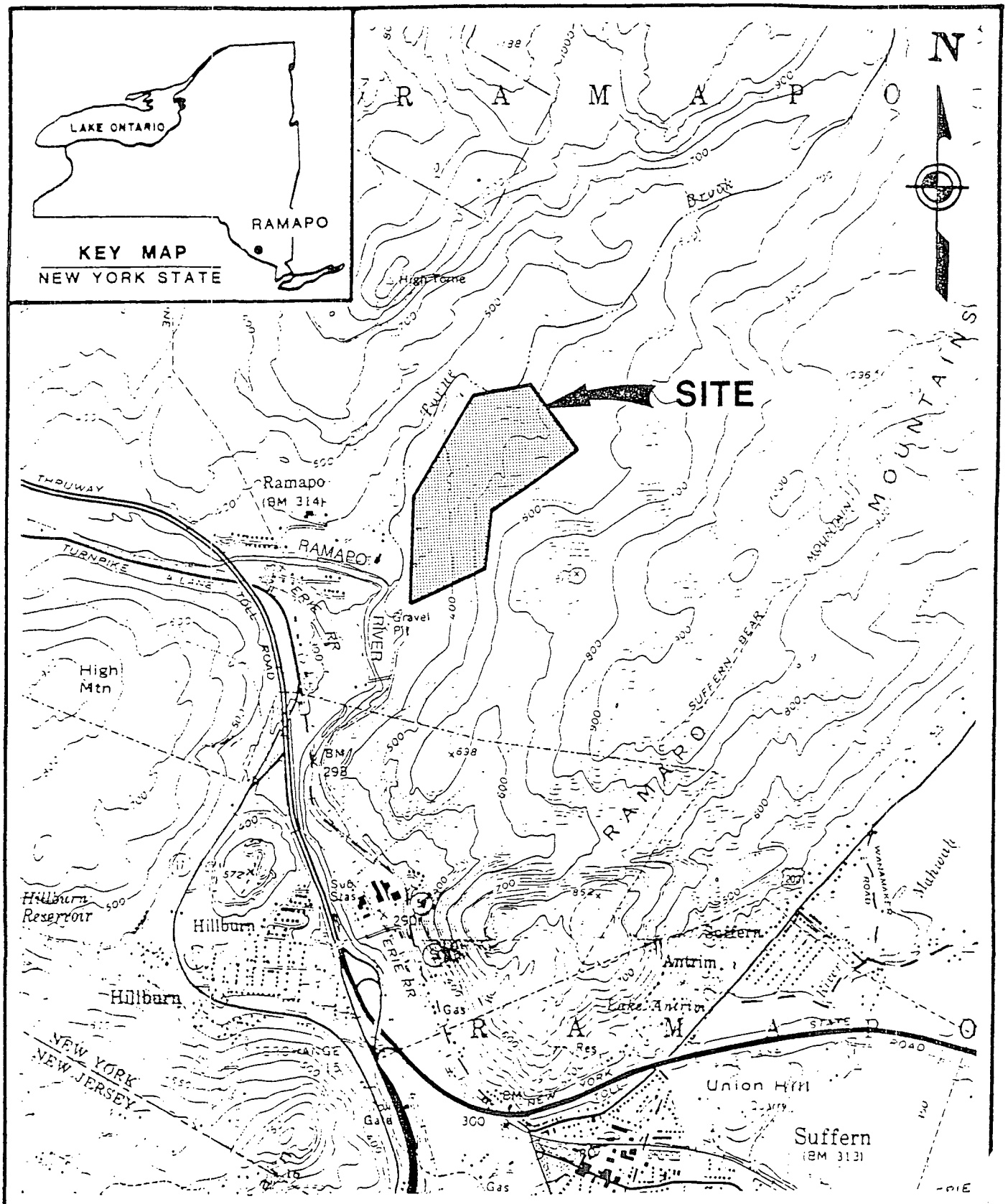
RAM 002 0037

APPENDIX I

FIGURES

Figures

RAM 002 0039



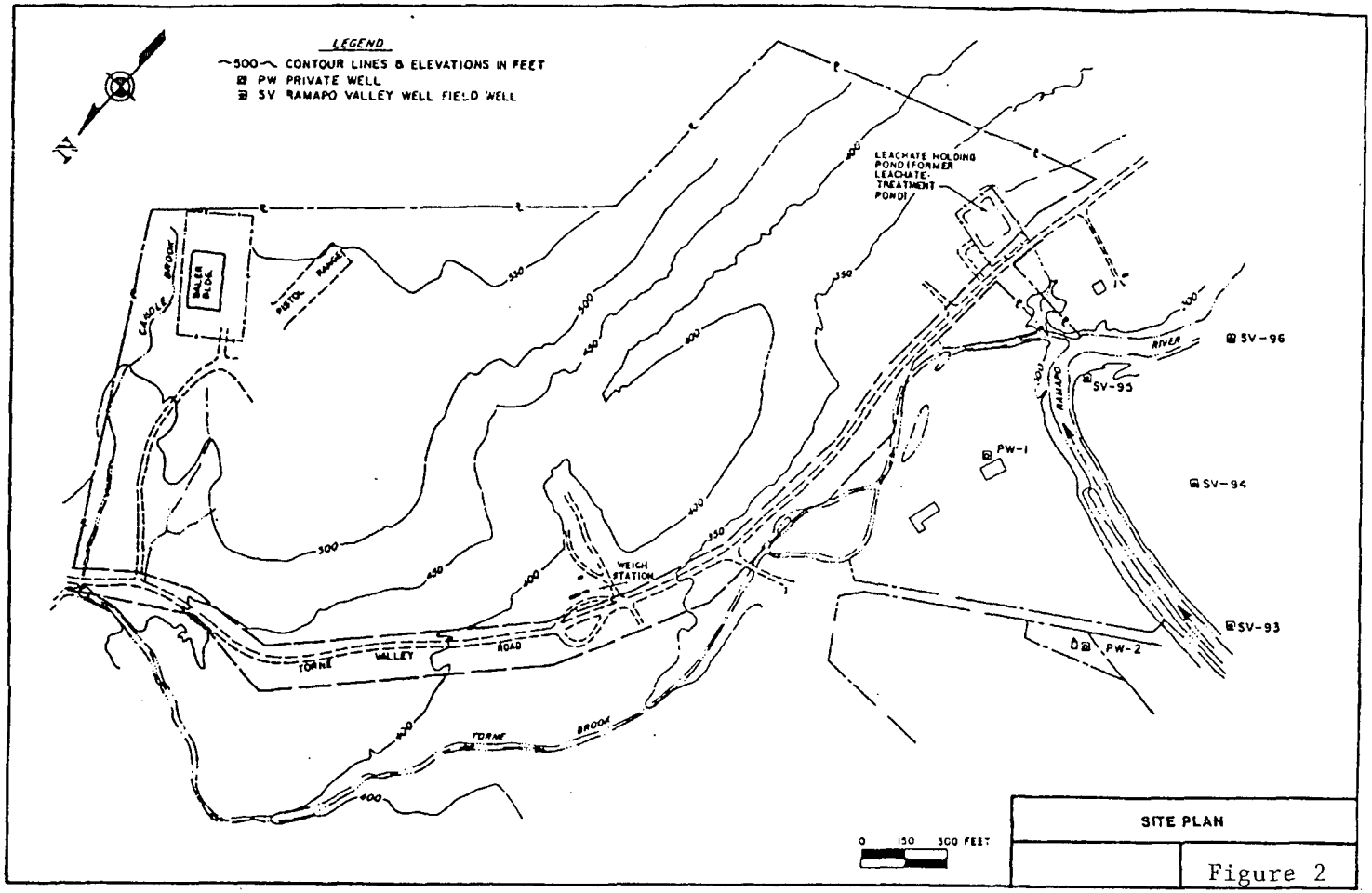
USGS 7.5 MINUTE SERIES
RAMSEY AND SLOATSBURG
QUADRANGLES (1955)

SCALE 0 1000 2000FT

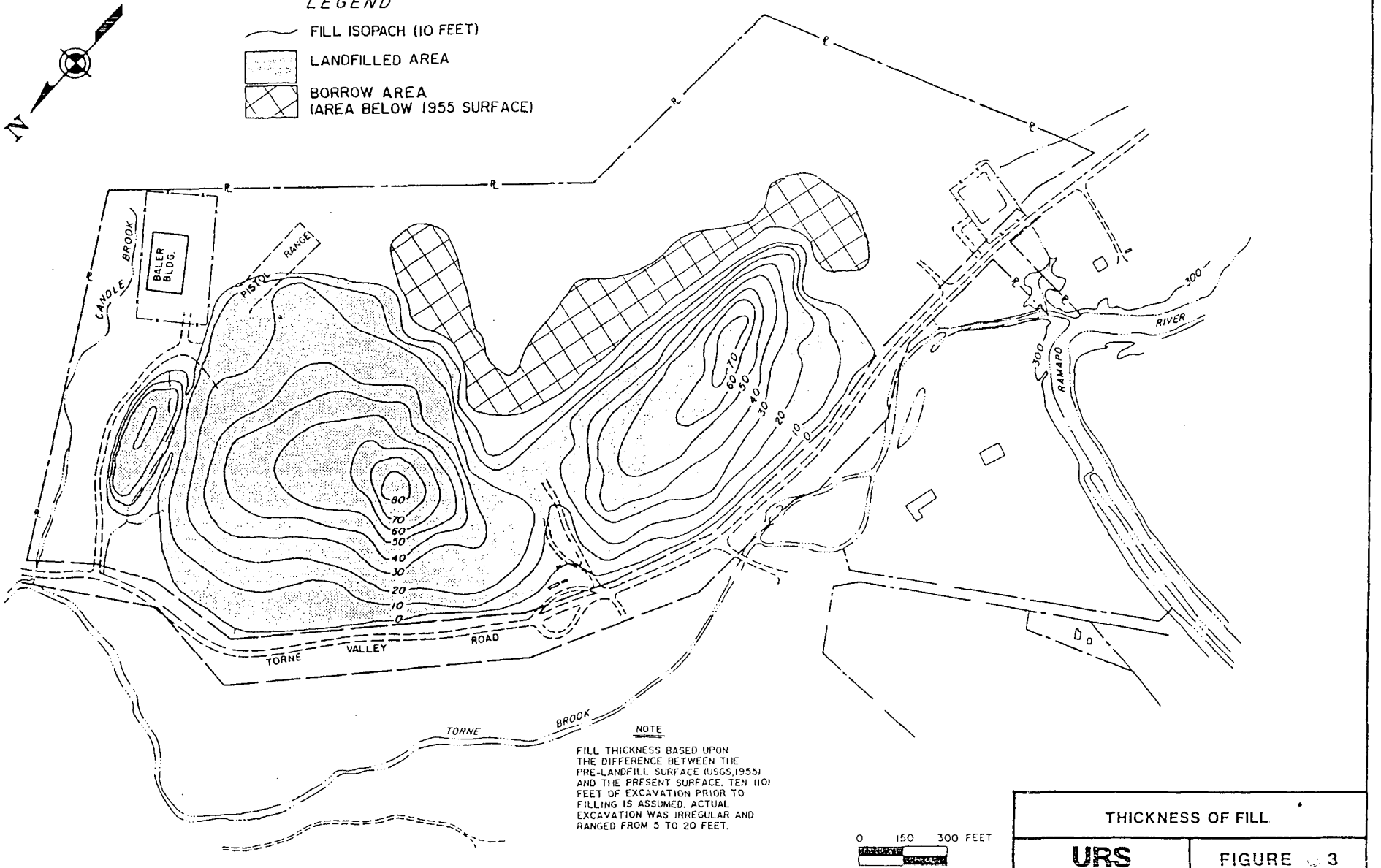
URS CONSULTANTS, INC.	SITE LOCATION	FIGURE 1

A-2936-C

RAM 002 0040

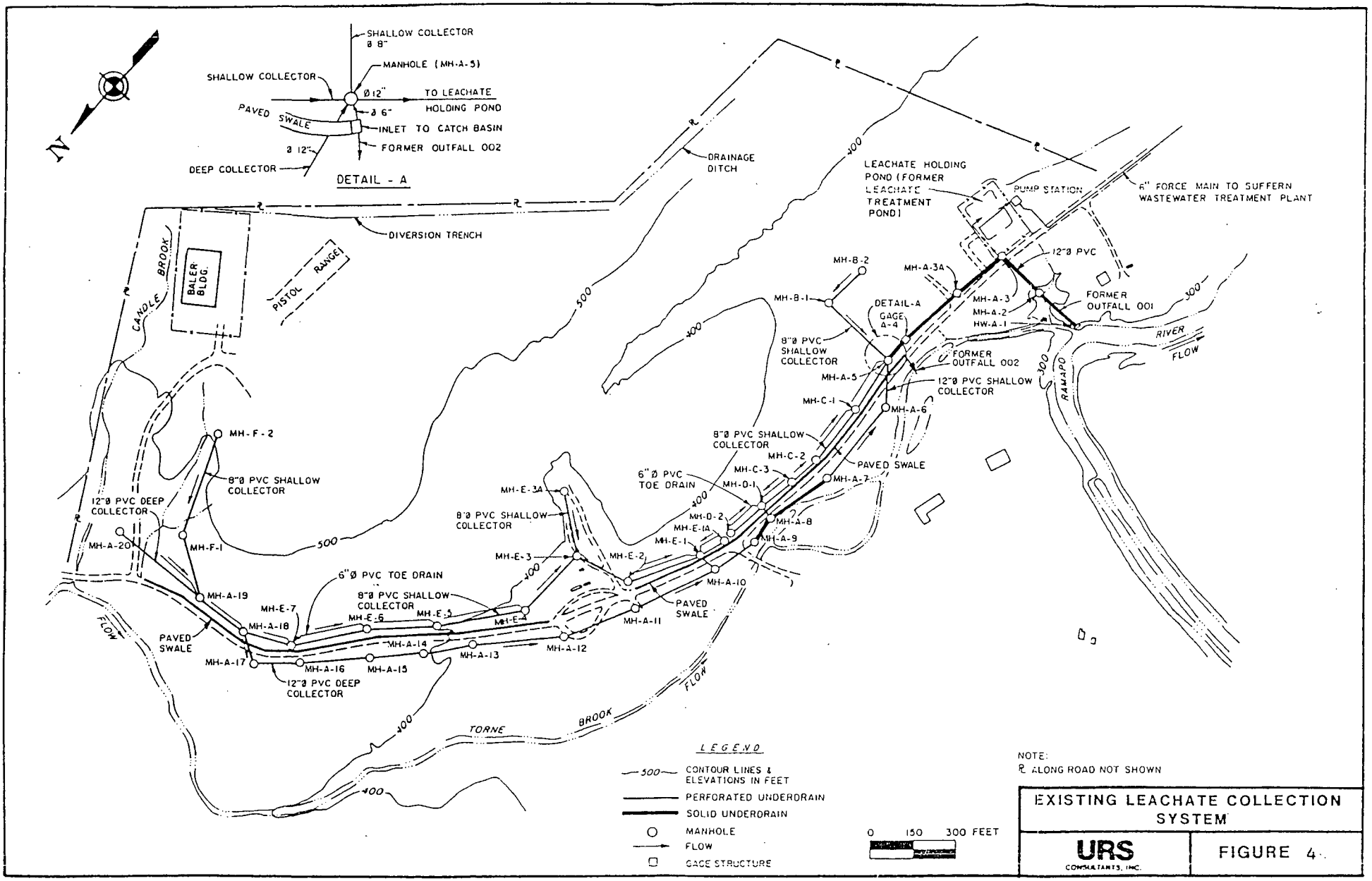

LEGEND
~500~ CONTOUR LINES & ELEVATIONS IN FEET
PW PRIVATE WELL
SV RAMAPO VALLEY WELL FIELD WELL
N
LEACHATE HOLDING POND (FORMER LEACHATE TREATMENT POND)
SALER BLDG.
PISTOL RANGE
LANDFILL BROOK
RAMAPO RIVER
SV-96
SV-95
SV-94
SV-93
PW-1
PW-2
WEIGH STATION
TORNE VALLEY ROAD
TORNE BROOK
0 150 300 FEET
SITE PLAN
Figure 2

RAM 002 0041

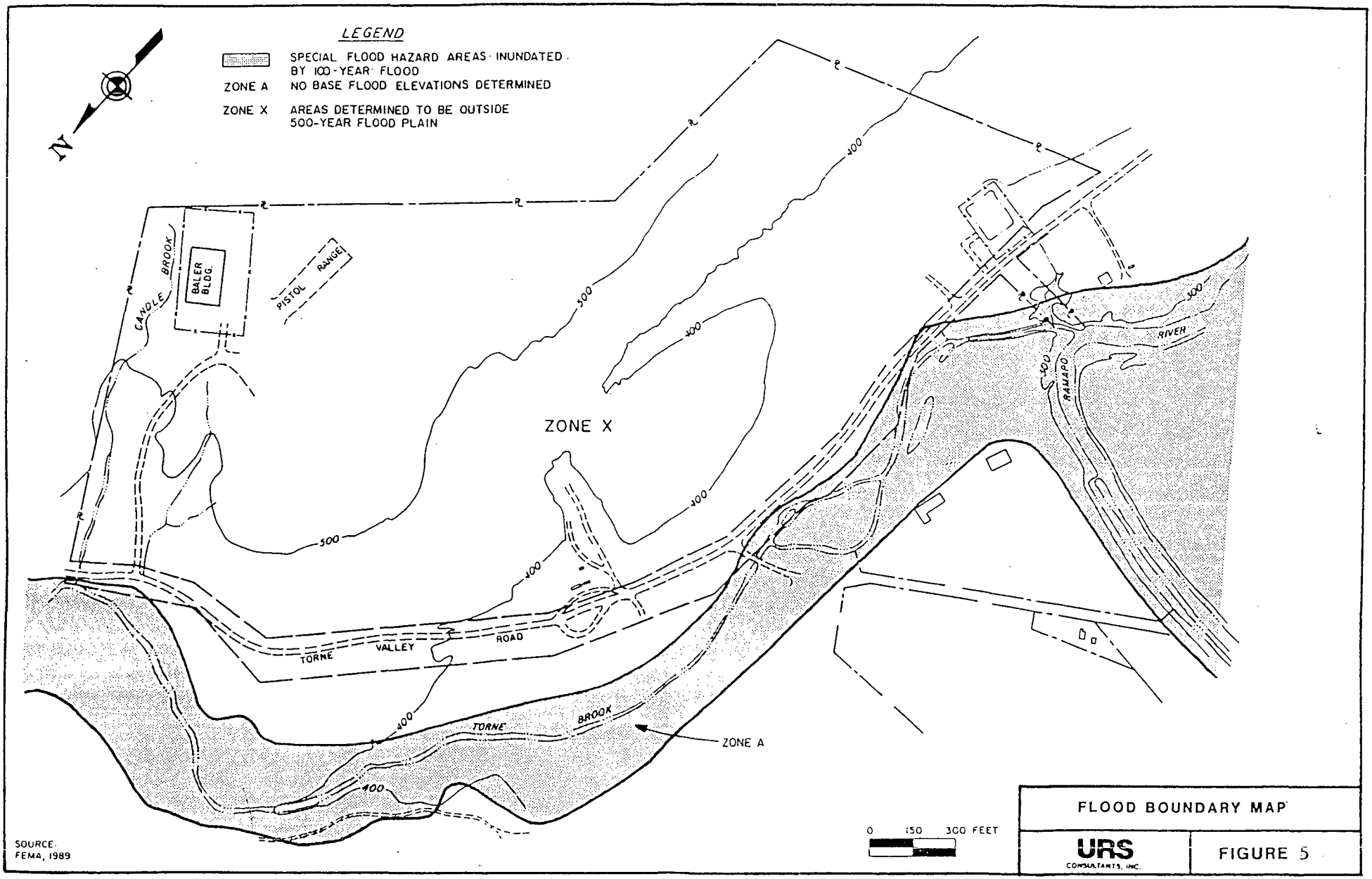


C-1871

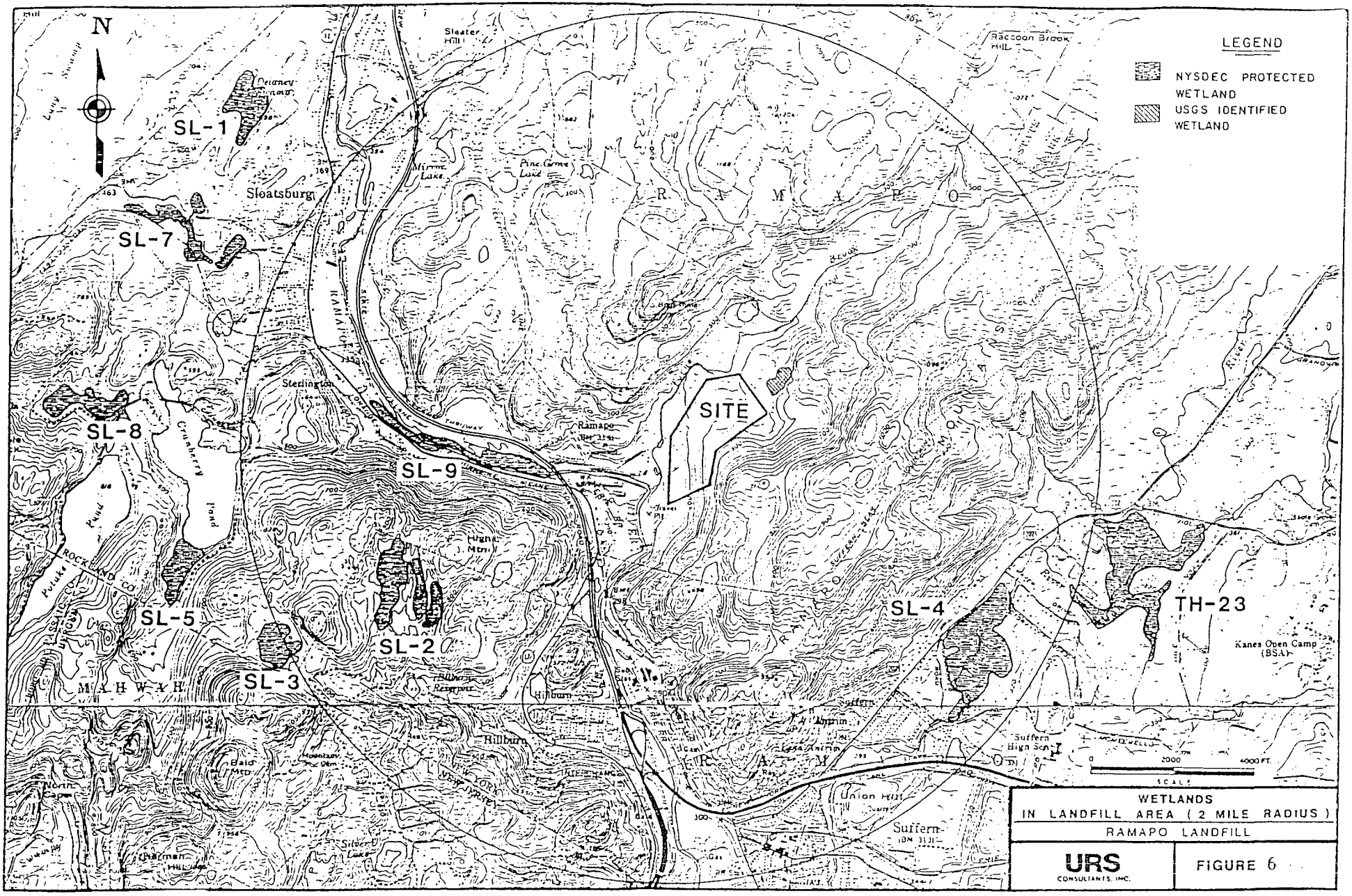
RAM 002 0042


SHALLOW COLLECTOR Ø 8"
MANHOLE (MH-A-5)
SHALLOW COLLECTOR
Ø 12"
TO LEACHATE HOLDING POND
PAVED SWALE
Ø 6"
INLET TO CATCH BASIN
Ø 12"
FORMER OUTFALL 002
DEEP COLLECTOR
DETAIL - A
N
DRAINAGE DITCH
LEACHATE HOLDING POND (FORMER LEACHATE TREATMENT POND)
PUMP STATION
6" FORCE MAIN TO SUFFERN WASTEWATER TREATMENT PLANT
DIVERSION TRENCH
BALER BLDG.
PISTOL RANGE
CANDLE BROOK
MH-B-2
MH-A-3A
12"Ø PVC
MH-B-1
DETAIL-A
GAGE A-4
MH-A-3
MH-A-2
HW-A-1
FORMER OUTFALL 001
8"Ø PVC SHALLOW COLLECTOR
FORMER OUTFALL 002
RIVER FLOW
MH-A-5
12"Ø PVC SHALLOW COLLECTOR
MH-C-1
MH-A-6
RAMAPO
8"Ø PVC SHALLOW COLLECTOR
MH-C-2
MH-C-3
PAVED SWALE
6"Ø PVC TOE DRAIN
MH-D-1
MH-A-7
MH-E-3A
MH-D-2
MH-A-8
8"Ø PVC SHALLOW COLLECTOR
MH-E-1A
MH-E-1
MH-A-9
MH-F-2
8"Ø PVC SHALLOW COLLECTOR
MH-E-3
MH-E-2
MH-A-10
12"Ø PVC DEEP COLLECTOR
MH-A-20
MH-F-1
6"Ø PVC TOE DRAIN
MH-A-19
8"Ø PVC SHALLOW COLLECTOR
MH-E-7
MH-E-6
MH-E-5
MH-E-4
MH-A-11
PAVED SWALE
FLOW
PAVED SWALE
MH-A-18
MH-A-14
MH-A-17
MH-A-16
MH-A-15
MH-A-13
MH-A-12
12"Ø PVC DEEP COLLECTOR
FLOW
TORNE BROOK
500
400
300
LEGEND
500 CONTOUR LINES & ELEVATIONS IN FEET
PERFORATED UNDERDRAIN
SOLID UNDERDRAIN
MANHOLE
FLOW
GAGE STRUCTURE
0 150 300 FEET
NOTE:
℄ ALONG ROAD NOT SHOWN
EXISTING LEACHATE COLLECTION SYSTEM
URS CONSULTANTS, INC.
FIGURE 4
C-1851

RAM 002 0043

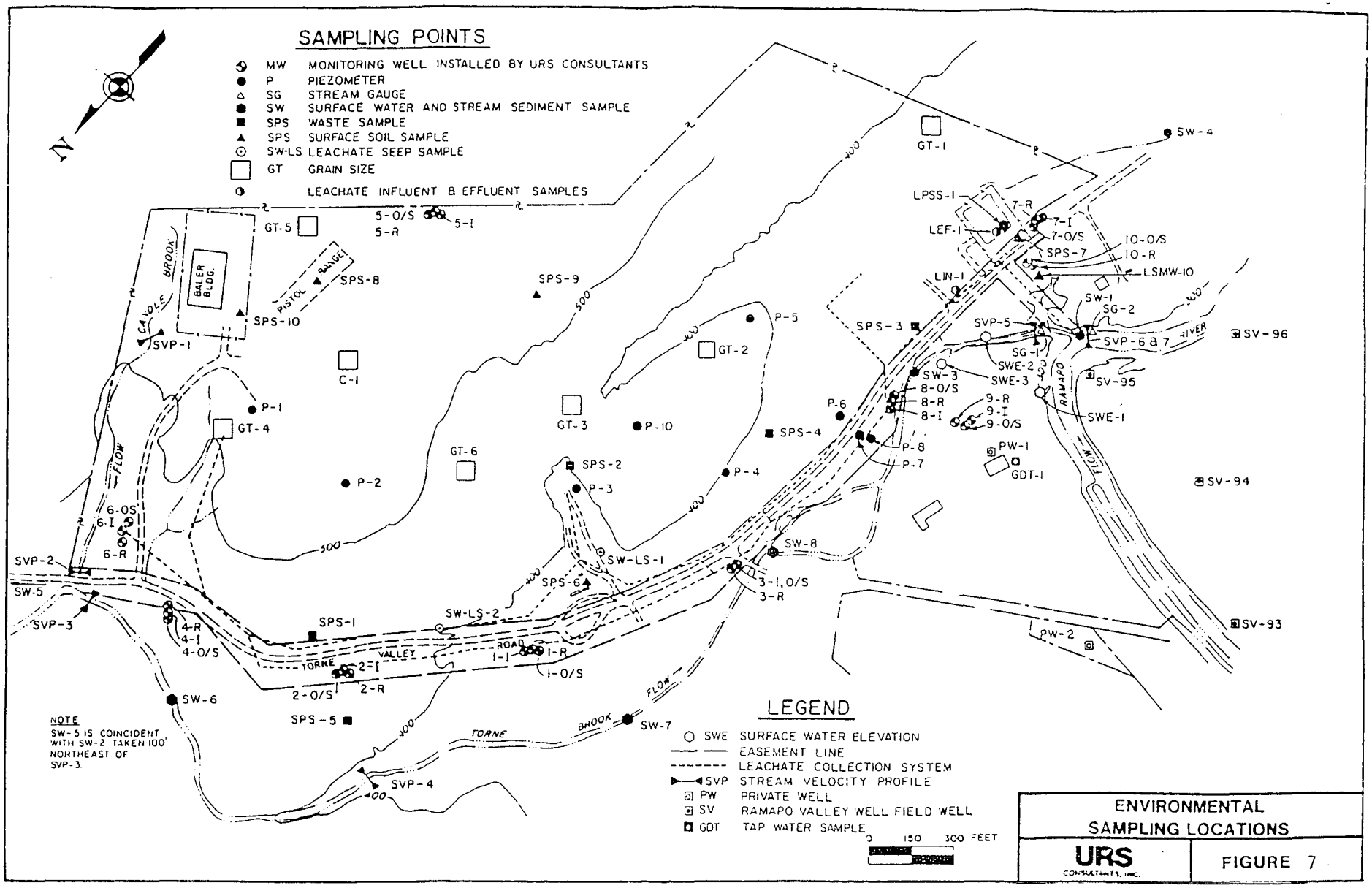

LEGEND
SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100-YEAR FLOOD
ZONE A NO BASE FLOOD ELEVATIONS DETERMINED
ZONE X AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOOD PLAIN
N
CANDLE BROOK
BALER BLDG.
PISTOL RANGE
ZONE X
500
400
TORNE VALLEY ROAD
TORNE BROOK
ZONE A
RAMAPO RIVER
0 150 300 FEET
SOURCE: FEMA, 1989
FLOOD BOUNDARY MAP
URS CONSULTANTS, INC.
FIGURE 5

RAM 002 0044

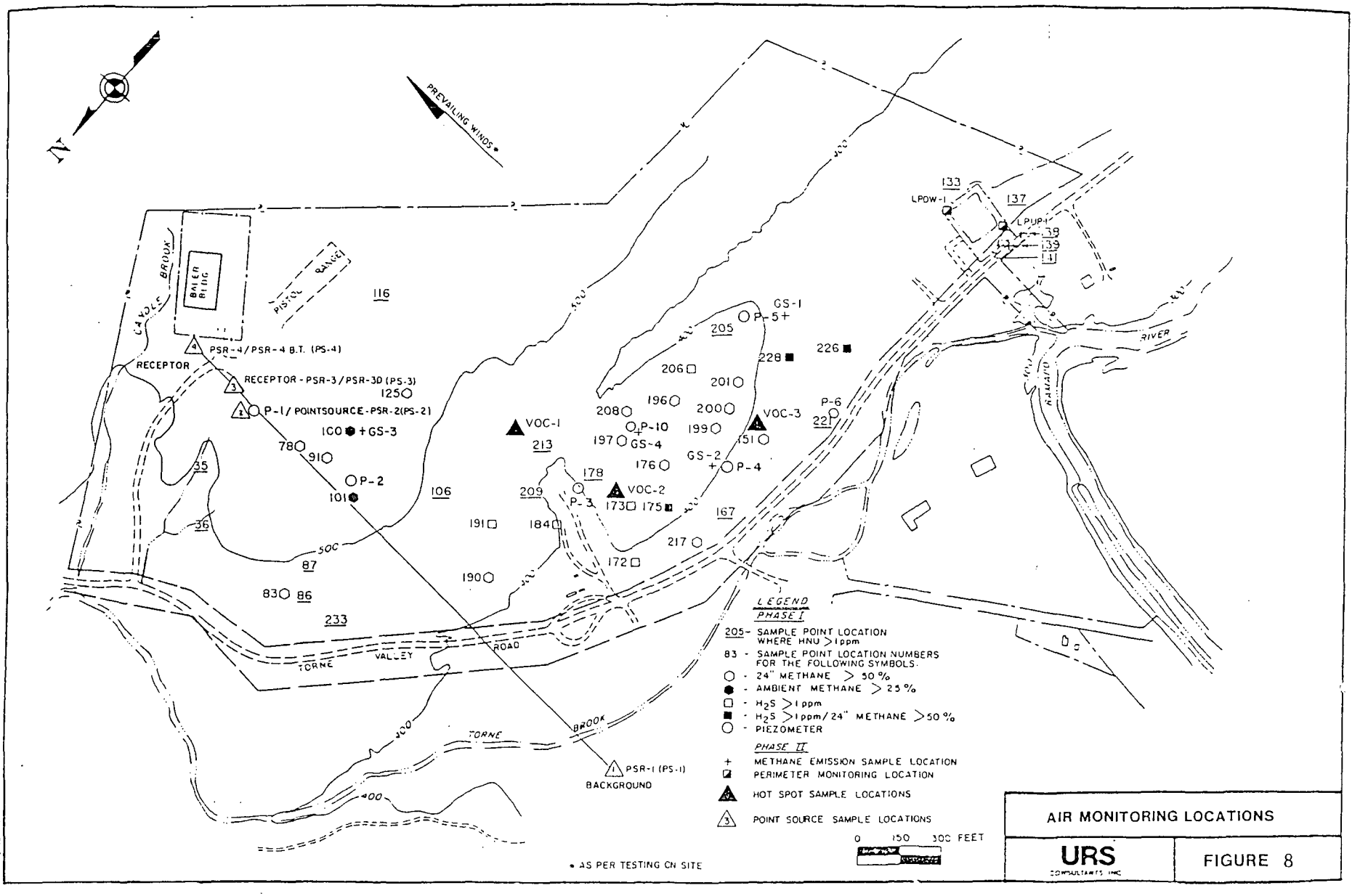


C-1879/o

RAM 002 0045


SAMPLING POINTS
MW MONITORING WELL INSTALLED BY URS CONSULTANTS
P PIEZOMETER
SG STREAM GAUGE
SW SURFACE WATER AND STREAM SEDIMENT SAMPLE
SPS WASTE SAMPLE
SPS SURFACE SOIL SAMPLE
SW-LS LEACHATE SEEP SAMPLE
GT GRAIN SIZE
LEACHATE INFLUENT & EFFLUENT SAMPLES
N
GT-1
GT-2
GT-3
GT-4
GT-5
GT-6
C-1
BALER BLDG.
PISTOL RANGE
CANDLE BROOK
FLOW
TORNE VALLEY ROAD
TORNE BROOK
RAMAPO RIVER
MOTT
SPS-1
SPS-2
SPS-3
SPS-4
SPS-5
SPS-6
SPS-7
SPS-8
SPS-9
SPS-10
SVP-1
SVP-2
SVP-3
SVP-4
SVP-5
SVP-6 8 7
P-1
P-2
P-3
P-4
P-5
P-6
P-7
P-8
P-10
SW-1
SW-2
SW-3
SW-4
SW-5
SW-6
SW-7
SW-8
SW-LS-1
SW-LS-2
SG-1
SG-2
SWE-1
SWE-2
SWE-3
5-O/S
5-I
5-R
6-OS
6-I
6-R
4-R
4-I
4-O/S
2-I
2-O/S
2-R
1-I
1-R
1-O/S
3-I, O/S
3-R
8-O/S
8-R
8-I
9-R
9-I
9-O/S
7-R
7-I
7-O/S
10-O/S
10-R
LSMW-10
LPSS-1
LEF-1
LIN-1
PW-1
PW-2
GDT-1
SV-93
SV-94
SV-95
SV-96
NOTE
SW-5 IS COINCIDENT WITH SW-2 TAKEN 100' NORTHEAST OF SVP-3
LEGEND
SWE SURFACE WATER ELEVATION
EASEMENT LINE
LEACHATE COLLECTION SYSTEM
SVP STREAM VELOCITY PROFILE
PW PRIVATE WELL
SV RAMAPO VALLEY WELL FIELD WELL
GDT TAP WATER SAMPLE
0 150 300 FEET
ENVIRONMENTAL SAMPLING LOCATIONS
URS CONSULTANTS, INC.
FIGURE 7
C-1822

RAM 002 0046


PREVAILING WINDS*
PISTOL RANGE
BAILER BLDG
CAMBRIDGE BRIDGE
RECEPTOR
PSR-4/PSR-4 B.T. (PS-4)
RECEPTOR - PSR-3/PSR-30 (PS-3)
P-1/ POINTSOURCE - PSR-2(PS-2)
P-2
P-3
P-4
P-5
P-6
P-10
GS-1
GS-2
GS-3
GS-4
VOC-1
VOC-2
VOC-3
LPDW-1
LPUP-1
PSR-1 (PS-1)
BACKGROUND
TORNE VALLEY ROAD
TORNE BROOK
RIVER
116
106
233
LEGEND
PHASE I
205- SAMPLE POINT LOCATION WHERE HNU > 1 ppm
83 - SAMPLE POINT LOCATION NUMBERS FOR THE FOLLOWING SYMBOLS:
○ - 24" METHANE > 50 %
● - AMBIENT METHANE > 25 %
□ - H2S > 1 ppm
■ - H2S > 1 ppm / 24" METHANE > 50 %
○ - PIEZOMETER
PHASE II
+ METHANE EMISSION SAMPLE LOCATION
PERIMETER MONITORING LOCATION
HOT SPOT SAMPLE LOCATIONS
POINT SOURCE SAMPLE LOCATIONS
0 150 300 FEET
* AS PER TESTING ON SITE
AIR MONITORING LOCATIONS
URS CONSULTANTS INC
FIGURE 8

RAM 002 0047

APPENDIX II

TABLES

Tables

RAM 002 0049

TABLE 1

COMPARISON BETWEEN ANALYTICAL RESULTS FOR
WASTES AND EP TOXICITY LIMITS

Parameter	SPS-1	SPS-2	SPS-3	SPS-4	SPS-5	EP Toxicity Limit
Arsenic						5.0
Barium	0.322	0.417	0.433	1.170	1.900	100.0
Cadmium					0.009	1.0
Chromium					0.0461	5.0
Lead					0.320	5.0
Mercury						0.2
Selenium	0.640					1.0
Silver						5.0
Endrin						0.02
Lindane						0.4
Methoxychlor						10.0
Toxaphene						0.5
2,4-D		0.13				10.0
2,4,5-TP		0.01		0.3		1.0

Note: All concentrations are in mg/l (ppm).

RAM 002 0050

TABLE 2

COMPARISON OF MAXIMUM DOWNGRADIENT GROUNDWATER DATA TO ARARS

Parameter	Overburden Max. Conc. (ppb)	Overburden Location of Max. Conc.	Inter-mediate Max. Conc. (ppb)	Inter-mediate Location of Max. Conc.	Bedrock Max. Conc. (ppb)	Bedrock Location Max. Conc.	ARAR Value[a] (ppb)
Carbon Disulfide					2	GW-4	--
Benzene	2	GW-8	2.9	GW-8	3	GW-8	ND
1,1-Dichloroethane			3	GW-4	5	GW-4	5
Chloromethane			3	GW-8			5[b]
1,2-Dichloroethane			0.2	GW-4	0.1	GW-4	5
4-methyl-2-pentanone					3	GW-1	--
Dichlorodifluoromethane					0.2	GW-4	5[b]
Trichloroethane			0.2	GW-6			5
Acetone	21	GW-6	28	GW-2	35	GW-8	50[c]
Toluene	0.7	GW-6	1	GW-8	0.3	GW-6	5[b]
Tetrachloroethene	0.6	GDT-1	0.6	GW-6			5
cis-1,2-Dichloroethene			0.3	GW-1	0.9	GW-8	5[b]
Styrene			0.6	GW-6			5
Chlorobenzene	1	GW-8	16	GW-8	2	GW-9	5
p-Isopropyltoluene	1.2	GW-6	1.7	GW-8	1.2	GW-9	5[b]
Isopropylbenzene			3.7	GW-8	1.0	GW-9	5[b]
1,3,4-Trimethylbenzene			1.9	GW-4 GW-6			5[b]
1,2,4-Trimethylbenzene			1.4	GW-8			5[b]
1,3,5 trimethylbenzene					1.9	GW-9	5[b]
m&p-Xylene			1.3	GW-6			5
o-Xylene			0.7	GW-8			5
Propylbenzene			0.8	GW-8	0.5	GW-9	5[b]
tert-butylbenzene			1.5	GW-8			5[b]
1-2,Dichlorobenzene			1.2	GW-8	0.9	GW-9	4.7[+]
Diethylphthalate			5	GW-4	3	GW-4	50
1,4-Dichlorobenzene	1.1	GW-8					4.7[+]
Butylbenzylphthalate					2	GW-8	50
Bis(2-ethylhexyl) phthalate	3	GW-1/GW-2	30	GW-7	27	GW-7	50
Di-n-octylphthalate					130	GW-8	50
gamma-BHC					0.11	GW-9 split	ND
Naphthalene			4.2	GW-8	0.8	GW-8	10
pyrene			3	GW-9 split			50
delta-BHC			1.9	GW-4			ND
Aluminum	19,000	GW-2	5,160	GW-4	2700	GW-10	--
Arsenic	26.1	GW-8	11	GW-8	4.9	GW-9 split	25
Barium	441	GW-8	559	GW-8	117	GW-9 split	1,000
Cadmium			4.9	GW-4			10
Calcium	132,000	GW-2	113,000	GW-4	219,000	GW-8	--

RAM 002 0051

TABLE 2 (Continued)

Parameter	Overburden Max. Conc. (ppb)	Overburden Location of Max. Conc.	Inter-mediate Max. Conc. (ppb)	Inter-mediate Location of Max. Conc.	Bedrock Max. Conc. (ppb)	Bedrock Location Max. Conc.	ARAR Value[a] (ppb)
Chromium	1,290	GW-3	280	GW-1	39.7	GW-1	50
Cobalt	42.3	GW-2	36.2	GW-8	19.5	GW-3	---
Copper	78.3	GW-1	20.9	GW-4	39.3	GW-8	200
Iron	229,000	GW-8	30,500	GW-8	22,700	GW-9 split	300
Lead	34.1	GW-2	5.3	GW-4	11.4	GW-4	15[f]
Magnesium	31,500	GW-6	71,400	GW-8	51,100	GW-8	35,000
Manganese	31,200	GW-10	4,500	GW-4	12,400	GW-3	300
Mercury	0.63	GW-6	2.3	GW-6	2	GW-8	2
Nickel	331	GW-3	162	GW-1	35.3	GW-9 split	---
Potassium	31,200	GW-7	196,000	GW-8	19,100	GW-9 split	---
Sodium	102,000	GW-8	643,000	GW-8	154,000	GW-9 Split	20,000
Vanadium	51.6	GW-1	19.5	GW-8	6.1	GW-10	---
Zinc	107	GW-2	23.9	GW-8	53.7	GW-8	300
BOD	20	GW-7	25	GW-4	27	GW-9	---
COD	140	GW-8	94.4	GW-8	97	GW-9	---
Total Kjeldahl Nitrogen			28.3	GW-8			
Ammonia-N	59.6	GW-8			26.4	GW-9	---
TKN	61	GW-8			25.8	GW-9	---
Alkalinity	1,048	GW-8	772	GW-8	444	GW-8	---
Acidity	563	GW-8	622	GW-8	380	GW-8	---
NO_3/NO_2-N	0.62	GW-9			0.62	GW-7	10[e]
Total Phosphorus	0.79	GW-2	0.44	GW-2	0.34	GW-1	---
Oil & Grease			3	GW-1	6.7	GW-1	
TOC	77.4	GW-3	74.8	GW-8	95.1	GW-3	0.1
TSS	5,000	GW-1	560	GW-1	60	GW-4	---
TDS	1,500	GW-8	1,200	GW-8	800	GW-8	---
pH					8.87	GW-2	
Spec. Conductance					1500	GW-8	
Sulfate	80.9	GW-2	62.8	GW-1	39.9	GW-8	250

a - The values were obtained from New York State DEC Water Quality Standards and Guidelines dated September 1990.

b - The values were obtained from Chapter I - New York State Sanitary Code, Subpart 5-1, Principle Organic Contaminants.

c - The values were obtained from Chapter I - New York State Sanitary Code, Subpart 5-1, Unspecified Organic Contaminants.

d - The values were obtained from USEPA Drinking Water Standards

e - This values is for NO_3-N only. Analytical results are given as NO_3/NO_2-N

f - USEPA proposed action level

+ - This value applies to the sum of 1,4 and 1,2-dichlorobenzene

NA - This well could not be sampled due to insufficient sample volume.

ND - Not detected

Shaded values exceed ARARs

RAM 002 0052

TABLE 3

LOCATIONS OF GROUNDWATER DATA EXCEEDING ARARS

OVERBURDEN

Parameter	Location
Arsenic	GW-8
Chromium	GW-1, GW-2, GW-3, GW-4, GW-5
Iron	GW-1, GW-2, GW-3, GW-4, GW-5, GW-6, GW-7, GW-8, GW-9 split
Lead	GW-2
Manganese	GW-1 through GW-8, GW-10
Sodium	GW-1, GW-3, GW-4, GW-6, GW-7, GW-8
TOC	GW-1 through GW-10, not analyzed in GW-5
Benzene	GW-5, GW-8, GW-4

INTERMEDIATE

Benzene	GW-1, GW-4, GW-6, GW-7, GW-8, GW-9
Chlorobenzene	GW-8
alpha-BHC	GW-5
delta-BHC	GW-4
Chromium	GW-1, GW-4, GW-5, GW-7, GW-8
Iron	GW-1 through GW-8
Magnesium	GW-4, GW-8
Manganese	GW-1, GW-4, GW-7, GW-8, GW-9
Mercury	GW-6
TOC	GW-1, GW-4, GW-5, GW-7, GW-8

BEDROCK

1,1-Dichloroethane	GW-4
Benzene	GW-4, GW-8, GW-9
Di-n-octyl phthalate	GW-8
gamma-BHC	GW-7
Iron	All wells
Magnesium	GW-8
Manganese	GW-3, GW-4, GW-8, GW-9, GW-9 split
Mercury	GW-8
Sodium	GW-3, GW-4, GW-7, GW-8, GW-9
TOC	GW-3, GW-4, GW-5, GW-8, GW-9, GW-10

RAM 002 0053

TABLE 4

COMPARISON OF MAXIMUM SURFACE WATER CONCENTRATIONS TO ARARs

Parameter	Upstream Max. Conc. Detected (ug/l)	Downstream Max. Conc. Detected (ug/l)	Downstream Location of Max. Conc.	Human ARAR/ Source (ug/l)	Aquatic ARAR/ Source (ug/l)
Vinyl chloride	1.9	0.7	SW-6	0.3 A	
Benzene		0.08	SW-6	0.7 B	6 A
Toluene		0.2	SW-7	5 A	
Aluminum	120	995	SW-8		
Antimony		37.8	SW-1	3 A	1,600 B
Arsenic		1.9	SW-1	0.0022 B	
Barium	14	83.0	SW-1	1,000 A&B	
Calcium	4,570	110,000	SW-1		
Copper		6.4	SW-1	200 A	(*) A
Iron	163	2,630	SW-1	300 A	300 A
Lead	1.8	2.8	SW-8	50 A&B	(*) A
Magnesium	1,100	33,100	SW-1	35,000 A	
Manganese	44.5	1,120	SW-1	300 A	
Mercury	0.36	1.2	SW-1	0.14 B	0.012 B
Nickel		25.2	SW-1	1.3 E-7 B	(*) A
Potassium	432	42,100	SW-1		
Sodium	2,740	109,000	SW-1		
Thallium	5.3			4 A	8 A
Vanadium		5.4	SW-8		14 A
Zinc	35.7	54.9	SW-3	300 A	30 A
Total Cyanide		33	SW-1	100 A	5.2 B
Total phenols	7	18	SW-1	1 A	
Ammonia-Nitrogen	110	21,900	SW-1	2,000 A	(*) A
TOC	1,640	21,300	SW-1	100 A	
NO3-N		6,960	SW-1	10,000 A&B	
NO2-N		2,380	SW-1	100 A	
TDS	32,000	873,000	SW-1	500,000 A	
Sulfate	57,100	74,600	SW-1	250,000 A	
Sulfide	1,400	2,000	SW-1	50 A	2 A
pH Min.	6.93	6.69	SW-1	6.5 A	
pH Max.	7.52	7.41	SW-3	8.5 A	

Sources:

A - NYSDEC TOGS 1.1.1 dated September 1990
B - Clean Water Act

Notes:

* - ARAR value must be calculated see Table 4a.

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Table 4a

Calculated Surface Water ARARs

		SW-1		SW-2		SW-3		SW-5		SW-6		SW-7		SW-8	
Parameter	Units	Conc.	Calculated ARAR	Conc.	Calculated ARAR	Conc.	Calculated ARAR	Conc.	Calculated ARAR	Conc.	Calculated ARAR	Conc.	Calculated ARAR	Conc.	Calculated ARAR
Hardness	ppm	477		12.4		13.8		5.67		6.06		6.03		7.60	
pH	SU	7.28		6.93		7.28		7.52		6.86		7.11		7.05	
Temp	deg C	13.0		11.0		11.0		21		21		21		21	
Ammonia	ppm	21.9	4	0.11	5	0.10	4	NA		NA		NA		NA	
Copper	ppb	6.4	44.9	ND		ND		ND		3.1	1.1	ND		ND	
Lead	ppb	1.4	23.3	ND		ND		1.8	0.08	1.6	0.09	1.7	0.09	2.8	0.12
Nickel	ppb	25.2	313	ND		ND		ND		ND		ND		ND	

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TABLE 5

LOCATIONS OF SURFACE WATER DATA EXCEEDING ARARS

Parameter	Location
Vinyl chloride	SW-5, SW-6
Antimony	SW-1
Arsenic	SW-1
Iron	SW-1, SW-8
Manganese	SW-1
Mercury	SW-1, SW-5, SW-6, SW-7, SW-8
Nickel	SW-1
Thallium	SW-2
Zinc	SW-2, SW-3, SW-4
Ammonia	SW-1
TOC	SW-1, SW-5, SW-6, SW-7, SW-8
NO2-N	SW-1
TDS	SW-1
Sulfide	SW-1, SW-2
Copper	SW-6
Lead	SW-5, SW-6, SW-7, SW-8
Cyanide	SW-1

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TABLE 6
SEDIMENT CLEANUP CRITERIA

Compound	AWQS/GV ug/l	Log Kow	H or A*	Sediment Cleanup Criteria SS-3 (ug/Kg)	Ramapo Analytical Results SS-3 (ug/kg)
4-Methylphenol	none	1.94	none	N/A	ND
Benzoic Acid	none	1.87	none	N/A	ND
Phenanthrene	50 none	4.46	H A	21,600	ND
Fluoranthrene	50 none	5.33	H A	160,000	40
Pyrene	50 none	4.88	H A	56,900	46
Benz(a)anthracene	0.002 none	5.61	H A	12	ND
Chrysene	0.002 none	5.61	H A	12	ND
Benzo(b)fluoranthrene	0.002 none	6.57	H A	110	ND
Bis(2-ethylhexyl)-phthalate	4 0.6	5.3	H A	12,000 1,800	45
Benzo(k)fluoranthrene	0.002 none	6.84	H A	210	ND
Benzo(a)pyrene	0.002 0.0012	6.04	H A	33 20	ND
Gamma-chlordane	0.02** 0.002**	2.68	H A	0.18 0.018	ND

* H: Human health based
A: Aquatic organism health based
**: AWQS/GV for chlordane

Sediment Cleanup Criteria (ug/kg) = AWQS/GV (ug/L) * $10^{\log Kow}$ * TOC

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TABLE 7

Phase II
Air Monitoring Program
VOA Analytical Summary
Ramapo Landfill

Parameter	Units	TLV/300	VOC-1	VOC-2	VOC-3	LPDW-1	LPUP-1	LPTB-1	PSR-1	PSR-2	PSR-3	PSR-3D	PSR-4	PSR-4BT	PSR-TB
2 - Butanone	mg/m^3	1.97	0.0054	0.0079	0.003	0.0031	ND	ND	ND	ND	0.0091	0.0075	0.011	0.018	ND
1,1,1 - Trichloroethane	mg/m^3	6.37	ND	0.0008	ND	0.0011	0.0013	ND	ND	ND	0.001	0.0007	0.0011	ND	ND
Carbon Tetrachloride	mg/m^3	0.10	ND	0.0002 J	ND	0.0007	ND	ND	ND	ND	ND	ND	0.0004	ND	ND
Benzene	mg/m^3	0.10	0.0007	0.0006	0.0003 J	0.0008	0.001	ND	ND	0.029 E	0.0005	ND	0.0006	ND	ND
Chlorobenzene	mg/m^3	1.15	ND	0.0005	ND	ND	ND	ND	ND	0.37 E	0.0007	ND	ND	ND	ND
Ethylbenzene	mg/m^3	1.45	ND	0.0026	0.0008	ND	0.0009	ND	ND	1.20 E	0.0049	0.0012	0.0009	0.0011	ND
Tetrachloroethylene	mg/m^3	1.13	ND	ND	ND	ND	ND	ND	ND	0.0041	ND	ND	ND	ND	ND
Styrene	mg/m^3	0.71	ND	ND	0.0005	ND	ND	ND	ND	ND	ND	ND	ND	0.0008	ND
Toluene	mg/m^3	1.26	0.0079	0.0016	0.0061	0.0017	0.0038	ND	0.0004 J	0.27 E	0.0011	0.0007	0.0014	0.0013	0.0004 J
Xylene (Total)	mg/m^3	1.45	ND	0.011	0.007	0.0025	0.0058	ND	ND	7.70 E	0.016	0.0046	0.012	0.016	ND
Methylene Chloride	mg/m^3	0.58	0.0018 B	0.001 B	0.0013 B	0.0023 B	0.001 B	0.0028 B	0.001 B	0.002 B	0.0006 B	0.0013 B	0.0008 B	0.003 B	0.0034 B
Acetone	mg/m^3	5.93	0.015 B	0.013 B	0.016 B	0.011 B	0.011 B	0.0061 B	0.01 B	0.0057 B	0.012 B	0.010 B	0.011 B	0.018 B	0.012 B

NOTE: Samples were analyzed for the complete TCL Volatiles list.
ND - None Detected
TLV - Threshold Limit Value as a Time Weighted Average; American Conference of Industrial Hygienists, 1990 - 1991.
J - Indicates the result is less than the sample quantitation limit but greater than zero.
E - Estimated value due to interference.
B - Analyte detected in the associated method blank.

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Table 8

GROUNDWATER CHEMICALS OF POTENTIAL CONCERN

Benzene	Propylbenzene	Pyrene
Tetrachloroethene	Chloromethane	Arsenic
Trichloroethene	Chlorobenzene	Cadmium
1,4-Dichlorobenzene	Styrene	Manganese
Isopropylbenzene	1,2-Dichlorobenzene	Cobalt
Total Xylene	1,3,5-Trimethylbenzene	Lead
Dichlorodifluoromethane	tert-Butylbenzene	Sodium
1,1-Dichloroethane	Naphthalene	Vanadium
1,2-Dichloroethane	Diethylphthalate	Mercury
p-Isopropyltoluene	Butylbenzylphthalate	Chromium (III)
cis-1,2-Dichloroethene	Bis(2-ethylhexyl)phthalate	Aluminum
1,2,4-Trimethylbenzene	Di-n-octylphthalate	Barium
Carbon Disulfide	delta-BHC	Calcium
Toluene	gamma-BHC	Copper
Acetone	4-Methyl-2-pentanone	Iron
Nickel	Potassium	Zinc

SOIL/WASTE CHEMICALS OF POTENTIAL CONCERN

1,4-Dichlorobenzene	Benzo(g,h,i)perylene
1,2-Dichlorobenzene	2-Butanone
Benzoic Acid	Benzene
Naphthalene	1,1,2,2-Tetrachloroethane
2-Methylenaphthalene	Chlorobenzene
Acenaphthene	Ethylbenzene
Fluorene	Total Xylenes
N-nitrosodiphenylamine	Dieldrin
Phenanthrene	Chlordane
Anthracene	Heptachlor Epoxide
Fluoranthene	Beryllium
Pyrene	Cadmium
Bucylbenzylphthalate	Mercury
Benzo(a)anthracene	Total Phenols
Chrysene	
Bis(2-ethylhexyl)phthalate	
Di-n-octylphthalate	
Benzo(b)fluoranthene	
Benzo(k)fluoranthene	
Benzo(a)pyrene	
Indeno(1,2,3-cd)pyrene	
Dibenzofuran	

AIR CHEMICALS OF POTENTIAL CONCERN

2-Butanone	Tetrachloroethene
1,1,1-Trichloroethane	Styrene
Carbon Tetrachloride	Toluene
Benzene	Total Xylenes
Chlorobenzene	Methylene Chloride
Ethylbenzene	Acetone

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Table 9

Potential Exposure Pathways

CURRENT LAND USE	RECEPTOR	EXPOSURE ROUTE	EXPOSURE MEDIUM
Trespasser/ Recreational	Adult	Ingestion	Soil/Waste
	Child (6-11yrs)		
	Adult	Dermal	Soil/Waste
	Child (6-11yrs)		
	Adult	Inhalation	Air
	Child (6-11yrs)		
Off-site Residential	Adult	Ingestion	Groundwater
	Child (0-6yrs)		
	Adult	Inhalation	Air
	Child (0-6yrs)		
Industrial/ Commercial	Adult	Ingestion	Soil/Waste
	Adult	Dermal	Soil/Waste
FUTURE LAND USE			
On-site Residential	Adult	Ingestion	Soil/Waste
	Child (0-6yrs)		
	Adult	Dermal	Soil/Waste
	Child (0-6yrs)		
	Adult	Ingestion	Groundwater
	Child (0-6yrs)		
	Adult	Inhalation	Groundwater
	Child (0-6yrs)		
	Adult	Inhalation	Air
	Child (0-6yrs)		
Industrial/ Commercial	Adult	Ingestion	Soil/Waste
	Adult	Dermal	Soil/Waste
	Adult	Ingestion	Groundwater
	Adult	Inhalation	Air

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TABLE 10

TOXICITY VALUES: POTENTIAL NONCARCINOGENIC EFFECTS

CHEMICAL	TOXICITY VALUES (mg/kg-day)				REF/SOURCE				DATE
	SUBCHRONIC		CHRONIC		SUBCHRONIC		CHRONIC		RECORDED
	INHALATION Rfc	ORAL Rfd	INHALATION Rfc	ORAL Rfd	INHALATION Rfc	ORAL Rfd	INHALATION Rfc	ORAL Rfd	Inhal/Oral
Acenaphthene	ND	6.00E-01	ND	6.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/FY91
Acetone	ND	1.00E+00	ND	1.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/12-90
Aluminum	Data inadequate for quantitative risk assessment (HEAST)								
Anthracene	ND	3.00E+00	ND	3.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/FY91
Arsenic (d)	ND	1.00E-03	ND	1.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
Barium	1.00E-03	7.00E-02	1.00E-04	5.00E-02	HEAST	IRIS	HEAST	HEAST	4-FY90/8-91
Benzo(g,h,i)perylene (c)		4.00E-02		4.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
Benzoic Acid	ND	4.00E+00	ND	4.00E+00	HEAST	HEAST	HEAST	IRIS	4-FY90/1-91
Beryllium	ND	5.00E-03	ND	5.00E-03	HEAST	HEAST	HEAST	IRIS	4-FY90/9-90
Bis(2-ethylhexyl)phthalate (d)	ND	2.00E-02	ND	2.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/9-89
2-Butanone (MEK)	9.00E-01	5.00E-01	9.00E-02	5.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/6-90
tert-Butylbenzene	ND	ND	ND	4.00E-01	ECAO	ECAO	ECAO	ECAO	4-91
Butylbenzylphthalate	ND	2.00E+00	ND	2.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/9-89
Cadmium	ND	ND	ND	5.00E-04 (c)	HEAST	HEAST	HEAST	IRIS	4-FY90/10-89
Calcium									
Carbon Disulfide	2.85E-03(a)	1.00E-01	2.85E-03 (a)	1.00E-01	ECAO	HEAST	HEAST	IRIS	4-FY90/9-90
Chromium(III)	5.71E-06	1.00E-01	5.71E-07	1.00E+00	HEAST	HEAST	HEAST	IRIS	FY91
Chlorobenzene	5.00E-02	2.00E-01	5.00E-03	2.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/3-91
Cobalt	ND	ND	1.00E-06	1.00E-05	ECAO	ECAO	ECAO	ECAO	4-91
Copper	ND	ND	ND	ND	HEAST	HEAST	HEAST	HEAST	4-FY90
Cumene (Isopropylbenzene)	2.57E-02 (a)	4.00E-01	2.57E-03 (a)	4.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/4-91
Cymene (p-Isopropyltoluene)	ND	4.00E-01	ND	4.00E-01	ECAO	ECAO	ECAO	ECAO	4-91
Dibenzofuran	Data inadequate for quantitative risk assessment (HEAST)								
1,2-Dichlorobenzene	4.00E-01	9.00E-01	4.00E-02	9.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/3-91
1,4-Dichlorobenzene	2.00E-01 (a)	ND	2.00E-01 (a)	ND	HEAST	HEAST	HEAST	HEAST	4-FY90
Dichlorodifluoromethane	5.00E-01	9.00E-01	5.00E-02	2.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/8-90
1,1-Dichloroethane	1.00E+00	1.00E+00	1.00E-01	1.00E-01	HEAST	HEAST	HEAST	HEAST	4-FY90
cis-1,2-Dichloroethene	ND	1.00E-01	ND	1.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/1-89
Dieldrin	ND	5.00E-05	ND	5.00E-05	HEAST	HEAST	HEAST	IRIS	4-FY90/9-90
Diethylphthalate	ND	8.00E+00	ND	8.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/9-87
Di-n-octylphthalate	ND	2.00E-02	ND	2.00E-02	HEAST	HEAST	HEAST	HEAST	4-FY90
Ethylbenzene	2.86E-01	1.00E+00	2.86E-01	1.00E-01	HEAST	HEAST	IRIS	IRIS	4-FY90/FY91
Fluoranthene	ND	4.00E-01	ND	4.00E-02	HEAST	HEAST	HEAST	IRIS	FY91
Fluorene	ND	4.00E-01	ND	4.00E-02	HEAST	HEAST	HEAST	IRIS	FY91
Iron	Data inadequate for quantitative risk assessment (HEA								
Lead (d)	ND	ND	ND	ND	HEAST	HEAST	HEAST	IRIS	4-FY90/2-91
Lindane (gamma-BHC)	ND	3.00E-03	ND	3.00E-04	HEAST	HEAST	HEAST	IRIS	4-FY90/3-88
delta-BHC	Data inadequate for quantitative risk assessment (HEAST)								
Manganese	1.14E-04 (a)	1.00E-01	1.14E-04** (a)	1.00E-01	HEAST	HEAST	IRIS	IRIS	4-FY90/12-90
Mercury	8.57E-05 (a)	3.00E-04	8.57E-05 (a)	3.00E-04	HEAST	HEAST	HEAST	HEAST	4-FY90
Methylene Chloride (d)	8.57E-01 (a)	6.00E-02	8.57E-01 (a)	6.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/3-88
2-Methylnaphthalene (c)		4.00E-02		4.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
4-Methyl-2-Pentanone	2.00E-01	5.00E-01	2.00E-02	5.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/3-91
Naphthalene	ND	4.00E-02	ND	4.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
Nickel (d)	ND	2.00E-02	ND	2.00E-02	HEAST	HEAST	HEAST	HEAST	4-FY90
Phenanthrene (c)		4.00E-02		4.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
Phenols(Total) *	ND	6.00E-01 (b)	ND	6.00E-01 (b)	HEAST	HEAST	IRIS	IRIS	4-FY90/3-91
Potassium									
Propylbenzene	ND	4.00E-01	ND	4.00E-01	ECAO	ECAO	ECAO	ECAO	4-91
Pyrene	ND	3.00E-01	ND	3.00E-02	HEAST	HEAST	HEAST	HEAST	4-FY90
Sodium									
Styrene	ND	2.00E+00	ND	2.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/9-90
Tetrachloroethene	ND	1.00E-01	ND	1.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/3-88
Toluene	5.71E-01 (a)	2.00E+00	5.71E-01 (a)	2.00E-01	HEAST	HEAST	HEAST	IRIS	4-FY90/8-90
1,1,1-Trichloroethane	3.00E+00	9.00E-01	3.00E-01	9.00E-02	HEAST	HEAST	HEAST	IRIS	4-FY90/9-90
1,2,4-Trimethylbenzene	Data inadequate for quantitative risk assessment (HEAST)								
1,3,5-Trimethylbenzene	Data inadequate for quantitative risk assessment (HEAST)								
Vanadium	ND	7.00E-03	ND	7.00E-03	HEAST	HEAST	HEAST	HEAST	4-FY90
Xylenes, Total	8.57E-02	4.00E+00	8.57E-02	2.00E+00	HEAST	HEAST	IRIS	IRIS	4-FY90/FY91
Zinc	ND	2.00E-01	ND	2.00E-01	HEAST	HEAST	HEAST	HEAST	4-FY90
Carbon Tetrachloride (d)	ND	7.00E-03	ND	7.00E-04	HEAST	HEAST	HEAST	IRIS	4-FY90/3-91
Chlordane (d)	NA	6.00E-05	ND	6.00E-05	HEAST	HEAST	HEAST	IRIS	4-FY90/7-89

* - Phenol toxicity values are used.

** - Calculated by analogy to antimony by correcting for differences in molecular weight.

a - Converted from inhalation Rfc (mg/m^3).

b - Developmental effects have been used as the basis of calculation.

c - Toxicity values based on Oral Rfd for naphthalene (HEAST 4-FY90).

d - Refer to Table 6-21 for carcinogenic effects.

e - Rfd is based on water.

Table 11
Summary of Noncancer Risks

CURRENT LAND USE	RECEPTOR	EXPOSURE ROUTE	EXPOSURE MEDIUM	HAZARD QUOTIENT
Trespasser/ Recreational	Adult	Ingestion	Soil/Waste	<0.01
	Child (6-11yrs)			<0.01
	Adult	Dermal	Soil/Waste	<0.01
	Child (6-11yrs)			<0.01
	Adult	Inhalation	Air	0.329
	Child (6-11yrs)			6.24
Off-site Residential	Adult	Ingestion	Groundwater	<0.01
	Child (0-6yrs)			<0.01
	Adult	Inhalation	Groundwater	<0.01
	Child (0-6yrs)			<0.01
Industrial/ Commercial	Adult	Ingestion	Soil/Waste	<0.01
	Adult	Dermal	Soil/Waste	<0.01
	Adult	Inhalation	Air	6.58
FUTURE LAND USE				
On-site Residential	Adult	Ingestion	Soil/Waste	<0.01
	Child (0-6yrs)			<0.01
	Adult	Dermal	Soil/Waste	0.151
	Child (0-6yrs)			<0.01
	Adult	Ingestion	Groundwater	1.79
	Child (0-6yrs)			3.10
	Adult	Inhalation	Groundwater	0.085
	Child (0-6yrs)			0.057
	Adult	Inhalation	Air	19.2
	Child (0-6yrs)			42.6
Industrial/ Commercial	Adult	Ingestion	Soil/Waste	<0.01
	Adult	Dermal	Soil/Waste	<0.01
	Adult	Ingestion	Groundwater	1.23
	Adult	Inhalation	Air	6.58

NONCANCER RISK SUMMARY

CURRENT LAND USE		
Trespasser/ Recreational	Adult	0.3
	Child	6
Off-site Residential	Adult	<0.01
	Child	<0.01
Industrial/ Commercial	Adult	7
FUTURE LAND USE		
On-site Residential	Adult	20
	Child	50
Industrial	Adult	8

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TABLE 12

TOXICITY VALUES: POTENTIAL CARCINOGENIC EFFECTS

CHEMICAL	SLOPE FACTORS (mg/kg-day)^-1		WEIGHT-OF-EVIDENCE		TUMOR SITE		REFERENCE / SOURCE		DATE RECORDED INHAL/ORAL
	INHALATION	ORAL	INHALATION	ORAL	INHALATION	ORAL	INHALATION	ORAL	
alpha-BHC	6.30E+00	6.30E+00	B2	B2	NA	Liver	IRIS	IRIS	4-91
Arsenic	5.00E+01**	1.75E+00 (a)	A	A	Respiratory	Skin	IRIS	HEAST	2-91/4-FY90
Benzene	2.90E-02	2.90E-02	A	A	Leukemia	Leukemia	IRIS	IRIS	1-91
Benzo(a)anthracene (b)	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
Benzo(a)pyrene	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
Benzo(b)fluoranthene (b)	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
Benzo(k)fluoranthene (b)	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
Beryllium	8.40E+00	4.30E+00	B2	B2	Lung	Total Tumors	IRIS	IRIS	1-91
Bis(2-ethylhexyl)phthalate	ND	1.40E-02	B2	B2	NA	Liver	IRIS	IRIS	5-90
Butylbenzylphthalate	NA	NA	NA	C	NA	NA	HEAST	IRIS	4-FY90/2-89
Cadmium	6.10E+00	ND	B1	ND	Respiratory	NA	IRIS	HEAST	3-91/4-FY90
Chloromethane	6.30E-03	1.30E-02	C	C	Kidney	Kidney	HEAST	HEAST	4-FY90
Chrysene (b)	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
1,4-Dichlorobenzene	ND	2.40E-02	C	C	NA	Liver	IRIS	IRIS	12-90
1,1-Dichloroethane	ND	ND	C	C	NA	Blood	IRIS	IRIS	1-90
1,2-Dichloroethane	9.10E-02	9.10E-02	B2	B2	CS	CS	IRIS	IRIS	1-91
Dieldrin	1.60E+01	1.60E+01	B2	B2	Liver	Liver	IRIS	IRIS	1-91
alpha-Chlordane *	1.30E+00	1.30E+00	B2	B2	Liver	Liver	IRIS	IRIS	1-91
gamma-Chlordane *	1.30E+00	1.30E+00	B2	B2	Liver	Liver	IRIS	IRIS	1-91
Heptachlor Epoxide	9.10E+00	9.10E+00	B2	B2	Liver	Liver	IRIS	IRIS	1-91
Indeno(1,2,3-cd)pyrene (b)	6.10E+00	1.15E+01	B2	B2	Respiratory	Stomach	SPHEM	SPHEM	1986
Lead	NA	NA	B2	B2	NA	NA	IRIS	IRIS	2-89
Lindane (gamma-BHC)	ND	1.30E+00	B2-C	B2-C	NA	Liver	HEAST	HEAST	4-FY90
Methylene Chloride	4.70E-07	7.50E-03	B2	B2	Lung,Liver	Liver	IRIS	IRIS	1-91
Nickel	8.40E-01	ND	A	ND	Respiratory	NA	IRIS	HEAST	8-91/4-FY90
N-Nitrosodiphenylamine	ND	4.90E-03	B2	B2	NA	Bladder	HEAST	IRIS	4-FY90/3-88
Styrene	2.00E-03	3.00E-02	B2	B2	Blood	Respiratory	HEAST	HEAST	4-FY90
Tetrachloroethene	5.20E-07	5.10E-02	B2	B2	Leukemia,Liver	Liver	HEAST	HEAST	4-FY90
1,1,2,2-Tetrachloroethane	2.00E-01	2.00E-01	C	C	Liver	Liver	IRIS	IRIS	1-91
Trichloroethene	1.70E-02	1.10E-02	B2	B2	Lung	Liver	HEAST	HEAST	4-FY90
Carbon Tetrachloride	1.30E-01	1.30E-01	B2	B2	Liver	Liver	IRIS	IRIS	1-91

Notes:

* - Slope factors are obtained for the chemical chlordane.

** - An absorption factor of 30% is used to calculate unit risk from the slope factor.

CS - Effects circulatory system.

BW - Effects body weight.

NA - Not applicable.

a - Calculated from oral unit risk of 5E-5[μg/L]-1 (HEAST 3-FY90).

b - Toxicity values for Benzo(a)pyrene were used for all carcinogenic PAHs when data were otherwise unavailable.

ND - Not determined.

IRIS - Integrated Risk Information System. Date indicates last update by EPA. Access to IRIS was March, April 1991.

HEAST - Health Effects Summary Tables. Date indicates quarter and fiscal year for which table was published.

SPHEM - Superfund Public Health Evaluation Manual, USEPA 1986.

RAM 002 0063

Table 13

Summary of Cancer Risks

CURRENT LAND USE	RECEPTOR	EXPOSURE ROUTE	EXPOSURE MEDIUM	CANCER RISK
Trespasser/ Recreational	Adult	Ingestion	Soil/Waste	2.25E-6
	Child (6-11yrs)			2.88E-6
	Adult	Dermal	Soil/Waste	4.82E-7
	Child (6-11yrs)			3.73E-6
	Adult	Inhalation	Air	8.55E-7
	Child (6-11yrs)			4.55E-6
Off-site Residential	Adult	Ingestion	Groundwater	1.97E-8
	Child (0-6yrs)			3.68E-9
	Adult	Inhalation	Groundwater	5.38E-10
	Child (0-6yrs)			2.51E-10
Industrial/ Commercial	Adult	Ingestion	Soil/Waste	5.63E-6
	Adult	Dermal	Soil/Waste	4.58E-6
	Adult	Inhalation	Air	1.71E-5
FUTURE LAND USE				
On-site Residential	Adult	Ingestion	Soil/Waste	8.22E-6
	Child (0-6yrs)			1.28E-5
	Adult	Dermal	Soil/Waste	1.76E-6
	Child (0-6yrs)			5.27E-6
	Adult	Ingestion	Groundwater	1.03E-4
	Child (0-6yrs)			3.19E-5
	Adult	Inhalation	Groundwater	5.38E-6
	Child (0-6yrs)			1.39E-6
	Adult	Inhalation	Air	5.00E-5
	Child (0-6yrs)			3.10E-5
Industrial/ Commercial	Adult	Ingestion	Soil/Waste	5.63E-6
	Adult	Dermal	Soil/Waste	4.58E-6
	Adult	Ingestion	Groundwater	7.03E-5
	Adult	Inhalation	Air	1.71E-5

CANCER RISK SUMMARY

CURRENT LAND USE		
Trespasser/ Recreational	Adult	4E-6
	Child	1E-5
Off-site Residential	Adult	2E-8
	Child	4E-9
Industrial/ Commercial	Adult	3E-5
FUTURE LAND USE		
On-site Residential	Adult	2E-4
	Child	8E-5
Industrial	Adult	1E-4

RAM 002 0064

TABLE 14

SUMMARY OF CAPITAL, OPERATION AND MAINTENANCE, AND PRESENT WORTH COSTS FOR ALL REMEDIAL ALTERNATIVES ASSOCIATED WITH THE RAMAPO LANDFILL SITE

ALTERNATIVE		CAPITAL COST	OPERATION AND MAINTENANCE COST	PRESENT WORTH COST
Alternative 1:	No Further Action with Monitoring	$0	$345,700	$3,260,000
Alternative 2:	Limited Action (with Option for Alternate Water Supply)	$190,000 - $710,000	$345,700	$3,380,000 - $3,970,000
Alternative 3:	Installation of Groundwater Extraction Wells	$1,040,000 - $3,300,000	$547,300 - $1,156,000	$6,206,000 - $14,210,000
Alternative 4A:	Landfill Cap; Installation of Groundwater Extraction Wells	$26,170,000 - $29,310,000	$319,600 - $622,600	$29,190,000 - $35,760,000
Alternative 4B:	Landfill Cap; Installation of Groundwater Extraction Wells	$21,870,000 -$25,010,000	$319,600 - $622,600	$24,890,000 - $30,880,000
Alternative 5:	Landfill Cap with Soil Cover on Side Slopes; Installation of Groundwater Extraction Wells	$18,390,000 - $21,640,000	$319,800 - $678,600	$21,410,000 - $28,050,000

RAM 002 0065

APPENDIX III

ADMINISTRATIVE RECORD INDEX

Document Number: RAM-001-2344 To 2346 Date: / /

Title: Notice of Public Meeting, description of proposed remedial action plan, Town of Ramapo Landfill, inactive hazardous waste disposal site

Type: OTHER
Author: none: NY Dept of Environmental Conservation
Recipient: none: none

Document Number: RAM-001-0210 To 0218 Parent: RAM-001-0209 Date: 08/29/01

Title: (Memo discussing the Ramapo Landfill Data Package usability)

Type: CORRESPONDENCE
Author: Vernoy, Charles: NY Dept of Environmental Conservation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1889 To 1893 Date: 11/22/83

Title: (Letter forwarding attached results of a "blue-green rubbery substance" discovered at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: Gardineer, Richard: NY Dept of Environmental Conservation

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Document Number: RAM-001-2276 To 2276 Date: 08/31/87

Title: (Letter transferring the enforcement lead from EPA to the New York Department of Environmental Conservation regarding the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Evans, Louis A.: NY Dept of Environmental Conservation
Recipient: Henry, Sherrel D.: US EPA

Document Number: RAM-001-2279 To 2299 Date: 04/11/88

Title: Order on Consent (between Town of Ramapo and New York State Department of Environmental Conservation for the Remedial Program at the Ramapo Landfill)

Type: LEGAL DOCUMENT
Author: Jorling, Thomas C.: NY Dept of Environmental Conservation
Recipient: Blecher, Sam: Town of Ramapo

Document Number: RAM-001-1894 To 1894 Date: 07/06/88

Title: (Letter expressing concern over what is contained in the Scope of Work proposal (Remedial Investigation/Feasibility Study) and stating what should be contained in the Work Plan)

Type: CORRESPONDENCE
Author: Gilday, William M.: NY Dept of Health
Recipient: Sheeran, Anthony R.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1895 To 1895 Date: 07/20/88

Title: (Letter expressing concern with the manner in which the Ramapo Landfill closure is being handled)

Type: CORRESPONDENCE
Author: various: New York Environmental Institute
Recipient: O'Toole, Michael J.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1896 To 1897 Date: 07/23/88

Title: (Letter containing comments on the URS Corporation's proposal for the remediation of the Town of Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Henry, Sherrel D.: US EPA
Recipient: Sheeran, Anthony R.: NY Dept of Environmental Conservation

Document Number: RAM-001-1898 To 1900 Date: 07/25/88

Title: (Letter containing comments on URS Consultant's proposed Scope of Work for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Sheeran, Anthony R.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-1901 To 1901 Date: 08/05/88

Title: (Letter stating that a letter has been sent to the Town of Ramapo requesting that Leonard Jackson Associates be removed as a subcontractor of the team proposed to undertake the Remedial Investigation/Feasibility Study at the Ramapo Landfill site)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: O'Toole, Michael J.: NY Dept of Environmental Conservation
Recipient: various: New York Environmental Institute

Document Number: RAM-001-1902 To 1905 Date: 06/28/89

Title: (Letter containing comments on the proposed Work Plan, Field Sampling Plan and Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Henry, Sherrel D.: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1906 To 1907 Date: 07/06/89

Title: (Letter containing items that must be incorporated into the proposed Work Plan for the Ramapo Landfill Remedial Investigation/Feasibility Study, the Field Sampling Plan and the Quality Assurance Project Plan)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-1908 To 1910 Date: 07/06/89

Title: (Letter commenting on the proposed Work Plan for the Remedial Investigation/Feasibility at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Gilday, William M.: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1914 To 1918 Date: 07/26/89

Title: (Letter containing URS Consultant's response to regulatory comments on the Work Plan for Remedial Investigation/Feasibility Study and outlining URS Consultant's intended revisions)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1911 To 1913 Date: 07/26/89

Title: (Letter containing comments from the NY Department of Environmental Conservation, NY Department of Health and EPA on the proposed Field Sampling Plan and Quality Assurance Project Plan for the Ramapo Landfill Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-0001 To 0181 Date: 08/01/89

Title: Work Plan - Quality Assurance Project Plan and Field Sampling Plan for the Remedial Investigation/Feasibility Study at the Ramapo Landfill, Town of Ramapo, New York

Type: PLAN
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-0219 To 0243 Date: 08/01/89

Title: Citizen Participation Plan for the Remedial Investigation/Feasibility Study at the Ramapo Landfill, Town of Ramapo, New York

Type: PLAN
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-1919 To 1920 Date: 08/03/89

Title: (Letter expressing concern over using Energy & Environmental Engineering, Inc., as the analytical laboratory for the Ramapo Remedial Investigation/Feasibility Study and detailing a recent laboratory audit)

Type: CORRESPONDENCE
Author: Barone, Mary E.: URS Corporation
Recipient: Serafini, Maureen: NY Dept of Environmental Conservation

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Document Number: RAM-001-1921 To 1921 Date: 09/05/89

Title: (Letter approving the Work Plan, Quality Assurance Project Plan and the Health and Safety Plan for the Ramapo Landfill Remedial Investigation/Feasibility Study and giving notice to proceed with the Remedial Investigation)

Type: CORRESPONDENCE
Condition: MISSING ATTACHMENT
Author: Cozzy, Robert J.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-1922 To 1923 Date: 09/14/89

Title: (Memo regarding a September 20, 1989, public meeting to discuss the Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Gorman, Joy: Town of Ramapo
Recipient: none: Journal News, Radio Station WRKL

Document Number: RAM-001-1924 To 1926 Date: 10/06/89

Title: (Letter discussing the proposed locations of wells as presented in the Ramapo Landfill Remedial Investigation/Feasibility Study Work Plan)

Type: CORRESPONDENCE
Author: Lenhardt, Duane: URS Corporation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-1927 To 1927 Date: 10/10/89

Title: (Letter confirming New York Department of Environmental Conservation's field approval of monitoring well sites)

Type: CORRESPONDENCE
Author: Cassidy, Edward K.: Town of Ramapo
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2166 To 2170 Date: 10/17/89

Title: (Letter discussing the three categories of Applicable or Relevant and Appropriate Requirements and issues to be considered)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2171 To 2172 Date: 10/30/89

Title: (Letter commenting on the Preliminary Applicable or Relevant and Appropriate Requirements which URS proposes to use during the Remedial Investigation/Feasibility Study at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Gilday, William M.: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-1928 To 1928 Date: 10/31/89

Title: (Letter confirming that URS Consultants has approval to amend the protocol for monitoring well construction in the Remedial Investigation Work Plan)

Type: CORRESPONDENCE
Author: Cassidy, Edward K.: Town of Ramapo
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1929 To 1933 Date: 10/31/89

Title: (Letter forwarding the attached revised contact list for inclusion in the Citizen Participation Plan for the Ramapo Landfill Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-1934 To 1934 Date: 11/27/89

Title: (Letter granting approval to regrade a portion of the Ramapo Landfill for the purpose of creating access for drilling equipment during piezometer drilling and installation)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-2173 To 2173 Date: 11/29/89

Title: (Memo forwarding a preliminary list of Applicable or Relevant and Appropriate Requirements for the remediation of the Ramapo Landfill site)

Type: CORRESPONDENCE
Condition: MARGINALIA; MISSING ATTACHMENT
Author: Slack, Joseph L.: NY Dept of Environmental Conservation
Recipient: distribution list: NY Dept of Environmental Conservation

Document Number: RAM-001-1935 To 1935 Date: 12/07/89

Title: (Letter concurring with URS Consultant's proposal to refrain from installing well cluster URS-6 north of the baler building, Ramapo Landfill)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Cassidy, Edward K.: Town of Ramapo

Document Number: RAM-001-2174 To 2175 Date: 12/21/89

Title: (Letter containing the NY Department of Environmental Conservation, the NY Department of Health, and EPA's comments on the list of preliminary Applicable or Relevant and Appropriate Requirements developed for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-1936 To 1936 Date: 01/10/90

Title: (Letter discussing the disposal of contaminated water generated during the Remedial Investigation)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-1937 To 1937 Date: 01/26/90

Title: (Letter discussing the repairs on cracked monitoring well pads at the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Przybyl, Bruce J.: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2277 To 2277 Date: 02/21/90

Title: (Letter initiating informal consultation to determine if there are any federal endangered/threatened species or critical habitats present in the vicinity of the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Hargrove, Robert W.: US EPA
Recipient: Corin, Leonard P.: US Fish & Wildlife Service
Attached: RAM-001-2278

Document Number: RAM-001-2176 To 2183 Date: 03/06/90

Title: (Letter stating that URS Consultants has revised its list of Applicable or Relevant and Appropriate Requirements and issues to be considered for the Ramapo Landfill site per the NY Department of Environmental Conservation's comments)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2186 To 2187 Date: 03/21/90

Title: (Letter commenting on the revised list of Applicable or Relevant and Appropriate Requirements and issues to be considered for the Ramapo Landfill site provided by URS Consultants)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2278 To 2278 Parent: RAM-001-2277 Date: 03/23/90

Title: (Letter responding to information requested on the presence of endangered or threatened species in the vicinity of the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Corin, Leonard P.: US Fish & Wildlife Service
Recipient: Hargrove, Robert W.: US EPA

Document Number: RAM-001-2302 To 2307 Parent: RAM-001-2300 Date: 04/01/90

Title: Quick Reference Fact Sheet - Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part A)

Type: CORRESPONDENCE
Author: none: US EPA
Recipient: none: none

Document Number: RAM-001-1940 To 1941 Date: 04/20/90

Title: (Letter commenting on the Remedial Investigation Phase I draft report and proposed Phase II Work Plan for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Olm, John: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1938 To 1939 Date: 04/23/90

Title: (Letter commenting on the summary of results for the first phase Remedial Investigation and the Scope of Work for the second phase Remedial Investigation provided by URS Consultants for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2184 To 2185 Date: 04/25/90

Title: (Letter commenting on the revised list of Applicable or Relevant and Appropriate Requirements and other issues to be considered for the Ramapo Landfill site as provided in Mr. Lanzo's March 6, 1990 letter)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-1945 To 1948 Date: 05/08/90

Title: (Letter containing comments from the NY Department of Environmental Conservation, the NY Department of Health, and EPA on the Preliminary Draft Remedial Investigation Report and proposed Scope of Work for the Second Phase Remedial Investigation)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-1942 To 1944 Date: 05/25/90

Title: (Letter forwarding the enclosed comments on the revised draft Remedial Investigation and the Second Phase Remedial Investigation Scope of Work for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-0244 To 0341 Date: 06/01/90

Title: Scope of Work for the Second Phase Remedial Investigation at the Ramapo Landfill, Town of Ramapo, New York

Type: PLAN
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-1949 To 1949 Date: 06/01/90

Title: (Letter stating EPA's concerns with regard to the Remedial Investigation/Feasibility Study at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-0343 To 0440 Date: 06/01/90

Title: Remedial Investigation and Feasibility Study at the Ramapo Landfill, Ramapo (T), Rockland (C), New York - Preliminary Draft Report

Type: REPORT
Condition: DRAFT
Author: none: URS Corporation
Recipient: none: Town of Ramapo

Document Number: RAM-001-1950 To 1950 Date: 06/07/90

Title: (Letter approving the draft Remedial Investigation Report and the Scope of Work for the Second Phase Remedial Investigation (May 1990) for release to the public document repositories)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-1951 To 1951 Date: 06/28/90

Title: (Letter requesting that the public comment period for the "Preliminary Draft Remedial Investigation at the Ramapo Landfill" be extended)

Type: CORRESPONDENCE
Author: Vanderhoef, C. Scott: Ramapo Land Company, Inc.
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2308 To 2313 Date: 07/05/90

Title: (Letter forwarding the enclosed Proposed Scope of Work for the Health Risk Assessment at the Ramapo Landfill site for review)

Type: CORRESPONDENCE
Author: Pawlewski, Craig: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-1958 To 1959 Date: 07/06/90

Title: (Letter, on behalf of George Demas, requesting that he be given time to review and comment on the June 1990 Scope of Work for Second Phase Remedial Investigation at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Gibson, Brian M.: Sichol and Hicks
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1952 To 1957 Date: 07/06/90

Title: (Letter, on behalf of Ramapo Land Company, commenting on the June 1990 Preliminary Draft Remedial Investigation Report for the Town of Ramapo Landfill)

Type: CORRESPONDENCE
Author: Angell, Glenn T.: Alfred Crew Consulting Engineers
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1960 To 1960 Date: 07/13/90

Title: (Fax Cover Page regarding the review of the Preliminary Remedial Investigation)

Type: CORRESPONDENCE
Author: Angell, Glenn T.: Alfred Crew Consulting Engineers
Recipient: Monti, Amy M.: URS Corporation
Attached: RAM-001-1961

Document Number: RAM-001-1961 To 1963 Parent: RAM-001-1960 Date: 07/13/90

Title: (Letter, on behalf of the Ramapo Land Company, expressing concern over the tone and statements in the Preliminary Draft Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Angell, Glenn T.: Alfred Crew Consulting Engineers
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-1964 To 1972 Date: 07/31/90

Title: (Letter forwarding the attached letter report entitled "Summary of Public Participation, June - July 1990", Preliminary Draft Remedial Investigation and Appendices, and Scope of Work for Second Phase Remedial Investigation)

Type: CORRESPONDENCE
Author: Monti, Amy M.: URS Corporation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-0194 To 0196 Date: 08/06/90

Title: (Laboratory reports for samples collected on July 25, 1990)

Type: REPORT
Author: Jimenez, William: Laboratory Resources, Inc.
Recipient: none: Rockland County Board of Health

Document Number: RAM-001-1973 To 1973 Date: 08/22/90

Title: (Letter recommending that a sample of surface water be collected for analysis)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2314 To 2315 Date: 09/17/90

Title: (Letter containing comments on the "Proposed Scope of Work for Health Risk Assessment at Ramapo Landfill Site")

Type: CORRESPONDENCE
Author: Olm, John: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-0182 To 0193 Date: 10/04/90

Title: (Letter forwarding attached sampling data summary for Well #97 - Ramapo Landfill, Rockland County)

Type: CORRESPONDENCE
Author: Olm, John: NY Dept of Health
Recipient: Cozzy, Robert J.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2300 To 2301 Date: 10/11/90

Title: (Letter containing comments on the proposed scope of work for the Health Risk Assessment at the Ramapo Landfill site and forwarding the enclosed fact sheet)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation
Attached: RAM-001-2302

Document Number: RAM-001-2316 To 2316 Date: 10/19/90

Title: (Letter containing the New York Department of Environmental Conservation and the New York Department of Health's comments on the proposed scope of work for the Health Risk Assessment at the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2317 To 2318 Date: 11/02/90

Title: (Letter expressing concern over the proposed Scope of Work for the Health Risk Assessment for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2201 To 2217 Date: 12/28/90

Title: (Letter forwarding the enclosed revised Preliminary Draft Feasibility Study which consists of the initial screening sections for the Ramapo Landfill)

Type: CORRESPONDENCE
Condition: MARGINALIA
Author: Lanzo, James: URS Corporation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2319 To 2325 Date: 01/14/91

Title: (Letter forwarding the enclosed Revised Scope of Work for the Health Risk Assessment at the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2326 To 2336 Date: 02/01/91

Title: (Letter forwarding the attached proposed chemicals of concern for the baseline human health risk assessment)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2218 To 2220 Date: 02/01/91

Title: (Letter containing comments on the Preliminary Draft Feasibility Study prepared by URS Consultants)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-1974 To 1974 Date: 02/06/91

Title: (Letter commenting on EPA groundwater data which has been reviewed for inclusion to the baseline health risk assessment for the Ramapo Landfill Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1975 To 1986 Date: 03/10/91

Title: (Memo commenting on the June 1990 Preliminary Draft Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Luckey, Frederick J.: US EPA
Recipient: Singerman, Joel: US EPA

Document Number: RAM-001-2337 To 2338 Date: 03/14/91

Title: (Letter discussing URS Consultant's telephone conference with EPA concerning the Health Risk Assessment)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1987 To 1989 Date: 03/26/91

Title: (Letter commenting on the advanced draft final of the Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-1990 To 1991 Date: 04/01/91

Title: (Letter forwarding the enclosed values for Henry's Law constants for requested chemicals)

Type: CORRESPONDENCE
Author: Hurst, Pei-Fung: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-1992 To 1994 Date: 04/03/91

Title: (Letter containing additional comments on the June 1990 Preliminary Draft Remedial Investigation Report and the June 1990 Scope of Work Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2221 To 2221 Date: 04/18/91

Title: (Letter recommending frost protection depths for remedial construction at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: Monti, Amy M.: URS Corporation

Document Number: RAM-001-1995 To 2002 Date: 04/19/91

Title: (Letter containing information on assessing dermal absorption of chemicals in soil)

Type: CORRESPONDENCE
Author: Hammerstrom, Karen A.: US EPA
Recipient: Hurst, Pei-Fung: US EPA

Document Number: RAM-001-2003 To 2003 Date: 04/23/91

Title: Facsimile Coversheet

Type: CORRESPONDENCE
Author: Hurst, Pei-Fung: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation
Attached: RAM-001-2004

Document Number: RAM-001-2004 To 2023 Parent: RAM-001-2003 Date: 04/23/91

Title: (Memo discussing inhalation RFC's, oral RFD's, slope factors, and cancer classifications at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Hurst, Pei-Fung: US EPA
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2024 To 2026 Date: 04/24/91

Title: (Memorandum discussing the determination of carcinogenicity of PAH compounds at the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Hurst, Pei-Fung: US EPA
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2027 To 2027 Date: 05/08/91

Title: (Letter discussing the Remedial Investigation Report for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2028 To 2028 Date: 05/14/91

Title: (Letter discussing values for absorption fractions)

Type: CORRESPONDENCE
Author: Hurst, Pei-Fung: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2029 To 2045 Date: 06/07/91

Title: (Letter containing comments on the April 1991 Draft Final Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2046 To 2047 Date: 06/13/91

Title: (Letter containing additional comments on the April 1991 Draft Final Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2048 To 2049 Date: 06/18/91

Title: (Letter expressing concern over EPA's comments on the draft Final Remedial Investigation Report)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2056 To 2065 Date: 06/19/91

Title: (Letter containing comments from the NY Department of Environmental Conservation, the New York Department of Health, and EPA on the draft Remedial Investigation Report submitted by URS Consultants for the Town of Ramapo concerning the Ramapo Landfill)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2050 To 2055 Date: 06/19/91

Title: (Letter forwarding enclosed review of the draft Remedial Investigation of the Ramapo Landfill, dated April 1991)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-2066 To 2067 Date: 07/02/91

Title: (Letter containing comments on the draft Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Olm, John: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2068 To 2072 Date: 07/03/91

Title: (Letter containing additional comments on the April 1991 draft Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2073 To 2078 Date: 07/03/91

Title: (Memo containing comments on the April 1991 Draft Remedial Investigation for the Ramapo Landfill)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Luckey, Frederick J.: US EPA
Recipient: Singerman, Joel: US EPA

Document Number: RAM-001-2079 To 2083 Date: 07/05/91

Title: (Letter containing supplemental comments to the April 1991 Draft Remedial Investigation Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Condition: DRAFT; MARGINALIA
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2084 To 2087 Date: 07/12/91

Title: (Letter containing supplemental regulatory comments required for the Remedial Investigation)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2088 To 2104 Date: 07/18/91

Title: (Letter forwarding the attached response to the New York Department of Environmental Conservation's comments dated June 19, 1991 on the draft Final Remedial Investigation of the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2105 To 2106 Date: 07/22/91

Title: (Letter discussing the recommended procedure for performing the New York Department of Environmental Conservation's screening model for landfill air emissions)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-2222 To 2223 Date: 07/31/91

Title: (Letter discussing the Draft Final Feasibility Study for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-0197 To 0208 Date: 08/02/91

Title: (Letter forwarding attached water quality information regarding Spring Valley Water Company Wells 94, 95, and 96)

Type: CORRESPONDENCE
Author: Matteo, Jean M.: Spring Valley Water Company
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-2107 To 2130 Date: 08/05/91

Title: (Letter discussing screening model for baseline air emission models with attachments)

Type: CORRESPONDENCE
Author: Monti, Amy M.: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-0441 To 0845 Date: 09/01/91

Title: *Remedial Investigation and Feasibility Study at the Ramapo Landfill, Town of Ramapo, New York.* Volume 1 of 4

Type: REPORT
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-1125 To 1517 Date: 09/01/91

Title: Appendices for Remedial Investigation and Feasibility Study at the Ramapo Landfill, Town of Ramapo, New York. Volume 3 of 4

Type: REPORT
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-1518 To 1888 Date: 09/01/91

Title: *Appendices for Remedial Investigation and Feasibility Study at the Ramapo Landfill, Town of* Ramapo, New York. Volume 4 of 4

Type: REPORT
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-2131 To 2132 Date: 09/03/91

Title: (Letter containing outstanding revisions required for the Remedial Investigation Report)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Lanzo, James: URS Corporation

Document Number: RAM-001-0209 To 0209 Date: 09/03/91

Title: (Letter forwarding the attached results of surface water sampling performed by New York Department of Environmental Conservation personnel on July 12, 1991 in the vicinity of the Ramapo Landfill)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo
Attached: RAM-001-0210

Document Number: RAM-001-2339 To 2340 Date: 09/06/91

Title: (Letter stating that finalizing an agreement between the Town of Ramapo and the NY Department of Environmental Conservation concerning the appropriate closure of the Ramapo Landfill should not be rushed into & forwarding a copy of a newspaper article)

Type: CORRESPONDENCE
Author: Reisman, Herbert: Town of Ramapo
Recipient: Marsh, Langdon: NY Dept of Environmental Conservation

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Document Number: RAM-001-2224 To 2241 Date: 09/10/91

Title: (Letter containing comments on the August 1991 Draft Final Feasibility Study Report for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Nunes, Robert: US EPA
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2242 To 2243 Date: 09/11/91

Title: (Letter commenting on the Draft Final Feasibility Study for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Olm, John: NY Dept of Health
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2133 To 2139 Date: 09/12/91

Title: (Letter discussing modifications to air emissions modelling used in the Ramapo Landfill Remedial Investigation Report)

Type: CORRESPONDENCE
Author: Monti, Amy M.: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2140 To 2140 Date: 09/19/91

Title: (Notice of Availability of the Remedial Investigation Report (Volume I) and Appendices for the Remedial Investigation Report (Volumes III and IV)

Type: CORRESPONDENCE
Author: none: none
Recipient: none: none

Document Number: RAM-001-2244 To 2255 Date: 09/20/91

Title: (Letter containing the New York Department of Health's and the EPA's concerns and comments regarding the Feasibility Study Report)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Ostertag, Gene: Town of Ramapo

Document Number: RAM-001-2341 To 2342 Date: 10/07/91

Title: (Letter responding to Mr. Reisman's September 6, 1991 letter and the New York Times article he submitted with the letter discussing the cost of remediation of hazardous waste sites such as the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Marsh, Langdon: NY Dept of Environmental Conservation
Recipient: Reisman, Herbert: Town of Ramapo

Document Number: RAM-001-2256 To 2256 Date: 10/08/91

Title: (Letter requesting a meeting to resolve difficulties in trying to ensure a successful completion to closure of the Town of Ramapo Landfill)

Type: CORRESPONDENCE
Author: Colman, Sam: NY State Legislature
Recipient: Jorling, Thomas C.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2257 To 2267 Date: 10/10/91

Title: (Memo discussing the Ramapo Landfill Superfund Site Computer Model, September 1991 Draft Feasibility Study with attachments)

Type: CORRESPONDENCE
Condition: DRAFT
Author: Luckey, Frederick J.: US EPA
Recipient: Singerman, Joel: US EPA

Document Number: RAM-001-2141 To 2149 Date: 10/17/91

Title: (Letter forwarding URS Consultants' attached responses to EPA's review of the groundwater flow model for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

Document Number: RAM-001-2150 To 2158 Date: 10/23/91

Title: (Letter forwarding the enclosed URS Consultants' responses to concerns raised by EPA about the groundwater model used in the Ramapo Remedial Investigation/Feasibility Study Reports)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2268 To 2269 Date: 10/24/91

Title: (Letter expressing concern that the Town of Ramapo is allowed to discuss the draft Feasibility Study at public meetings and in the local media when the draft Feasibility Study is not available to the public)

Type: CORRESPONDENCE
Author: Demas, George C.: Torne Brook Farm
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2343 To 2343 Date: 11/01/91

Title: (Letter responding to Assemblyman Colman's October 8, 1991 letter requesting a meeting to discuss the scope and cost of remedial action for the Ramapo Town Landfill)

Type: CORRESPONDENCE
Author: Jorling, Thomas C.: NY Dept of Environmental Conservation
Recipient: Colman, Sam: NY State Legislature

Document Number: RAM-001-2347 To 2351 Date: 12/30/91

Title: (Letter forwarding the enclosed summary of major issues discussed at a November 26, 1991 meeting concerning the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Marsh, Langdon: NY Dept of Environmental Conservation
Recipient: Reisman, Herbert: Town of Ramapo

Document Number: RAM-001-0846 To 1124 Date: 01/01/92

Title: Remedial Investigation and Feasibility Study at the Ramapo Landfill, Town of Ramapo, New York.
Volume 2 of 4

Type: REPORT
Author: none: URS Consultants, Inc.
Recipient: none: none

Document Number: RAM-001-2270 To 2271 Date: 01/09/92

Title: (Letter commenting on Volume 2 of the Remedial Investigation/Feasibility Study for the Ramapo Landfill)

Type: CORRESPONDENCE
Author: Ostertag, Gene: Town of Ramapo
Recipient: McCue, Kathleen A.: NY Dept of Environmental Conservation

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Document Number: RAM-001-2188 To 2200 Date: 02/01/92

Title: Superfund Proposed Plan, Ramapo Landfill, Town of Ramapo, Rockland County, New York

Type: PLAN
Author: none: US EPA
Recipient: none: none

Document Number: RAM-001-2159 To 2159 Date: 02/07/92

Title: (Letter transmitting Phase I and Phase II analytical data for the Ramapo Landfill Remedial Investigation/Feasibility Study)

Type: CORRESPONDENCE
Author: Lanzo, James: URS Corporation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2272 To 2275 Date: 02/11/92

Title: (Letter commenting on the draft proposed plan developed by EPA for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: McCue, Kathleen A.: NY Dept of Environmental Conservation
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2160 To 2163 Date: 02/14/92

Title: (Memo containing comments made about the Ramapo Landfill Superfund Site, Ramapo, New York)

Type: CORRESPONDENCE
Author: Ross, Randall R.: US EPA
Recipient: Nunes, Robert: US EPA

Document Number: RAM-001-2164 To 2165 Date: 02/18/92

Title: (Letter concurring with the draft Proposed Plan for remedial action at the Ramapo Landfill)

Type: CORRESPONDENCE
Author: O'Toole, Michael J.: NY Dept of Environmental Conservation
Recipient: Callahan, Kathleen C.: US EPA

Document Number: RAM-001-0342 To 0342 Date: 02/20/92

Title: (Letter providing comments on the Proposed Remedial Action Plan for the Ramapo Landfill site)

Type: CORRESPONDENCE
Author: Carlson, G. Anders: NY Dept of Health
Recipient: O'Toole, Michael J.: NY Dept of Environmental Conservation

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APPENDIX IV

NYSDEC LETTER OF CONCURRENCE

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

Bob Nunes	Kathleen McCue
Co. USEPA Reg II	Co. NYSDEC
Dept. (212)264 2723	Phone # (518) 457 1641
Fax #	Fax #

Thomas C. Jorling
Commissioner

MAR 2 5 1992

Mr. Constantine Sidamon-Eristoff
Regional Administrator
United States Environmental
Protection Agency, Region II
26 Federal Plaza
New York, New York 10278

Dear Mr. Sidamon-Eristoff:

RE: Ramapo Landfill - Site No. 344004
Record of Decision

The New York State Department of Environmental Conservation (NYSDEC) has reviewed the Record of Decision for the Ramapo Landfill and the Department concurs with the selected remedy, consisting of the following major components:

- Installation of a cap on the tops of the landfill using a multi-media system, including layers of fill material, a gas venting system and an impermeable membrane. The landfill side slopes will be capped using a multi-media system without an impermeable membrane, if confirmatory studies demonstrate that this approach meets remedial action objectives. Should the confirmatory studies indicate that the elimination of the impermeable barrier on the side slopes would significantly reduce the overall remedy's effectiveness, then an impermeable barrier would be included in the multi-media cap to be constructed on some or all of the side slopes of the landfill.

- Regrading and compacting of the landfill mound to provide a stable foundation for the placement of the cap prior to its construction.

- Collection and venting or treatment (as appropriate) of landfill gases.

- Installation of groundwater extraction wells to supplement the existing leachate collection system.

- Collection and diversion of leachate seeps to the leachate collection system for off-site treatment.

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- Installation of a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water run-off.

- If groundwater pretreatment is needed, construction of a pretreatment facility which would be tied into the existing leachate collection and discharge system.

- Performance of air monitoring prior to, during, and following construction at the site to ensure that air emissions resulting from the cap construction meet applicable or relevant and appropriate requirements (ARARs). Perimeter monitoring in monitoring wells and piezometers for landfill gas will also be performed, and permanent gas monitoring wells will be installed between the landfill and the Baler Building to detect subsurface gas migration. If necessary, landfill gas emissions will be controlled.

- Imposition of property deed restrictions to prevent future use of groundwater at the site for drinking purposes and to restrict activities which could effect the integrity of the cap.

- Performance of a maintenance and sampling program upon completion of closure activities. The monitoring program will provide data to evaluate the effectiveness of the remedial effort. Additional monitoring points will be established as needed to detect any future movement of site contaminants toward drinking water sources off-site.

- Development of a contingency plan for rapid implementation of additional measures to protect nearby residents and users of groundwater if those measures are determined necessary by the State.

The NYSDEC concurs that the ROD adequately documents and justifies selection of the above remedy.

Furthermore, as is documented in the ROD, this site will be subject to five-year reviews as required by the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986.

Sincerely,

Edward O. Sullivan
Deputy Commissioner

cc: K. Callahan
G. Pavlou

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APPENDIX V

RESPONSIVENESS SUMMARY

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APPENDIX V

RESPONSIVENESS SUMMARY

RAMAPO LANDFILL SUPERFUND SITE

Prepared by: Kathleen A. McCue, Project Manager
Division of Hazardous Waste Remediation
New York State Department of
Environmental Conservation

Introduction

A responsiveness summary is required by Superfund policy. It provides a summary of citizens' comments and concerns received during the public comment period, and the New York State Department of Environmental Conservation's (NYSDEC's) responses to those comments and concerns. All comments summarized in this document have been considered in NYSDEC's and the United States Environmental Protection Agency's (USEPA's) final decision for selection of a remedial alternative for the Ramapo Landfill site.

Summary of Community Relations Activities

Community interest in the Ramapo Landfill has remained active from the landfill's inception in 1971 up through the remedial investigation and feasibility study (RI/FS).

NYSDEC, the lead agency for this site, oversaw community relations activities conducted by the Town of Ramapo during the RI/FS process and has itself, with USEPA, conducted community relations efforts during the remedy selection process. NYSDEC approved a Citizen Participation Plan in August 1989. On September 20, 1989, a public information meeting was held concerning the workplan for the RI/FS. Two local document repositories were set up at the Suffern Free Library and the Finkelstein Library. A public comment period for the preliminary RI report was held from June 8 to July 24, 1990.

A public comment period associated with the RI/FS report and the Proposed Plan extended from February 19 through March 19, 1992. The availability of the RI/FS report and the Proposed Plan and a public meeting to discuss the results of the RI/FS and to present the preferred remedy, were advertised by means of legal notices in the February 19, 1992 Rockland Journal-News and the February 20, 1992 Rockland Review. Press releases were issued by NYSDEC on February 18 and on February 24, and an article appeared in the Rockland Journal-News announcing the public comment period and the public meeting. Residents, interested public and local officials listed on the site contact list were mailed notices to encourage their participation and to solicit comments on the Proposed Plan.

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A public meeting took place on March 3, 1992. Approximately 60 people attended, including representatives of USEPA, NYSDEC, and state and local health departments, as well as local officials, residents, and representatives of civic and environmental associations, news media, and businesses. NYSDEC also had frequent contact with many of these interested parties and sent them notices and project reports.

Summary of Comments and Responses

The following items of correspondence were received during the public comment period:

- Letter to Kathleen McCue, NYSDEC, from Geoffrey Welch, Ramapo River Committee, Re: RRC review comments on the Proposed Plan; March 19, 1992.

- Letter to Kathleen McCue, NYSDEC, from Terresa M. Bakner of Whiteman, Osterman, and Hanna, Re: Ramapo Land Company's comments concerning the Proposed Plan, with attached comments by Lawler, Matusky and Skelly, RLC's consultant; March 19, 1992.

- Letter to Kathleen McCue, NYSDEC, from George C. Demas, Torne Brook Farm, Re: Comments on the Proposed Plan; March 18, 1992.

- Letter to Kathleen McCue, NYSDEC, from Jean M. Matteo, Spring Valley Water Company, Re: Comments on the Proposed Plan; March 16, 1992.

- Letter to George C. Demas, Torne Brook Farm, from Michael R. Brother and Laurie E. Scheuing, Eckenfelder, Inc., Re: Interpretation of RI data; March 13, 1992.

- Memorandum to Kathleen McCue, NYSDEC, from Paul J. Ernest, Eleanor Burlingham Commission on Environmental Quality and Recycling, Re: Support for the Proposed Plan; March 3, 1992.

- Letter to Gene Ostertag, Town of Ramapo, from Richard L. Eichenlaub, Village of Sloatsburg, Re: Comments concerning the Proposed Plan, March 2, 1992.

- Letter to Herbert Reisman, Town of Ramapo, from Joseph T. Caruso, Town of Ramapo resident, Re: Support for Proposed Plan; February 28, 1992.

- Letter to Kathleen McCue, NYSDEC, from David Stein, Town of Ramapo resident, Re: Comments concerning the Proposed Plan; February 25, 1992.

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- Letter to George C. Demas, Torne Brook Farm, from Michael Brother, Eckenfelder, Inc., Re: Evaluation of Proposed Plan; February 25, 1992.

Comments

Both during the public meeting and in correspondence, local officials and citizens expressed support for the preferred remedy, Alternative 5, based upon its being apparently the most cost-effective means of meeting the regulatory agencies' closure and remediation requirements for the landfill.

Other commentors expressed opposition to the preferred remedy, or portions of the preferred remedy. Their comments are summarized below.

Comment #1: The preferred remedy is not truly cost-effective, since for a similar cost, the contingent remedy (Alternative 4 Option B) will achieve a greater environmental benefit.

Response: Both Alternative 5 and Alternative 4 Option B are expected to achieve substantial risk reduction through source control and a leachate and groundwater collection system. Leachate collection system enhancements are expected to collect nearly all of the water that infiltrates through the caps and through the waste mass with the partial-membrane cap in Alternative 5 and the full-membrane cap in Alternative 4 Option B. Therefore, it is not appropriate to address the overall effectiveness of the alternatives by only considering infiltration rates through the caps. NYSDEC and USEPA based their judgement of relative benefit upon the overall effectiveness of the alternatives to contain the source of contamination and to prevent off-site migration of contaminants. On this basis, there appears to be no significant difference between Alternatives 4 Option B and 5. This conclusion, however, is to be verified by confirmatory studies to be conducted during the remedial design.

Given the near equivalence of the two alternatives on the above basis, cost becomes the deciding factor. While the cost ranges overlap for Alternatives 4 Option B and 5, the ranges are based upon the cost contingency actions which are as likely to be implemented under Alternative 4 Option B as under Alternative 5, if they prove to be necessary in the future. Therefore, a cost difference of approximately $3 million becomes the deciding factor for remedy selection.

Comment #2: The water supply extension contingency should be implemented at once.

Response: To date, results obtained from sampling of nearby private wells indicate that the wells are not being adversely impacted by the landfill. Therefore, no provision for an alternate water supply is warranted at this time. However, should future groundwater monitoring data indicate that drinking water standards are being contravened in nearby wells, then an alternate water supply may be deemed necessary. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residential wells, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure, until an alternate water supply could be constructed.

Comment #3: A commentor expressed concern upon reading the February 24, 1992 article in the Rockland Journal-News discussing the Town of Ramapo's comments on the Proposed Plan. Town officials, as quoted in the article, appeared to be concerned solely with cost, whereas even as a town taxpayer, the commentor stated the belief that environmental and personal health should be the primary focus of decision-making in regard to the final landfill remedy.

Response: The primary focus of USEPA and NYSDEC in remedial decision-making at any Superfund site is on mitigating environmental and public health threats. Costs are, generally considered secondarily (i.e., if two remedial alternatives are both believed to be sufficiently protective of human health and the environment, then cost-effectiveness would be considered as a deciding factor in the selection between the alternatives.) USEPA and NYSDEC have evaluated the remedial alternatives for the site and have identified a preferred remedy that is, first of all, protective, and secondly, cost effective.

Comment #4: The illegal disposal of construction and demolition (C&D) debris at the landfill from 1984 to 1989 was excluded from the site histories discussed in the RI/FS report and the Proposed Plan. The presence of C&D debris contributes to the potential impact of the site on the environment and appears to have been overlooked in the RI/FS report.

Response: The Record of Decision (ROD) discusses the post-1984 disposal of C&D debris. The RI sampling program, the FS report, and the Proposed Plan have addressed the discrete C&D mound located along the baler access road, as well as C&D waste cells located in

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refuse areas. The preferred remedy will address, through capping, leachate and groundwater collection, and long-term monitoring, any long-term threat posed by the C&D waste.

Comment #5: There should be a backup plan to the remedial action if it does not prove to be effective, especially in regard to protecting the drinking water supply of nearby residents.

Response: Confirmatory studies are to be conducted during the remedial design to determine whether Alternative 5 can provide proper and effective closure of the landfill. If Alternative 5 cannot meet the remedial action objectives, then Alternative 4 Option B will be implemented.

Long-term monitoring of the site will be performed to ensure that residential drinking water wells are protected from contamination emanating form the site. Should the monitoring data indicate that drinking water standards are being contravened in nearby wells, then an alternate water supply may be deemed necessary. This alternative includes the development, during the remedial design, of a contingency plan for the rapid implementation of an alternate water supply, if shown to be needed. The contingency plan would include the preliminary design for the alternate water supply. If drinking water standards are significantly exceeded for site-related parameters in residential wells, or in the same aquifer in the closest monitoring wells to the residential wells, and detected concentrations are confirmed by subsequent sampling, residents would immediately be provided with bottled water and/or an acceptable point-of-use treatment system, as an interim measure until an alternate water supply could be constructed.

Comment #6: Quarterly sampling of wells is needed, especially downgradient residential and monitoring wells. Quarterly monitoring is also required by 6 NYCRR Part 360, Solid Waste Management Facilities Regulations (Part 360).

Response: The final remedy will contain quarterly monitoring as prescribed in 6 NYCRR Part 360 at selected on-site wells plus downgradient residential wells PW-1 and PW-2 and early warning monitoring wells.

Comment #7: Bedrock contamination could migrate up to supply wells in the overburden.

Response: Although this is possible, monitoring to date has not indicated that this is happening. Samples will be collected on a quarterly basis for site-related parameters from nearby residential wells and from new and selected existing monitoring wells. If increases are noted through this monitoring program at or immedi-

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ately upgradient of the residences, the State and EPA will make a determination as to the need for appropriate action (i.e., extension of a public water line) to remedy the situation.

Comment #8: The RI/FS did not gather sufficient data concerning groundwater contamination in the bedrock. It is not known how far the plume of contamination has migrated from the site through this aquifer. The remedy decision is therefore being made on inadequate data.

Response: Eight bedrock wells were installed during the RI at locations upgradient and downgradient of the site. All groundwater wells were sampled over two distinct field events--so two rounds of groundwater data were generated. It is agreed that the flow pattern of the plume in bedrock is not well known. Flow of groundwater in fractured bedrock is difficult to predict, unlike flow through unconsolidated material, such as sand or clay.

The selected remedial approach will mitigate risks to residents from exposure to a plume in bedrock by controlling contaminant releases at their source and by monitoring at both early warning points and at points of use (i.e., residential wells). In addition, the preferred remedy includes a contingency plan to provide an alternate water supply to nearby residents, should monitoring show evidence that the plume has reached or may impact those locations.

Comment #9: The regulatory agencies responsible for environmental quality in the New York and New Jersey region in the vicinity of the site are not considering the aggregate or cumulative effects of their decisions, particularly not the one concerning the site, on the region as a whole.

Response: Remedial activities conducted at Superfund sites focus on addressing contamination that is associated with releases from Superfund sites. The preferred remedy will control contaminant releases from the Ramapo Landfill site to the environment. The remedial action will be implemented to comply with federal and state water and air quality standards which are based on preventing deterioration of environmental quality from multiple sources.

Comment #10: The deposits of paint sludge in the vicinity of the landfill have not been addressed in the RI/FS. Some of the material was removed but a large amount likely remains behind.

Response: The placement of paint sludge in the vicinity of the landfill appears to be unrelated to the operation of the landfill. NYSDEC has begun a separate study to determine the extent and the environmental impact of this material.

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Comment #11: If the study showed that the levels of contaminants migrating from the landfill are not severe, then why is such a costly remedy being implemented?

Response: The levels of contaminants at and emanating from the site exceed state and federal standards for protection of human health and the environment. Therefore, a remedial action is warranted. Left unabated, the release of those contaminants to the aquifer would allow continued degradation of the groundwater downgradient of the site until that portion of the aquifer is unusable. The preferred remedy will greatly reduce any future release of contaminants to the aquifer by collecting and treating contaminated leachate and groundwater before they migrate off-site. A large portion of the overall cost of the remedy is for the placement of a multi-media cap on the landfill which is required by state regulations for closure of all municipal landfills. The cap serves to reduce the generation of leachate, prevent human and animal contact with contaminated soil from the landfill surface, prevent erosion of contaminated surface soil, and provide a means of treating landfill gas emissions.

Comment #12: One citizen requested a more detailed budget and closer analysis of remedy costs.

Response: Tables 10-1 through 10-19 in the FS report present a line by line breakdown of each component for the remedial action alternatives evaluated in the FS. These costs are based on conceptual designs of the remedial alternatives and have an accuracy of -30 to +50 percent of the actual cost of the remedy. The purpose of the cost estimates in the FS is to allow a cost comparison between alternatives and an assessment of cost-effectiveness of each alternative. During the remedial design, a detailed construction cost estimate will be developed based on the detailed engineering plans and specifications of the remedy. The design and cost estimate will be made available for public review at the document repositories.

Comment #13: How do deviations in the proposed remedy from 6 NYCRR Part 360 constitute a legitimate variance? The RI/FS and Proposed Plan have not justified a variance from Part 360.

Response: The requirement in 6 NYCRR Part 360-2.15(b) for a full impermeable barrier (i.e., a synthetic membrane or a clay layer) on a closed landfill is not met by the preferred remedy, Alternative 5. Part 360-1.7(c) allows for a variance from a requirement of Part 360 on the condition (in part) that the proposed alternative to the requirement "will be consistent with...the performance expected from application of this Part" (360-1.7(c)(2)(iii)).

RAM 002 0106

NYSDEC's approval of a variance from the requirement of a full Part 360 cap at the Ramapo Landfill site is to be based on whether Alternative 5 satisfactorily achieves an equivalent degree of protection as a landfill cap meeting all closure requirements in 6 NYCRR Part 360.

The preferred alternative, Alternative 5, which includes a landfill cap on all 60 acres, (including an impermeable membrane as part of the cap design on the flatter areas of the landfill which constitute approximately 35 acres), with leachate and groundwater collection, will provide for gas control in an equivalent manner to a Part 360 cap. It is also expected to control the migration of landfill contaminants, through the groundwater through the enhanced leachate collection system, as effectively as would a Part 360 cap with no groundwater collection. For this reason, it is believed that Alternative 5 may warrant a variance from the impermeable barrier requirement, since it is expected to provide an equivalent level of protection of human health and the environment, as would the Part 360 cap with impermeable membrane.

Approval to omit an impermeable cap has been granted by NYSDEC at a few other New York State sites where, similar to the situation posed by the Ramapo Landfill site, it is feasible to collect and treat the vast bulk of contaminated groundwater. These other sites (similar to the Ramapo Landfill site) also posed the problem of groundwater flow through the waste mass from upgradient areas, a cause of groundwater contamination for which a cap offers little protection to groundwater resources. This is, in part, the cause of groundwater contamination from the Ramapo Landfill and why a multi-media cap without the impermeable barrier on the side slopes, with downgradient groundwater collection, is expected to be equivalent in effectiveness to a landfill cap with an impermeable barrier. Approval for a variance from the impermeable membrane requirement for the sideslopes at the Ramapo Landfill site is contingent upon the results of the confirmatory studies to be conducted during the remedial design.

The preferred and contingent remedies, Alternatives 5 and 4 Option B, respectively, also include a variance from the NYCRR Part 360 regulations from the requirement of at least a 24-inch fill layer covering the impermeable barrier, which is intended to provide for adequate frost protection. NYSDEC considers that an 18-inch cover would provide adequate protection provided that a flexible membrane liner meeting NYSDEC specifications be used for the impermeable barrier.

Comment #14: Bedrock groundwater contamination has not been adequately characterized and remediation of the bedrock has not been sufficiently examined. Therefore, neither the preferred alternative nor the contingent alternative fulfills the objective, as stated in the FS report, of <u>preventing</u> off-site migration of

RAM 002 0107

contaminated groundwater.

Response: As stated in the response to Comment #8, eight bedrock wells were installed during the RI at locations upgradient and downgradient of the site and two rounds of groundwater data were generated. Remediation of the bedrock aquifer may not be feasible by conventional pump-and-treat methods, if the bedrock consists of competent rock with isolated fracture conduits; the inter-relationship between the upper and lower aquifers will be evaluated during the remedial design.

Both the preferred alternative and the contingent alternative fulfill the objective of preventing off-site migration of contaminated groundwater. Both alternatives call for reducing infiltration of precipitation through the landfill by the installation of a multi-media cap, and both alternatives require extraction of groundwater in the site area. Extraction of groundwater would reduce off-site migration by reducing the actual volume of contaminated groundwater and by decreasing the rate of groundwater flow, or reversing the direction of groundwater flow, from the landfill to off-site locations downgradient from the site.

Comment #15: USEPA and NYSDEC should specify now what studies will be performed to determine whether Alternative 5, the preferred remedy, meets the remedial action objectives.

Response: While the specifics of the confirmatory studies will be outlined in detail in the workplan documents for the remedial design, it is expected that additional groundwater modeling and pump tests, at a minimum, will be needed to resolve whether Alternative 5 meets the remedial objectives.

Comment #16: A passive gas venting system in the proposed cap is not sufficiently protective of nearby residents, particularly since the health risk assessment concluded that inhalation of landfill vapors was the main contributor to the overall risk posed by the site.

Response: Passive venting of landfill gas through the completed cap has been proposed in the Proposed Plan because, based upon the RI air sampling data, only frequent or long-term continuous on-site exposure (not occasional exposure or exposure to off-site residents) exceed air quality criteria and presents unacceptable risks in the baseline human health risk assessment. It is recognized that capping and the installation of a system to encourage gas venting is likely to change the quantity of gas emitted, at least in the short-term. Therefore, gas sampling of vents after construction of the cap will be required for volatile organic compounds, to determine if air quality criteria (and by extension, risk thresholds) are exceeded at the Ramapo Landfill property

RAM 002 0108

boundary. If such is the case, active venting and treatment will be implemented. It is expected, given the age of the landfill, that gas generation and emission will steadily decline upon installation of the cap.

Comment #17: Thicker vegetative support is needed on the cap, particularly with the Alternative 4 Option B full-membrane cap (if implemented) to retain moisture for vegetative growth during periods of low precipitation. One commentor suggested a thickness of 30 inches on the side slopes and 24 inches on the flat portions of the lobes. Commentors also asked whether slope stability had been considered in the vegetative/barrier protection layers proposed for FS cap alternatives.

Response: It is possible that problems with maintaining an 18-inch (12 inches of fill plus 6 inches of topsoil) vegetative cover may occur. The type of soil to be used, as well as the possible varieties of vegetation, will be reviewed during the remedial design. It is believed that with the proper choice of materials, a lasting vegetative cover can be established with less than the thickness specified in Part 360. To merely increase the thickness of fill over the membrane would result in a higher capital cost, as shown by Alternative 4, Option A, without necessarily being needed to ensure vegetative growth.

A slope stability analysis was performed during the FS for all the capping alternatives. The analysis concluded that a geogrid should be added to the general fill layer on the sideslopes to achieve slope stability, and that a maximum slope of 30 percent should be included in the cap design. This could be accomplished either by excavating approximately 30,000 cubic yards of landfill material from the southern lobe, or by adding fill material to the southern lobe and relocating and/or elevating Torne Valley Road. The latter option would probably be more cost effective and have fewer short-term impacts.

Comment #18: The RI has gathered insufficient data to gain an adequate understanding of a) the flow rates and interaction between bedrock and overburden aquifers; and b) the total amount of water flowing through the landfill. This information is needed to adequately evaluate the alternatives.

Response: Information was obtained during the RI to evaluate the remedial alternatives. Alternatives 5 and 4 Option B were selected as the preferred and contingent remedies, respectively, because they were found to efficiently and effectively reduce infiltration of precipitation through the cap and significantly reduce leachate generation. Infiltration rates would be reduced to an overall 1.2% and 7% of precipitation under Alternatives 4 Option B and 5, respectively. The reduced rates will also lower water tables under the landfill and should reduce migration of contaminated groundwa-

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ter into the bedrock aquifer and downgradient from the site. Although information on flow rates and degree of interaction between the upper and lower aquifers was obtained by modeling studies conducted during the RI/FS, additional modelling will need to be conducted to supplement the existing data. These topics will be examined in the confirmatory studies during the remedial design.

Comment #19: The groundwater modeling is inadequate to justify proceeding with implementation of the preferred alternative.

Response: A more comprehensive modeling effort, to fully evaluate the relative effectiveness of Alternatives 5 and 4 Option B, will be performed as part of remedial design confirmatory studies.

Comment #20: A downgradient groundwater containment wall should be considered in addition to the extraction wells. Otherwise, an excessive number of wells might be needed, or an excessive amount of clean water from Torne Brook may be captured.

Response: During the remedial design, studies will be performed (including pump tests) to determine the configuration of extraction wells needed. A vertical containment wall was evaluated and rejected in the screening analysis in the FS because of the extreme difficulty of excavation and installation of a wall in the rocky, dense overburden material encountered at the site. This technology was not considered implementable for this site.

Comment #21: It has not been considered whether withdrawal of water from the extraction wells will cause a significant impact on the Torne Brook and aquifer system downgradient.

Response: With the cap in place, a significant amount of clean surface water will be available for diversion to the brook and to recharge the aquifer. This will be examined further and addressed during the remedial design.

Comment #22: The amount of contaminated groundwater to be collected may have been greatly underestimated, treatment at the current publicly-owned treatment works (POTW) could, therefore, become so costly as to significantly impact the cost evaluation of the alternatives.

Response: The exact amount of groundwater to be treated will become known as a result of the remedial design studies. Final cost estimates in the ROD for treatment are based upon treatment at the current POTW. The Town of Ramapo, however, is pursuing arrangements for treatment at the Rockland County Sewer District No. 1 POTW, whose cost per gallon quote is estimated to be

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relatively low (about one-tenth of the current POTW's rate) such that an increase in flow is not expected to have a significant impact to the overall cost of the remedy.

Comment #23: The "upgradient" well cluster appears to be contaminated by the site, leading to an incorrect assessment of downgradient site-related contamination. Additional upgradient wells should be installed.

Response: It is uncertain from the RI data whether or not the upgradient monitoring well cluster, MW-5, was impacted by the site. Organic and inorganic contaminants were detected in these wells and may be site-related, or may have been introduced into the well during well drilling, or from logging or other activities in the area. A correct assessment of downgradient site-related contamination, however, is not dependent on identifying the source of contamination of these upgradient wells.

Due to the topography of the site, it would not be feasible to install additional upgradient wells. Site impacts were assessed in the RI with the understanding that the upgradient cluster was apparently impacted by a contaminant source, possibly the landfill, although the low levels of many metals and leachate indicator parameters compared to downgradient locations, and the hydraulic gradients noted in that area, do not point to a landfill impact. It is noted that the upgradient shallow well screen is physically higher than the highest point in the waste mass.

Comment #24: Measures are needed to protect wildlife from coming into contact with contaminated water in the holding pond. The closure/remediation plan does not address this problem.

Response: The holding pond may be redesigned to control clean surface water runoff upon closure. In any event, measures to prevent wildlife contact with contaminated water will be incorporated into the remedial design.

Comment #25: A commentor described concern over site contamination moving through bedrock to production wells downgradient of the site, and stated the belief that Alternatives 4 and 5 do not provide adequate protection due to bedrock migration of contaminants. The commentor stated that additional monitoring wells and more frequent monitoring is needed, along with contingency plans to intercept a contaminated plume if found migrating toward the water supply.

Response: Early warning monitoring wells will be installed where needed between the Spring Valley Water Company (SVWC) well field and the site as part of the remedy; these will be sampled on a

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quarterly basis as part of the long-term monitoring program. Quarterly sampling of the SVWC wells will be required for contaminants associated with the site for the first year of long-term monitoring, or longer if migration is noted.

Also, see responses to Comments #7, #8, and #14.

Comment #26: Any changes to standards or guidance values appearing in the November 1991 edition of NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 should be incorporated in the FS.

Response: The November 1991 TOGS 1.1.1 will be used in the development of long-term monitoring and contingency plans during the remedial design.

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Appendix V Attachment

Responsiveness Summary Records

Attendance Sheet for Public Meeting on March 3, 1992 - Ramapo Landfill Proposed Plan

February 24, 1992 Rockland Journal-News - Re: Announcement of Public Meeting

WRKL News Reports on Ramapo Landfill - July 31, 1991

October 22, 1991 Rockland Journal-News - Re: Article on cap design for the Ramapo Landfill

Letter to Mr. Herbert Reisman, Town of Ramapo Supervisor, fro Langdon Marsh, Executive Deputy Commissioner, NYSDEC; Re: Summary of issues discussed on November 26, 1991 meeting concerning Ramapo Landfill

July 31, 1991 Rockland Journal-News - Re: Article on proposed remedies for the Ramapo Landfill site

December 6, 1991 Rockland Journal-News - Re: Article on costs of Ramapo Landfill site cap design

February 20, 1992 Invoice from Rockland Review for notice of public meeting

NYSDEC Press Release for notice of public meeting

February 24, 1992 - Notice of Public Meeting for Proposed Plan

Transcript of public meeting regarding Proposed Plan at Ramapo Town Hall, March 3, 1992, 7:30 p.m. - Rockland & Orange Reporting

Letter to Kathleen McCue, NYSDEC, from Geoffrey Welch, Ramapo River Committee, Re: RRC review comments on the Proposed Plan; March 19, 1992.

Letter to Kathleen McCue, NYSDEC, from Terresa M. Bakner of Whiteman, Osterman, and Hanna, Re: Ramapo Land Company's comments concerning the Proposed Plan, with attached comments by Lawler, Matusky and Skelly, RLC's consultant; March 19, 1992.

Letter to Kathleen McCue, NYSDEC, from George C. Demas, Torne Brook Farm, Re: Comments on the Proposed Plan; March 18, 1992.

Letter to Kathleen McCue, NYSDEC, from Jean M. Matteo, Spring Valley Water Company, Re: Comments on the Proposed Plan; March 16, 1992.

Letter to George C. Demas, Torne Brook Farm, from Michael R.

Brother and Laurie E. Scheuing, Eckenfelder, Inc., Re: Interpretation of RI data; March 13, 1992.

Memorandum to Kathleen McCue, NYSDEC, from Paul J. Ernest, Eleanor Burlingham Commission on Environmental Quality and Recycling, Re: Support for the Proposed Plan; March 3, 1992.

Letter to Gene Ostertag, Town of Ramapo, from Richard L. Eichenlaub, Village of Sloatsburg, Re: Comments concerning the Proposed Plan, March 2, 1992.

Letter to Herbert Reisman, Town of Ramapo, from Joseph T. Caruso, Town of Ramapo resident, Re: Support for Proposed Plan; February 28, 1992.

Letter to Kathleen McCue, NYSDEC, from David Stein, Town of Ramapo resident, Re: Comments concerning the Proposed Plan; February 25, 1992.

Letter to George C. Demas, Torne Brook Farm, from Michael Brother, Eckenfelder, Inc., Re: Evaluation of Proposed Plan; February 25, 1992.

ATTENDANCE SHEET

New York State
Department of Environmental Conservation

MEETING Ramapo Landfill (344004) DATE 3/3/92
PRAP Mtg

	Name (PLEASE PRINT)	Address	Representing
1.	Tom Delonek	Mahwah Water Supply / Orchard Enviro	
2.	Mike & R. Brother Eckenfelder	Mahwah NJ	Term Book
3.	Nina Knapp	2 University Place Albany	NYSDOH
4.	Dave Gordon	Mack Gordon II, Paramus	VAS
5.	Geoff Wolch	PO Box 1315 Hillburn, NY	Ramapo River Com
6.	Laurie Schreurn	Eckenfelder Inc Mahwah, NJ	Term Brook
7.	Teresa Rynearson	9 Burling Place Nanuet, NY 10954	
8.	Ed MAKSH	One Blue Hill Plaza, Pearl River NY 10965	LMSE
9.	Sue Ocrow	Mahwah Health 300 Rt 17 Mahwah	Mahwah
10.	Anthony Ida	Ramapo Landfill Inc Hillburn NY	
11.	Bill	Town of RAMAPO CEO/R	Ramapo
12.	Ed Friedman	COUNCILMAN,	RAMAPO
13.	Charles H. Rossi	Dept of Public Works (Ramapo)	
14.	Allan M. Simon	Town Atty	Ramapo
15.	Herbert REISMAN	TOWN SUPERVISOR	RAMAPO
16.	Tom Matteo	300 West Nyack Rd	West Nyack Spring Valley Water Co
17.	Donald E. Grosso	61 WASHINGTON AVE.	SUFFERN, N.Y. 10901
18.	David K Farrison	Trustee	Village of Hillburn
19.	William Cawthra	Chem	MAHWAH ENVIRONMENTAL CO.
20.	Edward L Eichorn	Village of Spring Valley	Village Engineer
21.			

ATTENDANCE SHEET

New York State
Department of Environmental Conservation

MEETING Ramapo Landfill (Site #3-40-001) DATE 5/2/92
PRAP Mtg

	Name (PLEASE PRINT)	Address	Representing
1.	GEORGE C. DUMAS	Town Barn Road, Ramapo, N.Y. 10931	Town Board Member
2.	DENNIS D'AMICO	C/O Sealtest Ave Staten Island, NY	
3.	Margaret M. Laws	Fernbrook Ln, Ramapo N.Y. 10931	TBF
4.	Lisa Lowey	High School Student	
5.	[illegible]	" "	
6.	[illegible]	aide Senator Joseph Holland	
7.	LEE ROSS - Recycling Coordinator - Town of Ramapo		(914) 357-0591
8.	Edward P Dzurinko - Town of Ramapo		
9.	BRIAN BROOKER	29 LOZNS LANE MONSEY, N.Y. 10952	
10.	GEORGE SARGENT	TOWN BARN RD RAMAPO HAMLET NY 10931	
11.	[illegible]	34 SMITH HILL RD MONSEY N.Y. 10952	
12.	KERMIT F SOLOMON	Rt. Cliffside N.J. (the woodmyer	
13.	BETTIE J. BROWN	12 VAN GREEN AVE S.V. 10977	
14.	[illegible]	17 Torne Brook Road Ramapo NY 10931	
15.	DONALD HAIRSTON	29 Brook St Hillburn, N.Y. 10931	
16.	MAYOR GEORGE PARNES	VILLAGE OF SUFFERN, N.Y.	
17.	CHIEF LEO J. COSTA	SUFFERN POLICE DEPT.	
18.			
19.			
20.			

RAM 002 0116

New York State
Department of Environmental Conservation

MEETING Ramapo Landfill (344004) DATE 3/3/92
PRAP Mtg

	Name (PLEASE PRINT)	Address	Representing
1.	Barbara Buxon	169 Ammonit Ave Mahwah N.J. 07	Mahwah Planning Bd
2.	Richard Labrosse	Town of Ramapo	
3.	GEORGE PARNESS	— MAYOR VILLAGE OF SUFFERN	
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RAM 002 0117

Monday, February 24, 1992

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Rockland Journal-News, Rockland County, N.Y.

RAM 002 0118

$26.5M to cap Ramapo Landfill

Public hearing on proposal March 3

By Tim Henderson
Staff Writer

Ramapo taxpayers may have forgotten the garbage they threw out between 1979 and 1984, when the town buried it in an old quarry north of Hillburn.

But they may well remember the consequences for a long time.

U.S. environmental officials have unveiled a plan costing up to $26.5 million to seal off the closed Ramapo Landfill.

Town taxpayers will contribute up to $6.6 million, or $71 for every man, woman and child in the town, if the plan is approved after a March 3 public hearing by the U.S Environmental Protection Agency.

But Supervisor Herbert Reisman said the town is lucky, both to qualify for 75 percent reimbursement from the federal Superfund and to avoid alternatives costing up to $34 million.

"That's the battle that (consulting firm) URS and (Town Engineer) Gene Ostertag won for the town," Reisman said, adding that it's only a matter of time before other Rockland communities foot the bills for their landfill closings.

"It's big money and it's also an indication of what Clarkstown has

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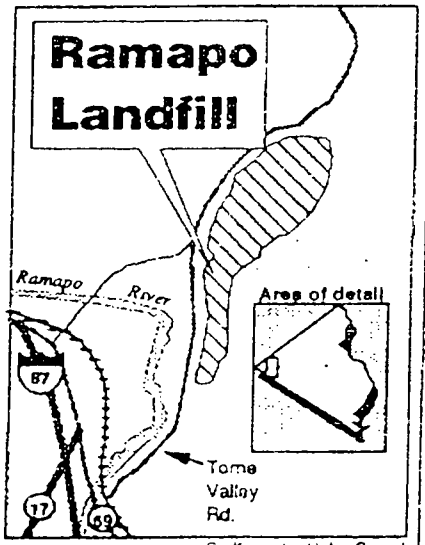

Staff graphic/John Cornell

Hearing

☐ **What:** Public presentation of Ramapo Landfill closing plan.

☐ **When:** 7:30 p.m. March 3.

☐ **Where:** Ramapo Town Hall, 237 Route 59, Airmont.

☐ **Why:** To present plan to cap and maintain landfill at cost of $20 million to $26 million. Public comment will be heard after the presentation.

Written comments may also be sent through March 19 to Kathleen McCue/ Project Manager, New York State Department of Environmental Conservation, Room 222, 50 Wolf Road, Albany, N.Y. 12233-7010.

☐ **Who:** State Department of Environmental Conservation/ U.S. Environmental Protection Agency.

☐ **Details:** Available at the following locations:

- Suffern Free Library, Washington and Maple avenues, Suffern.
- Finkelstein Memorial Library, 24 Chestnut Street, Spring Valley.
- U.S. EPA, 28 Federal Plaza, Manhattan.

RAM 002 0118

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DUMP/ From page B1

in store, and eventually "haverstraw," he said.

The EPA proposal requires an impermeable synthetic fabric "cap," covered with rock and other fill, which would trap gases generated by buried garbage. Such gases could pose a hazard to town employees at a nearby garbage baling operation, or to people trespassing on the property, according to a state study.

Ramapo unsuccessfully argued that the same end could be accomplished by fencing off the site to prevent trespassing, and that environmental benefits would be outweighed by the damage its installation would cause.

But the town succeeded in maintaining that only the tops of buried garbage mounds needed capping.

Geoff Welch, an environmentalist and landfill neighbor, said he's researching the EPA plan to see if it's adequate. It needs more provision for monitoring the health of local residents and for getting rid of the gas it's designed to collect, he said.

"They should be flaring it (burning off the gas) so they destroy the gas before it goes into the atmosphere," Welch said. "If you just collect it and release it, where is it going to go? The air just sits in a valley."

Welch said he hopes citizens will show their concern by going to the public hearing in Town Hall. Written comments will be accepted through March 19.

Ramapo hopes to keep the cost down to about $20 million, Reisman said, of which the town would have to pay $5 million. The maximum cost of $26 million includes contingency plans in case contamination of underground water supplies is detected.

Money for Ramapo's contribution would be borrowed, allowing the town to spread out the impact on taxpayers over an undetermined number of years, Reisman said.

The plan, reached after a $1 million study supervised by the state Department of Environmental Conservation, also includes the following:

- Improved extraction and treatment of water tainted by garbage.
- Long-term monitoring of water under the landfill; possible alternate water supply for wells at nearby Torne Brook Farms apartments.
- Restricted use of land to prevent disturbing the cap.

RAM 002 0119

Monday, February 24, 1992

11 A.M. WRKL NEWS

The Ramapo Town Board may have received good news last night, RKL's Andrew Schmirtz reports on a preliminary study on the Town Landfill:

In 1984 th Ramapo Landfill was closed and then targeted by the Environmental Protection Agency for Superfund money, thats used to clean dangerous waste sites, now a preliminary study by Ramapo engineers repocts the government may have over-reacted. Supervisor Herbert Reisman says no serious threats of toxins turned up and he will push for an inexpensive solution to protect the surrounding area. Two options exist, one a $600,000 plan, the other a $45 million one:

H.R "If they were to recommend the $45 or $45m expenditure, we certainly would not roll over and say yes, we're going to stop having a police department, and a recreation department, a highway department and spend $45m."

Reisman says the difference between the two really is'nt that great except for the price tag, and the Town, as they did with this million dollar study has to pay 25% of the final price tag. The E.P.A. is expected to make it's decision by next spring.

Andrew Schmirtz RKL News at Ramapo Town Hall.

The less expensive of the options that exist for the Ramapo Landfill involves re-routing some public water. The other $45m plan entails putting a 5-6 foot cover over the entire site. Town engineer Gene Ostertag thinks the latter plan would be ineffective and Ramapo did not need it.

RAM 002 0120

WRKL NEWS 2 P.M.

Concerned that the Ramapo Landfill represents serious environmental threats seemsseems to be unwarranted, RKL's Andrew Schmitz reports the findings of a new preliminary study:

A million dollars and thousands of pages later there may be good news about the closed Ramapo Landfill. A preliminary report completed by Town engineers is out and Supervisor Herbert Reisman likes what it says:

H.R. "It was put on the Superfund list but actually after looking at the results of it, it is not truly a Superfund project where there are toxic materials that threaten the health and safety of the community."

The Environmental Protection Agency Superfund is a Federal plan to clean dangerous waste sites, as for Ramapo, Town engineers have concluded the landfill may have been mis-targeted. They say there is little evidence of significant dangerous toxins and they will recommend the E.P.A. accept a $600k plan to keep the landfill from becoming a danger in the future. The other option a $45m plan and Ramapo would have to cough up 25% of the money with any plan. The E.P.A. is not expected to make any decisions until next spring.
Andrew Schmitz, Ramapo Town Hall.

Several options exist for the landfill. The $600k plan the Town may push involves re-routing some public water, the $45m plan is much more involved. A 5-6 foot cover would be placed over the entire site, Town engineer Gene Ostertag says the more expensive plan would not be effective and it would be a [illegible] of money

RAM 002 0121

5 P.M. WRKL NEWS

Andrew Schmirtz report on a preliminary study:

A million dollars and thousands of pages later there may be good news about the closed Ramapo landfill. A preliminary report completed by Town engineers is out. Supervisor Herbert Reisman likes what it says:

H.R. "It was put on the Superfund list, but actually after looking at the results of it, it is not truly a Superfund project, where ther are toxic materials that threaten the health and safety of the community".

The Environmental Protection Agency Superfund is a Federal plan to clean dangerous waste sites. As for Ramapo Town engineers have concluded the landfill may have been mis-targeted. They say there is little evidence of any significant dangerous toxins and they will recommend the E.P.A. accept a $600k plan to keep the landfill from becoming a danger in the future. The other option is a $45m plan and Ramapo would have to cough up 25% of the money with any plan. The E.P.A. is not expected to make any decisions until next spring.

Andrew Schmirtz RKL News Ramapo Town Hall

RAM 002 0122

RAMAPO LANDFILL WRKL 10/28/91

RAMAPO LANDFILL OUT OF COMMISSION FOR ABOUT SEVEN YEARS, COULD HAVE A HIGH PRICE TAG ATTACHED TO IT. SUPERVISOR HERB RIESMAN SAYS THE D.E.C. HAS WORKED UP SOME FIGURES ON CLOSING COSTS:

H.R. "THE ESTIMATES OF WHAT WE MIGHT HAVE TO DO TO FINALLY CLOSE THE LANDFILL RANGE FROM ANYWHERE FROM $600k to $40m. SO OBVIOUSLY WE ARE LOOKING FOR A SOLUTION WHICH IS BOTH COST EFFECTIVE AND ENVIRONMENTALLY SOUND"

THE $40m PRICE SOLUTION WOULD INVOLVE COVERING UP THE ENTIRE LANDFILL, WHICH ENGINEERS SAY ISN T NECESSARY. RAMAPO OFFICIALS ARE IN THE PROCESS OF SETTING UP A MEETING WITH THE D.E.C. WHO WILL HAVE THE FINAL WORD ON HOW THE LANDFILL SHOULD BE CLOSED. (Tracy Fitzpatrick, WRKL News Ramapo).

THE RAMAPO LANDFILL WHICH HAS BEEN OUT OF SERVICE SINCE 1984 COULD END UP COSTING THE TAXPAYERS MILLIONS TO FINALLY CLOSE IT DOWN, BUT SUPERVISOR HERB RIESMAN'S HOPING FOR ONLY THOUSANDS, $600 THOUSAND THAT IS:

H.R. "$600k COST WOULD BE A PROJECT WHEREBY WE WOULD BRING PUBLIC WATER INTO THE AREA SO THAT IN THE EVENT ANY WELLS NOT OF THE SPRING VALLEY WATER COMPANY BUT OF ANY PRIVATE HOMES IN THE AREA SHOULD GET CONTAMINATED THERE WOULD BE NO NEED FOR THEM TO RELY UPON WELL WATER".

THE $40m SOLUTION WILL INVOVLE PLACING A STATE OF THE ART COVER OVER THE LANDFILL, WHICH ENGINEERS SAY WONT BE NECESSARY THE D.E.C. HAVE THE FINAL WORD ON HOW TO CLOSE THE LANDFILL. (Tracy Fitzpatrick WRL News Ramapo)

RAM 002 0123

tate demands $20M for cover on losed Ramapo landfill, officials say

Tim Henderson
Writer

lamapo officials are in sticker k over the state's demand for a million clay cover for the d town landfill.

The state Department of Envi- ental Conservation has re- ted the cover to prevent ater from seeping through d garbage, possibly harming Ramapo River or underground ing water supplies.

the DEC doesn't change its , Ramapo would be responsi- or $5 million of the cost and tate would pay the other $15 n from 1986 set aside for ing environmental hazards in

ie DEC's demand contradicts ndings of a two-year, $1 mil- tudy by a Buffalo consulting supervised by the DEC, which no hazardous materials in the

wn Supervisor Herbert Reis- said he's trying to arrange a g with DEC Commissioner as Jorling to argue against the cover. Last night town Councilman Emanuel Weidler said the town should sue if the DEC insists on requiring the cover.

Town Engineer Gene Ostertag said he considers the cover unnecessary and too expensive. He said the town convinced the DEC to allow modifications in the cover, lowering the price from $45 million to $20 million, but the state won't budge any further.

The town, following the recommendations of the study, had offered to continue treating contaminated runoff from the landfill, at a cost of $250,000 a year, and to extend municipal water service to a neighboring apartment complex at a cost of $600,000.

Those offers were rejected by state officials, Ostertag said.

The landfill is protected somewhat by a dense growth of brush, which sprang up since the landfill closed seven years ago, Ostertag said. Putting a cover on would require tearing that up, he said.

"Tearing everything up might be more harmful to the environment than just leaving it alone," Ostertag said.

The state has more than $500 million set aside to clean up hazardous waste sites.

"Big amounts of money are being spent, and it's not just here, it's all over the country," Ostertag said. "It's a lot of money to be spending at time when lots of governments are having budget problems. You have to look at how cost-effective it is."

The landfill, located off Route 59 between Hillburn and Sloatsburg in an area sometimes called the hamlet of Ramapo, was ordered closed in 1984. It has been listed as a high-priority health threat by both federal and state authorities.

The consultant study, completed last summer by URS Corp, seemed to contradict those listings. It found high levels of iron and manganese in water, a non-hazardous but annoying condition sometimes known as "hard water."

The early results showed slight contamination by a solvent, tetrachloroethane, but the final results showed no health threat, Ostertag said.

RAM 002 0124

DEC 30 1991

Mr. Herbert Reisman
Supervisor
Town of Ramapo
Suffern, New York 10901

Dear Mr. Reisman:

Please find enclosed a summary of the major issues we discussed at the November 26, 1991 meeting regarding the Ramapo Town Landfill. I hope the opportunity to discuss these concerns was helpful to you and your staff.

Sincerely,

Langdon Marsh
Executive Deputy Commissioner

Enclosure
cc: Assemblyman John Bonacic
Assemblyman Alex Gromack
Assemblyman Sam Colman
Senator Joseph Holland
Rick Morse, NYS Legislative Commission on Solid Waste
Percival Miller, NYS Legislative Commission on Solid Waste
Beth Meer, NYS Legislative Commission on Hazardous Waste
John Gorton, URS Consultants

RAM 002 0125

Summary of Issues Discussed at a Meeting Concerning the Ramapo Landfill on November [redacted], 1991, at 10:00 a.m., 50 Wolf Road - Room 602:

The Town of Ramapo opened by explaining their objective in meeting with the DEC to discuss what engineering remedy the Town might be required to implement at the former Town Landfill to address contaminant releases and potential health and environmental risks identified during the Remedial Investigation (RI). They explained that they wished to bring to DEC policymakers' attention the cost of the full requirements of 6 NYCRR Part 360, Solid Waste Management Facilities Regulations, for final landfill closure at the Ramapo Landfill. The Town sees the need to protect public health, but has been informed by its consultant that a final cover designed to fully meet Part 360 specifications may not be necessary to adequately protect public health.

[redacted] He reminded the group present that the site is listed on the federal National Priorities List (NPL) and the EPA will make the final decision of an acceptable remedy. Marsh went on to explain the federal government's preference under CERCLA for permanent engineering remedies to address releases from sites. If permanent destruction or treatment of the contaminant source is not practicable, as in the case of a large municipal waste facility, then the preferred remedy is to isolate the source from the environment. The goal in any remedy and DEC's objective is not only to protect those now potentially impacted but also those who could be in the future; in the case of Ramapo, users of the downgradient aquifer. DEC confirmed that its preference at this time is to cap the landfill in accordance with Part 360 and to collect contaminated groundwater.

The Town then responded that what DEC would require far exceeds the need at Ramapo. Although the Town does not see site releases as being materially high or the aquifer presently affected, it agrees an upgrade of the existing leachate collection system (LCS) is needed to collect as much overburden groundwater as possible. The Town believes a cap will not provide enough of an additional benefit to make it worth the additional cost. As for other site releases, the Town stated that landfill gas is not a significant problem.

The Town's engineer added that his review of technical literature did not support the efficacy of a Part 360 cap. He agreed the LCS enhancement is needed, since some leachate does bypass the existing system, but he would prefer to regrade the waste mounds to enhance runoff. He believes maintenance of a cap will be very costly. He suggested the principle of allowing infiltrating groundwater and precipitation to flush the waste mass, to accelerate chemical/biological stabilization of the waste, with subsequent collection and treatment, rather than entombing the waste.

DEC responded that what the Town is doing is in effect challenging the Part 360 regulations. The Department did not adopt Part 360 lightly; the final regulations are those which have survived a battery of hearings, and they have withstood the test of time and field application. Engineering literature endorses capping as an effective technology. DEC emphasized procedures for

RAM 002 0126

obtaining variances from Part 360 specifications, and its policy of pollution prevention unless a technically equivalent cleanup can be performed.

The Town responded they believe their proposal meets the requirements for a variance. Their consultant remarked that there is already a cap of soil and vegetation on the site and a worthy approach to the problem would be to improve this cap in areas.

DEC interposed that the unacceptable risks posed by the uncapped site as identified in the RI must not be minimized. The Town responded to emphasize the extreme conservativeness of the risk assessment procedures and the improbability of a number of the exposure scenarios used in developing the site risk assessment. DEC agreed that established risk assessment procedures are not an exact science but are useful, when applied with judgment, as a benchmark for comparison of cleanup alternatives; also some future exposure scenarios, such as bedrock wells, could happen.

The Town returned to discussion of the existing site cover and pointed out that much of the site is already covered with industrial sludge of a low permeability to a depth of 18 to 24 inches.

DEC responded that the current type of cap does not prevent leachate outbreaks or the sideslopes which contribute to site risks. The Town's consultant was asked to present a discussion of present leachate generation (as caused by infiltration of rain or snow water into and percolation through the waste mass) and LCS collection rates and how these would be mitigated under various types of caps. Under existing conditions the rate of infiltration of precipitation through the landfill surface is about 33 gallons per minute (gpm). The consultant discussed three cap options: 1) the Town's favored option of site regrading and vegetation, which would reduce infiltration to 25-30 gpm; 2) a full Part 360 cover over the 60 acre site, which would reduce infiltration to about 2 gpm; and 3) the "soil cap", a compromise cap with a Part 360 hydraulic barrier on the flat tops of the waste mounds where infiltration rates are highest, and regrading with a vegetated soil cover on the steep sideslopes, where runoff will reduce infiltration and a full 360 cover would present the most maintenance problems; the soil cap would reduce infiltration to about 18 gpm.

[redacted] but a full Part 360 cover will be most effective at a) reducing the rate of leachate generation from surface infiltration and therefore the loading of contaminants to bedrock as well as b) lowering the water table mound in the waste mass which in turn reduces the driving force pushing water into the bedrock.

[redacted]

Whether delaying a remedial decision to allow the Town time to develop and present further data to EPA and the State, to show that no cap or a partial cap would address the concerns DEC expressed, was then discussed. R. Cozzy of DEC [redacted]

assessment needed to justify a variance from Part 360 requirement of a full hydraulic barrier would be extensive, and that it would be an uphill battle for the Town to gain not only DEC but NYSDOH and EPA acceptance. Nonetheless, DEC would be willing to entertain a technical argument for such a variance, provided the following were addressed by the Town's proposed alternative: contaminated surface soils, landfill gas, infiltration and leachate generation, and leakage to bedrock.

E. Sullivan of DEC countered that the delay in implementing a remedy while the outcome of such a study was awaited would not be acceptable. M. O'Toole added that even if the State approved a variance, EPA is unlikely to approve less than a Part 360 cover due to the site regulatory status, its proximity to a wellfield, and possible interstate concerns.

Upon the DEC's query of when a revised Feasibility Study Report could be expected, the Town stated the delay in resubmittal was caused by DEC's failure to answer the Town's question of whether additional site study would be considered by the State and also whether such study could be funded under EQBA. DEC confirmed that they had not responded in writing to the Town on this question. E. Sullivan asserted that as far as he was concerned additional study would not affect the Department's position. At this point in the meeting it was decided that issues of policy had been presented or addressed sufficiently and that technical staff could resolve remaining issues. A meeting between technical staffs of DEC, DOH, the Town and the EPA was proposed for mid-December, at which time the Town would have prepared a further technical justification for the Part 360 variance and if appropriate, a proposal for further study.*

*Immediately following the 10:00 a.m. meeting, technical staffs of DEC and the Town met during which the Town presented DEC with a draft of a variance justification to review. It was then decided that the mid-December meeting would not be necessary.

Ramapo Landfill Nov 26, 1991

Name	Representing	Phone
Kathleen McCue	NYSDEC - DHWR	(518) 457 1641
Bob Cozzy	NYSDEC - DHWR	518) 457-1641
Michael O'Toole	" "	518 457- 5861.
Jim Lanzo	URS Consultants	(716) 856-5636
Amy Monti	URS Consultants	(716) 856-5636
John Bonacic	Assemblyman 94th	(914) -343-7010
Alex Gromack	Assemblyman 92nd	914 634-9791
Rich Harris	Legis. Asst. - Assem. Gromack	(518) 455-5735
Ned Sullivan	NYSDEC	518 457 1415
Ferdinand A. Miller	NYS Leg. Comm. Solid Waste	(518) 455-3711
Ben Meer	NYS Leg. Comm. Haz. Waste	(518) 455-3711
Sam Colman	Assemblyman 93 AD	914-352-5560
Herb Reisman	Supervisor, Town of Ramapo	914 357-5100
Langdon Marsh	Exec. Dep. Commr, DEC	518 457-6804
Allan M. Simon	Town Atty Town of Ramapo	914-357-5100
John C Gorton 3-	URS Consultants	716 856-5636
Gene Ostertag, P.E.	T. Ramapo	(914) 357-0591
Tom Congdon	Senator Joseph Holland	518 455-3202
Bruce Morin	NYS Assembly LCTSNW Legislative Coordinator Program and Counsel Staff [illegible] Commission	518-455-4386

RAM 002 0129

Rockland Journal-News, Rockland County, N.Y.
Wednesday, July 31, 1991

LOCAL

Ramapo Landfill not so bad, officials say

By Tim Henderson
Staff Writer

An exhaustive two-year study found little pollution at the closed Ramapo Landfill, town officials said yesterday.

The $1 million study, supervised by state and federal environmental agencies, appears to contradict the landfill's official status as one of state's most potentially dangerous dumps.

"Hazardous waste" had been cited as a reason for closing the dump in 1984. The site, between Hillburn and Sloatsburg off Route 17, had been listed as a high-priority health threat by both federal and state authorities.

But the draft of the study found little cause for alarm. Town Engineer Gene Ostertag said yesterday.

"For all the allegations that have been made about our landfill, not much has been found that is harmful to the environment," Ostertag said as he summarized the report for the Town Board.

Later, Ostertag said the report's conclusions are similar to preliminary results issued last summer.

LANDFILL/From page B1

Those reports found high levels of iron and manganese in water, a non-hazardous but annoying condition sometimes known as "hard water." It can stain sinks and shower stalls, and make rinsing soap difficult.

The early results showed slight contamination by a solvent, tetrachloroethane, but the final results showed no health threat, Ostertag said.

A public hearing will be scheduled in November or December before the report goes to the U.S. Environmental Protection Agency for a decision on what Ramapo should do to clean up the landfill.

The report, conducted by a Buffalo contractor with supervision from the EPA and the state Department of Environmental Conservation, stood almost a foot tall on the conference table.

"I just wanted to show you what a million dollars looks like," Ostertag he said, citing costs such as $35 a day for each worker, to pay for disposable protective suits used during tests.

Supervisor Herbert Reisman said the town will negotiate with the EPA to determine what comes next. The town has several options, ranging from doing nothing, to shutting down a nearby well and piping in water at a $600,000 cost, to a $45 million clay-and-plastic cover on the whole landfill to keep water out.

Reisman said the town is willing to consider the $600,000 water pipe installation, which would replace a well at the only nearby residential property. Owners of the property, a collection of cottage apartments called Torne Brook Farms, have long been critical of the town's landfill policies.

"Nobody can really raise his ing $45 million, we're going to make it safer, as opposed to spending $600,000," Reisman said.

By installing water at Torne Brook, the town could also install a much-needed water supply at its garbage baling operation at the old landfill, Reisman said.

Any landfill fix approved by the EPA will be 75 percent reimbursed by the state.

The report included a worst-case study on what would happen to a hypothetical family who lived atop the landfill for 30 years, digging a well through the buried garbage for drinking water, Ostertag said. That would not be advisable, the report concluded, and said

Remedies

A $1 million study of Ramapo's closed landfill outlines several remedies for consideration by federal authorities:

- **Cheapest:** Do nothing, leaving a system in place for collecting tainted rainwater. Ramapo now pays $250,000 a year to treat the "garbage juice" at Suffern's sewage plant.
- **Next cheapest:** Shut down the nearest drinking water well at the Torne Brook Farms apartments, and replace with municipal water at $600,000 cost.
- **Most expensive:** Install a cover for the entire landfill to keep rainwater out, with clay and plastic layers to trap and remove gases, at a cost of up to $45 million.

— Tim Henderson

RAM 002 0130

LANDFILL / From page B1

trols on water seeping through garbage.

Other capping methods costing more would cover all 60 acres, including the slopes of the garbage mounds. That would more effectively prevent rainwater from washing through the garbage, but wouldn't make any difference with the fumes problem.

All the caps would use a waterproof layer of synthetic material, topped by fill and soil, to prevent gas from escaping.

The top environmental priorities for closing the landfill, as established by the study, are the following:

- Prevent inhalation of vapors and physical contact with contaminated soil.
- Prevent erosion of contaminated soil.
- Prevent anyone from drinking water directly beneath the garbage.

Local

Rockland Journal-News, Rockland County, N.Y.

Monday, February 3, 1992

Ramapo awaits estimate on landfill cap

By Tim Henderson
Staff Writer

Ramapo officials are expecting to hear any day how much it will cost to put the closed town landfill to rest.

State and federal officials are scrutinizing a study of the 60-acre dump, used until a decade ago for the town's garbage.

A $1 million study dug up no damage to the surrounding environment, but recommended capping the landfill to control fumes like methane and benzene that could be a health threat to anyone walking over the buried garbage.

An impervious "cap" for the buried garbage would also control rain seeping through it, which could lead to pollution of nearby underground drinking water.

As soon as the state Department of Environmental Conservation and the federal Environmental Protection Agency decide how the capping should be done, a public hearing will be held. Town Engineer Gene Ostertag said he expects a decision any day and a hearing by the end of February.

The potential capping methods cost anywhere from $15 million to $23 million, and the decision could include orders to move roads near the landfill ($1.1 million), improve drainage control ($1.1 million), or make other changes to make the area safer.

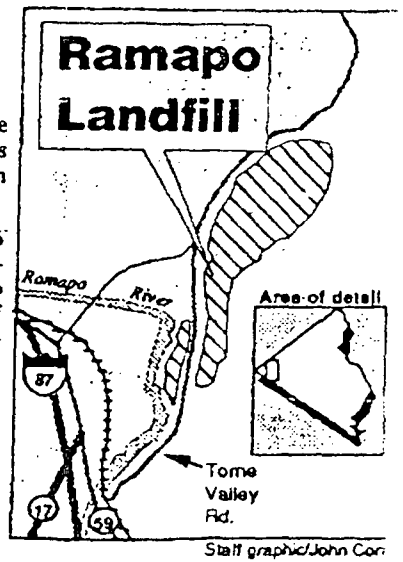
Supervisor Herbert Reisman said he'll be fuming if the solution is too expensive. Ramapo must pay 25 percent of the cost; the rest will be state-funded.

"If it's $30 million we're going to scream," Reisman said. "If we're suddenly clobbered with a multi-million dollar expense, you have to cut back on services. Which way are the people safer — if we have 10 less police officers because we had to cover the entire 60 acres with a very expensive cover, when our experts say it's not necessary?"

The town is promoting the $15 million capping plan, which involves covering only the tops of two huge mounds, 70 to 90 feet thick, of garbage buried between the mid-1960s and early 1980s before the landfill closed.

A report from the $1 million landfill study, released earlier this month, said the option is a viable one but would require more con

*Please see **LANDFILL**, B2*



Staff graphic/John Cor

Rockland Journal-News, Rockland County,
December 6, 1991

'Let's make a deal' on town dump

Ramapo wants compromise on cleanup

By Tim Henderson
Staff Writer

Ramapo hopes to compromise with the state at $20 million on a cleanup plan for its closed landfill.

State officials have demanded a $30 million clay cover, lined with plastic, for the 60-acre site off Route 59 between Hillburn and Sloatsburg. The cover would protect underground water supplies by keeping rainwater from trickling through the buried garbage.

Supervisor Herbert Reisman said the town, which would have to pay 25 percent of the cost, will fight the plan unless it's scaled down to $20 million.

The extra $10 million could be saved by covering only 40 percent of the old landfill, rather than the whole thing, Reisman said. That would take care of areas that really need the cap, he asserted.

Ramapo recently took its plan to the state Department of Environmental Conservation in Albany, where officials agreed to consider it.

"We are sensitive to the costs that are involved," said DEC spokesman Ben Marvin. "At the same time, we are especially sensitive to the specifics of the proposal.

Reisman said the DEC's demand, and the state procedures for cleaning up hazardous waste sites, are not realistic in an economic recession.

"When the law was written, there was an economy of plenty, and everybody was spending money," Reisman said. "We indicated that we did not feel it was necessary to provide the full treatment as prescribed by law. There are many areas of the landfill that are stabilized, and putting a plastic lining and all the fill on top of it would not enhance the safety of the area."

Ramapo has also offered to replace drinking water wells at an apartment building near the landfill with municipal water. It would also continue to collect runoff from the landfill, improving equipment for that purpose and sending runoff for treatment at the county sewer plant in Orangeburg.

The DEC has listed the landfill as an "inactive hazardous waste site," a potential but latent health threat, since it was ordered closed in 1986. A two-year, $1 million study supervised by the DEC found

RAM 002 0132

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DIVISION OF
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NYS DEPT OF ENVIRONMENTAL
CONSERVATION
ATTN/ERIN O'DELL
21 SO PUTT CORNERS RD
NEW PALTZ NY 12561

33815
K. McCue
FEB 2, 1992

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02-20-92	1480725

DATE	ACCOUNT NO.
02-20-92	1480725

ODE	DESCRIPTION Inches/Lines	RATE	AMOUNT
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$31.31
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DATE:

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INV DATE: 2/20/92 INV RECD: 2/21/92
FEDERAL ID#: 132617121

L SITE (#344004)
LAND COUNTY,
NEW YORK

York State Department of
ental Conservation (NYS-
and the Town of Ramapo hereby
nce a public meeting on March
1992 beginning at 7:30 p.m. at the
own of Ramapo Town Hall, Route
59, Suffern, New York, to discuss the
Proposed Remedial Action Plan
(PRAP) for the Ramapo Town Landfill
Inactive Hazardous Waste Disposal
Site (ID #344004). The purpose of the
meeting is to inform the public about
the results of the Remedial Investiga-
tion/Feasibility Study (RI/FS) and to
present NYSDEC's proposed remedial
action for the site. The Ramapo Town
Landfill is located on a 96 acre tract
approximately one mile northeast of
the Village of Hillburn, Rockland
County. The site is situated at the
western base of the Ramapo Mountains
of Torne Valley Road, east of the New
York State Thruway, Route 17, and
Route 59. The Ramapo River is located
approximately 300 feet from the south-
west corner of the site. Torne Brook
flows near the western boundary of the
site. Approximately 50 acres of the site
are covered with fill material, consist-
ing of mixed refuse, which is mounded
into two major lobes (northern and
southern). The lobes slope steeply
toward the west with grades greater
than 30 percent. Substances reportedly
disposed of at the landfill include in-
dustrial sludge and other wastes from a
pharmaceutical company, sewage
sludge, municipal refuse, asbestos,
construction and demolition debris,
yard debris, paint sludge and liquid
wastes from a paper company. In
1971, the Rockland County Depart-
ment of Health granted the Town of
Ramapo a permit for operation of a
sanitary landfill at the former gravel
mine. The Town contracted for landfill
operations until 1979, when the Town
began operating the landfill directly.
Landfilling continued until 1984. The
site is currently being used as a com-
paction and transfer facility by the
Town of Ramapo. In 1983, the landfill
was placed on the United States Envi-
ronmental Protection Agency's (USE-
PA) Superfund National Priorities List.
A leachate collection and treatment
system was constructed along the
downgradient edge in 1984 and 1985.
Surface water and groundwater were
conducted to an aeration pond and then
to the Ramapo River. As of November
1, 1990, leachate from the pond is
being discharged to the Village of
Suffern Wastewater Treatment Plant
via a sewer line. In 1988, the Town of
Ramapo and NYSDEC entered into an
Order on Consent which requires the
Town to develop and implement a
remedial program for the landfill. A
Remedial Investigation/Feasibility
Study (RI/FS) of the landfill has been
completed. Volatile (VOCs) and semi-
volatile organic compounds were de-
tected in soil samples taken from the
landfill surface. In addition, some
VOCs were detected in landfill sur-
face. In addition, some VOCs were
detected in landfill gas emissions. In
the groundwater down-gradient of the
site, exceedences of New York State
groundwater standards were noted for
iron, manganese, chromium and arsen-
ic. These exceedences occurred mostly
in locations where the leachate collec-
tion system periodically fails to inter-
cept groundwater as designed. Exceed-
ences of State surface water quality
standards for vinyl chloride and some
metals were detected in Torne Brook.
lected from a set of five cleanup
rnatives evaluated, the proposed
includes the following main com-
impermeable membrane. *Collecting
and venting of landfill gases. Landfill
gases will be collected and treated if
necessary. *Installing groundwater
extraction wells to supplement the
existing leachate collection system.
*Installing a perimeter drain around the
sections of the cap containing the im-
permeable membranes to collect and
divert surface water run-off. *Collect-
ing and diverting leachate seeps to the
leachate collection system for off-site
treatment. If necessary, the wastewater
discharge from the site will be pre-
treated prior to discharge to a publicly
owned treatment works. *Annual long-
term monitoring of groundwater. If
deemed necessary by long-term moni-
toring, an alternate water supply will
be provided for nearby users. *Restric-
tions on the future use of the site to
prevent disturbance of the cap and
prohibit the use of groundwater on the
site for purposes other than sampling.
The total estimated cost of the pre-
ferred remedial measures, including
the long-term treatment and monitoring
ranges between $20 million and $26.6
million. The range of costs reflect the
potential need for future actions such
as pre-treating the wastewater dis-
charge and providing an alternate
water supply to nearby resident. All
oral comments received during the
March 3, 1992 public meeting as well
as any written comments and concerns
and any new and significant informa-
tion received by March 19, 1992 will
be considered BEFORE the final selec-
tion of a remedial action plan. To be
included in this decision-making pro-
cess, written comments must be RE-
CEIVED before the close of the public
comment period which began on Feb-
ruary 19, 1992 and continues through
March 19, 1992. Written comments, as
well as any questions that you may
have should be sent to: Kathleen
McCue, Project Manager, New York
State Department of Environmental
Conservation, Rm. 222, 50 Wolf
Road, Albany, NY 12233-7010, (518)
457-1641 or Toll Free 1-800-342-
9296. The PRAP, along with the RI/FS
reports and others project information
is available for public review at the
following repositories: 1. Suffern Free
Library, Washington and Maple Ave-
nues, Suffern, NY. 2. Finkelstein
Library, 24 Chestnut Street, Spring
Valley, NY. 3. NYSDEC, Region 3
Headquarters, 21 South Putt Corners
Rd., New Paltz, NY. 4. NYSDEC,
Albany Office, 50 Wolf Road, Room
212, Albany, NY.

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'87 Reliant - Low mileage, 4 cyl., A/C, 4 door, mint condition, "Original Own-er." Price negotiable. Leave message. (914) 429-1874

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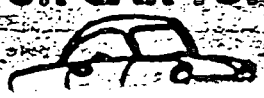

LAKESIDE
1-9 Roosevelt Ave.
Spring Valley, NY 10977

RAM 002 0134

Co.	Co.
Dept.	Phone #
Fax #	Fax #

Regional Director

Region 3
of Environmental Conservation
21 South Putt Corners Road
New Paltz, New York 12561

FOR RELEASE: IMMEDIATE

The Proposed Remedial Action Plan (PRAP) for the Town of Ramapo Landfill Inactive Hazardous Waste Disposal Site (1D#344004) will be the subject of a public meeting Tuesday, March 3, 1992, to be held by New York State Department of Environmental Conservation (DEC).

The meeting will be held at 7:30 p.m. in the Ramapo Town Hall, Route 59, Suffern, New York.

Staff from NYSDEC will discuss the Remedial Investigation/ Feasibility Study (RI/FS) performed at the site and answer questions about the Proposed Remedial Action Plan. Since the landfill was owned and operated by the Town of Ramapo, 75% of the Town's eligible remediation costs will be reimbursed by DEC using funds provided by the 1986 Environmental Quality Bond Act.

The Ramapo Town Landfill is located on a 96 acre tract approximately one mile northeast of the Village of Hillburn, Rockland County. The site is situated at the western base of

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RAM 002 0135

the Ramapo Mountains of Torne Valley Road, east of the New York State Thruway, Route 17, and Route 59. The Ramapo River is located approximately 300 feet from the southwest corner of the site. Torne Brook flows near the western boundary of the site.

Approximately 50 acres of the site are covered with fill material, consisting of mixed refuse, which is mounded into two major lobes (northern and southern). The lobes slope steeply toward the west with grades greater than 30 percent. Substances reportedly disposed of at the landfill include industrial sludge and other wastes from a pharmaceutical company, sewage sludge, municipal refuse, asbestos, construction and demolition debris, yard debris, paint sludge and liquid wastes from a paper company.

In 1971, the Rockland County Department of Health granted the Town of Ramapo a permit for operation of a sanitary landfill at the former gravel mine. The Town contracted for landfill operations until 1979, when the Town began operating the landfill directly. Landfilling continued until 1984. The site is currently being used as a compaction and transfer facility by the Town of Ramapo.

In 1983, the landfill was placed on the United States Environmental Protection Agency's (USEPA) Superfund National Priorities List. A leachate collection and treatment system was constructed along the downgradient edge in 1984 and 1985.

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Surface water and groundwater were conducted to an aeration pond and then to the Ramapo River. As of November 1, 1990, leachate from the pond is being discharged to the Village of Suffern Wastewater Treatment Plant via a sewer line.

In 1988, the Town of Ramapo and NYSDEC entered into an Order on Consent which requires the Town to develop and implement a remedial program for the landfill. A Remedial Investigation/ Feasibility Study (RI/FS) of the landfill has been completed. Volatile organic compounds (VOCs) and semi-volatile organic compounds were detected in soil samples taken from the landfill surface. In addition, some VOCs were detected in landfill gas emissions. In the groundwater down-gradient of the site, exceedences of New York State groundwater standards were noted for iron, manganese, chromium and arsenic. These exceedances occurred mostly in locations where the leachate collection system periodically fails to intercept groundwater as designed. Exceedences of State surface water quality standards for vinyl chloride and some metals were detected in Torne Brook.

Selected from a set of five cleanup alternatives evaluated, the proposed plan includes the following main components:

- **Capping of 35 acres of the landfill** using a multi-media system including layers of fill material, a gas-venting system and an impermeable membrane. The remaining 25

RAM 002 0137

acres consists of slopes where the grade is greater than 20 percent. If studies demonstrate that this approach is feasible, the slopes will receive a capping system but will not be covered by an impermeable membrane.

- **Collecting and venting of landfill gases.** Landfill gases will be collected and treated if necessary.

- **Installing groundwater extraction wells** to supplement the existing leachate collection system.

- **Installing a perimeter drain** around the sections of the cap containing the impermeable membrane to **collect and divert surface water run-off.**

- **Collecting and diverting leachate seeps** to the leachate collection system for off-site treatment. If necessary, the wastewater discharged from the site will be pre-treated prior to discharge to a publicly owned treatment works.

- **Annual long-term monitoring** of groundwater. If deemed necessary by long-term monitoring, an alternate water supply will be provided for nearby users.

RAM 002 0138

disturbance of the cap and prohibit the use of groundwater on the site for purposes other than sampling.

The total estimated cost of the preferred remedial measures, including the long-term treatment and monitoring ranges between $20 million and $26.5 million. The range of costs reflect the potential need for future actions such as pre-treating the wastewater discharge and providing an alternate water supply to nearby residents.

The public is invited to comment on the proposed remedial action during the March 3, 1992 public meeting. Written comments will be accepted during the comment period which begins on February 19, 1992 and ends March 19, 1992. All comments will be considered BEFORE the final selection of a remedial action plan. To be included in the decision-making process, written comments must be RECEIVED by the March 19, 1992 deadline. Written comments and concerns should be sent to:

Kathleen McCue, Project Manager
New York State Department of Environmental Conservation
Rm 222, 50 Wolf Road
Albany, NY 12233-7010
(518) 457-1641 or Toll Free 1-800-342-9296

Copies of the Proposed Remedial Action Plan, reports of the investigations, and other information are available for public inspection at the Suffern Free Library, Washington and Maple Avenues, Suffern; the Finkelstein Library, 24 Chestnut Street, Spring Valley; and the NYSDEC Region 3 Office, 21 S. Putt Corners Road, New Paltz.

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For additional information, call:

Erin O'Dell
Citizen Participation Specialist
NYSDEC, New Paltz
(914) 255-5453

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eo-2/18/92

RAM 002 0140

New York State Department of Environmental Conservation
Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1696
914-256-3453

FEB 2 4 1992

ADMINISTRATION

NOTICE OF PUBLIC MEETING
DESCRIPTION OF PROPOSED REMEDIAL ACTION PLAN
TOWN OF RAMAPO LANDFILL
INACTIVE HAZARDOUS WASTE DISPOSAL SITE (#344004)

The New York State Department of Environmental Conservation (NYSDEC) announces that a public meeting will be held on March 3, 1992 beginning at 7:30 pm at the Town of Ramapo Town Hall, Route 59, Suffern, New York. The purpose of the meeting is to describe NYSDEC's proposed method to clean up the Ramapo Town Landfill Inactive Hazardous Waste Disposal Site (#44004). After a presentation of the proposed plan, interested parties will be invited to present written and/or oral comments or ask questions about the plan. All comments on the plan will be accepted during the public comment period beginning February 19, 1992 and continuing through March 19, 1992.

The Ramapo Town Landfill is located on a 96 acre tract approximately one mile northeast of the Village of Hillburn, Rockland County. The site is situated at the western base of the Ramapo Mountains of Torne Valley Road, east of the New York State Thruway, Route 17, and Route 59. The Ramapo River is located approximately 300 feet from the southwest corner of the site. Torne Brook flows near the western boundary of the site.

Approximately 50 acres of the site are covered with fill material, consisting of mixed refuse, which is mounded into two major lobes (northern and southern). The lobes slope steeply toward the west with grades greater than 30 percent. Substances reportedly disposed of at the landfill include industrial sludge and other wastes from a pharmaceutical company, sewage sludge, municipal refuse, asbestos, construction and demolition debris, yard debris, paint sludge and liquid wastes from a paper company.

In 1971, the Rockland County Department of Health granted the Town of Ramapo a permit for operation of a sanitary landfill at the former gravel mine. The Town contracted for landfill operations until 1979, when the Town began operating the landfill directly. Landfilling continued until 1984. The site is currently being used as a compaction and transfer facility by the Town of Ramapo.

In 1983, the landfill was placed on the United States Environmental Protection Agency's (USEPA) Superfund National Priorities List. A leachate collection and treatment system was constructed along the downgradient edge in 1984 and 1985. Surface water and groundwater were conducted to an aeration pond and then to the Ramapo River. As of November 1, 1990, leachate from the pond is being discharged to the Village of Suffern Wastewater Treatment Plant via a sewer line.

RAM 002 0141

New York State Department of Environmental Conservation
Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1696
914-256-3153

FEB 24 1992

NOTICE OF PUBLIC MEETING
DESCRIPTION OF PROPOSED REMEDIAL ACTION PLAN
TOWN OF RAMAPO LANDFILL
INACTIVE HAZARDOUS WASTE DISPOSAL SITE (#344004)

The New York State Department of Environmental Conservation (NYSDEC) announces that a public meeting will be held on March 3, 1992 beginning at 7:30 pm at the Town of Ramapo Town Hall, Route 59, Suffern, New York. The purpose of the meeting is to describe NYSDEC's proposed method to clean up the Ramapo Town Landfill Inactive Hazardous Waste Disposal Site (#44004). After a presentation of the proposed plan, interested parties will be invited to present written and/or oral comments or ask questions about the plan. All comments on the plan will be accepted during the public comment period beginning February 19, 1992 and continuing through March 19, 1992.

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RAM 002 0142

In 1988, the Town of Ramapo and NYSDEC entered into an Order on Consent which requires the Town to develop and implement a remedial program for the landfill. A Remedial Investigation/ Feasibility Study (RI/FS) of the landfill has been completed. Volatile organic compounds (VOCs) and semi-volatile organic compounds were detected in soil samples taken from the landfill surface. In addition, some VOCs were detected in landfill gas emissions. In the groundwater down-gradient of the site, exceedences of New York State groundwater standards were noted for iron, manganese, chromium and arsenic. These exceedences occurred mostly in locations where the leachate collection system periodically fails to intercept groundwater as designed. Exceedences of State surface water quality standards for vinyl chloride and some metals were detected in Torne Brook.

Selected from a set of five cleanup alternatives evaluated, the proposed plan includes the following main components:

- **Capping of 33 acres of the landfill** using a multi-media system including layers of fill material, a gas-venting system and an impermeable membrane. The remaining 25 acres consists of slopes where the grade is greater than 20 percent. If studies demonstrate that this approach is feasible, the slopes will receive a capping system but will not be covered by an impermeable membrane.

- **Collecting and venting of landfill gases.** Landfill gases will be collected and treated if necessary.

- **Installing groundwater extraction wells** to supplement the existing leachate collection system.

- **Installing a perimeter drain** around the sections of the cap containing the impermeable membrane to collect and divert surface water run-off.

- **Collecting and diverting leachate seeps** to the leachate collection system for off-site treatment. If necessary, the wastewater discharged from the site will be pre-treated prior to discharge to a publicly owned treatment works.

- **Annual long-term monitoring** of groundwater. If deemed necessary by long-term monitoring, an alternate water supply will be provided for nearby users.

- **Restrictions on the future use** of the site to prevent disturbance of the cap and prohibit the use of groundwater on the site for purposes other than sampling.

RAM 002 0143

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Selected from a set of five cleanup alternatives evaluated, the proposed plan includes the following main components:

- **Capping of 35 acres of the landfill** using a multi-media system including layers of fill material, a gas-venting system and an impermeable membrane. The remaining 25 acres consists of slopes where the grade is greater than 20 percent. If studies demonstrate that this approach is feasible, the slopes will receive a capping system but will not be covered by an impermeable membrane.

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The total estimated cost of the preferred remedial measures, including the long-term treatment and monitoring ranges between $20 million and $26.5 million. The range of costs reflect the potential need for future actions such as pre-treating the wastewater discharge and providing an alternate water supply to nearby residents.

Copies of the Proposed Remedial Action Plan, reports of the investigations, and other information are available for public inspection at the Suffern Free Library, Washington and Maple Avenues, Suffern; the Finkelstein Library, 24 Chestnut Street, Spring Valley; and the NYSDEC Region 3 Office, 21 S. Putt Corners Road, New Paltz.

All comments received during the public meeting as well as any written comments and concerns and any new and significant information received by March 19, 1992 will be considered BEFORE the final selection of a remedial action plan. To be included in the decision-making process, written comments must be RECEIVED before the close of the public comment period. Written comments should be sent to:

Kathleen McCue, Project Manager
New York State Department of Environmental Conservation
Rm 222, 50 Wolf Road
Albany, NY 12233-7010
(518) 457-1641 or Toll Free 1-800-342-9296

For additional information, contact Kathleen McCue, Project Manager at the above address or Erin O'Dell, Citizen Participation Specialist, NYSDEC Region 3, 21 South Putt Corners Road, New Paltz, (914) 255-5453.

WE LOOK FORWARD TO YOUR ATTENDANCE ON MARCH 3, 1992 AT 7:30 PM AT THE RAMAPO TOWN HALL IN RAMAPO, NEW YORK.

eo\2/14/92

March 13, 1992 6632

Mr. George C. Demas
Torne Brook Farm
Torne Brook Road
Ramapo, New York 10931

RE: Evaluation of Groundwater Quality Analyses

Dear Mr. Demas:

In accordance with your request, ECKENFELDER INC. has completed a review of the data provided and our findings are presented below. The data reviewed was presented in the Final RI Report.

Since our initial review included unvalidated data, we re-evaluated the data using the final water quality results from test wells installed at Torne Brook Farm. In brief, the conclusions reached in the June 1991 letter remain valid: that is, leachate from the Town of Ramapo Landfill is adversely affecting groundwater quality in the bedrock well located at Torne Brook Farm.

INTRODUCTION

ECKENFELDER INC. has re-evaluated the water quality data from monitoring wells located on the Torne Brook Farm property. URS Consultants, Inc. installed these monitoring wells during Phase II of the Remedial Investigation/Feasibility Study (RI/FS) for the adjacent Town of Ramapo Landfill. We considered it prudent to re-evaluate the data, because it has since undergone the Contract Laboratory Program (CLP) validation process and is now in final form. We also reviewed the analytical results from a sample extracted from the pump house at Torne Brook Farm.

SCOPE OF WORK

The findings presented herein are based on a review of the Remedial Investigation and Feasibility Study at the Ramapo Landfill, URS Consultants, Inc., September 1991, including Appendices in Volumes 3 and 4, and the Draft Final and Final Feasibility Study at the Ramapo Landfill, URS Consultants, Inc., August 1991.

A quantitative analysis of the analytical results reported for the monitoring well cluster located at Torne Brook Farm (GW-9-OS, GW-9-I, and GW-9-R) and for the potable water sample extracted from the pump house at Torne Brook Farm (GDT-1)

RAM 002 0146

was conducted. This included a comparison of the analytical results from monitoring wells installed in both Phase I and Phase II of the RI/FS. In the previous water quality evaluation, focus was placed on well clusters GW-4 and GW-5. At that time, these well clusters were identified as upgradient and considered to be representative of background levels. However, the final RI/FS identifies only well cluster GW-5 as located on the upgradient edge of the landfill. The GW-5 cluster was identified as beyond the limits of the fill based on the EM-31 terrain conductivity survey. Therefore, for the purposes of this re-evaluation, only well cluster GW-5 will be considered representative of background data.

United States Environmental Protection Agency (USEPA) National Primary and Secondary Drinking Water Standards (40 CFR, 141 and 143, respectively) were also a basis for comparison for the analytical results.

SUMMARY OF RESULTS

The analytical results that were the basis for the June 1991 evaluation were also used in this review. The groundwater samples from well cluster GW-9 were split with the USEPA. The USEPA contracted Gulf South Environmental Laboratory of New Orleans, Louisiana for analysis of the volatile organic compounds, semi-volatile organic compounds, and PCBs/pesticides. Datachem of Salt Lake City, Utah analyzed the samples for the inorganic parameters. URS Consultants, Inc. used York Laboratories of Monroe, Connecticut to analyze volatile organic compounds, semi-volatile organic compounds, and PCBs/pesticides. The remaining analyses were performed by Energy & Environmental Engineering Inc. (E^3I) of East Cambridge, Massachusetts. The analytical results from all laboratories have been subjected to the CLP validation process.

As stated in the previous evaluation, many inorganic chemicals were detected in samples collected from the three monitoring wells installed at the Torne Brook Farm. A similar suite of inorganic compounds was also detected in the sample collected from the pump house at Torne Brook Farm. However, none of the inorganic parameters detected in the samples taken from Torne Brook Farm exceed the National Primary Drinking Water Standards.

The Secondary Maximum Contaminant Levels (SMCLs) are federally non-enforceable established limits for contaminants in drinking water which may affect the aesthetic qualities and the public's acceptance of drinking water (e.g., taste and odor; 40 CFR, 143). The concentrations of manganese in the intermediate and rock wells reported by the laboratories contracted by both the USEPA and URS Consultants, Inc. exceed the SMCL of 50 parts per billion (ppb). It should also be noted that the concentration of manganese reported for samples collected in January 1990 from the background wells screened in the overburden and intermediate zones, GW-5-OS and GW-5-I, also exceed the SMCL.

RAM 002 0147

Manganese Concentrations in Groundwater

	Datachem (USEPA)	E^3I (URS Consultants, Inc.)
GW-9-I	360	377
GW-9-R	3,690	3,270
GW-5-OS	NA*	530
GW-5-I	NA	276

* Not Analyzed -- only samples collected from well cluster GW-9-R were split with the USEPA

The concentration of iron in GW-9-R exceeds the SMCL of 300 ppb by two orders of magnitude. In addition the SMCL for iron is exceeded in all the wells in the upgradient cluster.

Iron Concentrations in Groundwater

	Datachem (USEPA)	E^3I (URS Consultants, Inc.)
GW-9-R	22,700	25,800
GW-5-OS	NA	11,200
GW-5-I	NA	23,300
GW-5-R	NA	368

The concentrations of the following inorganic constituents reported for the sample collected from the pump house at Torne Brook Farm are greater than those reported from the overburden background well, GW-5-OS: calcium, copper, lead, and nickel. None of the analytical results from GW-9-OS are greater than those from GW-5-OS. Only the concentration of manganese in GW-9-I is greater than that reported for GW-5-I.

The following constituents were found in the sample collected from the rock well located on Torne Brook Farm in concentrations that exceed those found in samples from GW-5-R collected in January 1990:

- Calcium
- Iron
- Magnesium
- Manganese
- Potassium
- Sodium

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The concentrations reported for samples collected from GW-9-R range from approximately five times to two orders of magnitude greater than those found in the upgradient rock well, GW-5-R. These parameters are consistent with those commonly found in leachate.

The organic analyses differ slightly between the two laboratory reports. Gulf South Environmental reported the following analytes in the corresponding samples (all results in ppb):

GW-9-OS	bis (2-ethylhexyl) phthalate.....	12 J
GW-9-I	bis (2-ethylhexyl) phthalate.....	7 J
	Pyrene	3 J
GW-9-R	bis (2-ethylhexyl) phthalate	4 J

None of the above analytes were reported in the samples analyzed by York Laboratories. It should be noted that the J qualifier noted above indicates the numerical value is an estimated quantity (USEPA, 1988). Bis (2-ethylhexyl) phthalate is a common laboratory contaminant. Thus, these results should be interpreted with caution.

In the June 1991 evaluation, 2,4-Dinitrotoluene was reported in all of the above samples. These were not reported in the final documentation presumably because of the UJ qualifier. UJ indicates the material was analyzed for, not detected, and the sample quantitation limit is an estimated quantity (USEPA, 1988).

The results from York Laboratories indicate numerous benzene compounds were found in the samples collected from GW-9-R. The following compounds were reported in the corresponding samples (all results in ppb):

Organic Concentrations in Groundwater

Well Number	Compound	Concentration
GW-9-I	Benzene	0.2J
GW-9-R	Acetone	23
	Benzene	0.9J
	Chlorobenzene	2
	Isopropylbenzene	1
	Propylbenzene	0.5J
	1,3,5 Trimethylbenzene	1.9
	p-Isopropyltoluene	1.2
	Naphthalene	0.9J
GDT-1	Tetrachloroethene	0.6J

RAM 002 0149

No organic compounds were found in the samples collected from GW-5-OS or GW-5-R. The following compounds were detected in GW-5-I:

Methylene Chloride	0.6 J
Tetrachloroethene	2.3
Toluene	0.4
Bromochloromethane	0.8

No PCBs or pesticides were detected in the samples collected from the shallow or intermediate wells located on Torne Brook Farm. Gamma-BHC (Lindane), a pesticide, was found in the sample collected from GW-9-R and analyzed by Gulf South Environmental Laboratory. This compound was not detected in any of the upgradient wells. Also, the concentration reported in GW-9-R (0.11 ppb) is greater than that observed in GW-7-R (0.055 ppb), the only other sample for which this analyte was detected.

Should you have any questions regarding our review, please feel free to contact us at your convenience. As always, it is a pleasure to be of service.

Very truly yours,

ECKENFELDER INC.

Laurie E. Scheuing
Project Hydrogeologist

Michael R. Brother
Vice President
Director, Hydrogeology Division

ECKENFELDER INC.

February 25, 1992 6632

Mr. George C. Demas
Torne Brook Farm
Torne Brook Road
Ramapo, New York 10931

RE: Evaluation of Remedial Alternatives and Groundwater Quality Analyses

Dear George:

In accordance with your request, ECKENFELDER INC. has completed a review of the data provided and our findings are presented below. The documents reviewed included the Final RI Report, the Draft Final and Final Feasibility Study reports, and the PRAP.

Our review can be summarized as follows:

- The validated groundwater quality data confirm that leachate has adversely impacted groundwater quality in the bedrock well at Torne Brook Farm.

- Given the costs associated with long-term monitoring, the liability associated with potential degradation of a public water supply, and the relatively low cost of installing the water line (less than 3 per cent of the total cost of the preferred alternative), it would seem prudent on the part of the landfill owner to provide this water supply now.

- The preferred alternative is not the most cost-effective remedy and permits substantial leachate discharge to the bedrock aquifer.

- The contingent alternative, although it also requires a variance from 6 NYCRR Part 360, is, with minor modifications, both technically justifiable and cost-effective.

- Neither the preferred alternative nor the contingent alternative is consistent with the stated objectives for remedial action with respect to *preventing* off-site migration of contaminated groundwater and *preventing* inhalation of vapors from the landfill.

- The Final FS and the PRAP do not sufficiently define the monitoring requirements for environmental sampling, or where defined do not provide sufficient justification for apparent departures from 6 NYCRR Part 360 requirements. Similarly, the criteria which will be used to decide which components of the selected alternatives (e.g., passive venting versus active gas collection) will be implemented are poorly

[illegible] MacArthur Boulevard
Mahwah, New Jersey 07430
[illegible]

defined. More importantly, the criteria and additional studies which will be required to determine whether the preferred or contingent alternative is ultimately selected have not been adequately defined.

Discussion

In this section a more detailed examination of the issues summarized above is provided.

First, since our initial review included unvalidated data, the final water quality results from test wells installed at Torne Brook Farm were re-evaluated. In brief, the conclusions reached in our June, 1991 letter remain valid, that is, leachate from the Town of Ramapo Landfill is adversely affecting groundwater quality in the bedrock well located at Torne Brook Farm. Our detailed review of the water quality data will be provided to you under separate cover.

Second, in terms of the remedial alternatives presented for the Ramapo Landfill, the preferred alternative specified in the PRAP is not the most cost-effective remedy in our judgment. Based upon our analysis of the data presented in the Final FS, the modified Part 360 cap (the contingent alternative) would be the most cost-effective remedy. The preferred alternative (i.e., the "soil" cap) is clearly inconsistent with 6 NYCRR Part 360, as was so forcefully argued by DEC in their meeting of November 26, 1991 with the Town of Ramapo, and is not particularly cost-effective. This alternative permits a substantial amount of infiltration and would allow continued and significant production of leachate and substantial and continued leachate migration to the deep bedrock. In addition, the proposed thickness of general fill and topsoil above the cap (18" total) is probably not sufficient to maintain vegetative cover during periods of low precipitation.

The contingent alternative (i.e., the "modified Part 360" cap) is effective from the standpoint of reducing leachate generation; however, because of the reduced thickness of the general fill layer (12", plus 6" of topsoil), potential problems maintaining vegetative cover during periods of low precipitation are likely. This is particularly true on the side slopes and is also the case on the flatter portions of the landfill. In our judgment a minimum thickness of 24" on the flatter areas and 30" on the side slopes is required. Accordingly, the apparent savings in capital cost associated with this alternative as currently proposed would likely result in increased operations and maintenance costs over the long-run. A proposal for a "modified" Part 360 cap with soil thicknesses as noted above would be acceptable from a technical standpoint.

A cost-benefit analysis of the various capping alternatives was not provided in the FS. This type of analysis can be very useful in identifying the point at which additional expenditures to achieve environmental control (defined perhaps as the per cent reduction in leachate generation) are no longer justified due to ever increasing costs. In this instance, one can compare the soil cap to the modified Part 360 cap, assuming for the moment that the modified cap is as effective as has been

RAM 002 0152

stated by URS. The soil cap, for example, achieves about a 67% reduction in leachate generation (infiltration) at a capital cost of $15.1m. The modified Part 360 cap achieves about a 94% reduction in leachate generation at a capital cost of $15.6m. Thus, for a 23% increase in capital cost the environmental effectiveness is increased by about 40%. Clearly, the point of diminishing returns has not been reached. Figure 1 graphically illustrates this concept using the cost estimates presented in the PRAP.

Third, both the preferred alternative and the contingent alternative include a provision for installation of a water line to Torne Brook Farm based upon the results of water quality monitoring in the future. Given the costs associated with long-term monitoring, the liability associated with potential degradation of a public water supply, and the relatively low cost of installing the water line (less than 3 per cent of the total cost of the preferred alternative), it would seem prudent on the part of the landfill owner to provide this water supply now.

Even if the water line is only to be retained as an option for the future, it is imperative that the frequency of monitoring, the parameters to be analyzed, and the conditions under which the water line would be installed be explicitly defined up-front. One should keep in mind that only a single sample from the public water supply well has ever been comprehensively tested and that single sample was taken more than 18 months ago.

The proposed groundwater monitoring program described in the Final FS does not appear to be in compliance with Part 360 requirements for post-closure monitoring. The proposed program apparently includes only annual sampling and analysis from selected wells (p. 10-3), whereas Part 360 mandates quarterly collection of samples for at least the first five years of the post-closure period (p. 10-19).

The proposal also excludes surface water sampling if groundwater remediation is implemented; this is also inconsistent with the Part 360 post-closure monitoring requirements. In addition, there appears to be no consideration of the hydraulic monitoring that would be necessary to verify that the leachate collection system improvements and/or groundwater recovery well system are effective in preventing off-site migration. Moreover, if the system will rely upon hydraulic control along the landfill perimeter to prevent migration towards the Torne Brook Farm well, it would seem both reasonable and prudent to require periodic (i.e., quarterly) monitoring of the water supply well on your property in addition to the well cluster installed by URS.

Fourth, the Baseline Risk Assessment presented in Volume 1 of 4 of the RI/FS identified inhalation of landfill vapors as the primary contributor to the total health risk posed by the site (carcinogenic, non-carcinogenic, etc.). However, the remedial alternatives presented in the FS and the PRAP recommend that only passive venting of landfill gases be implemented. A passive venting system would not be expected to have any substantial impact on reducing the health risks from the gases; therefore, the primary risk factor identified in the risk assessment is not

RAM 002 0153

addressed in the recommended alternatives. Moreover, the RI did not include collection of air monitoring data in the immediate vicinity of the Torne Brook Farm apartments and no assessment of the impact of a passive venting system on odor problems, the subject of numerous complaints hisorically, has been provided.

In order to reduce the risk from inhalation some form of active gas collection and flaring or emissions control would be required. The active system would also likely reduce the potential for objectionable odors. The preferred and contingent alternatives include upgrading the passive system to an active system in future if needed. However, an effective monitoring system that would permit determination of the need for an active system has not been proposed nor have the criteria by which the decision would be made been defined. Moreover, in our judgment the ease with which a passive venting system could be converted to an active system has been overstated in the FS.

Lastly, the RI has failed to define the vertical extent of groundwater quality degradation in the bedrock aquifer. Contamination was detected in the bedrock in the deep wells drilled for the RI, yet no prediction of the maximum depth of contamination can be made with the current database. The absence of this information is clearly not consistent with the concept of the Critical Stratigraphic Section defined in Part 360-1.2(b)(40) and referenced in 360-2.11 and 360-2.15a(1)(i). Groundwater recovery wells in the overburden and intermediate zones are proposed for selected areas of the landfill perimeter. The recovery wells would be installed in the area generally upgradient of the Torne Brook Farm well, and, if properly installed, would likely prevent further migration of leachate-contaminated groundwater beyond Torne Brook in the overburden and intermediate zones. However, deeper bedrock wells were ruled out (incorrectly in our judgment) and none of the remedial alternatives adequately addresses this component of groundwater flow.

Should you have any questions regarding our review, please feel free to contact us at your convenience. As always, it is a pleasure to be of service.

Very truly yours,

ECKENFELDER INC.

Michael R. Brother

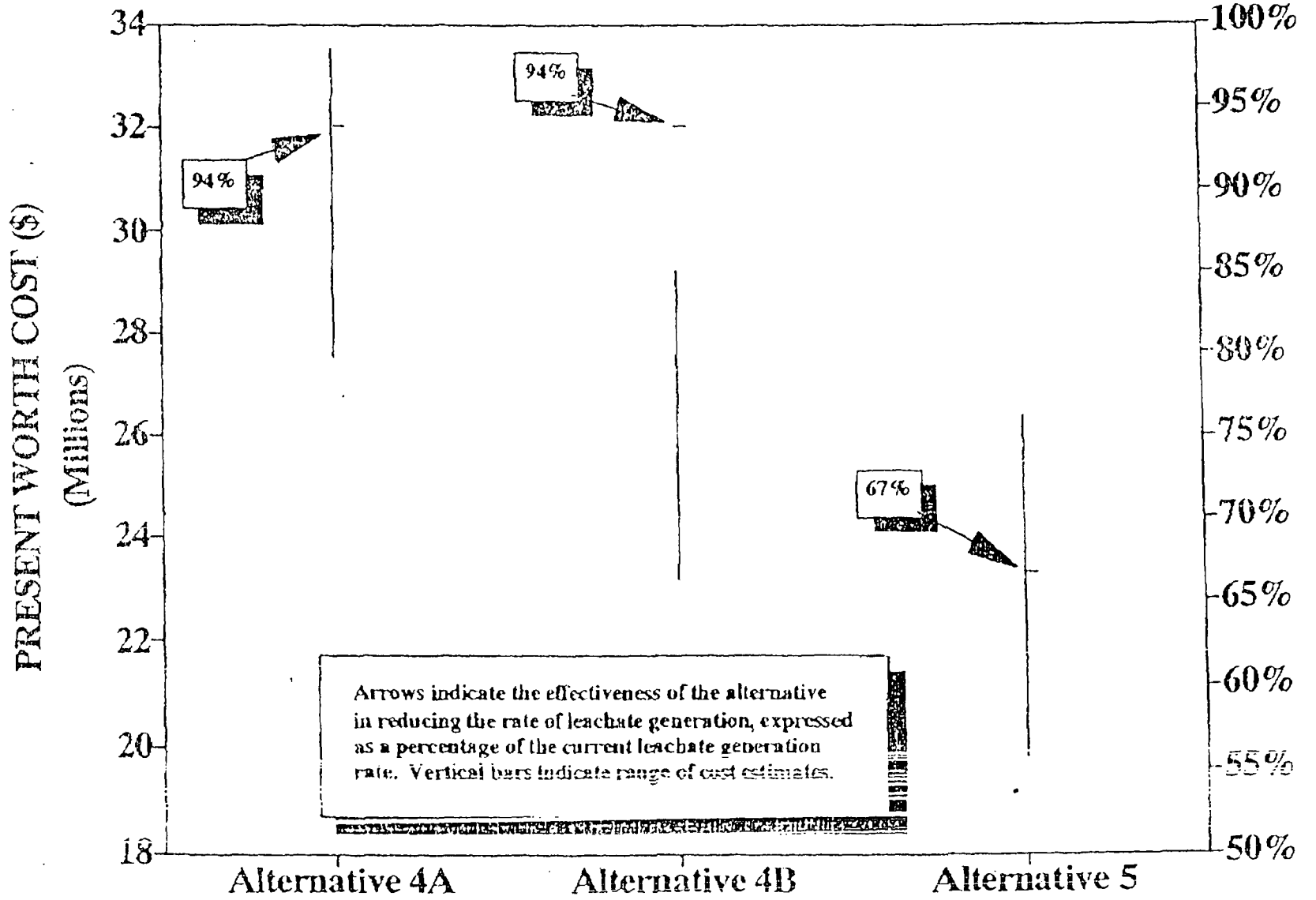
Michael R. Brother
Vice President
Director, Hydrogeology Division

Attachments

RAM 002 0154

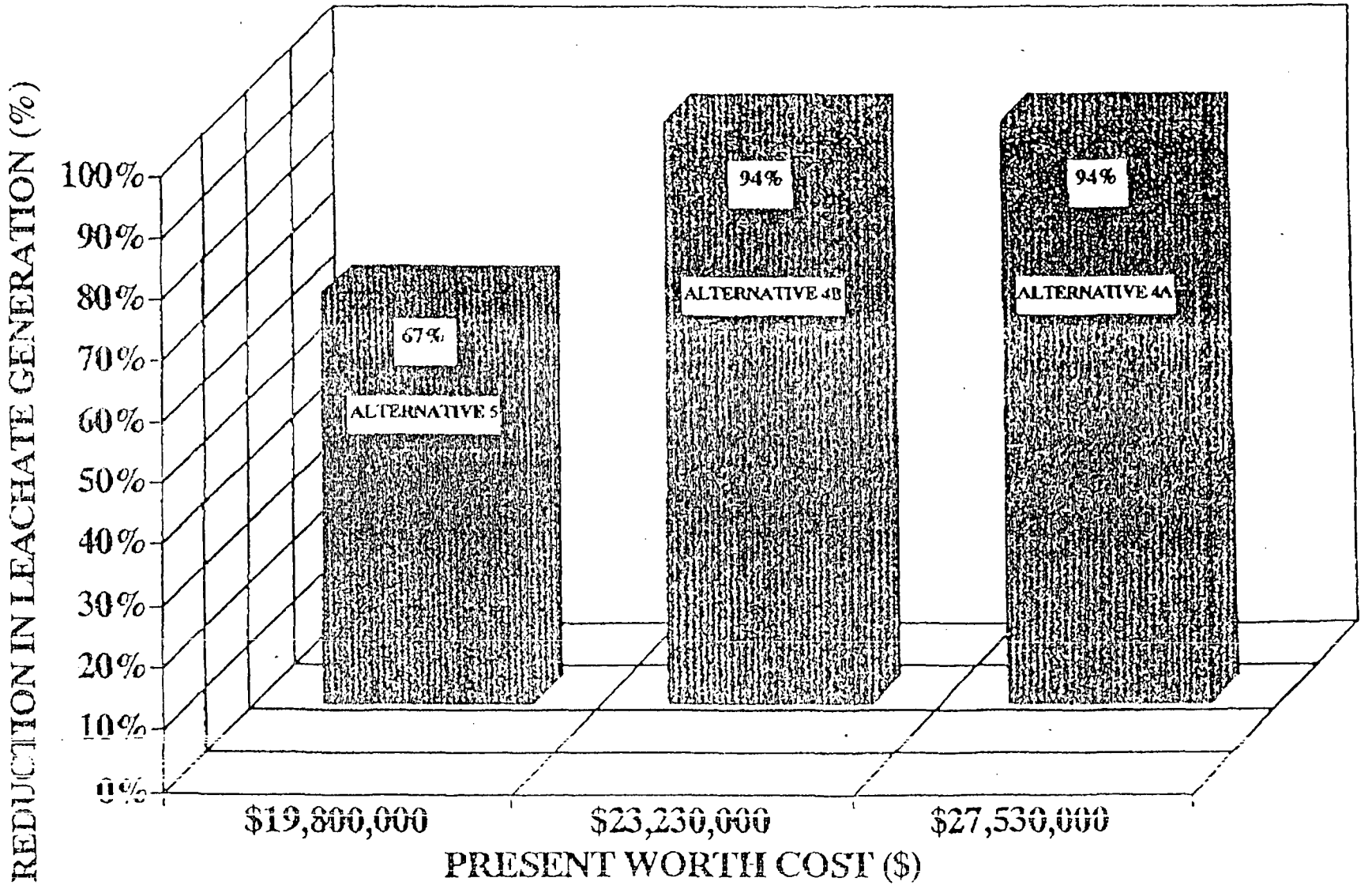
COST-EFFECTIVENESS EVALUATION

RAMAPO LANDFILL RI/FS



COST-EFFECTIVENESS EVALUATION

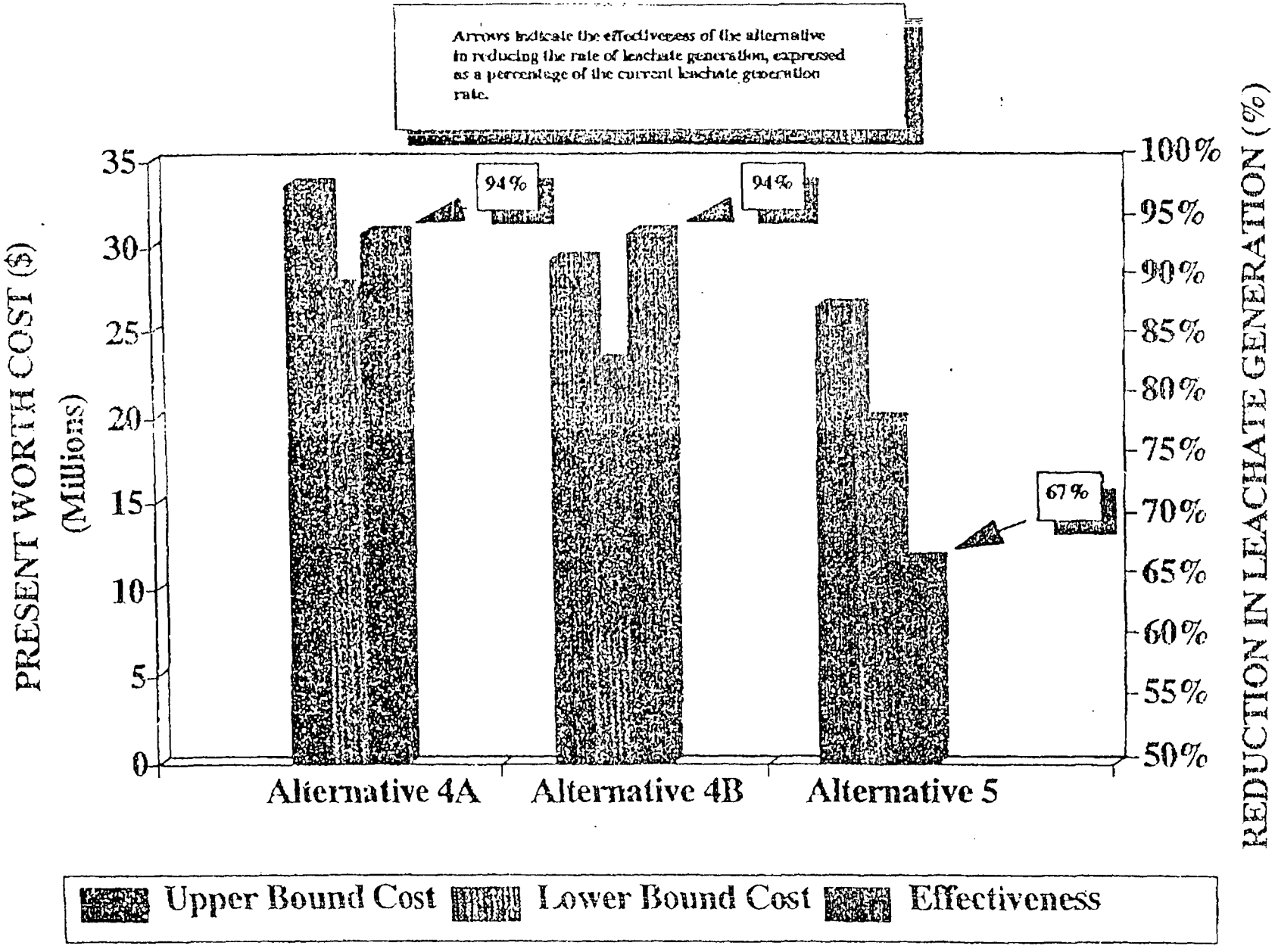
RAMAPO LANDFILL RI/FS



TORNE BROOK FARM

COST-EFFECTIVENESS EVALUATION

RAMAPO LANDFILL RI/FS



RAM 002 0157

QUESTIONS

Contamination has been observed in the bedrock aquifer at several locations on and off site. For example, MCLs were exceeded in well MW-8-R at depth in the bedrock. How much deeper does this contamination extend into the bedrock aquifer? Has the critical stratigraphic section been adequately defined and has the Department approved this definition, if it exists (6 NYCRR Part 360-2.15(a)(1)(i)?

Where does the deep bedrock groundwater discharge? Is there a potential for flow in the bedrock to pass beyond the Ramapo River? How was this determined?

The slug test results in the intermediate aquifer and the bedrock aquifer indicate that these aquifers have, on average, virtually the same hydraulic conductivity (geometric mean in the intermediate aquifer: 3.2×10^{-4} cm/second vs. geometric mean in the bedrock aquifer: 3.6×10^{-4} cm/second). The bedrock aquifer is described in the RI as being extensively fractured, even at depth. In addition, water level data from wells in the bedrock aquifer describe a potentiometric surface that is consistent with Darcian flow. On what basis was it determined that groundwater recovery wells in the bedrock aquifer are not feasible?

Without recovery wells in the bedrock aquifer, what is the volume of groundwater flow, on an annual basis, that would not be captured by the preferred alternative? How was this determined?

The groundwater flow model for the site uses a vertical hydraulic conductivity for the bedrock on the order of 10^{-10} cm/second. Is this value consistent with the observation that the bedrock aquifer is extensively fractured, even at depth? Is it consistent with the transport of contaminants to the aquifer; that is, if the permeability is truly that low should contaminants even be present in the aquifer? Why did it not prevent the vertical transport of contaminants? In the presence of downward vertical gradients, what prevents continued downward migration of leachate into the deep bedrock and how has this been quantified?

Given that a substantial amount of hydrogeologic data is likely to exist for the Spring Valley Water Company well field across the Ramapo River from the site, why was the model not extended across the river?

Contaminants exceed MCLs at well MW-8-R and appear in well MW-9-R at elevated concentrations. A dividing line between groundwater that is above MCLs and groundwater that is below MCLs must be present somewhere between these two wells. Where is this line and how was it determined? How far is it currently from the monitoring wells at Torne Brook Farm and when is it likely to appear in these wells? If this has not or cannot be determined, please explain why not.

Some type of aquifer test will presumably be conducted in an attempt to show that pumping from the intermediate aquifer will capture all or "nearly all" of the contaminated groundwater leaving the site. What kinds of tests will be conducted; how many will be performed; what will be the duration of those tests; how will they be analyzed; and what criteria will be used to determine if a sufficient quantity of groundwater is captured? Will these tests include pumping and/or monitoring of

RAM 002 0158

deep bedrock wells? Will the results be used to verify the groundwater flow model? Will vertical hydraulic conductivity be determined (using, for example, a Neuman-Witherspoon Ratio-Method aquifer test)?

What kind of hydraulic monitoring will be conducted to verify the operation of the leachate collection and groundwater recovery systems? How many piezometers will be needed, where will they be located, and how frequently will they be measured? What criteria will be used to define when a section of the leachate collection system or a portion of the recovery well system has failed and requires corrective action?

How does a passive gas collection system that simply vents landfill gases to the atmosphere reduce, much less *prevent*, the inhalation of landfill vapors? How is a passive system justified when inhalation of landfill vapors is identified as a major contributor to the total site risk? Will the proposed system control objectionable odors (6 NYCRR Part 360-2.15(c))? If so, how?

Has the Town of Ramapo landfill been closed in accordance with 6 NYCRR Part 360 requirements? If not, why does the preferred alternative for this inactive hazardous waste disposal site not meet even the minimum regulatory requirements for a municipal solid waste landfill that never received hazardous waste?

Have applications for variances from 6 NYCRR Part 360 been submitted by the Town? How is compliance with the capping requirements of Part 360 considered to *uniquely* impose an unreasonable economic, technological, or safety burden on the public [see 6 NYCRR Part 360-1.7(c)(2)(ii)]? Does this establish a precedent for other Part 360 closures of municipal landfills, whether investigated under CERCLA or Part 360? Will a variance be required to modify the Part 360 requirement for quarterly monitoring in the first five years after closure? If so, what condition is *unique* to this site that justifies such a variance?

Can the Department or the Town demonstrate that vegetation will be likely to survive during drought conditions given the proposed (reduced) thickness of the cap? If not, is a variance from the Part 360 thickness requirement reasonable and prudent? What conditions will be imposed to ensure vegetation maintenance and monitoring if such a variance is granted?

Does the preferred alternative comply with 6 NYCRR Part 360-2.17(g), which states:

> "All landfills must be constructed, operated, and closed to minimize the generation of leachate and prevent the migration of leachate into surface and groundwater."

In fact, doesn't the preferred alternative explicitly permit additional generation of leachate and rely upon recovering this leachate after it has been introduced in the groundwater? How can such an alternative be deemed to *minimize* leachate generation and *prevent* migration of leachate into groundwater?

Spring Valley Water Company INCORPORATED
360 West Nyack Road
West Nyack, N.Y. 10994
914-623-1500

PURVEYORS OF PURE WATER SINCE 1895
B.E.R.A.
FOILABLE Y-N
SITE NAME
SITE CODE
SUB SECTIONS
PRO. ELEMENT
OPERABLE UNIT NO. DESC.
DRAFT OR FINAL
FILE SECTION
I
II
III
IV
V
VI

March 16, 1992

RECEIVED
MAR 19 1992
BUREAU OF CENTRAL REMEDIAL ACTION

Ms. Kathleen McCue
Project Manager
NYS Department of Env. Conservation
Rm. 222, 50 Wolf Road
Albany, NY 12233-7010

Subject: Comments on the Proposed Remedial Action Plan, Town of Ramapo Landfill - Inactive Hazardous Waste Disposal Site #344004

Dear Ms. McCue:

We are in receipt of and have reviewed the above referenced document. We offer the following comments:

1. The objective of the Superfund Proposed Plan is to "control the source of contamination at the site, and minimize and reduce the downgradient migration of contaminates in groundwater" (EPA/NYSDEC Superfund Proposed Plan, Feb. 1992). Alternatives 4 and 5 are the minimal alternatives that appear to approach this goal.

   Spring Valley Water Company's Ramapo Valley Well Field consists of ten potable wells which supply approximately 1/3 of the drinking water to Rockland County residents. The landfill, as is, represents an imminent threat to this water supply. Alternatives 4 and 5 significantly decrease the infiltration through the landfill and resultant leachate via a cap and leachate collection system. At this time, "Groundwater quality standards and/or EPA Primary Drinking Water Standards are currently being contravened in the overburden, intermediate layer, and bedrock aquifer" (EPA/NYSDEC Superfund Proposed Plan, Feb. 1992).

   It appears from this document that although measures will be taken to reduce infiltration and collect and treat the leachate, the fate and movement of the bedrock aquifer is questionable. In our opinion, Alternatives 4 and 5 do not provide adequate protection for the ten public water supply wells due to the potential migration of contaminated groundwater in the bedrock aquifer. Monitoring wells should be installed between the landfill and the well field and plans should be made to intercept and treat any contaminated plume moving toward this water supply.

RAM 002 0160

2. The report mentions the Technical and Operational Guidance Series 1.1.1. This document was updated in November 1991. Any changes as per this revised document should be included in the Feasibility Study.

3. Long-term groundwater monitoring is stated in Alternatives 4 and 5. The schedule for this should be increased to semi-annually and should be clear as to which wells and which parameters will be monitored.

If you have any questions, please call me at 914-623-1500.

Sincerely,

Jean M. Matteo
Manager-Environmental Resources

JMM:jc

RAM 002 0161

MEMORANDUM

To: Kathleen McCue, Project Manager, New York State Department of Environmental Conservation
Room 222, 50 Wolf Road, Albany, New York 12233-7010

From: Eleanor Burlingham Commission on Environmental Quality and Recycling
Ramapo Town Hall, Route 59, Suffern, New York 10901

Re: Proposed Remedial Action Plan, Town of Ramapo Landfill
Inactive Hazardous Waste Disposal Site (#344004)

Date: March 3, 1992

At its regular meeting held on February 20, 1992, the Eleanor Burlingham Commission on Environmental Quality and Recycling passed a resolution (Bull/Tarkan: unanimous) supporting the above referenced proposed plan of action, which includes the following main components:

- Capping of 35 acres of the landfill using a multi-media system including layers of fill material, a gas-venting system and an impermeable membrane. The remaining 25 acres consists of slopes where the grade is greater than 20 percent. If studies demonstrate that this approach is feasible, the slopes will receive a capping system but will not be covered by an impermeable membrane.

- Collecting and venting of landfill gases. Landfill gases will be collected and treated if necessary.

- Installing groundwater extraction wells to supplement the existing leachate collection system.

- Installing a perimeter drain around the sections of the cap containing the impermeable membrane to collect and divert surface water run-off.

- Collecting and diverting leachate seeps to the leachate collection system for off-site treatment. If necessary, the wastewater discharged from the site will be pretreated prior to discharge to a publicly owned treatment works.

- Annual long-term monitoring of groundwater. If deemed necessary by long-term monitoring, an alternate water supply will be provided for nearby users.

- Restrictions on the future use of the site to prevent disturbance of the cap and prohibit the use of groundwater on the site for purposes other than sampling.

It is the Commission's understanding that contingency plans will be in place to further protect air and water quality should long-term monitoring deem this necessary.

Paul J. Ernest, Chairman
ELEANOR BURLINGHAM COMMISSION
ON ENVIRONMENTAL QUALITY AND
RECYCLING

RAM 002 0162

February 25th, 1992

Ms. Kathleen McCue
Project Manager
New York State Department of Environmental Conservation
Room 222
50 Wolf Road
Albany, NY 12233

Dear Ms. McCue,

As a resident of Torne Brook Farm in Ramapo, I am quite concerned about the Town Landfill. In the past 2 years that I have lived in this otherwise unspoiled wooded area, I have seen several unusual occurrences. Most importantly, during summer thunderstorms, there is a copious greenish-yellow runoff that one has to drive through when using the Torne Valley Road access. I have been told that the Landfill has been "capped," but the smell on a hot summer night and this discharge leads me to believe otherwise. In light of these concerns, imagine how I felt when I read the February 24th article in the Rockland Journal news, outlining how the Town of Ramapo could close the Landfill-choosing least cost as a primary concern. To paraphrase Mr. Reisman: "...said the Town was lucky...to avoid alternatives costing up to $34 Million." I certainly do not feel "lucky" having these toxic substances at the edge of our beautiful back lawn. It seems to me that the cost of capping, water treatment, and any other necessary measures should be met-keeping environmental and personal health as the primary focus. Humans are quite adept at using the environment as a garbage can, it's obvious that this attitude is now commanding a very steep price.
Although I pay taxes only indirectly (since I rent), the additional taxes incurred for a complete job would be more than worth our health and peace of mind. I appreciate your taking the time to read this letter. If I can be of any assistance, please do not hesitate to contact me at: (914) 753-6527.
Thank you for your attention to this matter.

Sincerely,

David Stein

cc: New York State Department of Health
Rockland County Department of Health
USEPA
Rockland Journal News

RAM 002 0163

B.E.R.A.
FOILABLE Y-N
FILE SECTION
SITE NAME
SITE CODE
SECTIONS
OPERABLE UNIT NO. DESC.
OU OR FINAL

cc: Gene

Joseph T. Caruso, P.E.
7 Marietta Drive
Pomona, NY 10970
February 28, 1992

Hon. Town Board
Town of Ramapo
Town Hall
Route 59
Suffern, NY 10901

ATTN: Hon. Herbert Reisman, Supervisor

RE: Ramapo Landfill
Conclusions

Dear Supervisor Reisman and Members of the Board:

Unfortunately, I will not be able to attend the public comment period scheduled for March 3, 1992, as I will be attending the Affordable Housing Seminar at Rockland Community College that evening.

Nevertheless, I would like to take this opportunity to indicate to you that I support the recommended option for the landfill closure.

While I'm sure no one is more aware of today's economic situation than you are, and everyone knows what a burden an additional 19-20 million dollar project would be on the taxpayers, we must be realistic and note the necessity of properly closing the landfill to protect human health and the environment, and still comply with Federal and State Requirements.

In reviewing the reports and documents pertaining to the closure, it appears that Alternate 5 would be both cost-effective and still provide the necessary protection. I therefore urge you to obtain whatever variances are necessary to implement this Alternate.

I also urge you to do this as soon as possible, while State Funding is available. Further, being familiar with construction projects, delays in implementing a project such as this, usually result in cost increases.

As a resident and taxpayer in the Town of Ramapo, I would like you to note that I support the implementation of the project as early as possible.

Very truly yours,

JOSEPH T. CARUSO, P.E.

RAM 002 0164

FACSIMILE MESSAGE

TO: Cathy McCue 1641
NYSDEC
50 Wolf Rd
Albany NY
518-457-1088

DATE: March 19, 1992

FAX. NO. _____

NO. OF PAGES 2

MSG. NO. 284

FROM: Geoffrey Welch
Torne Brook Farm
Torne Brook Road
Ramapo, N.Y. 10931

Fax. No. (914) 753-5068

RAM 002 0165

The Ramapo River Committee

An interstate citizens group to protect the Ramapo and its aquifer from pollution and preserve the natural beauty and character of this ancient waterway.

AS EXPRESSED IN MY VERBAL COMMENTS AT THE PUBLIC MEETING MY CONCERNS ABOUT THE PRAP ARE:

1) WE NEED QUARTERLY TESTING OF PW-1 AND PW-2.

2) INSTALLATION OF THE ALTERNATIVE WATER SUPPLY LINE SHOULD BE UNDERTAKEN AS SOON AS POSSIBLE.

3) GAS TREATMENT SUCH AS FLARING SHOULD BE INSTALLED TO REDUCE THE HEALTH RISKS TO VALLEY RESIDENTS AND WORKERS AT THE BAILER. (STATIC AIR CONDITIONS IN THE EARLY EVENING ALLOW LANDFILL GASES TO AFFECT TORNE BROOK FARM RESIDENTS.)

4) I FAVOR REMEDIAL ALTERNATIVE 4B, THE MODIFIED PART 360 CAP. HOWEVER, I BELIEVE THICKER COVER MATERIAL SHOULD BE USED SO THAT ENOUGH MOISTURE IS RETAINED FOR PLANT GROWTH DURING HOT, DRY SUMMER WEATHER CONDITIONS.

5) I REQUEST THAT THE SITE HISTORY INCLUDE THE PERIOD FROM JUNE, 1984 TO MARCH 1989 DURING WHICH THE LANDFILL WAS USED FOR THE LOCATION OF SEVERAL ILLEGAL C+D DUMPS. LEAVING OUT THE C+D DUMPING FROM THE PUBLIC RECORD IS NOT SCIENCE BUT POLITICAL SCIENCE.

6) ONE AREA OF CONCERN I DID NOT ADDRESS AT THE PUBLIC MEETING IS THE EXPOSURE OF WILDLIFE TO UNTREATED LEACHATE AT THE LEACHATE HOLDING POND. I HAVE SEEN PROTECTED SPECIES OF DUCKS SWIMMING IN THE LEACHATE LAGGOON MANY TIMES INCLUDING A SITE VISIT MARCH 17TH 1992 WITH JOHN OLM FROM NYSDOH. A PAIR OF MALLARDS WAS SWIMMING IN VERY BROWN LEACHATE. SCREENING OR NETTING INSTALLED OVER THE LAGGOON WHOULD PREVENT BIRDS FROM THIS CONTACT.

GEOFFREY WELCH
PO BOX 1215
MILLBURN, N.Y. 10931

RAM 002 0166

TOWN OF RAMAPO
DEPT. OF ENGINEERING
1991 MAR -5 P 11: 27

Village of Sloatsburg
Incorporated October 7, 1929
96 ORANGE TURNPIKE
SLOATSBURG, NEW YORK 10974
(914) 753-2727

March 2, 1991

Mr. Gene Ostertag, P.E.
Town of Ramapo
237 Route 59
Suffern, New York 10901

Re: Superfund Proposed Plan
Ramapo Landfill
Rockland County, New York

Dear Mr. Ostertag:

The Village of Sloatsburg has reviewed the Remedial Alternatives proposed for the subject landfill closure. We can appreciate the considerable time and effort the Town and its Consultant have invested in this project.

We have studied both the benefits and deficiencies of each Alternative presented in the Report. As discussed in the Report, we agree that Alternatives 1 through 3 provide little relief to the problem. Because each of these Alternatives will continue to draw contaminates from the landfill the deep leachate collectors must be maintained and the leachate collected will continue to be treated at the Suffern Wastewater Treatment Plant. The problem with these Alternatives is they allow the rainwater to continue to seep through all 60 acres of landfill. To prevent this continued flow through the entire 60 acres an impermeable barrier is required over the landfill, and this we understand.

With an impermeable cap over the entire 60 acres there will still be the runoff from the hillside which runs down through the fill. Given the geological makeup of the area and understanding the rock conditions which exist it would appear the installation of perimeter drains would be ineffective along the upper limits (on the hill) and two sides. Covering the entire 60 acres with cap does not guarantee that there will not be continued downward migration of contaminants.

Alternatives 4 and 5 will include extraction wells at the low side of the landfill and will continue to discharge leachate for treatment

RAM 002 0167

Village of Sloatsburg

Incorporated October 7, 1929

96 ORANGE TURNPIKE

SLOATSBURG, NEW YORK 10974

(914) 753-2727

(Mr. Gene Ostertag, P.E.) March 2, 1992

at the Suffern Plant. Both of these Alternatives will still require annual long-term monitoring of ground water and both will prohibit the use of the site through deed restrictions. With all those measures proposed there is still the fact that contaminants will remain on site and the site will have to be reviewed every five years. Should it be found that the Alternative installed is not providing adequate protection to the community, it is understood that remedial actions may be implemented to remove or treat the wastes.

From an economical point, we see a savings of 8 to 10 million dollars by installing Alternative 5 over Alternative 4. Both Alternatives provide the same benefits except for the coverage of landfill side slopes. The additional seepage through the side slopes can be intercepted by the leachate drains at the low side of the landfill and the savings realized could be used at a later date if further remedial action is required.

Based on our review and findings discussed above, we endorse Alternative 5. Should you have any questions, please do not hesitate to contact my office.

Sincerely,

Richard L. Eichenlaub, P.E.
Village Engineer

RLE:md

RAM 002 0168

Torne Brook Farm COUNTRY APARTMENTS

Torne Brock Road
Ramapo, New York 10931

(914) 753-5999
George C. Demas

March 18, 1992

Ms. Kathleen McCue, Project Manager
Division of Hazardous Waste Remediation
New York State Department of
Environmental Conservation
50 Wolf Road
Albany, New York 12233

Dear Ms. McCue,

As the owner and operator of Torne Brook Farm, a residential property adjacent to the Ramapo Landfill which includes a public water supply and the home of approximately 50 people, I have been involved with the trials and tribulations of the site for over 10 years. I attended the public hearing at Ramapo Town Hall on March 3rd, accompanied by Mr. Michael R. Brother of Eckenfelder, Inc. , my environmental engineering consultant. I made some general remarks at that meeting, and Mr. Brother reviewed his firms analysis of the situation concerning the RI/FS and the PRAP from an engineering point of view. I felt that it was appropriate on that occasion to cover only a general overview of my feelings about the situation, and I understand that the remarks at the hearing are being transcribed, and will become a part of the overall public comment record. I am writing this letter to take advantage of the opportunity for written public comment, and to cover some items in more detail then was practical at that time, as well as to mention several other items which I did not mention, and which I believe belong in the record. In addition, I have enclosed copies of some documents which I also think belong in the record. I have enclosed to letters to me from Eckenfelder (dated February 25, and March 13, 1992), as well as a 2 page document prepared for me by them which is simply titled "Questions". The 2 letters cover the firms basic review of the water test information from the test wells and the drinking well located on Torne Brook Farm, and a general review of the RI/FS and PRAP as they relate to the residents here. My understanding of the public comments period is that it allows for detailed questions to be raised regarding the PRAP, and the 2 page 'questions' document from Eckenfelder lays out in some detail exactly those engineering questions which we feel relate to the health and welfare of those who live and work at Torne Brook Farm. I am unsure of exactly what the procedure is regarding your response to such questions, and I would appreciate it if you would advise me of same.

RAM 002 0169

In addition, I would like a copy of the transcript of the March 3rd hearing as soon as it is available. I would also appreciate copies of all other comments submitted in this procedure. If such information requires a Freedom of Information request, please consider this letter to be such. If necessary, kindly advise me of any costs involved with this request.

I have also included a copy of notes of a meeting held at the DEC offices in Albany on November 26, 1991 with various state and local officials, State Legislators, EPA and engineering represnetatives, etc. This is enclosed for 2 reasons; First, because I referred to it in my remarks on March 3rd and I think it therefore should become a part of this record, and , Second, because it quite clearly indicates how firm a position the DEC and the EPA were taking at that point in time relative to the Towns expressed desire for significant relief from the Part 360 regulations. These notes make it very clear that neither the DEC nor the EPA were at all inclined to consider any significant deviation from the reglations, and that if they did, it would be only under the strict variance guidlines which are contained in Part 360. It is particularly in light of the firm position expressed in the November 26 notes that I find the considerable deviations from the law which are contained in the PRAP to be so dissappointing. When I raised the question on March 3rd as to wether these deviations will be considered a variance in terms of Part 360, I was given a rather curious answer. I was told that this site was being considered a "unique case". Becasue the nature of this 'uniqueness' was not further explained, nor was the question of a variance answered at that time, I will restate my concern in a simple and straightforward way: Do the deviations from Part 360 (and/or related State and Federal regulations) which are in the PRAP constitute a variance from Part 360..particularly in terms of Part 360's clear definition of a variance? In addition, I would like to know the specific definition of a "unique case", and how this situation meets that definition.

In addition, I have enclosed copies of several items from the local newspaper which relate to the RI/FS, as well as transcripts from several news broadcasts on the local radio station, WRKL 91AM, located in Pomona, N.Y. This news coverage began at a time when the Draft FS had been prepared and distributed to State and Federal Agencies, but specifically withheld from the general public. I argued with public officials and lobbied for a number of months before a copy of this document was finally released to me. During this time, as the enclosed media copies indicate, a clear and consistant

RAM 002 0170

effort was underway to inform the public about only specific aspects of the report. The thrust of this media attention as basically that the superfund study fould no threat to the public, that a water supply was needed for residents of Torne Valley, and that it was unnecessarily wasteful to spend significant amounts of money for such things as capping the landfill. It was particularly difficult for me as the owner of the public water supply in question to deal with the questions and problems raised by this media attention at a time when the documents on which it was based were being withheld from me (as well as from the general public)!

On page 5 of the PRAP the final disposition of the Ramapo Landfill is described as "the first and only planned operable unit for the site". We have waited for years for this "Superfund Cleanup" to finally take place. During this time, questions about the effectiveness of measure taken to protect us from negative effects of actions taken at the site were often put off on the basis of the fact that any and all concerns, problems, etc. were to be thoroughly investigated as part of the "new look" at the situation which was to be the RI/FS, etc. Our problems with prior hearings and decisions, compliance with consent orders, unanswered or partially answered complaints etc., have all been put "on hold", waiting for this final disposition to take place, and it is taking place years after it was promised. This is the 'last chance' for those who live and work in Torne Valley to be a part of the long awaited final resolution of this situation.

The significant cost associated with the closure of such a facility as the Ramapo Landfill cannot, or at least should not, be a surprise to anyone involved with it. This is one of the reasons that it is so disturbing at this poin n time to see indications that the final decisions regarding public health are being, or may be, determined not on the basis of clear and long-standing requirements for such a situation, but on the basis of comparing the need for compliance with such regulations with such other municipal services as police and highways departments. When a gentleman by the name of Richard Miller spoke publicly at the March 3rd hearing and expressed his view that the health and welfare of his own family would best be served by minumizing the costs involved in closure of the landfill (minumizing them to a level below that clearly required by law!) based on a need for continued municipal services as well as relative local tax stability, it becomes clear to me that one of the local

RAM 002 0171

media goals has been met! While I do not blame Mr. Miller for suggesting that corners be cut in the cleanup as a way of protecting his familys' (financial) health and welfare, I would point out that his familys' drinking water is not immediatly threatened. I would also like to point out that Mr. Miller, and those Ramapo citizens who, like him, do not live in Torne Valley, clearly benefitted from the municipal waste disposal plan in effect in this town from 1971 to 1985 when the facility was in operation. I see no injustice whatsoever in expecting all the citizens of the town whose garbage was disposed of here in Torne Valley to contribute to the final closure and capping of the facility. I have not responded so specifically to Mr. Millers remarks because I haveany objection to him making them. On the contrary, I was pleased to see the number of people who did attend the hearing, and was happy to hear the remarks of Mr. Miller as well as everyone else who spoke out at that time. I simply want to use his remarks as an example of how political considerations seem to have been put ahead of all others in some aspects of the situation. I am sorry that the public presentation by the officials who opened the hearing failed to make it clear that the PRAP represents a significant deviation from the law...a deviation which has not yet been justified or approved. It would also have been helpful at that time to point out that the studies required to justify these deviations will cause even further delays in the implementation of the final plan, and will increase costs accordingly, without any assurance that the deviation will ever be approved. I also think that Mr. Millers remarks were particularly significant in that he failed to fully identify himself in his introduction. Mr. Miller is indeed a resident of Ramapo as he stated. However, he is also a full time employee of the Town of Ramapo..a Department who works in Town Hall and reports directly to the Town Supervisor. I don't think that this means that he should not be allowed to testify, but I do think that if he had fully identified himself, the perspective of his remarks would have been significantly changed.

I do not, of course, know the background of all of the speakers on March 3rd. However, there was one other whose situation is worthy of note. His name is Brian Brooker, and he also identified himself simply as a resident of the town. He raised the question of the possibility of contamination discovered in the bedrock aquifer having been caused by something other than the landfill. This remark is curious since it hints at the possibility that the contamination on my property was caused by something other than the failure of the leachate collection system. I think it was deceptive of Mr. Brooker to question the

clearly established notion that the leachate collection system failed, and not to even mention that he is a consulting engineer, and further, that he is eployed by Leonard Jackson Associates, the Rockland County Engineering firm that designed the leachate collection system!! Again, I don't quarrel with Mr. Brooker, or anyone else's right to speak at a public hearing. I do think that it is necessary for comments to be viewed in context, with knowledge of the background of the people involved.

There are several other subjects mentioned in the FS and/or the PRAP on which I think it appropriate to make a brief comment. They are as follows:

At the initial meeting at Town Hall prior to the start of the RI, I pointed out that there were a number of instances of paint sludge (presumably automotive) which had been dumped at various places in the Valley, including on the Landfill property. I therefore requested that all of the paint sludge in the valley (wether on the landfill property or not) be included in the study. It later appeared that my suggestion had been accepted. I personally toured several of these paint sludge dump areas with engineers involved in the study. There were some preliminary attempts to remove the sludge from those area in which itwas found, and the sludge removed was arrarently disposed of at the Clarkstown Landfill. I was, however, amazed to find a reference in the final documents that indicated that all of the slude had been so removed. This is simply NOT TRUE! Significant quantities of sludge remain on the site as well as adjacent to the site, both above and below the ground! It is improper for this study to imply that the paint sludge has been removed and the paint sludge problem resolved, for this is absolutly not the case. In addition, I fail to understand how this sludge can be described as harmless or inert, when even today (some 20 years or more after it was dumped), it gives off fumes when distrubed which are strong enough to cause an immediate health hazzard to that at the site.

It is my understanding that the PRAP does not address remediation of the relatively small parcel subdivided from the north end of the site which was the dumping area fo C&D for a number of years in the late 80's. If this particular area is being treated as a separate site, I am curious that there has been no mention in the study of the environmental effects of any leachate generated by this separate facility. What is the status of this parcel? Is it part of this site? Is it part of this study? Is there remediation planned for it, and, if so, how is this remediation related to the main site?

Just prior to the beginning of the RI/FS there was a 'public meeting' at Ramapo Town Hall. At the time it was billed as a Public Hearing, a hearing

which met the specifications of the Public Participation Plan which was filed as a part of the overall study. I would like to point out that this meeting, as it was conducted, did not meet the requirements of a public hearing as spelled out in the Plan. Speakers were curtly questioned and cut off midway through their remarks, and the meeting was improperly and abruptly adjourned prior to conclusion of pulic comment. In addition, the file Public Participation Plans for this study indicated that there would be several other Public Hearings in the course of the study. I was dismayed to find that such Hearings were never held; and I question the decision not to hold them. Why were these meeting cancelled, and by who?

The question of the frequency and scope of future water tests was raised on March 3rd. I had expected future plans to include a testing schedule for all of the test wells, especially those at Torne Brook Farm, as well as our Public Water Supply well. In addition, I think that the 2 adjacent private wells should have been tested. Further, I feel that at least the Torne Brook wells, and even the other two private wells, should have been investigated in terms of their depths, pumping capacity, etc. Will these items now be added? Why were they not included initially?

I made my feelings very clear at the Public Hearing on March 3rd on the need for the installation of the Torne Vally Water line at the outset of the remediation of this site. I will not go into further detail here except to note that it has already been over 18 months since the Torne Brook Farm wells have been tested. There has been no mention of the expected timing of the next test. In addition, there is no mention of the specifications of the water line. Where and how will it be run? Will it go to the property line, or to the existing wells? I think such questions must be answered. I also feel that, at a very minimum, the design for the water line must be in place long before the undefined "trigger" situation occure. I want to make it very clear at this time (as I ahve done repeatedly in my conversaions with DEC and EPA officials for the last 6 months!) that I think that the water should be made available as soon as possible, and on a permanent no cost basis to those owners of wells which have been threatened by the failure of the Leachate Collection System to prevent the migration off-site of landfill contaminants! As the owner of this public water supply well, I am not, all things being equal, inclined to want to hook up to Spring Valley or any other public water company. I consider the water here at Torne Brook to be superior to such outside water, and it is free al well. But, alas, all things are not equal!! Our once pure and free water has been contaminated and/or threatened by the siting, operations, etc.

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of the Ramapo Landfill, and we must look to the "Superfund" process to assure us that this problem will be permanently and safely resolved.

Torne Brook Farm, a National Historic Register property is threatened by its municipal neighbor. We have been forced to spend time and money on research, on private consultants, on water tests, etc., all the while being suject to the odors and leachate which we cannot escape. Now that the final plan for a safe and fair resolution of these problems is being devised, it cannot overlook the odors, and wait-and-see for the water. We look to the State and Federal Agencies charged with the protection of the environment to finally end the sad saga of this failed facility. We should not be expected to settle for anything less that compliance with the regulations designed to assure our health and peace of mind, and we have no intention of resting until our just and promised protection is at hand.

very truly yours,

George C. Demas

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*ADMITTED IN CALIFORNIA ONLY

correspondence

March 19, 1992

VIA HAND DELIVERY

Kathleen McCue, Project Manager
New York State Department of
Environmental Conservation
50 Wolf Road, Room 222
Albany, NY 12233-7010

Re: Submission of Public Comments on behalf of Ramapo Land Company (RLC) on the Town of Ramapo Landfill Inactive Hazardous Waste Disposal Site (#344004) Remedial Investigation/Feasibility Study (RI/FS) and Proposed Remedial Action Plan (PRAP)

Dear Ms. McCue:

Enclosed for your review are technical comments on the RI/FS and PRAP by Lawler, Matusky & Skelly, Engineers made at the request of Whiteman Osterman & Hanna for RLC. RLC's primary interest in the investigation and remediation of the Town of Ramapo Landfill is as a property owner with land holdings neighboring the former landfill and existing Town of Ramapo Transfer Station. These comments are submitted with the objective of assisting both the New York State Department of Environmental Conservation (DEC) and the U.S. Environmental Protection Agency (EPA) in their review of the investigation conducted by URS Consultants, Inc. (URS) on behalf of the Town of Ramapo and the proposed remedial measures upon which the agencies and URS are currently focusing.

Based on the presentation at the public meeting on March 3, 1992, it is our understanding that additional investigations, including ground water modeling, may be undertaken by URS and/or the agencies. The enclosed comments may be of some assistance to you in designing these investigations. We look forward to DEC's response to the enclosed comments, as well as any additional public comments submitted to DEC. If you have any questions or concerns

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regarding the enclosed comments, please do not hesitate to contact me.

Very truly yours,

Terresa M. Bakner

Terresa M. Bakner

Attachment

cc: Scott Vanderhoef, Esq.
Arlene Lapidos
Edward Maikish

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COMMENTS ON REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

AT THE RAMAPO LANDFILL

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Lawler, Matusky & Skelly Engineers

COMMENTS ON REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE RAMAPO LANDFILL

GENERAL COMMENT

LMS believes that the investigation and study conducted on the groundwater hydrology of the site thus far are insufficient and that understanding of the groundwater hydrology regarding flow rates and interaction between bedrock and overburden groundwater is incomplete. Without this information any evaluation of remedial alternatives for the site may result in incorrect conclusions and costlier remediation. The lack of groundwater information in particular may result in the following:

- *Underestimate of Leachate Flow.* LMS' review of the RI indicates that the amount of water that flows through the landfill and resulting leachate is much greater than estimated. The net result may be that the preferred alternative will be far costlier than projected and ineffective in containing significant migration of contaminants from the landfill.

- *Model Study.* With inadequate data it is impossible to accurately calibrate or set boundary conditions for a groundwater model. LMS believes that the existing model does not represent the key conditions at the site, and a more comprehensive model study should be conducted before any alternative is implemented.

- *Bedrock Groundwater.* The RI and FS both contain statements indicating that the landfill has contaminated the bedrock aquifer, but the RI does not track this contamination and determine its impact. The FS does not propose any alternative that will remediate the bedrock groundwater and the preferred alternative does not include any bedrock remediation.

DETAILED COMMENTS

Preferred Alternative

Because of a lack of detailed knowledge of the groundwater as well as other potential problems, LMS believes that the preferred alternative may prove much costlier than anticipated and ineffective in containing significant migration of contaminants from the landfill. Our concerns are as follows:

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- The steep groundwater gradient in the area and the proximity of Torne Brook will result in small capture zones for downgradient withdrawal wells. To prevent leachate from bypassing the withdrawal zones, more wells or a downgradient containment vertical wall may be needed, both costly modifications to the proposed design.

- Because the proposed withdrawal wells are so close to Torne Brook, they may withdraw water from the brook. Besides the impact on the brook, this will reduce the capture zones even further and result in the pumping/treating of clean brook water. A vertical wall may become an additional and costly solution.

- The FS did not evaluate the impact of withdrawal of water from Torne Brook or the Ramapo River System. If LMS estimates are correct (concerning the amount of leachate emerging from the landfill) and the withdrawal wells pull water from Torne Brook, the flow may be significant enough to warrant an assessment, particularly considering the use of the Ramapo aquifer as a major water supply.

- Discharge to a POTW is a viable option unless the flow becomes too high, which could drastically increase treatment costs. The existing average flow is estimated at 55 gpm. The Malcolm Pirnie report indicated that flow varied significantly; LMS contends that the existing leachate collection system fails to collect the flow by an order of magnitude. Even if the flow is not that high, an increase of three to four times would require treatment at the Suffern POTW costing $1 million per year ($10 million present worth), altering the cost evaluations of all the alternatives.

- It is proposed to eliminate the erosion of contaminated surface soils by capping the steep-sloped areas with 18 in. of backfill and topsoil. Little provision is made for stabilizing the soils on these steep slopes, which may exceed 20% grade. This may be a serious problem; the cover soils may erode easily and expose the contaminated surface soils. A plan view showing the details of the proposed surface drain system (P. 10-9) would be helpful.

- LMS believes that the upgradient wells are not really upgradient of the site and are contaminated, causing an incorrect assessment (i.e., comparisons of up- and downgradient water should show sizable differences but do not). We recommend additional upgradient wells. Quarterly sampling should be considered to protect the neighboring and private drinking water wells.

Bedrock Remediation

The FS states (pp. 11-21 and 11-23) that the bedrock aquifer is contaminated and the ARARs are contravened. The FS does not evaluate any alternatives that attempt to remediate the

RAM 002 0180

bedrock aquifer, however. Considering the lack of knowledge of the extent of the bedrock contamination, LMS believes additional studies are needed, including a detailed feasibility study of remedial bedrock alternatives.

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ORIGINAL

- x

PUBLIC MEETING

regarding

PROPOSED REMEDIAL ACTION PLAN FOR

RAMAPO LANDFILL

- X

Ramapo Town Hall,
Tuesday,
March 3, 1992
7:30 p.m.

A P P E A R A N C E S :

KATHLEEN A. McCUE, Project Manager
Environmental Engineer
New York State DEC
50 Wolf Road
Albany, New York 12233-7010

ERIN E. O'DELL,
Citizen Participation Specialist
New York State DEC
21 South Putt Corners Road
New Paltz, New York 12561-1696

ROCKLAND & ORANGE REPORTING
20 South Main Street
New City, New York 10956
(914) 634-4200

ALSO PRESENT:

JAMES LANZO,
URS - Engineering Consultant

ROBERTY COZZY,
Supervisor Special Projects
Department of Environmental Conservation

JOEL SINGERMAN,
Chief Western N.Y. Superfund Section
Environmental Protection Agency

ROBERT NUNEZ,
Remedial Project Manager
Environmental Protection Agency

GEOFF LACETTI,
Environmental Health Specialist
New York State Department of Health

SUPERVISOR REISMAN: Good evening ladies and gentlemen. My name is Herbert Reisman. I am the supervisor of the Town of Ramapo. I am here to welcome you to this informational meeting which is being held by the New York State Department of Environmental Conservation in cooperation with the Federal Environmental Protection Agency. As I understand from the folks who are conducting this hearing, it will be informal. As you know, at some meetings you have to fill out cards in order to be recognized. Here presentations will be made by certain government officials and following that any member of the public who wishes to make a comment or ask questions will be permitted to do so merely by raising their hand.

To explain the procedure for tonight, I'd like to introduce Ms. Erin O'Dell of New York State Department of Environmental Conservation. Ms. O'Dell.

MS. O'DELL: Good evening. Thank you for coming to the public meeting on the Ramapo Landfill Inactive Hazardous Waste Disposal

Site. As noted by Supervisor Reisman, the purpose of tonight's meeting is to discuss the Proposed Remedial Action Plan, or what we call a PREP, for the Ramapo Landfill.

Before we begin, I would like to make some introductions. My name is Erin O'Dell and I am the Citizens Participation Specialist for the Region Three office of New York State Department of Environmental Conservation. Also here tonight, from our Albany office, is Kathleen McCue, the project manager for the site. And Robert Cozzy the supervisor of the special projects section. From the New York State Department of Health we have Geoff Lacetti, who is the Environmental Health Specialist and Nina Knapp. Representing U.R.S, the consults on this project we have James Lanzo, the project manager. Craig Poliforski, the task leader for the health assessments and John Gordon, vice-president of URS. Finally, representing the United States Environmental Protection Agency are Robert Nunez, the remedial project manager and Joel Singerman, chief of the Western New York

Superfund section.

Tonight we are here to discuss the proposed remediation plan or PREP, as I have said, on the Ramapo Landfill. Ms. Kathleen McCue will provide a brief discussion of the site history and enforcement history on this. James Lanzo will discuss the remediation investigation and feasibility study conducted at the site talk about the various remedial alternatives looked at. Then Ms.McCue will describe New York State preferred remedial action to address this site. Following the presentation we will open the meeting up for public comment.

To insure that this process runs smoothly and, as Supervisor Reisman said, it's relatively informal, we will ask that any state, county, village or town officials who wish to speak to come forward first. And if anyone has a prepared statement, a written statement that they would like to read into the record they can come after the officials. Then we will open the floor up for questions and comments on the PREP. I would like to

emphasize that all prepared statements can be submitted as written statements and they will be given the full weight of any oral statements given here tonight. So that although we will stay as long as necessary to address everybody's comments, if you have some written comments that you could summarize and that would be good too.

As you've noticed, we have a stenographer here tonight. She will be making an official transcript of the meeting. For the benefit of the stenographer, I will ask you to approach the microphone, it will be located probably in the center of the room at that point. Speak your name slowly and clearly. It might be necessary to spell your last name.

The transcript will be used to prepare a responsiveness summary and that is a compilation of all the questions that were asked tonight and the responses that were given by the DEC, the Department of Health, the EPA or the consultant's, URS. If a question is not fully addressed here tonight,

we will attempt to expand on that answer in the responsiveness summary. Any written comments that are received during the public comment period will also be put in the responsiveness summary. The public comments period for this runs from February 19th and ends on March 19th. We hold the public meeting at this point, about halfway through, so that you have a few weeks to review the PREP and provide comments tonight and then anything that you hear tonight and you want to comment on you have another two weeks in which to provide written comments. And, again, any comments that you have to present in writing can be given to Ms. McCue prior to the March 19th deadline.

The responsiveness summary will be part of the record of decision or what we call a ROD for the site. The ROD is the official documentation of the selected remedial action. Everyone on the contact list, and that includes anyone who signed in tonight, will receive notification when the responsiveness summary and the ROD are complete. The

transcript, the responsiveness summary and the ROD will be placed in the local repositories that are in the Suffern Library, Finkelstein Library, Region Three office in New Paltz and our Albany office.

Again, I would urge you to sign in on our attendance sheets to insure that you receive notification of the responsiveness summary and the ROD. There is also a facts sheet, this one (indicating), that is out on the table with the attendance sheets that explains the ROD process. I have also left business cards on the table so if anyone has any further questions they can contact me after the meeting or in my office.

Now I would turn the meeting over to Ms. McCue.

MS. McCUE: Thank you, Erin. As Erin mentioned, I am the project manager, project engineer and I have been coordinating the State's review and oversight of this study for the last couple of years and I would just like to run through a brief summary of the history of the site, why it has become a concern to

the community and eventually to the State and Federal government and why we've performed this study.

Just to familiarize you with the general location of the site, the landfill is located north of the Village of Hillburn fairly close to here. Maybe some of you are familiar with it's location. It's located in a small valley between High Tore Peak and another slope on this side. It's a relatively undeveloped area in this County. It's bordered by the Torne Brook and the Ramapo River comes close to the edge of the site. You have Harriman State Park north of the landfill, the Thruway is south of the landfill. As I mentioned, it's a relatively unused undeveloped area. I will put up a plan of the site.

Again, this map shows, although we are now facing east, you can see where the river comes. The Ramapo River comes close to the southwest corner of the site. There are private residences, not many of them, around this area because, again, it's a relatively

unused area undeveloped area; we have one residence here, an apartment house, and a small one over here. Both of these residences have private wells and in addition there is an array of supply wells of the Spring Valley Water Company on the opposite side of the river from the landfill. The reason there are so many wells in this area is because the overburden material that -- the sand above the bed rock here are loose and give a good yield of good quality drinking water. And this is actually known as the Ramapo Valley Fill Aquifer and it's an important water resource.

And this perhaps gives you an idea of why the site has been of such concern. It's a landfill sitting next to a high quality water source of great importance. Over the last 15 years or so, starting about 1974, there have been various studies done by water companies, by the Town of Ramapo, by the EPA, by the DEC and samples of various matrices; groundwater, surface water, surface waste on the landfill have been taken.

Aside from the drinking water concerns,

obviously, the community has also had concerns with what sort of waste may have gone into this site. As far as we know, we believe that the predominant kind of waste that went into the site is commercial and domestic refuse, normal municipal solid waste but also we know that there are significant quantities of industrial waste brought to the landfill, such as pharmaceutical sludge, sewerage sludge, asbestos, foundry sand, construction and demolition debris at various times. So that basically is our understanding of the mix of waste that went into the Ramapo site.

All these concerns together, basically what might have gone into the landfill plus the importance of the groundwater resource have led the EPA, the United States Environmental Protection Agency, to place this site on the National Priorities List. The National Priorities List is a list of approximately a thousand sites that have been designated to get high priority for action under the Comprehensive Environmental Response Compensation and Liability Act of 1980.

Perhaps some of you are familiar with that act. That is otherwise known as CERCLA or I am going to refer to it as the Superfund Law. And that was the action of EPA and, as I said, the site went on the NPL in 1983.

Now, on it's part the DEC has also taken various actions with respect to the landfill. Starting in 1980 there were a series of consent orders enacted between DEC and the town for phase out of operations of the landfill which had been in operation since 1971 and for construction of a leachate collection system. And the Town, in accordance with the consent order, did build a leachate collection system in 1984 which runs along the western edge of the site. Now, the leachate collection system that the Town constructed is made up of a surface swale which collects surface water that runs off the landfill and may have picked up contaminants. It may wash these off the landfill surface. And also there are a series of pipes beneath the ground which intersect groundwater flowing through the landfill waste or beneath the

landfill waste toward the Torne Brook. The general direction of groundwater flow follows the topography, basically down the mountainside to the west and into the Torne Brook, where it flows into the Ramapo River. And the leachate collection system was designed to capture any of that water, groundwater, surface water, which may have come in contact with the waste. All of this was done, again, in fulfillment of the Town's consents orders with the DEC.

I alluded to the period of operation of the landfill. Again, the landfill did begin operating in 1971. In accordance with the DEC consent orders, the town shut the landfill down from receiving commercial and industrial and domestic refuse in 1984. For some time after that C & D waste was still received and it was placed in a separate cell here to the north next to the Baylor (phonetic spelling) facility but that too ended in 1989.

Now, at this time the Town only uses the site for transfer station, the Baylor facility here, and police pistol range in this

general area. The town has at various times had green waste temporary storage areas, for green waste and brush composting.

Getting back to the EPA's involvement. In 1987 it was decided that the enforcement responsibilities for the Superfund study -- the Superfund study being required as a result of the landfill being placed on the National Priorities List -- this responsibility was transferred to the DEC. And since, in 1986 the Environmental Quality Bond Act had been passed by the government of the State of New York the Town became eligible for 75 percent funding, funding up to 75 percent of eligible costs for remedial studies, remedial design, and remedial construction at the landfill. But to get this aide, the Town had to enter into still another consent order with the DEC, which they did in, I believe it was April of 1988. Under that consent order, the Town has conducted the Superfund study.

To describe that study in more detail I would like to have a representative of URS Consultants, the Town's consulting engineer,

come up and give us a run through of basically what activities were performed for the Superfund study, which is otherwise known as a remedial investigation and feasibility study. I believe Jim will explain what that is for us. So at this time I would like to ask Jim to come up.

MR. LANZO: Good evening. URS was hired by the Town of Ramapo in the spring of 1989 to carry out the remedial investigation and feasibility study. Just to visit what has taken place in a briefly sense of time: A series of activities are involved in a remedial investigation feasibility study. They start with the development of work plans, in which URS, in conjunction with the Town and the various agencies, developed in detail what work would be carried out in terms of investigation and, based on what you find in an investigation, alternatives are developed into feasibility study options. Ultimately you get to the point tonight where those alternatives can be presented and comments received on a preferred alternative.

During our remedial investigation there were two distinct phases of field activities. The initial one took place in the fall and winter of 1989 and 1990. The second took place in the late summer and early fall of 1990. This varying season activities is meant to determine what levels of contamination might be found in the varying season to allow a more in-depth study of areas of concern. During the remedial investigation phase of our study, a number of matrices were investigated; the groundwater, the surface water, there were some leachate seeps which were recognized on top of the landfill and its discharge into the surface directly, we sampled both the sediment in Torne Brook and we collected surface soil samples on the landfill as well as some surface waste samples.

In gathering these samples, typically you do a series of screening activities. For example, the waste samples you intentionally or you pursue, you attempt to find the worst looking material, based on either H-New (phonetic spelling) or other field

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instruments. Take samples of that, rather than just randomly take samples, many more samples to see what risks might be involved. In almost all cases, in fact almost 95 cases, these samples were analyzed to the full T.C.L. risk. That involves approximately 141 chemicals. Plus the indicated plan which was another 30 analyses, which meant to generate more traditional waste parameters.

Following the collections of samples and the analysis of them, the results are looked at in depth by scientists and engineers to determine what the values are compared to such things as the regulations that are published by the State and Federal government to determine what impact the landfill might be having on the environment. In the case here, we determined that three matrices were being somewhat affected by the landfill. Those matrices were the groundwater, the surface soil, -- especially where waste was encountered -- and finally some of the air samples.

With that information in hand -- I'm

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sorry, one other study I want to show you. Also during the study, the attempt is made to leave no stone unturned. Such things as the soil gas study was conducted across the whole landfill. And supplemental to that the 28 monitoring wells that were installed were installed shallow, intermediate, and deep in eight or 10 locations and other locations where the aquifer was right on top of the bedrock, only two sets of samples were taken. You can see upgraded spots were chosen as well as downgrading locations. And the soil samples and the waste samples were taken representatively across the 65 acre landfill. Based on our findings, in the initial phases of the feasibility study, attempts were made to identify what technologies and treatment options make sense for this site. Identified here are technologies which have been incorporated into the six alternatives that are presented in the plat. The circled items are items which are contingent items. The solid X's are the ones that are a given portion of the alternatives. A great variety

of treatment or satisfaction has been put into the different options. Start out with the "No action" note, which is to do nothing other than continue to monitor the various groundwater and air samples, up to alternative 4A, 4B and 5, which include a cap, the main variable between the three options. In addition to that, other common elements are deed restrictions to keep the site, make sure it is not developed as a residential property. There is continuing water monitoring to make sure everything works. There is installation of additional downgrading wells, continuing to discharge the leachate to the treatment plant to a local P.R.T.D. as well as installation of passive gas venting system. Other components of the cap involve surface water drainage features and some modifications to Torne Valley Road.

Finally, the cost associated with implementing these alternatives ranges from the low, half a million dollars, up to a high of 28 million.

At this time I will hand it back over

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to Kathy to wrap up where the PRAP stands.

MS. McCUE: I would like to take up where we've gone with Jim. Jim showed how we developed, the Town has developed a number of alternatives for consideration by the EPA and the DEC and I would like to just explain to you how the EPA and the DEC went about evaluating these alternatives.

The slide I have put up shows nine criteria that we use to evaluate remedial alternatives. We also consider our remedial goals, which we set as we go through the remedial investigation and we find out what kind of contaminants we have in various media in the site.

Remedial goals: Do we want to meet groundwater standards, air standards? Obviously we do. That sort of a thing. And general response actions: Do we want to look at containing the waste or treating the waste? And so forth.

So keeping those objectives in mind. We use these nine criteria to evaluate the alternatives.

Now, what URS consultants has done in the F.S., if any of you have had a chance to look at it, is they have gone through and rated the alternatives by seven of these criteria. I am just going to run very quickly through what they mean.

The threshold criteria, as they are sometimes called: Overall protection of human health and the environment and compliance with applicable or relevant and appropriate requirements. Those are groundwater standards air standards and the like. These are the threshold criteria. To be selected an alternative must meet these criteria. In the case of A.R.A.R., Applicable or Relative Appropriate Requirements, if we can show that there is good reason to waive an A.R.A.R. or get a variance -- and you will see what I mean as I go on in the discussion -- then we can show that we have met this criteria. Having met these criteria, the balancing criteria are considered. Whether an alternative is going to be effective in the long term, whether it uses or I should say to what extent it uses

treatment to permanently destroy or treat waste such that they are no longer toxic or mobile or perhaps we reduce their volume so that they don't present as much of a threat. We evaluate how much we can treat the waste in the site through given alternative. We consider the short-term effectiveness of an alternative. How quickly will this alternative achieve our remedial goals. And in with short terms effectiveness is also the consideration with this: Will implementing this alternative in itself cause an environmental problem or possibly even a public health hazard? And if so: Can we deal with this environmental problem or public health hazards that would be created for the short period that the alternative would, say, be under construction?

Next we consider implementability. Simply put, are the materials and trained personnel available to construct this alternative? Could the alternative be modified later in the future? Could we add to it, if it shown that we need additional action

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in the future?

Finally, we consider cost. We compare capital, yearly O & M, and present worth cost. If you don't know what a present worth cost is, we take the future cost and we discount them to the present year using an interest factor. So that gives us a number that we can compare all the alternatives equally by.

Now you see at the bottom the modifying criteria. These have not been considered by URS They are considered by the U.S. Environmental Protection Agency during the record of decision process. Erin described to some extent what the record of decision is. While the record of decision is being written, the EPA will consider whether the State accepts the preferred remedy. And, obviously, they have been working closely with us and we with them at this point. So perhaps that is not as big a consideration on this site.

The community acceptance we have yet to evaluate and that's the main purpose of this meeting tonight and of the comment period is to gather your concerns and your questions,

which we will respond to and, if necessary, we will modify the remedy in accordance with the concerns of the community.

Next I would like to show what the preferred alternative of the EPA and the DEC is. It is Alternative 5 of the alternatives that Jim Lanzo showed you. It is, as you see, landfill cap with a soil cover on the side slopes, installation of groundwater extraction wells to improve the existing leachate collection system, which I described to you, adding fencing and deed restrictions to prevent future groundwater use on the landfill property, long term monitoring of groundwater, at least for the next 30 years, and various contingency items as Jim was describing; an alternate water supply, groundwater pre-treatment and treatment of landfill gases.

Now the alternate water supply would be implemented if our long term monitoring showed that this remedy was not effective at stopping contaminated groundwater from moving off-site. Groundwater pre-treatment may be required in the future if the sewerage treatment plant

where the town is intending to send the leachate say requires it as a result of a change in the regulation or possibly a change in the composition of the leachate. URS has included this as a possible contingency and so have we, in the preferred remedy. And the treatment of landfill gases will become necessary if after we construct the cap and we test the vents we find that there are unacceptable levels of nonmethane organic compounds which would contribute to the air pollution in the general area. We'll evaluate that. We will take samples and we will compare them to DEC and EPA air quality criteria. And, if necessary, we will treat those landfill gases.

Now, I mentioned before compliance with applicable or relevant and appropriate requirements. I may just call them requirements. The landfill cap with soil cover on the side slopes does not meet the letter of state solid waste landfill regulations. It does not contain an impermeable membrane over the entire fifty

acres of the site. It only contains this impermeable layer over the flat tops of the mounds. I don't know if you can see the map that we have put up in the corner there but the shaded areas on the map -- you can feel free to look at this after the meeting -- show where we propose putting the impermeable membrane. Now -- actually we have a slide of here which I will show you. The light shaded areas will contain an impermeable plastic membrane in addition to the foot and a half of soil that will be over the entire site, plus vegetation. These areas, these areas here will only contain a foot and a half of soil. Now that, as I say, does not meet the letter of the state landfill closure regulations but what the DEC and the EPA have done is we've looked at the overall alternative and the fact that this landfill is kind of a unique situation because of the leachate collection system already being in place and the fact that we can improve this through the installation of extraction wells enables us to collect nearly all of the groundwater, we

believe, that is flowing off of this site.

As I say, this is a rather unique case. In most landfills it is not feasible to do this but here we are able to do it. So we feel that a deviation or a variance from the landfill closure requirements in their letter maybe justified because we can meet the intent of these regulations through the groundwater collection.

Now, we need to confirm this as the studies in the F.S. have not been complete enough to show this belief to be true conclusively. What we plan to do are confirmatory studies. At this point we are planning to do them in the remedial design stage of the project following the record of decision. These studies will consist of at least a pump test. A pump test is where we will pump water from wells in the downgrading area of the site to basically prove physically or in real life what we've only been able to show so far with a groundwater model; that is, that we are able to capture most of the water coming off the site. In addition, we will

probably do more detailed groundwater modeling. But, in any event, these studies may confirm that our belief about Alternative 5 is true. If they do not, if they don't show that Alternative 5 will meet the remedial goals in an equivalent way to, say, if we put a full 360 cap over the whole site, then we will implement an alternative with a full 360 cap. When I say 360, pardon me, I am referring to Part 360 of the State Landfill Closure Regulations. We will put a full cap with a full impermeable membrane over the site, which is otherwise referred to as Alternative 4 option B of the alternatives that Jim Lanzo showed. And that, as you can see, is a landfill cap, a full multimedia cap with a full impermeable membrane over the entire site. In other respects it is identical to the Alternative 5 I just showed you, same contingency items and so forth. Now, this alternative, because there is a full impermeable cap over the site the cap will shut out more rainwater from getting through the waste and carrying contaminants within the

waste into the groundwater. It will prevent that from happening on a greater scale than Alternative 5 which I showed you. But, again, because we are able to capture all the groundwater coming off the site, or nearly all, again, we feel Alternative 5 may be equivalent to this alternative in effectiveness. But this alternative does, of course, meet the letter of the regulations with respect to a full impermeable barrier. It does contain a minor variance, this alternative option B in which we are only thinking of using a foot and a half of soil over the impermeable barrier. The regulations actually call for two and a half feet. We feel that because we are using an impermeable plastic, as opposed to a clay that might be damaged by frost cycles, we feel that the additional thickness of soil may not be needed. And it certainly cuts down on the cost. So that is included in this alternative. But that, I should stress is a relatively minor departure from the regulation requirements as opposed to Alternative 5.

I have already kind of covered somewhat the comparison of these two alternatives. Alternative 4 option B and Alternative 5. I won't go into how we compared them both with the nine criteria, except to state that they were the only two alternatives that we felt were protective. Alternatives 1, 2, and 3 that you saw before do not address all the pathways of exposure to materials in the landfill. This alternative and Alternative 5 do. We feel they are both protective. Of course, we will confirm that in the case of Alternative 5 with the studies that we plan to do in remedial design. We feel they are both effective in the long term, if they were properly maintained. They don't contain treatment of the waste. Perhaps I should put the criteria up again. They don't contain treatment of the waste but this being a very large landfill with no pockets of concentrated waste that we could find during the R.I., really treatment of the waste isn't a practical option for this site and wasn't even considered as an alternative.

They are both implementable. Alternative 5 will be somewhat easier to construct because we will not be trying to put a plastic membrane on steep side slopes, which can be done and is done in landfills throughout the state but any engineer will tell you that that's a challenge. In fact, that kind of leads to the consideration of cost. Why are we considering Alternative 5? Because it's cheaper than Alternative 4 by about three million dollars. The cost of Alternative 5 being about close to 20 million dollars, the upper number you see there includes contingency items, if they are needed, if they are included. The cost of Alternative 4 on the other hand is 23 million dollars.

That basically summarizes the process and the rationale by which we've come to initially decide upon Alternative 5 and hence our preferred remedy, the Environmental Protection Agency and the DEC.

I think at this point in the meeting it's a good time to open it up to your

reactions, your comments and questions and, as Erin mentioned, I believe we will begin with any statements of any local officials who would like to speak.

MS. O'DELL: I am going to open up this microphone if anyone wants to use this one. I think we will take the standing microphone and put it down on the floor.

MS. McCUE: Could I just add, this is the preferred remedy. The final selection of the remedy will be made after the consideration of all the public comments. So keep that in mind. This is not cast in stone yet. Thank you.

MR. REISMAN: Ladies and gentlemen of the DEC the EPA and the State Health Department and members of the public. My name is Herbert Reisman. I am the supervisor of the Town of Ramapo and have served in that capacity since January 1986. More than 60 years ago I learned that two plus two equals four. Today that is still true. The reason that two plus two equals four 60 years ago and today is because mathematics is a precise

science. The closing of landfills and what steps will best serve the public interest is not an exact science. Experts, like you, can only theorize, postulate, and estimate. You cannot be sure that the actions that you prescribed today will not be laughed at ten years or 60 years from now. Now this is not meant to be a negative reflection of your knowledge and intellect but a basic statement of the truth. Nevertheless, the decisions that you are going to reach following this hearing will not only have a profound effect upon the environment but also have a very severe monetary effect on the taxpayers of both the Town of Ramapo and all of the taxpayers of New York State.

Simply stated, the more we spend on your recommendation on how to properly close the landfill will have a direct impact on how many people work for our police department, highway department, and other vital government offices in our town for many many years to come.

Sixty years ago state government

officials condoned the use of incinerators in apartment houses as a method of disposing of solid waste. Sixty years ago state officials condoned the use of wetlands as a place to deposit garbage for municipal disposal. As recently as 20 years ago, to get back into your lifetime, the State Health Department sent a letter to the Town of Ramapo describing the Ramapo landfill as one of the finest in New York State. And several years later State officials gave a permit to the Spring Valley Water Company to construct their water wells adjacent to the Ramapo landfill.

Along came Love Canal and we then embarked upon a major series of changes which brings us to the subject of tonight's hearing. In September of 1983, the Ramapo landfill site was placed on the Superfund National Priorities List. In 1988 the Town entered into a consent order, which I signed, with the New York State DEC which required that a R.I.F.S. remedial program be developed and implemented for the site subject to the approval from DEC. Now, the Town, in addition

to its own engineering staff, hired a well known and respected consulting engineering firm, namely URS, to conduct a study of the landfill for the town. After nearly two years of study and a cost approaching one million dollars the engineers met with Town officials to discuss the results of their study. As I understood their discussion, not being a physical scientist but a political scientist, they indicated to me that we could spend anywhere from one million dollars to 50 million dollars to take the appropriate remedial action. However, they stated that even if we spent 100 million dollars there could be no guaranty that there would not be any undesirable effects coming from the landfill five, ten, or thirty years from now. For each additional million dollars that you spend, there is a slightly immeasurable lessening of risk in terms of safeguarding the environment for future years. Thus the Town finds itself in a dilemma.

As everyone knows, we are currently in a recession which to many people is really a

depression. We are cutting the quality of services in vital departments, such as police, highway, and public works in order to avoid raising taxes to the point where residents no longer can afford to live here. For the Town to agree to spend 40 or 50 million dollars for our landfill closure plan, as was originally proposed by State officials, would have been criminal, especially since there would be no guarantees that this would totally remove any possibility of problems developing in the future. As a matter of fact, we do know that in the near vicinity of our town landfill there is private lands into which garbage and C & D material have been buried for years, which, regardless of what we do at our landfill will have a future negative effect on the aquifer system.

Originally our engineers recommended a closure plan which, although it would cost less than a million dollars, scored nearly as high on a weighted evaluation of the more costly plan before us tonight. This was totally rejected by the honorable DEC and EPA

officials. Informally, we have agreed to support a plan which could cost from 20 to 26 million dollars, which is the subject of the hearing tonight.

Reluctantly, the Town Board of Ramapo will support this proposal, since we know that State and Federal officials will not support our one million dollar remediation plan. And, likewise, the Town of Ramapo would oppose any 30 to 50 million dollar plan.

Now both President George Bush and Governor Mario Cuomo, whichever one you like better, have both stressed in recent months that all departments under their jurisdiction should seek the most cost effective methods of accomplishing their goals. Their comments are most appropriate to what we are dealing with here tonight.

What we are really talking about is taking educated risks. We all know that hundreds and possibly thousands of lives would be saved each year if automobile manufacturers were mandated by the Federal government to install air bags for front seat occupants of

automobiles, yet because of the cost factor, the Federal government has not mandated their installation and lives are lost each year. Similarly, we all know that there would be a much saver and healthier environment if the pollutants coming from automobile exhausts were diminished. The technology is there but, once again, there has been no mandate from the Federal or State government to add that additional expense to automobile owners to purchase vehicles with the development which would reduce the risk of air pollution. From the moment we wake up in the morning until we go to bed at night we are taking risks, with every movement that we make. No amount of expenditures could possibly eliminate dangers which will lead to a perfectly safe society. Thus, we must use our intelligence and minimize the risks with which we live in accordance with our ability to pay for these risk reduction expenditures.

It's in this spirit that the plan submitted by the DEC for tonight's hearing and supported by the Town of Ramapo, namely

Alternative 5, is the subject of our hearing.

I would like to thank the conscientious officials of the DEC and the EPA who have cooperated with our town officials in reaching this compromise alternative. Let us know that it will prove to be effective and not prove to be an exorbitant waste of taxpayers dollars.

I Thank you.

MAYOR PARNESS: Mayor George Parness, Village of Suffern. My statement is very short and brief. Suffern is happy to learn that the matter of the Ramapo landfill is finally drawing to a close. After living through years of fears, rumors, studies, and reams of sampling data, we will be able to feel secure in the fact that the Village water supply and also any other water supply in the Lower Ramapo valley will no longer be impacted by the infamous Ramapo Landfill. Suffern became part of the solution to the problem a year and a half ago when we agreed to accept the landfill leachate for treatment at our waste water treatment plant. All indications are that the leachate is free from any toxic

or hazardous materials. So we are looking forward to a long contractual relationship with the Town of Ramapo in this matter.

Now, getting to the subject of this public hearing. We have reviewed the various methods for landfill closure that have been described in the URS report and find some merit in most of the schemes that are presented. The basis for a satisfactory closure program is to limit the generation of leachate by controlling the percolation of rain and snowmelt through the landfill. Diversion of surface and subsurface drainage away from the landfill providing a method for positive leachate collection and, finally, securing the site from any activity that would disturb the integrity of the landfill. Gas collection and disposal will be an ongoing problem for the early periods of a closed landfill.

Most of the plans under consideration touch on each of these aspects, some more aggressively than others. We must also take into consideration some of the natural closure

that has occurred through the several years of inactivity at the landfill. It's unwise to disturb the lush vegetation that has developed on the stabilized side slopes. It's equally unwise to cut into the top of the landfill just for the purpose of providing runoff grades. The necessary grading can be accomplished by bringing in clean fill, thereby keeping the landfill intact.

The method that Suffern finds acceptable and recommends for adoption is Alternative 5. This plan requires the least amount of disturbance to the landfill while at the same time provides for the optimum protection for the environment. We in the Village of Suffern look for an early action to this plan. Thank you.

MR. FARRISON: I have a prepared statement from Mayor Brian Miele from the Village of Hillburn. My name is Dennis Farrison. I am a trustee for the Village of Hillburn. To the extent that Hillburn lies very close to the subject matter for this evening's hearing, I would like to read Mayor

Miele's statements.

"Clearly the interests of the Village of Hillburn closely parallel the Town of Ramapo, both with respect to the concern for public safety as well as for the concerns relating to the financial burdens associated with the landfill remediation program. It's my impression, based on review of the volumes of documents published recently, that the risk assessment for this site has been well thought out and the identified alternatives have adequately been addressed both in the long term and the short term as far as the impacts on the public health.

As expensive as the remediation program appears to be, I must applaud the EPA and the DEC for their determination in the requiring of the capping of the landfill in order to contain and reduce the volume of contaminated groundwater. Further, I am most pleased with the reasonable approach that the EPA and DEC has employed in the evaluation and determination of the remediation measure.

Their willingness to consider the

various waivers from Part 360 requirement for capping the landfill bespeaks the thoughtful assessment of the rather modest contamination levels found at the site and is entirely welcome during this period of limited and strained financial resources.

Finally, I would like to share just two thoughts relative to the current direction of the DEC which would be taken into the matter of the remediation requirements. First, because of the acute problem of potential contamination of the downgradiant watercourses and wells, I would like to see a more frequent sampling and testing program than is presently scheduled. I would hope a quarterly program would be instituted for these tests; understanding that the cost of such testing obviously pales when compared to the overall project cost. Certainly, an early warning of the escaping contaminants will most easily and less expensively be addressed with the prompt attention to the supplemental withdrawal wells and/or enhancement of the subsurface cut-off trench drains.

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Secondly, while I endorse the DEC's preliminary decision to provide some minor relief for the project budget by eliminating the formal capping of the steeper side slopes, it would be prudent to require additional storm water diversion to the upland at the base of the capped sections of the landfill. Such that the potential groundwater infiltrations is further reduced. However, since the nature of this project is such that the capping construction can be extended at any time in the future, I would support the graduated response to this problem with the hope that the continued testing and the volume monitoring will confirm the rationale that the additional capping of the sloped sections is unnecessary.

In conclusion, by my most rough estimates of the site utility over the past 14 years of operation, the actual cost of the landfill dumping operation which preceded unchecked and unmonitored will eventually cost the taxpayers up to $30 per ton over the original cost and it's my recollection that

the earlier figures would most certainly ranged between $4 to $20 per ton.

Finally, I think there is a real lesson to be learned here."

Those are the statements of Brian L. Miele, Mayor of Hillburn on behalf of the Village Board, Village of Hillburn. I want to thank you all.

MR. ERNEST: My name is Paul Ernest. I am the chairman of the Eleanor Burlingham Commission on Environmental Quality and Recycling for Ramapo. We, the members of the Commission have looked into this project and we have a prepared statement which I will read out now to you. "At its regular meeting held on February 20th, 1992 the Eleanore Birmingham Commission on Environmental Quality and Recycling passed a resolution supporting the above referenced proposed plan of action, which includes the following main components:

Capping of 35 acres of the landfill using a multi media system, including layers of fill material; a gas-venting system and an impermeable membrane. The remaining 25 acres

consists of slopes where the grade is greater than 20 percent. If studies demonstrate that this approach is feasible, the slopes will receive a capping system, but will not be covered by an impermeable membrane.

Collecting and venting of landfill gases: Landfill gases will be collected and treated if necessary.

Installing groundwater extraction wells to supplement the existing leachate collection system.

Installing perimeter drain around the section of the cap containing the impermeable membrane to collect and divert surface water runoff.

Collecting and diverting leachate seeps to the leachate collection system for off-site treatment. If necessary, the waste water discharge from the site will be pretreated prior to discharge to a publicly owned treatment works.

Annual long-term monitoring of groundwater. If deemed necessary by long-term monitoring and alternate water supply will be

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provided for nearby users.

Restrictions on the future use of the site to prevent disturbance of the cap and prohibit the use of groundwater on the site for purposes other than sampling.

It's the Commission's understanding that contingency plans will be in place to further protect air and water quality should long term monitoring deem this necessary."

Thank you.

MR. DEMAS: Good evening, my name is George Demas. I own a piece of property that is next to the Ramapo Landfill. I appreciate the opportunity to come here tonight and give my comments and those of my consultant as input before the final decision on this project is made.

When the Superfund project got underway and information relating to the technical data became available, it became clear to me that it was too technical for me to handle myself and too difficult for me to interpret in a meaningful way. My object is the protection of my property. The property is 15 acres that

is listed in the National Register of Historic Places. The property was originally a horse farm and it's been converted to residential use. There are 50 residents of the Town of Ramapo that now live at Torne Brook Farm and we have a private well. That private well is classified as a public water supply because of the number of people that it serves. It is the closest well to the landfill. That well and the water supply system are supervised by County, State and Federal officials. That supervision includes testing, questionnaires, inspection of the premises on a regular basis, et cetera. And it's the protection of that well and the overall protection of the health of the residents of Torne Brook Farm that concerns me tonight.

Like I said, the data began to get too technical and I had to call in somebody to help me interpret it. We turned to a environmental engineering firm from the area and over the past number of months have asked them to review all the technical data and to interpret it as it effects the residents of

Torne Brook Farm. I have with me tonight Mr. Michael Brother. Mr. Brother is the vice-president and the director of the division of hydrogeology for Eichenfelder, Inc. (phonetic spelling) at their Mahwah office. Eichenfelder Incorporated is a national environmental engineering consulting firm headquartered in Tennessee. Mr. Brother will give you a technical overview of our interpretation of the way the PRAP and the overall study effect those of us who live in Torne Valley. Michael. When he is done I have a few comments of my own.

MR. BROTHER: I would like to take advantage of your overhead.

For the record, my name is Michael Brother, Eichenfelder, Incorporated. I am, by training, a geologist and hydrogeologist. I received a Bachelor's Degree in Earth Sciences from Fairleigh Dickinson University, Master's Degree in Geology, specializing in environmental geology, from the University of Vermont. I spent the last 12 years working as a hydrogeologist on waste disposal,

investigations and remediations of waste disposal sites, including both CERCLA sites and Part 360 sites in New York State.

Our review of the documents is what we would call a conceptual level review. We went in not with the intent to evaluate every equation, every calculation that is presented in the documents but to take a broader view regarding the work that was done and what the proposed remedies are in terms of their likely effectiveness. We focus on the conceptual model of site conditions and on the question of how well do the preferred alternatives and the contingent alternatives address those site conditions. The documents that we reviewed included the draft R.I., the final R.I., the draft Final F.S., the final F.S. and the PRAP, in addition to various other background documents.

Based on that review, the schematic conceptual model -- and by that I simply mean a representation of what we know or think we know about the physical system -- this is a cross-section schematically drawn across the

landfill site, Torne Brook, across Torne Brook Farm and the Ramapo River to the well field. We know from the water quality analyses that have been conducted that there is a plume of leachate contamination emanating from the landfill site. We know that in some fashion it's limited in its extent in the overburden aquifer and intermediate aquifer by an existing leachate collection system that it's at least partially effective. There have been areas identified where historically it has not been effective and contamination has been free to move further in those areas.

Those are the things we know. We know we have degradation of water quality at considerable distances from the landfill. By degradation I don't necessarily means it exceeds drinking water quality standards at this point in time but you can see an impact from leachate.

What don't we know about where this plume is going. We know that it's down in the deepest wells that have been drilled into the bedrock aquifer. We don't know how much

further into the bedrock aquifer it may go. In particular, at the immediate downgrading edge, in the deep bedrock aquifer, groundwater quality standards are exceeded. If we were to put a little color on the conceptual model, we know that in this area it exceeds water quality standards. Somewhere out here it doesn't. We know we don't know where that boundary is. Keep in mind this is just a single slice. We also don't know in the third dimension, in the map view what the limits on that contamination might be. We know that there is a downward component of flow in the system, so groundwater is moving down. To my knowledge we have not evaluated the ultimate discharge point of some of the deeper flow paths that would emerge from bedrock aquifer and could either discharge to the Ramapo River, which you would anticipate under normal conditions, it's as has been stated, the lowest point in the natural system. But we don't know if substantial pumping from the well field could alter that natural system and draw groundwater across the natural divide.

These are unknowns, not necessarily exactly what's happening but they are unknowns.

By way of summarizing our findings, leachate has impacted groundwater quality in the bedrock well to the Torne Brook Farm. Given the costs that are associated with long term monitoring, the potential liability that's associated with degradation of a public water supply and the relatively low cost of installing a water line -- less than three percent of the preferred alternative -- and even less on a percentage basis of the contingent alternative would seem prudent to install a water line at this point in time. In the larger scheme of things, it's a very small percentage and would reduce liability and also reduce some of the monitoring costs. In a strict sense, based on what has been done to date near the preferred alternative for the contingent alternative are consistent with the stated objectives, particularly with respect to preventing off-site migration and also with respect to preventing inhalation of vapors from the landfill. Based on what we know now,

we can say that these alternatives will limit, we certainly can't say prevent. There is an deep groundwater flow path which is likely to continue to carry groundwater contamination off-site.

The installation of a passive gas collection system, will not prevent inhalation of vapors, it simply collects them, vents them to the atmosphere, not unlike has been occurring throughout the history of the landfill.

The preferred alternative is not the most cost effective remedy and permits substantial leachate discharge to the bedrock aquifer.

I think it would be fair to say that the preferred alternative is the least costly of the alternatives that has some marginal effectiveness. It will reduce the amount of leachate that is generated. Not necessarily in the most cost effective fashion.

One way we can look at this, one way that is typically done, in fact we have done it many times ourselves, is to look at the

effectiveness in terms of the percent reduction in the leachate generation achieved versus the cost of the alternative. What you typically find is you reach a point in diminishing returns where you spend more and more dollars for no additional environmental benefit.

We compared the three alternatives under discussion, Alternative 5, 4B and 4A. Alternative 5 is the preferred remedy. It achieves a 67 percent reduction in the rate of leachate generation based on the numbers that are provided in the R.I.F. Present worth cost, on the lower end of 19.8 million dollars. Both alternative 4B and 4A, because they include an impermeable membrane throughout the area of the landfill achieve an identical reduction in the rate of leachate generation of 94 percent. Alternative 4B at a cost of 23.2 million, alternative 4A at cost of 27 and a half million. Clearly choosing between these two, 4A is not justified. You are not achieving any additional benefit for those additional four million dollars. But

you are substantially increasing your benefits between the preferred and the contingent alternatives.

Another way of looking at it, same numbers but in this case we are looking at the range of estimates that are given in the PRAP for each alternative. Alternative 5, the preferred, ranging from 19.8 to about 26 million. The little dashes that you see here correspond with effectiveness on this scale. The vertical bars are in terms of cost, present worth. What this graph highlights is that you're effectiveness for alternative 4B and the contingent alternative clearly exceeds the cost range. Again, additional cost to go to 4B, a true Part 360 cap, no additional environmental benefit. Here for even what is overlapping in essence of cost protectiveness is substantially increased.

We've also got some concerns just from a practical standpoint with the proposed variance on the thickness of the materials above the cap in alternative 4B. But we feel that the contingent alternative 4B, even

though it requires a variance can be both technically justified and cost effective. We are not looking for the Cadillac here but looking for the thing that gets you the most bang for the buck.

As at least one other commenter has noted, we share some concerns about the monitoring that has been prepared. We don't think, A, that the monitoring requirements are sufficiently defined at this point or where they have been defined they apparently depart also from Part 360. We don't see any evidence that that has been considered in terms of a variance. We also comment the criteria which will be used to decide which components of the selected alternatives. For example, the passive venting versus active gas collection will be implemented are poorly defined. It seems to me when you are going to set up something that is highly contingent like this we need to know right up front what the triggers are going to be, when they are going to be evaluated, how frequently. It just seems prudent to do it that way. Most

importantly, maybe it can be shown that you are going to collect all the groundwater from the deep bedrock. It doesn't seem likely given some of the permeabilities that you've measured. But the criterion, additional studies which will be required to determine whether the preferred alternative or the contingent alternative as collected have not been adequately defined. I don't think its enough to say "We may do some aquifer testing. We may do some additional groundwater modeling." If we are going to have to make those decisions now, we need to say what we are going to use to make that judgments. What type of aquifer test, what the results would be received in a test of that type tell you you have to go to the alternative. Those types of questions need to be answered up front or we may find ourselves several years down the road starting the whole thing over again. Thank you very much.

MR. DEMAS: George Demas. Michael, I appreciate the technical comments. Obviously his area of expertise is beyond my

understanding of all the data that was provided.

What I would like to do briefly -- I know it's getting late but I have spent many years waiting for this study to finally go out -- is to go through a very brief story as to the way I look at it as having lived next door to this site.

In the spring of 1986 there was an application made to the DEC for what was called a SPDES permit. It was a permit to discharge the collected leachate from a leachate collection system that had been constructed directly into the Ramapo River after some minor treatment. We did a lot of research. I hired an attorney and we legally formally opposed that permit. There were several hearings held, one here, one in Clark Center, and the fears that we expressed were these:

First of all, we didn't think that the leachate collection system was going to work. We weren't convinced it was working. We had some reasons to think it might be

insufficient. We said that at the time.

Secondly, we felt that even if it did work for above the bedrock contamination, that there would be a problem with contamination below the bedrock.

And the third thing that we were afraid of was that if the leachate collection system did not work, the contamination would spread from their property to my property, to our property and contaminate the water supply.

The hearing was held, our arguments were made and we were told very clearly that the system was designed to work, that the leachate would be collected, that it would be contained. We were told that the collection system included extracting leachate from the bedrock, from the cracks in the rock that is way down in the ground, and we were told that in any case no matter what happened even if the collection system failed there was a brook separating the two properties and the brook would act as a natural barrier to the leachate and therefore we were safe.

We didn't like it. The decision was

made and we lived with it. A couple of years ago the Superfund study started and one of the things that that study did, and the detail was shown on the map with all the wells, is that they dug wells all around the perimeter of the landfill to see what was down there. They dug wells in sequences of three; a shallow well into the water table you might call it, a deeper well to the top of the bedrock, and then a well all the way into the bedrock to see if there was water flowing through the bedrock; that is, to see if there were cracks in the rook that the leachate could flow through. The tests came back and they were to me frightening because they said, very simply, one thing, the leachate collection system failed.

I have heard a lot of technical data here tonight but I haven't heard anybody say that. I will say it. The leachate collection system failed. As a matter of fact, the series of three wells that was closest to my public water supply is the one in which there was the most leachate contamination. And that

series of wells was outside the leachate collection system. That is the basis for my saying that the system failed. Those wells were supposed to verify that the containment was working and they didn't because it didn't.

I was notified by the DEC and by the engineers that they wanted to take the next step, that is, to drill a series of similar test wells on my property halfway between the contaminated test wells and my public drinking water supply. We negotiated an agreement for that kind of drilling to go on, although the assumption was still there that the contamination was stopped by the natural barrier of the brook. The test wells were dug and when the results of those tests came back, including tests of my drinking water, they found that my drinking water was still safe and the shallow and intermediate well water was safe but that in fact there was contamination in the bedrock well. That meant the next step had been taken, the next barrier had been penetrated and it meant, very simply, that the aquifer under my property and Torne

Valley has been contaminated with leachate.

This is not my description of what happened. If you look at the PRAP, they very clearly use exactly that term, because they are talking about Alternative 3 and why it is in that description I don't know but Alternative 3 contains the phrase that they "Need to restore the contaminated groundwater aquifer." If they have to restore it, that means it's been contaminated, polluted, whatever you want to call it.

So none of the assurances given to us in 1986 have held. The protections that we were promised, based on what was told to us to be the best engineering of the time just didn't turn out to offer us the protection that we wanted. The hearing tonight is on the final proposal for the final cleanup of this mess that has been going on for all these years. It's described in the literature as "The final way to resolve this problem." It seems to me that if the prior solutions failed, if a public water supply is threatened -- and these documents -- again, it

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is not my language, it is there -- say very clearly that it is threatened, that it is not time for compromises and it is not time for variances or deviations or "Let's hope that this one holds because the last two didn't hold." It's time to be a little more sure than that.

The interesting thing about the PRAP is that it describes what can be called site specific goals for this study. That is, these are not goals set for the study of any landfill. These are the goals set for the study of this landfill. And number four is to prevent off-site migration of contaminated groundwater. Well, it's a little late for that. The contaminated groundwater has already migrated off the site.

So what do we do? Aside from a solution of trying to pump that water out of the bedrock, there are really only two things we can do. Number one, do everything possible and practicable to stop the production of leachate so it can't migrate off the site. And, number two, provide alternate water for

the people whose water supply is threatened.

Now, the question of capping the landfill is an interesting one because one would be led to believe by this that because there were improper substances dumped and because there have been toxins and hazardous substances found in the landfill that the DEC is asking for this very expensive cap and that maybe the site isn't so bad and so maybe the expensive cap isn't required.

Two quick comments on that: Number one, in a meeting held in Albany on November 26th with local public officials and the DEC and the EPA to discuss this situation, the EPA made it very clear what the situation with this landfill is. DEC Deputy Commissioner Langdon Marsh pointed out the landfill is not considered by EPA or the DEC to be merely an old landfill, it is an inactive hazardous waste site releasing hazardous substances into the environment. That is what we have here.

Now, the second question is "What do you do about the stuff that is released into the bedrock". It has been suggested here that

that can be contained. Again, from the minutes of that meeting, the Town's consultant described the technical infeasibility of groundwater collection to prevented flow into the bedrock and added that they are not able to ascertain whether data modeling methods show how much water is actually escaping to the bedrock. In other words, they don't know.

I am not here to blame them for not knowing but I am here pointing out to you that if contamination is leaching into the bedrock and, as Michael showed you, it is going somewhere, we don't know where yet, it is not the time to set up a situation where we put up a partial cap, do some tests to see if it's working. My understanding is, number one, that the cap we are talking about is a cap that would be placed on landfill that never had any toxic or hazardous problems, a landfill that only took banana peals and orange peals, and coffee grounds from houses and was properly run and has no problems. The 360 cap would be required even for that. The 360 cap that we are talking about here is

particularly required because in this case, and again using their words "Actual or threatened releases of hazardous substances from the site if they are not addressed now will present a current or potential threat to public health."

So it's very clear where we are here tonight. We are at another crossroads. At the crossroads in 1986 we apparently gave the benefit of the doubt to some engineering we thought was going to be good and that engineering very clearly failed. Now I am not here asking for a Cadillac. If it's true that we can reduce somewhat the area to be covered, if it's true that we can reduce the amount of dirt on top -- and Michael gave you the figures on that, and I'm sure they will be in our written presentation -- that is fine with me. I don't insist that every single thing that is humanly possible be done, a hundred million or even 50 million but we can suggest an alternative here to go from 67 percent of the reduction in the leachate to 94 and 95 percent when we know that the leachate is

leaching that we are not going to stop it, that we don't even know where it is leaching. It seems to me that that relatively small amount of money is well spent.

But that is only part of it, because that does not take care of the objective of this study which is to prevent the migration. If we can't prevent the migration, then what are we going to do about the water supply. The water supply at Torne Brook Farm tested eighteen months ago tested clean except for the bad test well. The DEC is suggesting in the PRAP that testing be done on an annual basis. My understanding is 360 regulations call for examining on a quarterly basis at least for the first five years until we find out if there is any contamination. In this case we have found out that there is. Even if the annual testing is sufficient, I would point out to you it's been eighteen months now since a test was done. I don't know how much longer this procedure is going to take. If we take three or four or five or six more months to go the preliminary studies, contingency

studies and the rest of it, we are looking at two years before we do the second of the annual tests. And we are talking about people whose water supply is threatened. For something in the area of three percent to be spent now to put a water line in seems to me not only prudent but an absolutely inescapable alternative at this point in time. I popped the odometer on my vehicle tonight when I left and drove over here. We are talking about a mile, mile and a half of water pipe. Not a cheap proposition, $520,000.

Another question to me is how long does it take to run this pipe. I mean from the day, whatever the trigger is sets it off until meetings are held, consultations are held, then that plan is drawn up, engineer is hired to draw a plan for the water line that's approved and then bids are taken and somebody starts a water line and then runs it a mile and a half up the valley through rock and wintertime frost whatever, is that sufficient time, once there is contamination found, to supply the people in Torne Valley with a clean

drinking water supply? I say no. I say we start tonight. Start digging the pipe line and put it in. There is going to be a question down the line about who pays for the water and whether you hook it up the day it's completed or not but, for goodness sake, while all of this is going on let's have the water there so that if we test quarterly, like I would like to see happen, or even if we only test annually, once the triggers are popped and we know we have a problem, there is a water line there to hook up to.

That is a layman's look at what's happened here. There isn't any doubt in my mind that, like I said, we are at the cross-roads now. We are not going to be back. Now is the time to make a decision. Let's not go for 50 million dollars, let's not go for a Cadillac but let's reduce to 94 percent. Let's give Torne Valley clean water. It is not just me. There are 50 people living on my property. There are a couple of other, my neighbors here who have private wells. Theirs aren't as close as mine but theirs are

threatened. That is not my words, that is in here. There are two town facilities in the valley now and I don't know what planned for the future. This $520,000 for a water line for me or for my business or for the residents of my property, it's a water line for Torne Valley for now and for the future. And it's time to stop the water coming into the landfill so it doesn't come out. Provide alternate water now in case bad turns to worse and that is the way this thing has been going.

Thanks very much for your time.

MR. FRANKEL: My name is Robert Frankel and I am the Mayor of the Village of Wesley Hills which lies three, four miles up the road. I want to be on record as saying a few words at this hearing and this is what I would like to say:

I strongly support the efforts of the various government agencies in their attempt to try to control our environment and perhaps correct some of the sins of the past but I would like to emphasize and expand briefly on Supervisor Reisman's comments relating to

costs. I would like you to try to keep in perspective that the demands on our taxpayers in most of the communities in New York State is verging on confiscation. To emphasize this point I would like to say that the budget for our village of 4,200 people in 1984, I think when this controversy started, the entire budget was $300,000. In '92 our solid waste removal budget, on just the waste, has nothing to do with fixing the roads or our contract police agency, will be somewhere in the vicinity of $400,000 alone.

I just wanted to emphasize that and now with your proposal we are going to have, it appears to me we are going to have another very dramatic increase. Thank you.

MR. OSTROW: Stew Ostrow from Mahwah Health Department, New Jersey.

I have a brief comment considering Mr. Brother's comments this evening as to the uncertain impact of the bedrock aquifer from the landfill. The township of Mahwah is dismayed that unfortunately the Spring Valley and Suffern wells may have to act as an early

warning sentry system to detect migrating chemicals towards the Mahwah well field. And that's all.

MS. BIXON: I don't have a prepared statement. May name is Barbara Bixon. I am the executive director of Alliance for National Forest and I am speaking for myself. I am a member of the Mahwah Planning Board but I do not represent them tonight. I will be reporting to them.

I find is it very very disconcerting to hear a lot of politicians get up here and equate what the cost of human health is. I find it absolutely disgusting. I know that my mother was in the hospital for two and a half months and it cost over $250,000. It didn't force my father out of his home; it totally bankrupt him. If you go to any local hospital today, you will find lines of people just waiting in the chairs and waiting on line for chemotherapy or other things which probably won't even save their lives. Can you put a cost on that? The DEP and the DEC are paid with taxpayers dollars. You are here to do

the bidding of the citizens of the State of New York and in the case of the DEP, New Jersey. You are not here to do the bidding of the politicians. I'm sure if you asked the tax paying citizens of the town whether they would rather pay another fifty or a hundred dollars on their taxes to insure their drinking water and the health of their family, they would very quickly go along with it. And their health is entrusted to you.

Mahwah has filed for a sole source aquifer petition. We are very concerned about our water supply and we also sell water to other neighboring communities in New Jersey. What happens if New York State has its effect on New Jersey. I have gone to a couple of different meetings and I find, unfortunately, that the DEP and the DEC do not always get the results of various projects or intended projects and therefore you do not take into account the cumulative effect of many things that are going on or proposed to go on. You are talking about contamination of Torne Brook you are talking about it leaching into the

Ramapo River. If Sterling Forest is developed, there will be three more treatment plants being built along with the two that you have and they will be emptying into different streams and in the Torne and going into the Ramapo River.

If the Passaic Tunnel plan is completed, as it was now funded, they propose to widen and deepen the Ramapo River in Mahwah. Our experts say that in doing so Mahwah's rechargability will be affected; it will not recharge as fast and the water will flow from the Ramapo. What effect will that have on the amount of water and the volumes that are there. What effect will it have on the wells in New York and in New Jersey. What effect from Ramapo land companies leaching into the Ramapo. What effect by I-287's salt and contaminants coming over the highway into the Ramapo? What effect, never taken into consideration is in the Environmental Impact Statement, of the shading of the Ramapo River? You put all of those effects together and somewhere you should have a data base. There

should be better communications with the DEP and then you decide on the right plan of action. The most totally effective plan that combines the best effective way of cleaning this up and taking care of some of the other problems that are planned in a very short time.

You just can't look at one finger on a hand that has been run over by a truck. There are four other fingers that are being run over also. What is the total effect? Forget the imaginary line between New York and New Jersey and, for God's sake, our health is at stake. Our air and our water are the things that we thrive on and unless somebody has the guts to do what has to be done, regardless of the bucks, then we are not going to get anyplace. And I say to you, I lived in Ramapo for 22 years. I live in New Jersey now for six years. My friends are in Ramapo. They signed a petition. I had over 10,000 signatures in New Jersey and in New York and New Jersey for this federal study to have a national forest. These are people in New York and New Jersey

who are concerned about one thing, water quality and health. And that's why you are here, not to debate how much money is going to be spent but as our experts to say what is the most effective way of cleaning this up as quickly as possible. Not long range, now. We can't wait.

MR. EICHENLAUB: My name is Richard Eichenlaub. I am the Village of Sloatsburg engineer. I had prepared a letter and sent a letter out addressed to Mr. Ostertag of the Town of Ramapo and that has been submitted as part of the file. I'm not going to go through and read the entire letter tonight but I would like to just summarize what I've written.

We in the Village of Ramapo have reviewed PRAP. We have gone through it. We can appreciate the considerable efforts and time that both the Town and their consultant have put into this study. We agree with the study that the alternatives 1 through 3 really have no benefit to the town and the surrounding properties. Reviewing the alternatives 4 and 5 and the contingency plans

and the fact that there is no guaranty that if one of these alternatives are installed that the continued migration of contaminated water will be prevented, we agree with the study that at this time installing Alternative 5 would be beneficial. In that should it be determined that contaminants are still migrating off of the site after the monitoring leachate extraction system is installed, we still have that contingency and additional funds that we are not using the complete capping of the site to install a water system, pipe water system to these residents. With that, once again, I understand that we do agree with the selection of Alternative 5. Thank you.

MR. COZZY: I would like to respond to some of the comments that Mr. Brother had to make --

UNIDENTIFIED SPEAKER: Are you still taking comments?

MR. COZZY: Yes. -- and the Alliance of National Forest. What I would suggest Mr. Brother and others do is not just

look at how much of the landfill will be capped but look at the overall remedy and the fact that we are going to capture, we feel, the majority of the water leaving the site. To address the Alliance for the National Forest, we can only address -- through this study, we can only address this site. What we are recommending is what we feel is the best to contain as much of the water at the site and to control as much of the water at the site as is reasonably possible. And, yes, there are other problems in the area but this study can only address this site and we believe this proposal has done that and will be the best long term solution as far as controlling migration from the site.

MR. WELCH: I am Jeff Welch. I am with the Ramapo River Committee. This was, I assume, someone maybe speaking from the Spring Valley Water Company -- I would like to point out there was a strong letter in 1971 Robert Gerber to the Rockland County Department of Health that included a sentence something like "Never has a proposal been put forth which

carries with it more inherent risk and damage potential to the county water supply than the surprising plan to put a landfill next to the Ramapo River and Torne Valley."

So there were warnings early on about the threat to the water supply. I am doing a study for the Village of Suffern to develop groundwater rules and regulations and zones of protection for their well field. This is a program that is done with the New York State Department of Health. The rules and regulations when reviewed and accepted are then promulgated by the Commission of Health in the State of New York and become law. The zones of protection for -- this is the entire Ramapo drainage basin of New York State. This is the primary aquifer. The landfill would be overhear and Spring Valley wells are here and the Suffern wells are here. I know you can't all see that but I wanted to put the landfill into context that even though we have to address the immediate effects of the site, as part of an interstate water system that supplies over two million people with the

water supply including where the Ramapo is pumped over to the Wanaque Reservoir (phonetic spelling) in New Jersey and goes all over northeastern New Jersey. About 25 percent of the water in the reservoir comes from the Ramapo. It's very important that the solution here be the most thorough and most protective of the requirements. I am surprised that in the history of the site is really incomplete in the statement that dumping was completed in 1984. If you look at -- in 1984, June of 1984, I believe, "By an order of the State Supreme Court Ramapo finally stopped dumping their municipal waste, solid waste." C & D operations then commenced. In September of '85, under police observation, all types of asbestos was observed to be taken into the site and the logs of trucks going in didn't comply with the number of trucks observed by the police. So, okay. 1985 letter from the DEC, "The Ramapo Landfill's long and troubled history apparently has come to a end. State officials has ordered the town to stop accepting construction demolition debris."

Actually they allowed extra dumping at the Ramapo Landfill, through a loophole in State Environmental regulations coupled with laxity by New York environmental watchdogs. The DEC allowed Ramapo to continue dumping debris at its landfill four months after an August closing deadline. I won't go into all the details but like flashcards, 1986 "DEC allowed dumping at landfill." 1988 "State orders Ramapo to close dump." April 16th, 1989 "Westchester County Judge, State Supreme Court Judge last week granted preliminarily injunction closing the dump ruling that its proximity to a drinking water source threatens public health and that Ramapo violated environmental laws by operating a similar dump for three and a half years without state permits." Okay where is that in the history? I mean didn't the consultants look at the history of the site. I think that is a glaring omission. It excludes four years eight months of dumping which would be, at least by my calculations, using the Town's figure of 855 tons per month that they used in

a permit in 1987, I think, would be 47,800 tons of additional debris. Including their last C & D site over here shown covered by the cap, which is a good idea, drainage from this site can go across landfill road into Candle Brook which comes down here into Torne Brook, hence into the Ramapo River where the well field is. The plan does call for traction wells along Torne Brook, which should be able to capture the leachate. This site, however, was outside of a leachate collection pipe over here. So it was in a very bad location.

Now some may say that C & D is not a major problem but we are experiencing a plague of C & D sites in the Hudson Valley. It's gotten a little better but there are sites all over the place. Some of them, unfortunately, will probably be Superfund site in the future because of cocktailing of contaminated waste with the C & D. Hopefully this didn't happen. There was more control in the Town of Ramapo than that the Saco (phonetic spelling) site in Tuxedo, which, of course, did get on the Superfund list and is also polluting the

Ramapo River. But even in painted walls, wall board, et cetera. Bricks. Where is brick? Was brick in a chimney covered with creosote? Wall board have glue in it? What is in the glue? What is in the paint? Is it lead paint? If you tear a building down, you don't tear new buildings down, you tear old buildings down. Lead was commonly used in old buildings through the 50's. Mercury used in interior paint until 1990 and is still used in exterior paint and can leach out into the ecosystem. The mercury can bio-accumulate, it's broken down by bacteria into methomercury and absorbed by the protozoa and absorbed, eaten by the plankton by the water, plankton is eaten by the minnows, minnows eaten by the game fish, we eat the game fish. There is consequences of C & D sites, particularly near water supply. And Ramapo River is stocked with fish by the DEC and is very popular fishing spot in New York and New Jersey. Also the habitat for Blue Flamingos. Blue Flamingos in New York State have been showed to have increased levels of mercury

contamination in a study done by Ward Stone.

I have to endorse the views of Michael Brothers, who did a very thorough analysis. The alternative water supply I endorse being built now, particularly because I live at Torne Brook Farms so I don't have to wait for the studies to come in and, you know, the pipe to be planted and all that delay. I don't know if the -- I saw our neighbor from the green house across Torne Brook Road here earlier, I don't know if he's still here, but I was very surprised to see that the other nearest residential property which would be over here, it is not on this map, it would be well number two; PW-2, I believe was never tested. I mean if I was going into an area to design a Superfund study, I would go to the nearest residential wells and test there first. That is the way -- that is where people are using water and where the contamination could be affecting people's health most directly.

It seems the process should be reprioritized so that is done routinely at

Superfund sites. If the cap thickness is reduced to the foot and a half and the slopes are sitting in the sun in a summer drought period, will that be sufficient to maintain the vegetative growth if a plant material fails. The cap's going to erode down and you are going to have to replace it at additional cost. I don't know the answer to that. I wanted to raise it so it can be addressed.

To the point that the alternative water supply is built and possibly thereafter, absolutely quarterly testing of the residential wells. I don't even believe the residential well at Torne Brook Farm was listed to be tested annually. Was it?

MS. McCUE: Not specifically but it certainly could be.

MR. EICHENLAUB: Quarterly. I mean if a plume is in the bedrock and we don't know the depth of the well at Torne Brook and it's in relation with the sand aquifer, that is an area of the primary aquifer it's at least 20 feet thick, I'm sure this definition of primary aquifer. If there is an interaction

between the bedrock and that aquifer, the contamination could get up in the well. So quarterly testing, please. Thank you.

MS. McCUE: I would just like to answer or address Jeff's question about the thickness of the barrier protection layer which is the soil above the impermeable membrane or in the case of the steep side slopes under Alternate 5 it would be directly over the gas venting layer. I think the question he raises is very valid and it's something we are going to look at very carefully during remedial design. We will need to carefully evaluate what sort of soil we use and even what kind of vegetation we use. I believe we can select vegetation that is very hardy under those circumstances and we can select soils that will retain the moisture well to keep the vegetation thriving. That is an excellent question, I am glad it was brought up.

MR. BROOKER: My name is Brian Brooker. I am a resident of the Town of Ramapo. I live at 129 Horn Lane, Monsey, New York. I have

looked over the proposals that were made in terms of the various alternatives and it seems to me that the DEC and the EPA and the engineering firm hired by the Town has spent an enormous amount of time and effort looking into this thing and I appreciate that, because I think it's something that needs to be done in such a thorough way. I'm not sure how residents or people in the public are to evaluate all of the information, that it has taken two years to come up with, in a half an hour meeting; however, I would like to say that I think that going for a plan that is not the most costly plan but going for a plan that provides a reasonable amount of protection and also takes into consideration the dollar amount has got to be a revelation. I am glad our government even thinks that way. I would like to say that I support the plan Alternative 5 and I say that it seems to be a most reasonable plan. As a resident of the Town of Ramapo, obviously, I am very concerned with what our tax rates are and what it costs to live here and I am also concerned with the

environment and what it costs in terms of environmental effects. I have a couple of questions -- I'm not sure whether -- are we allowed to ask questions?

MR. COZZY: Sure.

MR. BROOKER: One question I was curious about, because there seemed to be a little bit of confusion on my part is, you talk a lot about the bedrock aquifer being contaminated and I wonder, is that something that could have been contaminated before the leachate collection system was installed? After all, the landfill was open for many years and there was no provisions for leachate at that time. The water was simply going right through the stuff. Does it store in the bedrock aquifer? Could it just be sitting there? So I don't know the answer to that.

The second is, it seems to be a little inconsistent in that I heard testimony that the testing that was done of the contaminants was not conclusive in terms of finding high levels of pollutants that were leaching out of the landfill. And so, it seems to me that we

are looking after something that has maybe little environmental impact and yet we are willing to spend a lot of money on it. I am just not sure, is it that there is no level that is acceptable or is there some level that is acceptable or what is it that we are exactly trying to protect? What is it that we are exactly trying to make sure doesn't enter the groundwater system?

MR. COZZY: You asked if there is any levels that are safe. What has been established by EPA and followed by the State as criteria for carcinogenic compounds there is no set level that is considered safe, quote unquote. What they do is they look at the risk and the target risk. There is a range that EPA uses of one in 10,000 to one in a million. We tend to lean towards one in a million risk. Carcinogens were not a significant concern at this site.

The other set of standards that we follow are drinking water standards, most of which are set by the Health Department. Those parameters that you talked about, you said we

had low level contamination. We did exceed the drinking water standards for certain compounds in our monitoring wells, not in drinking water wells but in groundwater wells. That is what we are trying to protect. We are trying to protect the groundwater resource that insures that in the future it can be used for drinking water.

MR. BROOKER: Okay and the question about the bedrock the water in there.

MR. LANZO: In terms of the bedrock. The bedrock aquifer that we tested was not as competent bedrock as we could find it. We know the bedrock beneath this site has a history to have been identified to have some fractures in it. We have very limited information in terms of how much water is contained in a bedrock aquifer. We have reason to believe, based on the information we have, and the permeability we could get out of the bedrock wells that we installed that flow is very low and, you know, your question in terms of when the water got there. It could have been a long time ago. I mean, it could

have been possibly before that leachate system went in in 1984 or '86.

MR. BROOKER: Thank you very much.

MR. CAWTHRA: My name is Bill Cawthra. I am chairman of the Environmental Commission for the township of Mahwah. I am also a registered professional engineer. I have been working with consultants for the last five years with industry and in the environmental area for 15 years before that. I am appalled really that you would even consider making a ROD on the basis of so little data in the bedrock aquifer. If this were an industry, that wouldn't fly. I just don't understand how you can even conceive of preparing a ROD in such a short period, unless you have a budget and you have to push it real quickly. I have had that experience too. In fact I did a feasibility study for Ringwood and the EPA had a budget and they had to push it right through. We had to finish that feasibility study within a certain period of time. I expect that is what's happening here. You are not considering -- I am not sure there has

been an adequate risk assessment done. Couldn't be because you don't have enough data on the deep well aquifer. I really have nothing more to say.

MR. LANZO: Just point of note. There was a health risk assessment done which included a bedrock aquifer. As Bob pointed out earlier, none of those numbers showed a definitive risk. There was eight wells installed in the bedrock. In comparison to the overburden that water was generally cleaner and, again, my point in terms of limited information was about flow only in the bedrock. We put in eight wells set in competent bedrock. I think that's a reasonable amount of information. Compounded by the fact that all the wells, all the pumping wells were obviously in a good aquifer not in the bedrock itself. The aquifer typically was 40 feet thick. The bedrock wells we set were all a minimum of 20 feet of competent rock, 10 to 20 feet of competent rock. In each case at least, we typically found 10 feet of broken bedrock above

competent test bedrock. So that the bedrock aquifer -- basically our assessment was the bedrock aquifer does not pose a real threat to anything.

MR. MILLER: Actually I came unprepared I didn't expect to speak. My name is Richard Miller. After listening and after considering what you said at the onset, where your decision would be influenced by what we had to say, from what I've heard I think mine and my families health and welfare would be better protected if the local services were not diminished by spending an additional 3 million dollars for Contingency 4, I guess it's called or Plan 4 and I wish you'd consider that too. I think our services are very important:

MR. DEMAS: I don't understand the analysis of the quality of water from the private wells, mine and the two across the street, when the two across the street were never tested whatsoever and my well only had a water test. Nobody knows how deep it is. Nobody knows where the water is being drawn from. There are no flow tests. We don't know

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how much water is being extracted. None of that work was done. Nobody ever touched the well physically except to draw water out of a faucet. How can you make a statement that your flow indicates that the source of the water is safe when you really don't know what the source of the water is? Is it 60 feet down next to the fractured bedrock or is it drawing from 10 feet below the surface? The test was never done. I was never asked. The folks across the street never even had their water tested. That is the kind of thing that is disturbing to me. I don't want to spend any more taxpayer money than anybody else either. You have got to find out what is going on before you can make a decision.

I have spoken enough tonight, Thank you.

MR. OSTERTAG: My name is Gene Ostertag. I am the Town Engineer for the Town of Ramapo. I received a letter from a resident of the town which I want to provide a copy for the record and I thought I would read just a little bit of it so that it's made

available tonight. It comes from Joseph Caruso who is one of the consulting engineers who practices in the town in a private practice but who is also a resident of the town. He was unable to come here tonight. It says:

"While I'm sure no one is more aware of today's economic situation than you are, everyone knows what a burden an additional 19 or 20 million dollar project would be on the taxpayers. We must be realistic and note the necessity of properly closing the landfill to protect human health and the environment and still comply with federal and state requirements. In reviewing the reports and document pertaining to the closure, it appears that Alternate 5 would be most cost effective and still provide the necessary protection. I therefore urge you to obtain whatever variances are necessary to implement this alternative. I also urge you to do this as soon as possible while State funding is available. If you are familiar with construction projects, delays in implementing

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a project such as this usual result in cost increases. As a resident and taxpayer in the Town of Ramapo, I would like you to note that I support the implementation of the project as early as possible."

I would like to add just a short personal note that I have been involved in the study of the project for the last two years quite closely and one of the things I've observed in comparing things is that the town recently has spent 28 million dollars on a sewer extension in the Town, which was a very large extensive project in order to hopefully affect the environment in a positive way by keeping sewerage contamination from the groundwater and to benefit our residents that way. So that the Town has been very committed towards doing good for the environment. What we do feel, however, is something I have heard a couple of times tonight and that is that we need to be careful to spend our money wisely. And part of our process has been evaluating just how well our money is being spent. That is how the conclusion to go to Alternate 5 was

reached and I would urge our residents and urge the Federal and State government to adopt the Alternate 5 with the contingency that if we cannot satisfactorily prove that Alternate 5 is all right 4B could be done. But we certainly are very aware of the cost of the various environmental improvements that need to believe done. We want to see our money spent carefully. Thank you.

MR. FRANCI: My name is Tom Franci. I am a resident of the Village of Wesley Hills. I am one of the long termers around here who wondered 20 years ago or so why they would ever consider putting a landfill on top of a water aquifer. I suppose if we are going to do it today and the question were posed to you ladies and gentlemen, I would love to hear your analysis of that proposal. My guess is that you would deny it. Every corrective action that we have taken over the past ten years has been an exercise in fiscal futility. Nothing has worked up to performance, up to specifications. We are given a plan here, Alternative 5. Once again, we throw our faith

into the hands of the professional and political figures who make these decisions. Based on our record in the past I have to ask the question what is the next step if and when this proposal fails?

Now, all evening we have heard everything. I have waited until I think I am the last one to speak. I haven't heard anyone speak about the backup plan in case Alternative 5 is ineffective or not completely effective. Do you have a backup plan?

MS. McCUE: We review remedial actions after they are implemented and we review them every five years for a containment remedy such as what we are proposing for this site. As a result of those reviews, if it shows the remedy isn't being effective, then we would add to it whatever way we needed to to make it effective.

MR. FRANCI: That would probably cost several more million dollars.

MS. McCUE: Yes.

MR. FRANCI: If I sound sarcastic, it's because I have been through this race so many

times we are getting used to it. I would say if a man's public water system in one community is being threatened, we better have a backup plan before we really do get some contaminants in the drinking well. I will limit my comments to that.

Thank you very much.

MS. McCUE: It was believed we did propose this alternative because we did feel it would be effective in the long term. Our confidence is that a five year review will bear that out, unless there is some sort of a change in conditions that the landfill that we couldn't possibly anticipate in this setting.

MR. COZZY: Are there any other questions?

FLETCHER: I came in a little late. My name is Bob Fletcher and I am a resident of the Town of Ramapo. I am not sure how I feel about all of this because it is a lot to consider here. But my question right now is -- you may have covered this before I arrived -- can you just give me a little idea from a budget point of view what that 20 some

odd million dollars consists of in terms of construction activity, maintenance, that type of thing?

MR. LANZO: I was saving the slide for now. I couldn't find it earlier. This is the capital items only but for the alternatives we are speaking of 4A, 4B, and 5. The primary costs are in the cap. I mean the predominant cost is either a full Part 360 cap, modified 360 cap or the further modified 360 cap, which we are calling a soil cap for purpose of discussion. The other items are surface water diversion, load relocation, installation of some additional correction wells, which is to improve the leachate correction system, and this is how the, if you will, the 67 versus the 94 percent solution kind of is immaterial. Because whatever water that will be collected in the system will be treated in a POTW.

The other contingent items which is also the future type items, the water supply, the potential for future groundwater pretreatment on-site prior to discharge to POTW and some provisions for gas treatment add

up to the difference between the 19 and the 22 million or the 27 and the 30 million in the case of the various options. The other small option is there is also some provisions for air monitoring shown here. That is capital costs associated with air monitoring. In addition to these costs, the bigger cost that Kathy McCue presented earlier is for the O & M cost. O & M cost is the cost of the air monitoring, the water monitoring predominantly as well as the cost of treating the water off-site.

MR. FLETCHER: When you refer to the cap, could you give me an idea, are you talking about so many hundreds of thousands of earth or the material of the cover? Can you give me an idea of what that all consists of?

MR. LANZO: Well, the cap is everything above the existing waste. It's going to be some rough drainage -- excuse me. The smoothing activities to get the cap to be broad enough to be good drainage components, artificial layer of plastic, various geonets, gas venting, topsoil, minimum of 12 inches of

cover between the topsoil.

MR. FLETCHER: I don't mean right now but would you have a more detailed budget available for public inspection? I am familiar with construction activity and I can honestly say that if I were estimating, for example, a one million dollar job as opposed to a 26 million dollar job, my estimate would consist of eight or nine pages of detailed information. I'm not being sarcastic but that's a very vague explanation of construction activity. So would it be possible for the public at some point to have a detailed estimate of these activities?

MR. LANZO: The cost estimates are included as part of the F.S. This is a preconceptual estimate. Obviously, the range in accuracy of these things are typically 30 to 50 percent. However, for each item in the F.S. itself there is a full page giving a further breakdown of what costs we considered. In terms of the detailed backup for that, unlike a final construction cost estimate, that information is not provided. Assuming on

any specific item, we could find it if it's requested through the agencies. But if it is not, we identify in the F.S., which is available at the public depositories in the Village of Suffern in the Hillburn as well as the Region Three and the federal and the state DEC that information.

MR. FLETCHER: My experience has been that when you throw a general term general figure a guestimate more or less even though it may exceed reality by a hundred percent, somehow or other those dollars always wind up being spent. So, would it be possible to get a little bit more of a -- just hone in a little bit more on the budget items? That is my concern. Thank you.

MR. COZZY: Anymore questions or comments?

MS. O'DELL: I just wanted to correct one thing. The local repositories are the Suffern Library and the Finkelstein Library and the Regional office of DEC as well the Albany office of DEC.

MR. COZZY: Okay. No other comments or

questions?

MS. McCUE: Thank you for coming. Just, again, a reminder that comment period for written comments will conclude on March 19th so please send any written comments you may have to my attention at the Albany DEC office. If you need an address, just approach me. Thanks.

(Whereupon, the hearing adjourned at 10:05 p.m.)

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C E R T I F I C A T I O N

I, Shelley Ann Keyes, a Certified Shorthand Reporter and Notary Public within and for the State of New York, hereby certify:

That hereinfore set forth is a true record of the statements made for the record; and

That I am not related to any of the parties to this action by blood or marriage and I am in no way interested in the outcome of this matter.

Shelley Ann Keyes

Shelley Ann Keyes, C.S.R.

LAWYER'S NOTES

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