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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

05 JUN 1992

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Mr. Randall Battaglia
Environmental Coordinator
Seneca Army Depot
Romulus, New York 14541

Re: Ash Landfill Preliminary Site Characterization Report (PSCR)

Dear Mr. Battaglia:

This letter is in response to the Ash Landfill PSCR dated April 1992 prepared by C.T. Main, Inc. for the Seneca Army Depot. EPA received the document and plans on April 27, 1992. The following comments and recommendations should be incorporated into the Remedial Investigation (RI) Report for the Ashlandfill:

Page-Specific Comments

PSCR Section 1.0 - Introduction

p.1-1,¶2 The first sentence in this paragraph references Figure 1-1, which is not presented until the end of Chapter 1. It is recommended that all figures be incorporated within the text so that the figure appears on the page immediately following the first reference to the figure. This will simplify referencing between the text and the figures. This comment should be incorporated throughout the report, but is noted only here.

Regional Hydrogeologic Setting

p.1-3,¶3 The PSCR indicates that ground water in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water. Clarification of the source of potable water for the area and the primary source of water for area agricultural enterprises should be provided to support risk assessment development.

p.1-7,¶4 Potential source areas are discussed. The final RI should present more effective descriptions of all potential source areas (e.g., size of each area, extent and location of stressed and/or dead

vegetation, etc.). A sketch of each area, identifying notable features should also be provided considering the fact the RI will be used to develop the feasibility study (FS).

Previous Investigations

p.1-9,¶4 The analytical results of the Groundwater Contamination Survey conducted by the United States Army Environmental Hygiene Agency (USAEHA) should be presented in the final RI Report. The discussion should be accompanied by a table which shows the concentrations of the identified contaminants found in each well. This would provide a better conceptualization of the site and provide a basis to compare historical analytical results with recently acquired results.

p.1-14,¶2 The text refers to the previously performed electromagnetic (EM) survey. Inclusion of a map depicting the location of the previously-completed survey work should be presented in the Final RI report to provide a full understanding of how the scope of the current EM survey was formulated. This should be conducted for all previous field events which impact the current program (i.e. soil gas surveys, etc.).

Conceptual Site Model

p.1-17 Section 1.1.4, Conceptual Site Model, requires significant modification as it currently does not evaluate migration pathways for source area contaminants or discuss potential receptors. It may not be possible to evaluate all of these features at this time; however, refinement of the model should occur before the Phase II RI activities are formulated by MAIN. Note that a migration pathway analysis is critical to defining where follow-up soil boring and well installations should be located (i.e., wells should be situated to intercept zones of potential contaminant movement based on an extensive hydrogeologic analysis of Phase I data).

For specific Phase II recommendations, the reader is referred to Section 5.0.

p.1-18,¶3 All private and public drinking water supplies as well as industrial and agricultural water supplies within a one mile radius of the site should be identified in the Final RI report.

PSC Section 2.0 - Study area Investigation

Surface Water, Sediment, Spring Investigation

p.2-5,¶4 The text discusses surface water and sediment sampling for the site and references Plate 2-2 for the locations of the samples taken. On Plate 2-2, locations SW-700, SW-800, SW-801, SW-802, SW-900, and SW-901 are located outside of the mapped area. This results in an incomplete presentation of the surface water and sediment sampling program. A larger area map should be presented in the Final RI to illustrate all sampling locations.

Wetlands, not sampled during Phase I, exist adjacent to the location of the borings which were found to be contaminated with chlorinated solvents [bend of the road]. These additional wetlands require sampling and analysis during Phase II [refer to specific Phase II recommendations].

Soils Investigation

p.2-8,¶1 The text states two soil borings, B6-91 and B7-91, were located within the former construction debris disposal area. Plate 2-3 identifies B7-91 within the non-combustible fill landfill, not a construction debris landfill. Also, B6-91 is not identified as being located within any suspected disposal area. The text needs to be corrected in the Final RI report.

Boring B19-91 is stated to be located within the suspected burning pits in the southern portion of the former ash landfill area. The burning pits are not been identified on Plate 2-3, and Plate 2-3 shows B19-91 to be located outside of the Ash Landfill. All locations should be checked for accuracy in the Final RI.

p.2-10,¶2 Test pits in the Non-Combustible Fill Area have been advanced to a depth of only 5 feet; however, the depth of fill identified in boring log for B7-91 is 10 feet. This presents a data gap in that objects which have produced magnetic anomalies may be present at depths greater than 5 feet and therefore were not found during test pitting. If all magnetic anomalies

identified by the geophysical surveys cannot be reasonably explained by MAIN, additional test pitting appears to be warranted in the fill area to verify the absence of buried drums at depths of 5 to 10 feet below ground surface (bgs) [refer to specific Phase II recommendations].

Ground Water Investigations

p.2-17,¶1 The text states well screens were set to intersect fractures which were thought to be avenues for ground water movement. Due to the presence of fractured, weathered shale, extensive efforts may need to be undertaken to accurately define contaminant migration pathways [refer to specific Phase II recommendations].

PSC Section 3.0 - Detailed Environmental Setting and Physical Characteristics of the Site

p.3-1,¶3 The detailed site description should state if there are any physical features, such as fencing, which restrict unauthorized access to the site.

Ground Water Flow Directions

p.3-11,¶4 The water level measurements taken from three dates indicate that there is a downward vertical gradient in the area of PT-16 and MW-38D. This suggests that a downward component of ground water flow into the deeper portions of the competent bedrock exists on certain portions of the site. As this is a critical issue, the analysis of vertical gradients requires some additional analysis and interpretation, as discussed below.

The vertical gradients need to be evaluated in relation to actual vertical gradients between wells, not in terms of head differences between well pairs. The correct way to calculate vertical gradient is to divide the head elevation difference between two wells by the difference in the center point elevation of the respective well screens. Both the text and Table 3-6 need to be amended to address this issue.

Accurate definition of the hydrogeologic conditions becomes extremely important at this site due to the presence of the fractured and weathered shale. As stated previously, all potential pathways should be identified and evaluated prior to formulating the Phase II field program.

p.3-11,¶5 The discussion of head elevations and vertical gradients in this paragraph requires clarification. For instance, the text states that "Water in deep fractures (29-54 feet) exists at a greater head than the water in shallower fractures (9.7-29.7 feet)." However, the head in MW-38D, the shallower well, is higher (634.49 feet) than in MW-35D (629.48), the deeper well.

Hydraulic Conductivities

p.3-12,¶4 The comparison of hydraulic conductivity values to published values also needs to be made for the deep (bedrock) aquifer. This may provide a higher level of confidence in the values which were determined.

p.3-13,¶2 The effective porosity of 0.25 used for glacial till is inappropriate for the slightly plastic gray silty till described for this site. The value of 0.25 for glacial till used in Driscoll (1986) is at the upper range of values for that material and would be more appropriate for a sandy till with far less fines than the till on this site apparently contains.

Land Use

p.3.13,¶4 Subsection 3.8, Land Use - Further information on local zoning and possible future land use of the site including residential development and/or use for agriculture is needed to support the risk assessment. The types of human activity currently occurring at the site such as trespassing by area youths (dirt bike riding, target practice) and/or hunters should also be obtained.

p.3-15,¶1 Additional sources, such as the County Board of Health and Water Departments, should be contacted to identify all area private/public water supply wells for drinking water, industrial, and/or agricultural use. The classification for ground water in this area needs to be stated.

p.3-20,¶5 Significant wetland resources present in the vicinity of the site have been identified based on the New York state wetland maps. However, wetlands identified from the National Wetland Inventory (NWI) maps prepared by the U.S. Fish and Wildlife Service were not presented in the report as indicated in Section 2.9. Information concerning NWI maps should be presented in the Final RI Report, in addition to state-regulated wetland areas.

PSC Section 4.0 - Nature and Extent of Contamination

Soil Gas Summary

p.4-1,¶2 This paragraph states the soil gas program identified an area near the bend in the unpaved road, and confirmatory borings were advanced to delineate this source area. If the extent of contamination has been accurately defined, the lateral/vertical extent should be depicted. Upon reviewing the analytical data presented in Appendix J, all borings advanced in this area contain chlorinated solvents (e.g. volatile organic compounds [VOCs]) with the possible exception of B27-91 which was not sampled deeper than 4 feet. This source area does not appear to have been defined and additional borings are recommended during Phase II [refer to Section 6.0].

p.4-1,¶3 The soil gas program identified a potential source of VOCs in the area of the Non-Combustible Fill Landfill. The only method of confirmatory exploration which has been performed in this area has been the excavation of test pits to a maximum depth of 5 feet and a single soil boring. Upon comparing Plate 2-3 to Plate 4-2, it seems none of the test pits were excavated within the area which the soil gas survey identified as the potential source area. Therefore, a data gap exists with respect to the source of the VOCs identified by the soil gas survey within the boundaries of the Non-Combustible Fill Landfill. Boring B7-91, which was not located directly downgradient of the area identified by the soil gas survey, detected VOCs such as acetone and 1,2-DCE and a significant number of semi-VOCs (SVOCs). This suggests that a source of low-level VOCs/SVOCs is present within the landfill which requires further investigation.

Soil Sampling Results

p.4-3 A table which provides a complete summary of all VOC analytical data for soil boring samples should be presented. For potential source areas, a three-dimensional analysis which depicts VOC concentrations at each depth should be presented to illustrate the lateral/vertical extent of the source.

p.4-3,¶3 The PSCR states methylene chloride and acetone are believed to be laboratory contaminants. Upon reviewing Appendix J and the data tables presented in the PSCR, analytical results have not been subject to

data validation and no information is available to support the stated conclusion. Methylene chloride and acetone may be landfill leachate constituents. Supporting information must be provided prior to eliminating contaminants from consideration. It is recommended that all or a percentage of data be validated in accordance with the USEPA Region II data validation guidelines to establish data quality.

p.4-3,¶4 The PSCR states that the western portion of the Ash Landfill and the area near the bend in the road and Wetland B are believed to be likely source areas for VOCs. A review of Plate 2-5 show wells PT-18 and PT-12 (which have shown the highest detected concentrations of chlorinated solvents in ground water) are located south of this area. Ground water is shown on Plate 3-5 to flow westerly in the area of the landfill. Ground water samples collected from monitoring wells PT-23 and MW-27, which are located directly downgradient from this area, have not shown concentrations of chlorinated solvents above detection limits. Therefore, it seems either these compounds are migrating in a manner which is not yet fully understood or the location of all source areas has not yet been defined.

Activities need to be proposed to accurately define potential migration pathways within the weathered shale. Additional monitoring wells need to be installed west of and closer to, this source area. Also, the results of the soil gas survey need to be reevaluated. If any problems were encountered during the collection and analysis of soil gas samples, potential source areas may have been missed which could be contributing to the contamination being detected in these wells [refer to recommendations provided in Section 6.0].

Table 4-3 **Summary of SVOCs in Soils** - where compounds are below detection limit (BDL), the sample quantitation limits (QLs) should be presented. Detections of SVOCs should be evaluated with consideration given to the level at which these compounds can be quantified. According to Appendix J, many of the reported detections only slightly exceed the sample QL(s), and therefore represent only trace concentrations. Note that SVOCs may actually be ubiquitous to the study area, at levels just below the sample QL(s).

p.4-5,¶2	The first sentence states SVOCs were detected at the surface as well as at depth in borings located in the centers of the debris piles except B5-91. This statement seems somewhat misleading as it appears to suggest that SVOCs were not detected in B5-91. As indicated both in Table 4-3 and Appendix J, samples from this boring have been found to be contaminated with SVOCs (i.e., pyrene, fluoranthene, etc.).
p.4-6,¶2	Since polychlorinated biphenyls (PCBs) were detected in the surface soils of the Ash Landfill, monitoring for dioxin should be considered. Also, PCBs are being detected in the same soil borings which have detected high concentrations of chlorinated solvents. Since chlorinated solvents would tend to mobilize PCBs from the soils, it would be expected that ground water, which is being impacted from this area could contain PCBs as well as chlorinated solvents. Wells PT-18 and PT-12 have detected chlorinated solvents, but no PCBs. This may indicate contamination found in these wells is in fact originating from another source which has not yet been defined.
p.4-6,¶3	Subsection 4.3.4 bases the entire presentation of analytical results for metals and cyanide on the number of samples which detected contaminants above or below the average background concentrations. The Final RI Report should present the complete analytical results; all metals concentrations should be compared to site background levels to determine potential sources of inorganic contamination as well as the extent of this contamination.
Table 4-5	The concentrations of metals for all samples should be presented in this table and compared to background concentrations. Note that a similar presentation is required for metals concentrations in all media.
p.4-6,¶3	The Final RI report should provide justification for the use of borings B8-91 and B9-91 to represent background conditions.
p.4-7,¶6	Subsection 4.3.6 discusses total recoverable petroleum hydrocarbons detected in boring B26-91. No analytical data have been presented in the tables or in the appendices relative to boring B26-91 to support the statements made in this subsection.

Ground Water Results

Table 4-7	**Ground Water Inorganic Analytical Results** - the well(s) which are considered to represent background concentrations for metals should be clearly presented in this table.
p.4-8,¶1	The text states methylene chloride and acetone are believed to be laboratory contaminants. See comment for P.4-3, ¶3.
p.4-8,¶3	This paragraph discusses the ground water plume of total volatile organics and refers to Plate 4-4 which presents isocontours of contaminant concentrations. The isocontours presented on Plate 4-4 should, at a minimum, encompass the suspected source area identified at the bend in the road. As stated in this paragraph, the source of these contaminants has not been fully defined. Also the extent of the ground water plume has not been defined. Efforts, including the installation of additional monitoring wells and the sampling and analysis of ground water from these wells to determine the extent of the ground water plume, and soil borings to delineate the source area, need to be undertaken during the Phase II RI. Additional wells are needed closer to the wetlands W-B and W-D (near the area where the borings detected soil contamination) to provide information on ground water quality in this area. All of the wetlands in the area near the landfill need to be subject to sampling and analysis to determine if these areas may be sources of contamination.
p.4-9,¶2	The text states that SVOCs detected in well PT-20 are suspected to be laboratory contaminants. See comment for P.4-3, ¶3.

Surface Water/Sediment Results

p.4-10,¶3	Section 4.5 discusses surface water and sediment analytical results. As illustrated on Plate 2-2, the only wetland onsite which has been sampled is wetland W-D. Surface water and sediment sampling and analysis need to be performed on all wetlands. Borings advanced through wetland W-B have shown soil contamination throughout their depth. Also, there appears to be a source located upgradient of PT-18

which has not been identified. Since the borings showed W-B to be a source of VOC contamination, the wetlands may have been used as solvent dumping areas. Therefore, samples collected from these other wetlands may be useful in determining if all wetlands were used for this purpose.

p.4-10,¶4 The text states the types and concentrations of VOCs detected in surface water/sediment samples are likely laboratory contaminants. See comment for P.4-3 ¶3.

Appendix C: Soil Boring Logs

The following deficiencies are noted with the soil boring logs:

- No boring logs were provided for the monitoring wells;
- sample descriptions are not provided for all sampled intervals;
- sample recoveries are not provided;
- PID and/or FID readings are not provided;
- refusal depths are not noted for all borings; and
- sample descriptions should capitalize only the major (ie., first) constituent, not all constituents.

Appendix F: Monitoring Well Installation Diagrams

Well installation diagrams have not been provided for all monitoring wells at the site. This information is needed for evaluation of the depth of contamination being detected as well as each well's ability to detect contamination present.

Appendix I: Hydraulic Conductivity Results

The following deficiencies were noted with the hydraulic conductivity results:

- No calculations are provided;
- no reference to commercially available software used to analyze the data are provided;
- no listing of formula input variables is provided;

- water levels on the day of the tests are not provided;
- the well drilled diameter is not provided;
- the well depth below the water table is not provided;
- the screened interval below the water table is not provided;
- the variation of the Hvorslev (1951) method used to derive hydraulic conductivity is not provided; and
- no explanation of why most of the wells did not recover to 90 percent of the original static water level is provided.

Because no details of well geometry are provided, it is not possible to determine if slug displacements caused the water level to drop below the level of the top of the screen. Such a drop makes a significant difference in how the hydraulic conductivities would be calculated by the Bouwer and Rice method.

Appendix J: Analytical Results

The analytical data presented in Appendix J as well as in the tables of Section 4 do not indicate that the results have been validated. The data qualifiers presented in Appendix J and Section 4 tables are those assigned by the laboratory according to CLP protocol. MAIN must validate this data in accordance with USEPA Region II data validation guidelines before using it to characterize the Ash Landfill.

<u>The following comments are from EPA's Water Management Division:</u>

1. The source of the map (figure 1-3) should be indicated because it is based on a pre-existing map.

2. On page 1-8, Section 1.1.3.1, the document states that "...wells PT-13 and PT-14 no longer exist on the site". Please indicate abandonment procedures that followed. Wells should be closed in such a manner that they will not serve as possible conduits by which contaminants can enter the aquifer.

3. Physical properties such as density, solubility, and mobility of site contaminants of concern, (i.e. those exceeding MCLs) should be discussed in relation to patterns of contaminant transport.

4. All well and boring logs from previous investigations should be included in the report appendices to gain a better understanding of the site hydrogeology and for the potential for contaminant migration.

5. Monitoring results from the survey of private wells in the area should be included in appendices.

6. The detection limits are 10 ug/l for many VOCs listed in Appendix J whose federal maximum contaminant levels (MCLs) for drinking water are 5 ug/l or less, examples being vinyl chloride and TCE. It is suggested that a list of federal drinking water MCLs be included in documentation, as well as New York State standards, Contract Required Detection Limits (CRDLs), and Contract Required Quantitation Limits (CRQLs).

8. WMD recommends that field data sheets from the delineation of wetlands on the site be submitted as part of the document's appendix.

9. Please be advised that the Section 404 ARAR and Executive Order 11990 require that disturbance to wetlands and other aquatic resources be avoided or minimized.

<u>The following comments are from EPA's Air Programs Branch:</u>

1. The air pathway was not analyzed in this report. Since high levels of DCE, TCE, and total VOCs were detected in the soil gas samples and soil samples, the results could be used to generate estimates of baseline VOC emissions into the ambient air. Once the emission rates are known, they could be used as input in an air dispersion model to determine ambient air concentrations at receptors of interest such as the residences and farmland located beyond the western boundary of the SEAD property. The resulting concentrations may be used as inhalation exposure concentrations in the baseline risk assessment. Attached are procedures for estimating VOC emissions using soil gas data and procedures for modeling air concentrations.

2. Since metals were detected in the soils, PM_{10} emission rates due to wind erosion and mechanical disturbances could be estimated and modeled to determine ambient air concentrations at receptors of interest. The resulting concentrations could also be used in the baseline risk assessment. Procedures are attached for estimating PM_{10} emissions.

RECOMMENDATIONS FOR THE PHASE II RI

The PSCR currently does not provide a detailed contaminant distribution and migration pathway analysis, thus, it is difficult to formulate recommendations for Phase II work. For instance, if a contaminant source area is discovered in the unsaturated soils, it is critical that there be an understanding of the potential migration pathways available to site contaminants (i.e., ground water flow patterns, vertical/horizontal hydraulic gradients, existence of preferential lithologic zones of contaminant transport, etc.) in order to predict where migration is likely to be occurring. This enables targeting of these potentially impacted areas for Phase II investigation and sampling.

Because MAIN has yet to perform a pathways analysis, the following recommendations are based on Alliance's understanding of potential contaminant migration based on a review of the PSCR. These recommendations should be considered by MAIN; however, it is important that MAIN independently evaluate the data and perform a pathway analysis prior to formulating Phase II RI activities.

Source Characterization

The western portion of the Ash Landfill and the area near the bend in the road and Wetland B appear to be source areas for VOCs. A review of Plate 2-5 shows wells PT-12 and PT-18 (which have shown the highest detected concentrations of chlorinated solvents in ground water) are located south of this area. Ground water is shown on Plate 3-5 to flow westerly in the area of the landfill. Ground water samples collected from monitoring wells PT-23 and MW-27, which are located directly downgradient from the source area noted above, have not shown VOC concentrations above detection limits. Therefore, it is currently unknown if VOCs near the bend in the road are migrating towards PT-12 and PT-18, thus providing the source for the identified plume, or if a second source exists within and upgradient of these wells within the ash landfill.

Activities need to be proposed to accurately define potential migration pathways within the weathered shale. Additional monitoring wells need to be installed west of and closer to, this source area. Also, the results of the soil gas survey need to be reevaluated. If any problems were encountered during the collection and analysis of soil gas samples, potential source areas may have been missed which could be contributing to the contamination being detected in these wells.

Specific recommendations focussing on source area identification appear below.

1. The most prominent source area at the site, as depicted in Plate 4-3, is situated in the area of B15-91, the bend in the road. At this location, VOCs were detected as high as 669,000 ug/kg at 2-4 feet below ground surface (bgs). Other significant detections of total VOCs for this source area are noted below: for depth 4-6 feet bgs B29-91 - 56,010 ug/kg; B30-91 - 25,390 ug/kg; B28-91 - 22,980 ug/kg]; for depths of 6-8 feet bgs B2-91 - 143,580 ug/kg; B10-91 - 1,639 ug/kg; B31-91- 1,708 ug/kg; B17-91 - 774 ug/kg.

   As all of the borings in this area have detected VOCs, additional soil borings are needed to the north and east of boring B15-91 to define the vertical and lateral extent of VOC contamination in soils in this area. The soil gas survey results presented in the ICF report (ICF, 1989) suggest that the source of VOC contamination is located in this direction.

2. Since wetlands area W-B is a demonstrated source area, it is possible that wetlands W-E may also have been a historical disposal location. Soils/sediments in wetlands W-E need to be sampled to determine if a source exists within this wetland. In addition, all wetlands in the vicinity of the site require some sampling and analysis to evaluate any impacts the landfill area may be having on these wetlands.

3. Additional soil borings should be advanced further east of well PT-18 to locate any potential sources of the contamination being detected in this well. Based on the results of the soil gas survey presented in the ICF report (ICF, July 1989), a potential source may be located to the northeast of the PT-18 location. However, due to the poor quality of the figures presented in the ICF report, it is not possible to identify the exact location. MAIN needs to review this data prior to proposing locations for additional soil borings.

4. Additional monitoring wells should be installed due west of the currently identified ground water plume to determine its extent and spatial orientation. As indicated in Plate 4-4, the western and southwestern edges of the contaminant plume have not been defined [note the dashed lines which reflect inferred plume limits only].

Monitoring well clusters should be installed downgradient of PT-24, spaced approximately 100 to 200 feet apart, with screens set in the saturated overburden (till/weathered shale layer), and the deep aquifer(competent bedrock). The bedrock well screen zone should be situated to intercept a significant fracture zone. In the event that these wells continue to detect contaminants, additional series of well pairs should be installed further downgradient to define the full vertical and lateral extent of the plume.

5. The northwest corner of the Ash Landfill [near the bend of the road] is a verified source of contamination. It is expected that this source area would be impacting ground water, yet currently there is no monitoring well coverage in this area. It is possible that the plume presented on Plate 4-4 actually begins in this area [near wetlands D and B] and no definition is currently provided. Monitoring well pairs, similar to those described above, should be installed to define the plume in this area. Additional wells should be added, as needed to define the plume limit.

   Note that the locations of all downgradient monitoring wells should be based on a detailed analysis of ground water flow patterns. The well screen should be installed in those zones where contaminant migration is expected to occur. This will enable these wells to intercept the plume and, thus, serve as an "early warning system" to monitor potential off-site migration where downgradient receptors will potentially be impacted.

   A fracture trace analysis, additional rock coring and geophysical surveys employing VLF, electrical resistivity, or seismic refraction should be considered in order to better define the contaminant migration pathways west of the cooling pond/ash landfill area. This information should be used to position additional monitoring wells and determine the optimal depth for placing well screens.

6. No excavations have been conducted to the east of the Ash Landfill in order to confirm the presented vertical/lateral extent of fill material [in the event landfill capping is determined to be a viable remedy]. Limited confirmatory borings to verify landfill boundaries should be advanced to the east of the landfill.

7. **Non-Combustible Fill Area** - soil gas results identified a potential VOC source in this area. Methods of confirmatory exploration were limited the excavation of five test pits to a maximum depth of 5 feet and a single soil boring. Upon comparing Plate 2-3, Test Pit Locations, to Plate 4-2, Soil Gas Contours, it seems none of the test pits were excavated within the potential source area defined by the soil gas survey. Phase II should provide confirmation sampling via borings in the Non Combustible fill area, with sampling and analysis for Target Compound List (TCL) organics, to define the limits of the potential low level VOC source area. Note that boring B7-91, located generally downgradient of the potential source area, detected VOCs (acetone and 1,2-DCE) and semi-volatiles (SVOCs) at a total of 117,690 ug/kg. This suggests a source of low level VOC/SVOC contamination may be present within the landfill.

8. **Non-Combustible Fill Area** - the PSCR states that no anomalies were identified as drums during test pitting; however, test pits were only excavated to 5 feet bgs. According to the boring log for B7-91 [provided in Appendix C] which is situated within the Non-Combustible Fill Area, the depth of fill in this area is 10 feet bgs. Therefore, it is possible that buried drums may be present from 5 to 10 feet within the fill area. Phase II should confirm the absence of drums below 5 feet using a number of deep test pits.

9. A number of metals appear to be elevated based on Table 4-5 which compares the maximum concentration of each metal detected at the site with background concentrations. These elevated metals include: barium (7.5 times background); copper (30 times background); iron (17 times background); lead (200 times background); selenium (not detected in background); silver (not detected in background); and zinc (450 times background). The PSCR has not currently reduced the data in a manner which presents the distribution of metals across the site; therefore, no trends in metals elevation can currently be determined from the data.

   Data reduction for metals distribution across the site should be conducted. Trends should be identified, and the data should be presented to illustrate the aerial distribution of the elevated metals concentrations. Additional boring and sampling should be conducted, if needed, based on the analysis.

10. Wetlands W-B, W-E, W-C, W-F, and W-A should be subject to surface water and sediment sampling and analysis. Of particular concern are wetlands W-B, W-C, and W-E due to their location with respect to the Ash Landfill.

11. The conduct and results of the soil gas survey may need to be re-evaluated. Based on a comparison with the previous soil gas survey presented in the ICF report (ICF, 1989) and the location and concentrations of contaminants being detected, the results of the soil gas survey do not appear completely accurate.

12. A review of Appendix J and the tables presented in the report has shown that analytical data have not yet been adequately validated. All data must be validated in accordance with USEPA Region II guidelines prior to using this data to characterize the site and support a risk assessment and a feasibility study.

13. All chemical analyses should be for full Target Compound List/Target Analyte List (TCL/TAL) compounds. Also, since PCBs were detected in the surface soils of the Ash Landfill, MAIN should consider analyzing a limited number of Phase II soil samples for dioxins.

Hydrogeology

1. The shallow aquifer ground water contours need to be redrawn at a smaller contour interval. Only those wells that are screened at or near the water table should be used for contouring. By redrawing the contours at a smaller scale, local changes in flow direction that may be affecting contaminant transport direction can be discerned. Contours in areas where there is no data (for example, west of wetlands B) should be dashed, to indicate that these contours are estimates only.

2. Given the relatively shallow ground water table, and depth to competent bedrock, the 6" and 2 1/2" water line may be acting as ground water/contaminant controls or transport pathways, at least seasonally, given the wide fluctuations of the water table. This possibility may need to be investigated during Phase II.

3. The site geology/hydrogeology has not been adequately defined. Although ground water probably flows generally westward towards the lake, local bedrock

geology probably has an impact on contaminant migration given the relative immiscibility and density of the VOCs. Specifically, a shallow bedrock trough which controls contaminant migration may not be fully defined.

As stated previously, a fracture trace analysis, additional rock coring and geophysical surveys employing VLF, electrical resistivity, or seismic refraction should be considered in order to better define the pathways of contaminant migration. This information would also be useful to position additional monitoring wells.

4. An auger pumping test may be warranted to determine the hydraulic connection of potential downgradient water supply and/or residential wells, and on-site releases.

5. The presence of swampy areas suggest there may be locally perched water table or zones of relatively impermeable till/competent bedrock. These should be investigated to ascertain whether locally radial flow exists or whether there is an impact on ground water flow direction.

6. The bedrock topography map appears to be drawn based upon a number of borings which did not include a 10 foot confirmatory rock core, but rather "refusal". Given the description of some large size rock fragments, cobbles, etc., the true competent bedrock elevation should be confirmed by coring at additional locations.

7. The presence of numerous springs suggests that there may be radial flow from the site area. These springs/seeps should be sampled and analyzed for VOCs and metals. Downward recharging ground water which flows through contaminated zones may discharge through springs/seeps as the ground water encounters relatively impermeable bedrock or till.

8. Hydraulic conductivity data need to be re-evaluated and if necessary, the wells retested, to more accurately determine aquifer hydraulic conductivities.

9. The hydrogeologic analysis needs to discuss vertical gradients in relation to actual vertical gradients between wells, not in terms of head differences

between well pairs. The correct way to calculate vertical gradient is to divide the head elevation difference between two wells by the difference in the center point elevation of the respective well screens. Both the text and Table 3-6 need to be corrected. Accurate definition of the hydrogeologic conditions becomes extremely important at this site due to the presence of the fractured and weathered shale.

Note that the presence of a downward hydraulic gradient warrants that ground water flow and contaminant transport through the competent bedrock be considered as a potential migration pathway.

10. No monitoring wells have been installed downgradient of the Non-Combustible Fill Landfill. In order to provide information relative to ground water quality downgradient of this landfill a minimum of one monitoring well should be installed.

11. Well construction data on the PT series wells including well screen interval should be presented in the Final RI. If necessary, Phase II investigations should include the use of borehole geophysics to determine the screened interval, since this data is important for determining from where water samples are obtained in those wells and for determining vertical hydraulic gradients.

I did not receive comments from EPA's Biological Technical Assistance Group (BTAG) in time to be included in this letter. For that reason, we will be sending comments on the Ecological Investigations and Terrestrial Assessment in the near future. If you have any questions, do not hesitate to contact me at (212) 264-4595.

Sincerely yours,

Carla M. Struble
Federal Facilities Section

Attachments

cc: G. Kittel, SEAD
K. Healy, USACE
K. Gupta, NYSDEC
M. Duchesneau, Main

STEP III. ESTIMATE AIR EMISSION RATES OF EACH APPLICABLE SITE CONTAMINANT

Background:

Predictive modeling techniques include calculation of theoretical emission rates for both gaseous and particulate matter contaminants. Emission rate models predict emission rates as a function of contaminant concentration and contaminant physical and chemical properties within the surrounding media (e.g., within soils, surface water, etc.) and through measured or theoretically derived mass transfer coefficients. Some models have been evaluated against pilot-scale and field test results. Because these models attempt to predict complex physical and chemical phenomena, their potential relative error may be considered to span perhaps one order of magnitude.

It should be noted that many of these emission rate models require physical data about the surrounding media (e.g., soil porosity, moisture content, etc.) as well as physical and chemical properties of the contaminants (e.g., Henry's Law constants, diffusivity in air, etc.). In addition, proper use of these emission rate models assumes that a thorough site characterization has been accomplished and that media-specific concentrations of all contaminants have been adequately determined within the site volume in all three dimensions (i.e., all contaminant-specific "hot spots" have been identified to a known depth). The emission rates calculated from these models must accurately represent the site or gross under/overprediction of the resulting ambient air concentrations will result.

1. Gaseous Emissions from Subsurface Soils:

   A. For air release potential of contaminants from subsurface soils, measure contaminant-specific soil gas concentrations. As an alternative, soil bulk concentrations can also be used for predicting air release potential of contaminants; however, soil gas measurements are preferred. Care must be taken to ensure adequate site coverage.

   Note: For baseline conditions, relatively shallow soil gas measurements can be taken. Soil gas measurements at greater depths will be advantageous if soil excavation is contemplated during remediation. Measurements should be made during periods of stable atmospheric pressure to avoid "barometric pumping" effects. Great care must be taken not to disturb soil equilibrium conditions and thus dilute the sample. For both soil gas and bulk concentration samples, use the 95 percent upper confidence limit (UCL) on the arithmetic mean for each homogeneous subsection of the area of contamination unless this concentration is greater than the maximum detected concentration. In this case, the maximum observed value should be used. Data used in calculating contaminant concentrations for this analysis should include all detected concentrations of a substance plus half the quantitation limit for each sample in which that substance was not detected. Only substances that were detected in at least one sample from the site should be included in this analysis.

Reference for Step III, 1, A: *RAGS Part A*, Sections 5-6. December 1989.

B. If soil bulk concentrations are to be used to calculate emission rates, estimate the saturation concentration (C_{sat}) for each contaminant in the vadose zone. C_{sat} for each contaminant is the concentration at which the adsorptive limit of the soil plus the theoretical dissolution limit of the contaminant in the available soil moisture has been reached. Concentrations > C_{sat} indicate "free-phase" contaminants within the soil matrix.

$$C_{sat} = (K_d \times s \times n_m) + (s \times \theta_m) \qquad (1)$$

where C_{sat} = Saturation concentration, mg/kg (ppm)

K_d = Soil/water partition coefficient, l/kg (or ml/g)

s = Solubility of contaminant in water, mg/l-water

n_m = Soil moisture content expressed as a weight fraction, kg-water/kg-soil

θ_m = Soil moisture content, l-water/kg-soil (or ml/g).

Reference for Equation No. 1: *Risk Assessment Guidance for Superfund (RAGS), Volume I, Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals), Interim*, Section 3.3.1, Office of Emergency and Remedial Response, Washington, D.C., EPA Publication No. 9285.7-01B, October 1991.

Estimation of K_d if not available in the scientific literature:

$$K_d = K_{oc} \times f_{oc} \tag{2}$$

where K_d = Soil/water, partition coefficient, l/kg (or ml/g)

K_{oc} = Organic carbon partition coefficient, l/kg (or ml/g)

f_{oc} = Fraction of organic carbon in soil, mg/mg (default = 0.02).

Estimation of K_{oc} if not available in the scientific literature:

Use one of the following equations based on the chemical class closest to the subject contaminant. If the contaminant does not fit any given class, use Equation No. 3 (based on largest sampling):

<u>Based on a wide variety of contaminants (mostly pesticides)</u>:

$$K_{oc} = 10^{((0.544\ log K_{ow}) + 1.377)} \tag{3}$$

<u>Based on aromatics, polynuclear aromatics, triazines, and dinitroaniline herbicides</u>:

$$K_{oc} = 10^{((0.937\ log K_{ow}) - 0.006)} \tag{3a}$$

<u>Based on aromatics or polynuclear aromatics</u>:

$$K_{oc} = 10^{((1.00\ log K_{ow}) - 0.21)} \tag{3b}$$

<u>Based on s-triazines and dinitroaniline herbicides</u>:

$$K_{oc} = 10^{((0.94\ log K_{ow}) + 0.02)} \tag{3c}$$

<u>Based on insecticides, herbicides, and fungicides</u>:

$$K_{oc} = 10^{((1.029\ logK_{ow}) - 0.18)} \tag{3d}$$

<u>Based on substituted phenylureas and alkyl-N-phenylcarbamates</u>:

$$K_{oc} = 10^{((0.524\ logK_{ow}) + 0.855)} \tag{3e}$$

where K_{oc} = Organic carbon partition coefficient, l/kg (or ml/g)

K_{ow} = Octanol/water partition coefficient, l/kg (or ml/g).

<u>Reference for Step III, 1, Equation Nos. 2-3e</u>: *Superfund Exposure Assessment Manual (SEAM)*, Section 3.5.2.4, Office of Emergency and Remedial Response, Washington, D.C., EPA-450/1-88-001, 1988.

<u>Reference for Values of K_{oc} and logK_{ow} in Step III, 1, B</u>: *Superfund Public Health Evaluation Manual (SPHEM)*, Exhibit A-1, Office of Emergency Remedial Response, Washington, D.C., EPA-540/1-86-060, October 1986.

C. From the vapor-phase contaminant concentrations (soil gas) or from bulk concentrations determined in "A" above, calculate an emission rate for each contaminant.

1. With measured <u>soil gas concentrations</u>:

$$E_i = \frac{D_i\ C_i\ A\ (P_t^{4/3})}{d_{sc}} \tag{4}$$

where E_i = Emission rate of component i, g/s

D_i = Diffusion coefficient of component i in air, cm^2/s (scientific literature or Equation No. 7)

C_i = Vapor concentration of component i measured in the soil pore spaces, g/cm^3 (Equation No. 4a)

A = Exposed surface area, cm^2

P_t = Total soil porosity, dimensionless (Equation No. 6). P_t assumes dry soil (worst-case); if soil is wet more often than dry, substitute the term ($P_a^{10/3}/P_t^2$) for the term $P_t^{4/3}$ (see Equation No. 6a)

d_{sc} = Effective depth of soil cover, cm (from sample depth to soil surface).

If soil gas measurements are given in ppm on a volume per volume basis, use the following equation to convert to a weight per volume basis:

$$C_i = C_{SG} \times \frac{MW_i}{2.404 \times 10^{10}} \tag{4a}$$

where C_i = Vapor concentration of component i in the soil pore spaces, g/cm^3

C_{SG} = Measured soil gas concentration of component i, ppmv

MW_i = Molecular weight of component i, g/mole.

2. With measured <u>bulk concentrations</u> ≥ C_{sat} (Equation No. 1):

<u>Note</u>: Under this scenario, "free-phase" contaminants exist in the soil vadose zone, usually as a liquid-phase waste layer or discrete film. Representative concentration measurements should be used from the discrete waste layer at depth and not from composite samples.

$$E_i = D_i \, C_{si} \, A(P_t^{4/3}) \frac{M_i}{d_{sc}} \tag{5}$$

where E_i = Emission rate of component i, g/s

D_i = Diffusion coefficient of component i in air, cm^2/s (scientific literature or Equation No. 7)

C_{si} = Saturation vapor concentration of component i, g/cm^3 (Equation No. 8)

A = Exposed surface area, cm^2

P_t = Total soil porosity, dimensionless (Equation No. 6). P_t assumes dry soil (worst-case); if soil is wet more often than dry, substitute the term $(P_a^{10/13}/P_t^2)$ for the term $P_t^{4/3}$ (see Equation No. 6a).

M_i = Mole fraction of component i in the waste, gmole/gmole

d_{sc} = Effective depth of soil cover, cm.

<u>Note</u>: When calculating M_i, include the number of moles of all contaminants plus the water within the waste. Do not include the number of moles of soil because soil is assumed to be nonvolatile.

Calculation of total soil porosity (P_t):

$$P_t = 1 - \frac{\beta}{\rho} \tag{6}$$

where P_t = Total soil porosity, dimensionless

β = Soil bulk density, g/cm^3: generally between 1.0 and 2.0 g/cm^3 (default = 1.5 g/cm^3)

ρ = Particle density, g/cm^3: usually 2.65 g/cm^3 for most mineral material.

<u>Note</u>: P_t assumes dry soil and thus <u>worst-case</u> diffusion conditions. If the soil cover is wet more often than dry on a long-term basis, air-filled porosity (P_a) may be substituted for P_t. For estimation, P_t can be

assumed to be between 0.55 for dry, noncompacted soils and 0.35 for compacted soils.

Calculation of air-filled porosity (P_a):

$$P_a = P_t - \theta_m \beta \tag{6a}$$

where P_a = Air-filled soil porosity, dimensionless

P_t = Total soil porosity, dimensionless (Equation No. 6)

Θ_m = Soil moisture content, cm^3-water/g-soil (or ml/g)

β = Soil bulk density, g/cm^3.

Estimation of diffusion coefficient of component i in air (D_i) if not available from the scientific literature:

$$D_i = \frac{0.001 T^{1.75} \sqrt{\frac{1}{MW_i} + \frac{1}{MW_a}}}{P_{ab} [(\sum V_i)^{1/3} + (\sum V_a)^{1/3}]^2} \tag{7}$$

where D_i = Diffusion coefficient of component i in air, cm^2/s

T = Absolute temperature of ambient air, °K (annual average)

MW_i; MW_a = Molecular weight of component i and air (28.8), respectively, g/mole

P_{ab} = Absolute pressure, atmospheres

ΣV_i; ΣV_a = Molecular diffusion volumes of component i and air (20.1), respectively, cm^3/mole. This is the sum of the atomic diffusion volumes of the compound's atomic constituents.

Atomic diffusion volumes for use in estimating D_i:

C = 16.5	Cl = 19.5	Aromatic ring = -20.2
H = 1.98	Br = 35.0	Heterocyclic ring = -20.2
O = 5.48	F = 25.0	
N = 5.69	S = 17.0	

Example of calculating ΣV_i for carbon tetrachloride, CCl_4:

$$\begin{array}{rl} C = & 16.5 \\ Cl_4 = 4\times 19.5 = & \underline{78.0} + \\ & 94.5\ \text{cm}^3/\text{mole} \end{array}$$

Note: Equation No. 7 may not be appropriate for polar compounds. Where possible, values of D_i in the scientific literature should be used.

Calculation of saturation vapor concentration (C_{si}):

$$C_{si} = \frac{p\ MW_i}{R\ T} \qquad (8)$$

where

C_{si} = Saturation vapor concentration of component i, g/cm^3

p = Vapor pressure of the chemical i, mm Hg

R = Molar gas constant, 62,361 mm Hg-cm^3/mole-° K

T = Absolute temperature of waste (in situ), ° K

MW_i = Molecular weight of component i, g/mole.

3. With measured bulk concentrations < C_{sat} (Equation No. 1):

Note: Under this scenario all contaminants are assumed to be in solution with the available soil moisture and adsorbed to soil particles within the soil matrix (fully incorporated). Soil samples should not show evidence of discrete waste layers or films.

$$E_i = \frac{A\ 2\ D_{ei}\ \varepsilon\ K_{as}\ C_i}{\sqrt{\pi\ \alpha\ t}} \tag{9}$$

where E_i = Average emission rate of component i for exposure interval t, g/s

D_{ei} = Effective diffusivity of component i, cm^2/s (= $D_i\ \epsilon^{0.33}$)

D_i = Molecular diffusivity of component i in air, cm^2/s (scientific literature or Equation No. 7)

K_{as} = Soil/air partition coefficient, g/cm^3 (Equation No. 9b)

C_i = Bulk soil concentration of component i, g/g

t = Exposure interval, s (exposure time x exposure frequency x exposure duration in seconds)

ϵ = Soil porosity, dimensionless. $\epsilon = P_t$ for dry soil or $\epsilon = P_a$ when soil is more often wet than dry (see Equation Nos. 6 and 6a)

A = Exposed surface area, cm^2.

and:

$$\alpha = \frac{D_{ei}\ \varepsilon}{\varepsilon + (\rho)(1-\varepsilon)/K_{as}} \tag{9a}$$

where ρ = Particle density, g/cm^3 (default = 2.65 g/cm^3).

Calculation of soil/air partition coefficient (K_{as}):

$$K_{as} = (H/K_d) \times 41 \tag{9b}$$

where K_{as} = Soil/air partition coefficient, g/cm^3

H = Henry's Law constant of component i, atm-m^3/mole

K_d = Soil/water partition coefficient, ml/g or cm^3/g (Equation No. 2)

41 = Conversion factor to change H to dimensionless form.

Reference for Step III, 3: *Development of Advisory Levels for Polychlorinated Biphenyl (PCB) Cleanup*, Office of Research and Development, Exposure Assessment Group, Washington, D.C. EPA-600/6-86-002, 1986.

Reference for Step III, 3: *RAGS Part B*, Section 3.3.1, October 1991.

2. Gaseous Emissions From Nonaerated Surface Impoundments and Contaminants (In Solution) Pooled at Soil Surfaces:

   A. For air release potential of contaminants from nonaerated surface impoundments and for diluted contaminants pooled at soil surfaces, measure contaminant-specific liquid-phase concentrations of each contaminant.

      1. Take sufficient samples to ensure representative sampling of the impoundment/pool.

      2. Conduct analysis of samples to quantify content on a contaminant-specific basis.

   B. From the liquid-phase contaminant concentrations determined in "A" above, calculate an emission rate for each contaminant:

$$E_i = K_i \, C_s \, A \qquad (10)$$

where E_i = Emission rate of component i, g/s

K_i = Overall mass transfer coefficient, cm/s (Equation No. 11)

C_s = Liquid-phase concentration of component i, g/cm^3
(1 mg/l = 1x10^{6} g/cm^3)

A = Exposed surface area, cm^2.

Calculation of overall mass transfer coefficient (K_i):

$$\frac{1}{K_i} = \frac{1}{k_{iL}} + \frac{R\,T}{H_i\,k_{iG}} \tag{11}$$

where K_i = Overall mass transfer coefficient, cm/s

k_{iL} = Liquid-phase mass transfer coefficient, cm/s (Equation No. 12)

R = Ideal gas constant, 8.2×10^{-5} atm-m^3/mole-°K

T = Absolute temperature, °K

H_i = Henry's Law constant of component i, atm-m^3/mole

k_{iG} = Gas-phase mass transfer coefficient, cm/s (Equation No. 13).

Estimation of liquid-phase mass transfer coefficient (k_{iL}):

$$k_{iL} = \left(\frac{MW_{O_2}}{MW_i}\right)^{0.5} \left(\frac{T}{298}\right) (k_L,\ O_2) \tag{12}$$

where k_{iL} = Liquid-phase mass transfer coefficient, cm/s

MW_{O_2}; MW_i = Molecular weights of oxygen (32.0) and component i, respectively, g/mole

T = Absolute temperature, °K

k_L, O_2 = Liquid-phase mass transfer coefficient for oxygen at 25° C, cm/s (default = 0.002 cm/s).

Estimation of gas-phase mass transfer coefficient (k_{iG}):

$$k_{iG} = \left(\frac{MW_{H_2O}}{MW_i}\right)^{0.335} \left(\frac{T}{298}\right)^{1.005} (k_{iG}, H_2O) \tag{13}$$

where k_{iG} = Gas-phase mass transfer coefficient, cm/s

MW_{H_2O}; MW_i = Molecular weights of water (18.0) and component i, respectively, g/mole

T = Absolute temperature, °K

k_{iG}, H_2O = Gas-phase mass transfer coefficient of water vapor at 25° C, cm/s (default = 0.833 cm/s).

Reference for Default Values of k_L,O_2 and k_G,H_2O: *Evaluation and Selection of Models for Estimating Air Emissions From Hazardous Waste Treatment, Storage, and Disposal Facilities*, Section 2, Office of Air Quality Planning and Standards, Research Triangle Park, NC. EPA-450/3-84-020, NTIS PB85-156115, December 1984.

3. Volatile Nonmethane Organic Compound (NMOC) Emissions From Codisposal Landfills:

Codisposal sites contain toxic wastes in combination with municipal or sanitary wastes which generate landfill gases (e.g., methane, hydrogen gas, and carbon dioxide). These "sweep" gases greatly increase the upward migration of volatile NMOCs and their subsequent release to the atmosphere. In fact, the landfill gas velocity becomes the controlling factor so that soil and gas-phase diffusion become essentially insignificant.

A. Measure soil gas concentrations of each volatile NMOC.

B. From the soil gas concentrations determined in "A" above, calculate an emission rate for each volatile NMOC:

$$E_i = C_i \, V_y \, A \tag{14}$$

where E_i = Emission rate of component i, g/s

C_i = Concentration of component i in the soil pore spaces, g/cm^3

V_y = Mean landfill gas velocity in the soil pore spaces, cm/s (default = 1.63×10^{-3} cm/s average)

A = Exposed surface area, cm^2.

Note: The default value of V_y is an average value. Various site factors such as saturated soils will tend to reduce the rate of volatilization. The degree to which this model is able to accurately predict release rates under conditions of moist or wet soils is unknown. Under such conditions, emission flux measurements at soil surfaces may be necessary.

Reference for Step III,1,2,&3: *SEAM*, Section 2.3.2.1., April 1988.

4. Free-phase Volatile Contaminants Directly Exposed to the Atmosphere:

For any and all free-phase volatile contaminants directly exposed to the atmosphere, in-depth APA is warranted. Source monitoring is recommended to determine emission rates, supplemented by ambient monitoring and/or refined modeling. Applicable situations include open drums/containers, fresh spills, etc. where free product exists.

5. Solids and Semivolatiles Emitted as Particulate Matter:

A. For solids and semivolatile contaminants with air release potential (e.g., metals, semivolatiles, and pesticides adsorbed to fugitive dust, etc.), measure contaminant-specific bulk concentrations of erodible surface materials.

Note: If onsite data are not available, assume that the contaminant concentrations measured from bulk samples of surface materials are constant across the entire soil particle size range.

For estimating emissions from wind erosion, either of two emission flux (g/m^2-h) models are used depending on the erodibility classification of the site surface material. These two models are: 1) "unlimited reservoir," and 2) "limited reservoir." Each site surface of homogeneous contaminant concentration must be placed into one of these two classifications. The following decision flowchart (Figure 1) is used to determine: 1) whether no

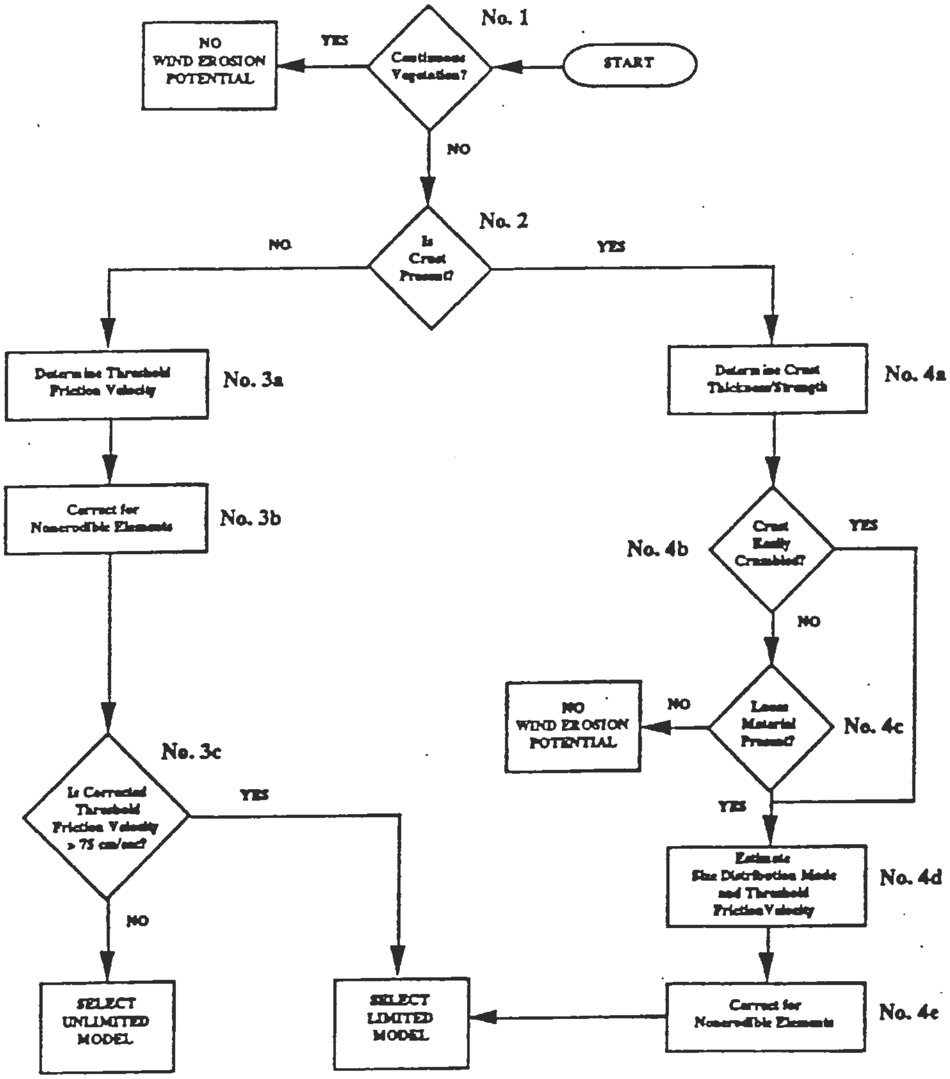


Figure 1. Decision flowchart.

wind erosion potential exists, or 2) which of the two emission flux models is applicable for site conditions. The instructions within each box of the flowchart are detailed in the list of steps following the flowchart.

It should be noted that the two emission flux models (Equations 15 and 18) represent average annual emissions. This assumes continuous emissions over time. In actuality, emissions do not occur except during periods when the windspeed meets or exceeds the threshold friction velocity for the given soil particle size. A continuous average emission flux is calculated to account for a continuous exposure interval (i.e., hours/day x days/year x years).

Detailed Steps for Flowchart:

No. 1 Continuous Vegetation?

Continuous vegetation means "unbroken" vegetation covering 100 percent of the site or site sector to be analyzed.

No. 2 Is Crust Present?

Crusted surfaces are regarded as having a "limited reservoir" of erodible particles. Check for crust thickness/strength during the site inspection.

No. 3a Determine Threshold Friction Velocity

Threshold friction velocity (u'_t) is that wind velocity at which erodible site particles are suspended. To determine u'_t, the mode of the surface aggregate size distribution must be determined. The distribution mode is the particle size containing the highest percentage of material from a representative sample. This can be determined with a field sieving procedure as follows:

1. Prepare a nest of sieves with the following openings: 4 mm, 2 mm, 1 mm, 0.5 mm, and 0.25 mm. Place a collector pan below the bottom sieve (0.25 mm opening).

2. Collect a sample representing the surface layer of loose particles (approximately 1 cm in depth for an uncrusted surface), removing any objects larger than about 1 cm in average physical diameter (nonerodible material). The area to be sampled should not be less than 30 cm x 30 cm.

3. Pour the sample into the top sieve (4 mm opening), and place a lid on top.

4. Rotate the covered sieve/pan by hand using broad sweeping arm motions in the horizontal plane. Complete 20 rotations at a speed just necessary to achieve some relative horizontal motion between the sieve and the particles.

5. Inspect the relative quantities of catch within each sieve and determine where the mode in the aggregate size distribution lies, i.e.., between the opening size of the sieve with the largest catch and the opening size of the next largest sieve (e.g., 0.375 mm lies between the 0.5 mm and the 0.25 mm sieve).

With the aggregate size distribution mode, determine the threshold friction velocity (u'_t) in cm/s from the relationship in Figure 1a.

No. 3b Correct for Nonerodible Elements

Mark off a representative site area 1m x 1m and determine the fraction of total area, as viewed from directly overhead, that is occupied by nonerodible elements (e.g., stones, clumps of grass, etc.). Nonerodible elements can be said to exceed 1 cm in diameter. Correct the overhead fractional area of nonerodible elements to the equivalent projected frontal area. An example would be that a spherical stone with an area of 10 cm^2 as viewed from overhead but half-buried in the soil, would have a frontal projected area of 5 cm^2. Determine the ratio of the frontal projected area of nonerodible elements to the total overhead area of the erodible soil. This ratio (L_c) is used with the relationship shown in Figure 1b to determine the appropriate correction factor. Multiply u'_t by the correction factor to obtain the corrected threshold friction velocity (u^*_t).

Note: If data for determining L_c is not available, a conservative default value of 0.01 may be used for nonsmooth soil surfaces. This results in a correction factor of approximately 1.5.

No. 3c Is Corrected Threshold Friction Velocity >75 cm/s?

75 cm/s is an empirical number determined through observation of actual soil types.

No. 4a Determine Crust Thickness/Strength

and

No. 4b Crust Easily Crumbled?

If the crust thickness is <0.6 cm or if the crust can be easily crumbled by hand pressure it exhibits a potential for wind erosion.

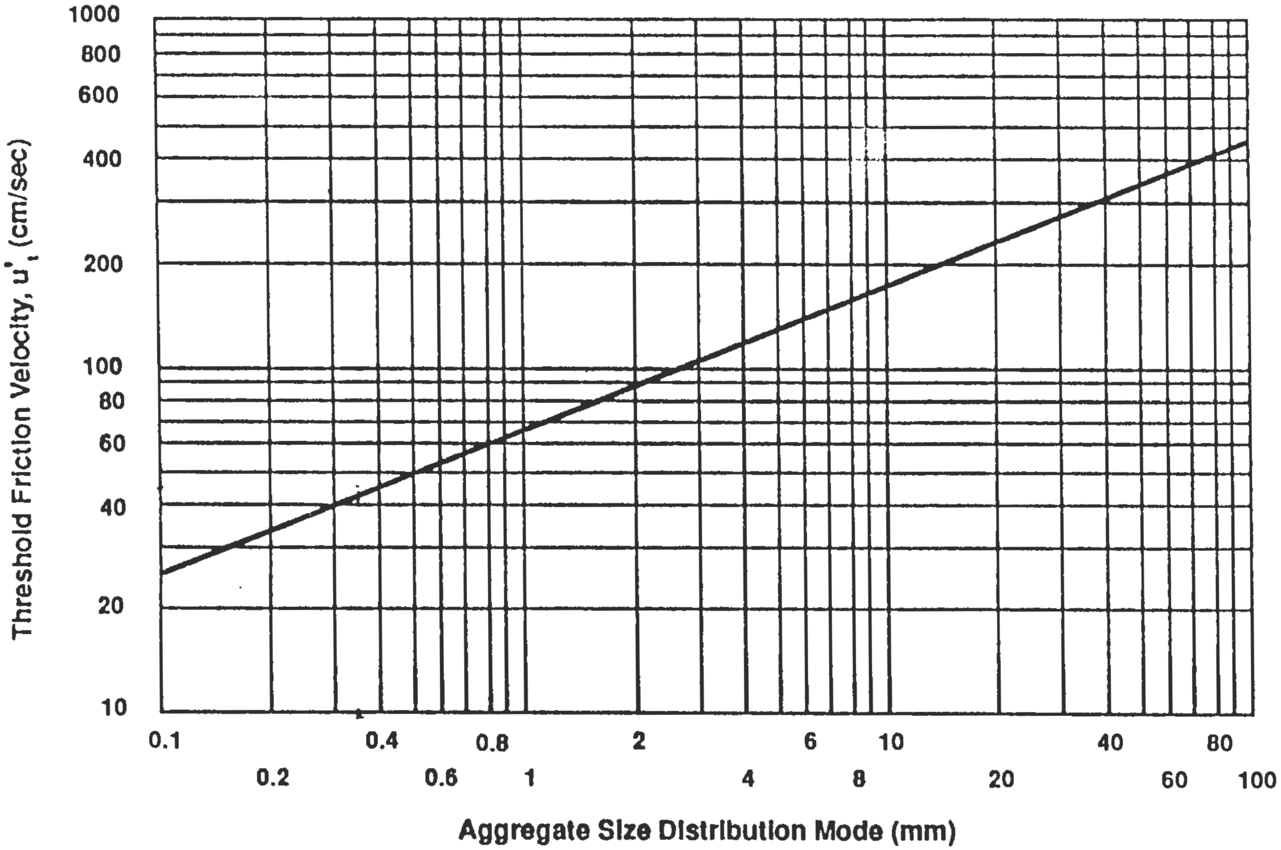


Figure 1a. Threshold friction velocity versus aggregate size distribution.

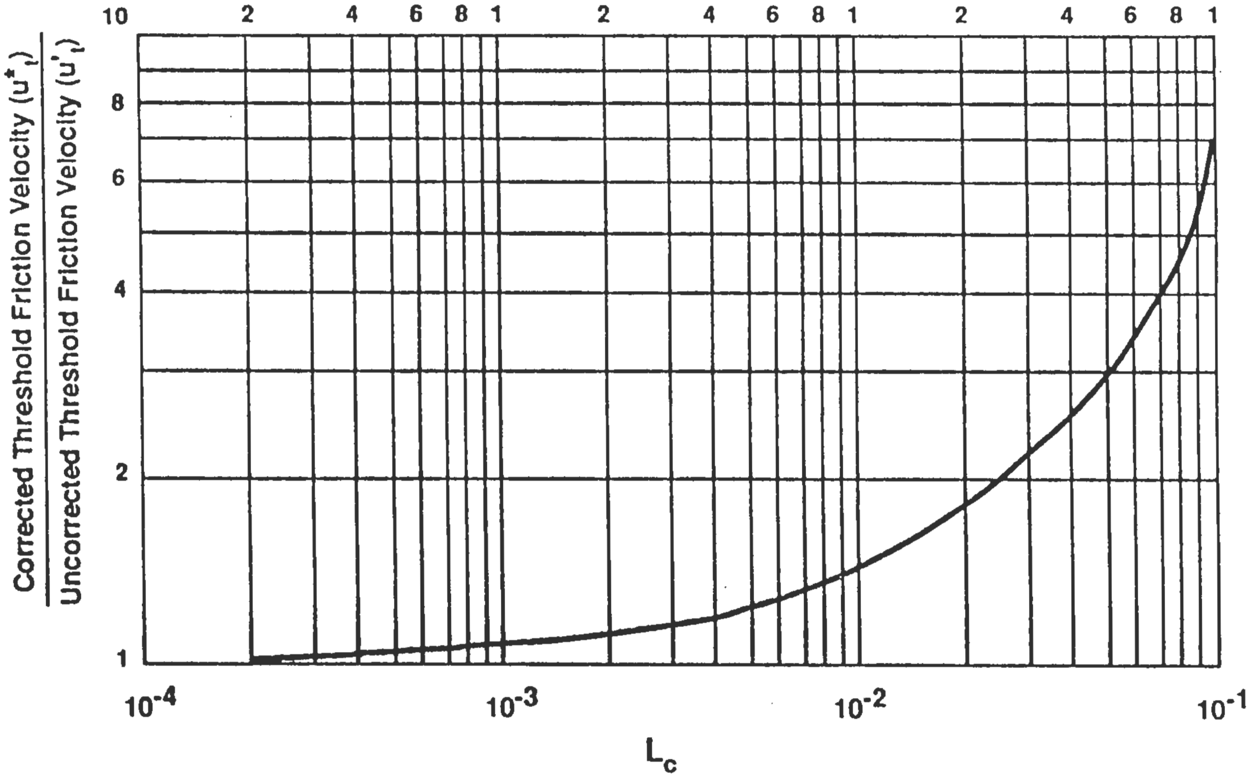


Figure 1b. Increase in threshold friction velocity with L_c.

No. 4c Loose Material Present?

Determine if there is loose erodible material above any hardened crust.

No. 4d Estimate Size Distribution Mode and Threshold Friction Velocity

Estimate the aggregate size distribution mode of the loose material above the hardened crust and determine the threshold friction velocity (u'_t) (Step 3a).

No. 4e Correct for Nonerodible Elements (u^*_t)

(Step 3b)

B. Using either the "unlimited reservoir" or the "limited reservoir" model as determined from Figure 1, calculate an annual average emission flux (g/m^2-h) for each contaminant found in the erodible surface material.

1. Using the "unlimited reservoir" model

a. Emission flux for inhalable particles $\leq 10\,\mu m$ (PM_{10}):

$$E_{10} = 0.036\ (1-V)\left(\frac{[u]}{u_t}\right)^3 F(x)\ C \qquad (15)$$

where E_{10} = PM_{10} annual average emission flux of component i, g/m^2-h

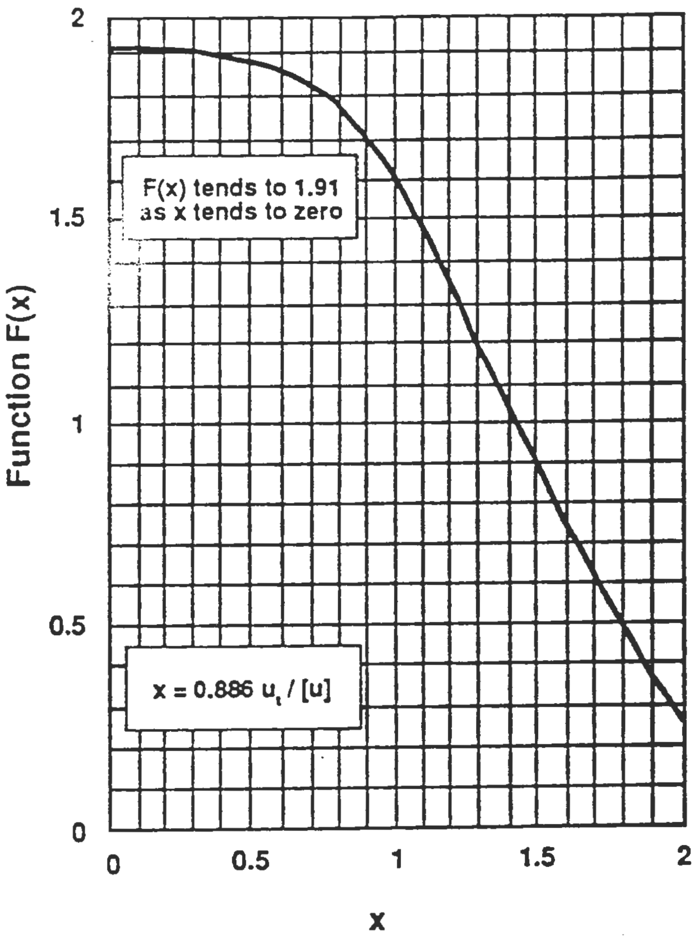
V = Fraction of contaminated surface with continuous vegetative cover (equals 0 for bare soil)

$[u]$ = Mean annual windspeed at 10 m anemometer height, m/s (from local climatological data)

u_t = Equivalent threshold value of windspeed at 7 m anemometer height, m/s (Equation No. 16)

C = Fractional percent by weight of component i from bulk samples of surface material

$F(x)$ = Function obtained from the relationship in Figure 2 ($x=0.886\ u_t/[u]$, dimensionless ratio).



NOTE: If $x > 2$,
$F(x) = 0.18\,(8x^3 + 12x)\,e^{-x^2}$

Figure 2. Function curve used in "unlimited reservoir" model.

Calculation of the equivalent threshold value of windspeed at a 7 m anemometer height (u_t):

$$u_t = 18.1\ (u^*t)/100 \qquad (16)$$

where u_t = Equivalent threshold value of windspeed at a 7 m anemometer height, m/s

(u^*_t) = Threshold friction velocity corrected for nonerodible elements, cm/s (5.A, detailed Steps 3a and 3b)

Note: This calculation is based on an assumed roughness height for flat terrain of 0.5 cm, between natural snow (0.1) and a plowed field (1.0). Refer to the reference for Step III.5. to calculate u_t if a roughness height of 0.5 cm is not appropriate for site-specific conditions.

b. Emission flux for particles $\leq 30\ \mu m$ (for deposition modeling):

$$E_{30} = E_{10} \times 2 \qquad (17)$$

where E_{30} = Annual average emission flux of component i as particles $\leq 30\ \mu m$, g/m^2-h

E_{10} = PM_{10} annual average emission flux of component i, g/m^2-h (Equation No. 15).

2. Using the "limited reservoir" model.

a. Emission flux for inhalable particles $\leq$ 10 μm (PM_{10}):

$$E_{10} = 0.83 \frac{(f)\ P(u^{+})\ (1-V)\ (C)}{(1000)\ (PE/50)^2} \quad (18)$$

where E_{10} = PM_{10} annual average emission flux of component i, g/m^2-h

f = Frequency of disturbances per month (1/month for abandoned sites or sites with no activity)

u^+ = Observed (or probable) fastest mile of wind (at 10 m anemometer height) for the period between disturbances, m/s (from local climatological data)

$P(u^+)$ = Erosion potential, i.e., quantity of erodible particles at the surface prior to the onset of erosion, g/m^2 (Equation No. 19 or 19a)

V = Fraction of surface area covered by continuous vegetation (equals O for bare soil)

C = Fractional percent by weight of component i from bulk samples of surface material

PE = Thornthwaite's Precipitation-Evaporation Index used as a measure of soil moisture content (Figure 3).

Calculation of erosion potential $[P(u^+)]$:

$$P(u^{+}) = 6.7\ (u^{+} - u_t)\ for\ u^{+} \geq u_t \quad (19)$$

$$P(u^{+}) = O\ for\ u^{+} < u_t \quad (19a)$$

where $P(u^+)$ = Erosion potential, g/m^2

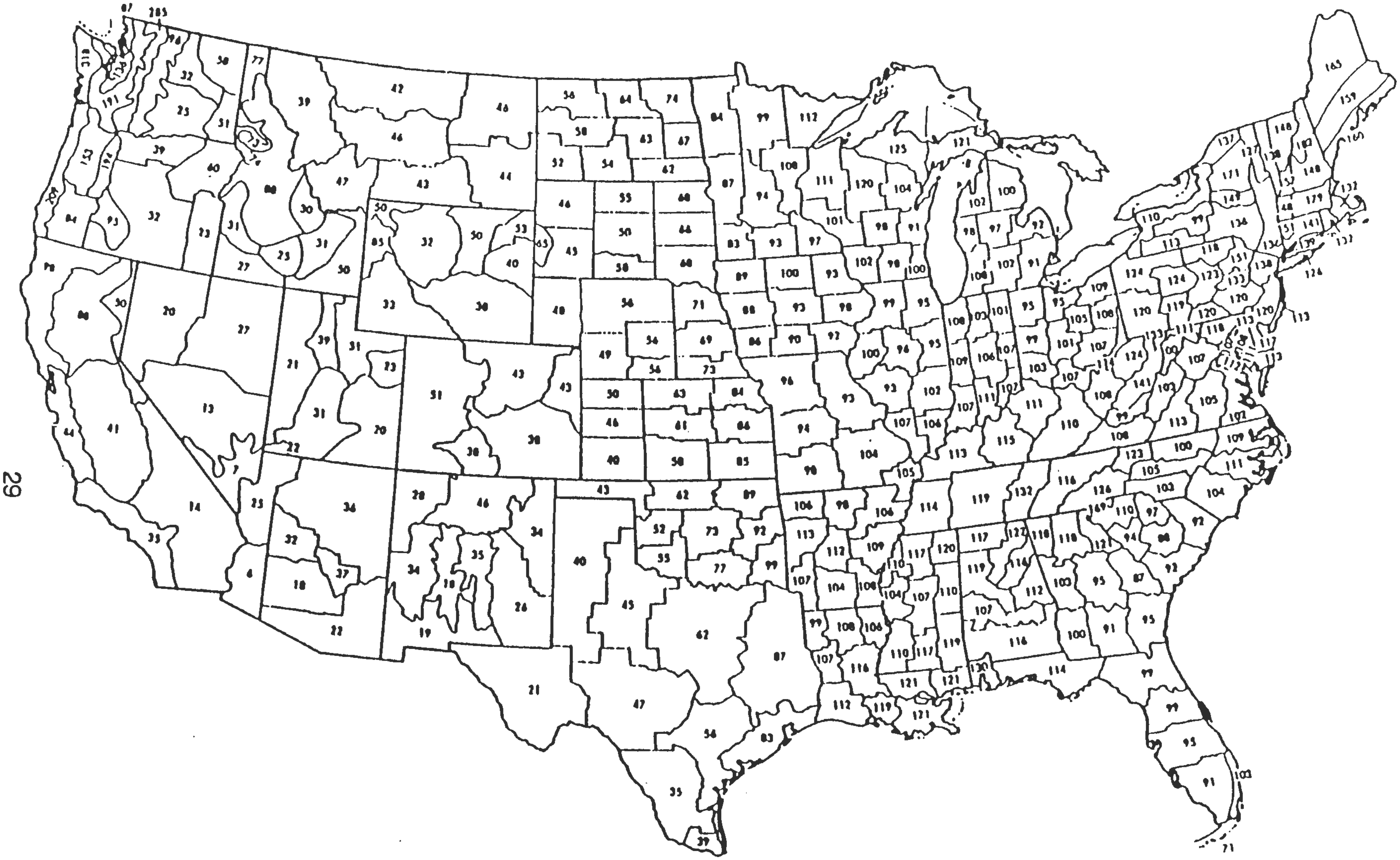


Figure 3. Thornthwaite's Precipitation-Evaporation Index (PE) for State Climatological Divisions.

u^+ = Observed (or probable) fastest mile of wind (at 10 m anemometer height) for the period between disturbances, m/s (from local climatological data)

u_t = Equivalent threshold value of windspeed at a 7 m anemometer height, m/s (Equation No. 16).

b. Emission flux for particles $\leq 30\,\mu m$ (for deposition modeling):

$$E_{30} = E_{10} \times 2 \tag{20}$$

where E_{30} = Annual average emission flux of component i as particles $\leq 30\,\mu m$, g/m^2-h

E_{10} = PM$_{10}$ annual average emission flux of component i, g/m^2-h (Equation No. 18).

Reference for Step III.5: *Rapid Assessment of Exposure to Particulate Emissions from Surface Contamination Sites*, Sections 1 - 4.1.2. Office of Health and Environmental Assessment, Washington, DC. EPA-600/8-85/002. February 1985.

C. Calculate a total emission rate (g/s) of each contaminant from the emission flux rate using the following formula:

$$E_T = \frac{E_x A}{3600} \tag{20a}$$

where E_T = Annual average emission rate of component i for particles $\leq x\,\mu m$, g/s

E_x = E_{10} or E_{30} emission flux obtained from Equation Nos. 15, 17, 18, or 20, g/m^2-h

A = Contaminated surface area, m^2.

STEP IV. ESTIMATE AMBIENT AIR CONCENTRATIONS AND/OR DEPOSITION CONCENTRATIONS AT RECEPTOR LOCATIONS OF INTEREST

Background:

Once emission rates have been calculated, atmospheric dispersion models are used to predict ambient air concentrations and/or deposition concentrations at receptors of interest. Dispersion models may include simple hand calculations or special computer models. Upper bound values can be approached by making conservative modeling assumptions (e.g., worst-case meteorological conditions, source configuration, etc.). A number of other more refined EPA-approved dispersion models may be substituted for models in the procedures listed below if an in-depth APA is warranted. Use of the procedures below should generally produce a more conservative estimate.

1. Model the emissions of each contaminant (gaseous or particulate) for each source using the appropriate EPA atmospheric dispersion model and source configuration data (i.e., size, location, height, etc.).

   A. Determine if the release is negative, positive or neutrally buoyant.

      Note: Under various release scenarios more applicable to CERCLA Removal Actions (e.g., sudden release of dense gases) negatively buoyant releases may be encountered. Impacts from negatively buoyant releases are likely to be most severe during stable atmospheric conditions and light windspeeds. Under these conditions, buoyancy effects may dominate atmospheric turbulent energy reducing dispersion and resulting in higher concentrations close to the site. If negatively buoyant releases are anticipated, perform the calculations referenced below to determine if negative buoyancy effects are applicable.

      Reference for Step IV.1.A: *A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants (Workbook)*, Section 5.1. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/4-88-009. NTIS PB89-134340. September 1989.

      Note: The Workbook contains hand calculation procedures for estimating emission rates, dispersion parameters, and ambient air concentrations for 18 different release scenarios typically found at treatment, storage, and disposal (TSDF) facilities (e.g., pipe leaks, tank leaks, etc.). These procedures may be used in conjunction with or in lieu of the procedures described herein if the baseline case accurately approximates one of the 18 scenarios described in the Workbook. Care should be taken, however, to carefully analyze and compare the emission rate scenarios in the Workbook with that of the baseline case to ensure that the Workbook emission scenarios are appropriate. The Workbook procedures have been converted to a PC-based system called TSCREEN. TSCREEN is available free of charge from the EPA Support Center for Regulatory Air Models (SCRAM) Bulletin Board System at (919) 541-5742.

B. For neutral or positively buoyant point or area source emissions, use the EPA SCREEN atmospheric dispersion model to predict short-term (if applicable) downwind ambient air concentrations ($\mu g/m^3$). The SCREEN model predicts one hour average concentrations at receptors, independent of wind direction, for point, area, and flare sources. Because the SCREEN model can accommodate only one source for each run, model each source separately and aggregate the predicted concentrations at the receptors of interest. Aggregating will yield a conservative one hour average estimate. The following reference should be reviewed to fully understand the capabilities and limitations of the SCREEN dispersion model. SCREEN may be obtained free of charge from the SCRAM Bulletin Board at (919) 541-5742.

Reference for Step IV.1.B: *Screening Procedures for Estimating the Air Quality Impacts of Stationary Sources*. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/4-88-010. NTIS PB89-159396. August 1989.

C. As applicable, estimate 3-, 8-, 24-hour, or annual average concentrations (e.g., to demonstrate compliance with ARARs/TBCs of the same averaging times) at receptors of interest by multiplying one hour concentrations ($\mu g/m^3$) by the following factors:

Averaging time	Multiplying factor
3 hours	0.9
8 hours	0.7
24 hours	0.4
annual	0.025 (for point sources only)

Reference for Step IV.1.C: *Workbook*. Appendix E.

Reference for Annual Point Source Multiplying Factor: *Estimation of Air Impacts From Air Stripping of Contaminated Water*. Air/Superfund NTGS Series, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/1-91-002. NTIS PB91-21888, May 1991. (The referenced value is presently under review and subject to change.)

D. Estimate downwind annual average concentrations for area sources using the following procedures:

1. Estimate the combined area source size by summing the sizes of all individual area sources.

2. Determine the square area of the combined area source (example: 2,500 m^2 = 50 m x 50 m).

3. Determine the total annual emission rate for the combined area source and convert to kg/m^2-yr.

4. From the set of curves in Figure 4, locate the χ/Q value for the appropriate downwind receptor distance and source size.

5. Multiply the χ/Q value (10^{-9} yr/m) by the annual emission rate per square meter, Q (kg/m^2-yr) to derive the annual average concentration, χ ($\mu g/m^3$) for the combined source.

Note: For downwind distances <50 meters and for onsite receptors, the model presented in the following step (Step IV,1,E) may be used.

Reference for Step IV.1.D: *Hazardous Waste TSDF-Fugitive Particulate Matter Air Emissions Guidance Document*, Appendix C. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/3-89-019. NTIS PB90-103250. May 1989.

E. If the receptor is located at the edge of the area source or within the contaminated area, use the following procedure to estimate the annual average concentration at the center of the area source.

Given the horizontal dimension of the square area source (X in meters) and the total source emission rate (Q_T in g/s):

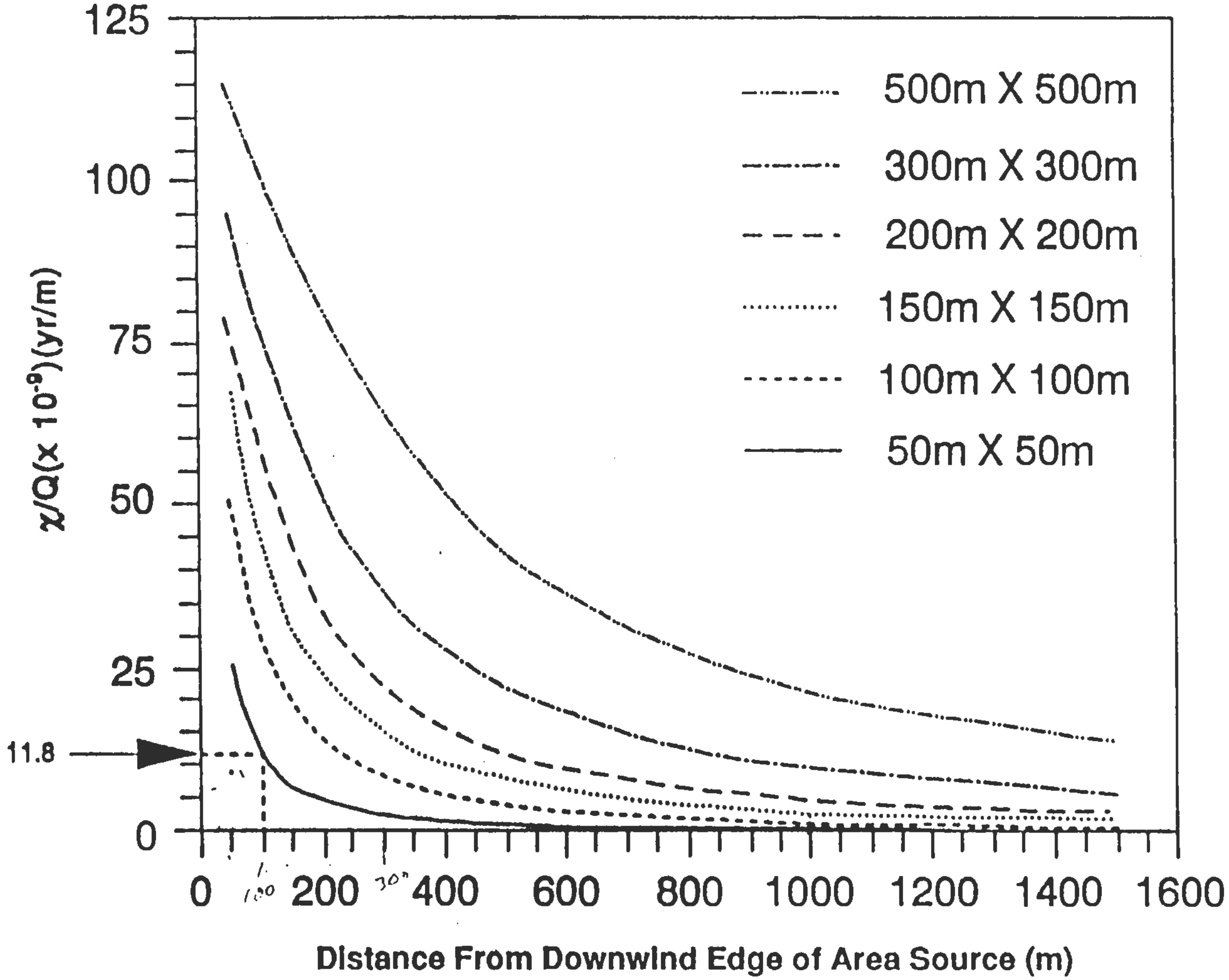


Figure 4. χ/Q versus distance for six area source sizes.

1. Determine the natural logarithm of the horizontal dimension of the subject area source (lnX).

2. Enter the value produced in (1) above into the following polynomial equation to produce the natural logarithm of the normalized concentration:

$$\ln(C/Q_T) = 13.0 - 0.261(\ln X) - 0.241(\ln X)^2 + 0.0124(\ln X)^3$$

3. Take the exponential of the value produced in (2) above to produce the normalized concentration:

$$C/Q_T = e^{\ln(C/Q_T)}$$

4. Multiply the normalized concentration by the emission rate to produce the long-term (annual average) concentration in $\mu g/m^3$:

$$C = (C/Q_T)Q_T$$

Note: The above polynominal equation is based on the modeling results of progressively larger square area sources utilizing the U.S. EPA Point-Area-Line (PAL) dispersion model. A single receptor was located at the center of each source negating the effects of wind direction. Windspeed was set at 2 m/s and atmospheric stability was set at Pasquill-Gifford class D (neutral) as typical average annual values. Emissions are assumed to be continuous, uniform over the surface of the area, nonbuoyant, inert, and emitted at a concentration less than approximately one percent (10,000 ppmv), so that density differences relative to air are not important. These procedures may not be conservative for sites in very sheltered locations where windspeeds may average less than 2 m/s and/or where very stable conditions may be typical. In these cases, refined modeling and/or monitoring may be required.

The procedures in Step IV,1,D and E are presently under review and subject to change.

Reference for Step IV.1.E: Memorandum from Robert Wilson, U.S. EPA, Region X Meteorologist, to Pat Cirone, Chief, Health and Environmental Assessment Section. June 1991.

2. If the Baseline Risk Assessment ultimately indicates that the incremental or aggregate risk for carcinogenic contaminants from onsite incidental ingestion of contaminated soil exceeds the acceptable risk range (i.e., 10^{-4} to 10^{-6}) or if the

Hazard Index for noncarcinongenic contaminants for the same pathway exceeds unity, determine the deposition concentration (g/m^2) of each applicable contaminant at receptors of interest. Deposition concentrations are used to calculate exposures from atmospheric deposition of contaminants. Applicable pathways may include incidental ingestion of soil, uptake in edible biota, indoor exposures due to track-in of outdoor dustfall, etc.

A. Model the particulate emissions of each applicable contaminant using the EPA Industrial Source Complex (ISC) model or the EPA Fugitive Dust Model (FDM) to determine deposition concentrations.

Reference for Step IV.2.A. *User's Guide for the Fugitive Dust Model (FDM) (Revised), User's Instructions*, U.S. EPA, Region X, Seattle, Washington. EPA-910/9-88-202R. NTIS PB90-215203, PB90-502410 (program diskette). January 1991.

Reference for Step IV.2.A: *Industrial Source Complex (ISC) Dispersion Model User's Guide-Second Edition (Revised)*, Volumes I, II, and User's Supplement. Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. EPA-450/4-88-002a and 002b. NTIS PB88-171475, PB88-171483, and PB88-171491. December 1987.

Note: The most recent and fully capable editions of ISC and FDM may be obtained free of charge from the SCRAM Bulletin Board at (919) 541-5742.

B. For sites that are suspected of having deposited contaminants (especially low mobility contaminants) offsite over an extended period of time, measure contaminant-specific concentrations of surface materials at receptors of interest. The potential contributions from other sources in the area (if any) should be considered and separated from the analysis.

COMMENTS BY JAMES MILLER, SEAD

LOCATION	COMMENT
Document Cover	For document control purposes, all future iterations of this report should have the date of report completion printed on both the document spine and cover.
Page 1-18, Section 1.2	The old house adjacent to the Nogle residence on Smith Vineyard Road should not be considered a "home with a private drinking water well". The house has been abandoned for many years and severely dilapidated. New York State real property maps classify the parcel as "abandoned agricultural land".
Table 1-2, Summary of Previous Investigations	Add a description of the March 1992 quarterly groundwater monitoring results.
Page 2-9, #4	Main states that soil boarings B6-91 and B7-91 are located in the former construction debris disposal area. These boaring are actually situated in the non-combustible fill area (SWMU-8). The old construction debris landfill is located on the south side of Indian Creek, far removed from the Ash Landfill Operable Unit. The construction debris disposal area has been designated SWMU-11.
Page 2-15, Section 2.7.5, (Data Interpretation)	The wording of this section seems to imply that the concentration of Volatile Organic Compounds in soil gas, can be extrapolated to its concentration in another media (i.e. soil or water). Please verify.
Page 2-23, Sect. 2.9.2.2, Aquatic Assessment Method Sentence #1	Reeder Creek is not a stream of concern for this report. Change reference to "Kendaia Creek".
Page 3-12, First Para.	Correct the sentence that reads "... in deep fractures (29-54 feet) is exist at a greater..."
Page 3-15, Para. 1	Correct the spelling error in the second sentence of this paragraph.
Page 3-15, Para. 1	Do not include the dilapidated house as a residential home which obtains its water from a private well.
Page 3-21	The white-pelaged deer are lesser in number than the brown-pelaged deer.
Page 3-21	Main has omitted any discussion of the occurrence, and harvesting of the Eastern Coyote on the Depot.

Page 3-20 and 3-21, Section on Significant Resources	Under New York State Freshwater Wetland Law, their exists a classification system based on a hierarchy of wetland benefits and functions. Class I wetlands have the most "beneficial characteristics", while Class IV wetlands have the least beneficial characteristics. It should be mentioned in this section that no Class I wetlands exist within a two mile radius, and that of the sic (6) New York State jurisdictional wetlands, half are considered Class III wetlands. Under New York State Law, the "benefits" provided by Class III wetlands are considered to be minor.
Appendix A, Individual Well History Tables	(1) The following Groundwater monitoring data has not been included for individual well histories; please revise accordingly. (a) Samples collected Nov 87 for off-post wells/purgables/Galson; (b) Samples collected 31 Oct 88 for off-post wells/purgables/ CS Environmental Laboratories; (c) Samples collected 5 Apr 88, several on post wells/TOX/ GALSON; (d) Samples collected 22 Sep 89 several on post wells/TOX/GALSON; (e) Samples collected 26 Jun 89 on off-post wells/purgables/CS Environmental Laboratories; (f) Samples collected 31 Mar 89/PT-12817/purgables/GALSON. (2) On 16 Apr 92, SEAD furnished Main with quarterly GW results for the Ash Landfill collected on 26 Mar 92. Please update tables accordingly. (3) Update the historical GW monitoring tables for the 4 Feb 92 sampling event by Lozier Labs. These results are for the off-post farmhouse wells only and have been previously forwarded to Main by SEAD.
Appendices, Draft Geophysical Survey Report, Page 1, Para 1	The large magnitude anomaly referred to in this paragraph was actually associated with the "non-combustible fill area" not a "construction and demolition debris landfill".

OB GROUND COMMENTS BY JAMES MILLER

LOCATION	COMMENT
Cover	For document control purposes, all future iterations of this report should have the date of report completion printed on both the document spine and cover.
Page 2-9, third paragraph	The third sentence in this paragraph refers to Section 3.5.3 of the original workplan. When referencing the "original workplan", indicate the date of the document (i.e. April 1991).
Page 3-24, Section 3.9.2.1	The discussion of significant resources needs to mention that of the seven (7) New York State jurisdictional wetlands, located within a two mile radius of the site, six (6) have been designated as NYS Class III wetlands. The "benefits" provided by classification III wetlands are considered "minor" compared to higher classified wetlands.
Page 3-24, Section 3.9.2.1, Para. 2	The white-pelaged deer are lesser in number than the brown - pelaged deer.
Page 3-24, Section 3.9.2.1, Para. 3	The type of bean grown adjacent to the depot are soybeans. The type of bean needs to be specified.
Page 3-24 & 3-25 Section 3.9.2.1, Para. 4	Main has omitted any discussion of the occurrence, and harvesting of the Eastern Coyote both on and off depot.
Page 3-27, Para. 1	Delete the parenthesis after the word "...bird..." in the third sentence of this paragraph.
Page 4-1, Section 4.1.1, Para. 1	Specify the month that the "original" workplan was completed.
Page 4-3, Section 4.1.3, Para. 2	The fifth sentence in this paragraph states "...Figure 4-1 shows a plot of the Level II versus Level V results along with a plot of the best fit regression line...". Figure 4-1, however, is labelled "level II vs. level IV results". Please clarify.
Page 4-3, Section 4.1.3, Para. 2	This paragraph states that Level II analysis yielded a concentration of 69 mg/kg of TNT for BE-F-2A. This statement is consistent with the result reported in Table 4-1 for sample BE-F-2A (Level II). The paragraph goes on to state that Level V analysis determined 90.65 mg/kg of total explosives to be present. However, the value of 90.65 mg/kg is reported in Table 4-1 for Level IV data for sample BE-F-2A. Is the second column in Table 4-1 actually showing Level V data?

OB GROUND COMMENTS BY JAMES MILLER (cont'd)

Page 4-5, Section 4.2, Second Para.	Eliminate the unneeded comma from the first sentence.
Page 4-12, Section 4.3.3.1, First Para.	Main classifies the pesticides 4-4-DDT and Endrin as herbicides. These pesticides should be labeled insecticides, rather than herbicides.
Page 4-12, Section 4.3.3.1	Polychlorinated insecticides such as DDT are highly resistant to destruction by light or oxidation, and are considered very environmentally persistent. It seems likely that the insecticides found on-site may be the result of localized Anthropogenic or ambient concentrations resulting from human non-site sources; the non-site sources being the farms adjacent to both sites. This scenario should be briefly noted in this section, especially in light of the fact that very low concentrations of insecticides were reported and the historical use of the lands adjacent depot have been largely for agriculture.

COMMENTS BY RANDALL BATTAGLIA, SEAD
(FOR BOTH ASH LANDFILL AND OPEN BURNING GROUNDS)

OB Grounds -

Page 1-15, Para. 1.2 - 2.400 → 2,400

Table 1-2 - It may be useful to include background well levels here.

Table 1-4 - For MW-1 through MW-7, enclosed is the well installation report.

General Comment - When discussing the white deer at Seneca, SEAD uses the term "rare but not unique" rather than only "rare".

Page 4-11, Para. 4.3.2.3 - "di-n-butylphalate" - this should be "di-n-butylphthalate.

GARYS comments

1.0 INTRODUCTION

This Preliminary Site Characterization report is submitted as the first phase of the Remedial Investigation (RI). Chas. T Main, Inc. (MAIN) has been retained by the United States Army Corps of Engineers (USACE) as part of their remedial response activities under the Comprehensive Environmental Responsibility, Compensation and Liability Act (CERCLA) to perform these activities. The purpose of this report is to discuss the physical characteristics of the site, review the analytical results from the investigation programs, and identify sources of potential contamination at the site. The Ash Landfill site is included on the federal facilities National Priorities List (NPL); it has been listed since July 13, 1989.

1.1 SITE BACKGROUND

1.1.1 Site Description

Th n the western flank of a topographic high between Cayuga and kes region of central New York (Figure 1-1). Specifically, the Landfill site is located about 2,000 feet east of the nor AD airstrip in the southwestern portion of the 10,587-acre Sen omulus, New York (Figure 1-2). SEAD was constructed in 1 n elongated central area for storage of ammunitions and weaponry in quonset-style buildings, an operations and administration area in the eastern portion and an army barracks area at the north end of the depot. The base was expanded to encompass a 1,524-meter airstrip, formerly the Sampson Air Force Base. Currently, SEAD is used for: 1) receiving, storing, and distributing ammunition and explosives, 2) providing receipt, storage, and distribution of items that support special weapons activity; and 3) performing depot-level maintenance, demilitarization, and surveillance on conventional ammunition and special weapons. The depot employs approximately 1,000 civilian and military personnel.

quonset style
concrete underground
"igloos"
not correct
as written
means something
else

The site consists of an abandoned incinerator building and tower (Building 2207), a former cooling pond, an Ash Landfill, and a nearby Non-Combustible Fill Landfill (Plate 1-1). The site is bound on the north by Cemetery Road, on the east by a SEAD railroad line, on the south by undeveloped SEAD land, and on the west by the depot's boundary. Beyond the depot's western boundary are farmland and residences on Smith Farm Road and along Route 96A. Sampson State Park near Seneca Lake is further to the west.

Darien silt-loam soils, 0 to 18 inches thick, have developed in the Wisconsonian age glacial tills on and in the vicinity of the site. The soils are somewhat poorly drained and have a silt clay loam and clay sub soils. These soils are developed in glacial till where they overlie the shale. In general, the topographic relief associated with these soils is 3-8%. Figure 1-7 presents the U.S. Department of Agriculture General Soil map for Seneca County. Figure 1-8 presents the soils map for the area surrounding the Ash Landfill.

Table 1-1 compares average metal content in shale, sandstone, limestone, soil and sediment of the Great Lakes for As, Ba, Cd, Cr, Hg, Pb, and Se. The table shows shales to contain from 2 to more than 10 times the quantity of metals found in other sedimentary rocks. This is due to the cation complexing capacity of the clays that make up the shales. It is probable that soils developed over shales, or over tills derived from shales, would contain metal values greater than those listed for average soils.

1.1.1.2 Regional Hydrogeologic Setting

Regionally, four (4) distinct hydrologic units have been identified within Seneca County. These include two (2) distinct shale formations, a series of limestone units and unconsolidated beds of Pleistocene glacial drift. Overall the groundwater in the county is very hard, and therefore, the quality is minimally acceptable for use as potable water. Approximately 95 percent of the wells are used for domestic or farm supply and the average daily withdrawal is approximately 500 gallons (0.35 gpm). About five percent of the wells in the county are used for commercial, industrial, or municipal purposes. Seneca Falls and Waterloo, the two largest communities in the county, are in the hydrogeologic region which is most favorable for [illegible] ndwater supply. However, because the hardness of the grc [illegible] e industrial and commercial establishments operating within the [illegible] surface water as their municipal supplies. The villages of Ovi [illegible] ch are without substantial industrial establishments, utilize gro [illegible] supplies. Ovid obtains its supply from two shallow gravel-pacl [illegible] ved by a developed seepage-spring area.

Phreatic

Regionally, the pheratic aquifer of the unconsolidated surficial glacial deposits of the region would be expected to flow in a direction consistent with the ground surface elevations. Geologic cross-sections from Seneca Lake and Cayuga Lake have been constructed by the State of New York, (Mozola, A.J., 1951 and Crain, L.J., 1974). This information suggests that a groundwater divide exists approximately half way between the two finger lakes. SEAD is

2 lb/hr sounds too low.
2 ton/hr perhaps?

The incinerator was built in 1974. Between 1974 and 1979, mater[illegible] were transported to the incinerator. The incinerator was a multiple chamber, batch-fed 2 lb/hour capacity unit which burned rubbish and garbage. The incinerator unit contained an automatic ram-type feeder, a refractory lined furnace with secondary combustion and settling chamber, a reciprocating stoker, a residue conveyor for ash removal, combustion air fans, a wet gas scrubber, an induced draft fan, and a refractory-lined stack (USAEHA, 1975).

Nearly all of the approximately 18 tons of refuse generated per week on the depot were incinerated. The source for the refuse was domestic waste from depot activities and family housing. Large items which could not be burned were disposed of at the non-combustible fill landfill.

Ashes and other residues from the incinerator were temporarily disposed of in an unlined cooling pond immediately north of the incinerator building. The cooling pond consisted of an unlined depression approximately 50 feet in diameter and approximately 6 to 8 feet deep. When the pond filled (approximately every 18 months), the fly ash and residues were removed, transported, and buried in the adjacent landfill east of the cooling pond. The refuse was dumped in piles and occasionally spread and compacted. No daily or final cover was applied. The active area of the ash landfill extended at least 500 feet north at the incinerator building near a bend in a dirt road, based on an undated aerial photograph of the incinerator during operation. Parallel groves at the northernmost extent of the filled area are visible in the aerial view of the incinerator and adjacent fill area during active operation and indicate that the fill was spread using a bulldozer or similar equipment. The incinerator was destroyed by a fire on May 8, 1979, and the landfill was subsequently closed. The landfill was reported to have been capped. The landfill was apparently covered with native soils of various thicknesses but has not been closed with an engineered cover or cap.

A grease pit disposal area near the eastern boundary of the site was used for disposal of cooking grease. Evidence of burning of debris and dumping of possible solvents during the operation of the incinerator is evidenced by the areas of blackened soil, charred debris and areas of stressed or dead vegetation.

The approximately 2-acre Non-Combustible Fill Landfill southeast of the incinerator building (immediately south of the SEAD railroad line) was used as a disposal site for non-combustible materials including construction debris from 1969 until 1977.

Subsequent groundwater sampling events from January 1990 through December 1991 have confirmed the presence of these volatile organic compounds in the selected wells on the Ash Landfill site. Monitoring Wells PT-10 through PT-12, PT-15 through PT-18, PT-20 through PT-26 and MW-27 through MW-33 were included in the sampling program (Table 1-2). The prominent volatile organic compounds detected in wells on-site include trichloroethylene, tetrachloroethene, trans-1,2-dichloroethylene, vinyl chloride, 1,2-dichloroethane, and chloroform. Less common compounds are 1,1,1-trichloroethane, 1,1-dichloroethane and chloromethane. Wells PT-18 and PT-12 were the most severely impacted. Historical concentrations of trichloroethylene indicate considerable variation in the concentration of this compound in selected wells on-site (Figure 1-9). Generally trichloroethylene appears to be the predominant compound in the wells where volatiles were detected.

A greater amount of fluctuation in the concentration of trichloroethylene occurs in wells located near the suspected source areas for volatiles (PT-18, PT-12, PT-20, and PT-22) than in wells located farther downgradient (PT-24 and PT-28). From well monitoring logs, well PT-21 is believed to be screened in competent shale and exhibits very slow recharge and has contained significantly less trichloroethylene than its paired well, PT-22, screened in the shallow till/weathered shale aquifer.

In March 1991, trichloroethylene was detecte[illegible] [illegible]dient farmhouse shallow well at 1 ug/l. In September and I[illegible] [illegible]tions of volatile organic compounds (trichloroethene, and 1,[illegible] [illegible]ofluoromethane, respecti[illegible]ere detected in well PT-26, w[illegible] [illegible]dient of the site near the three private off-site wells at the far[illegible] December 1991 indicated that a low concentration of 1,1,1-trichloroethane was present in the barn well at the farm house. The presence of low concentrations of these compounds in these offsite downgradient offsite wells is the first in the history of the SEAD monitoring program. Historical groundwater monitoring data are included in Appendix A.

Needs to state
result showed
nothing in
farm wells

1.1.3.5 Geohydrologic Study (USAEHA 1987)

Analytical results of soil samples from eleven soil borings (BH-16, BH-17, BH-18, BH-19, BH-21, BH-24, BH-25, BH-27, BH-28, BH-29, and BH-30) during the USAEHA October 1987 study indicated that volatile organic compounds were present in the samples. Several volatile

conductivity, whereas the in-phase or 180° component is extremely sensitive to high-conductivity objects such as buried metal. The 180° component allows better detection of buried metal [illegible] are highly [illegible] ctive. The correlation between the in-phase and quadrature-ph [illegible] allowed [illegible] delineation of metallic objects. Good correlation of the two dat [illegible] expected [illegible] ckground soils consist of relatively resistant non-conductive sil [illegible] debris areas contain an abundance of metallic objects. Ther [illegible] vities were resistive enough so that the metallic anomalies we [illegible]

The GPR survey was based of the field plots of the EM anomalies. Due to wet, soft soil conditions in the northwestern portion of the survey area, the geophysics team was unable to maneuver the survey van close enough to this area to allow hand-pulling of the GPR antenna over the area previously shown to have EM anomalies. In the remainder of the areas where the EM showed anomalous values, GPR also showed evidence of disrupted earth and/or the presence of metals. GPR was operated with a 120 megahertz (MHz) antenna, rendering it functionally blind by the transmit/receive pulse at the start of each scan. Consequently, the data did not show the conditions in the upper 3 feet of the subsurface. Because of this blind zone, GPR was unable to distinguish any shallow buried material from any surface dumping.

As reported by Detection Sciences, Inc. (1990), the GPR signatures within the burial/debris areas were remarkably homogeneous, indicating that the various anomalies contained relatively similar mixes of metals and nonmetals. In general, a busy radar signature indicates the burial of solid waste materials. No radar signatures indicating the presence of intact drums were observed. The ability of GPR to identify drums is based on buried targets having the size, shape, and characteristics of a buried drum (Detection Sciences, Inc., 1990). To the radar, a crushed drum is simply a piece of scrap metal and is not identifiable as a drum.

In general, the radar (GPR) contour map indicates what appears to be normal soil horizons, or background conditions, over the majority of the survey lines. Several small ash mounds were observed during the investigation. The geophysical data collected indicated that the surface piles did not contain buried debris and did not penetrate the surface.

occurrence of a nonstandardized light (volatile) hydrocarbon. Low concentrations of trichloroethylene and trans-1,2-dichloroethylene were measured on the western half of the site, coinciding with the points of highest total volatiles concentrations. During removal of the steel probe used in the soil gas technique, a liquid substance was observed. Soil gas samples from this location (K-6 and K-8), were sent to the TES laboratory for overnight analysis. Gas chromatography (GC) analysis indicated the presence of typical diesel fuel or kerosene constituents and a wide variety of volatile chlorinated species in these samples. Eight other locations directly surrounding this area were then sampled. These samples showed significantly reduced photoionization detector (PID) readings and levels of volatiles in the field GC analysis, indicating that the incident involved a localized source of contaminants.

1.1.4 Conceptual Site Model

1.1.4.1 Physical Site Characterization

The Ash Landfill site is located on the western slope of a topographic high between Seneca Lake and Cayuga Lake. The area is covered with low lying shrubs and grasses. The area is dominated by the presence of the former incinerator stack and adjacent buildings which are in various stages of deterioration. The upper portions of soil at this site is classified as silty loam which is poorly drained. Underlying the upper soil horizon is unsorted glacial till. The till contains a high degree of fines and is also considered to be poorly drained. Sill thicknesses are generally thin ranging from 1 to 6 feet.

Till

The extent of the former Ash Landfill is not well defined, however, a low lying mound is apparent along a road which traverses the site. The former cooling pond is apparent and is situated adjacent to both the former incinerator and the grass covered ash landfill.

At the eastern portion of the site, at the intersection of two access roads is the former non-combustion debris landfill. The western toe of this landfill is clearly evident since the rise in mound elevation over the surrounding land is 10 to 15 feet. The eastern portion is not apparent since the landfill extent merges with the normal ground slope. No other noticeable ground features is apparent at this landfill.

2.9.2 Study Areas And Methods

2.9.2.1 Study Areas

Aquatic Study Area

The only water body in proximity to the Ash Landfill Site that flows on a year round basis is Kendaia Creek which is approximately 4500 feet north of the abandoned incinerator building (Figure 2-2). Near the Ash Landfill Site, this stream is quite small, ranging in width from 3 to 10 feet with typical maximum depths ranging from 1 to 7 inches. Discharge measured during mid-November was only 0.3 cubic feet per second (cfs). Judging from the water surface elevation relative to the stream banks at the time of measurement, this discharge is fairly typical of normal conditions in this segment of Kendaia Creek. The substrate is composed predominantly of gravel-and cobble-sized particles. There are some reaches where the stream flows directly over bedrock. Silt and some sand are typically imbedded in the interstitial spaces of the gravel and cobbles. Flow characteristics of the stream include approximately equal amounts of pool and riffle. The applicable State water quality standard given to Kendaia Creek in its entirety is Class D. Kendaia Creek discharges into Seneca Lake, approximately 2 miles downstream of the fence line of the Seneca Army Depot, at a portion designated as AA(T). The state water index number for Kendaia Creek is ONT 66-12-P369-9.

The only known actively managed fishery within two miles of the Ash Landfill Site is Seneca Lake. Seneca Lake supports a significant fishery f[illegible]ter and warmwater species. The New York State Department [illegible]on enforces special fishing regulations for the Finger Lakes, o[illegible] These regulations pertain to lake trout, landlocked salmon, raint[illegible] rainbow trout and smelt [illegible]lmouth bass, northern pike and walleye (NYSDEC undated). [illegible]nificant aquatic resources, including wild and scenic rivers, wi[illegible] Landfill Site.

Conversations with local residents indicated rainbow smelt migrate from Seneca Lake into the lower reaches of Kendaia Creek to spawn. The NYSDEC Regional Fish Manager (Carl Widmer of Region 8) and his staff have no data regarding the aquatic community of Kendaia Creek and are not aware of any significant resources associated with this stream.

the next morning. Any captured animals were identified to species then released. The habitat value of the cover types to wildlife was assessed during these field surveys. Any signs of wildlife and vegetation stress or alterations observed during the above surveys were also noted.

2.10 INCINERATOR DUST SAMPLING PROGRAM

Dust was sampled from two furnaces within the Ash Landfill incinerator building (2207) using the cotton swab technique as specified by EPA Region II. The samples were collected from walls and ledges within two refractory-lined chambers in the building as these areas have a [illegible] containing the parameters of interest and they were also accessible by the [illegible]

from a furnace

Sample [illegible] was collected from the north [illegible] furnace and sample DW1206-2 was collected a furnace located approximately 30 feet to the south. Moistened cotton swabs prepared according to the standard operating procedure [illegible] by EPA Region II for taking dust wipe samples and contained in the appropriate sample jars were provided directly by Aquatec. The prepared swabs for heavy metals were reviewed from the sample container, wiped over a one square foot wall and ledge surface using latex gloves and immediately replaced in the sample container. The swabs for acid base neutral compounds, pesticides, and Pcbs were treated in a similar fashion except these were wiped over a two foot square foot surface. All swabs were noticeably covered with dust and dirt after sample collection. The dust wipe samples were collected by two personnel in modified Level C protective equipment.

removed

are

Pollution Throughout the Contiguous United States (George C. Holzworth, US EPA, 1972). The closest stations for which inversion information is available for Albany, New York and Buffalo, New York. The Buffalo station is nearer to SEAD but almost certainly exhibits influences from Lake Erie. These influences would not be expected to be as noticeable at SEAD.

SEAD is located in the Genesse-Finger Lakes Air Quality Control Region (AQCR). The AQCR is designated as non-attainment for ozone and attainment or unclassified for all other criteria pollutants. Data for existing air quality in the immediate area surround the SEAD, however, can not be obtained since the nearest state air quality stations are 40 to 50 miles away from the army depot (Rochester or Monroe County or Syracuse of Onodaga County). A review of the data for Rochester, which is in the same AQCR as the SEAD, indicates that all monitored pollutants (sulfur dioxide, particulates, carbon monoxide, lead, ozone) are below state and federal limits, with the exception of ozone. In 1987, the maximum ozone concentration observed in Rochester was 0.127 ppm. However, this value may not be representative of the SEAD area which is a more rural environments.

3.4 SURFACE WATER HYDROLOGY AND SEDIMENTS

3.4.1 Surface Water and Sediment

Surface water on-site drains into several wetland areas on-site. Based on topographic expression, several of these wetland areas (W-B, W-D, W-E, and W-F) drain mostly into two small, but clearly developed, drainage swales south of the Ash Landfill and incinerator building (Plate 1-1). These swales drain into a drainage ditch along West Patrol Road. Surface water, when present, drains to the north along West Patrol Road. Wetland W-F also drains into the ditch along West Patrol Road. Drainage along West Patrol Road, and along Cemetery Road, is to the west based on topography.

Precipitation data from the nearest monitoring station (Aurora Research Farm), with comparable precipitation to that in Romulus, N.Y. was reviewed to gain a perspective on the seasonal variations in rainfall which would directly impact surface water flow. This data indicates that, historically, June has had the greatest amount of rainfall, 3.9 inches, and the winter months (January and February) generally have had the least amount of rainfall (Figure 3-2).

exists

land surface, respectively. Water in deep fractures (29-54 feet) is exist at a greater head than the water in shallower fractures (9.7-29.7 feet).

Based on this limited data, downward movement of groundwater occurs from the shallow till/weathered shale aquifer into the upper portions of the competent shale aquifer. However, in deeper portions of the competent shale aquifer groundwater movement is upward, possibly driven by the topographic highs between Seneca and Cayuga Lakes. It is likely that the size and distribution of fractures ultimately controls the relative movement of groundwater in this aquifer. The maximum topographic high between Seneca and Cayuga lakes in the region of the Ash Landfill is approximately 760 feet MSL; this location is 16,000 feet (3 miles) to the east of the Ash Landfill. Also, there is a 51 foot difference in hydraulic head in the competent shale aquifer between eastern and western portions of the site, based on an average elevation between the two deep wells in each area (MW-38D and MW-35D, and MW-4D and MW-42D) as measured on January 7, 1992.

3.7.4 Hydraulic Conductivities

Hydraulic conductivities were determined for both the shallow and deep aquifers on the Ash Landfill site (Table 3-7). Hydraulic conductivities for wells screened in the shallow till/weathered shale aquifer were determined using the methods of 1) Bouwer and Rice (1976) and 2) Horslev (1951). Generally, the values are similar, however, in several instances the values calculated using the Horslev method are slightly higher.

Average hydraulic conductivity valves for the shallow aquifer range from 2.3 x 10^{-5} cm/sec to 6.4 x 10^{-4} cm/sec. Average hydraulic conductivity values for the deep aquifer range from 1.9 x 10^{-7} to 4.1 x 10^{-5}. The average hydraulic conductivities for the shallow and deep aquifers are 3.2 x 10^{-4} and 1.2 x 10^{-5} cm/sec, respectively (Table 3-7).

Published hydraulic conductivity values for till or representative materials are: 1) 0.49 m/day (5.67 x 10^{-4} cm/sec) for a repacked predominantly sandy till (Todd 1980), and 2) from 10^{-2} to 10^{-3} m/day (10^{-5} to 10^{-6} cm/sec) for representative materials of silt, sand, and mixtures of sand, silt, and clay (Todd 1980).

The most recent land use report is that issued by Cornell University. This report classifies, in further detail, land uses and environments of this region (Cornell 1967). Agricultural land use is categorized as inactive and active use. Inactive agricultural land consists of land committed to eventual forest regeneration, land waiting to be developed, or land presently under construction. Active agricultural land surrounding SEAD consists of largely cropland and cropland pasture. The U.S. Geologic Survey (USGS) quadrangle maps for the Towns of Ovid and Dresden, New York (1970), New York State Department of Transportation (DOT) quadrangles for Romulus, New York (1978) and Geneva South, New York (1978) do not indicate land designated for dairy production in the vicinity of the site.

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The SEAD is a government-owned installation under the jurisdiction of the U.S. Army Material Command (AMC). SEAD lies immediately east of the village of Romulus, NY (Figure 1-1) 12 miles south of the villages of Waterloo and Seneca Falls, and 2.5 miles north of the village of Ovid, NY (Figure 1-1). The nearest major cities areRochester, NY and Syracuse, NY located 60 mil[illegible] respectively. The total area of SEAD is 10,587 acres, of which 8[illegible] storage areas for ammunition, storage and warehouse, and open storag[illegible] family housing is in two parcels, a 54-acre development adjacent [illegible] acres situated along Seneca Lake. Additionally, troop housing is available for 270 enlisted men (Buildings 703, 704 and 708). Bachelor officer quarters are located in Building 702, which is designated for 18 men. Other land uses include Administration, Community Services and an airfield. SEAD has a swimming pool at the north end of the facililty, along with tennis courts, a gymanasium, and a sports field complex. Picnic and playground areas are found on the installation at Hancock Park, the Lake Area and the Family Housing Area. There is also a skeet and trap range at the field. There are no recreational facilities located within 1,000 feet of the Ash Landfill.

The Ash Landfill is situated in the southwestern corner of SEAD. Land use adjacent to and off-site of the southwestern corner of SEAD is sparse residential areas with some farmland (Figure 3-5).

Forestland adjacent to SEAD is primarily forestland under regeneration with sporadic occurrence of mature forestry. Public and semi-public land use surrounding and within the vicinity of SEAD is Sampson State Park, Willard Psychiatric Center, and Central School (at the Town of Romulus). Sampson State Park entails approximately 1,853 acres of land and includes a boat ramp on Seneca Lake.

increased

Historically, Varick and Romulus Townships within Seneca County has developed as an agricultural center supporting a rural population. However, icreased population occurred in 1941 due to the opening of SEAD. Population has progressed since then largely due to the increased emphasis on promoting tourism and recreation in this area. Records provided by SEAD show approximately 11 residences adjacent to the northwestern border of SEAD which are within 1 mile of the Ash Landfill. These residences all obtain drinking water from private water wells. Detailed information regarding the construction of these wells was not available.

3.9 ECOLOGY

This section presents the results of the aquatic and terrestrial assessment programs. The aquatic assessment program will discuss the benthic invertebrate and fish communities. The terrestrial assessment program will discuss significant resources and resources used by humans, vegetative resources, wildlife resources, stressed or altered terrestrial biota, and potential terrestrial receptors.

3.9.1 Aquatic Assessment Program

3.9.1.1 Benthic Invertebrate Community

Based on the results of the macroinvertebrate Surber sampling program at three stations (SW-800, SW-801, and SW-802) the benthic community of Kendaia Creek is dominated by insects. Insects comprised approximately 72 percent of the 356 organisms collected, whereas the remaining 28 percent was a combination of worms (Turbellaria and Oligochaeta), leeches (Hirudinea), snails (Gastropoda), clams (Bivalvia), seed shrimp (Ostracoda), aquatic sow bugs (Isopoda) and scuds (Amphipoda) (Table 3-8). Insects collected included stoneflies (Plecoptera), caddisflies (Trichoptera), hellgramites (Megaloptera), beetles (Coleoptera), and true flies (Diptera). The fauna collected are characteristic of stoney habitat with equal amounts of pools and riffles, such as Kendaia Creek (Hynes 1979).

The combined relative abundance of all organisms collected indicates that the beetles dominated the collection (35.1 percent), closely followed by true flies (28.9 percent). Subdominate groups, in order of abundance include snails (12.6 percent), aquatic earthworms (7.3 percent), scuds (6.5 percent) and caddisflies (4.9 percent). The remaining six groups collected (flatworms, clams, seed shrimp, aquatic sow bugs, stoneflies, and hellgramites) comprised a total of 4.8 percent of the overall collection. Thus, as frequently occurs in

is to the northeast, while OV-7 and OV-8 are to the southeast. None of the eight regulated wetlands are believed to be hydrologically connected to the Ash Landfill area.

The only other significant terrestrial resource known to occur in the 2-mile study area is the rare population of white-pelaged white-tailed deer, which inhabits the fenced Seneca Army Depot (Buffington 1991) (Figure 3-6). Although the normal brown-pelaged deer are also common on the depot, the white deer are predominant. The white deer were not observed on the Ash Landfill area, but were sighted many times in adjacent environments. Several deer tracks and bedding areas were noted on the Ash Landfill area, so undoubtedly both the white- and brown-pelaged deer utilize the Ash Landfill area for resting and feeding.

Resources Used by Humans

In the 2-mile study area, agricultural crops and deciduous forests comprise the vegetative resources used by humans (Figure 3-6). Although no crops are grown on the Depot, farmland is one of the predominant land uses in the surrounding private lands. Crops, including corn, wheat, oats, beans and hay mixtures, are grown primarily for livestock feed (dairy cattle). Active agricultural fields are near and to the west of the Ash Landfill area. There are grape vineyards to the north of the Ash Landfill area, but not within the study area (Seneca Chamber of Commerce 1991).

Deciduous forestland on the depot and surrounding private lands is under active forest management (Morrison 1992, SEAD 1992). Timber and firewood are harvested from the private woodlots (Morrison 1992), however, presently no timber harvesting occurs on the Depot (SEAD 1992). The forestlands off the Depot appear to be in a normal and healthy condition with no apparent impacts.

Within the 2-mile study area, there are several wildlife species which are hunted and trapped on private lands. Game species hunted include the eastern cottontail, white-tailed deer, ruffed grouse, ring-necked pheasant and waterfowl (Canada goose, mallard and wood duck). Gray squirrel and wild turkey are [illegible] lesser extent due to the lack of appropriate wooded habitat. Species trapped in this study area include red and gray fox and raccoon. Muskrat and beaver are trapped to a lesser extent (Woodruff 1992), but neither would probably occur on or near the Ash Landfill area due to lack of aquatic habitat. On the Depot, deer, waterfowl and small game (squirrel, rabbit) hunting is allowed but regulated by SEAD. Although the designated waterfowl hunting area is outside the study area. A

sentence structure

4.0 NATURE AND EXTENT OF CONTAMINATION

4.1 INTRODUCTION

volatile

This section presents the results of analyses of all media sampled for th [illegible]. Soil gas results are discussed first, followed by results for volatile organic compounds, semi-voatile, organic compounds, pesticides and PCBs, metals and cyanide, and herbicides in groundwater, soil, dust wipe samples, sediment and surface water. Where possible, the extent of these parameters in the various media is presented.

4.2 SOIL GAS

4.2.1 Soil Gas Summary

The most notable result of the soil gas program was the detection of an area near the bend in the unpaved road, north of the old incinerator building, which has been identified as a likely source of solvent impacted soil. Confirmatory soil borings in this area were then performed to delineate this source area.

In addition, low levels of solvents was detected at the Non-Combustible Fill Landfill, located south/southwest of the old incinerator building. The concentrations of solvents detected in the soil gas extracted from the Non-Combustible Fill Landfill were substantially less than the levels detected at the bend in the road. Nonetheless, test pitting was performed in the areas where geophysical techniques indicated the presence of metal objects. The metal object responsible for the geophysical anomoly was identified. None of the anomolies were identified as drums during the test pitting process.

Results of the soil gas investigation are tabulated in Table 4-1, Soil Gas Summary Data. Soil gas identification numbers and locations are presented on Plate 4-1. Detector responses were used in conjunction with calibration curve data to calculate corresponding concentrations of 1,1,-dichloroethylene and trichloroethylene. Total volatile concentrations, determined as the sum of all detectable peaks, expressed as trichloroethylene, and OVM readings are also provided on the table. Additionally, syringe and probe blanks are included on the table.

The spatial distribution of this soil gas data is shown on Plates 4-1. These locations are mostly at locations where geophysical anomalies were identified. Additional locations were

Borings in the Ash Landfill and in the area near the bend in the road near wetland W-B generally contain semi-volatiles from the surface to the bottom of the boring, although the concentrations in this area are not as high as those from the debris pile and Non-Combustible Fill Landfill. Detectable concentrations of semi-volatiles from this area range between 61 ug/kg in boring B28-91 and 31, 970 ug/kg in B10-91. The highest concentration of semi-volatiles in this area are both from two borings on the Ash Landfill, B10-91 and B31-91 (Table 4-3).

Semi-volatile concentrations as high as 107,520 ug/kg are present at the surface as well as at depth (except in B5-91) in borings located in the centers of the three debris piles (B3-91, B4-91 and B5-91). Semi-volatiles were found at a concentration of 423 ug/kg in only one sample (0-2 feet from B11-91) from the perimeter borings drilled to the east and west of the debris pile containing B3-91. Near the debris pile which contains B4-91, semi-volatiles at concentrations up to 2000 ug/kg were found in perimeter borings (B13-91 and B14-91).

No semi-volatiles organic compounds were found in outlier borings B6-91, B9-91, B22-91, B23-91 and B24-91. One sample from outlier borings B8-91 and B25-91 contained 90 ug/kg of Pyrene (an estimated value which was also found in the laboratory blank) and 510 ug/kg of bis-(2-ethylhexyl) phthalate (an estimated value), respectively.

Relatively low concentrations of burning semi-volatiles (concentrations between 88 and 400 ug/kg) were found between 2 and 3 4 ft in boring B18-91 (at the cooking grease pits disposal area) and B19-91 (with suspected butning pits), east of the Ash Landfill. Near asphalt patch in the western perimeter of the site (B16-91) semi-volatile concentrations are up to 11,360 ug/kg.

4.3.3 Pesticides and PCBs

Five pesticides and two PCBs were detected in several soil samples on-site (Table 4-4). The pesticides include heptachlor, dieldrin, 4,4-DDE, 4,4-DDD, and 4,4-DDT. The PCBs are Aroclor-1242 and Aroclor-1260.

Relatively low concentrations of pesticides (18 to 250 ug/kg) were found in borings B7-91, B10-91, B12-91, B15-91, B16-91, B17-91, B20-91, B30-91 and B31-91. The compounds 4,4-DDE, 4-4-DDD and 4,4-DDT are the most common pesticides found on-site, but of these, 4,4-DDE is the most widespread. The highest concentration of total pesticides was found in

manganese the maximum concentrations on-site are only slightly above those for background samples. Also, for these latter three metals the average background concentrations are greater than on-site average concentrations.

For the remaining group of metals the number of on-site samples above the background average exceeds the number below this average. These metals include aluminum, arsenic, cadmium, chromium, copper, iron, lead, nickel, potassium, sodium, vanadium and zinc. On-site and background maximum and average concentrations are generally [illegible] aluminum, iron, nickel and vanadium. However, for arsenic, cadmium, chromium, copper, lead, potassium, sodium and zinc the maximum concentrations are significantly higher in than the background samples (Table 4-5).

than in

The maximum concentrations for metals occur at the following locations: B3-91 for arsenic, cadmium, copper and zinc; B4-91 for chromium and lead; B11-91 for potassium; and B10-91 for sodium. Borings B3-91 and B4-91 are in debris piles north of the Ash Landfill. In general, samples from the Ash Landfill and its immediate area contain high concentrations of metals.

4.3.5 Herbicides

Three herbicides 2,4-DB, MCPP, and 2,4,5-TP (Silvex) were detected in several samples on the site, however, 2,4-DB and MCPP are more prevalent (Table 4-6). These herbicides are found only in locations where dumping of suspected solvents, debris and ash has taken place on the site. Specifically, they were found in suspected solvent dump areas, in all three borings in and near the three debris piles, and in the Ash Landfill area.

The highest concentrations of 2,4-DB, MCPP, and 2,4,5-TP (Silvex), detected were 410 ug/kg (at B29-91), 24,000 ug/kg (at B11-91), and 10 ug/kg (at B10-91), respectively.

4.3.6 Total Recoverable Petroleum Hydrocarbons

The 2-4 foot sample from boring B26-91 near the underground fuel oil tank contained 13.6 mg/kg of total recoverable petroleum hydrocarbons. However, during drilling no VOCs or visual or olfactory evidence of petroleum hydrocarbons were detected in the soil from this boring.

4.4 GROUNDWATER

4.4.1 Volatile Organic Compounds

Volatile organic compounds were detected in nine of the 31 monitoring wells sampled on and off-site. The VOCs detected included trichloroethylene, 1,2-dichloroethylene (total), vinyl chloride, chloroform, 2-Butanone, xylene (total), methylene chloride, and acetone. The latter two compounds are believed to be laboratory contaminants in most instances. Trichloroethylene and 1,2-dichloroethylene are the dominant volatile organics on the site. Complete tables of analytical results are included in Appendix J.

The geographic distribution of total volatile organic compounds is shown in Plate 4-4). Ten, 100 and 10,000 ug/l isocontours define a total volatiles plume that originates in the western portion of the Ash Landfill and extends to the west in the direction of groundwater flow. The plume is believed to extend beyond the fence near the Conrail railroad line onto the adjacent property based on the 104 ug/l concentration of total volatiles in well PT-24.

As shown on Plate 4-4 the plume is relatively long and narrow, however, based on soil gas results and soil analyses, the source area for this plume is believed to extend as much as 300 feet north of PT-18, which has a total volatiles concentration of 11,580 ug/l. Because the source area is suspected to be wider than shown, the north and northeastern portions of the plume are bound by dashed or (inferred) 10 and 100 ug/l isocontours. Well MW-40 in the eastern portion of the Ash Landfill clearly defines the eastern extent of the plume while wells PT-19, MW-32 and MW-31 define its southern extent.

Trichloroethylene (TCE) is considered as the dominant volatile organic compound on-site. [illegible] tion of this compound is presented on (Plate 4-5). Concentrations [illegible] up to 11,000 ug/l in the source area (PT-18) and are as low as 4 and [illegible] n boundary of the site. A slug of higher concentrations of [illegible] ent in the southwestern portion of the plume.

They

[illegible] s of the breakdown of trichloroethylene have been observed at the site. The include 1,2-dichloroethylene and vinyl chloride.

At the downgradient, western end of the plume, 1,2-dichloroethene is the dominant volatile organic compound where it is found at 100 and 71 ug/l in wells PT-24 and MW-29,

respectively. The shift from trichloroethylene as the predominant volatile organic compound near the source areas to the dominance of the breakdown daughter compound 1,2-dichloroethylene at downgradient locations is consistent with the environmental chemistry of trichloroethylene.

4.4.2 Semi-Volatile Organic Compounds

No semi-volatile organic compounds were detected in any of the wells on and off-site. One well (PT-[illegible] semi-volatile organics, but were suspected to be laboratory [illegible] compounds were detected in a reanalysis of this sample.

4.4.3 [illegible]

Aroclor

No pesticid[illegible] in any of the well samples collected on and off-site. A very low concentration of Anclor-1260 (3.6 ug/l) was found in MW-28, however, a reanalysis of the sample did not detect this compound above 1 ug/l.

4.4.4 Metals and Cyanide

Unfiltered and filtered metals results for groundwater are presented in Table 4-7. Generally, filtered metals concentrations are less than concentrations in unfiltered samples, and most metals concentrations are below the detection limit in the filtered samples.

Some of the highest unfiltered metals concentrations were obtained in an off-site well, PT-26, near the Seneca airfield. PT-18 in the Ash Landfill also exhibits some high unfiltered concentrations of metals especially lead (17.8 ug/L), zinc (496 ug/l), manganese (1,530 ug/l) and mercury (0.42 ug/l). Elevated concentrations of barium, beryllium, cadmium, chromium, lead, manganese, vanadium and zinc occur in unfiltered samples from wells MW-29 and MW-31.

Cyanide concentrations in unfiltered samples are all below the detection limit except in PT-10 where 11.2 ug/l (just above the detection limit) was detected.

Aluminum and iron show the greatest difference between unfiltered and filtered concentrations.

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NEW MONITORING WELLS AT
SENECA ARMY DEPOT
ROMULUS, NEW YORK
PROJECT #81-121

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NEW MONITORING WELLS AT
SENECA ARMY DEPOT
ROMULUS, NEW YORK
PROJECT #81-121

Prepared by Parratt - Wolff, Inc.

INTRODUCTION

Hibbard Engineers contacted Parratt - Wolff, Inc. to install three new monitoring wells along the perimeter of the munitions destruction area at the Seneca Army Deport. These new wells are needed to completely surround the demolition area according to the new E.P.A. and R.C.R.A. regulations. They are designed and sited as required, and provide data necessary for a complete groundwater evaluation of the area.

DRILLING METHOD

The three boreholes were drilled using a Mobil Model B-56 hydraulic rotary drilling rig equipped with a 6" auger. These borings were placed as close as possible to the locations specified on the maps provided by Hibbard. Engineers. The exact siting of the borings was based on accessibility to drilling equipment.

The borings were drilled to a depth a short distance into the bedrock. No samples were taken from the boreholes, but a log was made for each hole giving soil descriptions and depths, depth to bedrock and depth to water. (Figure 1-3)

BEDROCK AND SOIL

The bedrock which underlies the demolition area is the Ludlowville formation shale. It is exposed in many low lying areas throughout the base and, in particular, along the banks of Reeder Creek to the east of the site. The frequent exposures of this bedrock are an indication of its shallow depth. The logs of the borings show it to lie at a depth of 9' on the west side of the site and 6.5 feet on the east side. The respective bedrock elevations of 108.0 and 90.7 show it to be sloping in an easterly direction. (Figure 5)

The soil of the area can be classified as a glacial till. It is a mixture of silt, sand and gravel which was laid down by glaciers and glacial meltwater. The large amount of silt in the overburden reflects the shale bedrock from which it originated.

MONITORING WELLS

Upon completion of each boring, a monitoring well was installed. (See figure 4 and Table II) Each well was composed of a 4" diameter well screen 5' in length with a slot size of .010 inch. Schedule 40 riser pipe was used to complete the well. This pipe was extended two to three feet above the ground surfaces for easy visibility and access. The screen was placed so as to expose it to the goundwater.

MONITORING WELLS (CONT.)

The annular space was back-filled with native soil to 18" below ground level. The remaining area was filled with a sand-bentonite grout. This grout mixture serves as a seal against surface contamination.

PERMEABILITY TEST

An in hole permeability test was performed within Well #7. This was done in order to arrive at a permeability rate for the soil underlying the site.

A typical falling head permeability test used. The rate at which water leaves the well through the screened portion was measured. Calculations were then made. The resulting permeability of the overburden material underlying the site was 2.2×10^{-4} cm/sec. This is in the range of permeabilities of medium to fine sand and silt.

GROUNDWATER GRADIENT AND DIRECTION OF FLOW

Water level measurements were taken in all three of the new wells and the four existing wells for the purpose of groundwater study. (Table 1) Using these measurements and the distances between the wells, the gradient or slope of the water table and its direction of flow was determined.

As shown in the sketch map (Figure 6) the flow of the water is in an ENE direction towards Reeder Creek. This can be expected because groundwater tends to feed any streams or lakes located nearby.

Another factor influencing the flow of water is the slope of the bedrock and topography (Figure 5 and 6) show that the bedrock and topography also slope in the direction of Reeder Creek. Groundwater, just as everything else that moves, will naturally flow downhill.

The groundwater gradient is approximately .015 ft/ft in the northeasterly and easterly directions. This was calculated using the data collected on July 6, 1981. (Table 1) It shows a definite dominate flow towards Well #2 and Reeder Creek which lies just to the east. This is the average gradient of the area. It tends to increase slightly in the vicinity of Reeder Creek and flattens out to the west where the topography becomes more level.

Respectfully submitted,

PARRATT - WOLFF, INC.

Deborah L. Young

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NEW MONITORING WELLS AT
SENECA ARMY DEPOT
ROMULUS, NEW YORK
PROJECT #81-121

TABLE I

MONITORING WELL DATA

Well Number	Depth Drilled	Depth to Rock	Soil Type	Ground Elevation	Depth to Water(7/6/81)
1*	13.0'	12.0'	Till	100.0'	4.3'
2*	7.0'	6.5'	Till	85.1'	3.75'
3*	11.0'	9.5'	Till	95.1'	4.1'
4*	10.0'	9.5'	Till	98.7'	5.85'
5	10.0'	9.0'	Till	118.5'**	Dry
6	9.0'	9.0'	Till	111.0'**	3.0'
7	6.5'	6.0'	Till	104.0'**	4.2'

*Wells installed by Parratt - Wolff, Inc. on August 31, 1979.

**Interpolated from Topography Map (Frank T. Tripi and Associates, 4/14/81).

NEW MONITORING WELLS AT
SENECA ARMY DEPOT
ROMULUS, NEW YORK
PROJECT #81-121

Prepared by Parratt - Wolff, Inc.

TABLE II

NEW MONITORING WELL SPECIFICATIONS

Well Number	Length of Riser Pipe (in feet) Total	Height above ground level	Screen Placement* (5' length)
5	7.0	2.0	5.0 - 10.0
6	6.3	2.5	3.8 - 8.8
7	3.0	1.5	1.5 - 6.5

*From Ground Level

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wolff inc
FISHER RD., EAST SYRACUSE, N.Y. 13057
TELEPHONE AREA CODE 315/437-1429

GENERAL NOTES

1. The soil logs, notes and other test data shown are the results of interpretations made by representatives of Parratt-Wolff Inc. from personal observations made during the exploration period of samples of subsurface materials recovered during exploration and records of exploration as prepared by the drill operator.

2. Explanation of the classifications and terms:

a. Bedrock - Natural solid mineral matter occurring in great thickness and extent in its natural location. It is classified according to geological type and structure (joints, bedding, etc.) and described as solid, weathered, broken, fragmented or decomposed depending on its condition.

b. Soils - Sediments or other unconsolidated accumulations of particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter.

PENETRATION RESISTANCE

COHESIONLESS SOILS		COHESIVE SOILS	
Blows Per Ft.	Relative Density	Blows Per Ft.	Consistency
0 to 4	Very Loose	0 to 2	Very Soft
4 to 10	Loose	2 to 4	Soft
10 to 30	Medium	4 to 8	Medium
30 to 50	Dense	8 to 15	Stiff
Over 50	Very Dense	15 to 30	Very Stiff
		Over 30	Hard

Size Component Terms

Boulder		Larger than 8 inches
Cobble or Small Stone		8 inches to 3 inches
Gravel	coarse	3 inches to 3/4 inch
	medium	3/4 inch to 4.76 mm
Sand	coarse	4.76 mm to 2.00 mm (#10 sieve)
	medium	2.00 mm to 0.42 mm (#40 sieve)
	fine	0.42 mm to 0.074 mm (#200 sieve)
Silt and Clay		Finer than 0.074 mm

Proportion by Weight

Major component is shown with all letters capitalized.

Minor component percentage terms of total sample are:

and	40 to 50 percent
some	20 to 40 percent
little	10 to 20 percent
trace	1 to 10 percent

c. Gradation Terms - The terms coarse, medium and fine are used to describe gradation of Sands and Gravel.

d. The terms used to describe the various soil components and proportions are arrived at by visual estimates of the recovered soil samples. Other terms are used when the recovered samples are not truly representative of the natural materials, such as, soil containing numerous cobbles and boulders which cannot be sampled, thinly stratified soils, organic soils, and fills.

e. Ground Water - The measurement was made during exploration work or immediately after completion, unless otherwise noted. The depth recorded is influenced by exploration methods, the soil type and weather conditions during exploration. Where no water was found it is so indicated. It is anticipated that the ground water will rise during periods of wet weather. In addition, perched ground water above the water levels indicated (or above the bottom of the hole where no ground water is indicated) may be encountered at changes in soil strata or top of rock.

FIGURE 1

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Seneca Army Depot
LOCATION Munitions Destruction Area
DATE STARTED 7/7/71 DATE COMPLETED 7/7/71

HOLE NO. B-5
SURF. EL. 118.5'
JOB NO. 8173

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

GROUND WATER DEPTH
WHILE DRILLING Dry
BEFORE CASING REMOVED Dry
AFTER CASING REMOVED Dry

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Brown moist SILT, trace fine to medium gravel, trace clay	3.0'
5.0'						Gray dry SILT, trace weathered shale	9.0'
10.0'						Gray dry weathered SHALE,trace silt	
						Bottom of Boring	10.0'
						Note: Installed observation well to 10.0'.	

FIGURE 2

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT	Seneca Army Depot	HOLE NO.	B-6
LOCATION	Munitions Destruction Area	SURF. EL.	111.0'
DATE STARTED	7/6/81 DATE COMPLETED 7/6/81	JOB NO.	8173

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

GROUND WATER DEPTH
WHILE DRILLING 8.0'
BEFORE CASING REMOVED 8.0'
AFTER CASING REMOVED 3.0'

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Brown moist SILT, trace fine to coarse gravel, trace fine sand	3.0'
5.0'						Gray moist SILT, some fine to medium gravel, little fine sand	8.5'
▼ WL						Weathered SHALE	
10.0'						Bottom of Boring	9.0'
						Note: Installed observation well to 8.8'.	

FIGURE 5

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TEST BORING LOG

FISHER ROAD
EAST SYRACUSE, N.Y. 13057

PROJECT Seneca Army Depot

LOCATION Munitions Destruction Area

DATE STARTED 7/6/81 DATE COMPLETED 7/6/81

HOLE NO. B-7

SURF. EL. 104.0'

JOB NO. 8173

GROUND WATER DEPTH WHILE DRILLING

BEFORE CASING REMOVED

AFTER CASING REMOVED 4.2'

N — NO. OF BLOWS TO DRIVE SAMPLER 12" W/140# HAMMER FALLING 30" — ASTM D-1586, STANDARD PENETRATION TEST

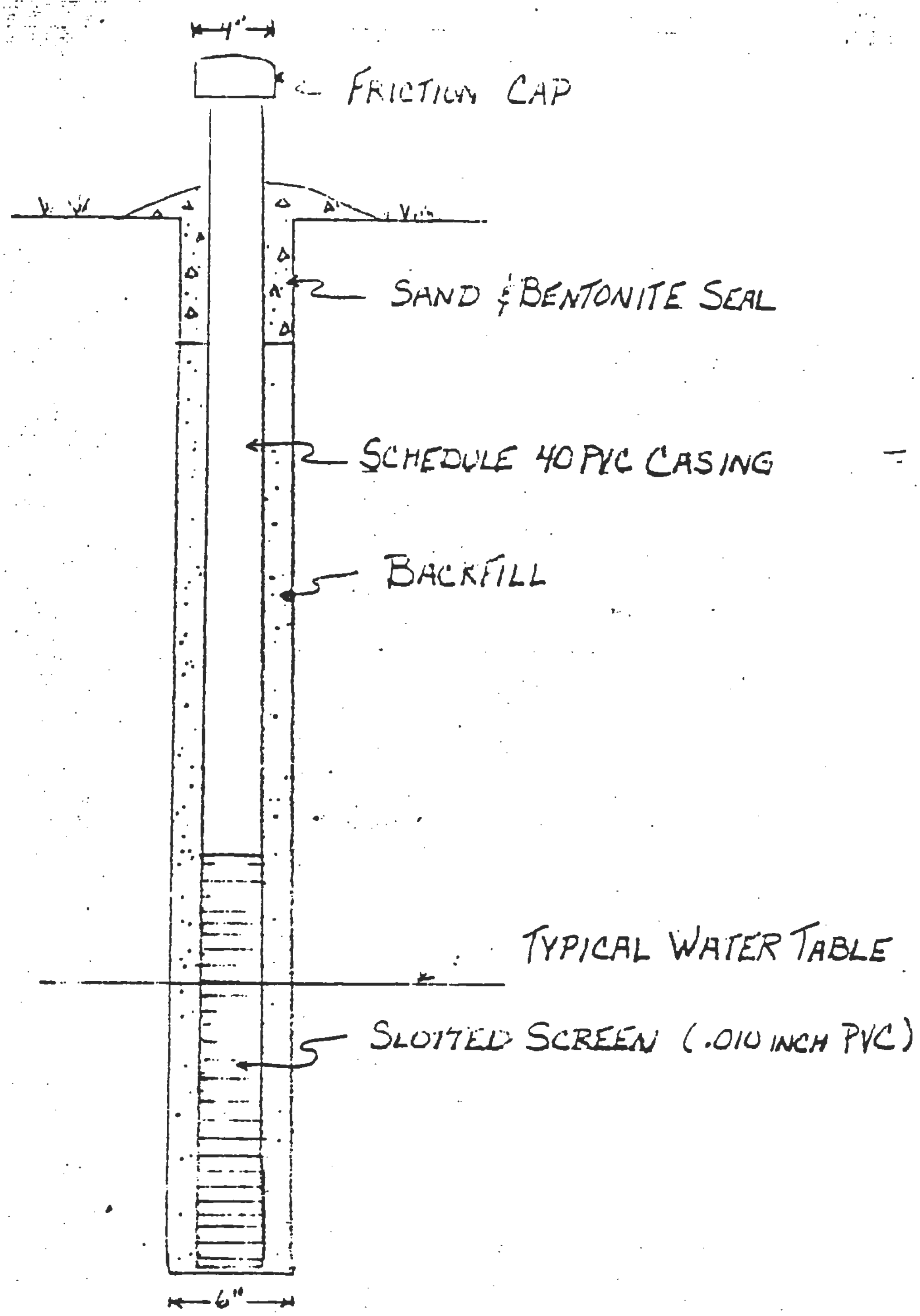
C — NO. OF BLOWS TO DRIVE CASING 12" W/ # HAMMER FALLING "/OR — % CORE RECOVERY

CASING TYPE - HOLLOW STEM AUGER

SHEET 1 OF 1

DEPTH	SAMPLE DEPTH	SAMPLE NUMBER	C	SAMPLE DRIVE RECORD PER 6"	N	DESCRIPTION OF MATERIAL	STRATA CHANGE DEPTH
						Brown moist SILT, trace fine to coarse gravel, trace fine to coarse sand	3.0'
5.0'						Gray moist SILT, some weathered shale pieces, little fine to coarse sand	5.0'
						Gray moist SILT, some fine to coarse gravel, little fine to coarse sand, trace clay	5.8'
10.0'						Gray wet SILT and fine to coarse SAND, some fine to coarse gravel	6.0'
						SHALE	
						Bottom of Boring	6.5'
						Note: Installed observation well to 6.5'.	

FIGURE 7



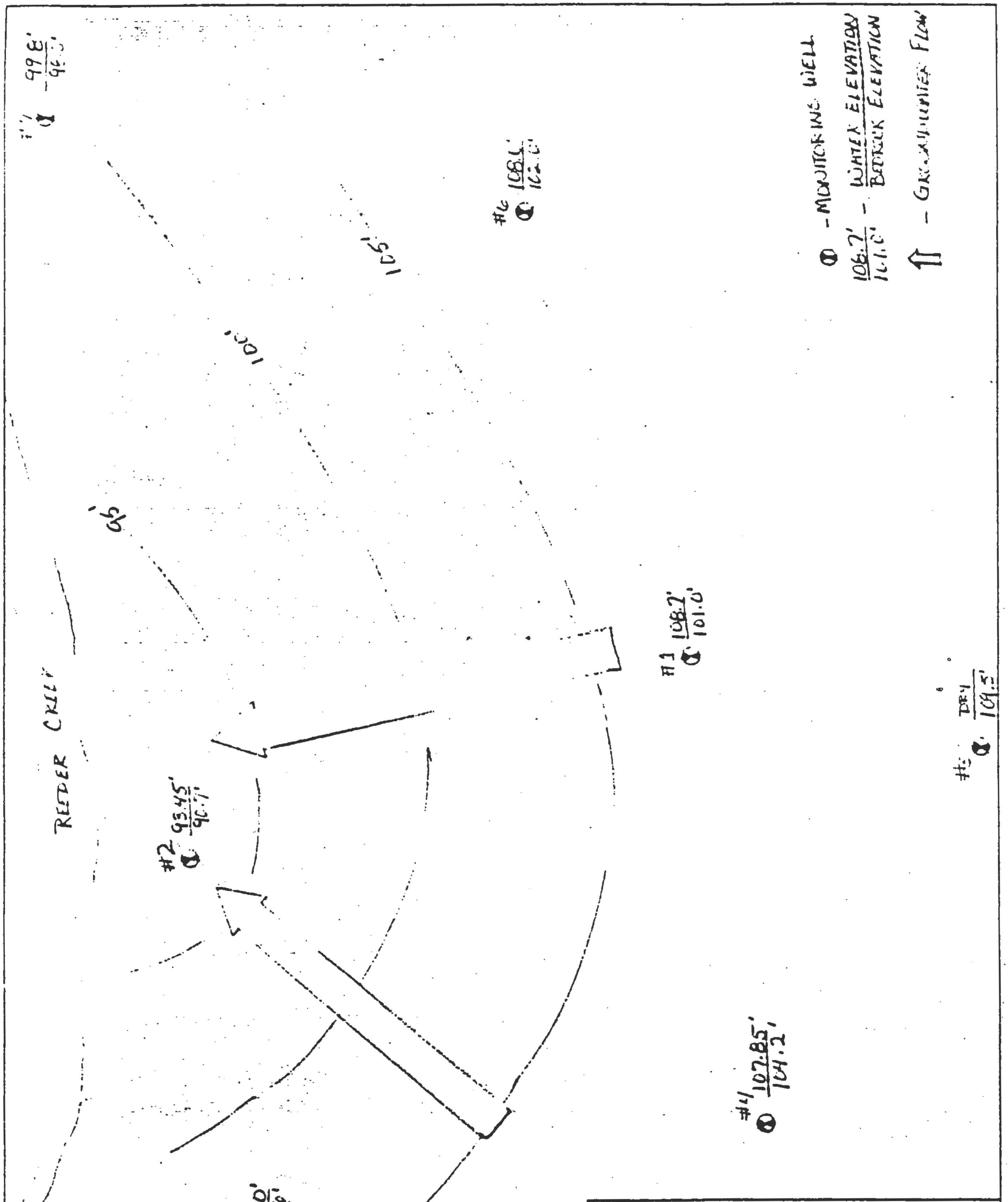
MONITORING WELL

Parratt-Wolff Inc.

MUNITIONS DESTRUCTION AREA
SENECA ARMY DEPOT
SCHEMATIC WELL DIAGRAM

7/6/81
JOB # 8173

FIGURE 5

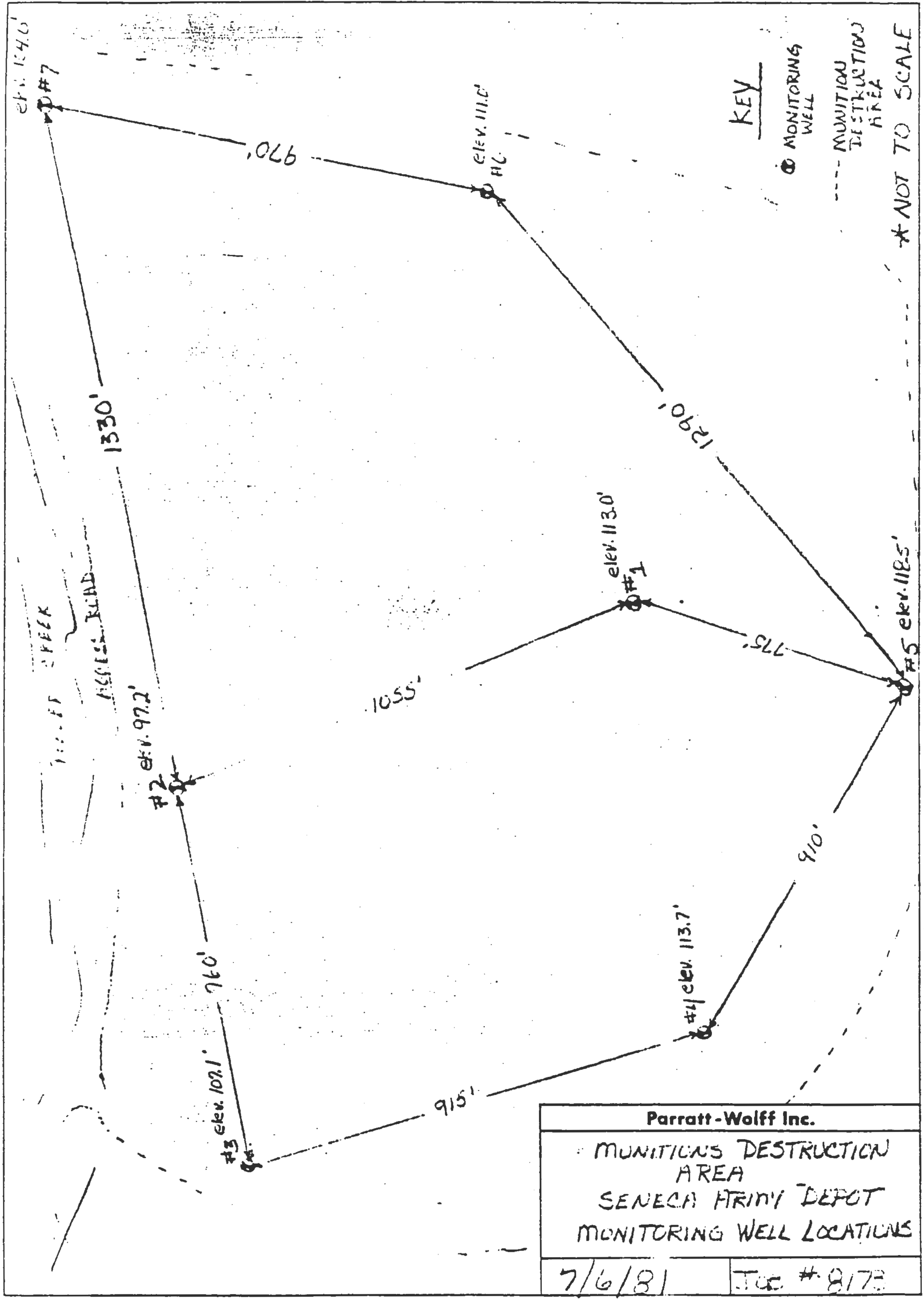


Parratt-Wolff Inc.

MUNITIONS DESTRUCTION AREA
SENECA ARMY DEPOT
GROUNDWATER CONTOURS

7/6/81	JOB # E173

FIGURE



Parratt-Wolff Inc.

MUNITIONS DESTRUCTION
AREA
SENECA ARMY DEPOT
MONITORING WELL LOCATIONS

7/6/81

Job # 8173

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CHAS. T. MAIN, INC.
PRUDENTIAL CENTER, BOSTON, MASSACHUSETTS 02199 • TELEPHONE 617 262-3200 • TELEX 4430038 • FAX 617 859-2075

November 21, 1991

Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, Alabama 35807

SUBJECT: Ash Landfill Field Monthly Report

Dear Mr. Healy:

This monthly field report describes the recent activities which have occurred at the Ash Landfill over the month of October and a portion of November.

The following tasks have been completed:

1. Monitoring Wells:

All shallow and deep (bedrock) monitoring wells have been installed. These include MW-34, MW-35D, MW-36, MW-37, MW-38D, MW-39, MW-40, MW-41D and MW-42D.

Deep wells have twenty feet of screen placed in twenty feet of bedrock. The well depths range approximately from 35 to 55 feet.

2. Soil Borings:

Twenty-one (21) soil borings have been performed at all locations which were defined in the ESE workplan. Of the thirty (30) planned, nine (9) borings remain to be completed. Those borings will be located based upon the geophysical investigation and the soil gas investigation. Although the workplan indicated that four (4) soil samples were to be collected at each boring, generally only three (3) samples were collected. This was a result of the lack of an existing water table and auger refusal which generally occurred at less than eight (8) ft. As a result, only three spoons were obtained at each boring and therefore soil was not available for sampling.

At all borings, the hollow stem auger was able to penetrate through the weathered shale and into the competent shale. Auger refusal is most likely at the competent shale surface.

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The geologic logs indicate that above the weathered shale is glacial till which ranges in thickness from one (1) to four (4) feet. Blow counts for the glacial till ranged from 40 to 80 blows per 6" of penetration, indicating the till to be very dense with a high silt/clay matrix. Of the twenty-one (21) boring performed, volatile headspace readings of the opened spoons were elevated in five (5) borings. These borings were in areas identified in the workplan as possible solvent dumps or debris piles. Follow-up boring will confirm the extent of impacts in these areas. Soil samples were collected for laboratory analyses at these locations.

3. Geophysical Investigation:

The geophysical investigation has been completed. Twenty (20) EM conductivity lines were performed at 100 foot intervals at the locations described in the Ash Landfill Workplan Addendum. Readings were taken every fifty (50) feet from zero to approximately 1700 feet for each line. A total of approximately 700 data points were collected. Following the EM conductivity survey, Ground Penetrating Radar (GPR) was performed at several anomalies identified during the EM survey. Forty (40) anomalies were identified by GPR as either fill areas or possible drum areas. Seven (7) localities were identified as possible areas where drums could be located. The remaining thirty-three (33) localities were interpreted as being comprised of fill areas.

4. Soil Gas:

Based upon the geophysical information collected, soil gas was performed at each of the forty (40) localities identified by the GPR survey. The soil gas survey has been completed. Preliminary data suggests the former construction debris landfill has low concentrations of volatile organics. Additionally, soil gas was used to confirm the extent of areas identified during the soil boring program as possible source areas. These areas were not part of the geophysical investigation but was included as part of the soil gas program since it was felt that soil gas would be able to delineate the extent of these possible source areas. The preliminary evaluation of the field data suggests that a source of VOC's exists at the bend in the road which passes through the Ash Landfill. Future borings will be used to confirm this information.

5. Surface water and Sediment Sampling:

Surface water and sediment sampling has been completed. In some instances no surface water existed and only sediment samples could be collected. The springs, which were to be sampled as part of this program, were non-existent due to the low water table.

The tasks which remain include:

1. Completion of the last nine (9) soil borings and soil sampling. The location of these borings will be based upon the results of the soil gas program.

2. Surveying the location of all borings and wells and completion of the site maps. This is currently underway.

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3. All monitoring wells will require development before groundwater sampling begins. Ballards will also be installed for the protection of the protective casings.

Attached to this monthly report is a copy of the analytical results for the water used for blanks and decontamination purposes.

If you have any questions regarding this letter please do not hesitate to call me at 617-859-2492

Yours truly,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager

MD/cmf/D#7

D#7

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November 21, 1991

Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, Alabama 35807

SUBJECT: **OB/OD FIELD MONTHLY REPORT**

Dear Mr. Healy:

This monthly field report describes the recent activities which have occurred at the Open-Burning (OB) grounds during the month of October.

The following tasks listed below have been completed.

1. Monitoring Wells:

Of the sixteen (16) monitoring wells which were to have been installed fourteen (14) weere installed. Two (2) overburden were wells not installed because the overburden was less than five (5) feet thick. Ten (10) wells are into weathered bedrock and four (4) are into the as overburden. The depth of wells ranged from five (5) to sixteen (16) feet. See attached summary of monitoring wells.

2. Soil Borings:

Seven (7) soil borings have been performed at locations where monitoring wells and boring coincided. Two (2) locations, MW30 and MW32, did not coincide with proposed with borings locations but were submitted to the laboratory due to a misunderstanding with the field team.

3. Surface and Sediment Sampling:

Surface and sediment sampling was performed and has been completed. All locations as define in the workplan were sampled. In some instances no surface water existed and only sediment samples were collected. Surface water flow measurements have also been completed.

4. <u>Ecological Assessment:</u>

A. Vegetation Typing:

Vegetative cover type mapping was conducted in forested and non-forested areas. This classification task has been completed.

B. Wildlife Observation:

Observation of wildlife activities such as tracks, dropping, NGSI's was made. This task has been completed.

C. Fish Collection:

Fish collection at various stations as defined in the workplan has been completed. The methodology used involved a 25 foot beach siene and a backpack electroshocker.

D. Wetland Delineation:

Wetland Delineation task has begun.

The tasks which remain are listed below:

1. <u>Monitoring Wells:</u>

Two (2) background wells remain to be installed. Wells already installed require development. Ballards will be installed around the completed well casings.

2. <u>Wetland Delineation:</u>

This task also requires completion.

3. <u>Berm Sampling:</u>

Sampling of berm soils in the open detonation area will be conducted after Thanksgiving.

4. <u>Surveying:</u>

Surveying the locations of all wells, borings, stream gaugings and completion of the site maps is currently underway.

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Finally, the analysis of the analyte-free water has been completed and is attached to this report.

If you have any questions please do not hesitate to call me at 617-859-2492

Very truly yours,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager

MD/cmf/D#7

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December 10, 1991
1345-082-6880

Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, Alabama 35807

SUBJECT: <u>Ash Landfill Field Monthly Report</u>

Dear Mr. Healy:

This monthly field report describes the recent activities which have occurred at the Ash Landfill from mid November to early December. It is intended to update you from the last report submitted to you on November 21, 1991.

The following discussion updates the status of the outstanding tasks remaining from last month's report.

1. Monitoring Wells:

All monitoring wells have been installed but have not been developed. Development is expected to be completed prior to Christmas. Sampling is expected to commence during the first week in January.

2. Soil Borings:

The nine (9) borings remaining have been completed.

The locations of these remaining borings was determined, based upon the combination of information collected during the geophysical investigation, the soil gas survey and the previous borings. Upon review of this information, MAIN selected four (4) boring locations to confirm that the anomolies identified by GPR, (i.e. small fill areas), were not contaminated areas.

The soil gas data did not indicate a significant source to be present at the fill areas other than the construction debris landfill. The locations selected for soil borings were:

1) Geophysical Line #4; 200 ft, (fill area - small debris)
2) Geophysical Line #5; 200 ft, (fill area - small debris)
3) Geophysical Line #17; 555 ft, (small fill areas)
4) Geophysical Line #17; 650 ft, (fill area - small debris)

The remaining five (5) borings were located in the area identified by the soil gas program as a likely source area responsible for the VOC impacts to groundwater. This area is at the bend in the dirt road which traveises the Ash Landfill. Soil gas data identified high soil gas concentrations, (i.e. > 10ppm) at seven (7) locations. These five (5) borings were performed within the area defined by the seven (7) soil gas points. Due to the high concentrations of vinyl chloride detected in several of the soil gas samples. All borings were performed in Level B protection. One sample, (SG-70), showed the presence of vinyl chloride at levels approaching 30 ppm. The presence of vinyl chloride was confirmed with Drager Tubes. The borings were positioned to confirm, with soil data, the highest soil gas data and to delineate the extent of impacts. Spacing for the boring were generally 25 feet from the location considered to be the most contaminated. The extent of impacts appear to extend into a potential wetland near the bend in the road. The area of concern has not yet been mapped, however, the approximate dimensions are 50' x 100'.

As required by the workplan, five (5) split samples were collected and shipped to Missouri River Division (MRD) for analyses. In addition, the location near the waste oil tank was split with MRD for TPH only and was included with this sampling sound. Initially, this sample was overlooked and not submitted to MRD. As of this date, all soil borings and soil samples have been collected at the Ash Landfill. MAIN believes the soil data will quantify the nature and extent of the source of VOC contamination at the Ash Landfill.

3. <u>Test Pitting</u>

Test pits have not been performed. The number and location of the test pits have not been described in the workplan instead the location of pits will be determined based upon the field data collected to date. The locations requiring test pits appear to be restricted to those locations identified within the construction debris landfill. Test pits at the other anomolies, outside the construction debris landfill, do not appear to be warranted since soil gas and soil borings did not indicate that source material was present. Further, the borings performed at four (4) of these fill areas showed the depth of the fill is approximately 1-2 feet thick and lies above the natural glacial till. It would be physically impossible for a drum to be present without protruding above the fill. No drums were visually apparent at any location. Consequently, since the intent of the test pitting program is to investigate the possibility of drums, it does not seem necessary to test pit at these fill areas.

On the other hand, the construction debris landfill could contain drums, since the depth of the landfill is approximately fifteen (15) feet thick along the western slope. GPR identified anomolies at five (5) locations. In addition, soil gas did indicate the presence of low to moderate levels of VOA's at these five locations. Accordingly, MAIN will excavate these anomolies and if possible, will identify the source of the geophysical anomolies. The nature of the material in the construction debris landfill may not readily lend itself to excavation. Nonetheless, every effort will be expended to identify the source of the GPR anomaly. Should drums be uncovered, the proper SEAD personnel will be notified, otherwise, the test pit will be backfilled with the spoils as approved by EPA. The work will conducted with Level B protection since vinyl chloride appeared to be present in the soil gas samples collected in this area.

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Problems encountered to date have been minor. Of note is the failure of surface water/sediment samples to be sufficiently cooled during shipment to MRD. These samples will be recollected and resubmitted to MRD for analysis.

If you have any questions, please do not hesitate to call me at 617-859-2492.

Yours truly,

CHAS. T. MAIN, INC.

Michael Duchesneau
Project Manager

Response Requested _Yes x No
Date Requested ________

MD/cmf/D#7

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CHAS. T. MAIN, INC.
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Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, Alabama 35807

SUBJECT: OB Ground Field Monthly Report

Dear Mr. Healy:

This monthly field report describes the recent field activities associated with the remedial investigation currently underway at the OB Grounds. The activities are being conducted in compliance with the requirements of the Draft-Final MAIN workplan and the final addendum letter. The following discussion is intended to update you regarding the status of tasks performed since the previous monthly report sent to you on November 21, 1991.

1. Monitoring Wells

All overburden and weathered bedrock monitoring wells have been installed. These wells have all been developed, however, most wells still remain somewhat turbid. Recall that the goal of development is to achieve a groundwater sample with a turbidity of less than 50 NTU's. This goal has not been met due to the high silt/clay content of the soils and the underlying weathered bedrock. IT appears that the weathered bedrock wells will yield water which is approaching this goal more than the overburden wells. For each well, two (2) 55 gallon drums are filled with development water. In most instances, this is equivalent to approximately 100 well volumes. MAIN believes that further purging will not substantially improve the quality of the water and has decided to eliminate further purging efforts following removal of approximately 110 gallons. As a result, it is likely that filtering will be required for metals analyses.

MAIN has contacted the SEAD wastewater treatment plant regarding the disposal of the development water at the plant. Indications are that the water can be accepted providing the development water does not exceed the NPDES limits. These limits are currently unknown. If possible, MAIN recommends the COE pursue this disposal option as it appears to be the most cost effective disposal option for the development water.

Sampling of all monitoring wells is planned for the first or second week in January.

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Mr. Kevin Healy
December 10, 1991
Page 2

2. Soil Borings

The boring program began on December 2, 1991 and consists of three (3) types of soil sampling. These include berm samples, grid borings and burn pad borings. Twelve (12) of the required twenty (20) grid borings have been performed. All thirty-two (32) berm samples have been collected. Berm samples collected from Burn Pads D and E were split with MRD. The pad borings from these pads (D and E) will also be split with MRD. The twenty-two (22) pad borings remain to be performed.

The boring program has been slowed due to the difficulty in rig mobility. The drilling has become mired in the mud on a regular basis and must be pulled out with heavy equipment. Additionally, burning operations and munition demolition activities force MAIN to cease sampling operations until the operation has been finished. Soil sampling operations will likely proceed into January of 1992 due to the two upcoming holiday weeks and the delays mentioned previously.

3. Geophysical Investigations

The geophysical investigation at the OB grounds has been complete. The program involved both ferrous and non-ferrous magnetometry followed by GPR. The magnetometry was used to detect possible UXO's which are a safety concern. Access routes were cleared by Human Factors Applications (HFA) using this technique. Following this, GPR was performed by B&B on all the Burn Pads. This was to detect the presence of buried trenches and pits. The preliminary data evaluation indicates that two pits, one approximately 20 feet long, and the other 12 feet long is present at Burn Pad G. A smaller pit, approximately 7 feet wide, was also detected at Burn Pad J.

Test pits will be performed at these three (3) localities to ascertain the nature of the fill in the pits. HFA will perform all test pitting activities since explosive and ordinance material is expected to be present. If possible, soil samples will be collected from the bottom of the pit.

If you have any questions, please feel free to call me at 617-859-2492.

Very truly yours,

CHAS. T. MAIN, INC.

Michael Duchesneau
Project Manager

Response Requested _Yes x No
Date Requested ________

MD/cmf/D#7

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CHAS. T. MAIN, INC.
PRUDENTIAL CENTER, BOSTON MASSACHUSETTS 02199 • TELEPHONE 617 262 3200 • TELEX 4430035 • FAX 617 859-2675

December 12, 1991

Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, AL

SUBJECT: Delivery Order D Progress Report

Dear Mr. Romeo:

This letter is intended to update you regarding the current status of the Seneca Army Depot (SEAD) Delivery Order D project. The objective of this delivery order is to prepare a workplan for the preliminary investigation of eleven (11) Solid Waste Management Units. MAIN is requesting payment for Tasks AD-1, the site visit and data review, and Tasks AD-2, preparation of the workplan. The attached backup sheets detail the tasks which have been performed and the degree to which these tasks have been completed. The Pre-draft workplan for investigation of the eleven (11) SWMU's was submitted to the appropriate reviewers on or about October 18, 1991. MAIN has received comments from the COE and AEHA and is currently in the process of responding to the review comments. The next submittal, the Draft, will be delivered within the next two weeks.

Please feel free to contact me at 617-859-2492 if you have any questions regarding this matter.

Sincerely,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager

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CHAS. T. MAIN, INC.
PRUDENTIAL CENTER, BOSTON, MASSACHUSETTS 02199 • TELEPHONE 617 262-3200 • TELEX 4430036 • FAX 617 859-2575

October 4, 1991

Mr. John Romeo, P.E.
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, AL

SUBJECT: Progress Report

Dear Mr. Romeo:

This letter is intended to update you regarding the current status of the Seneca Army Depot (SEAD) Delivery Order D project. The objective of this delivery order is to prepare a workplan for the preliminary investigation of eleven (11) Solid Waste Management Units. MAIN is requesting payment for Tasks AD-1, the site visit and data review, and Tasks AD-2, preparation of the workplan. The attached backup sheets detail the tasks which have been performed and the degree to which these tasks have been completed. Additionally, a project schedule has also been attached for your review. MAIN expects to deliver the Pre-draft workplan to you on October 18, 1991.

Please feel free to contact me at 617-859-2492 if you have any questions regarding this mattter.

Sincerly,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager

MAIN
1893

CHAS. T. MAIN, INC.

PRUDENTIAL CENTER, BOSTON, MASSACHUSETTS 02199 • TELEPHONE 617 262-3200 • TELEX 4430036 • FAX 617 859-2575

December 12, 1991

Mr. Kevin Healy
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, AL

SUBJECT: **Delivery Order E Progress Report**

Dear Mr. Healy:

This letter is intended to update you regarding the current status of the Seneca Army Depot (SEAD) Delivery Order E project. The objective of this delivery order is to prepare a RCRA Part B Permit. MAIN is requesting payment for Task 1, the site visit and data review and a portion of Task 2, review and update the RCRA Part A Permit. MAIN is also requesting partial payment for several subtasks of Task 3. A detailed description of the tasks and the degree complete are presented in the attached sheets.

MAIN has submitted the Part B Permit, the Trial Burn Plan and the Subpart X application to the appropriate reviewers on or about November 18, 1991. This submittal is considered by MAIN to represent 75% completion of the work. Comments have been received by MAIN from SEAD and AEHA. MAIN is responding to the comments of the Part B Permit. Regarding the Subpart X and the Trial Burn Plan, MAIN believes that the current scope of work is inadequate to properly respond to the EPA and DEC comments. MAIN's submittals describe the areas which is out of scope. Accordingly, it is imperative that MAIN, SEAD and the COE meet in the near future to discuss these issues.

Please feel free to contact me at 617-859-2492 if you have any questions regarding this matter.

Sincerely,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager

BOSTON, MASSACHUSETTS • CHARLOTTE, NORTH CAROLINA • PASADENA, CALIFORNIA

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October 4, 1991

Mr. John Romeo, P.E.
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, AL

SUBJECT: **Progress Report**

Dear Mr. Romeo:

This letter is intended to update you regarding the current status of the Seneca Army Depot (SEAD) Delivery Order E project. The objective of this delivery order is to prepare a RCRA Part B Permit. MAIN is requesting payment for Task 1, the site visit and data review, Task 2, review and update the RCRA Part A Permit, Task 3G, modify the description of the procedures, structures and equipment at SEAD to prevent hazards, Task3L, modification of the closure plan, Task 3M, generation of maps and plans, Task 4A, modify the description of the containment system, Task 5A, revise the existing trial burn plan to address the regulatory review comments, Task 6A, modification fo the preliminary environmental standard for the OB/OD units and Task 6F, revise the existing preliminary environmental assesement. The attatched backup sheets detail the tasks which have been performed and the degree to which these tasks have been completed. Additionally, a project schedule has also been attatched for your review.

Please feel free to contact me at 617-859-2492 if you have any questions regarding this mattter.

Sincerly,

CHAS. T. MAIN, INC.

Michael Duchesneau,P.E.
Project Manager

September 27, 1991

Mr. John Romeo
Corps of Engineers, Huntsville Division
106 Wynn Drive
Huntsville, Alabama

Dear Mr. Romeo:

This letter report is intended to update you as to the current status of the Seneca Army Depot (SEAD) project. The format of this letter report will be to discuss each Delivery Order individually.

<u>Delivery Order A</u>

The objective of Delivery Order A is to obtain an EPA approved workplan which will serve as the basis for implementing a CERCLA Remedial Investigation/Feasibility Study at the Open Buring (OB) grounds. The draft workplan was submitted on April 11, 1991, following a Scoping meeting, held in New York City on February 27 and 28 with Region 2 EPA. During this meeting, representatives of the New York State Department of Environmental Conservation (NYSDEC), SEAD, the COE, MAIN and EPA reviewed the comments and concerns of the Scoping Document which was submitted on November , 1990.

EPA and NYSDEC submitted comments to the draft workplan submittal on July 22, 1991. A phone conference call was arranged by MAIN on August 22, 1991 in order to discuss the comments and expidite the draft-final submittal. However, due to the difficulty in scheduling all EPA parties required to provide comment support, it was necessary to arrange

additional phone conference calls. These calls were on July 99, 1991 and August 99, 1991. Most comments were adequately addressed, with the exception of four. These were:

1. The first unresolved issue regarded the future land use of the OB grounds. SEAD and MAIN argued that the use would be light industrial, i.e. warehouse storage, but EPA would not agree without further internal discussion. EPA initially would have preferred residential. Both MAIN and SEAD believe this is overly conservative. However, unless the deed to the facility can be altered to eliminate this possiblity EPA is reluctant to agree with light industrial use. MAIN pointed out that ever with light industrial use the risk assessment exposure scenarios would be almost identical. Nonetheless, EPA refused to agree without consultation with additional risk assessment

experts.

2. The second issue which remained unresolved regarded the ability of the proposed analytical methods to achieve detection limits low enough to show compliance with the State of New York drinking water standards. The proposed methods are the currently approved NYSDEC Contract Laboratory Program (CLP) methods. These methods are normally used for the investigation of hazardous waste sites but can only achieve detection limits for volatile organic compounds at the 5 ppb level. The recently enacted Safe Drinking Water Act (SDWA) standards require detection limits for several volatile organic compounds at the 1 ppb level. MAIN agreed with EPA however pointed out that the methods EPA were requesting that the workplan switch to, the 500 series methods, were written and developed assuming the water sample was from a source of potable water, i.e. the tap of a water fountain. Since the water at this site will likely be turbid and may contain high levels of organics, the use of these analytical methods was inappropriate. Further, the constituents to be analyzed using the 500 series methods are different than those analyzed for the CLP methods. Additionally, the Quality Assurance/Quality Control (QA/QC) methods required for these methods are different than the QA/QC requirements for the CLP methods. EPA would not decide at that time on this issue but did indicate that this was likely an issue which they would not waiver on.

3. The third issue which remained unresolved regarded the EPA requirement that sieve analyses be performed upon the sediment samples collected in Reeder Creek. MAIN's position was that samples would be collected from that location which contained fines and organic matter. This would be where any pollutant would most likely be found. EPA agreed that this should be the location for sampling, however, EPA required documentation in the form of sieve analyses to assure that the sample was collected from this type of sample location. MAIN noted that sieve analyses may not be appropriate for river sediment. Organic matter does not contain discrete particles, such as soil, and would likely be unable to pass through the coarse sieves, possibly yielding false results. Although it seemed apparent that EPA would agree that sieve analyses on river sediment was unneccessary, EPA refused to agree until there was internal concurence within the agency.

4. The final issue which remained unresolved regarded the potential need to field filter the groundwater samples. EPA has indicated previously that filtered samples would not be allowed. MAIN reiterated the likelyhood that due to the silt and clay material which comprise a large amount of the soil at the OB grounds the groundwater samples collected at the site would most likely be turbid and therefore not valid for total metals analyses. MAIN indicated that NYSDEC has provided guidance regarding this issue which indicates that a valid groundwater sample was one which was less that 50 NTU. If the sample was greater than this value and was collected from a properly constructed well then filtering the groundwater sample was allowable. Although this was obviously acceptable to the NYSDEC representative, Mr. Kamal Gupta, EPA again would not commit to this until additional EPA review was performed.

It was agreed that in order to expidite the review process MAIN would submit a letter outlining all the changes to be made to the draft workplan prior to submitting the draft-final workplan. In this way, if EPA disagreed with was was to be submitted the issue could be resolved prior to the official submittal. This letter was submitted on August 99, 1991, even though EPA had not responed to the questions which still lingered regarding the four abovementioned items.

MAIN responded to the four unresolved items in the following manner:

1. The intended land use of the site would remain as originally described, light industrial use. This is the most reasonable use of this area. In additon, steps would be initiated to purse the possiblity of including land use restriction within the depot's deed.

2. MAIN has discussed the need to obtain lower detection limits for the CLP methods. Aquatec, the laboratory which will perform the analyses, indicated that they would obtain the lower detection limits by purging five times the normal sample volume. This, of course, would be a modification of the normal approved method and therefore the analtical method to be used would be a modified NYSDEC CLP method. Aquatec indicated that there would be no additional cost to perform this service.

3. MAIN has included an ASTM method which would be used to visually classify the sediments obtained from Reeder Creek for sampling. No sieve analysis

would be performed on the sediment sample. In addition, EPA would be given the opportunity to observe the sample collection procedure and view for themselves the type of sample collected.

4. MAIN has included the NYSDEC guidance protocol for determining the need to filter groundwater samples. A figure was included from this protocol which decricbes the requirement to be addressed in deciding to filter the groundwater sample.

There was no response from EPA on these issues and with concern mounting regarding performing the workplan in the upcoming winter, MAIN submitted the Draft-final workplan on August 99,1991 because EPA would have 30 days to respond upon receipt of the final-draft workplan. This would essentially force EPA to respond or delay the schedule.

In summary, the OB ground workplan appears close to being formally accepted by EPA. The remaining issues are not substantial enough to eliminate fieldwork. The most significant issue which could lead to delay is that related to the detection limits. The greater purge volume should lower the detection limits for the volatiles to a point where EPA will accept the analytical methods. However, the semi-volatile analysis is not affected by this modification. Consequently, EPA may be concerned with getting detection limits lowered for these compounds also. In order to meet this requirement, it would be necessary to extract and collect an additional substantial volume of water which may not be possible given the small yield of water these wells are likely to yield.

Delivery Order B

The objective of Delivery Order B was to make the necessary changes to the ESE workplan in order to obtain final EPA approval. MAIN responded to the latest round of EPA and DEC comments regarding the ESE final workplan. MAIN also provided the procedures to be used for performing the soil gas survey and the geophsysical investigation. As with the OB workplan, a phone conference call was arranged to discuss the comments. As a result of this phone call, it was decided to submit only the pages which would be changed in the ESE final workplan instead of resumitting the entire workplan. This submittal was issued to you on August 1, 1991. EPA's response was obtained on September 16, 1991. Five items are still outstanding. These include:

1. Contact the USDA regarding the status of any significant agricultural land. This will be done.

2. Contact the US Fish and Wildlife Service regarding the possiblity of the existance of any endangered species being present at the depot. This will also be done.

3. The COE certification of the laboratory Aquatec must be provided to the EPA as soon as it is avaliable. This will also be done. The performance evaluation of the laboratory has been delayed by approximately 2 months because the MRD missplaced the results of the Aquatec evaluation. This matter has been corrected.

4. The need to document that the water to be used for blanks and decontamination is analyte free the responsiblity of MAIN and not the EPA. MAIN will submitt the results of the analytical test on the water to be used for blanks and decontamination to the EPA prior to the intiation of field activties.

5. The fifth item to be addressed is

Delivery Order C

The objective of Delivery Order C is to implement the EPA approved workplan for the OB ground, which was prepared under Delivery Order A. Delivery Order C has not been implemented since MAIN is still awaiting final EPA approval of the OB workplan, described in Delivery Order A. The cost to implement this workplan was negotiated on June 99, 1991. MAIN received final acceptance of the cost proposal on June 99, 1991. This project will be implemented in two phases. The first phase will be conducted during this year, providing MAIN obtains EPA approval. Approximately, 20 soil borings will be performed over the site while an additional 20 will be performed on the existing nine burn pads. Approximately 20 soil samples will be collected from the berms which are surrounding the pads. Six soil samples will be collected from each soil boring. The borings will be performed using remote drilling techniques. Prior to any on-site activities, the location of any UXO's in the working area will be identified. An ecological and aquatic assessment of the area and Reeder Creek will be performed initially. Based upon the results of this qualitative evaluation additional evaluations may be warranted.

Delivery Order D

The objective of this delivery order is to prepare a workplan for the preliminary investigation of eleven of the sixty Solid Waste Management Units (SWMU's) identified at the depot. This delivery order was negotiated on June 99, 1991 and the cost proposal was accepted by the COE on June 99, 1991. The preliminary draft workplan has been completed and is currently being reviewed internally. The original date for submittal to the COE was Sept. 99, 1991 but was delayed due to the lack of maps for each individual SWMU. An extention for submittal was approved by Kevin Healy verbally in a phone conversation on August 99, 1991. This workplan will be submitted to the COE within the next week for your review.

Delivery Order E

This delivery order involves the resubmittal of the RCRA Part B application to the DEC and the EPA for the operation as a Treatment, Storage and Disposal Facility (TSDF). This document was submitted previously by both SEAD and EBASCO and was rejected for numerous reasons. A meeting was held with the DEP to discuss the comments regarding the operation of the hazardous waste storage area, the PCB storage area, the trial burn plan and the mixed waste storage facility. The operation of the demolition grounds as part of the permit was not discussed since this operation is regulated by the EPA under Subpart X of CFR 264. The goal of this project is to incorporate the SEAD submittal and the EBASCO submittal into one document.

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October 4, 1991

Mr. John Romeo, P.E.
CEHND-PM-E
U.S. Army Corps of Engineers
Huntsville Division
106 Wynn Drive
Huntsville, AL

SUBJECT: Progress Report

Dear Mr. Romeo:

This letter is intended to update you regarding the current status of the Seneca Army Depot (SEAD) Delivery Order C project. The objective of this delivery order is to implement the Open Burning (OB) grounds workplan. This workplan was prepared by MAIN and is still under review by NYSDEC and Region 2 EPA. Although approval appears at hand, some minor items remain to be resolved. MAIN believes that it is imperative that fieldwork begin now. The inability of performing fieldwork this fall will delay the project at least six months. This is because it will be impossible to perform tasks such as the terrestrial or aquatic survey when the streams are frozen, in addition to the inability to collect surface water samples. Further, drilling and groundwater sampling activities, although not impossible, are slowed due to the cold weather. Based upon our conversations with SEAD and Kevin Healy of your office, MAIN has begun to make plans to implement the OB grounds workplan. Attatched is a schedule outlining the proposed activities and timeframe for the performance of these activites.

MAIN is requesting payment for Tasks 1, the site visit and data review.

Please feel free to contact me at 617-859-2492 if you have any questions regarding this mattter.

Sincerly,

CHAS. T. MAIN, INC.

Michael Duchesneau, P.E.
Project Manager