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Operation and Maintenance Plan
for
Powersville Landfill NPL Site
Powersville, Georgia
Remedial Action

August 19, 1993

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Applied
Engineering and Science



CLEAN SITES

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Remedial Action

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Applied
Engineering and Science



OPERATION & MAINTENANCE PLAN
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1.0 INTRODUCTION

The Operation and Maintenance (O&M) Plan and the Operation and Maintenance (O&M) Manual are written to comply with the Record of Decision, September 1987, (ROD), and the Consent Decree, Civil Action No. 88-310-1-MAC (WDO), December 1988, for the Powersville Landfill NPL Site in Powersville, Georgia. It is also written in accordance with post-closure care requirements established under 40 CFR 264, as required by the Consent Decree.

The O&M Plan, presents the O&M activities and requirements which form the basis for the O&M plan and provides the rationale for each activity. The O&M Manual (submitted separately) describes in a step-by-step manner the field procedures required to comply with the O&M Plan.

Section 1 is the overall operation and maintenance plan, which describes the regulatory basis and the rationale for development of the O&M activities. Section 2 presents the ordinary maintenance and groundwater monitoring activities to be conducted throughout the care period, while Section 3 discusses the structures which will be inspected as part of the ordinary O&M during the same period. Ordinary maintenance of the cover system is contained in Section 4, and Extraordinary Repairs are discussed in Section 5. Section 6 addresses the report requirements and document control. Section 7 discusses the post-closure notices and financial

assurance. After the care period has expired, certification is required to confirm that the care was performed in accordance with this O&M Plan. Procedures for the certification are discussed in Section 8. Section 9 presents the schedule for ordinary post-closure care activities. The cost estimates for the operation and maintenance activities are discussed in Section 10. Sections 11 and 12 present the contact person and a discussion of the requirements for amendments to this O&M Plan, respectively.

The O&M Manual is the field guide which presents the specific procedures for ordinary O&M activities. Section 13 discusses the procedures for the collection of samples required for the groundwater monitoring program. Maintenance of the monitoring wells is presented in Section 14. Section 15 discusses the procedures to assess and repair cover settlement problems. The maintenance of the vegetation and the monitoring of landfill gas production are presented in Sections 16 and 17, respectively. Other site structures and aspects of the cover system are presented and discussed in Section 18.

References to guidance documents and protocols in this plan for the Powersville Landfill NPL Site reflect the current status of the regulations and procedures. This plan was written to cover O&M actions for the required care period of thirty years as specified in Section VII E of the Consent Decree. Activities covered under this plan are to be performed in accordance with the most current

regulations, protocols, and procedures available which are relevant to O&M activities. An overview of O&M activities are shown in the Summary of O&M Activities on the next two pages and is also included in the O&M Manual (Field Procedures).

1.1 Site Description

The Powersville Landfill site consists of two landfill areas (Figure 1.1). The municipal landfill is approximately 10 acres in size. The hazardous waste landfill area is approximately 0.5 acres and is located in the northern section of the site area. The site is located near the community of Powersville in Peach County, Georgia. Powersville landfill is bordered by private property to the north, Newell Road and a drainage ditch belonging to Peach County on the west, Georgia Highway 49 and Lizzie Chapel Church to the south/southeast, and other Peach County property to the east.

1.2 Site History

The Powersville Landfill NPL Site was originally a borrow area for fill material used locally for the construction of roadways, etc. from the early 1940s until 1969. Peach County began operating a portion of the borrow area as a sanitary landfill in 1969, after which it received municipal and industrial wastes. During operation, industrial wastes associated with the manufacture of pesticides and other industrial solid wastes were allegedly

Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Groundwater Sampling and Analysis	Quarterly for 2 years; reevaluate thereafter	quarterly	quarterly	TBD	TBD	2-8, 9-1, 10-6, 13-1	CD Section VII, E	Notification prior to sampling (2.4)
Maintenance of Vegetation						1-20, 9-2, 10-3, 16-2 through 16-7	CD Section VII, E, ii	O&M Activity Report* (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Mowing	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually			
Fertilization	annually	annually	annually	annually	annually			
Application of Lime	every 4-6 years, if necessary							
Inspection and Monitoring for Cover Settlement (includes surveying settlement monitoring stations)	Quarterly for 2 years; semi-annually thereafter; after all extreme weather events	quarterly	quarterly	semi-annually	semi-annually	9-2, 10-8, 15-1 through 15-7	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Inspection of Site Structures						9-3, 10-8, 10-9, 18-1	CD Section VII, E, ii,iv	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Concrete channels, rip-rap, fence & signs, drainage areas, benchmarks, gas vents, settlement monitoring stations, guard posts, cover drainage pipe clearout ports	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually			
maintenance roads	annually	annually	annually	annually	annually			
cover drainage pipes	every 5 years				every 5 years			
resurvey benchmarks	every 10 years				every 10 years			

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Gas Vent Monitoring	Semi-annually for 2 years; annually for 3 years; reevaluate according to section 9.0	semi-annually	semi-annually	annually	TBD	9-4, 10-9, 17-1	CD Section VII, E, i	O&M Activity Report* (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Monitoring Well Maintenance	Semi-annually for 2 years; annually thereafter	semi-annually	semi-annually	annually	annually	14-1, 3-8	CD Section VII, E, i, ii	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Inspection of grout seals for all wells	Beginning of O&M period; every 5 years thereafter	initial inspection		every 5 years	every 5 years			
FML Testing	Following the first cover repair activity after 5, 15, and 25 years; after 4 depressed areas have been repaired				following first cover repair activity after 5 years, 15 years, 25 years	4-10, 4-11, 15-13	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Sprinkling and weed/rodent/insect control	As necessary					16-6, 16-7	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Renew Deed Restrictions	Every 20 years				every 20 years	9-4	ROD	O&M Activity Report (6.3, 8.3)
Advise EPA should zoning status (R-1) on Property #3 change to allow drilling of wells.	When change occurs					1-13, 19-1		1st -2nd year: annually 3rd year on: every five years

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

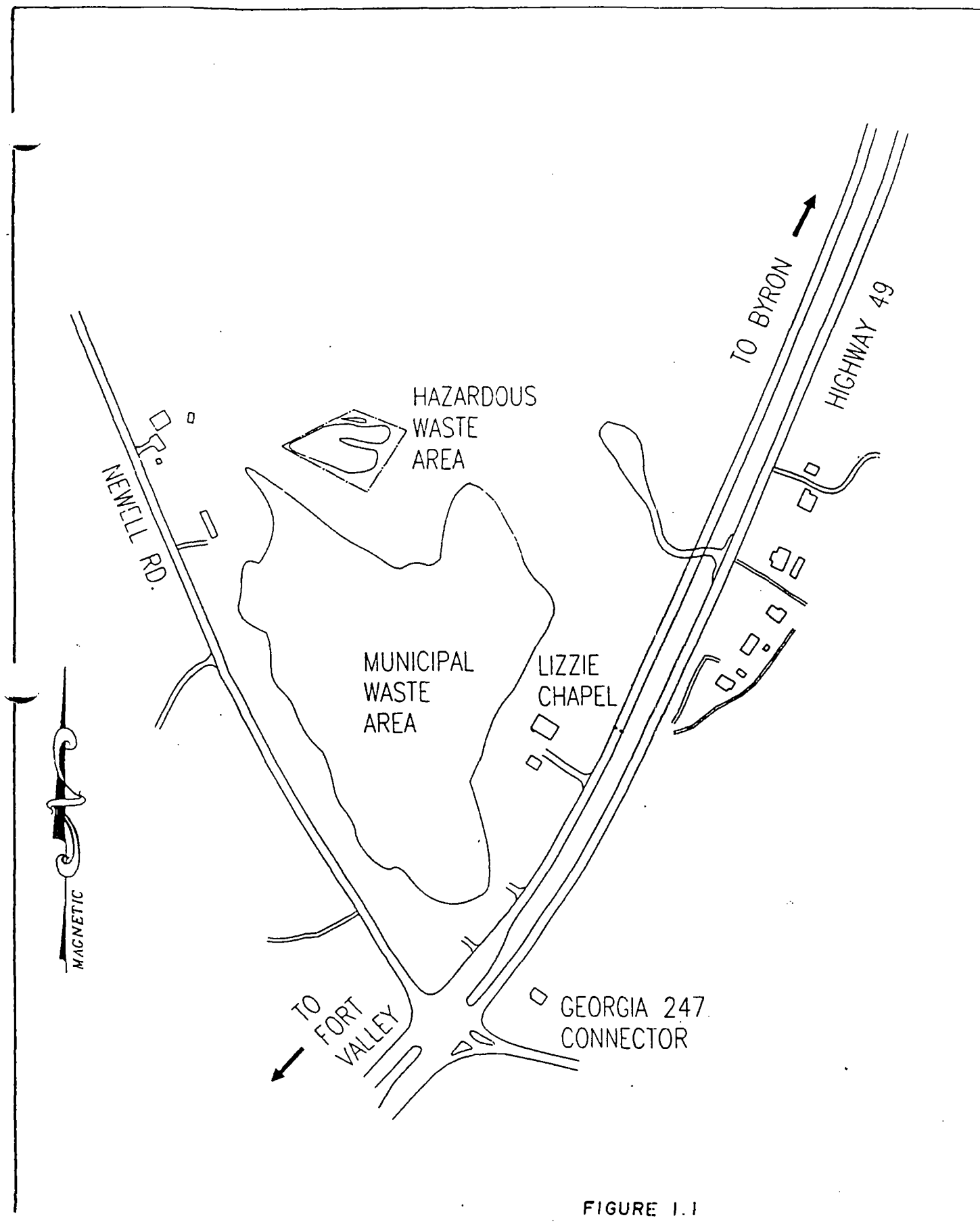
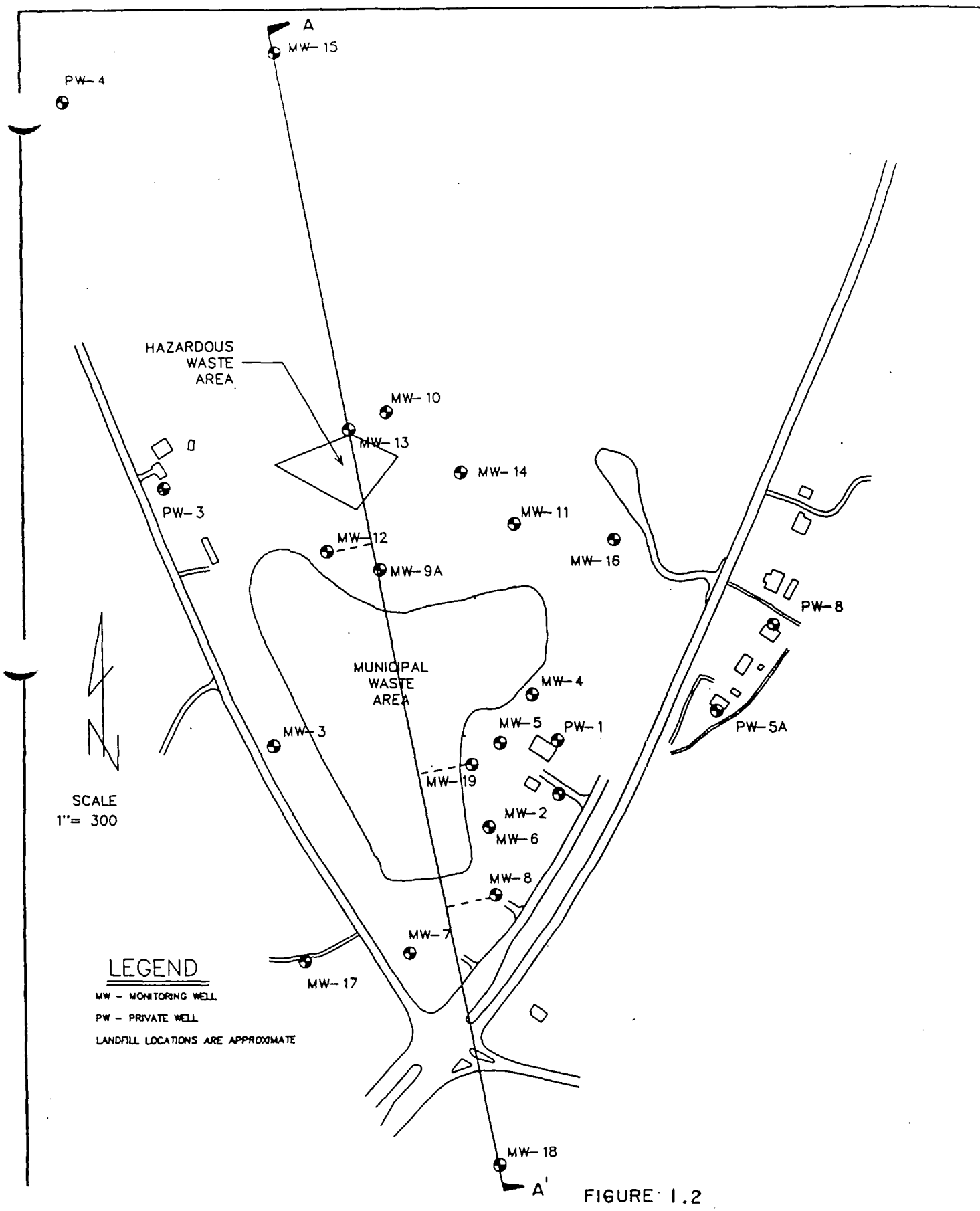


FIGURE 1.1

SCALE DWN. BY CHK'D. BY APPR. BY	 Applied Engineering & Science	SITE MAP POWERSVILLE LANDFILL NPL SITE CANADYNE-GEORGIA CORP.	DATE DWG. NO. SHEET NO.
--	---	---	--

disposed in the landfill. The EPD requested a separate hazardous waste disposal area be established in 1972. In June 1973, the hazardous waste landfill was constructed. The U.S. Environmental Protection Agency (EPA) notified the Peach County Board of Commissioners in March 1979, that the entire landfill facility was unacceptable for the disposal of solid waste. Disposal activities were discontinued and the landfill was closed later that year.

In April 1983, EPD investigations detected trace quantities of pesticides in water from a well located at Lizzie Chapel, a church which is south of the site property, after residents near the landfill began complaining of an unusual taste in their potable water. Concentrations of pesticides initially detected were: α -BHC at 0.30 $\mu\text{g/l}$, β -BHC at 0.01 $\mu\text{g/l}$, δ -BHC at 0.06 $\mu\text{g/l}$, γ -BHC (lindane) at 0.22 $\mu\text{g/l}$, and dieldrin at 0.15 $\mu\text{g/l}$. Samples collected from other surrounding residential wells in May 1983 indicated that there were no concentrations of pesticides above detection limits. Confirmation sampling of the well at Lizzie Chapel in June 1983 showed pesticides at slightly higher concentrations than were detected in April. The site was proposed for inclusion on the National Priority List (NPL) in September, 1983 and placed on the NPL in September, 1984.



SCALE 1" = 300' OWN. BY KMK CHK'D BY T K APPR. BY T K	 Applied Engineering & Science	INDEX MAP FOR GEOLOGIC CROSS SECTIONS POWERSVILLE LANDFILL SITE PEACH COUNTY, GEORGIA	DATE AUG, 1989 DWG. NO. SHEET NO.
---	--	--	---

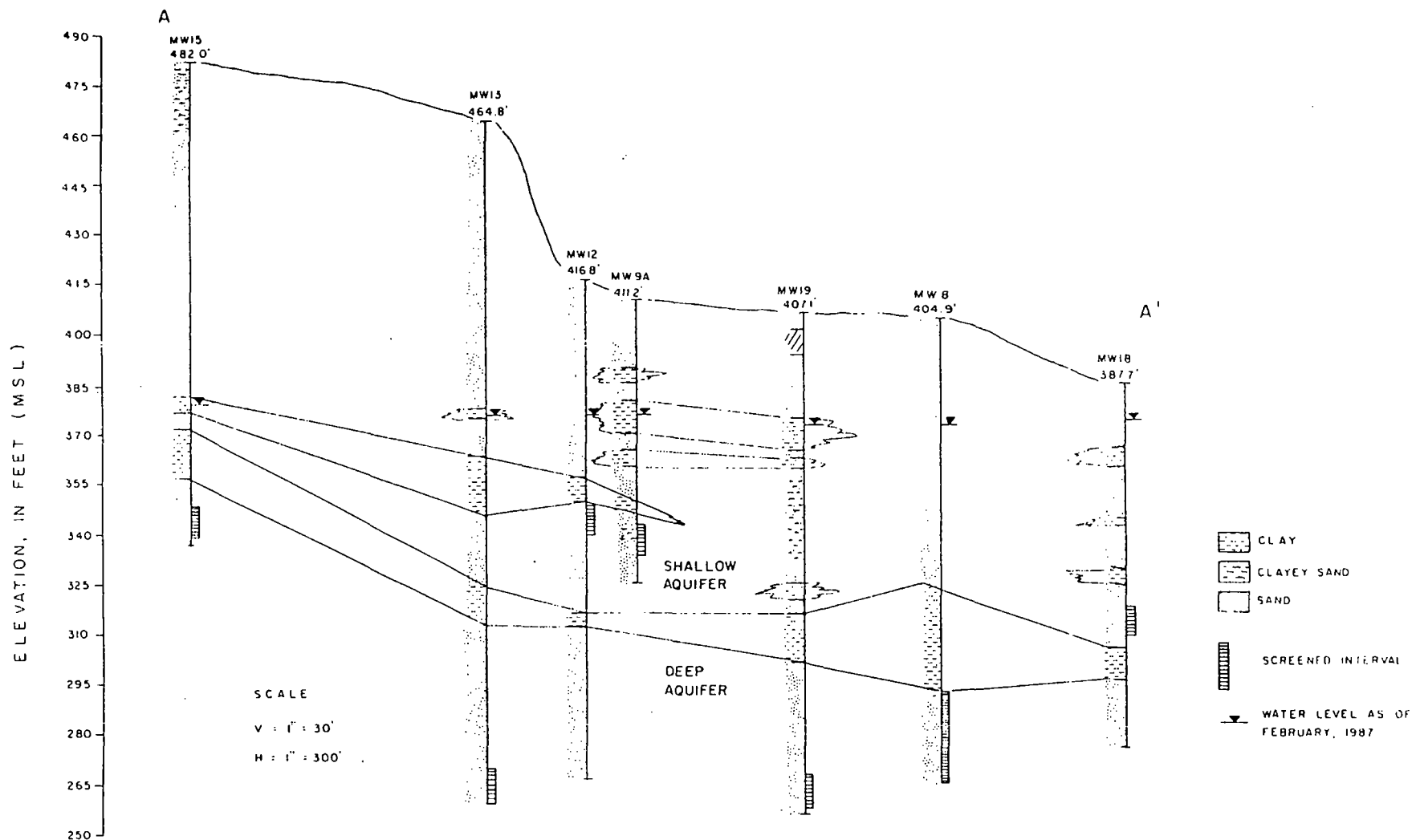


FIGURE 1.3

SCALE AS NOTED	NO.	DATE	REVISION DESCRIPTION	 Applied Engineering & Science Atlanta Georgia	GEOLOGIC CROSS SECTION A-A' POWERSVILLE LANDFILL SITE PEACH COUNTY, GEORGIA	DATE JANUARY, 1991
OWN. BY	1					DWG. NO.
CHK'D BY	2					
APPR. BY	3					SHEET NO.
	4					

MW-15

PW-4

9

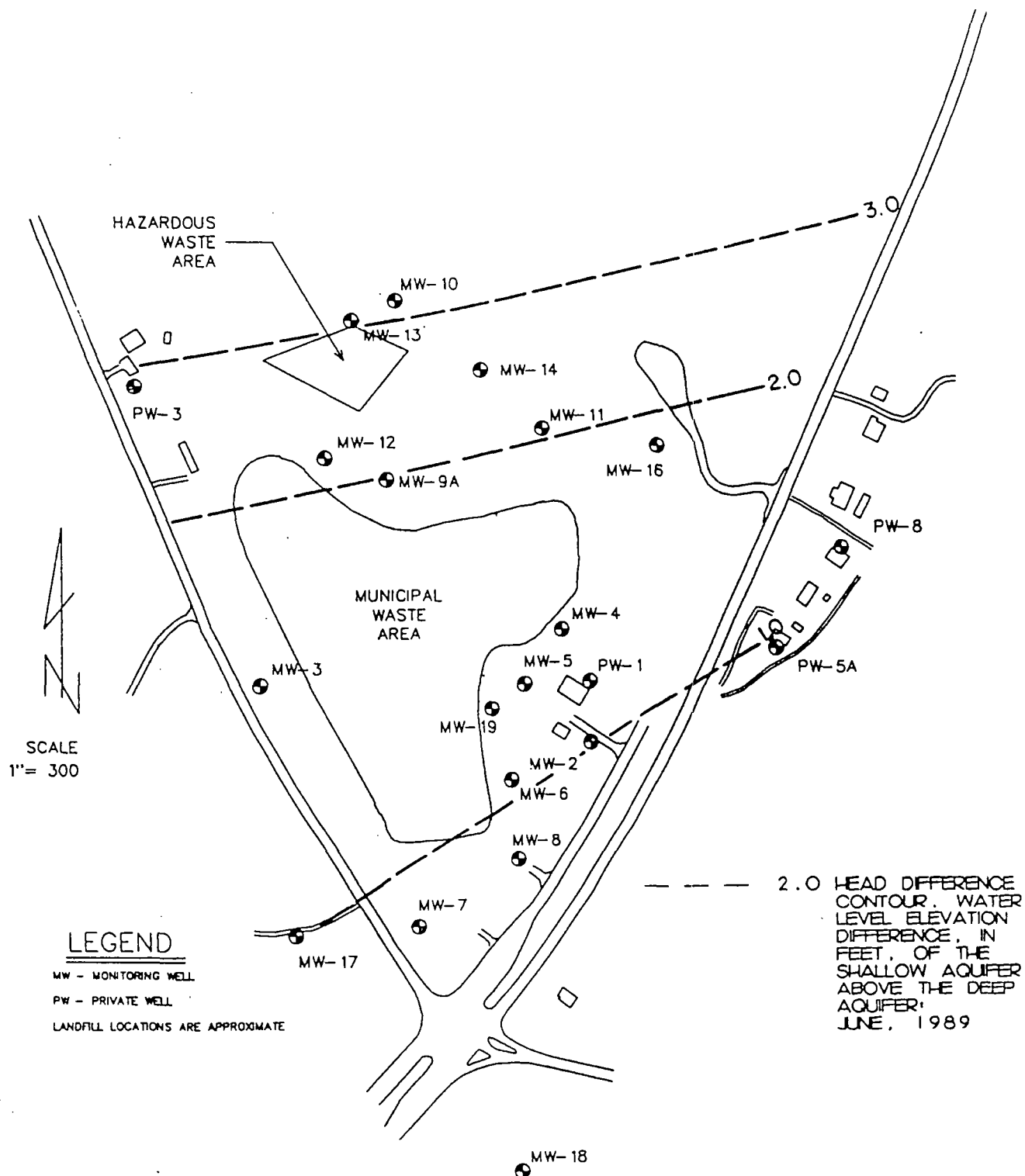


FIGURE 1.4

SCALE
1" = 300'

OWN. BY GOE

CHK'D. BY TK

APPR. BY TK



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Science**

HEAD DIFFERENCE CONTOUR MAP
 JUNE, 1989
 POWERSVILLE LANDFILL SITE
 PEACH COUNTY, GEORGIA

DATE
AUG, 1989

DWG. NO.

SHEET NO.

1.3 Previous Activities

1.3.1 Initial Site Investigation

The Providence aquifer underlies the landfill site. The EPA contractor, NUS Corporation, conducted geophysical surveys at the site in October 1983. The results of the study revealed no clear evidence of any continuous confining layer beneath the site to a depth of at least 200 feet.

1.3.2 Remedial Investigation/Feasibility Study

The EPA contractor began a hydrogeologic investigation in 1984. Nine groundwater monitoring wells were installed at the site by NUS Corporation following EPD's detection of the trace quantities of pesticides in the well water at Lizzie Chapel. Samples were collected from the nine monitoring wells and five private wells. Compounds which were detected in the monitoring well samples included BHC, vinyl chloride, 1,2-dichloroethane, lead, and chromium.

The Remedial Investigation/Feasibility Study (RI/FS) was conducted by EPA's contractor, Camp, Dresser, and McKee, Inc. from December 1984 to June 1987. Activities under the RI/FS involved the collection of surface soil samples, subsurface soil samples, surface water samples, sediment samples; installation of nine

additional groundwater monitoring wells; and sampling of all the monitoring wells. Results of the RI/FS sampling activities are presented in Appendix B.

1.3.3 Record of Decision

The Record of Decision (ROD) was issued in September 1987 and the selected alternative included:

- Surface cover systems for the hazardous waste and municipal landfill areas;
- Installation of a minimum of eight additional groundwater monitoring wells;
- Provision of an alternate drinking water source for selected residents near the site;
- Imposition of onsite and offsite deed restrictions to prohibit specific actions; and,
- Development and implementation of an operation and maintenance (O&M) plan for the remedy, once constructed.

1.3.4 Remedial Design

As part of the design, several studies and activities were conducted to fulfill the requirements of the ROD. These studies and activities included:

- Groundwater Current Condition Study
- Topographic survey
- Geotechnical Study
- Ground penetrating radar (GPR) survey
- Landfill Gas Venting Study
- Monitoring Well Location Study

- Groundwater transport computer model
- Alternate Drinking Water Feasibility Study
- Deed Restriction Report
- Cover Design Reports

1.3.4.1 Current Groundwater Condition Study

In June 1989, groundwater monitoring wells at the landfill site and nearby private wells were sampled and groundwater elevations measured. The analytical results and groundwater elevations were compared with past results obtained during the site investigation phase. Results were presented in Current Groundwater Condition Study, August 1989 and are summarized as follows:

- June 1989 contaminant concentrations differ slightly from previous contaminant concentrations.
- The groundwater flow direction based upon previous data and June 1989 data was the same, i.e., south-southeast.
- The groundwater elevations, both previously and in June 1989, and the geophysical and lithologic logs showed the aquifer system beneath the site contained confining layers that locally separate the aquifer system into a shallow zone and deep zone (Figures 1.2 and 1.3).
- Groundwater elevations were found to be a few feet higher in the shallow zone resulting in a vertically downward gradient in addition to the lateral gradient to the south-southeast (Figure 1.4).

This study concluded that groundwater conditions and contaminant concentrations did not change sufficiently, when compared with

previous data, to affect the functions of the remedy as proposed by the ROD.

1.3.4.2 Site Topographic Survey

In order to prepare an accurate surface cover system design, it was necessary to begin with an up-to-date and detailed topographic survey of the site. Furthermore, since the majority of the cover design work was to be completed on a computer aided drafting system, the survey needed to be in a compatible format. An aerial survey was conducted of the landfill and the adjacent property within a 0.5 mile radius of the site boundaries. A digitized product with 2 foot surface contour intervals (Figure 1.5), was obtained from the aerial surveyor.

1.3.4.3 Geotechnical Study

The purpose of the geotechnical study was to determine the settlement characteristics of both the municipal and hazardous waste landfills. The study included construction of soil surcharge loads over the landfills, recording field settlement measurements, data reduction, and analysis of the expected landfill settlements. These studies were outlined and presented in Geotechnical Study Sampling Plan, August 1989, and Geotechnical Study, December 1989.

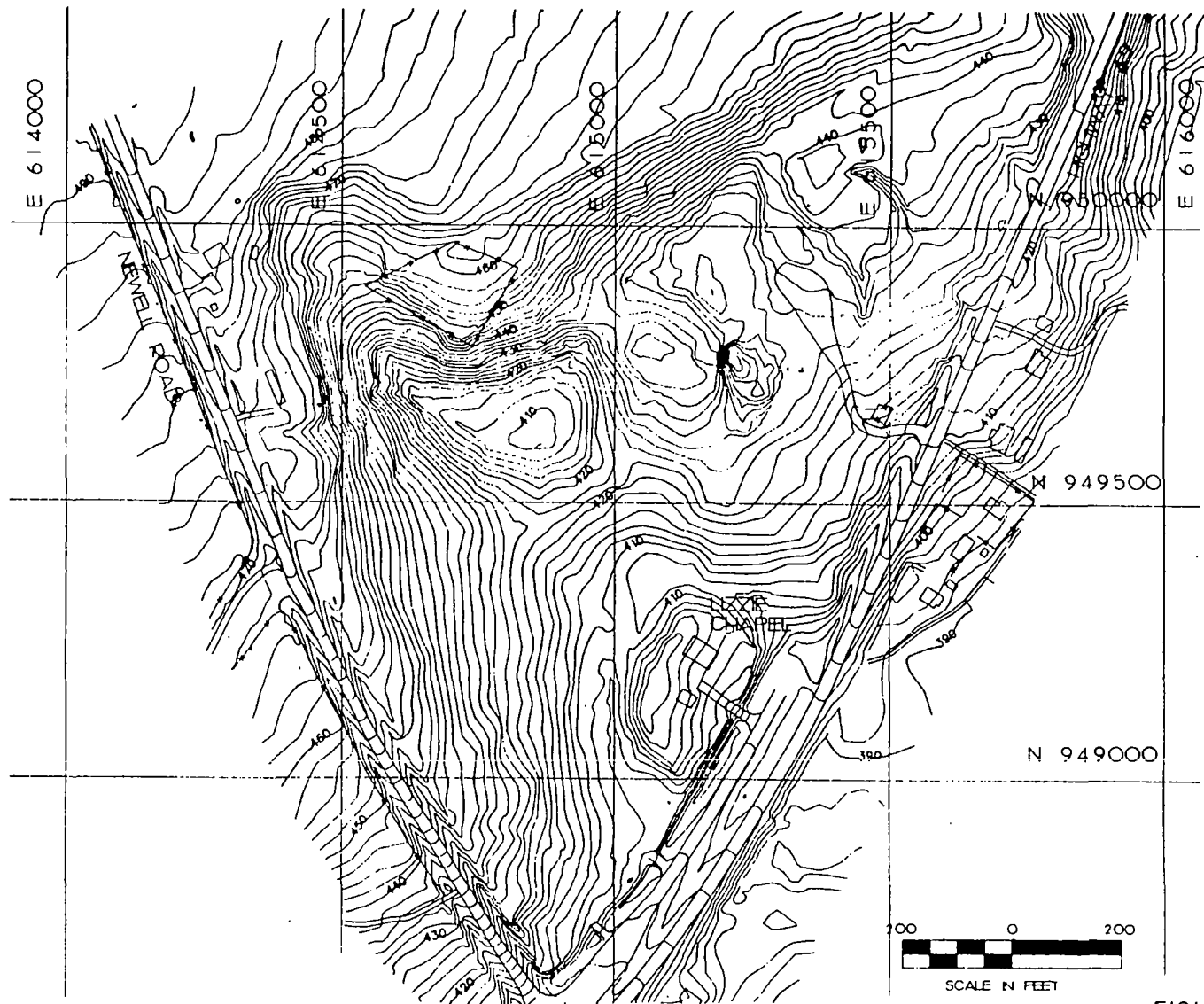


FIGURE 1.5

SCALE AS NOTED	NO.	DATE	REVISION DESCRIPTION
BY TER	1		
BY TK	2		
BY MJB	3		
	4		



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**SITE TOPOGRAPHIC PLAN
PRIOR TO REMEDIAL ACTION
POWERSVILLE LANDFILL NPL SITE
CANADYNE - GEORGIA CORP.**

**DATE
DEC 1989
DWG. NO.
5079C
SHEET NO.**

The study indicated that in the municipal landfill, short-term consolidation settlements of 1 to 2 inches and secondary compression settlements of an additional 3 to 7 inches could be expected over the thirty years following the placement of the cover system. In the hazardous waste landfill, primary consolidation settlements of approximately 0.5 inches and secondary compression settlements of approximately 1.5 inches could be expected. The geotechnical study recommended that the final cover design chosen for the landfill be able to accommodate up to 9 inches of total settlement in the municipal solid waste landfill and approximately 2 inches in the hazardous waste landfill over a period of thirty years.

1.3.4.4 Landfill Boundary Survey

The objective of the landfill boundary survey was to accurately determine the boundary locations of the municipal landfill and hazardous waste landfill for cover design and construction purposes. The landfill boundaries were located using ground penetrating radar (GPR). The landfill boundary survey, presented in Figure 1.6, was reported in the project document Cover System Design, December 1989.

1.3.4.5 Landfill Gas Production Study

The purpose of the landfill gas production study was to determine the gas generation characteristics of the municipal landfill. The

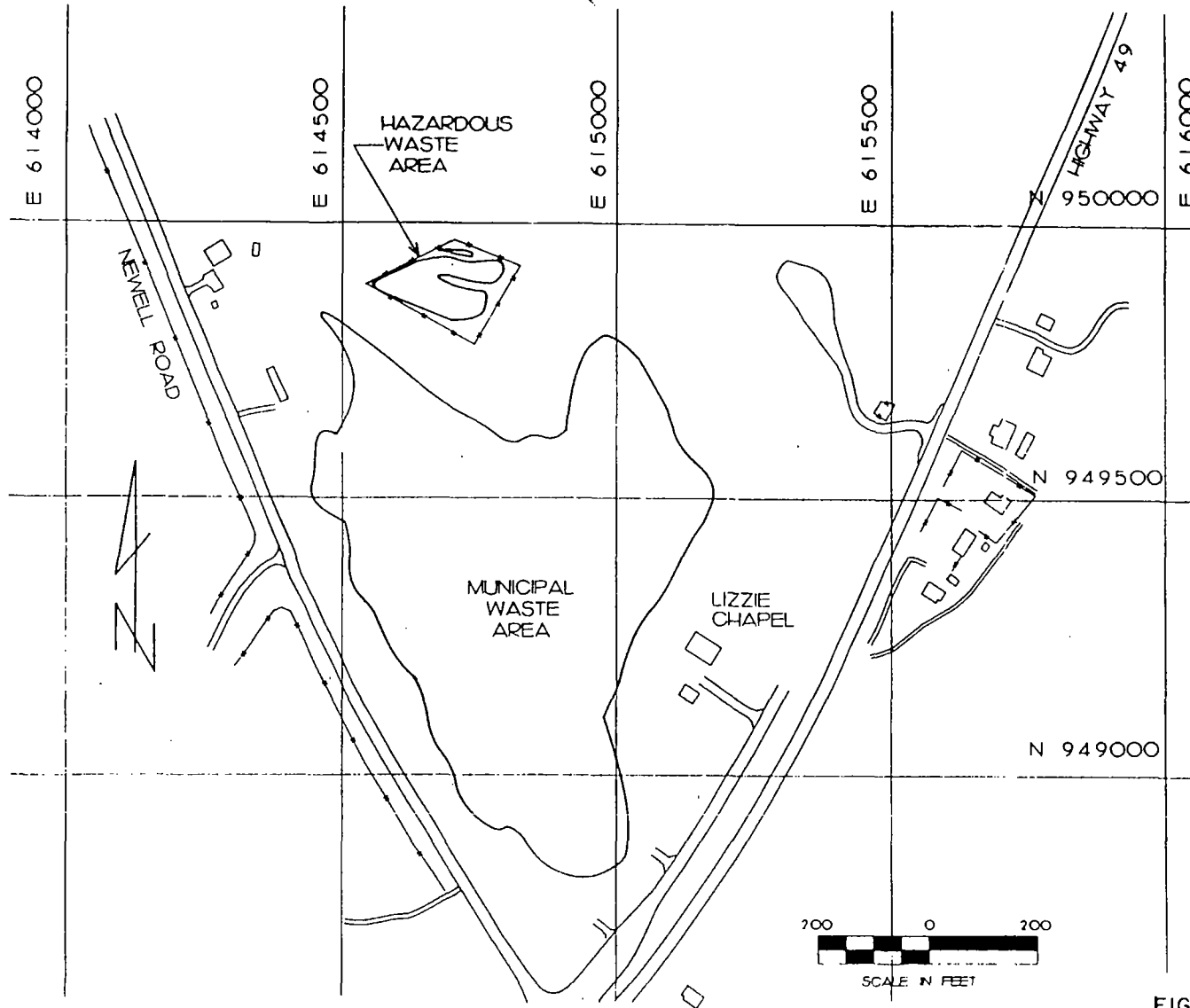


FIGURE I.6

SCAFF IS NOTED	NO.	DATE	REVISION DESCRIPTION	 Applied Engineering & Science	Atlanta Georgia	LANDFILL BOUNDARIES POWERSVILLE LANDFILL NPL SITE CANADYNE - GEORGIA CORP.	DATE DEC 1989 DWG. NO. 5079C SHEET NO.
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CHK'D BY TP	2						
APP'D BY MJH	4						

results of the study were used in the design of the gas venting system. This study was discussed in the documents Landfill Gas Production Study Plan, August 1989, and Landfill Gas Production Study, December 1989.

The data collected over the field study period at the municipal landfill indicated that the facility was still producing landfill gas, but at a very minimal rate.

1.3.4.6 Computer Groundwater Model

Future migration patterns of the groundwater contaminant plume were estimated using a solute transport model, data from previous hydrogeological investigations at the site, and conservative (i.e., worst case) assumptions for contaminant transport parameters for which field data did not exist. Information gained from the model was used in predesign decisions regarding the remedy for this site, including design of a monitoring well network, supply of private residences with an alternate drinking water source, and identification of properties to receive deed restrictions.

1.3.4.7 Monitoring Well Location Study

As required by the ROD, a monitoring well network was designed to evaluate the long-term performance of the cover system. The cover system is required to effectively reduce leachate production and,

over a period of time, lead to a general reduction in contaminant levels in groundwater leaving the site. The project document Monitoring Well Location Study, December 1989 reported the established monitoring network for the project.

Seven of the existing monitoring wells (MW-4, MW-5, MW-6, MW-9, MW-9A, MW-12 and MW-19) have been closed in accordance with the remedial design specifications. Seven new monitoring wells (6 downgradient, 1 upgradient) were installed to evaluate the effectiveness of the covers and to monitor the groundwater. The downgradient wells consist of MW-20, MW-21, MW-22, MW-23 MW-24, and MW-25. The upgradient well is MW-26. Together with two of the existing downgradient wells (MW-2 and MW-7), the six new downgradient wells (total of 8 downgradient) give a complete downgradient shallow zone monitoring on approximately 200-foot spacing across the most conservative projection of the contaminant front. The new upgradient well (MW-26) is used to monitor shallow zone background groundwater quality (Figure 1.7).

1.3.4.8 Properties to Receive Alternate Drinking Water Study

As part of the preliminary design activities, a report was prepared which identified the residents to receive alternate drinking water. This project document was entitled Properties Designated to Be Supplied with Alternate Drinking Water, December 1989.

Properties downgradient, within one-half mile of the site, and within the predicted contaminant plume dispersion boundary using conservative assumptions were designated to receive alternate drinking water (Figure 1.8).

1.3.4.9 Alternate Drinking Water Supply Feasibility Study

The purpose of this study was to evaluate the feasibility of three drinking water supply alternatives for the Powersville, Georgia community potentially affected by the Powersville Landfill NPL site. The study was presented in Alternate Drinking Water Feasibility Study, December 1989. The water line extension alternative which would connect the Powersville water system to the Fort Valley Utilities Commission system was demonstrated to be the most feasible alternative.

1.3.4.10 Deed Restriction Study

The ROD for the Powersville Landfill NPL site requires that deed restrictions be placed on the Powersville Landfill property to prevent any drilling of water wells and construction activities that could compromise the integrity of the landfill covers. In addition, the ROD requires that deed restrictions be placed on certain offsite properties to prohibit the drilling of water wells. The offsite properties were those properties potentially affected if contaminated groundwater were to leave the site. The report

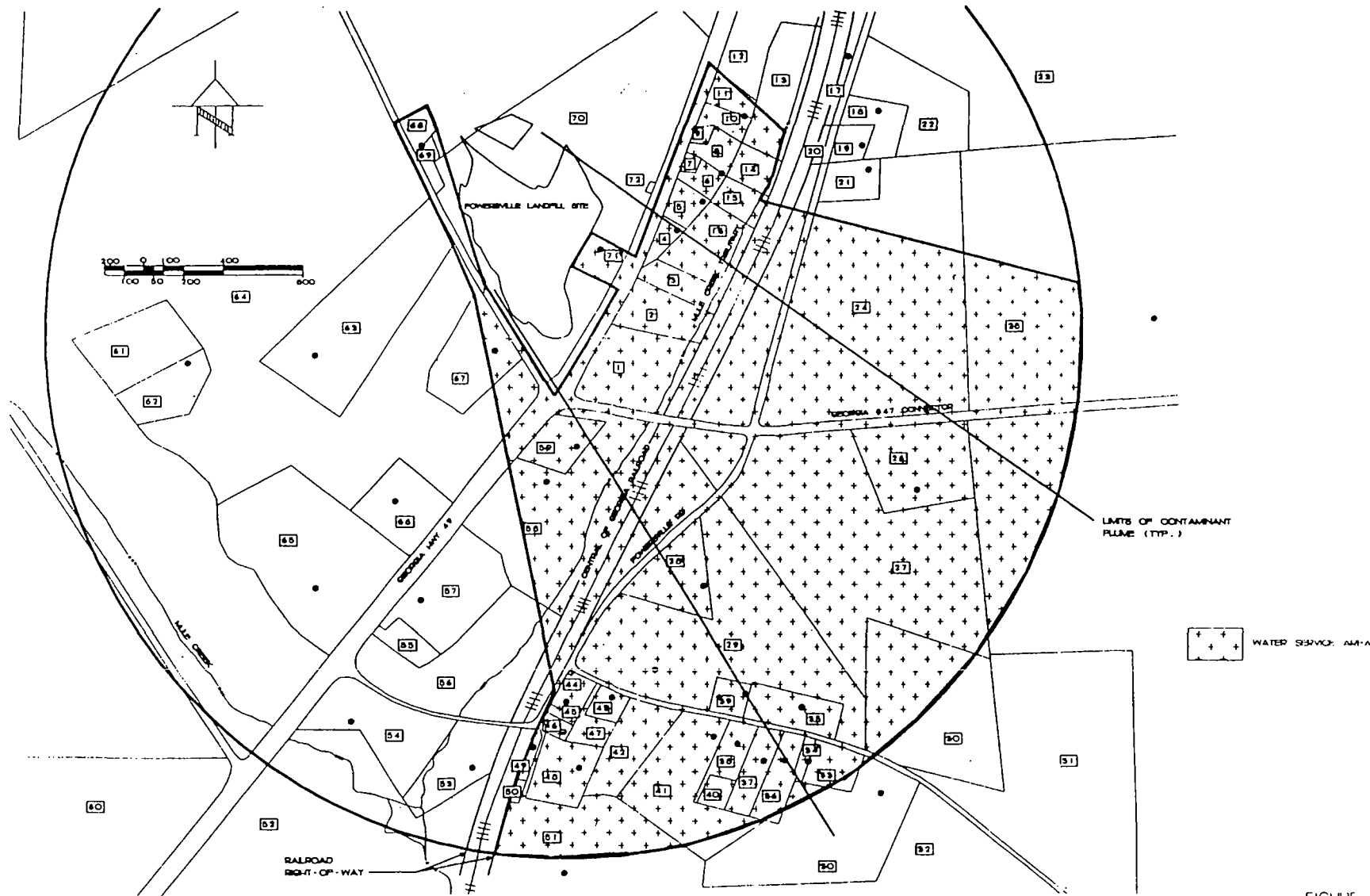


FIGURE 1-B

SCALE	NO.	DATE	REVISION DESCRIPTION
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which identified properties subject to deed restrictions was entitled Deed Restrictions, December 1989.

One Deed Restriction was outstanding as the owner of Property #3 was unwilling to allow the restriction to be placed. This property is currently zoned R-1 and as such the placement of a well to service any structure that may be built is prohibited due to the width of the property. EPA made minor changes to the ROD and has requested that the Peach County/Fort Valley Building and Zoning Office notify EPA should the zoning restriction on this property be changed. In addition, Section 19 of the O & M Manual requires that EPA be notified should such a change occur. Documentation relating to the zoning restriction, minor changes to the ROD and EPA's request to be notified are contained in the Remedial Action Report for Deed Restrictions which is presented as an Appendix to the Remedial Action Report for Alternate Drinking Water System.

1.3.4.11 Cover Design Study

In the early phase of the design, a study was undertaken to evaluate cover structure and materials for the municipal landfill and the hazardous waste landfill covers. This study, which developed the cover system and considered alternate materials, was presented in the Powersville project document Cover System Design, December 1989.

1.3.5 Remedial Action

The Remedial Action Final (100%) Design was submitted as a final draft to EPA in September 1990. The 100% design divides the remedial action construction work into three separate parts, each requiring contractors with different areas of expertise. Contract 1 is for the Landfill Covers and Site Work; Contract 2 is for Groundwater Monitoring Wells; and Contract 3 is for the Alternate Drinking Water Supply. During the bidding process contracts 1 and 2 were combined. Contract 3 was implemented under a 3-party agreement between CGC, Peach County, and the Fort Valley Utility Commission.

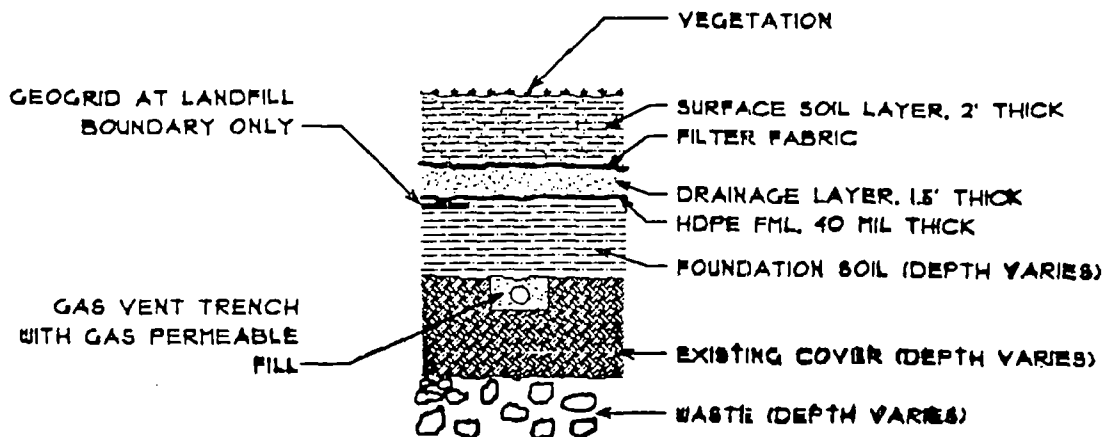
Deed restrictions will be implemented directly by CGC and Peach County.

1.4 Remedial Design Results

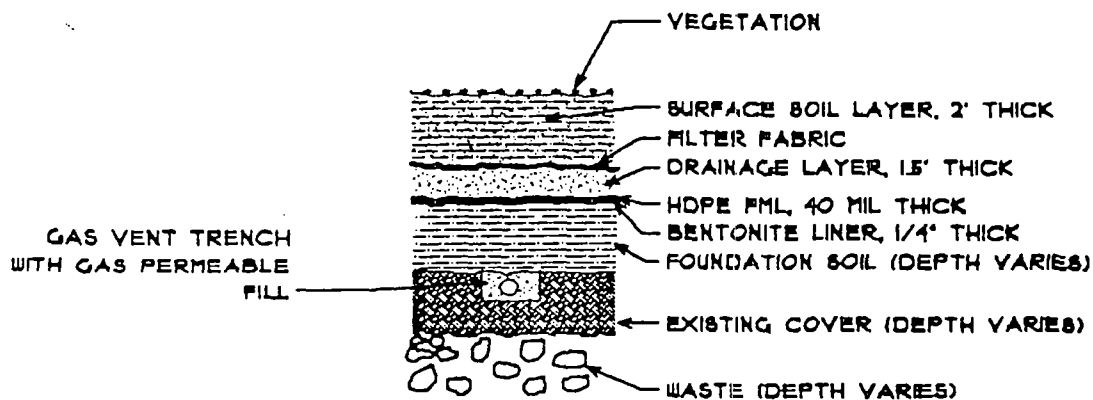
The cover design for both the municipal and hazardous waste landfill covers is a multi-layered cover structure consisting of a gas venting system, foundation layer, low permeability layer, drainage layer, and a vegetated surface layer (Table 1.1). The Final (100%) Design Submittal, September 1990, Contract 1 provides details of construction. A cross-section of the typical cover system is presented in Figure 1.9.

TYPICAL COVER SECTIONS

NOTE: FOR REFERENCE ONLY
NOT FOR CONSTRUCTION



MUNICIPAL WASTE AREA COVER



HAZARDOUS WASTE AREA COVER

FIGURE 1.9

SCALE	 Applied Engineering & Science	TYPICAL COVER SECTIONS POWERSVILLE LANDFILL NPL SITE CANADYNE-GEORGIA CORP.	DATE
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Table 1.1
LAYERS OF COVER SYSTEM

LAYER	MUNICIPAL LANDFILL COVER	HAZARDOUS WASTE LANDFILL COVER
Foundation layer	locally available soil with Unified Soil Classification System designation SW, SP, SM, or CL	locally available soil with Unified Soil Classification System designation SW, SP, SM, or CL
Low permeability layer	40 mil HDPE FML with geogrid at boundaries	Bentonite liner underneath a 40 mil HDPE FML
Drainage layer	18 inches local sandy soil (10^{-3} cm/sec permeability) with filter fabric	18 inches local sandy soil (10^{-3} cm/sec permeability) with filter fabric
Surface layer	2 ft thick vegetated soil	2 ft thick vegetated soil

1.4.1 Gas Venting Layer

Both the municipal landfill area and hazardous waste landfill area were designed with a passive gas venting system to prevent landfill gas buildup which could disrupt the cover. The gas venting system consists of parallel gas venting trenches spaced 100 feet apart. The gas venting trenches are filled with high permeability sandy soil surrounding a 4-inch perforated pipe. The pipes connect to gas vents open to the atmosphere at the high end of the trenches.

1.4.2 Foundation Layer

The foundation layer for each landfill consists of locally available soil with a Unified Soil Classification System designation SW, SP, SM or CL. The primary requirement for this soil is that it be compatible and provide stable support for the cover. The primary purpose of the foundation layer is to build up the original landfill surface to moderate, uniform slopes.

1.4.3 Low Permeability Layer

The municipal landfill cover low permeability layer consists of a 40 mil high density polyethylene (HDPE) synthetic liner. A polyethylene geogrid reinforcing material is installed beneath the FML along the landfill boundaries. If differential settlement occurs, it is expected to be greatest at the landfill boundaries where a step-like contour may occur. The geogrid reinforcing material is incorporated to support the FML at the boundaries where substantial settlement is most likely to occur.

The hazardous waste landfill low permeability layer consists of a two component system: a 40 mil HDPE synthetic liner and a ¼ inch thick bentonite liner (Claymax). The bentonite liner has a hydraulic conductivity of 2×10^{-10} cm/sec or less.

Geogrid reinforcing material is not required for the hazardous waste landfill boundary, since any settlement is expected to be minimal (less than 2 inches) and would be accommodated by the elasticity of the FML.

1.4.4 Drainage Layer

The drainage layer for each landfill consists of 18 inches of sandy soil with a permeability of 1×10^{-3} cm/sec or greater. A filter fabric placed on top of the drainage layer separates the drainage soil from the soil above.

The 18-inch depth of the drainage layer (vs. 12 inches in accordance with RCRA guidance (EPA/530-SW-89-047)) was designed, not for drainage capacity, but to provide an extra margin of protection for the FML when earth moving equipment is used to spread the drainage layer soil over the FML.

1.4.5 Surface Layer

The surface soil layer for each landfill is 2 feet thick, composed of 4 inches of top soil and a well-graded soil below.

1.4.6 Cover Slopes

The initial surface topography of the site sloped upward to the west with a depression between the municipal and hazardous waste landfills. The existing steeper slopes were reduced and the depression filled by hauling in foundation soil. In places, the foundation soil is placed over 15 feet deep. The final landfill slopes are 8:1 (horizontal to vertical) or less, except in a small area near the depression on the municipal and hazardous waste covers where the slopes are approximately 4:1. Minimum slopes are approximately 33 to 1 (3%) on the northeast part of the municipal landfill. The as-built drawings describe the actual final elevations.

1.4.7 Drainage and Erosion Control

Stormwater drainage control is designed such that stormwater from adjacent property will not flow onto either landfill cover. A concrete channel is incorporated in the design to collect stormwater runoff from higher lands to the north and convey it between the municipal landfill and the hazardous waste landfill to 2 permanent sediment basins.

In other areas, the site drains naturally or is graded to divert surface water away from the covers. To the south of the municipal landfill, another concrete channel conveys stormwater from the

cover to one of the sediment basins. Channels are used to prevent erosion where stormwater flow would otherwise accumulate.

Stormwater percolating through the cover soil surface layer will collect in the cover drainage layer. The municipal landfill cover drainage layer is designed with subsurface drainage piping placed in a trench lined with FML. Drainage pipes are 6 inch perforated polyethylene which is sufficient to convey all stormwater for a 10-year storm event. Drainage piping is provided along the lower edge of the municipal landfill cover to intercept the drainage water, thus providing a positive outlet from the cover drainage layer. No subsurface drainage layer piping is provided in the hazardous waste cover due to its small size.

The municipal landfill cover is designed with a series of terraces running across the slope. The terraces are spaced approximately every 10 vertical feet, as recommended by the local U.S. Soil Conservation Service. Where the terraces direct stormwater flow off the cover, rip-rap is provided at the cover sides to slow down the stormwater before it enters the concrete channels. The terraces are not required for erosion control once the vegetation is established; however, they will remain in place for additional protection.

1.4.8 Vegetation

The landfill covers and other site areas will be vegetated with a mixture of Annual Rye Grass, Bahia Grass and Lespedeza Sericea (unscarified). This vegetation was recommended by the local U.S. Soil Conservation Service. Lime, fertilizer and mulch were also specified by the Soil Conservation Service.

1.4.9 Settlement Monitoring Stations

Settlement monitoring stations are designed to monitor landfill cover settlement after construction. A station consists of a riser pipe connected at the bottom to a small square HDPE liner pad which rests upon the FML. As the FML settles, the riser pipe and pad will settle with it. The amount of settlement can be determined by measuring the elevation of the top of the riser pipe with survey instruments and comparing the measured elevation with the initial elevation.

The municipal landfill cover has 14 monitoring stations. Four are located along the western landfill boundary, approximately 20 feet inside the boundary. The waste was deepest in this region and the greatest differential settlement is expected in this area. Ten other stations are distributed somewhat equally over the cover surface.

1.4.10 Security Fence

The entire site is enclosed with a 6-foot high, industrial gauge, chain link fence with appropriate gates. A roadway inside the fence was constructed to provide access for the maintenance and repair of the site.

2.0 ORDINARY O&M ACTIVITIES FOR GROUNDWATER MONITORING

2.1 Background

Groundwater monitoring is necessary to evaluate the effectiveness of the landfill covers. The Consent Decree (Section VII.E.iii) requires that the O&M Plan which describes the groundwater monitoring program must contain the post-closure care requirements found in 40 CFR Part 264, including but not limited to "maintaining the groundwater monitoring system and complying with relevant and appropriate requirements of 40 CFR Section 264 Subpart F."

40 CFR Section 264 Subpart F (264.91) requires implementation of one of the following monitoring programs:

- compliance monitoring program (264.91 a (1))
- corrective action program (264.91 a (2))
- detection monitoring program (264.91 a (4))

Based on EPA's "Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites" (December, 1988), the corrective action monitoring program will be conducted at the Powersville site. The rationale for this decision follows Section 2.4.2.1 of

the referenced EPA guidance (Monitoring Requirements), which states that:

- Detection monitoring is used to determine if a release to groundwater has occurred.
- When a release has occurred, compliance monitoring is used to determine if any groundwater concentration standards have been exceeded.
- Corrective action monitoring is used when the groundwater protection standard has been exceeded and corrective action is implemented. Corrective action monitoring establishes the effectiveness of measures taken to remediate groundwater.

At a Superfund site with contaminated ground water, it has already been determined that a groundwater remediation decision must be made. Therefore, RCRA's detection monitoring and compliance monitoring requirements are not generally relevant and appropriate. However, RCRA corrective action monitoring requirements may be applicable or relevant and appropriate.

At the Powersville site, groundwater protection standards have been exceeded (vinyl chloride, 1,2-dichloroethane, benzene hexachloride, lead, chromium), as documented in the RI/FS, ROD, and other

predesign documents. Further, the purpose of the groundwater monitoring is to determine the effectiveness of the landfill covers which are to be constructed as part of the remedy. For these reasons, the corrective action monitoring is the most relevant and appropriate option.

According to 40 CFR 264.100 (corrective action program), the corrective action monitoring program must comply with the groundwater protection standards under 264.92, which include:

- the hazardous constituents described in 264.93;
- the concentration limits under 264.94 for each of those hazardous constituents;
- the compliance point under 264.95; and
- the compliance period under 264.96.

In addition, the relevant and appropriate portion of the general groundwater monitoring requirements under Section 264.97 apply.

These subjects are discussed below:

Hazardous Constituents

Section 264.93 (a) states that "hazardous constituents are constituents identified in Appendix VIII of Part 261 of this aquifer underlying a regulated unit and that are reasonably expected to be in or derived from waste contained in a regulated unit, unless the Regional Administrator has excluded them under paragraph (b) of this section."

Paragraph (b) follows with "The Regional Administrator will exclude an Appendix VIII constituent from the list of hazardous constituents specified in the facility permit if he finds that the constituent is not capable of posing a substantial present or potential hazard to human health or the environment."

Because the Powersville site is not a RCRA-permitted facility, application of these requirements is adjusted to fit a Superfund site. At the Powersville site, the hazardous constituents are equivalent to the indicator chemicals which were identified by the EPA Regional Administrator based on groundwater sampling data obtained during the RI/FS and other studies conducted by EPA. The Endangerment Assessment (July 20, 1987) identified the indicator chemicals based on the compounds which were detected in groundwater and which were capable of posing a substantial present or potential hazard to human health or the environment. These are the chemicals which are best suited for determining effectiveness of the covers.

The process which was used to select the indicator chemicals involved examination of the frequency of detection, comparison with background or upgradient concentrations, and assessment of the concentration and toxicity of the chemicals. This process is equivalent to the process of identifying hazardous constituents under 40 CFR 264.93. The indicator chemicals for groundwater were incorporated into the ROD, executed by the Regional Administrator (September 30, 1987). The indicator chemicals include:

- alpha-BHC*
- gamma-BHC
- vinyl chloride
- 1,2-dichloroethane
- lead
- chromium

These are the constituents (with the exception of alpha-BHC) which will be monitored in groundwater. In addition, the groundwater will be monitored for toxaphene. Monitoring the toxaphene is a precautionary measure to ensure that soil contamination identified during the construction of the landfill covers does not affect the groundwater.

* alpha-BHC will not be monitored because it has no concentration limit and it was not included in the ROD cleanup goals (see discussion below on Concentration Limits).

Concentration Limits

Section 264.94 requires that the concentration limits must not exceed the values listed for specific constituents in Table 1 of 264.94 a (2), Maximum Concentration of Constituents for Groundwater Protection. Section 264.94 states that if the hazardous constituents are not listed in Table 1 of 264.94 a (2), the Regional Administrator will establish alternate concentration limits. The alternate concentration limits have already been established by the Regional Administrator in the ROD. However, in July 1993 EPA required that these levels be modified to current levels. Both the original levels, as presented in the ROD as well as the current MCL's are presented below:

		EPA Required Level (7/93)
	<u>Rod Cleanup Goal</u>	<u>for O&M</u>
gamma-BHC	4 ug/l	4 ug/l
vinyl chloride	1 ug/l	2 ug/l
1,2-dichloroethane	5 ug/l	5 ug/l
lead	50 ug/l	15 ug/l
chromium	50 ug/l	100 ug/l

For gamma-BHC (lindane), lead, and chromium, these concentrations are the same as listed in Table 1 of 264.94 a (2).

Vinyl Chloride and 1,2-dichloroethane are not listed in Table 1 of 264.94 a (2). The cleanup goal established in the ROD for 1,2-

dichloroethane is the MCL (5 ug/l). The cleanup goal established in the ROD for vinyl chloride (1 ug/l) is more stringent than the MCL (2 ug/l).

The alpha-isomer of BHC was not included in the cleanup goals in the ROD, probably because there is no published concentration limit or MCL for this isomer, and the gamma-isomer of the same compound was already included. For these reasons, alpha-BHC will not be included in the monitoring program.

The concentration limit for toxaphene was determined by EPA. If the groundwater sampling data reveals concentrations exceeding the concentration limits for any of these chemicals, EPA will be notified within 30 days. Because all residents potentially affected by groundwater contamination are already being provided with alternate drinking water as part of the remedial action, exceeding the concentration limits (cleanup goals) in the groundwater does not pose a threat to the public.

In summary, the constituents and corresponding concentration limits to be included in the ground water monitoring program directed by EPA Region IV in July 1993 are shown in the right hand column below.

<u>Constituent</u>	ROD	EPA Required Level (7/93)
	<u>Concentration Limit</u>	<u>for O&M</u>
gamma-BHC	4 ug/l	4 ug/l

vinyl chloride	1 ug/l	2 ug/l
1, 2-dichloroethane	5 ug/l	5 ug/l
lead	50 ug/l	15 ug/l
chromium	50 ug/l	100 ug/l
toxaphene		3 ug/l

Compliance Point

Section 264.95 states that the "point of compliance is a vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated units." Based on the direction of groundwater flow at the Powersville site, the point of compliance is defined by the southeast edge of the municipal landfill, which is farthest hydraulically downgradient limit of both the hazardous waste and the municipal landfills. The location and configuration of the monitoring well network is based on the point of compliance (and the direction of flow of the groundwater), as discussed in Section 2.2.

Compliance Period

Section 264.96 (c) states that under a corrective action monitoring program, the compliance period is the number of years equal to the active life of the waste management area. Because the Powersville site is not an active waste management area, this does not apply.

The Consent Decree, however (Section VII E.viii) requires that a 30 year inspection schedule for O&M activities be implemented, according to the post-closure requirements of 40 CFR 264.117, and (Section VIII E.) that "a separate schedule will be established for monitoring the groundwater conditions as specified in Section VIII of the ROD."

In addition, a statutory requirement (CERCLA Section 121(c)) requires a performance evaluation to be conducted by EPA at least every five years after initiation of remedial actions if wastes are left on site.

The groundwater will be monitored quarterly for the first and second years following construction. After the first two years, the frequency of groundwater monitoring will be reevaluated. If appropriate, the monitoring program will be modified, pending agreement by EPA, Peach County, EPD, and CGC. As required by CERCLA, the performance evaluation will be conducted every five years by EPA.

General Groundwater Monitoring Requirements

Section 264.97 requires that the groundwater monitoring system consist of a sufficient number of wells installed at appropriate locations and depths to yield groundwater samples from the upper aquifer; that represent the quality of background water that has

not been affected by leakage from a "regulated unit" (in this case the municipal and hazardous waste landfills); and that represent the quality of groundwater passing the point of compliance (the southeast edge of the municipal landfill). Sections 264.97 (b) through (g) provide the specific requirements:

Section 264.97 (b) states that a separate groundwater monitoring system is not required for each regulated unit (in this case each of the two landfills) at a facility (site) where there are multiple units, provided that the monitoring system is adequate to detect and measure hazardous constituents at the compliance point for all units. The monitoring well network at the Powersville site is designed such that the hazardous constituents can be detected and measured at the compliance point for both units (the southeast edge of the municipal landfill). This is confirmed by the computer transport model used to design the monitoring well network (Final (100%) Design Submittal, September, 1990) which was approved by EPA. More detailed discussion of the monitoring well network follows in Section 2.2 of this O&M Plan, Monitoring Well Network.

Section 264.97 (c), (d), (e), and (f) refer to monitoring well design, sample collection procedures, sample preservation and shipment, analytical procedures, chain of custody control, and quality assurance/quality control. These subjects are discussed in detail in Section 2.2.

Section 264.97 (g) requires that "where appropriate, the groundwater monitoring program must establish background groundwater quality for each of the hazardous constituents or monitoring parameters or constituents specified in the permit." However, these requirements are directed at a RCRA facility where background values have not yet been established. At the Powersville site, the EPA Regional Administer has already established the background values for each of the hazardous constituents. These values were established on the basis of extensive sampling data from the RI/FS and other studies conducted by EPA, and served as the basis for EPA's selection of the indicator chemicals, the endangerment assessment, and the cleanup goals designated in the ROD. The purpose of the groundwater monitoring (as stated in the ROD) is to evaluate the effectiveness of the remedy, which is measured in terms of the cleanup goals, which were based on background values. Therefore, it is not "appropriate" in this case to "establish" background values. Upgradient wells, however, will be monitored to provide background data with which to compare sampling results, and to indicate possible changes in background conditions. If a significant change in background conditions is indicated, a more extensive investigation of background values will be initiated.

2.2 Monitoring Well Network

The groundwater monitoring system at the Powersville Landfill NPL Site was designed with monitoring wells of sufficient number, installed at appropriate locations and depth, to yield groundwater samples from the uppermost aquifer that are representative of the quality of water passing the southeast edge of the municipal landfill, which is the point of compliance as required by 40 CFR 264.95. Together with two existing wells, the seven monitoring wells (6 downgradient, 1 upgradient) to be installed during the Remedial Action will give complete downgradient shallow zone monitoring on approximately 200-foot spacing across the most conservative (largest) projection of the contaminant front. Monitoring wells which are designated as part of the monitoring well network are listed below and are shown on Figure 2.1.

- MW-20
- MW-21
- MW-22
- MW-23
- MW-24
- MW-25
- MW-26 (upgradient)
- MW-2
- MW-7

40 CFR 264.97 states if the site contains more than one unit, separate monitoring systems are not required for each unit provided that samples collected at the compliance point are representative of constituents from both units. As described in Section 2.1, the monitoring wells at the Powersville Site were designed such that

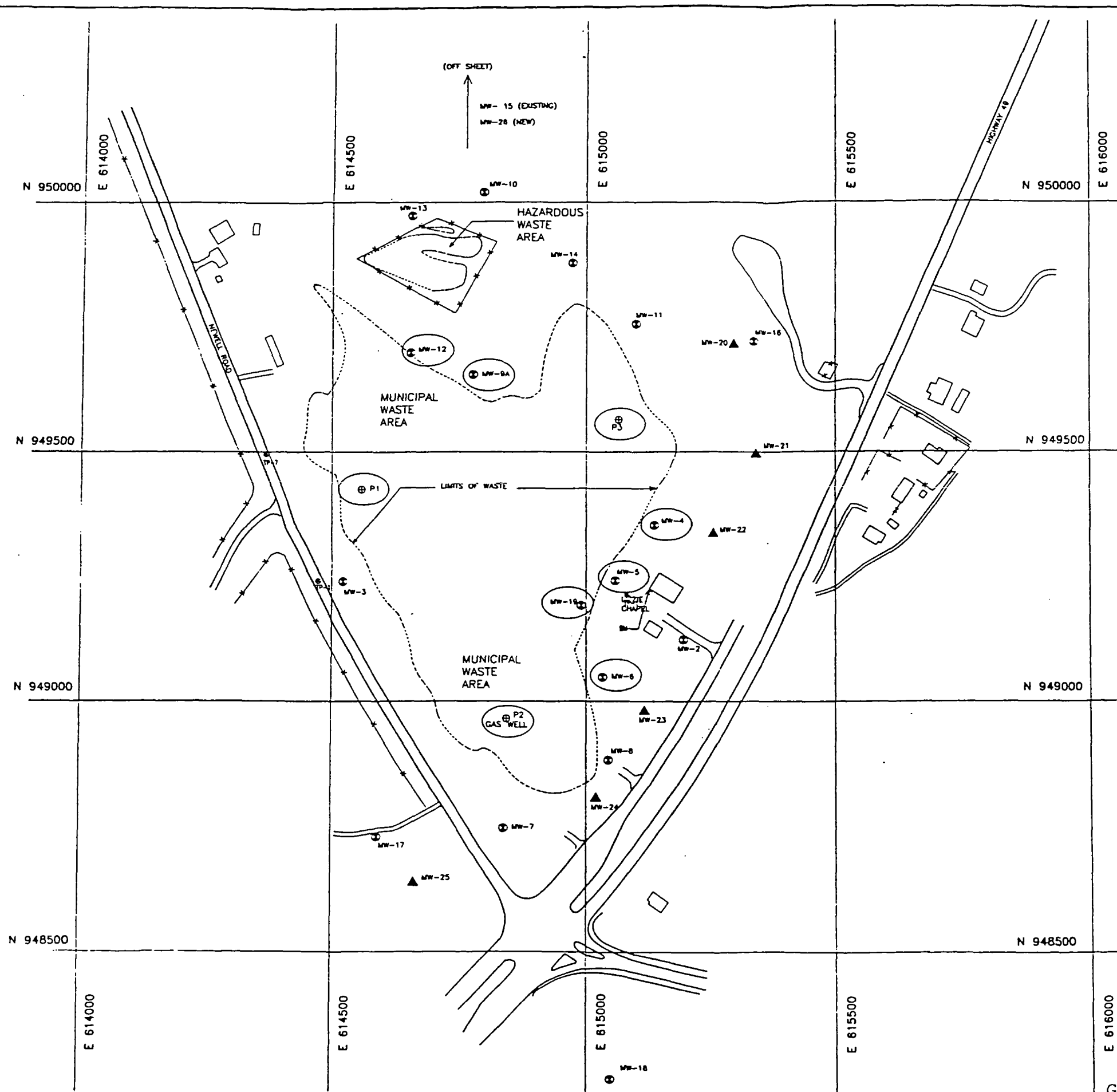


Figure 2.1
Groundwater Monitoring Well Network

FINAL DESIGN

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1			4		
2			5		
3			6		



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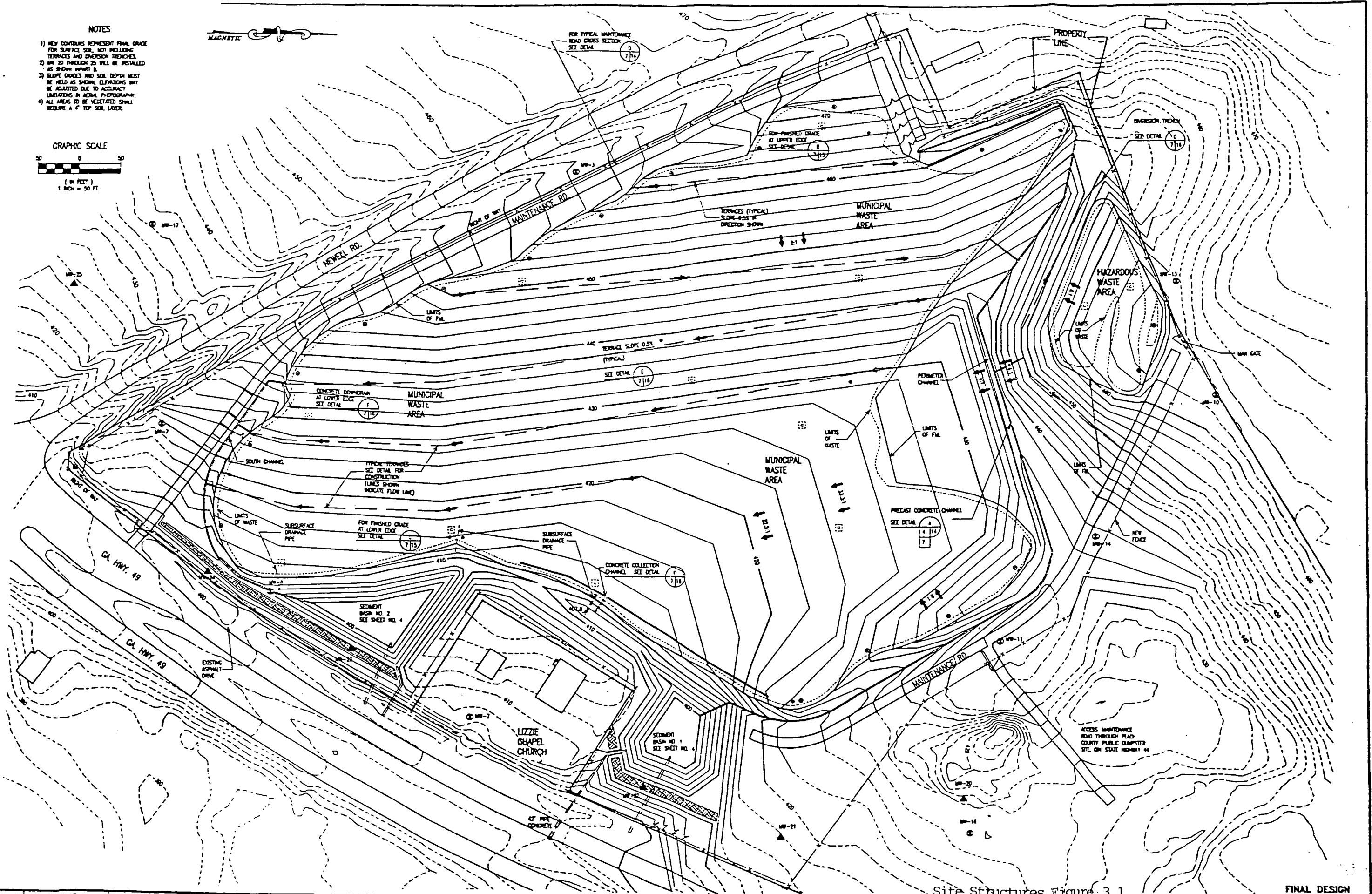
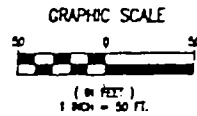
SITE PLAN

DWG. NO. 60798 - 81

SHEET NO. 1 of 6

NOTES

- 1) NEW CONTOURS REPRESENT FINAL GRADE FOR SURFACE SOIL, NOT INCLUDING TERRACES AND DIVERSION TRENCHES.
- 2) MW 20 THROUGH 25 WILL BE INSTALLED AS SHOWN IN PART B.
- 3) SLOPE GRADIES AND SOIL DEPTH MUST BE HELD AS SHOWN. ELEVATIONS MAY BE ADJUSTED DUE TO ACCURACY LIMITATIONS IN AERIAL PHOTOGRAPHY.
- 4) ALL AREAS TO BE VEGETATED SHALL REQUIRE A 4" TOP SOIL LAYER.



DESIGNED BY	SCALE	NO.	DATE	REVISION DESCRIPTION	NO.	DATE	REVISION DESCRIPTION
CHK	1" = 50'	1			1		
CHK		2			2		
CHK		3			3		



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POWERSVILLE LANDFILL NPL SITE
CANADYNE-GEORGIA CORP.

FINISHED GRADING PLAN

FINAL DESIGN

DWG. NO. 50798 - 07
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the concentrations of the hazardous constituents be detected and measured at the compliance point for both landfill units. This was confirmed by information gained from a computer transport model used to assist in the design of the monitoring well network.

The computer model describes the migratory characteristics of the contaminants and projects the probable migration pathway. The groundwater monitoring system network designed for the site is consistent with current conditions at the site. Because conditions may change, this O&M plan may be revised if groundwater monitoring requirements applicable to the site necessitate such a change. The direction and rate of groundwater flow will be confirmed at least annually.

2.3 Quality Assurance/Quality Control

To ensure that data generated will be of known and measurable quality, sampling procedures will be in accordance with the U.S. EPA Region IV Environmental Compliance, Standard Operating Procedures and Quality Assurance Manual, February 1, 1991; Samplers and Sampling Procedures for Hazardous Waste Streams, EPA-600/2-80-0-18; and Handbook for Sampling and Sample Preservation of Water and Wastewater EPA-600/4-82-029. Analyses and QA/QC procedures shall be conducted in accordance with U.S. EPA Contract Laboratory Program Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Revision 2/88; U.S. EPA Contract Laboratory

Program Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, SOW No. 787, Revision 12/87; Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846.

2.3.1 Data Quality

Data Quality Objectives (DQOs) for the O&M activities were based on the EPA guidance entitled Data Quality Objectives for Remedial Response Activities, March 1987. Although this guidance does not address remedial design or remedial action activities, the O&M plan uses the same approach to development of DQO's as described for RI/FS activities in the DQO guidance. DQO's are qualitative and quantitative statements which specify the type of data required to support decisions made during the O&M care period. DQOs are established based on the end uses of the data to be collected and are necessary for all data collection activities. DQOs ensure that the data collected are of sufficient quality and quantity for the intended use.

Groundwater monitoring data collected for the Powersville NPL Site must be of sufficient quality to evaluate the effectiveness of the landfill covers and to determine whether the concentration of the indicator chemicals have met the cleanup goals of the ROD. To accomplish this level of quality, laboratory analyses will follow EPA's Analytical Support Level III. This level of analytical support is used primarily to support engineering studies using

standard EPA-approved procedures. Some procedures in Level III may be equivalent to Contract Laboratory Program (CLP) Routine Analytical Services, but without the CLP requirements for documentation. Data validation will also follow EPA's DQO guidance, which states that achievable precision and accuracy levels should be the indicators of data quality. These levels are based on historical precision and accuracy information for analytical techniques classified by level. Appendix F of the EPA guidance on DQO's presents the historical precision and accuracy data for each analytical support level. The Powersville groundwater monitoring data will be validated on the basis of the historical precision and accuracy data for Analytical Support Level III, for each applicable parameter or analytical method, as described in Appendix F of the EPA guidance.

2.3.2 Analytical Procedures

As described above, Level III protocols will be followed for all groundwater analyses. The specific analytical methods which will be used are described in Table 2.1.

Table 2.1
ANALYTICAL METHODS FOR INDICATOR PARAMETERS

PARAMETER	METHOD (water) ¹
Chromium, Lead	EPA 200 series
Gamma-BHC, (Organochlorine Pesticides) toxaphene	EPA 608M ²
1,2-Dichloroethane, Vinyl chloride (Volatile Organic Compounds)	EPA 624M ²

¹ USEPA CLP protocols shall be used.

² Methods modified per CLP Statement of Work

2.3.3 Field Quality Control Samples

To ensure that high sample quality is maintained during collection, preparation, transport, storage, and analysis, several types of quality control samples will be collected. Quality control samples provide a level of assurance that outside influences have been minimized.

- Equipment Rinse Blank. The equipment (rinse) blank is designed to identify contamination between sample sources in the field due to deficient field cleaning procedures. This blank also addresses field preservation procedures and site interferences. Samples of final analyte-free rinse water from equipment cleaning are collected daily. They are collected from sampling equipment following decontamination between sample locations for every parameter analyzed during the field activity on a given day.
- Field Blanks. Field blanks are used to evaluate the sample container filling procedure, the effects of contaminants at the site, purity of preservatives or additives, and the source of the organic-free water used for field decontamination. A sample of the

analyte-free water used for decontamination is submitted for analysis once for each period of uninterrupted sampling days, e.g., once per week if sampling is not conducted through the weekend.

- Travel Blanks. Travel (trip) blanks are intended to address interferences derived from sample cross contamination during storage/transport, and extraneous environmental conditions affecting the sampling event, including delivery to the laboratory. Travel blanks originate at the analyzing laboratory or from the facility providing the analyte-free water for field decontamination. Travel blanks accompany the field samples during sampling and storage, and are to be included in each shipment of samples which contain samples to be analyzed for VOCs.
- Split Samples. Samples that require analysis by an outside laboratory are collected in the field by allocating a homogeneous sample into separate containers. The containers are then labeled as split samples and delivered with the proper chain-of-custody to specified outside laboratories.
- Duplicate Samples. These are duplicate composites of field samples and are submitted to the laboratory along with the field samples. Duplicate samples are collected one in twenty samples. Also, CLP protocol requires a replicate duplicate be submitted for final data validation.

2.3.4 Chain-of-Custody

To ensure the integrity and quality of the samples, during collection, transportation, storage, and analysis, proper sample chain-of-custody (COC) shall be maintained through the following COC documentation:

- Sample tags

- Custody seals affixed to each sample container to maintain the integrity of the sample from the time it is collected until it is opened in the laboratory
- Pictures and bound field logbooks to record information relative to the monitoring program
- COC forms which establish the documentation necessary to trace the sample possession from the time of collection to the laboratory sample receiving
- Laboratory notebook or records which contain pertinent information regarding the samples

The tags shall be completed at time of sample collection. The tag number shall be recorded in the field log book along with information descriptive of the sampling conditions for that particular sample. Sample custody shall be retained in the field. COC forms (provided by the laboratory) shall be filled out and signed by the person who collected the sample whenever sample custody is transferred. A COC seal shall be affixed to the outside of each cooler if the samples are shipped by a bonded shipping company.

All COC procedures shall comply with requirements and sample handling protocols indicated in U.S. EPA ESD Region IV, Standard Operating Procedures and Quality Assurance Manual, April 1986.

2.3.5 Sampling Procedures

Detailed procedures for sampling, field documentation, and reporting of activities are described in Section 13. All sample container selection, preservation requirements, and holding times shall be in accordance with EPA Region IV requirements. Appendix D presents a list of appropriate containers and sample handling requirements.

2.3.5.1 Groundwater Sampling

Samples from each monitoring well in the network sampled will be collected in accordance with the procedures and requirements referenced above.

For each well, the static water level and the total well depth will be measured prior to well purging. A minimum of three to five well volumes will be purged before sampling. Conductivity, pH, and temperature will be measured during purging until the parameters have stabilized, even if more than five well volumes must be purged.

Groundwater samples generally should not be filtered in the field. However, if extremely high concentrations of sediment are present in the sample, the aliquot of sample for metal analyses will be filtered before preservation. Whenever samples for metals are

filtered, an additional unfiltered and preserved sample will also be collected and submitted for analysis.

2.3.5.2 Decontamination

Decontamination of sampling equipment will be conducted in accordance with U.S. EPA Region IV Environmental Compliance Division, Standard Operating Procedures and Quality Assurance Manual, February 1, 1991. A detailed discussion of decontamination procedures is presented in Section 13.0.

2.3.6 Instrument Calibration

Monitoring equipment such as an OVA and HNu will be calibrated according to manufacturers' instructions. After an instrument is cleaned or when background levels drift, the instrument will be recalibrated. The instrument's response to the manufacturer-provided standard will be recorded in the bound field logbook and on a log that is assigned to that particular instrument.

2.4 Coordination of Sampling

At least four calendar weeks prior to any proposed sample collection, EPA must be notified in the event that EPA may want to collect split or duplicate samples. At least three working days

prior to the sampling activities, EPA will again be notified of the scheduled sample collection.

3.0 ORDINARY O&M ACTIVITIES FOR SITE STRUCTURES

Incorporated into the landfill cover design are structures which will require maintenance (Figure 3.1). The function and general construction features of the site structures are discussed in this section to provide an understanding of the purpose for the O&M procedures. Inspection, maintenance, and repair of these structures is addressed in detail in the O&M Manual, Section 18.0.

3.1 Concrete Channels

Concrete channels collect and divert stormwater runoff from higher lands to the north. The stormwater is conveyed between the municipal landfill and the hazardous waste landfill. South of the municipal landfill is another concrete channel to convey stormwater from the cover. Each channel is 1 foot 10 inches wide and 1 foot 10 inches deep. Concrete channels prevent erosion in areas where stormwater flow might accumulate. Terraces direct stormwater flow off the cover into rip rap at the cover sides and from there into the concrete channels. Proper and adequate inspections of the channels and rip rap are required to prevent sediment build-up and failure of integrity.

hazardous waste landfill cover. Locations of the settlement monitoring stations are presented in Figure 3.1.

The amount of settlement is determined by measuring the elevation of the top of the riser pipe at the monument with survey instruments and comparing the measured elevation with the installed elevation. There is no repair required at any definite measured settlement. Settlement data are used for general informational purposes as an indication of general landfill settlement..

3.2 Fence

The entire site is enclosed with a 6 foot high industrial gauge, chain link fence with appropriate gates. A roadway inside the fence was installed to provide vehicular access for the maintenance and repair activities.

Fencing is 6 feet in height, with three strands of barbed wire with top rails and bottom tension wires. The barbed wire at the top of the fence is mounted on angle extension arms. Wire fabric posts, top rails, extension arms, and all other fence appurtenances and hardware is hot-dipped galvanized.

The fence wire is heavy duty 9 gauge wire, woven in two inch mesh with the top and bottom salvages barbed. The fence wire is secured to the tension wire with ties and clips at intervals of two feet.

Line posts are 2½ inches O.D. set in 30 inches of concrete and spaced 10 feet apart. Corner pipes are 3 inches O.D. set in 3 feet of concrete. Gates for pedestrians and vehicles are constructed of two inch standard weight galvanized steel pipe frames and chain link mesh. Gates are chained and locked with padlocks which are keyed alike.

Inspections of the fence and signs are mandatory for the prevention of uncontrolled site access.

3.3 Signs

Signs are placed at each gate and at 100 foot intervals along the fence. The signs are steel, 20 gauge thick with a height and width of 11 inches by 13 inches. The signs have a red background with black lettering and are attached to the fence wire with galvanized steel wire. The tops of the signs will be placed 5 feet above the ground surface.

The signs will read as follows:

U.S. EPA
SUPERFUND PROJECT
DANGER
NO TRESPASSING
HAZARDOUS SUBSTANCES MAY BE PRESENT
PHONE (800) 424-8802

3.4 Drainage Areas

The municipal landfill cover is designed with a series of terraces running across the slope. The terraces are spaced approximately every 10 vertical feet, as recommended by the local U.S. Soil Conservation Service. Where the terraces direct stormwater flow off the cover, rip rap is provided at the cover sides to slow down stormwater flow before it is directed into the concrete channels.

The preconstruction surface topography of the site sloped upward to the west with a depression between the municipal and hazardous waste landfills. The steep slopes were reduced and the depression filled by hauling in foundation soil. The final landfill slopes are approximately 8:1 horizontal to vertical or less, except in a small area near the depression on the municipal and hazardous waste covers where the slopes are approximately 4:1. Minimum slopes are approximately 33 to 1 (3%) on a northeast part of the municipal landfill. In other areas, the site drains naturally or is graded to drain away from the covers. Maintenance and repair of the drainage areas will be conducted in areas which are barren or subject to sparse vegetation, or areas which have settled. In either case, topsoil will be replaced, compacted (95%) to design grade, and revegetated.

3.5 Maintenance Roads

Two maintenance roads (inside the fence) have been constructed to provide easy access to the site and to structures within the site. On the west perimeter of the site, a maintenance road runs parallel to Newell Road and Highway 49. The other road is located on the east edge of the site and runs parallel to the municipal waste area and extends to the east side of the hazardous waste area. Each road is approximately 12 feet wide, constructed with 6 inches of compacted aggregate over geotextile fabric.

Inspection and repair of the roads is not critical to the integrity of the cover system, however maintaining the roads increases the ease with which the other monitoring and maintenance activities are performed.

3.6 Benchmarks

Two permanent benchmarks were installed at the site. The benchmarks are brass discs, set in concrete, with the USGS elevations and engraved Georgia State Plane Coordinates.

The first benchmark was installed in the northwest portion of the site near Newell Road. The second benchmark was installed in the northeast section of the site near the east maintenance road. The benchmarks are installed such that the locations will be useful in

monitoring the elevations of the cover settlement monitoring stations.

The survey work establishing the benchmarks is certified by a registered land surveyor. Vertical control is in accordance with USGS standards; horizontal control conforms to the requirements of the Georgia Plat Act.

Precision of the benchmarks should be determined periodically to insure the accuracy of the elevations of the settlement monitoring stations.

3.7 Gas Vents (and Guard Posts)

Both the municipal landfill area and hazardous waste landfill area are designed with a passive gas venting system to prevent landfill gas buildup which could disrupt the cover. The gas venting system consist of parallel gas venting trenches spaced approximately 100 feet apart. The gas venting trenches are filled with high permeability sandy soil with a 4 inch corrugated, polyethylene (PE), perforated pipe. The pipes connect to gas vents open to the atmosphere at the high end of the trenches. The top of the gas vent trench piping has been surveyed when the pipe is installed and backfilled up to the springline.

The gas vents are important for the proper release of trapped gases to maintain the integrity of the FML and the cover system.

3.8 Cover Drainage Piping and Sediment Basins

Any stormwater which percolates through the cover soil surface layer will collect in the cover drainage layer. The municipal landfill cover drainage layer is designed with subsurface drainage piping placed in a trench lined with FML. Drainage piping is provided along the lower edge of the municipal landfill cover to intercept the drainage water. This provides a positive outlet from the cover drainage layer, and directs the flow of water into two sediment basins located at the lower edge of the municipal landfill inside the fence just west of GA Highway 49 (see Figure 3.1). The sediment basins are designed for a storm frequency of ten years for the discharge piping (principal spillway) and 25 years for the emergency spill. Each basin is constructed with a 5-foot high perforated riser pipe embedded in a 5-foot square concrete slab. Emergency spillways are constructed of rip rap.

No subsurface drainage layer piping is necessary in the hazardous waste cover because of its small size.

Cover drainage piping and fittings are corrugated, polyethylene (PE), perforated pipes. Corrugated 6 inch PE piping is perforated

with the perforated openings covering 1% of the pipe area. Perforations are in the form of slots, 0.125 inches wide.

Missing or cracked end caps may allow debris in the pipe which could inhibit flow, thereby damaging the cover system. Overflow of sediment basins could cause flooding of Highway 49 or erosion of the surrounding areas.

3.9 Monitoring Wells

Monitoring wells at the site were installed during three separate field events. Diagrams of typical well constructions and a sample boring log for a shallow monitoring well are presented in Appendix E. Included in Appendix F are the well construction data, groundwater elevations, and water level measurements for the existing wells.

Grout seal inspections, water level and pH tests will be run on all permanent monitoring wells at the beginning of the O&M period to determine the integrity of the grout (cement/bentonite) seal. This will constitute the baseline inspection. Inspections will be conducted once every five years thereafter for the duration of the O&M care period. The purpose of these inspections is:

- Baseline: the baseline inspection will be used to evaluate the condition of the grout seal in each of the monitoring wells at the start of the O&M period. Any zones of inadequate grout bond, particularly in the existing wells which are several years old, will be detected and corrected at this time.

- Five Year Logs: Every 5 years during the O&M care period, grout seal inspections will be repeated in all monitoring wells. These inspection results will be compared to the baseline inspection results to determine if deterioration of the grout has occurred.

All grout seal inspections will be run under the supervision of, and be evaluated by, a geologist or engineer. If there is an indication that the grout seal has deteriorated, the grout seal will be repaired, replaced, or the well will be abandoned. Repair of the well will be accomplished by:

- Overdrilling the monitoring well to remove the old grout to a depth below that of the deteriorated grout as determined by the grout seal inspection.
- Regrouting the annular space using a cement/bentonite grout installed under pressure through a tremie tube from the bottom of the annular space to land surface.

Procedures for monitoring well replacement and abandonment are presented in Section 14.0.

3.10 Settlement Monitoring Stations

Settlement monitoring stations are designed to monitor landfill settlement after construction. A station consists of a riser pipe connected at the bottom to a small square HDPE liner pad which rests upon the FML. As the FML settles, the riser pipe and pad settle with it.

The bottom pad is a 3 foot square section of 40 mil HDPE FML. The pad material is the same as that specified for the FML liner. The riser pipe is rigid 4 inch polyethylene, produced in accordance with ASTM F405. The riser pipe is filled with a nonshrinking, nonrusting metallic aggregate grout. The riser pipe has a polyethylene collar extrusion welded to the pipe end. The collar is extrusion welded to the HDPE pad. The grout top is rounded and formed slightly above the top of the riser pipe. A brass monument stamped with a number is placed in the grout to identify the stations.

3.11 Alternate Water Supply System

The alternate water supply system is owned and operated by the Fort Valley Utility Commission. O&M procedures for the alternate water supply system will be conducted by the Fort Valley Utility Commission in the same manner as the other water systems under their control. These procedures involve such activities as standard maintenance and repair of pumping equipment, valves, structures, meters, etc.

Provisions for measuring and billing water will also be conducted by the Fort Valley Utility Commission as established in the 3-party Waterline Extension Contract.

4.0 ORDINARY O&M ACTIVITIES FOR LANDFILL COVER SETTLEMENT

Landfill settlement, if severe enough, can be detrimental to cover performance by causing sufficient strain in the FML to tear it, by trapping water in the drainage layer, or by causing storm water to pond on the cover. This section establishes criteria to determine when settled areas are to be repaired and presents general methods to detect cover settlement and to repair settled areas. Detailed procedures for field inspection and repair of cover settlement are presented in Section 15 of this O&M Plan.

Settlement of landfill cover systems is considered to take two forms: 1) differential settlement; 2) uniform or area-wide settlement. Differential settlement typically results from the collapse of voids or cavities in the landfilled waste materials in and around containers which have corroded or decayed. Differential settlement affects small areas, often the areas are only several feet across. Area-wide settlement is primarily caused by consolidation and secondary compression of bulk wastes under the load of the foundation soil and cover soil. Area-wide settlement usually affects the entire landfill or a major portion of it.

Differential and area-wide settlement are expected to be minimal at the hazardous waste landfill. The nature of the wastes deposited and the settlement pile load test conducted in 1989 indicate that settlement will be minor. The municipal landfill area which

contains a variety of municipal and industrial wastes, however, is susceptible to moderate differential and area-wide settlement. The fact that the landfills were closed 12 years prior to constructing the covers will reduce the potential for settlement of the covers.

4.1 Differential Settlement

Local and severe differential settlement can cause strain sufficient to rupture the flexible membrane liner (FML). Differential settlement may be manifested as a stepwise dropping of a roughly circular or elliptical area, generally no more than a few yards across, or it may be manifested as a more subtle sunken area (EPA/600/2-87/039).

Differential settlement is expected to be most severe at the municipal landfill boundary. A geogrid reinforcement material has been placed under the FML at the municipal landfill boundary to support the FML and cover soils above it if the landfill settles at the boundary. Because of the geogrid, the FML should be protected from damage due to settlement at the boundary.

4.1.1 Criteria to Initiate Repair

A model to simulate FML failure due to differential settlement, proposed by Dr. Robert Koerner of the Geosynthetic Research Institute (GRI), was used as a basis for the repair criteria. Dr.

Koerner suggested that FML response under differential settlement resembles geomembrane response under multiaxial tension tests. Multiaxial tension tests on 40 mil HDPE membranes (and also other materials) have been performed at GRI and are described below.

The tests performed at GRI consist of placing a circular geomembrane specimen between the halves of a pressure vessel and hydrostatically stressing the FML until failure occurs. A schematic diagram of the test apparatus is shown in Figure 1 of Appendix G. Pressure applied to the geomembrane specimen and centerline deflection are measured and strain is calculated, based upon the geometry of the deformed surface. This loading reasonably resembles the loading that an FML would experience in a landfill cover application with a circular void area below and the weight of the cover soils above.

To apply this model for the evaluation of differential settlement in the field, the FML strain at failure (rupture) in multiaxial tension must be known. In addition, a safety factor should be selected. Repair of the FML should be initiated before it fails. The safety factor provides the margin between when a settled area should be excavated and the FML repaired, and the point when the FML fails.

The strain at failure for HDPE liner material in multiaxial tension is reported to be 16% to 17% (EPA/652/4-89/022, page 31). GRI

evaluated HDPE membranes from four different manufacturers, with resulting strains at failure under multiaxial tension of 16%, 16%, 23% and 30% (Koerner). Because the strain at failure of the Powersville FML material was unknown at the time this manual was written, a 16% strain at failure was used in the settlement criteria developed in this manual.

Because there is no empirical data available on FML response to landfill settlement, a safety factor must be selected based on engineering judgement. A safety factor of 2.5 for multiaxial strain was discussed with Dr. Koerner by phone, and it was agreed to be appropriate. For the Powersville project, a safety factor of 2.5 for multiaxial strain will be used.

Summarizing the discussion to this point, the landfill cover at Powersville is to be repaired when strain under differential settlement, as modelled by the multiaxial tension test, exceeds strain at failure (16%) with a safety factor of 2.5, which is a strain of 6.4% (16% divided by 2.5). In short, a differentially settled area will be repaired when FML strain reaches 6.4%. To apply this, a correlation between FML strain and parameters that can easily be measured in the field is required.

The paper by Dr. Koerner (Koerner, et al) provides the relationship between centerline deflection (δ) of the geomembrane specimen in

the multiaxial tension test, the diameter of the specimen (L), and percent strain (ϵ).

To apply the geomembrane multiaxial tension model to monitoring differential settlement at Powersville, L and δ are measured in the field for areas which have undergone differential settlement. The L dimension is a measured distance across the depressed area at the shortest line passing directly over the deepest point (largest deflection). For unsymmetric depressions, L is derived by measuring the distance, a , directly above the deepest point to the closest edge of the settled area, then doubling that distance, i.e. $L = 2a$. The deflection, δ , is a measured distance from the original undeformed landfill surface to the deepest point of the depressed area. The measurements for determining a and δ are shown on Figure 4.1. The original landfill surface can be approximated by a taught cord or tape pulled across the depressed area.

The equations relating settled area diameter, L , deflection, δ , and percent strain, ϵ , have been solved for various L and δ values for strains of 6.4%, 12%, and 16%. The results are given in Table 4.1. These strains represent the following conditions:

$\epsilon = 6.4\%$ represents the lowest measured strain at failure (16%) with a 2.5 safety factor.

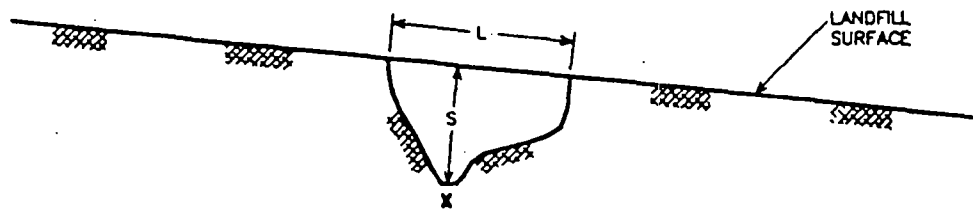
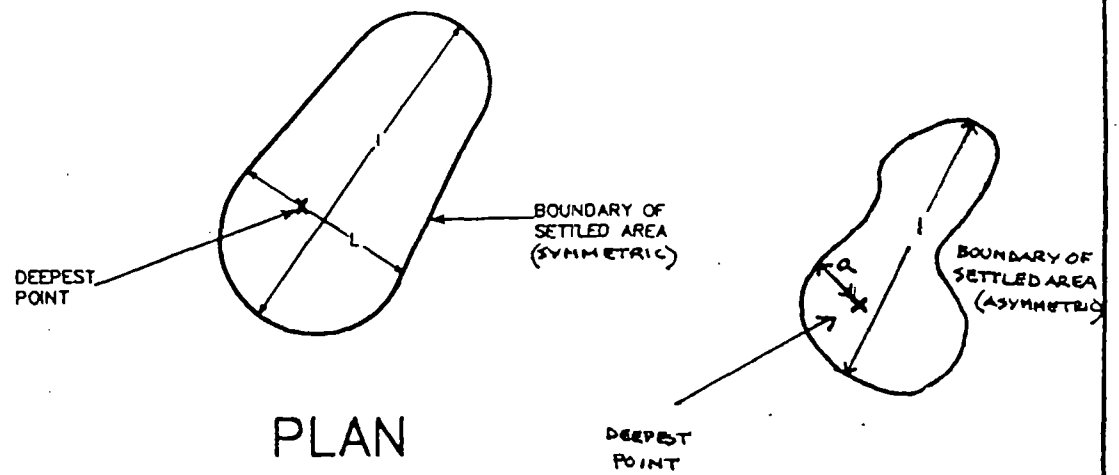


FIGURE 4.1

SCALE	 Applied Engineering & Science	DIFFERENTIAL SETTLEMENT AREA POWERSVILLE LANFILL NPL SITE	DATE
OWN. BY			DWG. NO.
CHK'D. BY			SHEET NO.
APPR. BY			

$\epsilon = 12\%$ represents the maximum measured strain (30%) at failure with a 2.5 safety factor.

$\epsilon = 16\%$ represents the lowest measured strain at failure with no (1.0) safety factor. This case represents when actual failure is expected to occur if a HDPE FML fails at the minimum measured strain (at failure) of 16%.

For any constant strain, the relationship between L and δ is linear. A plot of L vs. δ is shown in Figure 4.2.

As developed above, based on strain $\epsilon = 6.4\%$, the criteria to initiate repair for Powersville is when the L measurement divided by the δ measurement is less than 6.5, i.e., $L/\delta < 6.5$.

When inspecting for settlement in the field, it is not realistic to find, measure, and evaluate every area that appears to be depressed, no matter how small. It is desirable to have a minimum deflection criteria that would allow small shallow settled areas to be disregarded.

A minimum deflection criterion of six inches is a workable minimum in the field. With a 6-inch minimum deflection criteria, field inspection personnel would not consider for repair any depressed area that has a deflection less than 6 inches.

DEFLECTION OF THE GEOMEMBRANE

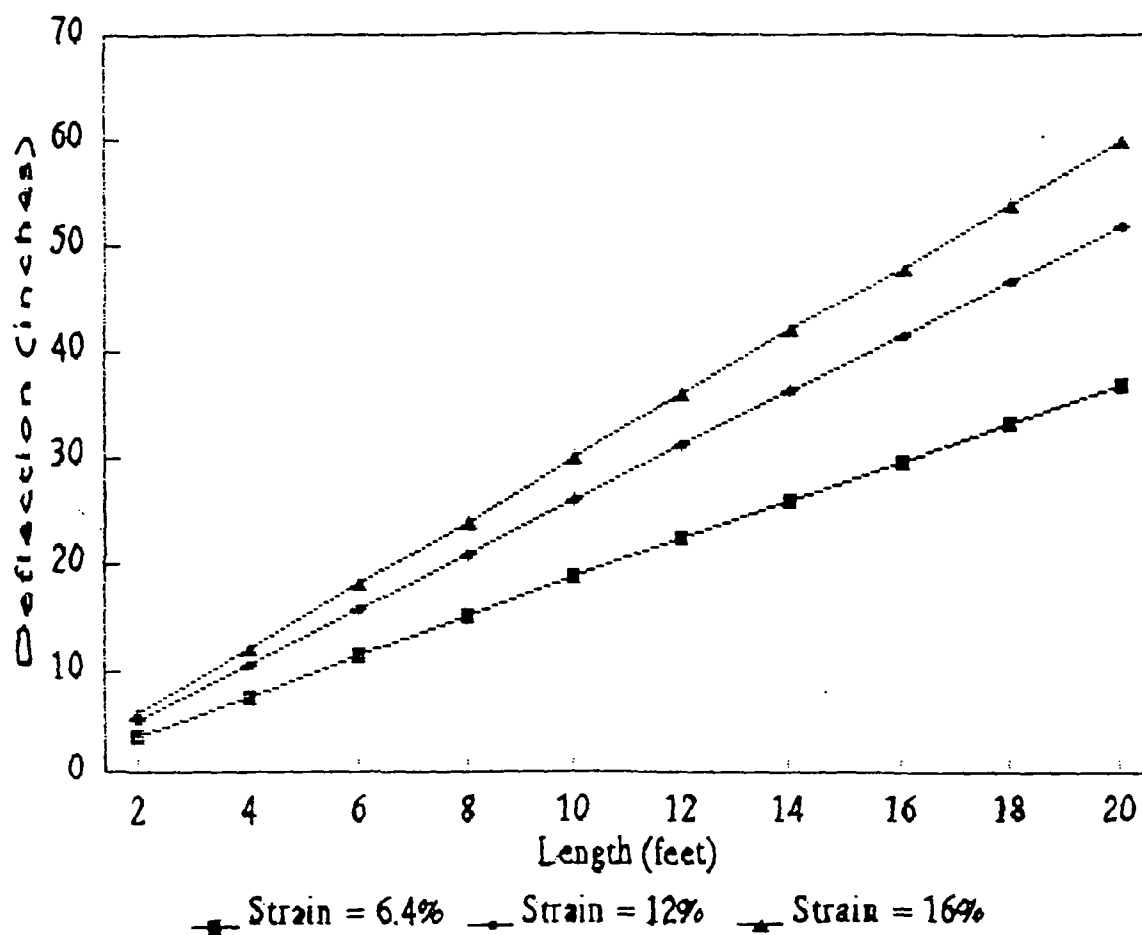


Figure 4.2

SCALE	 Applied Engineering & Science	Length vs. Deflection Relationship Powersville Landfill NPL Site	DATE
DWN. BY			DWG. NO
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Using the previously established criteria to initiate repair of $L/\delta < 6.5$, a depressed area with a deflection $\delta = 6$ inches corresponds to a $L = 3.25$ feet. For areas with L greater than 3.25 feet, the criteria $L/\delta < 6.5$ is the controlling criteria, and a 6-inch minimum deflection criteria has no effect on when the area is to be repaired.

For areas with L less than 3.25 feet, a 6-inch minimum deflection criteria would control. However, a 40 mil HDPE FML has sufficient strength to support a 3.5-foot depth of cover soil (as Powersville has) with a 3-foot diameter void underneath it. No noticeable deflection would be observed in the field. The strain and stress of the FML under these conditions is not large enough to damage the FML.

Thus, for Powersville, differentially settled areas will not be considered for repair unless the settled area has a deflection of 6 inches or more.

When an area of the cover settles, storm water may pond in the settled area depending on the extent of settling and the original slope of the cover at the settled location. Storm water may pond on both the cover surface and in the drainage layer above the FML. If the deflection of the settled area exceeds the criteria to initiate repair, the area will be repaired and ponding will be eliminated. If the deflection of the settled area is less than the

criteria to initiate repair, and the area continues to settle, it will eventually be repaired and ponding will be temporary. Other settled areas which cease further settlement will pond water indefinitely.

The volume of an 8-foot diameter settled area was calculated as an indication of how much water would be retained in a settled area. The settled area surface was taken to be spherical and the centerline deflection was taken to be at the limit to initiate repair, i.e., the maximum allowable deflection without requiring repair.

Diameter of settled area	8 feet
Deflection at maximum point	14.9 inch
Volume of water contained with:	
a. Landfill surface level	240 gallons
b. Landfill surface at a 8:1 slope	111 gallon

For comparison, 0.1 inches of rain over one acre is equal to 27,150 gallons. Differentially settled areas will retain only a small portion of a small rainfall.

Settled areas that do not meet the criteria for repair **are not to be filled with surface soil.** Their location will be noted and their settlement monitored in subsequent inspections. Filling the surface depression with soil is not acceptable because if the area continues to settle, it would be difficult to determine the strain condition of the FML. In addition, filling the surface depression with soil only prevents ponding on the surface; the depression in

the FML will pond water from the storm water percolating through the drainage layer from above.

4.1.2 Detection

Differential settlement can be detected by visual inspection. Depressed areas can be most easily observed after the cover vegetation is mowed. If δ is greater than 6 inches, dimensions a or L and δ are measured, and the settled area location measured from known permanent landmarks.

4.1.3 Repair Procedure

If the FML is suspected of being highly strained or torn, the only method available to determine the condition of the FML is to remove the cover soils and visually inspect the FML. When a differentially settled area meets the criteria to initiate repair, the area is to be excavated to the FML, the FML inspected, the deformed portion removed, and the foundation inspected and stabilized. The excavated area is to extend to the FML seams on either side and the seams are to be inspected. The FML section is to be replaced, seams tested, and the cover soils reconstructed as originally built.

For the first repair after 5, 15, and 25 years of O&M operation, the section of FML removed in the repair is to be sent to the FML

manufacturer or a testing laboratory to assess its general condition.

When the FML is to be removed, the work must be performed in accordance with a health and safety plan complying with 29 CFR 1910.120.

4.1.4 Revision to Criteria

As noted previously, the criteria to initiate repair for differentially settled areas is based upon a theoretical model and laboratory test data which simulates failure of the FML in the field. At this time, it is not known how well the criteria can predict when differentially settled areas in the field need repair (before the FML ruptures) but without designating unnecessary repairs. As more landfill covers with FMLs go into operation, field data are expected to become available which should be incorporated into the Powersville criteria to initiate repair. Thus, the criteria to initiate repair are to be reevaluated and, if necessary, revised after any of the following conditions occurs:

- Four depressed areas have been repaired at Powersville.
- The Powersville O&M program has operated for 5 years.

- EPA publishes guidance on O&M of landfill covers addressing repair of landfill covers.

4.2 Area-wide Settlement

As previously mentioned, area-wide settlement is primarily caused by consolidation and secondary compression of bulk wastes under the load of the foundation soil and cover soil. Area-wide settlement is also referred to as uniform settlement, although the settlement is not necessarily uniform. If landfill depth, compaction, and characteristics of the buried wastes vary, as is the case at Powersville, various areas will settle at different rates and different amounts. Area-wide settlement does not stress the FML and is anticipated to cause few or no problems with the FML (EPA/600/2-87/025). The major concern is ponding of storm water on the cover. If the FML has any holes in an area ponding water, the retained storm water could seep through the holes into the landfill.

Area-wide settlement of the hazardous waste landfill is expected to be minimal. During the cover design phase, a geotechnical study was conducted at Powersville to estimate area-wide settlement using an earthen settlement pile constructed upon the hazardous waste landfill. The predicted settlement was 1 to 2 inches for the

hazardous waste landfill. The hazardous waste area has a minimum slope of 10:1 (horizontal to vertical). With these slopes and based on the data obtained from the settlement pile, it is highly unlikely for area-wide settlement to result in ponding.

Also as part of the geotechnical study, three earthen settlement piles were constructed upon the municipal landfill area. The predicted settlement there was 4 to 9 inches. For the municipal landfill cover at Powersville, 8.5 acres of the 10-acre cover have slopes of 10:1 or greater. With the landfilled waste depth ranging from 10 feet to 30 feet and based on the data obtained from the settlement piles, it is highly unlikely for area-wide settlement to result in ponding on the steeper areas.

One cover area that has potential for ponding water due to area-wide settlement is an approximately 1.5-acre section of the municipal landfill northwest of Lizzie Chapel. The cover slopes there were constructed to 33.3:1 and 22.5:1 (3% and 4% slope respectively).

Steeper areas of the municipal landfill cover were constructed with terraces across the slope. The terraces are intended to intercept storm water runoff and divert it off the cover while the vegetative cover is being established. Once the vegetation is established, the terraces were no longer needed and do not have to be maintained. The terrace flow channels were constructed with a

slope of 0.5%. A slope this flat is susceptible to ponding from area-wide settlement.

4.2.1 Criteria to Initiate Repair

EPA publications on design, construction and maintenance of landfills and landfill covers were reviewed, and the EPA Superfund hotline was contacted. No discussions were found concerning criteria to initiate repair for area-wide settlement.

EPA guidance for covers for hazardous waste landfills recommends a minimum slope of 3% for the cover surface and FML after settlement (EPA/530-SW-89-047). The 3% slope for the cover surface is, according to this EPA guidance document, "to prevent ponding of rainwater due to irregularities of the surface...". Although 3% is a minimum design slope, that does not automatically make it a repair criteria. Minimum design values usually have safety factors so that there is some margin for degradation before failure occurs.

When settlement reduces the cover slope to less than 3%, the following results:

- Surface runoff slows.
- Irregularities pond more water.
- Water movement through the drainage layer slows.

When settlement produces a reverse slope and ponding, the following results:

- Ponded water acts as a reservoir which leaks through any hole below the ponded area by providing a higher hydraulic head above the hole.
- The area becomes swampy for long periods, not supportive of cover vegetation, and susceptible to damage when driven over or walked upon.

(As used here, positive slope means a slope which directs runoff off the cover; a reverse slope means a slope that directs runoff to an interior area of the cover.)

Storm water will drain off a cover as long as it has even the slightest positive slope. The steeper the slope, however, the faster the storm water will run off and the less storm water will infiltrate through the surface soils.

Runoff velocities may be estimated by the Uplands Method, used in hydrology to calculate travel times for overland flow (American Iron and Steel Institute). Table 4.2 gives runoff velocities for hay meadows using the Uplands Method:

TABLE 4.2
RUNOFF VELOCITIES

Land Slope	Velocity, feet/sec	Velocity, feet/day
3%	0.43	37,200
2%	0.36	31,000
1%	0.26	22,500

Thus, all surface water will essentially run off within a day after rain stops for any minimally positive slope.

In addition to slower run off, flatter slopes result in more water being retained in small surface irregularities. The water retained in irregularities would drain into the soil; it would not stand on the surface for any length of time. Infiltration thus would be increased.

Flatter slopes decrease water velocity as it flows through the drainage layer. The velocity of water flowing through a drainage layer with 5×10^{-3} cm/sec permeability at small hydraulic gradients is given in Table 4.3 (The permeability of the Powersville drainage layer was specified as 1×10^{-3} cm/sec minimum.)

Table 4.3
WATER VELOCITY IN DRAINAGE LAYER*

Hydraulic gradient	Velocity feet/sec	Velocity feet/day
3%	14.7×10^{-6}	1.27
2%	9.9×10^{-6}	0.85
1%	5.0×10^{-6}	0.43

*. Calculated from

$$v = \frac{k}{\eta} \left(\frac{dh}{dl} \right)$$

$v = \text{velocity, } \frac{\text{cm}}{\text{sec}}$
 where $k = \text{permeability, } \frac{\text{cm}}{\text{sec}}$
 $\eta = \text{porosity, dimensionless}$
 $\frac{dh}{dl} = \text{hydraulic gradient, } \frac{\text{ft}}{\text{ft}}$

The water that infiltrates the cover surface soil collects in the drainage layer. It flows along the FML in the direction of downward slope. The infiltrated water remains in the drainage layer until it is intercepted by a drainage pipe. The infiltrated water is conveyed off the cover via the drainage piping. With infiltrated water generally having to flow several hundred feet before reaching a drainage pipe, the drainage layer stays mostly saturated in the few inches above the FML irrespective of the slope when hydraulic gradients are at or less than 3%.

Even though the models discussed above for surface runoff and flow through the drainage layer are simplified, they apply adequately to conclude that when area-wide settlement reduces the cover slope below 3% cover performance is degraded some but not significantly. There is, however, significant reduction in cover performance when reverse slopes occur over large areas. Considering this, the criteria selected to initiate repair of area-wide settlement at the Powersville Landfill are as follows:

- Settled areas will be repaired when settlement reduces the slope to level, or
- When an area with reverse slope is formed (ponding condition).

In addition to criteria to initiate repair, criteria must be selected which identify area-wide settlement, distinguishing it as a ponding concern from differential settlement which threatens the integrity of the FML. It is not necessary to repair every small area that ponds under the criteria for area-wide settlement.

In the absence of published guidance addressing how large a settled area must be to be considered area-wide settlement, the criteria distinguishing the types of settlements for the Powersville Landfill will be made considering what size area is expected to be larger than that caused by the collapse of voids or cavities. (Differential settlement is caused by collapse of voids or cavities; area-wide settlement is caused by consolidation and compression of the landfilled wastes.) For Powersville, settled

areas with minimum dimensions (L) of 20 feet or more will be considered area-wide settlement.

Repair for area-wide settlement under certain circumstances will consist of filling the settled area without inspecting or repairing the FML. These circumstances are discussed in subsequent sections. Differential settlement areas, however, are not to be filled. Settlement of these areas is to be monitored to ensure that the FML is not threatened. If these areas were filled, the effect of continued settlement could not be reliably monitored. It could not be determined when the potential for damage to the FML is approached. These smaller, differentially settled areas will be allowed to pond storm water.

4.2.2 Detection

Area-wide settlement can be detected by visual observation, with particular attention to the level areas extending 20 feet or more in the direction of the original slope or 20 feet or more of reverse slope. The settlement monitoring stations may provide an indication that area-wide settlement has occurred. However, area-wide settlement may occur at places where there are no settlement monitoring stations. A settled area, suspected to be area-wide settlement, is to be surveyed only if it is not visually obvious that an area is level or it has a reverse slope. If an area must

be repaired, the areal extent and locations of the area requiring repair are to be surveyed.

4.2.3 Repair Procedures

The most detrimental aspect of area-wide settlement is that storm water does not run off, but ponds on the settled area. The surface runoff problem can be remedied by filling in the settled area with soil and revegetating. This repair leaves the FML with a level or reverse slope. Although the level or reverse slope is not desirable, the alternative of removing and replacing the cover over the settled area is difficult, expensive and exposes potentially hazardous material to the atmosphere.

For Powersville, a two-method repair procedure has been selected. The first repair to an area-wide settled area is to be made by filling the settled area with soil to reestablish original grades. The location of the repaired area is to be recorded. If an area that has been repaired once by filling with soil continues to settle and its minimum slope again meets the criteria for repair, accumulated settlement will be considerable. The area, once repaired by filling with surface soil, will not be repaired in the same matter again. After one repair, the cover in the settled area is then to be removed, the foundation stabilized if needed, built-up, and the cover reconstructed.

When the FML is to be removed, the work must be performed in accordance with a health and safety plan complying with 29 CFR 1910.120.

4.3 Settlement of Drainage Pipe Outlets

Drainage pipes in the cover drainage layer collect and drain storm water that infiltrates through the cover surface soil. The drainage pipes exit the cover at three locations on the low side of the landfill cover (the east side). If the drainage pipes settle sufficiently at the exit, water will not drain completely from the drainage layer. Either differential or area-wide settlement can be responsible for inhibiting discharge of water from the drainage pipes.

4.3.1 Criteria to Initiate Repair

The drainage pipes will be installed with a downward slope so water flows out of the pipes. A drainage pipe is to be repaired when sufficient settlement has occurred to result in the pipe becoming level or establishing a reverse slope (See Figure 4.3).

Even when a drainage pipe is level or at a reverse slope, the pipe is open to the atmosphere and will drain water from the cover drainage layer, although some ponding will occur at the cover edge

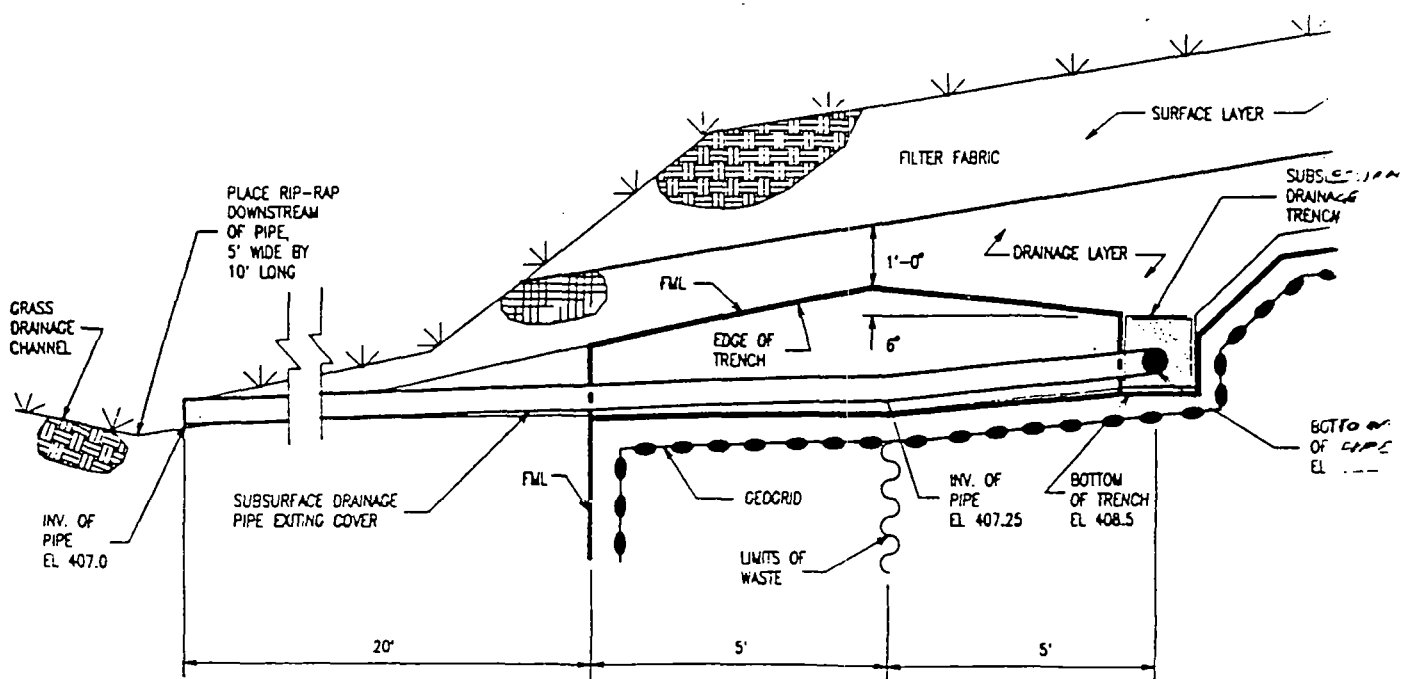


Figure 4.3

SCALE	 Applied Engineering & Science	Drainage Pipe Outlet Powersville Landfill NPL Site	DATE
OWN. BY			DWG. NO
CHK'D. BY			SHEET NO
APPR. BY			

in the vicinity of the pipe outlet due to the rise of the drain pipe.

The actual amount of settlement which will cause the outlet pipe to become level depends upon the initial installed elevations at the location of the settlement station and at the point the pipe crosses the landfill boundary. Actual elevations of these points will be surveyed before the remedial action is complete in accordance with the specifications. Based upon design elevations, repairs are to be initiated when settlement reaches 1.0 to 1.5 feet, depending upon the location.

4.3.2 Detection

Settlement monitoring stations have been installed at the three drainage pipe discharge points. Settlement is determined by surveying the elevation of the settlement stations at the drainage pipe outlets and comparing the current elevation with the installed elevation.

4.3.3 Repair Procedures

To repair settlement of the drainage piping, the landfill cover is to be removed over the drainage pipes, the drainage pipe and FML in the trench removed, and the trench deepened to slope the drainpipe

downward toward the cover boundary. The FML, drainage pipe, and cover soils are then to be reconstructed as originally built.

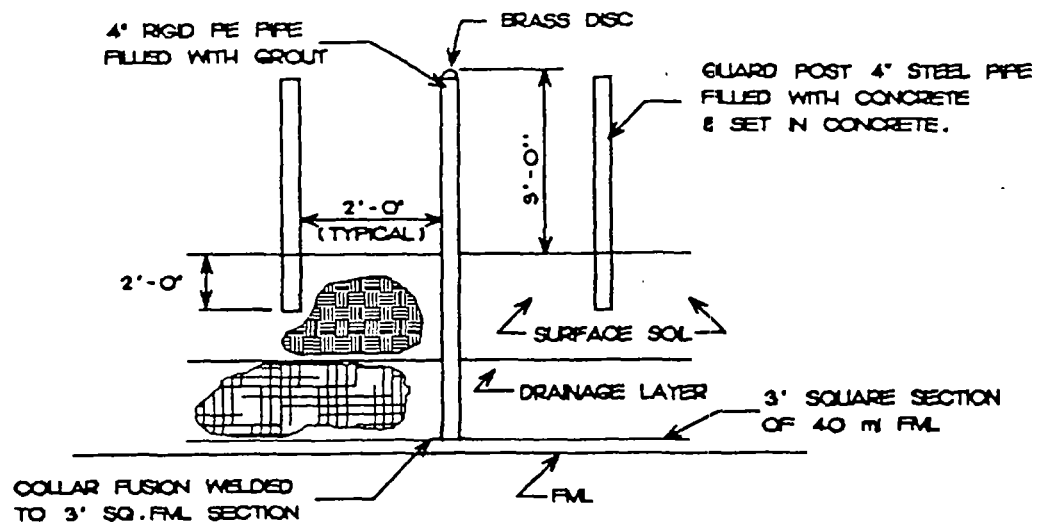
The drainage channel conveying water off the cover may need to be deepened to accommodate the lowered drainage pipe.

When the FML is to be removed, the work must be performed in accordance with a health and safety plan complying with 29 CFR 1910.120.

4.4 Settlement Monitoring Stations

Settlement monitoring stations are designed to monitor landfill settlement after construction. A station consists of a riser pipe connected at the bottom to a small square HDPE liner pad which rests upon the FML (Figure 4.4). As the FML settles, the riser pipe and pad settle with it.

The municipal landfill cover has 14 monitoring stations, including the three at the drainage pipe outlets. Four will be located along the western landfill boundary, approximately 20 feet inside the boundary. The waste is deepest in this region and the greatest differential settlement is expected in this area. Four other stations will be distributed over the municipal landfill cover surface. Two monitoring stations will be installed on the



DETAIL
SETTLEMENT MONITORING STATION

FIGURE 4.4

SCALE	 Applied Engineering & Science	SETTLEMENT MONITORING STATION POWERSVILLE LANDFILL NPL SITE CANADYNE-GEORGIA CORP.	DATE
OWN. BY			DWG. NO.
CHK'D. BY			SHEET NO.
APPR. BY			

5.0 EXTRAODINARY REPAIRS

Extraordinary repairs, if necessitated by the conditions described in Section 1.1, must be conducted in accordance with the requirements, criteria, and procedures developed for ordinary O&M activities. For example, if a hurricane causes severe damage to a site structure, repair of the structure must be conducted according to the requirements for ordinary O&M for site structures, as described in Sections 3.0 (Ordinary O&M Activities for Site Structures) and 18.0 of the O&M Manual (Procedures for Site Structure Maintenance). In addition, extraordinary repairs must meet the requirements described in this O&M Plan for reporting, data management, post-closure certification, schedule, etc., which are required for all O&M activities.

6.0 REPORT REQUIREMENTS AND DATA MANAGEMENT

The following section describes how the results of sampling and field measurements shall be documented, tracked, and reported. O&M document procedures, filing requirements, and report formats used to report data and conclusions are presented.

6.1 Data Record

The data record shall be the accumulation of documents and records generated during the O&M activities, which establish the quality of post-closure care over the 30 year O&M period. The data record shall be available to EPA and its contractors (via the O&M Administrator) at any time during the O&M activities. The record shall include, but not be limited to, the following documents, prepared immediately following the event to which they pertain.

- Sampling and analysis records
- Field logbooks
- Data sheets
- Calibration logs
- Engineering logs
- Chain-of-custody records
- Contracts
- Bills of lading
- Trucking logs
- Correspondence
- Other pertinent information

Documentation of the data record shall be maintained by the O&M Administrator (CGC).

Documentation of the data record shall be maintained by the O&M Administrator (CGC).

6.1.1 Field Logs

All information pertinent to the field activities shall be written in a bound logbook with consecutively numbered pages. Entries shall include, but not be limited to, the following:

- Date and time
- Purpose of activities
- Groundwater information
 - Groundwater level
 - Conductivity
 - pH
 - Temperature
- Samples collected
 - Description of sample
 - Number and size of sample collected
 - Location of sampling point
 - Date and time of sample collection
 - Sample ID number
 - Analyses to be performed
 - Collector's name and affiliation
- References to maps or photographs of site
- Routine field observations
- Routine inspections
- Cover settlement observations
 - settlement location with regard to permanent markers
 - the measurements of L/δ , l , and d
 - the corresponding settlement station elevations
 - calculation of the settlement

- a sketch of the proportions
- a sketch of the cross-section
- Inspection, maintenance and repair of site structures
 - Structures inspected
 - Inspection procedures
 - Maintenance performed
 - Drainage pipe test results
 - Record of major repairs
- Field monitoring measurements

Logbook entries should be as descriptive and inclusive as possible. Language shall be objective, factual, and free of inappropriate terminology. Any individual making an entry into the logbook must sign and date the entry. All entries shall be made in blue or black indelible ink. Blank lines and spaces shall be crossed out and errors and mark-outs in the logbook shall be initialed.

Field logbooks shall be numbered and a record of the books and the purpose for each book shall be listed and kept in the main files. Logbooks that pertain to sampling do not necessarily have to be the same logbooks that pertain to inspections, etc. However, if there are multiple logbooks, these shall be recorded and filed.

6.1.2 Photographs

Photographs may be used to provide a record of observations at the site. Photographs shall be documented so that they become a valid representation of the existing condition. The following

information regarding photographs shall be recorded in the field logbook:

- Date and time
- Signature of photographer
- General direction faced and description of the subject
- Sequential number and film roll number

Photographs shall be taken with a camera lens system with a perspective similar to that afforded by the naked eye.

6.1.3 Data Sheets

Calibration of field instruments shall be recorded in the field logbook but also on a calibration log form for that particular instrument. Information included on the form shall include: type of instrument; serial number; model number; type of calibration; calibration gas type; concentration and lot number; date; initial reading; final reading; calibration setting; any comments; calibrator's initials; and other information exclusive to the particular instrument.

Routine maintenance of the landfill cover shall be recorded on maintenance logs (see Appendix I). Information on the form includes:

- Date of mowing
- Date of fertilization and amount used
- Date of soil replacement
 - Amount of soil
 - Location
- Date of reseeding and mulching
 - Amount used
- Application of weed, insect, or rodent control
 - Date
 - Type chemical (name, concentration, brand, lot number, expiration date, etc.)
 - Amount used

Cover settlement should be recorded on a standardized form developed for this purpose (see Appendix I). Information to be included on the form shall be: the settlement location with regard to permanent markers; the measurements of L , L/δ , l , and δ ; the corresponding settlement station elevations; calculation of the settlement; a sketch of the proportions: a sketch of the cross-section. Information recorded on the forms shall also be recorded in the field logbook. Locations of settled areas and repaired areas shall be recorded on an area-wide blueprint of the site. Copies of the updated blueprints shall be stored with the main files.

O&M activities for site structures shall include Inspection and Maintenance Reports, Drainage Pipe Test Reports, and Record of Major Repair Reports.

Inspection and Maintenance Reports shall include the following data:

- Structures inspected and STET condition, including description and location of all structures requiring maintenance or repair
- Inspection procedures used
- Maintenance procedures performed and date
- Date repairs performed
- Activities included in the repairs

Drainage Pipe Test Reports shall include description of procedures, results of tests, and date the tests were conducted. The Record of Major Repair Reports shall include a description of the problem prior to repair, the actual repairs, and the dates the repairs were performed.

If monitoring wells need to be redrilled and installed, a boring log and a drilling report shall be completed. The boring log shall be similar to the logs included as an appendix to this plan. Information shall include but not be limited to; date; drilling method; well number; driller and drilling company; concrete pad elevation; top of casing elevation; static water level; well casing diameter, length, and type; centralizer; well screen diameter, length, and type; slot size; type of drilling fluid; filter pack, seals and grout; development water volume; a description of the

soil depth and elevation; well sketch; and comments. The drilling report shall include: method of drilling; hole diameter; total footage of borehole; sample interval; start and end of drilling, sampling, and well installation; number of 55 gallon drums filled; PVC surface casing, lot number, length, and diameter; well material (type, length, diameter; lot number); well screen (type, length, diameter, lot number); sand pack; bentonite seal; grout seal; well development method; hours and water quality; well completion (pad, cover, lock, and guard posts); pertinent remarks; signatures of the field representative and drilling foreman.

6.2 Record Management

Copies of results of chemical analyses and field monitoring activates will be collected by the O&M Administrator. The results of chemical analyses should be arranged in tabular displays for each sample collected by sample number, lab ID number, location, collection date, type, and depth of well, etc. Data should be stored on the basis of parameters of interest and data summaries. Field monitoring parameters and results such as depth to water, groundwater flow direction and rate, HNu readings, should also be maintained.

6.3 Required Deliverables

Regular reports on the O&M activities shall be submitted to EPA by the O&M Administrator. The reports shall include at a minimum: maintenance activities for the landfill covers; groundwater monitoring results; copies of field notes and data sheets; graphical displays (if generated); and a descriptive narrative of significant events and problems encountered during the past reporting period. Included in the reports shall be the determination of the groundwater flow rate and the direction in the surficial aquifer.

The O&M reports shall be submitted to EPA until the end of the O&M period and/or the termination of the Consent Decree. When groundwater samples are collected, reports submitted shall contain sampling results from the previous season/sampling event.

7.0 POST-CLOSURE NOTICES AND FINANCIAL ASSURANCE

7.1 Notices

There are two types of post-closure notices which must be on file to comply with 40 CFR 264.119. The first is a Record of Waste which is filed with the local zoning authority and the second is a notation on the deed.

7.1.1 Record of Waste

A Record of Waste shall be submitted by the O&M Administrator to the local zoning authority and EPA 60 days after the final completion of the Remedial Action. The record will contain the type, location, and quantity of hazardous waste disposed within each fill area. Since wastes were disposed prior to January 12, 1981, the record shall contain information to the best of knowledge and in accordance with prior records and reports.

Information for the Record of Waste can be gathered from the following source:

Remedial Investigation/Feasibility Study Final Report, Camp Dresser & McKee, Inc., January 1988.

- Appendix B of the RI/FS contains a list of the types and quantities of wastes placed in the hazardous waste landfill area from 1975 until the landfill ceased operation. The RI/FS states that there are apparently no records prior to 1975.
- The list was enclosed in an undated letter from Ed Chambliss, Plant Manager of Woolfolk Chemical Works, Inc. to Howard Barefoot of Georgia EPD.

The Record of Waste will be submitted to the Peach County Superior Court Records and will remain on file with that agency and the EPA.

7.1.2 Notation on Deed

A Notation on the Deed will be filed in accordance with State and/or local law within 60 days of final completion of remedial actions. The notation will state that the land has been used for the management of hazardous wastes and that it is restricted under 40 CFR 264 Subpart G regulations. A certification will be filed which states that the notation, a survey plat and a record of the type, location, and quantity of wastes disposed at the property have been filed with the local zoning authority. The certification will be signed by the O&M Administrator, notarized, and a copy will be forwarded to EPA. The Notation on Deed will be submitted to Peach County Superior Court Records and will remain on file with the Court and the EPA.

7.1.2.1 Placement of Deed Restrictions

Properties between the site and the unnamed tributary to Mule Creek (including the property designated as the site) are required by the ROD to have deed restrictions placed on them to prohibit the drilling of water wells. These lands are considered by the ROD to be potentially affected by the site because of groundwater contamination. A study was conducted to determine the properties which would be subject to the deed restrictions. The results were presented in Deed Restrictions, December 1989.

The offsite properties subject to deed restrictions are those properties included in the area bounded on both sides by a line marking the lateral extent of contamination as predicted by the contaminant transport computer model (Figure 7.1). This area encompasses all the properties between the site property line and the tributary to Mule Creek. The properties to be placed under deed restrictions consist of four entire parcels and three partial lots. A list of property owners subject to deed restrictions is provided in Table 7.1.

One deed restriction is outstanding due to the owner's unwillingness to have a deed restriction placed on the property. EPA made minor changes to the requirements of the ROD since other property restrictions were in place. These changes are explained on page 1-13 of this document.

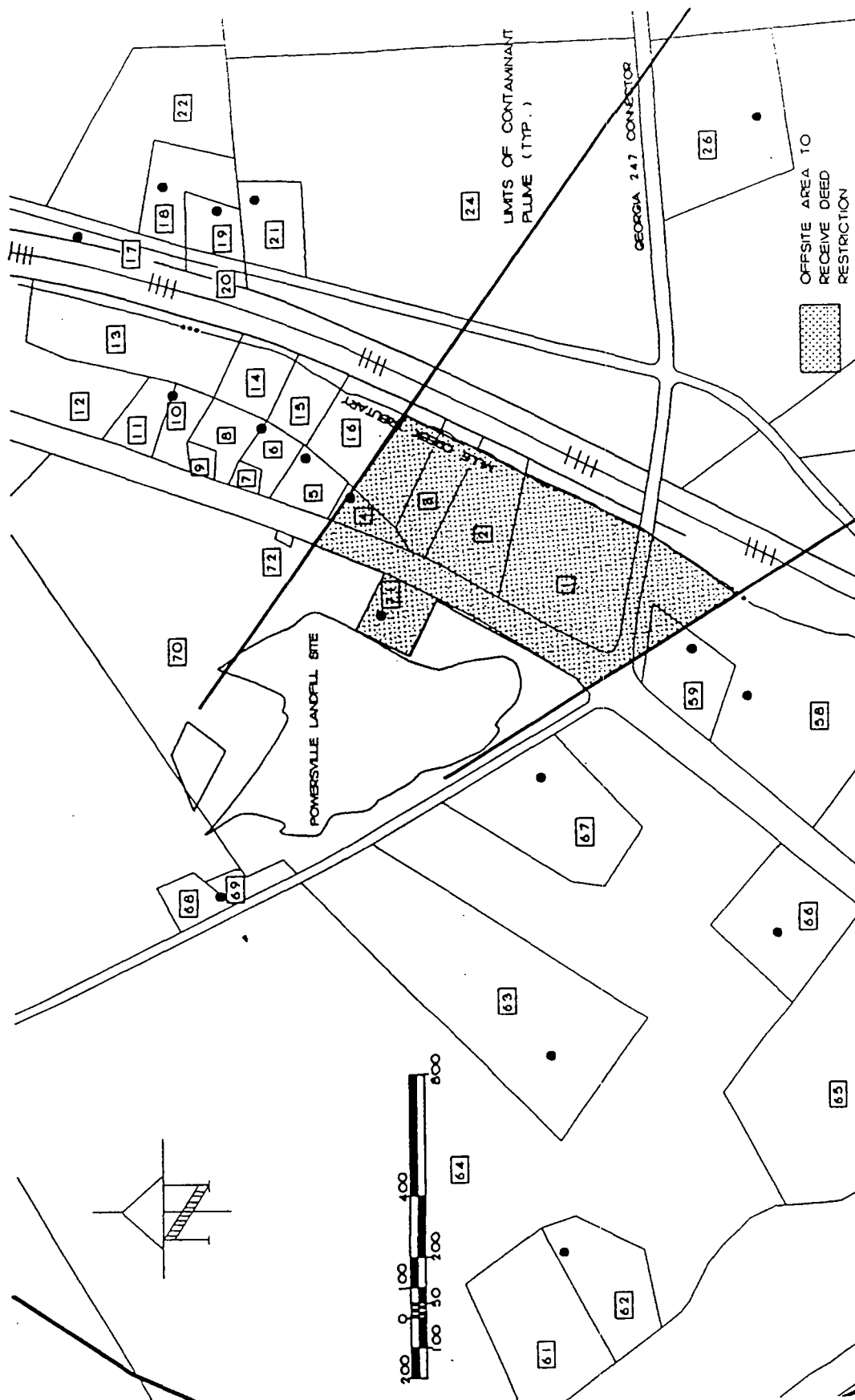


FIGURE 7.1

SCALE

W.N. BY GOE

CHK'D. BY GEW

APPR. BY TK



**Applied
Engineering &
Science**

AREA TO RECEIVE
DEED RESTRICTIONS
POWERSVILLE LANDFILL
NPL SITE

DATE

DEC., 1989

DWG. NO.

5079A

SHEET NO.

Table 7.1

POWERSVILLE PROPERTIES SUBJECT TO
DEED RESTRICTIONS

Property No.	Property Owner
1.	Ola May Watson Sanders
2.	Freddie Lee Cobb
3.**	Adele V. Hogan
4.	Felton Mobley
16.	Odell B. & Ira Dowson
58.	Mrs. Leon Hurdle
59.	Mary Ruth Hurdle Suggs
70.	Peach County
71.	Lizzie Chapel Baptist Church

**A Deed Restriction is not required for this property at this time since EPA made minor changes to the ROD as a result of other property restrictions being in place. See page 1-13.

7.1.2.2 Restrictive Covenant Agreement

The mechanisms for executing the deed restrictions are restrictive covenant agreements, which are currently being implemented by the County. When procedures are completed, the covenants for the Peach County property (the site) will serve as the Notation on Deed. The Peach County restrictive covenant agreement states that the property contains hazardous substances as defined by the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. Section 9601. It also states that acts such as drilling or construction activities which could compromise the integrity of the final cover, or any component of the containment

or treatment system, or the function of any monitoring system, are prohibited. The covenants will remain in effect for a period beginning when the agreement is executed and ending after twenty years. The agreement shall be renewed by the O&M Administrator for subsequent periods of twenty years, without the execution of any future documents.

7.2 Access Agreements

Several access agreements will be acquired by CGC in order to maintain the cover systems and to sample and maintain the monitoring wells. Residents supplied with alternate drinking water will follow requirements set forth by the Fort Valley Utilities Commission.

Access to property outside the site is crucial to maintain the integrity of the cover systems and the monitoring well network. Properties involved include:

- the site, which will be maintained by Peach County.
- private property along the northern boundary of the Hazardous Waste Landfill. The fence line follows the property line, therefore access of approximately 20 feet on the north side of the fence is necessary for maintenance of the cover and the fence. Also, a monitoring well used in the groundwater monitoring network is located on this property.
- the Peach County property outside and northeast of the site in order to access the maintenance road and sample and maintain monitoring wells.

- Lizzie Chapel property for the maintenance and sampling of a monitoring well included in the network.
- the private property of Mary Hurdle on the south side of the site for the maintenance and sampling of a monitoring well.
- a field on the north side of the site for the maintenance and sampling of two wells in the network.
- The private property of the Adams which is located southwest of the site for the maintenance and sampling of groundwater monitoring wells.

7.3 Financial Assurance

Financial assurance will be established for post-closure care in accordance with an approved post-closure plan (O&M Plan) for the Powersville site, as mandated by the Consent Decree, Civil Action No. 88-310-1-MAC (WDO), December 1988. There are eight options for establishing financial assurance under 40 CFR 264.145: post-closure trust fund, surety bond guaranteeing payment into a post-closure trust fund, surety bond guaranteeing performance of post-closure care, post-closure letter of credit, post-closure insurance, financial test and corporate guarantee for post-closure care, use of multiple financial mechanisms, and use of a financial mechanism for multiple facilities.

Section VII E of the Consent Decree states:

"The County shall be responsible to, and hereby covenants in favor of CGC that it will, conduct and fund ordinary O&M activities undertaken in connection with the remedial work and ordinary post-closure requirements, as set forth in the O&M Plan, but not including the provision of a financial assurance mechanism for post-closure care; provided, the County's responsibility hereunder shall not include extraordinary repairs in excess of \$5,000 in any 12-month period, and that such repairs shall be the sole responsibility of CGC; provided further, that this exclusion shall be inapplicable in such proportion as such repairs are caused by the negligence of County, its employees and agents."

CGC has established financial assurance for remedial action activities by posting a \$4 million letter of credit. The letter of credit is revised annually on its anniversary date. When EPA provides written notification that the Remedial Action is complete, the letter of credit will be revised to include O&M activities.

8.0 POST-CLOSURE CERTIFICATION

In accordance with 40 CFR 264.120, an independent registered professional engineer must certify that the post-care requirements for the site were conducted in accordance with the O&M plan. The purpose of the certification is to verify that the activities were conducted in accordance with the plan and that terminating the post-closure care period will not pose a threat to human health and the environment.

8.1 Requirements

The certification of post-closure will be prepared by the O&M Administrator and submitted to EPA within 60-days following the completion of the O&M period. In addition, periodic inspections of the site will be conducted to certify that the maintenance is in accordance with the plan. At the end of the post-closure care period, the O&M Administrator shall conduct a review of all pertinent data and records (provided by the County and EPD), and submit a report on the findings to EPA. Certification of post-closure shall be conducted after the report is reviewed and commented on by the O&M Administrator. A final report shall be submitted to EPA by the O&M Administrator.

8.2 Data Record

The data record shall be the documents and records generated during the required 30-year care period as discussed in Section 6.0. The record may include, but not be limited to, the following:

- Sampling and analysis records
- Field logbooks
- Data sheets
- Calibration logs
- Engineering logs
- Chain-of-custody records
- Contracts
- Bills of lading
- Trucking logs
- Correspondence
- Other pertinent information

Also available will be the previous documents generated for the Powersville Landfill NPL Site. These documents are listed in Appendix H, References.

8.3 Frequency of Inspections

The O&M Administrator shall submit inspection results to EPA at a minimum of once every five years, excluding the first and second years when inspection reports shall be submitted at least annually.

8.4 Release from O&M Activities

EPA will notify the O&M Administrator within 60 days of receipt of the Post-Closure Certification, that there is no longer a need to maintain financial assurance.

If EPA has reason to believe that the post-closure care was not conducted in accordance with the approved O&M Plan, EPA shall provide the O&M Administrator with a detailed written statement which outlines these reasons.

9.0 SCHEDULE FOR ORDINARY O&M ACTIVITIES

The following schedule provides the major tasks and deadlines. Timeframes for activities are approximate and correspond with the frequency of tasks discussed in subsequent sections. Severe damage, catastrophic events, and some minor items such as watering of the cover vegetation, etc., have not been included since these events do not occur on a regular schedule.

9.1 Groundwater Monitoring

Groundwater monitoring of the wells in the monitoring well network will be conducted on a quarterly basis for the first and second year following construction. After the first two years, the groundwater monitoring frequency will be reevaluated.

Quarterly sampling events shall occur in the months of March, June, September, and December unless otherwise approved by EPA.

Monitoring wells in the network shall be inspected for physical deterioration at least every 5 years. Repairs shall be performed soon after the inspection determines repairs are necessary.

9.2 Maintenance of Vegetation

Mowing of the covers and other vegetated site areas shall be conducted twice per year, once in the spring and once in the fall after the cover has reseeded, preferably in April and November. In the first year, the Rye Grass is expected to grow in before the Bahia Grass and the Lespedeza Sericea. It is important to mow the Rye Grass in the early spring (April) to allow the remaining grass to germinate later.

Fertilization of the cover shall be conducted once per year. The pH of the soil shall be maintained during the post-closure care period. Lime may be needed to maintain the pH between 6 and 7 and shall be conducted every four to six years as necessary.

9.3 Cover Settlement

Inspection and monitoring for cover settlement shall be conducted quarterly for the first two years, and semi-annually thereafter. The ROD recommends that "inspections be conducted frequently in the first six months...". Applicable regulations do not specify an inspection schedule. For Powersville, the period of frequent inspections was extended to two years so as to include two climatic cycles.

The cover shall also be inspected after extreme weather events. Inspection shall be conducted after mowing the vegetation whenever possible. Surveying the settlement stations is included in the inspection for cover settlement.

Repair of cover settlement shall be conducted as soon as practical after repair is found to be required.

9.4 Site Structures

The following structures shall be inspected semi-annually:

- Concrete channels
- Rip Rap
- Fence and signs
- Drainage areas
- Benchmarks
- Gas vents
- Settlement monitoring stations
- All guard posts
- Cover drainage pipes cleanout ports

The maintenance roads shall be inspected annually. Cover drainage pipes shall be inspected for collapse once every five years. Benchmarks shall be resurveyed every 10 years.

Repairs shall be performed as soon as reasonably possible after the inspection reveals the need for repairs.

9.5 Gas Production Monitoring

Each gas vent will be monitored semi-annually for the first two years of the O&M period. The monitoring of the gas production can then be limited to annually.

If after five years of monitoring annually, the levels of gas produced are asymptotic when plotted, the monitoring shall be discontinued for the remainder of the O&M period.

9.6 Cost Estimate Updates

As required by 40 CFR 264.144, the cost estimate shall be updated annually.

9.7 Deed Restrictions

The deed restrictions/covenant agreements remain in effect for a period beginning when the deed restrictions/agreements are executed and ending after twenty years. These shall be renewed for subsequent twenty year periods.

One deed restriction is outstanding due to the owner's unwillingness to have a deed restriction placed on the property. EPA made minor changes to the requirements of the ROD since other property restrictions were in place. These changes are explained

on page 1-13 of this document. EPA also requested that the Peach County/Fort Valley Building and Zoning Office notify EPA should the zoning restriction on this property be changed. In addition, Section 19 of the O & M Manual requires that EPA be notified should such a change occur.

9.8 Deliverables

Regular reports shall be submitted to the O&M Administrator during the O&M period, as described in the O&M Plan. The O&M Administrator will coordinate submittal of the reports to EPA.

10.0 COST ESTIMATE FOR ORDINARY O&M ACTIVITIES

The following detailed cost estimate is based on the activities described in this O&M Plan--the costs of monitoring and maintenance after the Remedial Action. Costs are based on completing the thirty year O&M period and prepared in accordance with the Consent Decree and 40 CFR 264.144. Each activity outlined in the O&M Plan is included in the estimate: i.e., monitoring, ordinary operation and maintenance, filing post-closure notices, maintenance of the security system, post-closure certification, repair, etc.

The O&M cost estimate was calculated by multiplying the loaded unit cost of each activity by the number of occurrences during the post-closure care period. Loaded costs include labor costs, including fringe benefits and overhead; travel; materials; equipment; supervision and management costs; administration costs, including taxes, insurance, reporting and paperwork requirements; and contingencies. The cost of each activity over the entire post-closure care period was summed to obtain a total O&M cost. The estimate reflects the total costs for the 30 year O&M period based on costs in the year that the estimate was prepared (i.e., 1992). The cost estimate does not reflect future inflation nor the cost of money.

10.1 Basis of Cost Estimate

The regulations require that the cost estimate for O&M be based on the costs to hire a third party to conduct all the O&M activities, even though the activities may actually be conducted in-house. Thus costs in this O&M Plan are based upon hiring an independent third party to conduct all the O&M activities.

Costs and assumptions used in this and subsequent sections are based on the typical unit prices stated in the series of EPA guidance documents Final Report Guidance Manual: Cost Estimates for Closure and Post-Closure Plans, Volumes I-IV, November 1986. Typical time frames and rates given in the above referenced guidance documents were used to establish costs. Worksheets provided in the guidance documents were used to define relevant tasks and subtasks to be performed under this O&M Plan. The costs given in the Cost Estimates for Closure and Post-Closure Plans manual are typical for post-closure or O&M activities and are not adjusted for local conditions. Since the costs were based on 1986 dollars, a factor of 5% inflation compounded for 6 years was applied to update the costs to 1992 dollars (see Table 10.13).

As provided in the RCRA guidance manual, the cost estimate need not include the costs of responding to highly unusual, or extraordinary contingencies, for example a 100-year flood. Extraordinary repairs are discussed in Section 5.0.

As provided in the RCRA guidance manual, the cost estimate need not include the costs of responding to highly unusual, or extraordinary contingencies, for example a 100-year flood. Extraordinary repairs are discussed in Section 5.0.

10.1.1 Maintenance of Cover Vegetation

Mowing of the cover vegetation is anticipated to be required twice per year, once in the spring and once in the fall after the cover has reseeded. Mowing shall be conducted using a tractor mower.

Sprinkling frequency will vary annually. In cases of an extreme drought, it may become necessary to water the cover to prevent loss of vegetation. For cost purposes, it is estimated that the cover shall require additional water 3 times in the 30 year O&M period. It is assumed that the sprinkling of the site would be conducted using a 5000 gallon truck, with the maximum daily amount of water being 20,000 gallons.

Fertilization of the cover is estimated to be conducted once per year. The pH of the soil shall be maintained during the O&M care period. Lime is assumed to be applied every four years.

Re-establishment of the vegetative cover is based on damage due to erosion. The anticipated erosion rate is 0.5% of the area annually

to a depth of one foot. Activities include acquisition of on-site and off-site soil, seeding, fertilizing, and mulching.

Control of rodents, weeds, and insects is based on a typical unit cost per acre for materials and labor.

10.1.2 Fence and Signs

Maintenance and repair of the security fence includes fencing, gate posts, barbed wire, and signs. Unit costs for these items include labor, materials, overhead, and profit. Unit costs are based on industrial chain-linked fencing, six feet high with three strands of barbed wire at the top. Sections of fence may be down because of an act of man or an act of nature such as high wind, etc. It is assumed that 5% of the total linear footage will be replaced in 30 years. Barbed wire in the top rails is expected to be replaced at the same rate as the fence wire.

Line, gate, and corner posts will need to be replaced because of the failure of the concrete, deterioration of the steel posts, acts of nature, or negligence. It is assumed that 40% of the concrete will fail, and 20% of the posts will need to be replaced due to other acts. The unit price for posts is based on galvanized steel, 4 inches in diameter. The lifespan for a galvanized steel post is expected to be at least 30 years. The unit price for gates is

based on a gate three feet wide, six feet high with a three inch frame.

There are 35 warning signs distributed along the fence. The warning signs may need to be replaced because they are no longer readable, have fallen off, or are stolen. Signs with painted surfaces have an expected lifespan of seven to eight years. Unit costs are based on the size of the sign. The galvanized steel wire that attaches the signs to the chain link may rust or break. It is assumed that at least five signs will fall off of the fence and another five signs will be stolen during the 30 year O&M period.

An estimate of fence components that will need replacement is presented in Table 10.1:

Table 10.1
Replacement Estimate for Security Fence

EQUIPMENT	NO. REPLACED IN 30 YEARS
Warning signs	135
Fencing (linear foot)	175
Barbed wire (linear foot)	175
Posts	72

10.1.3 Severe Erosion Repair

Erosion due to severe site conditions is expected to occur once during the 30 year O&M period. The area affected is estimated at 0.5 acres total area. Costs for repair of damage from severe erosion are based on the same unit costs as those in Section 10.1.1.

10.1.4 Groundwater Monitoring

Basic assumptions for the cost estimate for groundwater monitoring are as follows:

- Sampling activities shall be conducted quarterly for the first two years and semi-annually thereafter.
- Sample collection, preparation, and shipment shall be conducted by a field technician.
- The average time for sampling a well shall be four hours which includes in-field equipment decontamination.
- Analysis shall be conducted by a lab under the EPA Contract Laboratory Program following CLP procedures and protocols.

10.1.5 Monitoring Well Replacement

The expected lifespan of a monitoring well is seven to ten years, which is limited by the integrity of the grout and seal as discussed in Section 3.9. Cost estimates are based on the lifespan

of 10 years. Wells in the monitoring network will be replaced when they fail; wells not in the monitoring network will be abandoned when they fail.

Well end-caps should not need to be replaced during the life of the well. When wells are replaced, end-caps will be replaced.

The outer steel protective enclosure can rust and deteriorate with time. The hinge on the enclosure is the most vulnerable part which can rust through. Outer protective enclosures may need to be replaced every ten years due to rusting of the hinge. The protective enclosure, including cap, will be replaced when the monitoring well is replaced.

The concrete pads should last as long as the wells. However, the pads may break and crack due to temperature changes. It is assumed that an additional 40% of the pads may need to be replaced.

Locks may need to be replaced from once a year to every five years. Locks can rust shut or the tumblers can rust such that the key will not turn.

When the well casing grout or seal is in need of replacement, costs are based on sealing the old well and constructing a new well. The unit cost for constructing a new well is based on the per foot cost of using 2 inch diameter stainless steel screen and casing,

protective enclosure, cap, and lock. It can be assumed that over the period of thirty years, three additional wells will be rendered useless or destroyed due to acts of nature or negligence.

An estimate of equipment that will need replacement is presented in Table 10.2:

TABLE 10.2

EQUIPMENT REPLACEMENT ESTIMATE FOR MONITORING WELLS

EQUIPMENT	NO. REPLACED IN 30 YEARS
Stainless steel well casing (no. of complete wells)	53
Protective outer enclosures	11
Concrete pads	3
Locks	48

10.1.6 Facility Inspections

It is anticipated that inspections for cover settlement will be conducted quarterly for the first two years and semiannually for the remainder of the care period. Inspections of site structures will be conducted semiannually, maintenance roads annually, cover drainage pipe every five years, and benchmarks every ten years. Hours estimated in the cost estimate include travel time and preparation of a letter report at the conclusion of each inspection. Clerical time is included as an item in the cost estimate.

10.1.7 Gas Monitoring

Each gas vent is to be monitored semiannually for the first two years of the O&M period. After the first two years, the monitoring frequency depends on the sampling results. For cost estimating purposes it is assumed gas vents will be monitored once annually for the next five years and none thereafter.

During the O&M period, gas monitoring is assumed to be conducted by a field technician. The average time per well is estimated to be 0.50 hours. Well inspections are expected to require an average time of 0.25 hours per well.

10.1.8 Benchmarks

Maintenance of the benchmarks involves a resurvey of the benchmarks and replacing them if necessary or if they become damaged. Resurvey shall be conducted every ten years. The expected lifespan of the benchmarks is at least 30 years.

10.1.9 Repairs

The cost estimate includes costs for repair of cover settlement and repair of site structures. Frequencies for these repairs are estimated to be as shown in Table 10.3.

TABLE 10-3
REPAIR FREQUENCY ESTIMATE

Repair Items	Repair Frequency in 30 Years
Differential settlement	4 areas, 20' x 20'
Area-wide settlement	0
Drainage pipe outlets settlement	1
Concrete channels	2 Fractured sections 100 Cracked sections 2 Separated sections
Concrete downdrains	4 Fractured 60 Cracked
Drainage pipe collapse	1
Settlement stations	8 Pipe repair
Gas vents	8 Riser repair
Guard posts	200
Maintenance roads	1 Replace fabric

10.1.10 Post-Closure Certification

The initial document review by an engineer is anticipated to take four hours. Also included in the cost estimate is one hour for an engineer and a field technician per inspection during the care period to conduct any tests deemed necessary.

A final report is to be written by the engineer and field technician. Hours included in the estimate are for writing the report and submitting a draft and a final report plus the certification.

10.2 Cost Estimate Tables

The following tables present a breakdown of the cost to perform the tasks discussed in Section 10.1. Table 10.4 presents the costs for routine maintenance of cover vegetation, fence, and sign maintenance. For damage caused by erosion, the costs are shown in Table 10.5. Settlement may occur on the landfill cover systems. Costs for repair are shown on Table 10.6. Repair of the site structures is included as Table 10.7. Groundwater monitoring costs and well repair costs are present in Table 10.8. Facility inspections and landfill gas monitoring costs are shown on Tables 10.9 and 10.10, respectively. Table 10.11 presents costs for maintenance of benchmarks. The cost of post-closure certification is presented in Table 10.12.

Total cost for the 30-year O&M period is presented in Table 10.13. As described in Table 10.13, the total cost of the O&M activities for 30 years in 1992 dollars, is \$3,151,558. Therefore, the average annual outlay over the 30-year period, in 1992 dollars, is \$105,000 (not considering future inflation or the cost of money). The present value of this annual \$105,000 cost for 30 years,

assuming a 10% interest rate, is \$990,000. As described in Section 10.1, this cost estimate is based on hiring an independent third party to conduct all the O&M activities.

Table 10

ROUTINE MAINTENANCE AND REPAIRS

ITEM	UNIT	VISITS	PER	UNIT COST	PER	MOB/DEBMOB	TOTAL
Mowing	11 acres	60	30 years	\$25	acre	-	\$16,500
Fertilizing	11 acres	30	30 years	\$176	acre	\$105	\$61,230
Sprinkling	- -	3	30 years	\$420	day	-	\$1,260
Pest Control	11 acres	2	30 years	\$30	acre	-	\$844**
Maintaining pH	11 acres	7	30 years	\$60	acre	\$105	\$5,355
Revegetation							\$17,340
re-seeding	2 acres	6	30 years	\$1,155	acre	-	(\$13,860)
fertilizer	2 acres	6	30 years	\$290	acre	-	(\$3,480)
Routine Erosion Repair							\$20,558
off-site soil	5 cu.yd	30	30 years	\$18	cu.yd	-	(\$2,640)
on-site soil	1 cu.yd	30	30 years	-	-	-	(\$11,040)***
soil placement	-	30	30 years	8 hr/visit	-	-	(\$5,520)
re-seeding	0.01 acres	30	30 years	\$1,334	acre	-	(\$400)
fertilizer	0.01 acres	30	30 years	\$290	acre	-	(\$87)
mulch	0.01 acres	30	30 years	\$2,904	acre	-	(\$871)
Security System Repair							\$31,258
fencing	175 ft	6	30 years	\$11	In ft	-	(\$11,550)
gates	1 gate	2	30 years	\$80	gate	-	(\$160)
posts	72 posts	2	30 years	\$57	post	-	(\$8,208)
signs	135 signs	4	30 years	\$21	sign	-	(\$11,340)
Total							<u>\$154,345</u>

() Activity subpart

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

** Based on time required for application of 4 hrs/visit at a labor cost of \$23/hr.

*** Based on time required for excavation and transportation of 16hrs/visit at a labor cost of \$23/hr.

Table 10
EROSION DAMAGE REPAIR

Item	Materials	Visits	per	Unit Cost	per	Mob/Demob	Total
Soil Acquisition (on-site)							\$541
excavation	5 cu.yds	15	30 yrs	\$2.48	cu.yd		(\$186)
placement	5 cu.yds	15	30 yrs	\$2.25	cu.yd		(\$169)
compaction (25%)	5 cu.yds	15	30 yrs	\$1.04	cu.yd		(\$78)
Soil Acquisition (off-site soil)							\$2,998
purchase	14 cu.yds	15	30 yrs	\$6.56	cu.yd		(\$1,378)
delivery	14 cu.yds	15	30 yrs	\$2.61	cu.yd		(\$548)
spreading	14 cu.yds	15	30 yrs	\$1.03	cu.yd		(\$216)
compaction (25%)	14 cu.yds	15	30 yrs	\$1.22	cu.yd		(\$256)
Heavy Equipment Mob/Demob						\$250	\$250
Revegetation						\$105	\$20,145
seed	0.5 acre	15	30 yrs	\$1,334	acre		(\$10,005)
fertilizer	0.5 acre	15	30 yrs	\$290	acre		(\$2,175)
mulch	0.5 acre	15	30 yrs	\$1,048	acre		(\$7,860)
TOTAL							<u>\$23,934</u>

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10.6

Item	Unit	Visit	per	Unit	per	Mob/ Demob	Total
Mobilization/Demobilization	2 per event	4	30yrs			\$250	\$2,000
Cover Repair (20'x20' area)							\$24,694
Excavation	120 cu.yd	4	30yrs	\$1.71			(\$821)
Inspection							
Registered PE	2 hrs	4	30yrs	\$90			(\$720)
FML Removal							
Field Tech	8 hrs	4	30yrs	\$30			(\$960)
Inspection							
Registered PE	2 hrs	4	30yrs	\$90			(\$720)
Stabilization(Excavation/disposal)	1 repair	4	30yrs	\$400			(\$1,600)
Foundation soil	50 cu.yd	4	30yrs	\$7.20			(\$1,440)
Install FML (30'x30')	900 sq.ft	4	30yrs	\$1.20			(\$4,320)
Drainage layer	120 cu.yd	4	30yrs	\$3.91			(\$1,877)
Filter fabric	1600 sq.ft	4	30yrs	\$0.86			(\$5,504)
Surface soil (40% recovery)	120 cu.yd	4	30yrs	\$5.12			(\$2,458)
Revegetation							
seed	0.4 acre	4	30yrs	\$1,334			(\$3,134)
fertilizer	0.4 acre	4	30yrs	\$290			(\$464)
mulch	0.4 acre	4	30yrs	\$1,048			(\$1,677)
Drainage Pipe (at edge of cover)							\$3,052
Excavation	35 cu.yd	1	30yrs	\$1.71			(\$60)
FML/Drain Pipe Removal							
Field Tech (2)	8 hr/ea.	1	30yrs	\$30			(\$480)
Inspection							
Registered PE	2 hr	1	30yrs	\$90			(\$180)
Stabilization (removal/disposal)	1 repair	1	30yrs	\$700			(\$700)
Foundation soil	20 cu.yd	1	30yrs	\$7.20			(\$144)
Install FML	325 sq.ft	1	30yrs	\$1.50			(\$488)
Drainage layer (30% recovery)	15 cu.yd	1	30yrs	\$10.65			(\$160)
Install filter fabric/stone/pipe	25 ft	1	30yrs	\$6.00			(\$150)
Filter fabric	250 sq.ft	1	30yrs	\$0.86			(\$215)
Surface soil (30% recovery)	20 cu.yd	1	30yrs	\$10.44			(\$209)
Revegetation							
seed	0.1 acre	1	30yrs	\$1,334			(\$133)
fertilizer	0.1 acre	1	30yrs	\$290			(\$29)
mulch	0.1 acre	1	30yrs	\$1,048			(\$105)
TOTAL							\$29,747

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10.7

REPAIR OF SITE STRUCTURES

Item	Unit	Visits	per	Unit Cost	per	Mob/Demob	Total
Settlement Monitoring Station							
Above ground fracture materials	1 riser pipe	4	30 yrs	\$150	riser pipe		\$1,261
field technician (2)	4 hr	4	30 yrs	\$20.65	hr		(\$600)
Below ground fracture materials	1 riser pipe	4	30 yrs	\$150	riser pipe		(\$661)
field technician (2)	6 hr	4	30 yrs	\$20.65	hr		\$1,591
							(\$600)
							(\$991)
Guard Posts							
materials	1 post	200	30 yrs	\$250	post		\$99,560
field technician (2)	6 hr	200	30 yrs	\$20.65	hr		(\$50,000)
							(\$49,560)
Drainage Pipe Cleanout Port Repair						\$100	
materials	1 port	8	30 yrs	\$50	port		\$1,722
field technician (2)	4 hr	8	30 yrs	\$20.65	hr		(\$400)
							(\$1,322)
Maintenance Road.							
Minor Repair							
field technician	4 hr	12	30 yrs	\$20.65	hr		\$3,991
materials	25 ft	12	30 yrs	\$10	In ft		(\$991)
Fabric Replacement							(\$3,000)
field technician (2)	4 hr	1	30 yrs	\$20.65	hr		\$325
materials	10 ft	1	30 yrs	\$10	In ft		(\$165)
Install fabric	10 ft	1	30 yrs	\$6.00	In ft		(\$100)
							(\$60)
Concrete Channels and Downdrains							
Cleaning							
field technician (3)	8 hr	6	30 yrs	\$20.65	hr		\$1,291
disposal		6	30 yrs	\$50	visit		(\$991)
Concrete Channel Fracture							(\$300)
heavy equipment	1 backhoe	2	30 yrs			\$250	\$3,853
removal/disposal	8 ft	2	30 yrs	\$100	visit		(\$502)
stabilization/grading	8 sq yd	2	30 yrs	\$50	sq yd		(\$200)
replacement section	8 ft	2	30 yrs	\$60	In ft		(\$800)
grout/gravel/welding		2	30 yrs	\$200	visit		(\$960)
field technician (3)	8 hr	2	30 yrs	\$20.65	hr		(\$400)
Concrete Channel Crack							(\$991)
Grout/Tools		100	30 yrs	\$150	visit	\$100	\$35,325
field technician	5 hr	100	30 yrs	\$20.65	hr		(\$25,000)
Concrete Channel Separation							(\$10,325)
Grout/Tools		2	30 yrs	\$300	visit	\$150	\$1,561
field technician (2)	8 hr	2	30 yrs	\$20.65	hr		(\$900)
							(\$661)

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10.7 cont.*

Item	Unit	Visits	per	Unit Cost	per	Mob/Demob	Total
Concrete Downdrain Fracture							\$5,782
heavy equipment	1 backhoe	4	30 yrs			\$250	(\$1,004)
removal/disposal	15 ft	4	30 yrs	\$200	visit		(\$800)
replacement section	15 ft	4	30 yrs	\$22.25	In ft		(\$1,335)
field technician (4)	8 hr	4	30 yrs	\$20.65	hr		(\$2,643)
Concrete Downdrain Crack							\$21,195
Grout/Tools		60	30 yrs	\$150	visit	\$100	(\$15,000)
field technician (2)	5 hr	60	30 yrs	\$20.65	hr		(\$6,195)
Concrete Downdrain Separation							\$1,561
Grout/Tools		2	30 yrs	\$300	visit	\$150	(\$900)
field technician (2)	8 hr	2	30 yrs	\$20.65	hr		(\$661)
Drainage Pipe Collapse							\$2,823
Excavation	65 cu.yd	1	30 yrs	\$1.71	cu.yd	\$250	(\$361)
Pipe Removal/Disposal	50 ft	1	30 yrs	\$4.00	In ft		(\$200)
Pipe Replacement	50 ft	1	30 yrs	\$10.00	In ft		(\$500)
Top Soil (30% recovery)	15 cu.yd	1	30 yrs	\$19.32	cu.yd		(\$290)
Top Soil Base (30% recovery)	25 cu.yd	1	30 yrs	\$12.72	cu.yd		(\$318)
Filter Fabric	500 sq.ft	1	30 yrs	\$0.86	sq.ft		(\$430)
Drainage Layer (30% recovery)	30 cu.yd	1	30 yrs	\$15.22	cu.yd		(\$457)
Revegetation							\$267
seed	0.1 acre	1	30 yrs	\$1,334	acre		(\$133)
fertilizer	0.1 acre	1	30 yrs	\$290	acre		(\$29)
mulch	0.1 acre	1	30 yrs	\$1,048	acre		(\$105)
TOTAL							\$181,808

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10
GROUNDWATER MONITORING

Item	Unit	Visits	per	Unit Cost	per	Mob/ Demob	Total
Background/upgradient							\$60,544
sample collection (2 technicians)	1 well	64	30 yrs	\$20.50	hr/tech	82	(\$15,744) **
analysis (indicator parameters)	3 samples/well	64	30 yrs	\$200	sample	100+	(\$44,800)
Downgradient wells							\$621,184
sample collection (2 technicians)	8 wells	64	30 yrs	\$20.50	hr	82	(\$173,184) **
analysis (indicator parameters)	3 samples/well	64	30 yrs	\$200	sample	200+	(\$320,000)
analysis (OC samples)	10 smpl./visit	64	30 yrs	\$200	sample	(2)	(\$128,000)
						coolrs	
Inspection	0.25 hr/visit	64	30 yrs	\$20.50	hr		\$328
Maintenance	27 wells	6	30 yrs	\$23	hr		\$14,904***
Repair and Replacement							\$255,150
abandoned wells	27 wells	-	30 yrs	\$300	well		(\$8,100)
well construction	27 wells	-	30 yrs	\$4,125	well	150/ well	(\$247,050)
TOTAL							\$952,110

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

** Time required to collect samples is 4 hrs/well and transportation time is 2 hr one direction.

*** Time required for maintenance of wells is 4hr/well.

+ Shipment cost is based on \$100 per cooler.

Table (*
FACILITY INSPECTION

Item	Level of Effort	Visits	per	Unit Cost	per	Mob/Demob	Total
Engineer	8 hrs/insp	64	30 yrs	\$45.50	hr		\$23,296
Technician	16 hrs/insp	64	30 yrs	\$20.50	hr		\$20,992
Clerical	4 hrs/insp	64	30 yrs	\$18.00	hr		\$4,608
TOTAL							<u>\$48,896</u>

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10.10*
GAS MONITORING

Item	Unit	Visits	per	Unit Cost	per	Total
Monitoring	17 wells	9	30 yrs	\$20.50	hr	\$1,568**
Inspection	17 wells	64	30 yrs	\$20.50	hr	\$5,576***
TOTAL						<u>\$7,144</u>

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

** Time required to monitor each well is estimated at 0.5 hrs/well.

*** Time required to inspect each well is estimated at 0.25 hrs/well.

Table 11*

MAINTENANCE OF BENCHMARKS

Item	Unit	Visits	per	Unit Cost	per	Mob/ Demob	Total
Resurvey	100 hrs	3	30 yrs	\$50	hr	\$250	\$15,250
Replacement Markers	2 per marker	2	30 yrs	\$29	marker		\$116
TOTAL							\$15,366

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

Table 10.12*
CERTIFICATION OF POST-CLOSURE

Item	Unit	Visits	per	Unit Cost	per	Total
Independent Registered Professional Engineer						\$13,680
initial review	8 hr	1	30 yrs	\$90.00	hr	(\$720)
tests	2 hr	64	30 yrs	\$90.00	hr	(\$11,520)
final report	16 hr	1	30 yrs	\$90.00	hr	(\$1,440)
Engineering Technician						\$11,760
initial review	16 hr	1	30 yrs	\$30.00	hr	(\$480)
tests	4 hr	64	30 yrs	\$30.00	hr	(\$7,680)
final report	120 hr	1	30 yrs	\$30.00	hr	(\$3,600)
Clerical	40 hr	64	30 yrs	\$18.00	hr	\$46,080
TOTAL						<u>\$71,520</u>

* 1986 dollars (see Table 10.13 for update to 1992 dollars).

TOTAL COST FOR THE
30 YEAR O&M PERIOD

Item	Cost (1986 dollars)	Cost (1992 dollars) *
Maintenance of Benchmarks	\$15,366	\$20,590
Facility Inspections	\$48,896	\$65,520 -
Routine Maintenance and Repairs	\$154,345	\$206,822 -
Erosion Damage Repair	\$23,934	\$32,071 -
Groundwater Monitoring	\$952,110	\$1,275,827
Gas monitoring	\$7,144	\$9,573
Settlement Repair	\$29,747	\$39,861
Repair of Site Structures	\$181,808	\$243,622 -
Certification of Post-Closure	\$71,520	\$95,837
Project Mangement	\$560,270	\$750,762
Subtotal	<u>\$2,045,140</u>	<u>\$2,740,485</u>
Contingency Factor (15%)	\$306,771	\$411,073
TOTAL	<u>\$2,351,911</u>	<u>\$3,151,558</u>

* Assumes 5% inflation compounded for 6 years.

11.0 CONTACT PERSON

As required under 40 CFR 264.99, the name, address, and phone number of the person to contact regarding the post-closure care and maintenance (the O&M Administrator) is as follows:

NAME: Richard Sobel
TITLE: Remedial Action Coordinator
ADDRESS: 1199 North Fairfax St
Alexandria, Va 22314

PHONE: (703) 739-1221
AFFILIATION: Clean Sites, Inc

The O&M Administrator shall maintain a copy of the approved O&M Plan and be aware of the previous operations undertaken at the site. If the contact person must change during the post-closure care period, the O&M Plan shall be amended in accordance with Section 12.

12.0 REQUIREMENTS FOR AMENDMENTS TO O&M PLAN

According to 40 CFR 264.118, amendments to this plan must be approved by EPA. Requests for amendments to the plan must be submitted in writing to EPA and be accompanied by a copy of the amended plan. Additionally, any amendments to the plan must be submitted in writing to Peach County and approved by Peach County.

12.1 Changes That Require Amendments

A written request may be submitted at any time during the care period. A written request must be submitted for any of the following:

- Proposed changes in the operating plan or the facility design that affect the approved O&M plan
- Changes in procedures and protocols which affect the approved plan
- Projected changes in time of the expected care period
- Occurrence of unexpected events during the care period which affect the approved O&M plan
- Proposed changes in the contact person named in the approved plan
- Requests by EPA for modifications to the approved plan

12.2 Schedule and Procedures

A written request for an amended plan must be submitted by the O&M Administrator to EPA at least 60 days prior to the change in the procedures, design, etc., or within 60 days after the unexpected event that affected the approved plan. A copy of the amended plan must accompany the written request. If EPA has requested an amendment to the approved plan, a written copy of the amended plan must be submitted to EPA within 60 days. Cost estimates must be revised if a modification to the approved plan increases the cost estimate. These estimates must be revised no later than 30 days after the EPA has approved the request to modify the plan.

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF GEORGIA

UNITED STATES OF AMERICA

Plaintiff,

v.

Canadyne-Georgia Corporation
and Peach County, Georgia,

Defendants.

CONSENT DECREE

I. INTRODUCTION

This Consent Decree is made and entered into by and between Plaintiff, the United States of America ("United States"), and Defendants, Canadyne-Georgia Corporation ("CGC") and Peach County, (the "County") Georgia:

WHEREAS, the United States, acting on behalf of the Administrator of the United States Environmental Protection Agency ("EPA") has filed a Complaint alleging that "hazardous substances" and "pollutants and contaminants," as defined, respectively in Sections 101(14) and (33) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), 42 U.S.C. Sections 9601(14) and (33), were sent to and disposed at the Powersville Landfill National Priorities List Site ("Site");

WHEREAS, the Site is owned by Peach County and includes an inactive municipal landfill and separate hazardous waste area both of which may contain among other items, various hazardous substances and/or waste, pollutants, and contaminants;

WHEREAS, the Parties, acting in good faith to resolve any problems arising from the Site, recognize that the public interest is served by this settlement which avoids prolonged and complicated litigation and facilitates expeditious Site remediation;

WHEREAS, Plaintiff has determined that the actions required by this Consent Decree are consistent with the National Contingency Plan; that Settlers are qualified to perform their respective actions and that if these actions are performed according to the terms of this Decree, they will be performed properly and promptly by the Settlers;

WHEREAS, Settlers neither admit nor deny responsibility for the presence at, or any release of hazardous substances, pollutants and contaminants from the Site and deny any legal or equitable liability under any Federal, state or local statute or regulation. EPA and Settlers agree that any payment made hereunder (other than stipulated penalties paid pursuant to Section XXV) shall not be deemed a fine, penalty, or monetary sanction;

NOW, THEREFORE, without trial, adjudication or admission of any issue of law, fact, liability or responsibility by Settlers, and without this Consent Decree being admissible as evidence in any proceeding except in a proceeding to enforce the terms of this Decree or as otherwise specifically provided in or contemplated by this Consent Decree, it is hereby ORDERED, ADJUDGED AND DECREED that:

II. JURISDICTION

This Court has jurisdiction over this matter and of the parties consenting hereto. The parties agree not to contest the jurisdiction of the Court to enter this Consent Decree or, in any subsequent action, to enforce or terminate it. The Complaint filed by the Plaintiff states a claim upon which relief can be granted.

III. STATEMENT OF PURPOSE

The purpose of this Consent Decree, as well as the intention of the Parties, is to: (A) protect the public health and welfare and the environment from the release or threat of release of hazardous substances at and from the Site; (B) mitigate and avoid current and/or future property damage at the Site; (C) further the public interest by avoiding protracted litigation between the Parties; and (D) encourage the early and equitable resolution of claims by the United States against the Settlers.

IV. PARTIES BOUND

This Consent Decree shall apply to and be binding upon the Parties and their respective successors and assigns. Each Settlor shall provide a copy of this Consent Decree to the Contractor, and shall instruct the Contractor to provide a copy thereof to its sub contractors retained to perform the work. All work and contractor work undertaken pursuant to this Decree shall be conditioned upon compliance with the terms of this Decree.

V. DEFINITIONS

The following definitions shall apply to this Consent Decree:

A. Powersville Landfill NPL Site ("Site") means both the municipal and hazardous waste areas of a landfill owned by Peach County and located on Newell Road, just north of Highway 49, in Powersville, Peach County, Georgia and all areas contaminated with hazardous substances emanating from the Site. The Site's approximate geographic coordinates are 32°36'36" north latitude and 83°47'33" west longitude.

B. CERCLA means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Sections 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499.

C. Defendants mean Canadyne-Georgia Corporation, a Georgia corporation doing business in the State of Georgia, and Peach County, Georgia, a political subdivision of the State of Georgia, hereinafter, collectively referred to as "Settlers".

D. Georgia Department of Natural Resources ("GDNR") means the State of Georgia, Department of Natural Resources.

E. Hazardous Substances means any hazardous substance as defined by 42 U.S.C. Section 9601(14), and 40 C.F.R. 302.4.

F. The National Contingency Plan ("NCP") means the plan promulgated pursuant to CERCLA Section 105, 42 U.S.C. Section 9605, and codified at 40 C.F.R. Part 300 et seq., as amended.

G. Parties means all parties who are signatories to this Consent Decree.

H. Project Operations Plan ("POP") is a subpart to the remedial action plan which specifies site health & safety plans, QA/QC procedures, sampling and analysis, and other matters.

I. Remedial Design Work Plan ("RD Work Plan") means a detailed outline and schedule of activities necessary to perform the Remedial Design. The Remedial Design Work Plan will be attached as Attachment I to this Consent Decree upon approval by EPA.

J. Remedial Design ("RD") means all work undertaken to design the technical aspects of the remedial activities to be implemented at the Site.

K. RD Document means a detailed description of the Remedial Design.

L. Remedial Action Plan ("RAP") means the Remedial Action Plan which will be based on the Remedial Design and which will provide for the scheduled performance of the Remedial Action performed at the Site.

M. Remedial Action ("RA") means the implementation of the Remedial Design in accordance with the RAP consistent with the NCP and the Superfund Remedial Design and Remedial Action Guidance dated June 1986, including construction on-site, treatment processes, removals, and any other tasks necessary to effectuate the Site's cleanup, by means of the remedy-of-choice as set out in the ROD.

N. RCRA means the Resource Conservation and Recovery Act, 42 U.S.C. Sections 6901, et seq. as amended.

O. Release shall be used as that term is defined in Section 101(22) of CERCLA, 42 U.S.C. Section 9601(22).

P. Response Costs means costs incurred by EPA in connection with response activities taken by EPA at the Site pursuant to Sections 104, 106 and 107 of CERCLA, 42 U.S.C. Sections 9604, 9606, and 9607.

Q. ROD means the Record of Decision prepared by EPA with respect to the Site dated September 30, 1987.

R. Data Quality Objectives for Remedial Response Activities are qualitative and quantitative statements which specify the quality of the data required to support Agency decisions during remedial response activities.

S. Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual - a manual which contains the standard operating and field quality control procedures (SOP) to be followed during field operations.

VI. GENERAL PRINCIPLES

A. The Appendices and Attachments to this Consent Decree (sometimes hereinafter referred to as the "Decree") are a part of this Decree, and the various Remedial Design Work Plans, Remedial Action Plans, Project Operations Plans and other schedules and reports prepared as required in this Decree shall, upon their approval by EPA, be incorporated by reference in the Decree, but shall not be attached to the Decree. These plans and reports shall be maintained by the Parties and, in the event of a dispute to be resolved by this Court, shall be presented to the Court.

B. Except as provided in Paragraph XVIII (Covenant Not to Sue), nothing in this Consent Decree shall be deemed to limit the response authority of EPA under Section 104 of CERCLA, 42 U.S.C. Section 9604, under Section 106 of CERCLA, 42 U.S.C. Section 9606, or under any other federal response authority.

VII. WORK TO BE PERFORMED

A. EPA's Remedy as Specified in the Record of Decision

CGC agrees to implement the remedy selected by EPA for the Site as set out in the Record of Decision ("ROD"), and as further set forth in the RD Work Plan and RD Document.

B. Remedial Design Work Plan

CGC shall develop and submit the Remedial Design ("RD") Work Plan within forty-five (45) calendar days from the entry of this Consent Decree. The RD Work Plan shall describe in detail how CGC will design the remedy and provide a schedule for completion of the various components of the pre-design and design work. The completed design will explain how the remedial action will be implemented. CGC agrees to implement the RD Work Plan in accordance with the standards, specifications and schedules contained therein, and the schedule(s) set forth in this Consent Decree.

Within forty-five (45) calendar days after EPA's receipt of the RD Work Plan, EPA shall notify Settlers in writing of EPA's approval or disapproval of the RD Work Plan or any part thereof. In the event of any disapproval of the RD Work Plan, EPA shall specify in writing both the deficiencies and any EPA recommended modifications to the RD Work Plan.

Within fifteen (15) calendar days of the receipt of EPA notification of disapproval, CGC shall amend and submit to EPA the revised RD Work Plan and EPA shall have fifteen (15) days in which to approve or disapprove the revised RD Work Plan in writing. In the event of EPA's subsequent disapproval of the RD Work Plan, EPA

retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

Upon approval by EPA, the RD Work Plan will be attached to and incorporated in this Consent Decree as Attachment I.

C. Remedial Design Document

In accordance with the schedule set forth in the Remedial Design Work Plan, CGC shall develop and submit the RD Document, which shall set forth in detail the design of the remedy and explain how the remedy will be implemented. Within sixty (60) calendar days after EPA's receipt of the RD Document, the EPA shall notify Settlers in writing of EPA's approval or disapproval of the RD Document or any part thereof. In the event of any disapproval of the RD Document, the EPA shall specify in writing the deficiencies, any EPA recommended modifications to the RD Document, and the reasons for EPA's position.

Within forty-five (45) calendar days after the receipt of EPA notification of disapproval, if any, CGC shall amend and submit to EPA the revised RD Document, and EPA shall have thirty (30) days in which to approve or disapprove the revised RD Document in writing. In the event of EPA's subsequent disapproval of the RD Document, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

D. Remedial Action Plans/Project Operation Plan

Within sixty (60) calendar days of receipt of notice that EPA has approved the RD, CGC will submit to EPA a Remedial Action Plan ("RAP") and Project Operations Plan ("POP") which will describe

In detail the methods CGC intends to use to execute the Remedial Design and the QA/QC and safety plan. The POP will be developed according to the Data Quality Objective for Remedial Response Activities EPA/540/G-87/003. This document shall be provided to CGC by EPA. All field procedures will be developed pursuant to the Engineering Support Branch Standard Operating Procedures and Quality Assurance. The RAP/POP must specify the time schedules for implementation and completion of the work, the materials to be used, the technical aspects of conducting the work and all other items necessary for proper and timely performance of the work. The POP must include (1) a Site Health and Safety Plan, (2) a Field Activity Quality Assurance/Quality Control Plan, consistent with the requirement of Paragraph XII (Quality Assurance), (3) a detailed sampling and analysis plan, (4) a plan for satisfaction of permitting requirements and (5) a description of chain-of-custody procedures.

Within thirty (30) calendar days after EPA's receipt of the RAP/POP, EPA shall notify Settlers in writing of EPA's approval or disapproval of the plan or any part thereof. In the event of any disapproval of the RAP/POP, EPA shall specify in writing both the deficiencies and any EPA recommended modifications to the RAP/POP.

Within thirty (30) calendar days of the receipt of EPA notification of disapproval, CGC shall amend and submit to EPA the revised RAP/POP, and EPA shall have thirty (30) days thereafter in

which to approve or disapprove the RAP/POP Plan in writing. In the event of subsequent disapproval of the RA Plan, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

Upon approval by EPA, the RAP/POP will be attached to and incorporated in this Consent Decree as Attachment II. Within thirty (30) calendar days after receipt of EPA approval of the RAP/POP, CGC shall implement the required work under the RA Plan Report in accordance with the schedule and requirements contained therein and in accordance with the POP.

The RAP/POP shall be designed to insure that all pre-design, design and remedial field activities under this Decree will be conducted in accordance with the applicable requirements of the NCP and the EPA Remedial Design and Remedial Action ("RD/RA") guidance document, dated June 1986. Should there be any inconsistencies between the NCP and RD/RA guidance, the NCP shall control.

E. Operation and Maintenance

Upon completion of the implementation of the RA Plan for each task, the operation and maintenance ("O&M") period will begin for that portion of the remedy to the extent O&M is required for that portion of the remedy.

CGC shall be responsible for designing O&M activities undertaken in connection with the remedial work. CGC shall prepare an O&M Plan that ensures the long-term effectiveness of the remedial activities required by this Decree. The O&M Plan will contain the post-closure care requirements found in 40 C.F.R. Part 264 including but not limited to:

- i) maintaining the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;
- ii) preventing run-on and run-off from eroding or otherwise damaging the final cover by maintaining and monitoring the run-on and run-off control system;
- iii) maintaining the ground water monitoring system and complying with relevant and appropriate requirements of 40 C.F.R. Section 264 Subpart F;
- iv) protecting and maintaining surveyed benchmarks;
- v) a schedule for completion of each activity;
- vi) a cost estimate for post-closure care consistent with 40 C.F.R. Section 264.144;
- vii) establishment of a financial assurance mechanism for post-closure activities consistent with 40 C.F.R. Section 264.145, or other mechanism mutually satisfactory to the parties;
- viii) a post-closure care inspection schedule for a minimum of at least thirty (30) years as provided in 40 C.F.R. Section 264.117 (a)(1) and (2), and subject to extension of the site security care period as provided by 40 C.F.R. Section 264.117(b).

CGC shall submit a draft O&M Plan to EPA, within thirty (30) days after CGC submits its RD Document. The O&M Plan shall be subject to the review and approval procedures and schedules outlined in Section D of this Paragraph. CGC shall submit a draft O&M Plan to GDNR and the County at least sixty (60) days prior to the date the O&M Plan

must first be submitted to EPA. Within thirty (30) days after receipt of the O&M Plan by GDNR and the County, the County shall submit to CGC its comments to the O&M Plan, together with any suggested changes thereto.

i) In the event CGC does not receive the written comments of the County during the time indicated above, the County shall be deemed to have approved the O&M Plan submitted by CGC;

ii) In the event CGC does receive the written comments of the County within the time indicated above, the County and CGC shall have twenty (20) days thereafter to resolve any disputes between the County and CGC. In the event the County and CGC resolve any dispute within the time provided for herein, each party shall indicate its approval of the O&M Plan in writing, and CGC shall submit the Plan to EPA.

In the event that at the end of the time period provided for herein for resolving disputes, the County disagrees with the Plan, CGC shall submit its O&M Plan to EPA, and the County shall state the grounds for such disagreement in writing to be submitted to the EPA on or before the date upon which the O&M Plan is due to be submitted to the EPA.

The County shall be responsible to, and hereby covenants in favor of CGC that it will, conduct and fund ordinary O&M activities undertaken in connection with the remedial work and ordinary post-closure requirements, as set forth in the O&M Plan, but not including the provision of a financial assurance mechanism for post-closure care; provided, the County's responsibility hereunder shall not include extraordinary repairs in excess of \$5,000 in any 12-month period, and that such repairs shall be the sole

responsibility of CGC; provided further, that this exclusion shall be inapplicable in such proportion as such repairs are caused by the negligence of County, its employees and agents.

Notwithstanding anything herein to the contrary, CGC shall be liable to EPA for the conduct and funding of all O&M activities and post-closure care.

F. County's Contribution to Project

i) The County shall contribute the sum of \$100,000 toward the implementation of the RD and/or the RA, \$50,000 of which shall be contributed within 1 year of the execution of this Consent Decree, and the remaining \$50,000 of which shall be contributed within two years of the execution of this Consent Decree.

ii) In addition to the foregoing, in the event that CGC provides the County with monies to be applied to the implementation of the RD/RA, the County shall contribute such monies, up to a maximum of \$100,000, to the implementation of the RD or RA, in such manner as is agreed to between CGC and the County.

iii) The contribution of the County referenced in subsections i) and ii) hereof shall be accomplished by means of one or more payments to or on behalf of CGC in connection with the RD or RA, specifically in such manner and at such times as shall be agreed to by the County and CGC, and as shall be acceptable to the GDNR for purposes of providing matching funds to the extent available. The County and CGC shall each use best efforts and cooperate with the other toward the County's obtaining from GDNR such matching funds

VIII. REMEDIAL ACTION PROGRESS REPORTS

A. CGC shall provide or cause their contractors or agents to provide written reports to EPA (hereinafter referred to as RAP Reports) and its contractor on a monthly basis from the entry of this Consent Decree until all on-Site construction activities are completed and approved by EPA. RAP Reports are to be received no later than the 15th day of the month following the month covered by the report. The RAP Reports shall describe the actions that have been taken toward achieving compliance with this Consent Decree, including a general description of remedial action activities projected to be commenced or completed during the next reporting period, a summary of results from any analytical work conducted pursuant to this Consent Decree, and a description of any problems that have been encountered or are anticipated by CGC in commencing or completing the activities.

B. If a RAP Report is deemed to be incomplete or otherwise deficient, EPA shall notify CGC within twenty-one (21) days of receipt of such RAP Report by EPA. The notice shall include a description of the deficiencies. CGC or their contractors are responsible to make the necessary changes and resubmit the RAP Report with twenty-one (21) days of receipt of EPA's notice.

C. The Agency will, within thirty (30) days after receipt of a resubmitted RAP Report, approve or disapprove in writing the RAP Report.

D. If EPA determines that a resubmitted RAP Report fails to address previously identified deficiencies, CGC shall be deemed to be out of compliance with this Consent Decree.

E. After EPA issues a Certificate of Compliance, semiannual reports of operation and maintenance activities for site maintenance (e.g. maintenance of landfill cover, and groundwater monitoring system) shall be submitted to EPA and its contractor by the County on April 1 and October 1 of each year until termination of this Consent Decree. A separate schedule will be established for monitoring the groundwater conditions as specified in Section VIII of the ROD.

IX. APPOINTMENT AND DUTIES OF REMEDIAL PROJECT MANAGER
AND REMEDIAL ACTION COORDINATOR

A. On or before the effective date of this Consent Decree EPA shall appoint a Remedial Project Manager ("RPM") and CGC shall appoint, subject to EPA approval pursuant to Paragraph XI (Approval of Contractor), a Remedial Action Coordinator ("RAC") to act on their respective behalfs to oversee completion of the RD/RA. EPA and CGC each shall have the right to change their respective RPM and RAC. EPA and CGC shall accomplish this change by notifying the other party in writing at least thirty (30) days prior to the change and subject to the procedures set forth in Paragraph XI.

B. EPA's RPM will observe and monitor the progress of the RD/RA being performed pursuant to this Consent Decree. The RPM shall have the authority vested in RPM's by 40 C.F.R. Sections 300 et seq. and other applicable federal laws and regulations. The RPM does not have the authority to make major modifications to this Consent Decree, including the Appendices and Attachments, any design or construction plans, or any schedules submitted thereunder.

C. EPA's RPM will have the authority, inter alia, to halt, conduct, or direct any tasks required by this Consent Decree when conditions present an immediate risk to public health or welfare or the environment.

D. Neither the absence of the EPA RPM from the Site nor the lack of availability of an EPA representative by phone shall be cause for the stoppage of work except where stoppage of work is necessary to abate an immediate risk of harm to public health or the environment or Site workers. CGC shall notify EPA's RPM or other designated EPA representative by phone as soon as possible that work has been discontinued. Further, within twenty-four (24) hours after work is discontinued, CGC shall submit to EPA a written explanation of why work was discontinued.

X. FAILURE TO IMPLEMENT THE REQUIREMENTS OF CONSENT DECREE

A. Subject to the Force Majeure clause, Paragraph XXII, CGC is obligated to take all steps necessary to ensure that the RD/RA is completed according to the schedule(s) established pursuant to this Consent Decree. If CGC fails to comply in a timely manner with any performance date or other material requirement of this Decree and such delay is not caused by Force Majeure, CGC shall be deemed to be out of compliance with this Consent Decree.

B. In the event EPA determines that the CGC has failed without good cause to timely implement the RD/RA, or any portion thereof, EPA may, after notice to CGC and consistent with the Dispute Resolution procedures of Paragraph XXIII, perform any or all portions of the RD/RA that remain incomplete. If EPA performs all or portions of the RD/RA because of CGC's failure to comply with its obligations under this Consent Decree, CGC shall reimburse EPA for the costs of doing

such work which costs are not inconsistent with the National Contingency Plan within thirty (30) days of receipt of demand for payment of such costs and itemization thereof.

XL APPROVAL OF CONTRACTOR

All response work performed pursuant to the RD Work Plan and RA Plans shall be under the direction and supervision of qualified personnel. Within thirty (30) days prior to the initiation of remedial design, field work and actual construction, CGC shall notify EPA in writing regarding the identity of the contractor carrying out such work. EPA may, within thirty (30) days of receipt of the notice, reasonably disapprove the use of any contractor, subcontractor, laboratory and/or Remedial Action Coordinator (collectively, "Contractor") which EPA reasonably determines to be unqualified to perform the work or any portion thereof, provided that in such event the Agency will state in writing the grounds for such disapproval. In the event of a disapproval, the date for the completion of the RD Work Plan will be ninety days after the entry of this Consent Decree and CGC shall notify EPA within sixty (60) days of the identity and the qualifications of the replacement contractor, subcontractor, laboratory and/or Remedial Action Coordinator. EPA shall either approve or disapprove of the Replacement Contractor within thirty (30) days thereafter. In the event of subsequent disapproval of any contractor, subcontractor, laboratory and/or Remedial Action Coordinator which EPA reasonably determines to be unqualified to perform the work or any portion thereof, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

XII. QUALITY ASSURANCE

Settlors shall use the quality assurance, quality control and chain of custody procedures in accordance with the U.S. EPA Region IV Environmental Services Division Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual dated April 1, 1986 (ESDSOP and QA) throughout all sample collection and analysis activities. This manual will be provided to Settlers by EPA. In order to provide quality assurance and maintain quality control regarding all samples collected pursuant to this Consent Decree, Settlers shall:

A. Ensure that EPA personnel and/or EPA authorized representatives are allowed reasonable access to the laboratories and personnel utilized for analyses.

B. Ensure that the laboratories utilized for analyses perform such analyses according to EPA methods or methods deemed satisfactory to EPA and submit all protocols to be used for analysis to EPA either in the Sampling and Analysis Plan or at least twenty-one (21) calendar days prior to commencement of analysis.

C. Ensure that the laboratories utilized by Settlers for analyses participate in a quality assurance/quality control program equivalent to that which is followed by EPA and which is consistent with "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans", a copy of which will be provided to Settlor by EPA. As part of such a program, and upon reasonable request by EPA, such laboratories shall perform analyses of samples provided by EPA to demonstrate the quality of each laboratory's analytical data.

XIII. SAMPLING AND DATA/DOCUMENT AVAILABILITY

A. Sampling

Each Settlor shall make the results of all sampling and/or tests or other data generated by such Settlor, or on such Settlers' behalf, with respect to the implementation of this Consent Decree, available to EPA in a summary form and shall submit these results in progress reports as described in Paragraph VIII of this Consent Decree.

At the request of the EPA, each Settlor shall allow split or duplicate samples to be taken by EPA and/or its authorized representatives, of any samples collected by such Settlor pursuant to the implementation of this Consent Decree. Such Settlor shall notify EPA not less than four (4) calendar weeks in advance of any proposed sample collection activity and again not less than three (3) working days prior to commencing sampling activities. The RPM and RAC may agree in writing to a shorter notification period.

B. Data/Document Availability

Upon request by EPA, each Settlor shall provide copies to EPA of all records, documents and information generated by such Settlor and its contractors in the course of performing the Remedial Design Work, Remedial Action and Operation and Maintenance Activities including, but not limited to, sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs and correspondence. Additionally, each Settlor's employees, agents or representatives with knowledge of relevant facts concerning the performance of the RD/RA or O&M activities shall be made available to EPA upon reasonable notice and at reasonable times and places to provide

c. Claim of Confidentiality

Each Settlor may assert a confidentiality claim, if appropriate, covering part or all of the information requested by this Consent Decree pursuant to 40 C.F.R. Section 2.203(b). Such an assertion shall be adequately substantiated when the assertion is made. Analytical data shall not be claimed as confidential by the Settlers. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to the Settlor (see also Paragraph XXX).

XIV. COMPLETION OF REMEDIAL CONSTRUCTION WORK

CGC shall notify EPA and its contractor in writing, within ten (10) days after the completion of the construction phase of the RA Plan for each task (except O&M), that the required work has been completed. EPA shall review the construction phase of the RA plan for each task and indicate its agreement or disagreement as to the completion of the construction phase within forty-five (45) days of receipt of the notification. The construction phase of each RA plan task shall be deemed to have been completed when EPA provides Settlers with written notification that the elements set forth in the RA Plan have been completed satisfactorily and in conformity with the Plan and this Decree.

If EPA believes that the construction phase of the RA Plan has not been completed in accordance with the standards and specifications set out in the Plan, in this Decree, and under CERCLA, it shall notify CGC in writing of what it believes should be done to complete the construction, referencing the specific portion(s) of the RA Plan

thirty (30) days thereafter, object to the measures proposed by EPA, CGC shall expeditiously undertake and complete such measures in accordance with the proposed schedule of completion. The Agency intends to notify CGC of its objections with respect to any proposed or completed task promptly after first becoming aware of any such objections. The RA Plans for all tasks shall be deemed to have been finally completed when the EPA certifies in writing and in conformity with Section 122(f)(3) of CERCLA, 42 U.S.C. Section 9622(f)(3), that all of the elements set forth in the RD Work Plan, the RA Plans and in accordance with the requirements of CERCLA, 42 U.S.C. Section 9601 et seq., have been satisfactorily completed.

XV. ASSURANCE OF ABILITY TO COMPLETE WORK

CGC will demonstrate its financial ability to complete the Remedial Action and to pay all claims that arise from the performance of the Remedial Action by obtaining, and presenting to EPA for approval within 30 days after the effective date of this Decree, one of the following items: 1) performance bond; 2) letter of credit; or 3) guarantee by a third party.

XVI. OVERSIGHT COSTS

The parties acknowledge that the United States and its oversight contractor will incur costs at the Site after the effective date of this Consent Decree for oversight of the Remedial Design work and the Remedial Action to be performed by the Settlers. CGC shall reimburse the United States for all such costs which are not inconsistent with the NCP, provided however that CGC shall not reimburse EPA for oversight costs in excess of \$100,000. EPA plans to use GDNR as its contractor for the oversight work. EPA may in its discretion use other contractors to conduct part or all of the

oversight which EPA determines that GDNR cannot, will not or does not perform to EPA's satisfaction.

The United States shall send CGC a demand for payment, together with an accounting of the costs claimed, on an annual basis, with the first demand to be made on or before December 1 of the first year in which oversight costs are incurred by the United States. Thereafter, demands will be made on or before December 1 of each succeeding year in which the United States incurs costs for oversight. The payment shall be due within thirty (30) days of receipt of the demand for payment, shall be made by certified or cashiers check payable to "EPA Hazardous Substance Superfund", and shall specifically reference the Site and shall be sent to:

United States Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365

XVII. COST REIMBURSEMENT

CGC agrees to reimburse the Plaintiff for \$450,000 of its Response Costs incurred by the United States pursuant to CERCLA in connection with this Site. Upon receipt of the foregoing payment, the United States releases the Settlers for all of the United States past costs incurred by the United States pursuant to CERCLA in connection with this Site. The United States represents and warrants that the Response Costs were not inconsistent with the NCP and have been paid. EPA shall provide cost documentation within sixty (60)

days after the effective date of this Consent Order. Said payment shall be made by CGC within thirty (30) days of receipt of EPA's cost documentation and shall be by certified or cashiers check made payable to the EPA Hazardous Substances Superfund, shall specifically reference the Site, and shall be sent to:

United States Environmental Protection Agency
Hazardous Substances Superfund
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365

Except as provided in this paragraph XVII, Settlers shall be liable for no other costs incurred by the United States pursuant to CERCLA prior to the effective date of this Consent Decree..

XVIII. COVENANT NOT TO SUE

A. Except as provided in Section C and D of this Paragraph, upon the issuance by EPA of a Certificate of Compliance for the successful completion of all Remedial Action Activities, the United States covenants not to sue the Settlers under the provisions of CERCLA for claims arising from or related to the Site. Provided, however, that EPA shall not issue a Certificate of Compliance until Settlers can demonstrate that O&M Operations have been designed, are in place, and can reasonably be expected to achieve the requirements of this Consent Decree. This Paragraph is not and shall not be construed as a covenant not to sue any other person or entity not a party to this Consent Decree.

B. The Settlers hereby covenant not to sue the United States for any claims related to or arising from the Remedial Action or this Consent Decree, including any direct or indirect claims for reimbursement from the Hazardous Substance Response Trust Fund, 42 U.S.C. Section 9611. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a CERCLA claim within the meaning of Section 111 of CERCLA and 40 C.F.R. Section 300.25(d).

C. The Covenant Not to Sue does not apply to the following:

1. Claims based on a failure by the Settlers to meet the requirements of this Consent Decree;
2. Liability arising from the past, present or future disposal, release or threat of release of hazardous substances outside of the Site and not attributable to the Site;
3. Liability for the disposal of any hazardous substances taken from the Site;
4. Claims for any costs incurred by EPA as a result of the failure of the Settlers to implement the Remedial Action in accordance with this Consent Decree;
5. Liability for injury to natural resources;
6. Criminal liability;
7. Claims arising from contamination of ground water at and in the vicinity of the Site.

D. Notwithstanding any other provisions of this Consent Decree the United States reserves the right to institute proceedings in this action, or to institute a new action (1) to compel the Settlers to perform additional response work at the Site, or (2) to reimburse the United States for response costs, if:

1. For proceedings prior to issuance of the EPA Certificate of Compliance of the Remedial Action,

a. conditions at the Site, previously unknown to the United States, are discovered after the entry of this Consent Decree, or

b. information is received, in whole or in part, after the entry of this Consent Decree;

and these previously unknown conditions or this information indicates that the Remedial Action is not protective of human health and the environment; and

2. For proceedings subsequent to EPA's issuance of the Certificate of Compliance of the Remedial Action,

a. conditions at the site, previously unknown to the United States, are discovered after EPA's issuance of the Certificate of Compliance, or

b. information received, in whole or in part, after the Certificate of Compliance by EPA;

and these previously unknown conditions or this information indicates that the remedial action is not protective of human health and the environment.

XIX. INSURANCE AND INDEMNIFICATION

A. Prior to commencing any on-site work, CGC shall obtain or require its contractor(s) to obtain a policy or policies of insurance providing at least the following coverages in connection with the activities performed at the Site by CGC or its employees, agents, contractors or subcontractors under this Consent Decree:

1. Comprehensive General Liability Insurance, including Contractors Protective Coverage, in an amount of not less than five million dollars (\$5,000,000) per occurrence, combined single limit;

2. Automobile Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence;

3. Professional Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence;

4. Worker's Compensation Insurance adequate to meet the statutory requirements of all jurisdictions having authority over such claims, including but not limited to the State of Georgia, and Employer's Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence. The United States shall be named as an additional insured in the policy or policies required under subsections 1, 2 and 3 above. CGC shall maintain such insurance or require its contractor(s) to maintain such insurance in force until EPA issues a Certification of Compliance for all remedial activities.

B. Prior to commencing any on-site work, and annually thereafter, CGC shall provide to the United States certification of coverages maintained in compliance with this Paragraph. In addition, CGC shall furnish the United States with copies of those policies purchased specifically for activities undertaken pursuant to this Consent Decree.

C. Anything herein notwithstanding, in no event shall CGC be relieved of its obligation to implement in a timely fashion the remedial action under this Consent Decree by

reason of any inability to obtain or failure to maintain in force any insurance policies required in this Paragraph, or by reason of any dispute between CGC and any of its insurers pertaining to any claim arising out of the design, construction, implementation, or operation of the remedy or arising out of any other activity required under this Consent Decree.

D. Failure by CGC to obtain or maintain any insurance required by this Paragraph shall not be deemed to be a violation of this Consent Decree if CGC demonstrates that it or its contractor(s) have made good faith efforts to obtain such insurance.

E. CGC agrees to indemnify and save and hold harmless the United States, its agencies, departments, agents and employees from any and all claims or causes of action arising from or on account of acts or omissions of the Settlers or their employees, agents, contractors or subcontractors in carrying out activities under this Consent Decree. The County agrees to indemnify and save and hold harmless the United States, its agencies, departments, agents and employees from any and all claims or causes of action arising from or on account of acts or omissions of the County or their employees, agents, contractors or subcontractors in carrying out activities under this Consent Decree. The United States shall not be considered a party to any contracts between Settlers and persons retained to perform the work.

F. The County agrees to indemnify, save and hold harmless CGC to the extent permitted by and to the extent permitted under the Constitution of the State of Georgia from all third party claims arising out of the sole negligence of the County. CGC agrees to indemnify, save and hold harmless the County from all third party claims arising out of the sole negligence of CGC.

XX. COMPLIANCE WITH LAWS AND PERMITS

A. All activities undertaken by the Settlers pursuant to this Consent Decree shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations, and this Decree shall in no way relieve the Settlers of their obligation to comply with such laws and regulations governing their respective performances hereunder. The parties contemplate that all permits or other approvals required to implement the RD/RA or O&M will be identified in the Remedial Design Work Plan and Remedial Action Plans required under Paragraph VII of this Decree.

B. The parties agree that if a Settlor or its contractor(s) arrange for the storage, treatment, disposal, or transportation for disposal, of any hazardous substances at locations other than the Site, such Settlor will obtain EPA's prior approval of the use of any such off-site facility and will comply with the applicable provisions of RCRA, 40 C.F.R. Parts 261, 262, 263, 264, 265.

XXI. SITE ACCESS

A. The parties acknowledge that the Site is presently owned by one of the parties to this Consent Decree, i.e., the County, and that the County hereby grants Site access to CGC, EPA and their respective contractors for all purposes hereunder including effectuating and monitoring the terms of this Consent Decree and performing the RD/RA.

B. To the extent the Site is presently owned by persons that are not parties to this Consent Decree, the Settlers have obtained or will use their best efforts to obtain site access agreements from the owners within thirty (30) days of learning of the necessity of such access. Such access agreements shall provide the United States, EPA, the Settlers, and their representatives and contractors access to the

Site at all times for purposes of effectuating and monitoring the terms of this Consent Decree and performing the RD/RA. In the event that Site access agreements are not obtained within the thirty day (30) period, the Settlers shall notify EPA within five (5) days thereafter regarding both the lack of such agreements and the efforts made to obtain them.

C. To the extent access to or use of property other than the Site is required for the proper and complete performance of this Consent Decree, the Settlers shall use their best efforts to gain such access to or use of such property. EPA agrees, if necessary, to use its best efforts, consistent with its legal authority, to assist the Settlers in obtaining such access or use.

D. EPA's right of access under this Decree shall not be conditioned and shall be in addition to and not in substitution for, EPA's right of entry and access under applicable federal laws. During the effective period of this Decree, the United States, EPA, and their representatives, including contractors, shall have access at all times to the Site and any activity authorized by CERCLA, including but not limited to:

1. Monitoring the progress of Remedial Design and Remedial Action activities;
2. Reviewing or verifying any data or information developed by Settlor or Settlor's contractors including data or information submitted to EPA with respect to the RD/RA or the Site;
3. Conducting investigations relating to contamination at or near the Site;
4. Obtaining samples at the Site; and

5. Inspecting and copying records, files, sampling and monitoring data, operating logs, contracts, photographs, or other documents related to the Site or required to assess the Settlor's compliance with this Consent Decree; and

6. Inspecting sampling procedures and obtaining samples collected by the Settlers at the Site.

E. The United States shall provide a list of all EPA personnel, contractors or other parties who shall have the aforementioned access to this site at all times. All other parties shall provide reasonable notice prior to coming onto the Site.

F. Nothing herein limits or otherwise affects any right of entry held by the United States or EPA pursuant to applicable laws, regulations, or permits.

G. The Force Majeure clause, Paragraph XXII shall govern any delays caused by or attributed to difficulties in obtaining access to the Site or access to or use of any other property required for the proper and complete performance of this Consent Decree, provided the Settlers have used their best efforts to obtain such access to or use of the property.

XXII. FORCE MAJEURE

Settlers' activities under this Consent Decree shall be performed within the time limits set forth in the RD Work Plan and RAP/POP referenced in VII above, unless performance is delayed by events which constitute a force majeure. For purposes of this Consent Decree, a force majeure is defined as any event arising from causes beyond the reasonable control of Settlers (for example, but not limited to, fires, natural disasters, riots and wars) which could not have been prevented by the exercise of due diligence and causes a

delay in the performance of the work. Increased costs incurred by Settlers in conducting the RD/RA or changed economic circumstances of Settlers shall not be considered as constituting a force majeure.

A Settlor shall notify EPA in writing no later than ten (10) business days from the inception of any event which Settlor contend constitutes a force majeure as defined above. The written notice shall describe fully the nature of the delay, why the delay is beyond the control of the Settlor, the actions taken and/or that will be taken to mitigate, prevent and/or minimize the delay will be taken. The Settlor shall adopt all reasonable measures to avoid or minimize any such delay.

Delay that results from circumstances beyond the control of the Settlers that cannot be overcome by due diligence on the Settlers' part shall not be deemed to be a violation of this Consent Decree. To the extent a delay is caused by circumstances beyond the control of the Settlers, the schedule affected by the delay shall be extended for a period equal to the delay resulting from such circumstances, if deemed necessary by EPA.

Failure of the Settlers to comply with the notice requirements of this Section shall constitute a waiver of the Settlers' right to invoke the benefits of this Section with respect to that event.

XXIII. DISPUTE RESOLUTION

A. Any dispute which arises under or with respect to this Consent Decree, or the Appendix and Attachments hereto shall in the first instance be the subject of informal negotiations between EPA and the respective Settlor for a period of up to twenty (20) calendar days from the time EPA and/or the Settlor gives notice of the

existence of the dispute, or for a longer period if both parties agree in writing:

B. In the event that the parties cannot resolve a dispute by informal negotiations under Paragraph A of this Section, then the decision or interpretation advanced by the United States shall be considered binding unless, within twenty (20) days after the end of the informal negotiations period, a Settlor files a petition with this Court setting forth the matter in dispute and the relief requested. Except as otherwise agreed to by the parties, the filing of a petition asking the Court to resolve a dispute shall not serve to extend or postpone the Settlor's respective obligations under this Consent Decree provided that payment of stipulated penalties with respect to the disputed issue(s) shall be stayed pending resolution of the dispute. In the event that the Settlers do not prevail on the dispute, stipulated penalties shall accrue as provided in Paragraph XXV.

C. In any dispute resolution proceeding involving matters covered by Section 113(j)(2) of CERCLA, 42 U.S.C. Section 9613(j)(2), the Court shall apply the standards and provisions of Section 113(j)(2). In all other disputes the Court shall adopt the position proposed by EPA unless the Court finds that position to be arbitrary and capricious. In all disputes covered by this Paragraph, the burden of proof shall rest with the Settlers.

XXIV. PURPOSE OF SETTLEMENT

This Consent Decree was negotiated and executed by the United States and the Settlers in good faith to avoid expensive and protracted litigation and represents a fair, reasonable and equitable settlement of the matters addressed herein.

XXV. STIPULATED PENALTIES

A. Except as provided in Paragraph XXII (Force Majeure) and as may be otherwise provided in this Consent Decree, each Settlor shall be liable to the EPA for the stipulated penalties set forth below for each day during which it fails to comply with the requirements of this Consent Decree including but not limited to any implementation schedule, payment or funding requirement, or completion deadline.

B. For each day during which CGC fails to perform any of the following activities:

1. Submittal and, if necessary, modification of the RD Work Plan;
2. Submittal and, if necessary, modification of RD;
3. Submittal and, if necessary, modification of RA Plan/POP;
4. Implementation of RA Plan/POP;
5. Assurance of Ability to Complete Work.

CGC shall be liable to EPA for stipulated penalties in the following amounts:

<u>Period of Failure to Comply</u>	<u>Penalty Per Violation Per Day</u>
1st through 14th day	\$1,000
15th through 44th day	\$2,000
45th day and beyond	\$3,000

C. CGC shall be liable to EPA for stipulated penalties in the amount of \$500 per violation for each day during which it fails to submit, in accordance with the period set forth herein and, if necessary, modify, monthly RAP Reports. The County shall be liable for \$500.00 per day for each day during which the County fails to submit its semiannual report.

D. Each Settlor shall be liable to EPA for stipulated penalties in the amount of \$1,000 per violation for each day during which such Settlor fails to comply with any other requirements of this Consent Decree applicable to it including but not limited to any implementation schedule, payment or funding requirement, notification requirement or completion deadline. All penalties described in this subprograms begin to accrue ten (10) days after Settlers receive EPA's notification of violation , and shall continue through the final day of correction of the noncompliance.

E. Upon EPA's determination that a Settlor has failed to comply with the activities described in Sections B and C of Paragraph XXV, EPA shall give such Settlor written notice describing the noncompliance and stating the amount of penalties due.

F. All penalties owed to the EPA under this section shall be payable upon demand by EPA within 30 days of receipt of the notification of noncompliance. Such penalties shall be paid by certified or cashiers check made payable to "EPA Hazardous Substances Superfund", shall specifically reference the site and shall be sent to:

United States Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365

G. All penalties related to activities described in Sections B and C of Paragraph XXV begin to accrue on the day that complete

performance is due, and continue through the final day of correction of the noncompliance.

H. Neither the filing of a petition to resolve a dispute nor the payment of penalties shall in any way alter Settlers' ultimate obligation to complete their respective performances as required under this Decree.

I. Settlers may dispute EPA's right to the stated amount of penalties by filing a petition with the Court in accord with Section XXIII (Dispute Resolutions) herein, within 30 days of receipt of the notification of noncompliance. Penalties shall accrue but will not be demanded during this period. If such Settlor loses upon resolution, however, EPA has the right to collect all penalties¹ which accrued prior to and during the period of dispute. Settlers bear the burden of proving that any dispute brought under this subsection is a good faith dispute. If it is found that a Settlor has not invoked the dispute resolution provisions in good faith, EPA reserved the right to seek additional or other sanctions against Settlers.

J. Should CGC fail to meet any interim deadline by not more than ten (10) business days but meet the final deadline, the stipulated penalties for failure to meet any such interim deadline shall, upon meeting such final deadline, be forgiven.

K. If a Settlor refuses to pay stipulated penalties, EPA may institute contempt proceedings in the U.S. District Court for relief. However, nothing in this section shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of a Settlor's violation of this Decree or of the statutes and regulations upon which it is based.

L. No penalties shall accrue during any previously agreed upon extension period or any delay caused by a force majeure. If an extension of time is not granted and force majeure does not apply, EPA has the right to collect penalties which accrued prior to and during the pendency of the Settlor's request for time or claim of force majeure.

M. This section shall remain in full force and effect for the term of this Decree.

XXVI. MODIFICATION

No major modification shall be made to this Consent Decree, without written notification to and written approval of the parties to this Consent Decree and the Court. The notification required by this Section shall set forth the nature of and reasons for the requested modification. No oral modification of this Decree shall be effective.

XXVII. EFFECTIVE AND TERMINATION DATES

A. This Consent Decree shall be effective upon the date of its entry by the Court.

B. Termination of this Consent Decree may only be effected upon completion of all Remedial Action activities as set forth is in Paragraph VII of this Consent Decree or as determined by the Court. Termination of this Consent Decree shall not affect the Covenant Not To Sue, Paragraph XVIII, or Confidentiality Provision, Paragraph XIII or Operating and Maintenance, Paragraph VIII which shall remain in effect as an agreement between the parties.

C. If a Settlor believes that all required work has been completed and EPA disagrees, the dispute resolution process (Paragraph XXII) may be invoked.

D. CGC's liability for response and oversight costs shall not terminate upon termination of this Consent Decree.

XXVIII. RETENTION OF JURISDICTION

A. This Court shall retain jurisdiction over this matter for the purposes of insuring compliance with the terms and conditions of this Consent Decree, and of adjudicating disputes between the parties under this Decree.

B. Plaintiff and Settlers each retain their own right to enforce the terms of this Consent Decree and take any action authorized by federal or state law not inconsistent with the terms of this Consent Decree to achieve or maintain compliance with the terms and conditions of this Consent Decree.

XXIX. NOTICES

Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be forwarded by one party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice in writing to the other parties. Written notice to the individuals listed below shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, the Remedial Project Manager (on behalf of EPA), and the Remedial Action Coordinator (on behalf of the Settlers), respectively.

As to the United States:

Chief, Environmental Enforcement Section
Land and Natural Resources Division
United States Department of Justice
10th and Pennsylvania Ave., N.W.
Washington, D.C. 20530

and

Benjamin Moore
Remedial Project Manager
Environmental Protection Agency, Region IV
345 Courtland St., N.E.
Atlanta, GA 30365

As to the Settlers:

Canadyne-Georgia Corporation
c/o Powell, Goldstein, Frazer & Murphy
Suite 1050
400 Perimeter Center Terrace
Atlanta, Georgia 30346
ATTENTION: Thomas R. McNeill, Esquire
and the Remedial Action Coordinator

Chairman, Peach County Board of Commissioners
Peach County Courthouse
Fort Valley, Georgia 31030

Jeff Liipfert, Esquire
Culpepper & Liipfert
202 Central Avenue
Fort Valley, Georgia 31030

Will V. Toulme, Esquire
Alston & Bird
1200 C&S Bank Building
35 Broad Street
Atlanta, Georgia 30335

XXX. PUBLIC ACCESS TO INFORMATION

A. All data, factual information and documents submitted by the Settlers to EPA pursuant to this Consent Decree shall be subject to public inspection unless Settlers assert a confidential business information or trade secret claim pursuant to applicable federal law. The Settlers shall not assert a confidentiality claim regarding any hydrogeological or chemical data generated as a result of or as part of the Remedial Design or Remedial Action, data submitted in support of a remedial proposal or any other scientific or engineering tests or data generated as a result of or as part of the Remedial Design or Remedial Action (See Section XIII herein).

B. The parties will cooperate in developing a public relations plan which will include periodic public meetings. The Settlers will participate in public meetings if requested to do so by the United States.

XXXI. ADMISSIBILITY OF DATA

For the purposes of any proceeding to resolve a dispute concerning the implementation of this Consent Decree, the parties waive any evidentiary objection to the admissibility into evidence of data gathered or generated or evaluated pursuant to this Decree.

XXXII. RETENTION OF RECORDS

A. Until six (6) years after the completion of the Remedial Action, the Settlers shall preserve and retain all records and documents now in their possession or control that relate in any manner to the Site.

B. Until completion of the Remedial Action and termination of this Consent Decree, the Settlers shall preserve, and shall instruct all contractors, subcontractors, and anyone else acting on the Settlers' behalf at the Site to preserve, all records, documents, and information of whatever kind, nature or description relating to the performance of the Remedial Action at the Site. Upon the completion of the Remedial Action, copies of all such records, documents and information shall be delivered to the EPA Remedial Project Manager. CGC shall provide GDNR and the County one copy of each document not previously provided to those parties.

XXXIII. OTHER PROVISIONS

Each Settlor hereby consents to the terms of this Consent Decree, and hereby knowingly, willingly, and with advice of counsel waives any and all rights to appeal the entry of this Consent Decree.

Each Settlor hereby agrees that except as otherwise set forth herein, service of notice or any legal process for any purpose under this Consent Decree, including its enforcement, may be made by mailing a copy by first class mail, postage prepaid, to its undersigned attorney and representative identified in Section XXIX above. EPA agrees that service of notice or any legal process for any purpose under this Consent Decree including any dispute resolution action may be made by mailing a copy by first class mail, postage prepaid, to representatives of the United States and of EPA identified in Section XXIX.

XXXIV. LODGING OF DECREE WITH THE COURT AND PUBLIC COMMENT

This Consent Decree shall be lodged with the Court for a period of thirty (30) days for public comment pursuant to the provisions of 28 C.F.R. Section 50.7, and for public notice pursuant to the provisions of CERCLA 42 U.S.C. Section 9622(l) and it shall not be submitted to the Court for execution until the expiration of that period. Plaintiff reserves the right to withdraw or withhold its consent to a judgment based on this Consent Decree if the comments, views, and allegations concerning the Decree disclose facts or considerations which indicate that the Decree is inappropriate, improper, or inadequate. All parties reserve the right to oppose an attempt by any person to intervene in this action.

Comments on the Consent Decree shall be submitted to:

William Weinischke
Assistant Attorney General
Land and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

and

Charles E. Rooks
Assistant Regional Counsel
U.S Environmental Protection Agency - Region IV
345 Courtland St., N.E.
Atlanta, GA 30365

Department of Justice

Environmental Protection Agency

Roger J. Marzulla
Acting Assistant Attorney General
for Land and Natural Resources
Washington, D.C. 20530

Thomas L. Adams, Jr.
Assistant Administrator for
Enforcement and Compliance
Monitoring
Washington, D.C. 20460

Samuel A. Wilson, Jr.
United States Attorney by

Assistant United States Attorney
Middle District of Georgia
P.O. Box U
Macon, Georgia 31202

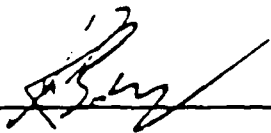
James H. Sargent
Regional Counsel
EPA, Region IV
Atlanta, Georgia 30365

M. Elizabeth Cox
Attorney Advisor
Office of Enforcement and
Compliance Monitoring
Washington, D.C.

William Weinischke
Trial Attorney - Land and
Natural Resources Division
Environmental Enforcement Section
Washington, D.C. 20530

Charles E. Rooks
Assistant Regional Counsel
EPA - Region IV
Atlanta, Georgia 30365

Canadyne-Georgia Corporation



Peach County, Georgia

ENTERED THIS

DAY OF

1987.

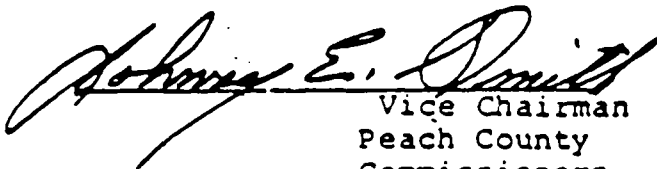
United States District Judge

William Weinischke
Trial Attorney - Land and
Natural Resources Division
Environmental Enforcement Section
Washington, D.C. 20530

Charles E. Rooks
Assistant Regional Counsel
EPA - Region IV
Atlanta, Georgia 30365

Canadyne-Georgia Corporation

Peach County, Georgia


Vice Chairman
Peach County
Commissioners


Clerk, Peach County Commissioners

ENTERED THIS

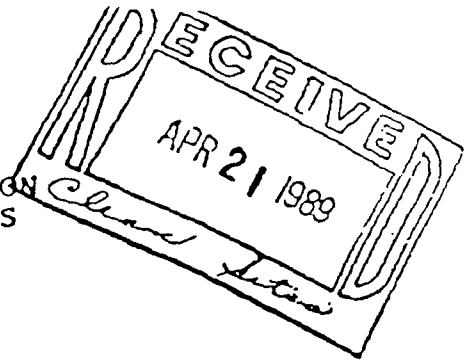
DAY OF

1988

United States District Judge

Received for
GONR

ENVIRONMENTAL PROTECTION DIVISION
DEPARTMENT OF NATURAL RESOURCES
STATE OF GEORGIA



CONSENT AGREEMENT

Peach County, Georgia

AGREEMENT NO. EPD-HW-416

WHEREAS, Peach County, Georgia ("County") is the owner of the Powersville Landfill National Priorities List Site ("Site"); and

WHEREAS, County, acting in good faith to resolve any problems arising from the Site, desires to enter into a settlement with the United States Environmental Protection Agency ("EPA") and Canadyne-Georgia Corporation in connection therewith; and

WHEREAS, in reliance upon the Environmental Protection Division's (the "Division") undertaking to provide certain assistance to County in connection therewith, County expects to execute that certain Consent Decree ("EPA Consent Decree"), a copy of which is attached hereto, in order to effectuate such settlement;

NOW, THEREFORE, it is hereby AGREED that:

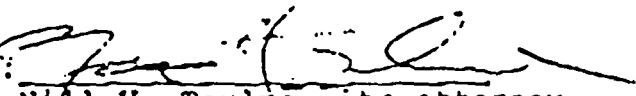
1. The Division shall assist and advise County in reviewing and commenting upon the proposed Operations and Maintenance (O&M) Plan as set forth in Section VII.E. of the EPA Consent Decree, in accordance with the time limitations set forth therein.

2. The Division shall undertake and perform all of the following O&M and post-closure care activities required of County under the EPA Consent Decree, until such time as County is relieved of the obligation to perform such activities:
 - a. Groundwater monitoring and sampling;
 - b. Analysis of groundwater samples;
 - c. Reporting of groundwater monitoring activities and data; and
 - d. Maintenance and repair of the groundwater monitoring system.
3. The Division shall provide technical assistance and advice to County in connection with the other O&M and post-closure activities required of County under the EPA Consent Decree.
4. The Division shall provide assistance and advice to County with respect to County's application for matching funds as set forth in Section VII.F. of the EPA Consent Decree.

It is so AGREED this 29th day of January, 1988.


J. Leonard Ledbetter, Director
Environmental Protection Division

PEACH COUNTY

By: 
Neil V. Roulme, its attorney

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1252, Atlanta, Georgia 30334
J. Leonard Ledbetter, Commissioner
404/656-3500

December 22, 1987

Mr. Lee DeHihns
Acting Regional Administrator
United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

RE: Powersville Landfill Site

Dear Mr. DeHihns:

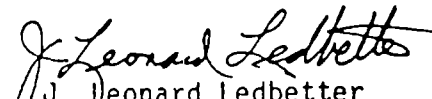
As a follow-up to our meeting with you on December 2, 1987 Canadyne - Georgia Corp. has prepared a written proposal laying out the terms of a proposed funding settlement for the Powersville NPL site.

We have reviewed and endorse the settlement proposal dated December 21, 1987. As proposed, the Department of Natural Resources would commit to award Peach County up to \$200,000.00 in Solid Waste and Water Supply grants to be matched on an equal basis by Peach County. This offer is of course contingent upon such grant funds being made available to the Department of Natural Resources by the Legislature in their annual appropriation.

One additional condition of this endorsement relates to paragraph B.(1) of the December 21 letter from Scott Italiaander, regarding operation and maintenance of the project. The Department of Natural Resources will commit to nothing more than sampling and analytical functions for the ground water monitoring system. The county will have to be responsible for any other operation and maintenance tasks, such as assuring a vegetative cover on the site and maintenance of the alternate water supply system.

We encourage your favorable consideration of this proposal.

Sincerely,


J. Leonard Ledbetter
Commissioner

JLL:jtd(7-10)

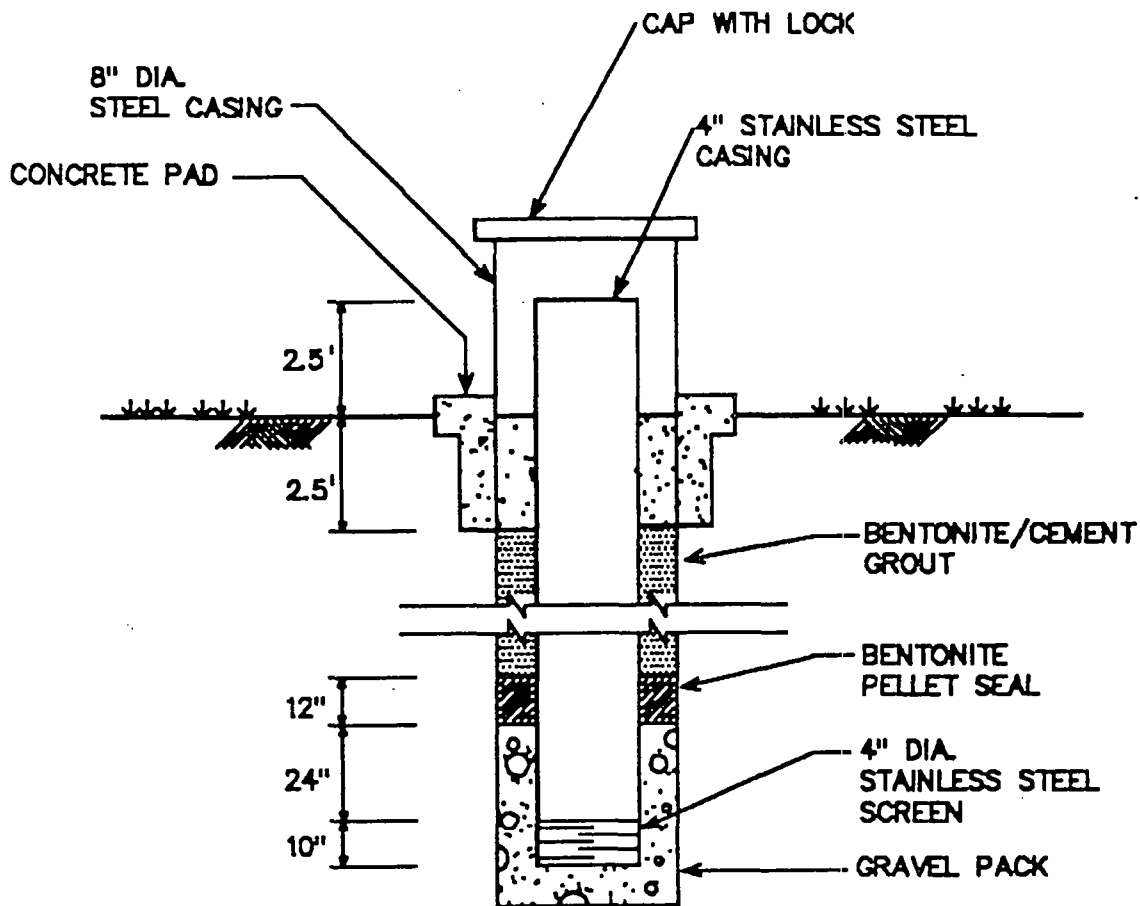
cc: John D. Taylor, Jr.
Robert Bomar
Scott Italiaander ✓
Neil Toulme
Pat Tobin

APPENDIX D
SAMPLE CONTAINER SELECTION, HOLDING TIMES, AND PRESERVATIVES

PARAMETER	CONTAINER	PRESERVATIVE	HOLDING TIME	PERMISSIBLE SAMPLE TYPE	REFERENCE
<u>Water-Low to Medium Concentration Samples</u>					
Organic Compounds - Specified, Extractable and Pesticides	1-gal. glass (amber) or 2.5-gal. glass (amber) with Teflon lined closure	Cool, 4° C	47 days	G or C	A
Metals and other inorganic compounds	1-liter polyethylene with polyethylene lined closure	50% Nitric Acid, pH<2	6 mos	G or C	A
Organic Compounds - Purgeable (VOA)	3 40 mil vials with Teflon lined septum sealed caps	Cool, 4° C 4 drops 1+1 HCl or Cool, 4° C	14 days or 7 days	G or C	A

Abbreviations: G=grab
C=composite

References: A - U.S. EPA Region IV, Environmental Compliance Division,
Standard Operating Procedures and Quality Assurance Manual,
February 1, 1991.



Appendix E

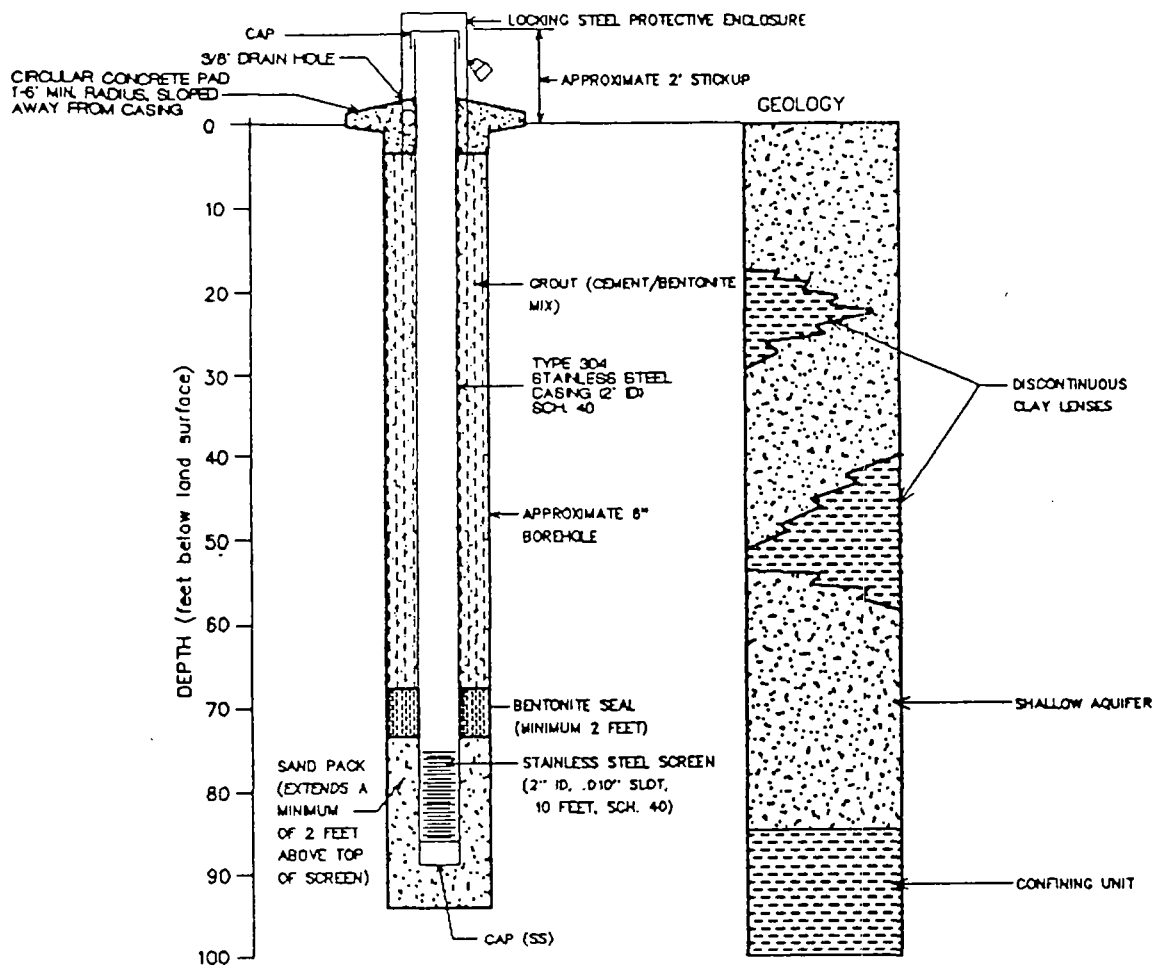
SCALE
NTS
DWN. BY SA
CHK'D. BY KG
APPR. BY TK



**Applied
Engineering &
Science**

TYPICAL MONITOR WELL
CONSTRUCTION INSTALLED
DURING RI/FS
POWERSVILLE LANDFILL SITE

DATE
NOV / 1990
DWG. NO.
5079 B
SHEET NO.



SHALLOW MONITORING WELL
(TYPICAL)

NOTE: THIS FIGURE SHOWS
TYPICAL MONITORING WELL
CONSTRUCTION FOR WELLS
INSTALLED DURING REMEDIAL
ACTION.

Appendix E

SCALE	 Applied Engineering & Science	MONITORING WELL CONSTRUCTION POWERSVILLE LANDFILL NPL SITE CANADYNE-GEORGIA CORP.	DATE
DWN. BY			DWG. NO.
CHK'D. BY			SHEET NO.
APPR. BY			

APPENDIX F
Table F-1
GROUNDWATER ELEVATIONS
CURRENT AND PAST
POWERSVILLE LANDFILL NPL SITE

MONITORING WELL	GROUNDWATER ZONE	WATER ELEVATIONS		
		6\89	2\87	7\86
MW-2	s	373.9	375.5	374.6
MW-3	s	375.8	376.6	376.0
MW-4	s*	375.6	377.8	375.6
MW-5	s*	377.6	dry	dry
MW-6	s*	dry	dry	dry
MW-7	s	374.7	376.1	374.7
MW-8	d	373.2	374.1	374.1
MW-9A	s	375.6	376.1	375.4
MW-10	s	378.4	379.6	378.0
MW-11	s	376.3	377.3	376.4
MW-12	s	375.8	376.6	376.2
MW-13	d	375.2	375.9	376.6
MW-14	d	374.0	374.8	375.1
MW-15	d	376.5	379.8	377.2
MW-16	d	373.9	374.5	374.9
MW-17	d	373.9	374.8	375.6
MW-18	s	373.7	375.3	374.0
MW-19	d	373.6	374.4	374.7

Elevations in feet above mean sea level

Legend

s = shallow

d = deep

* These wells are not in the same zone as others in the shallow aquifer

COLLECTION POINTS FOR MONITORING WELLS
POWERSVILLE LANDFILL SITE

ID NO.	DATE INST.	TYPE	CONST.	SIZE	COORDINATES		ELEV TOP OF SLAB	TOTAL DEPTH (ft)	SCREEN LENGTH (ft)	SCREEN ELEV. (ft)!!	NOTES
					NORTH	EAST					
MW-1	84-01-26	EMW	GS	4	950035.09	614867.15	458.88	107.00	3.0	-	Filled with grout and abandoned
MW-2	84-02-01	EMW	GS	4	949122.97	615194.48	407.28	94.00	10.0	313.28	Screen has 3-4 feet of clay in center
MW-3	84-02-10	EMW	GS	4	949241.10	614526.20	457.84	89.00	3.0	368.84	Screened in clay
MW-4	84-02-17	EMW	GS	4	949353.67	615136.57	407.37	33.00	3.0	374.37	
MW-5	84-02-17	EMW	GS	4	949241.37	615057.01	411.69	36.00	3.0	375.69	
MW-6	84-02-18	EMW	GS	4	949049.08	615032.36	406.12	31.00	3.0	375.12	
MW-7	84-02-15	EMW	GS	4	948747.87	614837.21	423.38	58.00	3.0	365.38	
MW-8	84-02-19	EMW	GS	4	948883.27	615044.90	404.98	135.00	20.0	268.98	20 foot screen with 2 clay zones
MW-9	84-02-18	EMW	GS	4	949649.00	614760.39	409.14	22.00	3.0	387.14	Screened above water level; may be in clay
MW-10	84-08	EMW	GS	4	950020.56	614796.68	464.87	96.00	10.0	368.87	
MW-11	84-11	EMW	GS	4	949759.32	615097.08	436.21	73.50	10.0	362.71	Casing cover missing; screened in clay
*MW9A	86-05-13	NMW	SS	4	949656.80	614778.99	411.21	77.67	10.0	336.36	
*MW12	86-06-05	NMW	SS	4	949699.85	614656.95	416.77	77.50	10.0	341.59	
*MW13	85-05-21	NMW	SS	4	949977.05	614656.62	464.76	204.50	10.0	261.49	Pump stuck in well
*MW14	86-05-17	NMW	SS	4	949873.12	614974.75	434.41	148.00	10.0	288.29	
*MW15	86-07-18	NMW	SS	4	950855.19	614542.78	481.99	145.00	10.0	341.39	
*MW16	86-06-28	NMW	SS	4	949724.27	615331.74	426.75	150.00	10.0	276.10	
*MW17	86-07-03	NMW	SS	4	948734.61	614591.85	436.99	180.00	10.0	260.92	
*MW18	86-0-13	NMW	SS	4	948247.55	615048.16	387.73	110.00	10.0	310.85	
*MW19	86-06-12	NMW	SS	4	949194.91	614990.41	407.11	150.00	10.0	260.58	

!! Elevation at the bottom of the screen (above mean sea level)

* Designates new monitor wells

EMW - Existing monitor well

NMW - New monitor well

GS - Galvanized steel

SS - Stainless steel

Table F-3
CONSTRUCTION DETAILS FOR PRIVATE WELLS
POWERSVILLE LANDFILL SITE

ID NO.	DATE CONST (YEAR)	CONST.	SIZE (in)	COORDINATES		TOTAL DEPTH (ft)	SCREEN DEPTH (ft)	NOTES AND OWNERS
				NORTH	EAST			
PW-1	-			949249.41	615195.95			Lizzie Chapel Church
PW-2	1980	PVC	4	948819.10	612975.26		5.0	Aluah Adams, Jr.
PW-3	1978		4	949849.34	614271.87	133.00	5.0	Aluah Adams, Sr.
PW-4	-		2	950646.77	614047.71	148.00	20.0	Randy Gordon
PW-5	1985		4	951625.14	615178.12	90.00	7.0	John Bowden
PW-5A	-			949315.81	615570.44			Felton Mobley
PW-6	-			951576.98	616065.33	52.00		Johnny Barnes
PW-7	1965			951162.20	616262.67	60.00		Otis Soencer
PW-8	1967			949517.18	615704.30	48.00		Willie Picken
PW-9	1981	GI	2	949689.31	616569.31	100.00	5.0	Joe Lewis
PW-10	-			948610.00	615150.00			(Could not access)
PW-11	1950		4	947883.40	614658.58	90.00	5.0	Mary Hurdle
PW-12	1980		4	947733.07	613669.92	110.00	10.0	Jack Newberry

PVC - Polyvinyl Chloride
GI - Galvanized Iron

Information was not available where none is shown in the table
All coordinates are based on the Georgia State Coordinate System

Table F-4
WATER LEVEL MEASUREMENTS¹
POWERSVILLE LANDFILL SITE

ID NO.	TYPE OF WELL	SCREEN LENGTH	ELEVATION BOTTOM OF SCREEN	WATER ELEVATION		
				FEB 1986	JULY 1986	FEB 1987
MW-1	-	abandoned	-	-	-	-
MW-2	s	10.0	317.98	376.40	374.59	375.49
MW-3	s	3.0	368.54	377.53	376.04	376.60
MW-4	s	3.0	372.87	377.21	375.60	377.77
MW-5	s	3.0	376.19	379.56	**	**
MW-6	s	3.0	376.12	377.12	**	**
MW-7	s	3.0	365.48	376.36	374.68	376.12
MW-8	d	20.0	270.78	376.12	374.06	374.14
MW-9	s	3.0	387.14	387.77	387.44	-
MW-10	s	10.0	368.87	-	377.98	379.60
MW-11	s	10.0	364.91	377.95	376.40	377.30
*MW-9A	s	10.0	325.66	-	375.41	376.14
*MW-12	s	10.0	264.80	-	376.19	376.59
*MW-13	d	10.0	259.74	-	376.58	375.87
*MW-14	d	10.0	284.43	-	375.06	374.53
*MW-15	d	10.0	336.79	-	377.21	376.74
*MW-16	d	10.0	276.67	-	374.90	374.47
*MW-17	d	10.0	257.00	-	375.65	376.79
*MW-18	s	10.0	277.73	-	373.96	375.34
*MW-19	d	10.0	257.14	-	374.66	374.47

¹ Designates new monitor well
** Screened above water table

REFERENCES

- American Iron and Steel Institute, Handbook of Steel Drainage and Highway Construction Products., Third Edition., 1983.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Current Groundwater Condition Study, August 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Cover System Design, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Deed Restrictions, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Geotechnical Study, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Geotechnical Study Sampling Plan, August 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Landfill Gas Production Study, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Landfill Gas Production Study Plan, August 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Monitoring Well Location Study, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Properties Designated to be Supplied with Alternate Drinking Water, December 1989.
- Applied Engineering and Science, Inc., Clean Sites, Inc., Powersville Landfill NPL Site Final (100%) Design Submittal, September 1990.
- Camp, Dresser, and McKee, Inc., Remedial Investigation/Feasibility Study Final Report for Powersville Landfill Site, Peach County, Georgia, January 1988.
- Consent Decree, Civil Action No. 88-310-1-MAC (WDO), December 1988.
- Daniel, Wayne W., Biostatistics: A Foundation for Analysis in the Health Sciences, 3rd Ed., John Wiley & Sons, New York, NY, 1983.
- ICF, Inc., RCRA Guidance Manual for Subpart G Closure and Post-Closure Care Standards and Subpart H Cost Estimating Requirements, OSWER Policy Directive #9476.00-5, November 1986.

Koerner, Robert M., Koerner, George R., HWU, Bao-Lin, "Three Dimensional, Axi-Symmetric Geomembrane Tension Test," Geosynthetic Research Institute, Philadelphia, PA, 1990.

Pope-Reid Associates, Inc., Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Vol. I - Land Disposal Facilities, EPA/530-SW-87-009A, November 1986.

Pope-Reid Associates, Inc., Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Vol. II - Unit Costs, EPA/530-SW-87-009B, November 1986.

Pope-Reid Associates, Inc., Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Vol. III - Treatment and Storage Facilities, EPA/530-SW-87-009C, November 1986.

Pope-Reid Associates, Inc., Guidance Manual: Cost Estimates for Closure and Post-Closure Plans (Subparts G and H), Vol. IV - Documentation, EPA/530-SW-87-009D, November 1986.

U.S. Army Engineer Waterways Experiment Station, Design, Construction, and Maintenance of Cover Systems for Hazardous Waste, PB87-191656, May 1987.

U.S. Army Engineer Waterways Experiment Station, Prediction/Mitigation of Subsidence Damage to Hazardous Waste Landfill Covers, PB 87-175386, March, 1987.

U.S. Department of Commerce, Survey of Current Business, December 1989, pages 16, 234.

USEPA, Contract Laboratory Program Statement of Work for Inorganics Analysis, Multi-media, Multi-concentration, SOW No. 787, Revision, December 1987.

USEPA, Contract Laboratory Program Statement of Work for Organics Analysis, Multi-media, Multi-concentration, SOW No. 787, Revision, July 1987.

USEPA, Covers for Uncontrolled Hazardous Waste Sites, EPA/540/2-85/002, September 1985.

USEPA, Data Quality Objectives for Remedial Response Activities, EPA 540/G-87 003, March 1987.

USEPA, Environmental Research Laboratory, Samplers and Sampling Procedures for Hazardous Waste Streams, EPA-600/2-80-0-18, January 1980.

USEPA, Hazardous Site Control Division, Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, May 1985.

USEPA, Hazardous Site Control Division, Laboratory Data Validation

Functional Guidelines for Evaluating Organic Analyses, May 1985.

USEPA, Hazardous Site Control Division, Laboratory Data Validation Functional Guidelines for Evaluating Pesticide and PCB Analyses, May 1985.

USEPA, Office of Research and Development, Handbook for Sampling and Sample Preservation of Water and Wastewater, EPA-600/4-82-029, 1982.

USEPA, Office of Research and Development, Seminars - Design and Construction of RCRA/CERCLA Final Covers, CERL 90-50, July-August 1990.

USEPA, Office of Solid Waste and Emergency Response, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, SW-846, 1986.

USEPA, Region IV, Engineering Support Branch, Standard Operating Procedures and Quality Assurance Manual, April 1986.

USEPA, Requirements for Hazardous Waste Landfill Design, Construction, and Closure, EPA/b25/4-89/022, August 1989.

USEPA, Superfund Record of Decision: Powersville L.F., GA, EPA/ROD/-R04-87/029, September 1987.

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

SUBSURFACE DRAINAGE TEST

DATE: _____

INSPECTOR: _____ SIGNATURE: _____

WEATHER CONDITIONS: _____

SOIL CONDITION: . . . DUSTY . . . DRY . . . NEUTRAL . . . DAMP . . . SATURATED

VEGETATION HEIGHT: . . . UNDER 6" . . . 6" TO 12" . . . 12" TO 18" . . . 18" TO 24" . . . OVER 24"

COMMENTS: _____

WAS THE HYDROJET LINE UNABLE TO PASS THROUGH ANY SUBSURFACE DRAIN PIPE ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR SUBSURFACE DRAIN PIPE IMMEDIATELY. SEE O&M MANUAL.

VOLUMES

APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 1 ? _____ (GALS.)

APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 2 ? _____ (GALS.)

APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 3 ? _____ (GALS.)

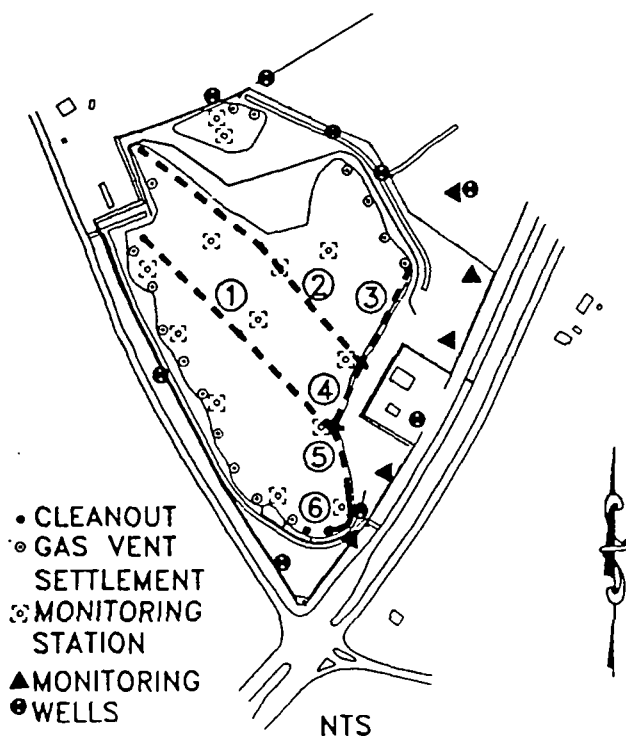
APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 4 ? _____ (GALS.)

APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 5 ? _____ (GALS.)

APPROXIMATE VOLUME OF WATER USED ON SUBSURFACE DRAIN PIPE NUMBER 6 ? _____ (GALS.)

LOCATION OF BLOCKAGE

COMMENTS/LOCATION: _____



POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

PAGE 1 OF 11

EXPLANATION

THIS FORM IS FOR ANNUAL AND SEMI-ANNUAL INSPECTION OF THE SITE STRUCTURES. THE INSPECTOR SHOULD FILL OUT ALL OF THE GENERAL INFORMATION SECTION AND INDICATE WHICH SITE STRUCTURES ARE TO BE INSPECTED BY CHECKING THE APPROPRIATE BOXES AND INITIALLING. EACH STRUCTURE HAS AN INDIVIDUAL INSPECTION SECTION THAT MUST COMPLETED. IN ADDITION THERE IS A SITE SKETCH ON THE LAST PAGE OF THIS FORM THAT SHOULD BE USED TO INDICATE THE LOCATIONS IN NEED OF REPAIR. THIS INSPECTION FORM IS TO PROVIDE A CONSISTANT FORMAT FOR INSPECTION OF SITE STRUCTURES; ANY ADDITIONAL INFORMATION THAT THE INSPECTOR FINDS NECESSARY SHOULD BE ATTACHED AND NOTED BELOW IN THE COMMENTS SECTION.

GENERAL INFORMATION

DATE: _____

INSPECTOR: _____ SIGNATURE: _____

WEATHER CONDITIONS: _____

SOIL CONDITION: . . . DUSTY . . . DRY . . . NEUTRAL . . . DAMP . . . SATURATED . . .

VEGETATION HEIGHT: . . . UNDER 6" . . . 6" TO 12" . . . 12" TO 18" . . . 18" TO 24" . . . OVER 24"

COMMENTS: _____

SITE STRUCTURES

- | | | |
|---|-------|----------|
| ☐ CONCRETE CHANNELS. | _____ | INITIALS |
| ☐ CONCRETE DOWNDRAINS. | _____ | INITIALS |
| ☐ FENCE AND SIGNS. | _____ | INITIALS |
| ☐ DRAINAGE AREAS. | _____ | INITIALS |
| ☐ COVER DRAINAGE PIPES. | _____ | INITIALS |
| ☐ GAS VENTS. | _____ | INITIALS |
| ☐ SETTLEMENT MONITORING STATIONS | _____ | INITIALS |
| ☐ GUARD POST. | _____ | INITIALS |
| ☐ MAINTENANCE ROADS. | _____ | INITIALS |
| ☐ BENCHMARKS. | _____ | INITIALS |

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

PAGE 2 OF 11

CONCRETE CHANNELS

SEDIMENT AND DEBRIS

IS THERE SEDIMENT OR DEBRIS IN THE PERIMETER CHANNEL ?

- ☐ NO, CLEANING IS UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNEL MUST BE CLEANED AS SOON AS POSSIBLE.

IS THERE SEDIMENT OR DEBRIS IN THE SOUTH CHANNEL ?

- ☐ NO, CLEANING IS UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNEL MUST BE CLEANED AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

CRACKS AND FRACTURES

ARE THERE CRACKS OR FRACTURES IN THE PERIMETER CHANNEL ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNELS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

ARE THERE CRACKS OR FRACTURES IN THE SOUTH CHANNELS?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNELS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

JOINT SEPARATION AND DETERIORATION

ARE THERE ANY SEPARATED OR DETERIORATED JOINTS IN THE PERIMETER CHANNEL ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNELS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

ARE THERE ANY SEPARATED OR DETERIORATED JOINTS IN THE SOUTH CHANNEL ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, CHANNELS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

EROSION

ARE THERE ANY PLACES WHERE SOIL EROSION PREVENTS STORMWATER FLOW INTO THE CHANNELS?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIRS ARE NECESSARY, SEE DRAINAGE AREAS SECTION OF THIS FORM.

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

PAGE 3 OF 11

CONCRETE DOWNDRAINS

SEDIMENT AND DEBRIS

IS THERE SEDIMENT OR DEBRIS IN ANY OF THE DOWNDRAINS ?

- ☐ NO, CLEANING IS UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, DOWNDRAINS MUST BE CLEANED AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

CRACKS AND FRACTURES

ARE THERE ANY CRACKS OR FRACTURES IN ANY OF THE DOWNDRAINS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, DOWNDRAINS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

JOINT SEPARATION AND DETERIOATION

ARE THERE ANY SEPARATED OR DETERIORATED JOINTS IN ANY OF THE DOWNDRAINS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, DOWNDRAINS MUST BE REPAIRED AS DESCRIBED IN THE O&M MANUAL AS SOON AS POSSIBLE.

COMENTS/LOCATION: _____

EROSION

ARE THERE ANY PLACES WHERE SOIL EROSION PREVENTS STORMWATER FLOW INTO THE DOWNDRAINS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIRS ARE NECESSARY, SEE DRAINAGE AREAS SECTION OF THIS FORM.

NPL SITE PEACH COUNTY, GEORGIA

PAGE 4 OF 11

ARE THE GATES AND HINGES DAMAGED OR IN NEED OF REPAIRS ?

- ARE ANY FENCE POSTS BENT OR BROKEN ?

- ARE ANY FENCE POST ANCHOR BASES LOOSE OR BROKEN ?

- ARE THERE ANY MISSING TIE WIRES OR LOOSE FENCE SECTIONS ?

- ARE THERE ANY TWISTED, TORN, OR MISSING FENCE SECTIONS ?

- ARE THERE ANY TWISTED, BROKEN, OR MISSING TENSION WIRES ?

- ARE THERE ANY TWISTED, TORN, OR MISSING SECTIONS OF BARB WIRE ?

- ARE ANY OF THE SIGNS TWISTED, FADED, OR MISSING ?

- COMMENTS/LOCATION:

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

PAGE 5 OF 11

DRAINAGE AREAS

STORMWATER DRAINAGE

ARE THERE ANY PLACES WHERE STORMWATER DOES NOT FLOW AROUND BOTH COVERS ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REROUTE STORMWATER FLOWS AROUND COVER. SEE O&M MANUAL.

ARE THERE ANY AREAS WHERE STORMWATER FLOW IS PROHIBITED OR RESTRICTED TO SETTLEMENT ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REROUTE STORMWATER FLOWS AROUND COVER. SEE O&M MANUAL.

DOES THE SIDES OF THE CONCRETE CHANNELS HAVE DEBRIS OR EROSION THAT WOULD RESTRICT STORMWATER FLOW ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR AREA SO STORMWATER FLOW IS NOT RESTRICTED. SEE O&M MANUAL.

DO ANY OF THE GRASS DRAINAGE CHANNELS HAVE DEBRIS OR SEDIMENT BUILD UP ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR AREA SO STORMWATER FLOW IS NOT RESTRICTED. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

VEGETATION AND EROSION

ARE THERE ANY AREAS WITH NO GRASS OR SCATTERED PATCHES OF GRASS ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REVEGETATE AREA AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE THERE ANY AREAS WITH RIPPLES OR SWALES CAUSED BY EROSION ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPLACE SOIL AND REVEGETATE AREAS AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

PAGE 6 OF 11

COVER DRAINAGE PIPE

ARE THERE ANY DAMAGED OR MISSING END CAPS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE END CAP AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE THERE ANY DAMAGED OR BROKEN CLEANOUTS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR CLEANOUT AS SOON AS POSSIBLE. SEE O&M MANUAL

ARE ANY OF THE PIPE OUTLETS BLOCKED BY SEDIMENT, DEBRIS, ROCKS, OR VEGETATION ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REMOVE BLOCKAGE FROM OUTLET AS SOON AS POSSIBLE.

COMMENTS/LOCATION: _____

GAS VENTS

ARE THERE ANY DAMAGED OR MISSING END CAPS ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE END CAP AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE ANY RISERS CRACKED, BROKEN, OR COMPLETELY DESTROYED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE RISER AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

GUARD POST

ARE ANY OF THE GUARD POST BENT, DAMAGED, OR RUSTED TO THE POINT IT NO LONGER PROTECTS THE STRUCTURE ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE GUARD POST AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE ANY OF THE GUARD POST UNEARTHED OR COMPLETELY DESTROYED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE GUARD POST AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

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BENCHMARKS

ARE ANY BENCHMARKS CRACKED, BENT, OR BROKEN ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE THE MONUMENT THE NEXT TIME THE SETTLEMENT MONITORING STATIONS ARE SURVEYED.

ARE ANY OF THE BRASS DISK ILLEGIBLE, LOOSE, OR MISSING ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE BRASS DISK THE NEXT TIME THE SETTLEMENT MONITORING STATIONS ARE SURVEYED.

ARE ANY BENCHMARKS IN NEED OF REPLACEMENT DUE TO SETTLEMENT ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE THE MONUMENT THE NEXT TIME THE SETTLEMENT MONITORING STATIONS ARE SURVEYED.

COMMENTS/LOCATION: _____

SETTLEMENT MONITORING STATIONS

ARE ANY RISERS OUT OF VERTICAL ALIGNMENT ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE RISER AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE ANY RISERS CRACKED, BENT, BROKEN ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE RISER AS SOON AS POSSIBLE. SEE O&M MANUAL.

IS THE GROUT IN ANY OF THE RISERS CHIPPED OR BROKEN ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR GROUT AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE ANY OF THE BRASS DISK ILLEGIBLE, LOOSE, OR MISSING ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE BRASS MONUMENT AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

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MAINTENANCE ROAD

NOTE: THE MAINTENANCE ROAD IS ONLY TO BE INSPECTED ANNUALLY.

ARE THERE ANY AREAS ALONG THE ROAD THAT PREVENT STORMWATER FLOW ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR FLOW LINE AND ROAD AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE THERE ANY AREAS WITH MISSING GRAVEL OR POTHOLES ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPLACE GRAVEL AS SOON AS POSSIBLE. SEE O&M MANUAL

ARE THERE ANY AREAS WITH EXPOSED, TORN, OR MISSING GEOTEXTILE FABRIC ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPLACE GEOTEXTILE FABRIC AND GRAVEL AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION:

NPL SITE PEACH COUNTY, GEORGIA

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ADDITIONAL COMMENTS AND LOCATIONS

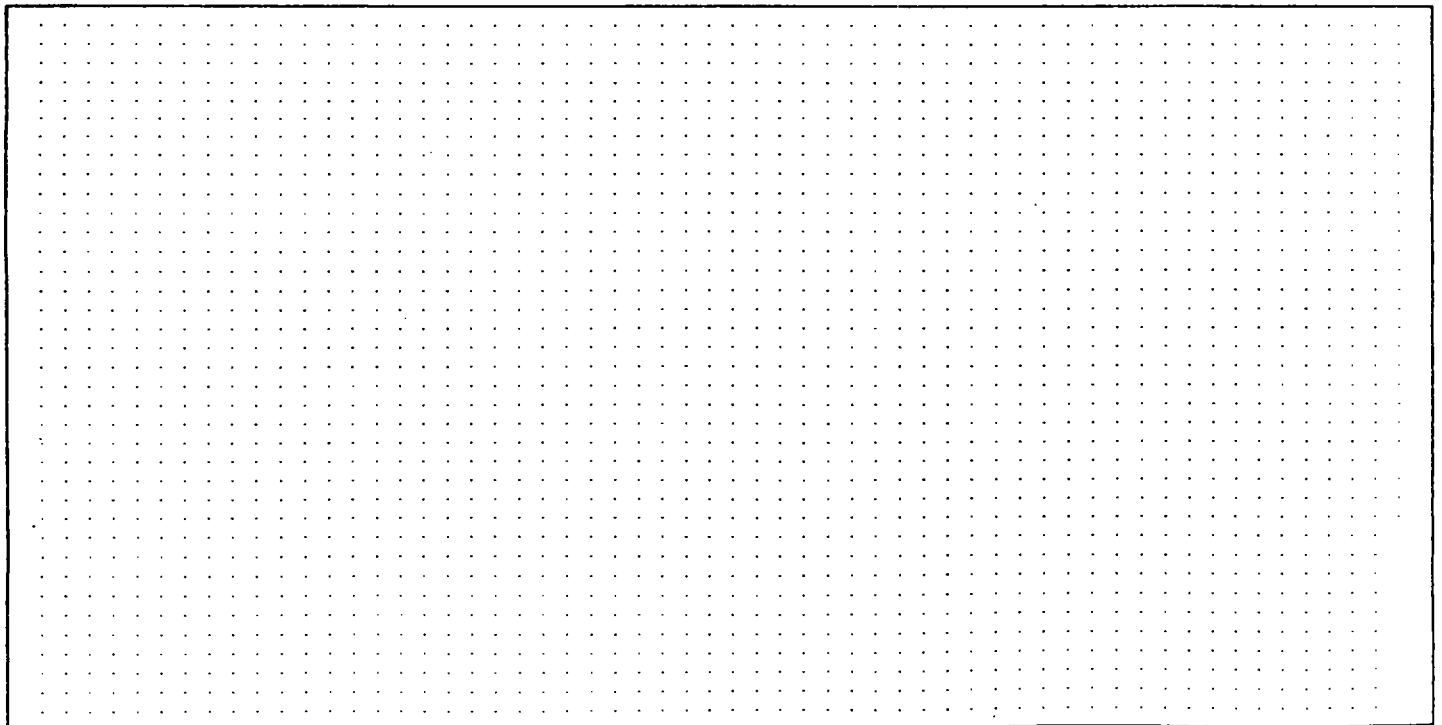
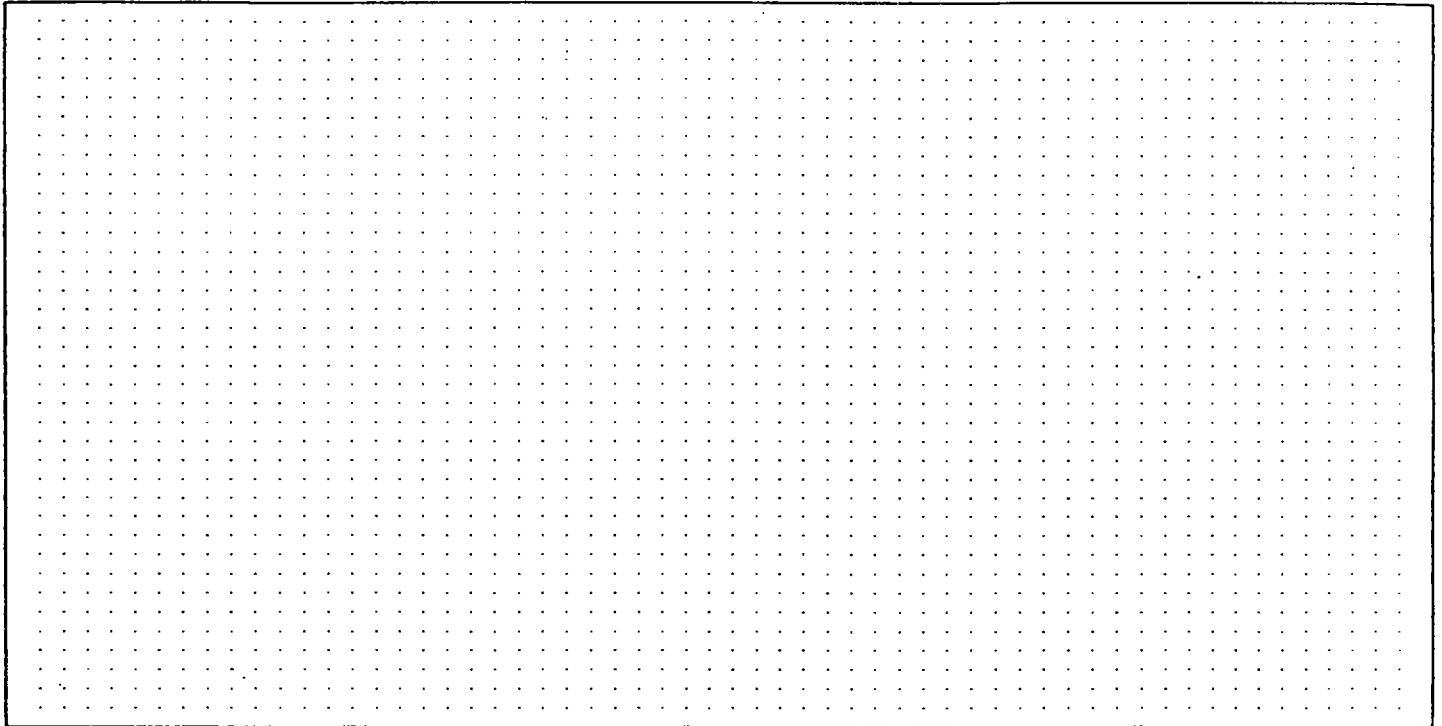
POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

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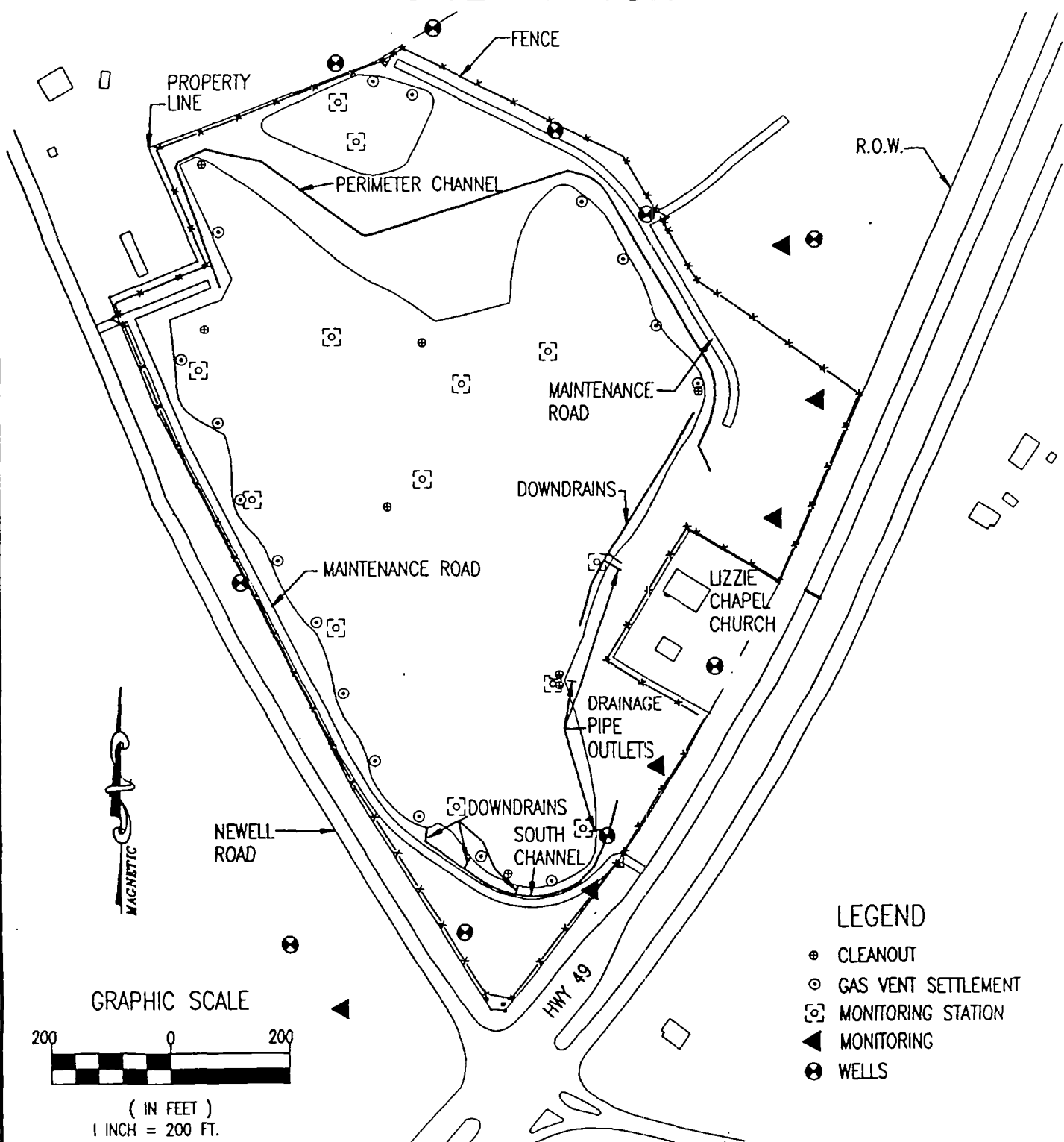
POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF SITE STRUCTURES

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SITE SKETCH



POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

MAINTENANCE OF VEGETATION LOG

DATE: _____

OPERATOR: _____ SIGNATURE: _____

WEATHER CONDITIONS: _____

COMMENTS: _____

MOWING

WAS THE VEGETATION MOWED ? _____ ☐ NO. _____ ☐ YES

FERTILIZATION

WAS THE VEGETATION FERTILIZED ? _____ ☐ NO. _____ ☐ YES

TYPE OF FERTILIZATION: _____

AMOUNT OF FERTILIZATION: _____

WEED AND PEST CONTROL

WAS WEED, INSECT, OR RODENT CONTROL USED ? _____ ☐ NO. _____ ☐ YES

CHEMICAL NAME: _____ BRAND NAME: _____

AMOUNT USED: _____ CONCENTRATION: _____

EXPIRATION DATE: _____ MISCELLANEOUS: _____

RESEEDING

WAS THE VEGETATION RESEEDED AND MULCHED ? _____ ☐ NO. _____ ☐ YES

RESEEDING AND MULCHING AMOUNTS: _____

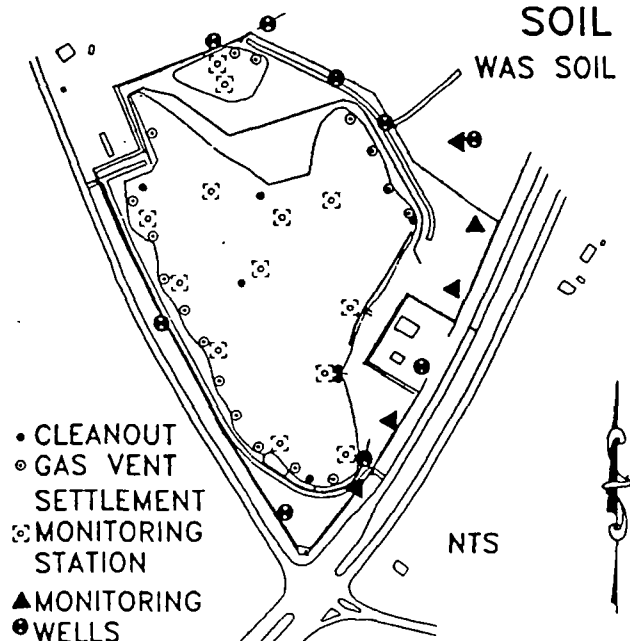
SOIL REPLACEMENT

WAS SOIL REPLACEMENT NECESSARY ? ☐ NO. _____ ☐ YES

AMOUNT OF SOIL: _____

SKETCH LOCATION OF PLACEMENT OF NEW SOIL
USE BOTH THE SKETCH TO THE LEFT AND THE
DESCRIPTION FOR AN ACCURATE LOCATION.

DESCRIPTION: _____



NPL SITE PEACH COUNTY, GEORGIA

PAGE 1 OF 2

SEE SITE SKETCH FOR SETTLEMENT MONITORING STATIONS DESIGNATIONS.

☐ YES, REPAIRS MAYBE NECESSARY ON SUBSURFACE DRAIN OUTLET.

COMMENTS:

POWERSVILLE LANDFILL

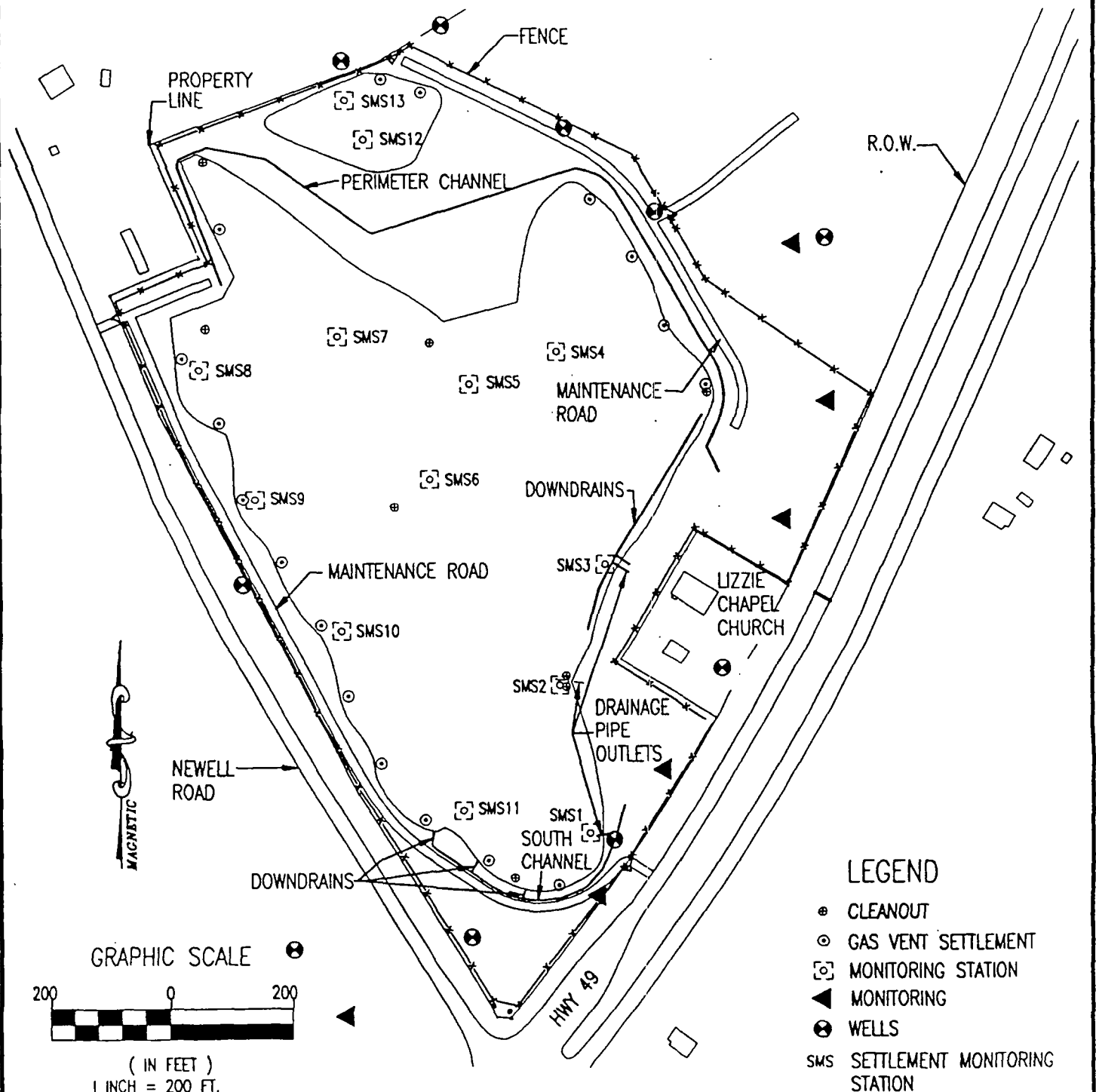
NPL SITE PEACH COUNTY, GEORGIA

INSPECTION SETTLEMENT MONITORING STATIONS

PAGE 2 OF 2

SITE SKETCH

CIRCLE SETTLEMENT MONITORING STATIONS NEAR THE SUBSURFACE DRAINAGE (SMS1-SMS3) OUTLETS THAT HAVE SETTLED A TOTAL OF 6" OR MORE.



POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

DRILLING, SAMPLING, AND WELL REPLACEMENT REPORT

DATE: _____

METHOD OF DRILLING: MUD ROTARY _____ HSA _____ OTHER _____

HOLE DIAMETER: _____ TOTAL FOOTAGE OF BOREHOLE: _____

SAMPLE INTERVAL: _____ EXTRA SPT: _____

START OF DRILLING, SAMPLING, AND WELL INSTALLATION: _____

55 GALLON DRUMS FILLED: _____ LABELED: _____

END OF DRILLING, SAMPLING, AND WELL INSTALLATION: _____

PVC SURFACE CASING SET ☐ YES ☐ NO

LENGTH: _____ DIAMETER: _____ LOT NO. _____

WELL MATERIAL

WELL CASING: MATERIAL: _____ LENGTH: _____ DIA: _____

LOT NO.: _____

WELL SCREEN: MATERIAL: _____ LENGTH: _____ DIA: _____

LOT NO.: _____ SLOT SIZE: _____

WELL INSTALLATION

SAND PACK: TYPE: _____ FEET: _____

BENTONITE SEAL: TYPE: _____ FEET: _____

GROUT SEAL: _____ TYPE: _____ FEET: _____

WELL DEVELOPMENT

METHOD: _____ HOURS: _____ WATER QUALITY: _____

WELL COMPLETION

	YES	NO
PAD		
COVER & LOCK		
GUARD POSTS		

REMARKS: _____

REPRESENTATIVE: _____ DRILLING FORMAN: _____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

CALIBRATION LOG

INSTRUMENT _____

SERIAL NO. _____

MODEL NO. _____

CALIBRATION TYPE: DAILY _____ ROUTINE CHECK _____ AUDIT CHECK _____

CALIBRATION GAS: TYPE _____ CONCENTRATION _____ PPM OR % CYLINDER NO. _____

DATE	INITIAL READING	FINAL READING	CALIBRATION SETTING	COMMENTS	INITIAL

HNU

EXPLOSIMETER

SPAN POT SETTING AT INITIAL READING: _____

O₂ METER CHECK _____ %LEL

PROBE TYPE _____

LEL _____ %LEL

IS SPAN POT SETTING WITHIN NORMAL LIMITS: _____

pH METER pH ____ pH7 ____ pH10 ____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF COVER SETTLEMENT

PAGE 1 OF 3

DATE: _____

INSPECTOR: _____ SIGNATURE: _____

WEATHER CONDITIONS: _____

SOIL CONDITION: . . . DUSTY . . . DRY . . . NEUTRAL . . . DAMP . . . SATURATED . . .

VEGETATION HEIGHT: . . . UNDER 6" . . . 6" TO 12" . . . 12" TO 18" . . . 18" TO 24" . . . OVER 24" . . .

COMMENTS: _____

WERE SETTLED AREAS NOTICED DURING THE VISUAL INSPECTION OF THE LANDFILL COVER ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME.

☐ YES, SETTLED AREAS WERE FOUND.

DIFFERENTIAL SETTLEMENT

MEASURE MAXIMUM SETTLED DEPTH (S)

☐ NO, NO SETTLED AREAS HAVE $S = 6$ INCHES OR MORE.

☐ YES, THE FOLLOWING SETTLED AREAS HAVE $S = 6$ INCHES OR MORE (ASSIGN AND ENTER IDENTIFICATION NUMBERS):

COMPLETE SHEETS FOR EACH LOCATION, DIMENSIONS, AND SKETCH. CALCULATE L/S .

☐ NO SETTLED AREAS HAVE L/S LESS THAN 6.5.

☐ THE FOLLOWING SETTLED AREAS HAVE L/S LESS THAN 6.5 AND MUST BE REPAIRED:

AREA-WIDE SETTLEMENT

MEASURE WIDTH (w) OF PONDED AREAS.

☐ NO, NO PONDED AREAS HAVE $w = 20$ FEET OR MORE.

☐ YES, THE FOLLOWING PONDED AREAS HAVE $w=20$ FEET OR MORE (ASSIGN AND ENTER IDENTIFICATION NUMBERS):

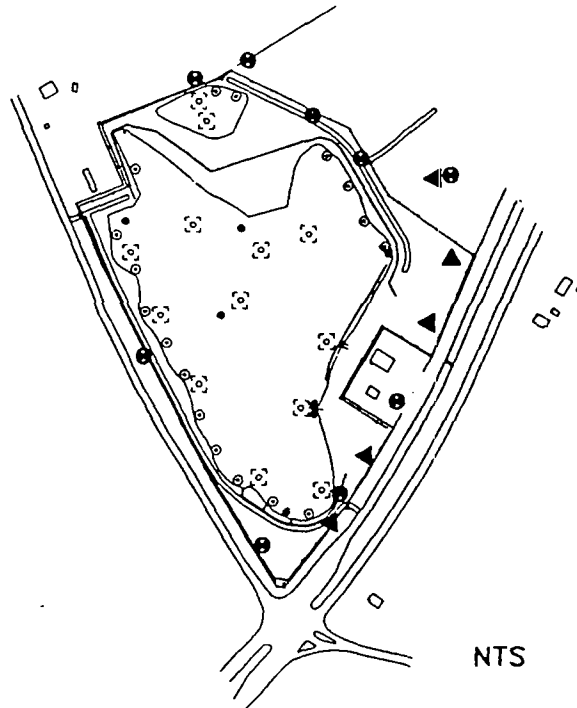
COMPLETE SHEETS FOR EACH LOCATION, DIMENSIONS, AND SKETCH. ALL PONDED AREAS WITH $w=20$ FEET OR MORE MUST BE REPAIRED.

NPL SITE PEACH COUNTY, GEORGIA

PAGE 2 OF 3

SETTLED AREA ID: _____

- CLEANOUT
- GAS VENT
- SETTLEMENT
- MONITORING
- STATION
- ▲ MONITORING
- WELLS



LOCATE SETTLED AREAS FROM TWO SITE STRUCTURES.
USE BOTH THE SKETCH ABOVE AND A
DESCRIPTION FOR AN ACCURATE LOCATION.
DESCRIPTION:

[illegible]

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

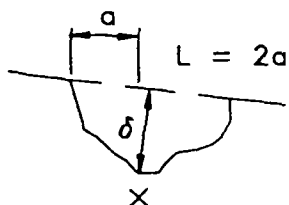
INSPECTION OF COVER SETTLEMENT

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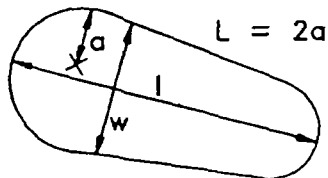
DEPRESSION SKETCH

ID. No. _____

CROSS SECTION VIEW



"a" IS THE DISTANCE FROM THE POINT WHERE δ IS MEASURED TO THE NEAREST EDGE OF THE DEPRESSION.



FOR DIFFERENTIAL SETTLEMENT, "a" AND "l" MEASURE THE SETTLED AREA.

FOR AREA-WIDE SETTLEMENT, "w" AND "l" MEASURE THE PONDED AREA.

MEASUREMENTS

δ _____ (IN FEET)

a _____ (IN FEET)

L _____ (IN FEET)

L/δ _____ (ft./ft.)

w _____ (IN FEET)

l _____ (IN FEET)

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF MONITORING WELLS

PAGE 1 OF 3

DATE: _____

GUARD POSTS

ARE ANY OF THE GUARD POSTS BENT, DAMAGED, OR RUSTED TO THE POINT THEY NO LONGER PROTECT THE STRUCTURE ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE GUARD POST AS SOON AS POSSIBLE. SEE O&M MANUAL.

ARE ANY OF THE GUARD POSTS UNEARTHED OR COMPLETELY DESTROYED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPLACE GUARD POST AS SOON AS POSSIBLE. SEE O&M MANUAL.

COMMENTS/LOCATION: _____

PROTECTIVE COVERS AND CONCRETE PAD

ARE ANY OF THE PROTECTIVE COVERS BENT, DAMAGED, OR SEVERELY RUSTED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR IN ACCORDANCE WITH THE O&M MANUAL AS SOON AS POSSIBLE.

WELLS NEEDING REPAIR ARE: _____

ARE THE HINGES ON THE PROTECTIVE COVER BENT, DAMAGED, OR SEVERELY RUSTED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR IN ACCORDANCE WITH THE O&M MANUAL AS SOON AS POSSIBLE.

WELLS NEEDING REPAIR ARE: _____

IS THE CONCRETE PAD DAMAGED, BROKEN, OR FRACTURED ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR IN ACCORDANCE WITH THE O&M MANUAL AS SOON AS POSSIBLE.

WELLS NEEDING REPAIR ARE: _____

IS THERE STANDING WATER ON OR AROUND THE CONCRETE PAD ?

- ☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ YES, REPAIR IN ACCORDANCE WITH THE O&M MANUAL AS SOON AS POSSIBLE.

WELLS NEEDING REPAIR ARE: _____

WAS THE MONITORING WELL LOCKED AND SECURED ?

- ☐ YES, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.
☐ NO, REPAIR IN ACCORDANCE WITH THE O&M MANUAL AS SOON AS POSSIBLE.

WELLS NEEDING REPAIR ARE: _____

COMMENTS/LOCATION: _____

POWERSVILLE LANDFILL

NPL SITE PEACH COUNTY, GEORGIA

INSPECTION OF MONITORING WELLS

PAGE 2 OF 3

CASING

IS THE MONITORING WELL CAP IN PLACE ?

☐ NO, REPLACE CAP FOR THE FOLLOWING WELLS: _____

☐ YES

IS THERE STANDING WATER BETWEEN THE WELL CASING AND THE PROTECTIVE CASING ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR WEEP HOLE AS SOON AS POSSIBLE FOR THE FOLLOWING WELLS:

IS THE CASING BENT, DAMAGED, OR BROKEN ?

☐ NO, REPAIRS ARE UNNECESSARY AT THIS TIME. EXAMINE AGAIN AT NEXT INSPECTION.

☐ YES, REPAIR IN ACCORDANCE WITH THE O&M MANUAL FOR THE FOLLOWING WELLS:

COMMENTS/LOCATION: _____

SITE:	
BREAK:	8.3
OTHER:	vol. 19

Operation and Maintenance Manual
(Field Procedures)
for
Powersville Landfill NPL Site
Powersville, Georgia
Remedial Action

August 19, 1993

10143600



Applied
Engineering and Science



OPERATION AND MAINTENANCE MANUAL (FIELD PROCEDURES)
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Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Groundwater Sampling and Analysis	Quarterly for 2 years; reevaluate thereafter	quarterly	quarterly	TBD	TBD	2-8, 9-1, 10-6, 13-1	CD Section VII, E	Notification prior to sampling (2.4)
Maintenance of Vegetation						1-20, 9-2, 10-3, 16-2 through 16-7	CD Section VII, E, ii	O&M Activity Report* (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Mowing	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually			
Fertilization	annually	annually	annually	annually	annually			
Application of Lime	every 4-6 years, if necessary							
Inspection and Monitoring for Cover Settlement (includes surveying settlement monitoring stations)	Quarterly for 2 years; semi-annually thereafter; after all extreme weather events	quarterly	quarterly	semi-annually	semi-annually	9-2, 10-8, 15-1 through 15-7	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Inspection of Site Structures						9-3, 10-8, 10-9, 18-1	CD Section VII, E, ii, iv	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Concrete channels, rip-rap, fence & signs, drainage areas, benchmarks, gas vents, settlement monitoring stations, guard posts, cover drainage pipe clearout ports	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually			
maintenance roads	annually	annually	annually	annually	annually			
cover drainage pipes	every 5 years				every 5 years			
resurvey benchmarks	every 10 years				every 10 years			

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Gas Vent Monitoring	Semi-annually for 2 years; annually for 3 years; reevaluate according to section 9.0	semi-annually	semi-annually	annually	TBD	9-4, 10-9, 17-1	CD Section VII, E, i	O&M Activity Report* (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Monitoring Well Maintenance	Semi-annually for 2 years; annually thereafter	semi-annually	semi-annually	annually	annually	14-1, 3-8	CD Section VII, E, i, ii	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Inspection of grout seals for all wells	Beginning of O&M period; every 5 years thereafter	initial inspection		every 5 years	every 5 years			
FML Testing	Following the first cover repair activity after 5, 15, and 25 years; after 4 depressed areas have been repaired				following first cover repair activity after 5 years, 15 years, 25 years	4-10, 4-11, 15-13	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Sprinkling and weed/rodent/insect control	As necessary					16-6, 16-7	CD Section VII, E, i	O&M Activity Report (6.3, 8.3) 1st -2nd year: annually 3rd year on: every five years
Renew Deed Restrictions	Every 20 years				every 20 years	9-4	ROD	O&M Activity Report (6.3, 8.3)
Advise EPA should zoning status (R-1) on Property #3 change to allow drilling of wells.	When change occurs					1-13, 19-1		1st -2nd year: annually 3rd year on: every five years

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

13.0 PROCEDURES FOR GROUNDWATER SAMPLING

Groundwater samples will be collected in accordance with U. S. EPA Region IV Environmental Compliance Division, Standard Operating Procedures and Quality Assurance Manual, February 1, 1991.

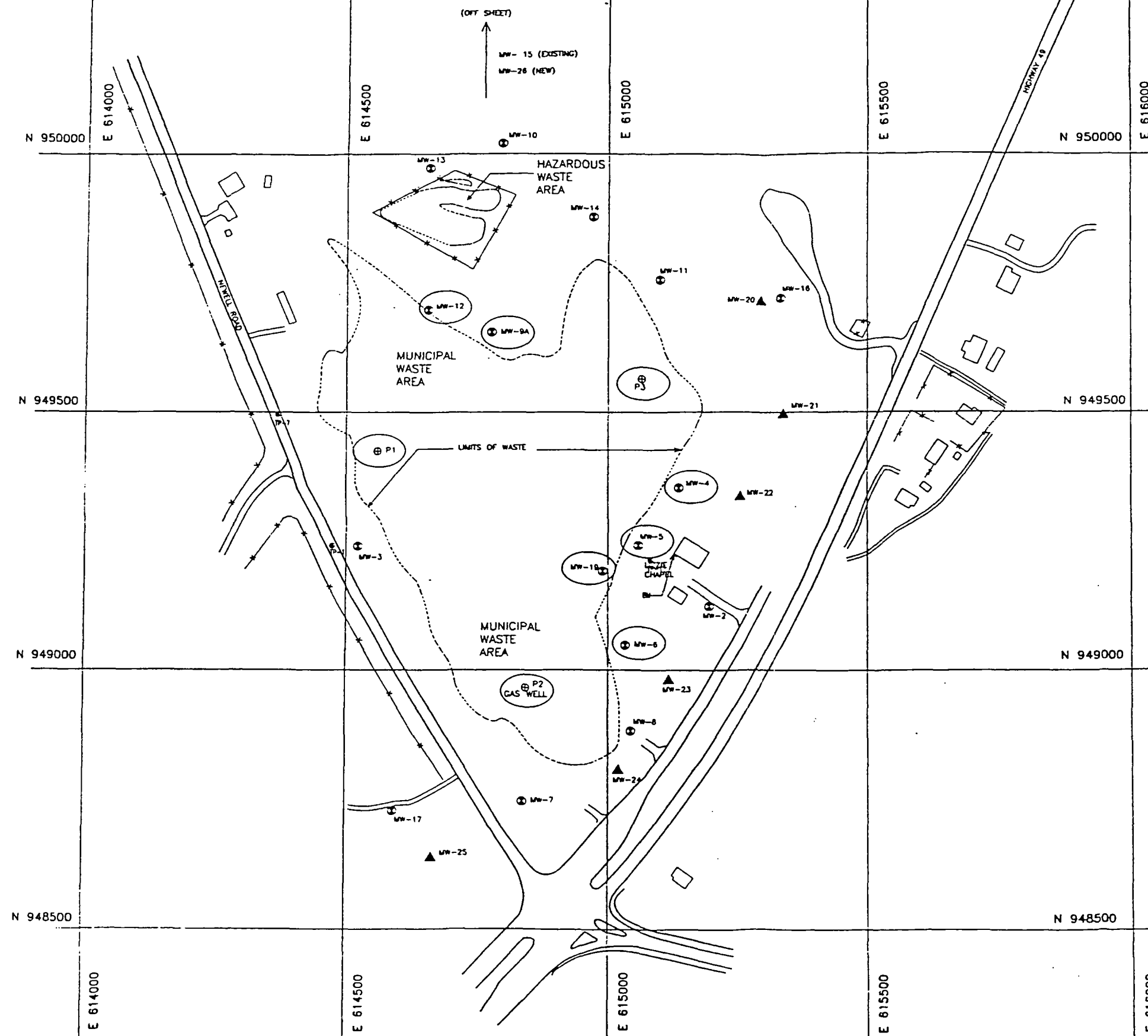
13.1 Schedule

Samples will be collected quarterly for the first two years. Sample collection frequency will be reevaluated after the 2nd year.

Quarterly sampling events will occur in; March, June, September, December, unless otherwise approved by EPA. All samples collected during quarterly sampling events will be analyzed for the following parameters:

- gamma - BHC
- vinyl chloride
- 1, 2 - dichloroethane
- lead
- chromium
- toxaphene

The number of samples collected for each event is presented in Table 13.1.



LEGEND

- ▲ NEW SHALLOW MONITORING WELLS
- WELLS TO BE PLUGGED ARE CIRCLED
- ⊙ EXISTING MONITORING WELL
- ⊕ LANDFILL GAS MONITORING WELL

NOTES:
 1) GRID SYSTEM SHOWN IS GEORGIA STATE PLANE COORDINATE SYSTEM.
 2) WELL LOCATION COORDINATES ARE GIVEN IN THE SPECIFICATIONS.
 3) FOR CONTOUR INFORMATION BEFORE AND AFTER CONSTRUCTION SEE REFERENCE SHEETS 1 REF AND 2 REF.
 4) SURVEY BENCHMARKS WILL BE PROVIDED ON OR NEAR SITE BY OTHERS.

Figure 13.1
Groundwater Monitoring Well Network

FINAL DESIGN

DRAWN BY	SCALE	NO. DATE	REVISION DESCRIPTION	NO. DATE	REVISION DESCRIPTION		Applied Engineering & Science	Atlanta Georgia	POWERSVILLE LANDFILL NPL SITE CANADYNE-GEORGIA CORP.	SITE PLAN	DWS. NO.	80798 - 01
CHECKED BY	1" = 100'	1		4							SHEET NO.	1 of 6
APPROVED BY	DATE	2		5								
TEX	MARCH, 1991	3		6								

Nine monitoring wells are included in the groundwater monitoring network; MW-20, MW-21, MW-22, MW-23, MW-24, MW-25, MW-26, MW-2, and MW-7. These wells are shown on Figure 13.1.

Table 13.1
SAMPLE ANALYSIS ENUMERATION
FOR ANALYTICAL PARAMETERS

ANALYSIS	1,2-DICHLOROETHANE VINYL CHLORIDE	LEAD CHROMIUM	GAMMA-BHC TOXAPHENE	TOTAL
No. of Samples	9	9	9	27
No. of Field Duplicates	1	1	1	3
Rinse Blanks	1	1	1	3
Field Blanks	1	1	1	3
Travel Blanks	1			1
TOTAL	13	12	12	37

13.2 Sampling Procedures

- Cut a slit in a large sheet of clean plastic and place the sheet over the well.
- Calibrate monitoring instruments, an HNu, OVA, or other air monitoring device in accordance with manufacturer's instructions. (Air monitoring equipment will be calibrated prior to each day's activities. After an instrument is cleaned or when background levels drift, the instrument will be recalibrated.) The instrument's response to the manufacturer-provided standard will be recorded in the bound field logbook and on a separate form for the particular instrument. Upon opening the well, monitor the concentration of organic vapors in the well head.
- Static water level and total well depth should be measured with a water level indicator. The volume of standing water should be calculated using the formula:

$$V = 0.168 r^2 h$$

V = Volume of water in gallons
 r = inside radius of well in inches
 h = height of the static water in the column
 to the nearest tenth of a foot

- Wells should be purged before taking samples to clear stagnant water and obtain a representative sample of the aquifer. There are several ways to purge a well:
 - The well can be pumped until three to five times the volume of the well standing water has been removed or the temperature, pH, and specific conductivity of the groundwater have stabilized (three consecutive readings $\pm 10\%$ at a minimum). The pump is placed just below the water level and the water level chased down to ensure that the entire water column has been removed.
 - If the water level has been chased down and the well has been pumped dry, this constitutes an adequate purge of the well and the well can be sampled following recharge.
- Pump rates should be determined and recorded along with pH, specific conductivity, and temperature.
- The water level indicator should be used to determine when the well has recharged sufficiently to sample. Samples should be collected using a peristaltic pump or a closed top teflon bailer. A representative portion of each bailer should be distributed into each sample container. Volatile organic samples should not be disturbed and should be collected first.
- The bailers, water level indicators, and pump should be decontaminated between each well. For each well, new bailer rope (nylon cord) should be used along with new teflon tubing for the pump.
- The pH meter should be calibrated using the two buffer method each time the meter is set up. The reading of the specific conductivity meter will be noted and recorded.

- The samples should be preserved with the appropriate reagent. The pH of the sample will be checked with pH paper to assure that sufficient preservative was added to raise or lower the pH to the required range.
- The sample containers should be sealed and affixed with the appropriate tags and chain-of-custody seals.
- Samples should be placed on ice at time of collection.

13.3 Sample Packing and Documentation

Proper sample packing and shipment is essential to maintain data quality. Samples of groundwater collected during the care period can be considered environmental samples. The following procedure is for the shipment of environmental samples. If the status of samples change, the shipping procedures should be modified to reflect these changes.

13.3.1 Environmental Samples

- Wash off the outside of sample bottles by rinsing them with organic-free water.
- Check to be sure sample bottle labels are completely filled out with the date and time of sample collection.
- Place the signed chain-of-custody (COC) seals across lids of all bottles except VOAs. Place pairs of VOA vials for the same sample in the same ziploc bag and place the COC seals for the VOA vials around the ziploc bag. All other sample bottles are placed in individual ziploc bags.

- Line the cooler with a large garbage bag, or two bags side-by-side if they are not large enough to fill the cooler. Fill the garbage bag with an inch or two of vermiculite.
- Begin filling out the COC form for each cooler, adding each bottle or group of bottles to the form as you place them in the cooler.
- Pour more vermiculite around the bottles as you fill the cooler. Place ziploc bags filled with ice around the bottles in such a way that there is complete coverage of the cooler. Make sure that any VOA vials are as near as possible to the ice. Add a VOA trip blank to any cooler that contains VOA vials.
- Fill out a separate carrier bill for each cooler -- do not place multiple coolers on one bill, as numbered items are harder to trace.
- Place the carrier bill number from the bill form assigned for that cooler on the COC form. Also, record the bill number and the COC number in the site logbook.
- Retain a copy of the completed COC form. Place the remaining copies of the COC forms for a single cooler in a ziploc bag and tape to the inside of the cooler lid.
- Close the latch on the cooler. Wrap strapping tape around the cooler covering the hinges. Also place strapping tape across the drain spout.
- Place the carrier bill in the plastic folder and affix it to the top of the cooler. Do not seal the carrier bill inside.
- Place a mailing label addressed to the appropriate laboratory onto the top of the cooler. This assures delivery if the carrier bill is lost during shipment.

- Fill out COC seals and place them across the cooler opening on at least three sides. Cover the COC seals with transparent packing tape or strapping tape so that the cooler cannot be opened without breaking seals. The sample cooler must be marked "THIS END UP" and arrow labels which indicate the proper upward position of the cooler should be affixed to the container.
- Retain the appropriate copy of the airbill.
- Samples should be shipped overnight with guaranteed next day delivery.

13.4 Decontamination

Decontamination of sampling equipment will be conducted between each location according to the following procedures:

- Scrape off as much of the soil and debris as possible.
- Clean with tap water and a phosphate-free laboratory detergent such as Alconox or Liquinox. Use a brush or scouring pad to remove remaining particulate matter and surface film.
- Rinse thoroughly with deionized water.
- Rinse twice with pesticide-grade isopropanol. Allow the alcohol to dry thoroughly.
- Rinse twice with organic-free water. [High Pressure Liquid Chromatography (HPLC)] - grade water is also acceptable)
- Allow to air dry as long as possible.
- If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse with deionized or distilled water.
- Wrap equipment completely with aluminum foil to prevent contamination.

- When equipment is cleaned in the field, quality control samples should be collected.

13.5 Field Quality Control Samples

To ensure that high sample quality is maintained during collection, preparation, transport, storage, and analysis, several types of quality control samples will be collected. Quality control samples provide a level of assurance that outside influences have been minimized.

13.5.1 Equipment Rinse Blank

Samples of final analyte-free rinse water from equipment cleaning will be collected daily. They should be collected from sampling equipment following decontamination between sample locations.

13.5.2 Field Blanks

A sample of the analyte-free water used for decontamination will be collected and submitted for analysis once for each period of uninterrupted sampling days, e.g., once per week if sampling is not conducted through the weekend.

13.5.3 Travel Blanks

Travel blanks will be obtained from the analyzing laboratory prior to the beginning of field activities. One travel blank will be placed in each shipment of samples which contains samples to be analyzed for VOCs.

13.5.4 Split Samples

Should the EPA request split samples, the samples will be collected in the field by allocating a homogeneous sample into separate containers. The containers will be labeled as split samples and delivered with the proper chain-of-custody to the EPA representative.

13.5.5 Duplicate Samples

Duplicate samples will be collected one in twenty samples. If there are not enough samples to constitute the collection of a duplicate one in twenty, a duplicate will be collected during each separate sampling event, e.g., once per week if sampling is not conducted through the weekend.

13.6 Documentation

All pertinent information regarding the sampling and shipment (e.g., time, date, sample location, analyses to be performed, condition of the well, volume of water purged, number of sample coolers shipped, etc.) shall be recorded in a bound field logbook with consecutively numbered pages.

An original copy of the COC form and the sample shipment air bill will be filed in the main site files. A photocopy of the COC form and the air bills will be included in the semi-annual report sent to EPA.

If samples are to be split with EPA, or their representatives, a form (signed by all parties), that acknowledges the samples were split and that custody of the samples was relinquished to the appropriate party will be filed with the main files and a copy will be included in the report sent to the O&M Administrator.

14.0 PROCEDURES FOR MONITORING WELL MAINTENANCE

The maintenance of the groundwater monitoring system will be conducted in accordance with the Consent Decree and 40 CFR Section 264 Subpart F.

14.1 Schedule

Inspection of monitoring wells shall be conducted semi-annually for the first two years and annually thereafter. Grout seal inspections shall be conducted once at the beginning of the O&M period and every five years thereafter. In the last year of the O&M period, the wells shall be inspected again regardless of the last scheduled test.

14.2 Inspection

Routine inspection of the nine (9) monitoring wells is vital to maintain the quality of groundwater samples collected during the post-closure care period. Inspection of all the monitoring wells shall be conducted as follows:

- The outer protective casing shall be inspected for signs of deterioration.

- The monitoring well shall be locked at all times except for when it is being sampled, inspected, maintained, or repaired. Whether or not the well was locked at the time of these activities shall be recorded. If the well is not locked or if the lock is damaged, the lock shall be replaced.
- Areas of excessive rust, dents, or damage shall be recorded in the field logbook. Special attention shall be paid to the hinges of the cover cap and the locking assembly.
- The hinges shall be replaced if the cap is unable to be lifted or if the hinges have rusted through.
- The weep holes in the outer casing shall be inspected and a rough estimate of the amount of water that is between the well casing and the outer cover shall be recorded.
- The well casing shall be inspected for signs of deterioration and pertinent information recorded.
- The end cap shall be inspected and it shall be recorded if the rubber 'O' ring is in place.
- The concrete pad shall be inspected for cracks and the overall condition of the pad shall be recorded.
- Grout seal inspections should be conducted every five years. These inspections can assist determining whether the integrity of the cement/bentonite bond has been jeopardized with time. Geophysical instruments such as the "Cement Bond Log" or the "Borehole Geophysical Density Log" or any other available technology that produces the same type and quality level of data may be used.
- If the well fails the Grout Seal Inspection, the well shall be replaced if it is in the monitoring well network.
- If the well fails the Grout Seal Inspection, the well shall be abandoned in accordance with the specifications in the Final (100%) Design, September, 1990 or current procedures if the well is not in the monitoring well network.

14.3 Maintenance Activities

Routine maintenance for the monitoring well system includes the clearing of weep holes in the outer protective casing, filling cracks in the cement pads, and the replacement of cement pads, locks, etc., when necessary.

Where a concrete pad is cracked, the area shall be repaired by cleaning the crack and applying a non-shrink grout and trowelling to a smooth finish. If the concrete pad is fractured, the pad shall be replaced in accordance with Contract 2, Final 100% Design Submittal, September 1990.

14.4 Redrilling Monitoring Wells

The expected life span of a monitoring well is limited by the life span and integrity of the grout and seal, which can shrink and crack with time. The University of Wisconsin has conducted studies on clay liners constructed of the same materials and mixtures as the grout used in the construction of monitoring wells. The study indicated that grout will shrink over a period of time and may last only 7 to 10 years (information was provided by the National Water Well Association Technical Assistance Hotline, 614-761-1711).

When the monitoring well stainless steel casing is in need of replacement, the monitoring well shall be abandoned and a new well

shall be constructed as close to the original location as reasonably possible. The wells shall be abandoned and constructed in accordance with the Final 100% Design Submittal, September 1990.

14.5 Abandoned Monitoring Wells

Seven monitoring wells were abandoned during construction. Those wells that remained active but are not in the monitoring network and continued to be inspected according to the same protocol and schedule as the active monitoring wells in the network.

14.6 Documentation

When monitoring wells are redrilled and installed, a boring log and a drilling report shall be completed. The boring log shall be similar to the logs included as an appendix to this plan. *Information shall include:* date; drilling method; well number; driller and drilling company; concrete pad elevation; top of casing elevation; static water level, well casing diameter, length, and type; centralizer; well screen diameter, length, and type; slot size; type of drilling fluid; filter pack, seals and grout; development water volume; a description of the soil depth and elevation; well sketch; and comments. The drilling report shall include; method of drilling; hole diameter; total footage of

borehole; sample interval; extra SPT; start and end of drilling, sampling, and well installation; number of 55 gallon drums filled; PVC surface casing, lot number, length, and diameter; well material (type, length, diameter; lot number); well screen (type, length, diameter, lot number); sand pack; bentonite seal; grout seal; well development method; hours and water quality; well completion (pad, cover, lock, and guard posts); pertinent remarks; signatures of the field representative and drilling foreman.

15.0 PROCEDURES FOR REPAIR OF DAMAGE FROM LANDFILL COVER SETTLEMENT

15.1 Scope

This section describes field procedures for inspecting, monitoring, and repair of settlement of the landfill covers. Procedures are given for differential settlement, area-wide settlement, and settlement of the cover drainage layer pipe outlets. In addition, procedures for monitoring settlement monitoring stations are given.

Inspection, maintenance and repair procedures for cover vegetation and structures are described in Section 16.0 and Section 18.0, respectively.

15.2 Schedule

The procedures in this section shall be performed at the following times:

1. Inspection and monitoring for settlement:

- a. Quarterly for the first two years.
- b. Semi-annually after the first two years.
- c. After extreme weather events.

Note: Inspect after mowing when possible.

2. Repair of settlement:

As soon as practical after repair is found to be required.

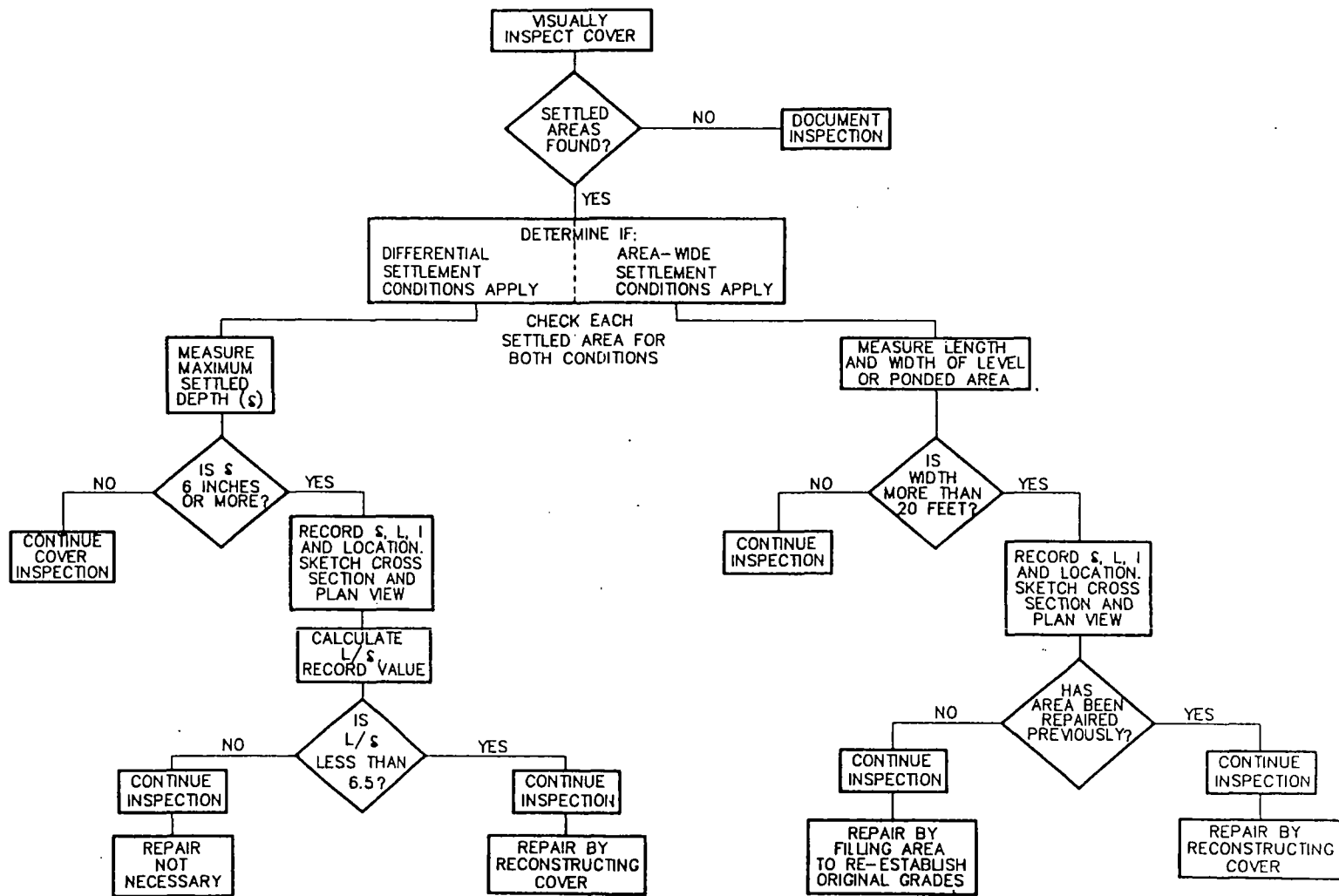


Figure 15.1

SCALE	NO.	DATE	REVISION DESCRIPTION
OWN. BY SAA	1		
CHK'D BY THK	2		
APPR. BY THK	3		
	4		



**Applied
Engineering &
Science**

Atlanta
Georgia

**DECISION DIAGRAM
COVER SETTLEMENT
POWERSVILLE LANDFILL NPL SITE**

DATE
MARCH 1994
DWG. NO.
SHEET NO.

3. Settlement Stations:
Resurvey semi-annually.

15.3 Inspection for Differential and Area-Wide Settlement

Depressed areas need to be identified and measured to determine if each settled area meets the criteria for both differential settlement and area-wide settlement, as defined in Section 4.0. The procedure for examining each settled area found is outlined in Figure 15.1. The field inspection form in Appendix I, "Inspection of Cover Settlement", should be completed whenever the covers are inspected for settlement.

- Conduct a visual inspection of the covers to identify sunken or depressed areas by systematically walking over the cover area in such a manner that the entire cover area is observed.

Each settled area found is measured as described in Section 15.3.1 for differential settlement and in Section 15.3.2 for area-wide settlement.

15.3.1 Evaluation of Differential Settlement Areas

Each settled area found should be evaluated for differential settlement as described in this section.

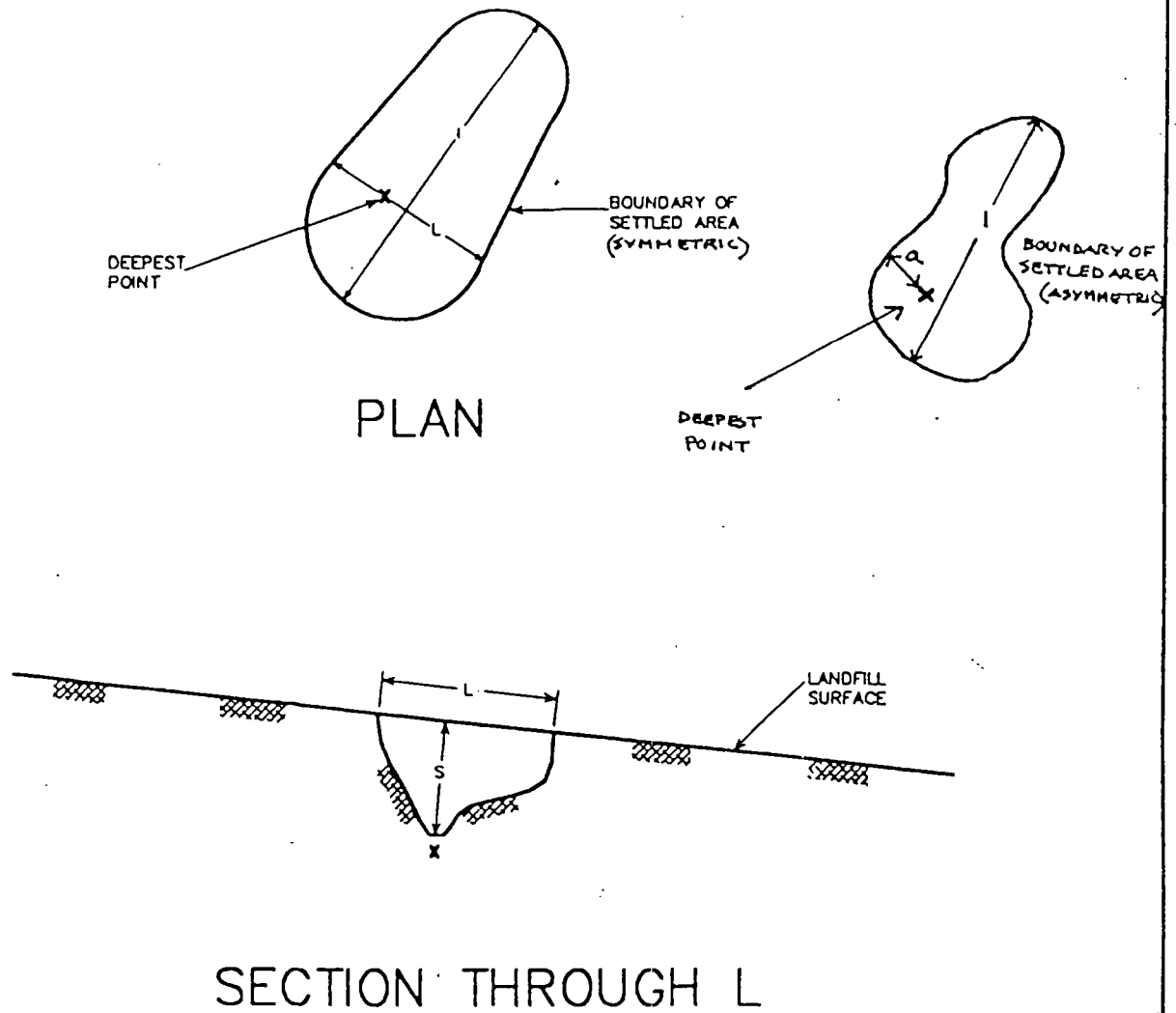


FIGURE 15.2

SCALE	 Applied Engineering & Science	DIFFERENTIAL SETTLEMENT AREA POWERSVILLE LANDFILL NPL SITE	DATE
DWN. BY			DWG. NO.
CHK'D. BY			SHEET NO.
APPR. BY			

- Measure the maximum settled depth (δ) as shown in Figure 15.2. This can usually be done by stretching a tape or cord taught along the minor axis from one edge to the other across the depressed area, then the depth can be measured from the settled distance of the soil surface to the tape.

If the maximum settled depth (δ) is less than 6 inches, nothing should be done. However, the depression should be remeasured during subsequent inspections to monitor whether the area continues to settle.

If the maximum settled depth (δ) is 6 inches or more, proceed as follows:

- Measure and record the shortest distance from the point of maximum settlement to the edge of the depression (a), as shown in Figure 15.2.
- Measure and record the width (w) and length (l) across the depressed area, as shown in Figure 15.2.
- Measure and record the location to the deepest point of the depression using a tape from known

landmarks, i.e., gas vent pipes, settlement stations, monitoring wells, etc.

- Sketch a plan view and cross-sectional view of the depression to show a resemblance of the depressed area's shape. Show location on a site map.

Use the following criteria to evaluate action:

If $\frac{2a}{\delta} > 6.5$, Record value but do not repair

If $\frac{2a}{\delta} < 6.5$, Repair depressed area

a & δ must be the same units (inches or feet)

NOTE: The criterion of $2a/\delta$ is based upon an assumed FML strain at failure of 16% in multiaxial tension with a safety factor of 2.5. After the installed FML is tested as required in the specifications, the value of $2a/\delta$ at which repair is initiated must be recalculated based upon the actual strain at failure, as discussed in Section 4.1.1.1 of this O&M Plan.

If repair is specified, the settled area shall be repaired as specified in Section 15.6.

If no repair is to be performed, on the next inspections find the same settled area and measure δ , a , L , and l . Compare the measurements with past data and with the repair criteria.

15.3.2 Evaluation of Area-wide Settlement

Each settled area found should be evaluated for area-wide settlement as described in this section.

- Measure the width (w) and the length (l) of any settled area that would pond water or is level.

If the width (w) is less than 20 feet, nothing should be done. However, the depression should be remeasured during subsequent inspections to monitor whether the area continues to settle.

If the width (w) is 20 feet or more, the settled area shall be repaired as specified in Section 15.6.

If no repair is to be performed, on the next inspections find the same settled area and measure w and l. Compare the measurements with past data and with the repair criteria.

15.4 Inspection of Drainage Layer Pipe Outlets

If settlement stations located at the pipe outlets settle more than the criteria given below, the pipes will not drain freely.

- Survey and record the elevations of the settlement monitoring stations at the drainage pipe outlets (Station

numbers 1, 2, and 3). The elevations shall be measured by a registered land surveyor and shall be measured to an accuracy of 0.01 feet with respect to site benchmarks.

- For each settlement monitoring station at drainage pipe outlets, subtract the current elevation from the initial elevation measured at the completion of construction and record the result.
- Compare the settlement to the following criteria:

Pipe Exit Location	Settlement Monitoring Station	Settlement Requiring Repair, Feet
1. South exit point	No. 1	1.00 or more
2. Central exit point	No. 2	1.00 or more
3. North exit point	No. 3	1.50 or more

- If the settlement meets the criteria for repair, repair the settled area as specified in Section 15.6.

15.5 Monitoring Settlement Stations

- Survey and record the elevations of all 11 settlement monitoring stations to an accuracy of 0.01 feet vertically. The elevations shall be measured by a

registered land surveyor and shall be measured with respect to site benchmarks.

- Inspect each station with respect to the surrounding surface of the cover, noting whether the station appears to be even with the surrounding surface, if it is in a depressed area, or if the area is higher than the surrounding surface. Record all observations.
- For each settlement monitoring station, subtract the current elevation from the initial elevation measured at the completion of construction and record the result. The initial elevations of the settlement monitoring stations can be found on drawing 447-92-D contained in the Remedial Action Report for Landfill Covers and site work.
- If significant settlement is found (typically more than 0.75 foot), consult the PE and have the PE evaluate the situation.

15.6 Repair of Settled Areas

If any settled areas are designated for repair, the repairs shall be performed as specified below.

15.6.1 Repair of Differential Settlement Area

- Excavate the depressed area to the FML. The excavation should extend to the FML seams on either side of the depressed area and eight feet beyond the depressed area in the direction running along the seams.
- Measure and record the measurements for a , w , l , and δ of the FML. Note and record the condition of the FML. The FML should be inspected by a Professional Engineer (PE) who is experienced with FMLs. The seams adjacent to the depression should also be inspected.
- Unless otherwise directed by the PE, remove the FML over the depressed area.
- Have the foundation soil inspected by a PE experienced in the geotechnical engineering field. Stabilize the depression and fill the area to the original grade with soil as directed by the PE. Record conditions of the foundation and document repair procedures.

- Repair the FML using a new piece of FML supplied by the same manufacturer who provided the original FML at Powersville (Gundle). If the original FML manufacturer is not responsive, use another manufacturer with an equivalent FML which meets the National Sanitation Foundation Standard 54 and the criteria established in the construction contract. Install the FML by a crew supplied by the FML manufacturer or an authorized installer as specified in the construction contracts.
- Replace the drainage layer, filter fabric, and surface soil as specified in the construction contracts. Revegetate in accordance with procedures in Section 16.0.
- Test the removed FML in accordance with Section 15.6.4.

15.6.2 Repair of Area-Wide Settlement

If the settled area requiring repair has not previously been repaired for settlement, or if the level or ponding area is limited to the terrace flow-line area, repair the settled area as follows:

- Survey the settled area before repair to obtain a record of the surface elevations of the area to be repaired.

- Fill the settled area with surface soil to reestablish original grades and revegetate. The surface soil and revegetation shall be performed as designated in Section 16.0.
- Survey the settled area after repair to obtain a record of the surface elevations of the repaired area.

If the settled area or major portion of it has been repaired previously by filling with soil as stated above (except for areas limited to terrace flow-line area), repair the settled area as follows:

- Survey the settled area before repair to obtain a record of the surface elevation of the area to be repaired.
- Excavate the depressed area to the FML and remove the FML. Record perimeter location of the FML removed.

- Have the foundation soil inspected by a PE experienced in the geotechnical engineering field. Stabilize the depressed area and fill the area to the original grade with foundation soil as directed by the PE. Record condition of the foundation and document repair procedures.
- Repair the FML using a new piece of FML supplied by the same manufacturer who provided the original FML at Powersville. If the original FML manufacturer is not responsive, use another manufacturer with an equivalent FML which meets the National Sanitation Foundation Standard 54 and the criteria established in the construction contract. Install the FML by a crew supplied by the FML manufacturer or an authorized installer as specified in the construction contracts.
- Replace the drainage layer, filter fabric, and surface soil as specified in the Final 100% Design Submittal, September, 1990. Revegetate in accordance with procedures in Section 16.0.
- Survey the settled area after repair to obtain a record of the surface elevation of the repaired area.

- Test the removed FML in accordance with Section 15.6.4.

15.6.3 Repair of Drainage Pipe Outlets

Drainage pipe outlets designated for repair shall be repaired as follows:

- Remove the cover materials above the drainage pipe to be repaired, remove the section of drainage pipe from the outlet to 5 feet interior from the landfill boundary. Remove the FML beneath the drainage pipe. Record perimeter location of the FML removed.
- Have the foundation soil inspected by a PE experienced in the geotechnical engineering field. Stabilize the depressed area as designated by the PE. Record conditions of the foundation and document repair procedures.
- Excavate the soil underneath the drain pipe to establish a 9-inch drop from 5 feet interior to the landfill to the landfill boundary.
- Repair the FML using a new piece of FML supplied by the same manufacturer who provided the original FML at Powersville (Gundle). If the original FML

manufacturer is not responsive, use another manufacturer with an equivalent FML which meets the National Sanitation Foundation Standard 54 and the criteria established in the construction contract. Install the FML by a crew supplied by the FML manufacturer or an authorized installer as specified in the construction contracts.

- Install the drainage pipe, drain stone, and filter fabric.
- Replace the drainage layer, filter fabric, and surface soil as specified in the Final 100% Design Submittal, September, 1990. Revegetate in accordance with procedures in Section 16.0.
- Deepen the off cover drainage channels as needed to facilitate drainage away from the cover.
- Test the removed FML in accordance with Section 15.6.4.

15.7 Documentation

Inspection of cover settlement should be recorded on the standardized form developed for this purpose provided in Appendix I, titled "Inspection of Cover Settlement". Information on the form includes: the settlement location with regard to permanent markers, the measurements of δ , a , w , l , and $2a/\delta$, a plan sketch and cross-section sketch of the settled area, and which settled areas are required to be repaired.

Inspection of drainage layer pipe outlets for settlement and settlement monitoring stations shall be recorded on the standardized form developed for this purpose provided in Appendix I, titled "Inspection Settlement Monitoring Stations". Information on the form includes surveyed elevations for all settlement monitoring stations.

All items that are specified to be recorded in this section shall be entered into the field logbook. All details of any repairs shall also be recorded in the field logbook.

Locations of all settled areas found and all areas repaired shall be recorded on a large scale plan drawing of the covers. Copies of the updated large scale drawing shall be stored with the main files.

16.0 PROCEDURES FOR MAINTENANCE OF COVER VEGETATION

Proper management and maintenance of the constructed Remedial Action remedy is essential in maintaining stability and integrity. The following section discusses the maintenance activities required to sustain the vegetative cover, groundwater monitoring system, and the site security fence.

Since the vegetative cover provides primary protection for the final cover, the vegetation must be maintained regularly to be an effective barrier against erosive damage. Maintenance activities are needed to repair damage to the cover vegetation caused by routine weather conditions, as well as periodic natural events such as storms, droughts, frosts, seismic activity or subsidence.

The permanent vegetative cover consists of Annual Rye Grass, Pensacola Bahia Grass, and Sericea Lespedeza. These are hardy, hay-like grasses which require low maintenance. Maintenance of cover should be conducted in accordance with Manual for Erosion and Sediment Control in Georgia, Second Edition, 1990, Georgia Soil and Water Conservation Commission, Athens, Georgia.

16.1 Schedule

Mowing of the covers and other vegetated site areas shall be conducted twice per year, once in the spring and once in the fall after the cover has reseeded, preferably in April and November.

Fertilization of the cover shall be conducted once per year. The pH of the soil shall be maintained during the post-closure care period. Lime may be needed to maintain the pH between 6 and 7 and shall be conducted every four to six years as necessary.

16.2 Mowing

Mowing is recommended because it promotes the growth of the desired vegetation and blocks the growth of trees or shrubs which could penetrate the cover soil with their roots. In the first year, the Rye Grass is expected to grow in before the Bahia Grass and the Lespedeza Sericea. It is important to mow the Rye Grass in the early spring (April) to allow the remaining grass to germinate later. The grass cuttings should also be contained or raked to allow sunlight and moisture for the remaining grasses to germinate. It is recommended to mow in April and November. A minimum of 6 inches of top growth should be maintained.

16.3 Fertilization

The first year after the vegetative cover has been established, the fertilizer required should be 6-12-12 N-P-K (nitrogen, phosphorus, potassium) analysis or equivalent. The fertilizer should be applied at a rate of 1500 lb/acre. The second year, the fertilizer should be 6-12-12, applied at a rate of 1000 lb/acre. After the second year, the fertilizer should be 10-10-10, applied at a rate of 400 lb/acre.

Maintenance fertilizer should be 10-10-10 N-P-K analysis or equivalent applied at a rate of 400 lbs/acre. The top dressing, ammonium nitrate, should be applied 30 lbs nitrogen/acre.

Agricultural lime should be applied one ton/acre every 4 to 6 years or as indicated by soil tests.

16.4 Soil Replacement/Erosion

Replacement of soil due to erosion is critical for preventing depressions from developing on the cover and trapping surface water over the landfill.

After the cover has been established, replacement of soil should be conducted according to the following procedures:

- Eroded area should be filled with a sandy loam to clay loam and 4 inches of topsoil.
- The area filled should be smoothed and brought up to finished grade.

16.5 Reseeding and Mulching

After such time that the cover has been accepted as established, reseeding of eroded areas, dead areas, and bald spots should be conducted according to the following procedures:

- Soil should be replaced as discussed under Section 15.6.
- Bare areas should be fertilized and limed.
- The seedbed should be prepared, seeded, and mulched as discussed below:
 - Lime and Fertilizer Application - lime and fertilizer shall be broadcast uniformly immediately before soil preparation so that it is mixed with the soil during seedbed preparation.
 - Seedbed Preparation - the soil to be seeded shall be loosened to a minimum depth of 4 to 6 inches by tilling. The soil shall then be smoothed and firmed before planting.
 - Seed Application - seeding shall be done on a freshly prepared and firmed seedbed. The seed shall be broadcast, using a cultipacker-seeder, drill, rotary seeder, or other mechanical seeder. The seeds shall be distributed uniformly over the area to be seeded and covered lightly with a cultipacker or other suitable equipment. Seeds shall be applied during the spring.
 - Mulching - all seeded areas shall be mulched. The mulch shall be applied by blower-type or other mulch spreading equipment or by hand. The mulch shall be applied uniformly over the seeded areas covering about

75% of the soil surface. It shall be spread within 24 hours after seeding.

Straw or hay mulch shall be anchored immediately after application by one of the following methods:

1. By emulsified asphalt, (a) sprayed uniformly onto the mulch as it is ejected from the blower machine, or (b) sprayed on the mulch immediately following mulch application when straw or hay is spread by methods other than special blower equipment.

The combination of asphalt emulsion and water shall consist of a homogeneous mixture satisfactory for spraying. The mixture shall consist of 100 gallons of grade SS-1h or CSS-1h emulsified asphalt and 100 gallons of water per ton of mulch.

2. By pressing the mulch into the soil immediately after the mulch is spread. A special "packer disk" or disk harrow with the disks set straight may be used. The disks may be smooth or serrated and should be 20 inches apart. The edges of the disks shall be dull enough to

press the mulch into the ground without cutting it, leaving much of it in an erect position.

3. By synthetic tackifiers or binders applied immediately after the mulch is spread. Synthetic tackifiers will be mixed and applied according to manufacturer's specifications.

4. Fall and winter plantings may include 1/2 bushel of rye or wheat to stabilize the mulch.

5. Plastic mesh or netting with no larger than one inch by one inch mesh shall be used as needed to anchor straw or hay mulch on unstable soils and concentrated flow areas.

- Top Dressing - Top dressing fertilizer shall be applied when the plants grow to a height of two to four inches. It shall be applied uniformly.

16.6 Sprinkling

Under normal circumstances, providing water in excess of natural rainfall is unnecessary. In cases of severe drought, it may become imperative to provide water to the vegetative cover. It is up to the person or persons in charge to render the decision whether to

apply water. The basis for this decision should be good engineering practice and past experience.

16.7 Weed, Rodent, and Insect Control

It is up to the person or persons in charge to render the decision whether weed, rodent, or insect control is necessary. The basis for this decision should be good engineering practice and past experience.

Weeds may need to be removed from the cover system because they may be noxious or provide too much competition with the desired grasses. Weeds may be removed by chemical or mechanical methods. Chemical means should only be used in highly selective situations (U. S. Department of Agriculture, Forest Service, 1979).

Insecticides may need to be used if the harm caused by insects is sufficient to warrant use. Before insecticide is applied, the type of the insect to be controlled should be known and the dangers of using the insecticide should be investigated.

Rodenticides may be used if infestation by rodents is causing excessive harm to the cover. Extreme caution should be used when applying rodenticides due to the effects of these chemicals on other animal life and the environment.

16.8 Documentation

Routine maintenance of the landfill cover shall be recorded on maintenance logs (see Appendix I) and submitted to the O&M Administrator. Information on the form includes:

- Date of mowing
- Date of fertilization and amount used
- Date of soil replacement
 - amount of soil
 - location
- Date of reseeding and mulching
 - amount used
- Application of weed, insect, or rodent control
 - date
 - type (chemical name, concentration, brand, expiration date)
 - amount used

17.0 PROCEDURES FOR LANDFILL GAS MONITORING

Monitoring of landfill gas production shall consist of air monitoring readings taken at the opening of the gas vents with an organic vapor analyzer (OVA) and an HNu Photoionization Detector (HNu) or equivalent. With these two instruments, a wide range of compounds can be detected.

17.1 Schedule

Each of the gas vent (see Figure 3.1) will be monitored as follows:

- Semiannually for the first two years of the O&M period.
- Annually for the next three years. If, after five years, the levels of gas produced are asymptotic when plotted, the monitoring shall be discontinued. If levels are not asymptotic, monitoring shall continue annually another three years. This shall continue until levels reached are relatively constant.

17.2 Monitoring Procedures

Landfill gas monitoring shall be conducted as follows:

- Monitoring of gas production shall be performed using two types of instruments; one with a photoionization detector and one with a flame ionization detector.
- Calibrate monitoring instruments, an HNu, OVA, or other suitable instrument, in accordance with manufacturers instructions. (Air monitoring equipment shall be calibrated prior to each day's activities. After an instrument is cleaned or when background levels drift, the instrument shall be recelebrated.) The instrument's response to the manufacturer-provided standard shall be recorded in the bound field logbook and on a separate form for the particular instrument.
- Record the calibration readings, settings, calibration gas concentration and lot number in the field logbook.
- Record weather conditions in the field logbook.

- Take a background reading with both instruments and record. The photoionization detector is more sensitive to larger aromatic compounds while the flame ionization detector can detect large aromatic compounds as well as the smaller, aliphatic compounds (such as methane).
- Take a reading at the opening of the gas vent with both instruments and record.
- Attach the OVA to a strip chart recorder. Switch the OVA into the gas chromatograph (GC) mode following manufacturer's instructions. Take a reading at the opening of the gas vent with the OVA in GC mode. Record.
- Compare the results of the GC reading to the previous readings at the gas vent. Calculate the concentration of methane.
- Run a known methane (CH_4) standard at least 20 feet upwind of the gas vents if there is more than one peak in the region where methane should elute or if the concentration can not be estimated using the procedure named above.

- Take another reading at the gas vent with the OVA in GC mode. Calculate the concentration of CH₄ detected in the landfill gas using the results of the known standard.
- Repeat procedure for each gas vent.

17.3 Documentation

A calibration log shall also be filed for each monitoring instrument. This log shall accompany the instrument and each subsequent calibration shall be recorded.

The instrument readings shall be entered into a bound field logbook with consecutively numbered pages. The stripchart shall be permanently attached to a page in the logbook. Upon completion of the field activities, copies shall be made of the logbook entries and one copy shall be attached to the report to the O&M Administrator.

18.0 PROCEDURES FOR SITE STRUCTURE MAINTENANCE

This section describes field procedures for performing inspection, maintenance, and anticipated repairs for the following site structures:

- Concrete channels
- Cover drainage pipes
- Sediment basins
- Fence and signs
- Drainage areas
- Maintenance roads
- Benchmarks
- Gas vents
- Settlement monitoring stations
- Guard posts

The site structures are shown in Figure 18.1. Inspection, maintenance and repair for monitoring wells are described in Section 14. Inspection and maintenance of vegetated areas is described in Section 16.

18.1 Schedule

Except for the activities noted below, inspection and maintenance procedures specified in this Section shall be performed semi-annually. Activities not on a semi-annual schedule are the following:

- Maintenance roads shall be inspected and maintained annually
- Cover drainage pipes shall be inspected for collapse sections every 5 years
- Benchmarks shall be resurveyed every 10 years
- Sediment basins shall be cleaned out every 10 years.

NOTES

- 1) ALL CONTOURS REPRESENT FINAL GRADE FOR SURFACE SOIL, NOT INCLUDING TERRACES AND DIVERSION TRENCHES.
- 2) ANY SO THROUGH 25 WILL BE INSTALLED AS SHOWN IN DETAIL.
- 3) SLOPE GRADES AND SOIL DEPTH MUST BE HELD AS SHOWN. ELEVATIONS MAY BE ADJUSTED DUE TO ACCURACY LIMITATIONS IN AERIAL PHOTOGRAPHY.
- 4) ALL AREAS TO BE VEGETATED SHALL REQUIRE A 4" TOP SOIL LAYER.

GRAPHIC SCALE

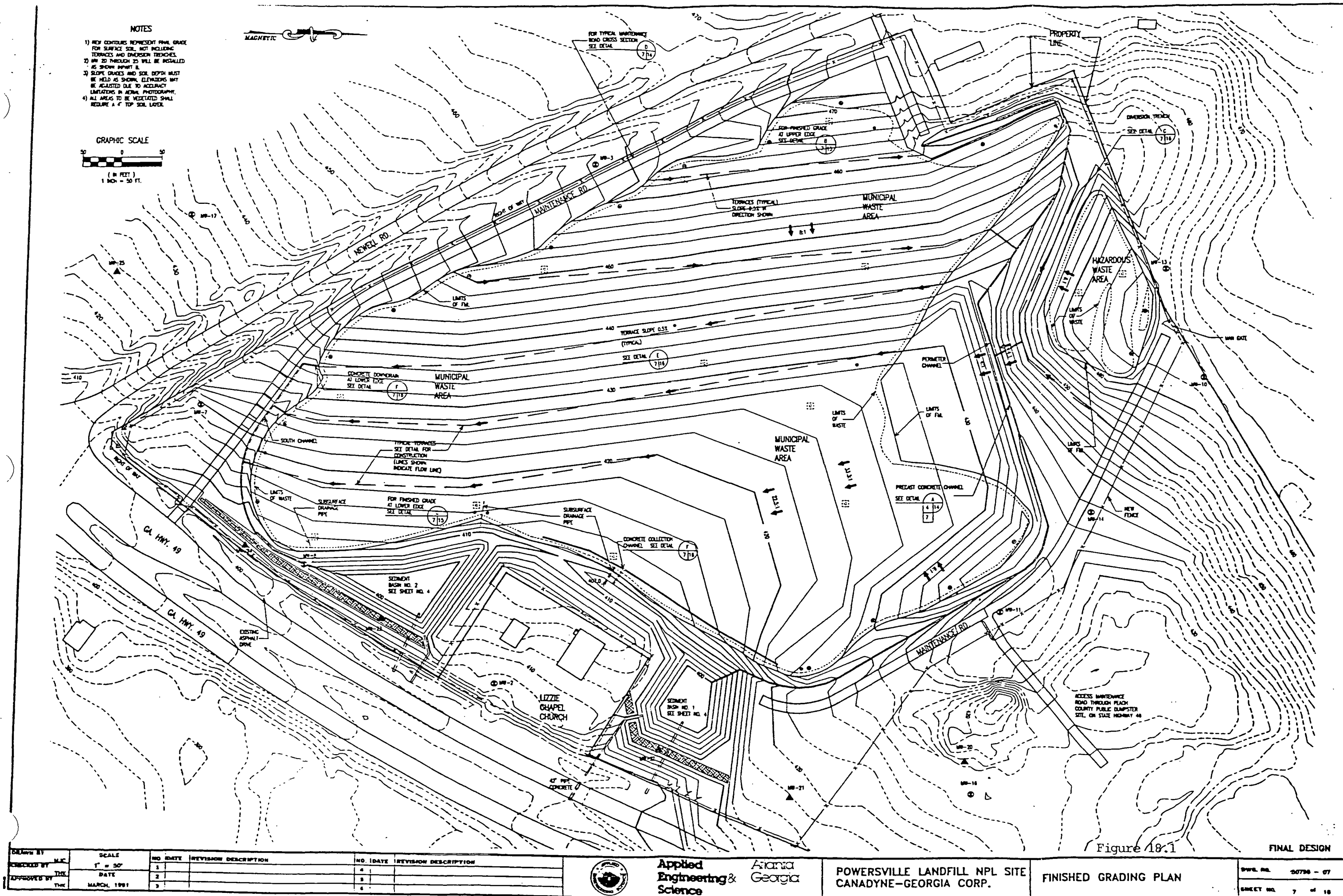
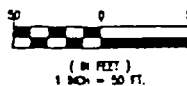


Figure 18.1

FINAL DESIGN

DATE	SCALE	NO.	DATE	REVISION DESCRIPTION	NO.	DATE	REVISION DESCRIPTION
DESIGNED BY	1" = 50'	1			4		
CHECKED BY		2			5		
APPROVED BY		3			6		
	MARCH, 1991						



Applied
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Atlanta
Georgia

POWERSVILLE LANDFILL NPL SITE
CANADYNE-GEORGIA CORP.

FINISHED GRADING PLAN

DWG. NO. 30798 - 07
SHEET NO. 7 of 18

Repairs shall be made soon after inspection procedures identify they are needed.

18.2 Inspections

18.2.1 Concrete Channels

The concrete channels shall be visually inspected by walking the length of each channel. Special attention should be paid to the following: sediment and debris accumulation along the channels; cracking or fractures of the concrete structure; erosion at joints or along edges; and separation or deterioration of joints between concrete sections.

18.2.2 Cover Drainage Pipes and Sediment Basins

The drainage pipe cleanout ports and the sediment basin riser pipes and discharge piping should be visually inspected for damage or blockage.

Drainage pipe outlets discharge piping, and riser pipes should be clear to allow free flow of water. The pipe outlets shall be inspected for blockage from rocks, vegetation, eroded soil, or debris.

Sediment basins should be inspected for buildup of sediment in the bottom. It is expected that sediment basins will require cleaning out every 10 years.

18.2.3 Fence and Signs

The security fence shall be visually inspected by driving along the maintenance roads as far as possible. Those areas inaccessible to the vehicle shall be inspected by walking the perimeter. Attention should be paid to the condition of the posts and concrete in which the posts are seated; the integrity of the gates and the condition of the hinges; the condition of the wire which attaches the fence to the posts and the signs to the fence; the actual shape of the fence wire, barbed wire, and signs; evidence of vandalism or unauthorized entry.

18.2.4 Drainage Areas

Storm water should flow around and away from the landfill covers. It should also flow directly into the concrete channels or other established drainage routes.

The perimeter of both covers should be inspected to check that drainage flows around and away from the covers. The lip and entrance to concrete drainage channels shall be inspected to check for areas where storm water would not readily enter a channel.

Nonconcrete drainage channels shall be inspected for erosion and proper functioning. Special attention should be directed to: areas of no grass or scattered grass; ripples or swells in the soil caused by erosion; settlement that inhibits or prohibits storm water flow. Inspection should be made by walking the cover perimeters and drainage channels.

18.2.5 Maintenance Roads

The maintenance roads should be inspected by walking or driving the length of each road. Attention should be centered on areas where the aggregate has been removed and areas where the geotextile fabric is exposed.

18.2.6 Benchmarks

Benchmarks should be visually inspected to determine if the benchmarks are broken, bent, illegible, or in need of replacement or reestablishment.

18.2.7 Gas Vents

The gas vent pipes shall be visually inspected, with extra attention centered on: cracks or holes in the riser pipe; missing or damaged screens and end caps; and completely destroyed riser pipes.

18.2.8 Settlement Monitoring Stations

Settlement monitoring stations shall be visually inspected, with extra attention centered on: riser pipe that has been moved from vertical; chipped or damaged grout at the end; and integrity of the brass monument and legibility of the stamped numbers.

18.2 9 Guard Posts

Gas vent pipes, settlement monitoring stations, and drainage pipe cleanouts all have guard posts. Guard posts should be visually inspected for damage that may encumber the gas vents or prevent the posts from effectively protecting the gas vents.

18.3 Maintenance

18.3.1 Concrete Channels

Sediment in the channels shall be removed by hand. Silt and debris on the bottom and sides shall be scooped with a blunt-end shovel until the structures are free of sediment.

The sediment shall be discarded downgradient of the channels. Trash and debris shall be removed from the site and disposed in the approved county sanitary landfill.

18.3.2 Drainage Piping and Sediment Basins

If end caps are missing or damaged, the caps shall be replaced immediately.

If cleanout ports are broken, split, or cracked, the damaged end shall be cut off below the damaged area. A new section of pipe should be attached to the existing riser with a compression coupling. The end cap should be replaced.

If any of the drainage outlets, discharge piping, or riser pipes are obstructed, the obstruction shall be removed.

Sediment basins shall be cleaned out every 10 years. The sediment shall be discarded downgradient of the basins. Trash and debris shall be removed from the site and disposed in the approved county sanitary landfill.

18.3.3 Drainage Areas

Areas which are barren or subject to sparse vegetation should be revegetated in accordance with Section 16. In areas where ripples and swells are present, or where areas have eroded, the top soil shall be replaced to reestablish the grade. The soil should be compacted (90%). Only track or low tire pressure equipment should

be used when working on the cover. The area be revegetated in accordance with Section 16.

Settlement of the drainage areas should be filled with top soil, compacted to design grade. The area should be revegetated in accordance with Section 16.

18.3.4 Benchmarks

Benchmarks that are broken or disfigured should be reestablished under the supervision of a registered land surveyor in the State of Georgia. For construction details, refer to the specifications under the Final (100%) Design Submittal, September 1990.

Benchmarks shall be reestablished by a closed, level loop from the USGS monument used to originally establish the benchmarks, which turns through both benchmarks.

18.3.5 Maintenance Roads

In areas where small amounts of aggregate are missing, the aggregate shall be replaced and compacted in accordance with the specifications under the Final (100%) Design Submittal, September 1990.

If the area is large or if the area has been subject to erosion, the geotextile shall be inspected for damage and wear.

18.3.6 Security Fence and Signs

Warning signs, soil to grade level at the bottom of the fence, tension wires, gate parts, small fence sections shall be replaced as needed.

18.4 Drainage Pipe Flow Test

The cover drainage shall be tested to ensure that the pipes do not have any collapse or obstructed places. Flow tests shall be conducted every five years. Flow tests shall also be conducted when there is reason to believe a drainage pipe is clogged or crushed.

Pipe blockage or deterioration shall be checked by pulling a 3-inch diameter plastic sphere through the pipe, with a fish tape, from the upgradient clean-out.

The following test shall be used:

- Begin at the most upgradient clean-out; remove end cap from clean-out and visually examine the clean-out for blockage. Do the same on the next down-gradient clean-out.

- Feed a 200-foot long minimum fish tape (fish tape must be a closed loop-end) into the upgradient clean-out. The entire 200-foot shall be extended into the pipe. If the fish tape is unable to be completely extended, it shall be assumed that the pipe is blocked or collapsed and needs repairing.
- After the fish tape is complete extended, it shall be visible from the downgradient clean-out. Another fish tape or wire shall be used to hook and pull the fish tape out through the downgradient clean-out.
- Attach a 200-foot nylon cord to a 3-inch plastic sphere and then attach the sphere to the end of the fish tape.
- The sphere shall be gently pushed into the downgradient clean-out by one inspector while another inspector applies continuous tension to the fish tape from the upgradient clean-out. The sphere shall be guided until it is clear of the 45° wye. The inspector at the downgradient cleanout shall also feed the nylon cord into the clean-out; this cord is to aid in recovering the sphere shall it become detached or if the pipe is blocked.
- Now the sphere can be pulled, with even continuous tension, through the pipe to the upgradient clean-out.
- If the sphere can be completely pulled through the drainage pipe section, the pipe has no obstructions large enough to impair flow.
- If the sphere can not be pulled completely through the pipe section, it must be assumed that the pipe is blocked or collapsed and needs repair. Mark the nylon cord and pull the sphere back to the downgradient clean-out, disconnect the sphere, and remove the fish tape. The length marked on the nylon cord shall give the inspector a general area in which to begin repairs. The pipe shall be excavated and repaired as given in Section 17.5.3.
- Repeat this procedure for all sections of the drainage pipe system.

18.5 Major Repairs

The procedure to be used to repair site structures are described below.

18.5.1 Concrete Channels

Fracture

If the channels or downdrains are fractured or severely broken, the concrete section should be replaced. The new channel or downdrain shall be constructed in accordance with the specifications under the Final (100%) Design Submittal, September 1990.

Cracks

Where the concrete of the drainage channels and downdrains is cracked, the areas shall be repaired by cleaning the crack and applying a non-shrink grout and trowelling to a smooth finish.

Separation

When channel sections separate horizontally, the joints shall be repaired by cleaning the area between the joints, filling the gaps completely with a non-shrink grout, and trowelling to a smooth finish.

Sections of the channels that have separated vertically shall be repaired in one of two ways:

1. If the channel has settled at the joint 3 inches or less, the gap may be filled with nonshrink grout and trowelled to a smooth flowline.
2. If the channel has settled at the joint more than 3 inches, the sections shall be removed, the soil below regraded to form a smooth joint, and the sections replaced. Foundation soil shall be replaced and compacted (95% compaction per Standard Proctor compaction test ASTM D-698) to re-establish the grade. If the removed sections are badly cracked or damaged, they shall be replaced in accordance with the specifications under the Final (100%) Design Submittal, September 1990. Disturbed areas shall be backfilled and revegetated in accordance with Section 16.1.1.4.

18.5.2 Drainage Piping

If the drainage pipe fails the flow test, the area which is causing the problem shall be located. The following method shall be used to locate and repair the blockage.

- Use a fish tape, air blown mouse, video equipment, or similar devices that will not damage the pipe, to locate the approximate area of the blockage.
- Excavate the soil and aggregate from the suspected section of pipe (10' to 15' long). Use only a track or low tire pressure equipment for the excavation.
- Inspect the pipe for the source of the problem. If the source cannot be determined, repeat the preceding procedures until the blocked area is located.
- Replace the section of the pipe that was the source of the problem.
- Replace the aggregate around the pipe and back fill with soil to a compaction of 90%. Revegetate the area in accordance with Section 16.1.1.4 of this O&M Plan.

18.5.3 Settlement Stations

Damaged settlement stations shall be repaired as described below.

- Bent or broken settlement monitoring stations shall be repaired by cutting the pipe and grout level the damaged area. A new section of rigid polyethylene pipe shall be attached with a compression coupling.
- A survey level loop shall be run to mark the last recorded elevation on the new section of pipe.
- If the disk is to extend above the top of the pipe when installed, the mark on the pipe shall be lowered to compensate for the difference. The pipe shall then be cut off at the marked elevation and filled with grout. Place the brass disk back on top of the station.

- If the disk is damaged or illegible, replace the disk with a new brass disk which is in accordance with the specifications under the Final (100%) Design Submittal, September 1990.

18.5.4 Guard Posts

Guard posts that are damaged or destroyed shall be removed. A new guard post, a 4-inch steel pipe, shall be set 2 feet deep in as close to the same location as possible.

The portion of the new pipe which is below grade shall be encased in concrete.

The entire pipe shall be filled with grout.

New guard posts shall be installed in accordance with the specifications under the Final (100%) Design Submittal, September 1990.

18.5.5 Gas Vents

Riser Pipe

- If the riser pipe is broken, cracked, or disfigured, the pipe shall be cut off below the damage.
- A new section of polyethylene pipe shall be attached to the existing riser with a compression coupling.

- Attach a new wye, screen, and end cap to the new section. The original wye, screen, and end cap may be used if in good condition.

Screen/End Caps

- The end cap shall be replaced if it is damaged, broken, torn, or cracked.
- If the screen or end cap are missing, the wye shall be inspected for possible debris which may obstruct gas flow. The inspection shall be done visually using a fish tape to check the entire length of riser. Once the debris is removed, the screen and end cap shall be replaced.

18.5.6 Maintenance Roads

- If the fabric needs to be replaced, it shall be installed in accordance with the specifications under the Final (100%) Design Submittal, September 1990.
- Once the fabric is replaced, 6 inches of aggregate shall be placed and compacted in accordance with the specifications under the Final (100%) Design Submittal, September 1990.

18.5.7 Security Fence and Signs

Fence wire, posts, and gates shall be replaced in accordance with the installation specifications contained in the Final 100% Design Submittal, September 1990.

Missing or unreadable signs shall be replaced. The sizes of the lettering and underlining are presented in the following table:

LETTERING AND UNDERLINING SIZES

SIGN TITLE	HEIGHT
'U.S. EPA'	$1' \frac{3}{16}"$ high
'Superfund Project'	$\frac{5}{8}"$ high
'Danger'	$1' \frac{3}{16}"$ high
Line under 'Danger'	$\frac{1}{8}"$ high
'No Trespassing'	$\frac{5}{8}"$ high
'Hazardous Substances May Be Present'	$\frac{5}{8}"$ high

The signs shall be reproduced in accordance with the specifications of the Final 100% Design Submittal, September 1990.

18.6 Documentation

O&M activities for site structures shall include Inspection and Maintenance Reports, Drainage Pipe Test Reports, and Record of Major Repair Reports.

Inspection and Maintenance Reports shall include the following data:

- Structures inspected and their condition, including description and location of all structures requiring maintenance or repair
- Inspection procedures used
- Maintenance procedures performed and date
- Date of repairs made
- Activities included in the repairs

Drainage Pipe Test Reports shall include description of procedures, results of tests, and date the tests were conducted.

The Record of Major Repair Reports shall include a description of the problem prior to repair, the actual repairs, and the dates the repairs were performed.

All reports shall be submitted to the O&M Administrator.

19.0 DEED RESTRICTIONS

19.1 Notification to EPA

EPA shall be notified if the zoning status that is currently applicable to Property #3 (i.e., R-1) is changed. If such a change occurs, notify EPA in writing at:

South Superfund Remedial Branch
U.S. Environmental Protection Agency
Region IV
345 Courtland Street, NE
Atlanta, GA 30365
(404) 347-2643

SITE:	
BREAK:	8.3
OTHER:	vol. 20

Operation and Maintenance

for

Powersville Landfill NPL Site Powersville, Georgia

Roles and Responsibilities

among

Canadyne-Georgia Corporation,

Peach County

and the

Environmental Protection Division of the State of

Georgia Department of Natural Resources

September 1993

10143599



ROLES AND RESPONSIBILITIES

The roles and responsibilities of Canadyne-Georgia Corporation (CGC), Peach County (County), and the Environmental Protection Division of the State of Georgia Department of Natural Resources (EPD) pertaining to O&M activities at the Powersville Landfill NPL Site are designated in three documents:

- 1) the Consent Decree (Consent Decree), Civil Action No. 88-310-1-MAC (WDO); between the United States of America, Canadyne-Georgia Corporation, and Peach County, Georgia; December, 1988 (Attachment 1); and
- 2) the "Consent Agreement" (Side Agreement); between the EPD, and Peach County, Georgia; Agreement No. EPD-HW-416; dated January 29, 1988 (Attachment 2); and
- 3) a letter from EPD, J. Leonard Ledbetter, Commissioner, EPD, to Mr. Lee DeHihns, Acting Regional Administrator, U.S. EPA Region IV; dated December 22, 1987 (Attachment 3).

Each of the documents is discussed below:

Consent Decree

The Consent Decree requires implementation of the remedy designated in the ROD, and outlines the related contributions and responsibilities of CGC, the County, and EPA. Section VII.E of the Consent Decree states that:

"CGC shall be responsible for designating O&M activities undertaken in connection with the remedial work. CGC shall prepare an O&M Plan that ensures the long-term effectiveness of the remedial activities required by this Decree. The O&M Plan will contain the post-closure care requirements found in 40 CFR Part 264 including but not limited to ... CGC shall submit a draft O&M Plan to EPA ... CGC shall submit a draft O&M Plan to GDNR and the County ..."

The Consent Decree (Section VII.E) continues with:

"The County shall be responsible to, and hereby covenants in favor of CGC that it will, conduct and fund ordinary O&M activities undertaken in connection with the remedial work and ordinary post-closure requirements, as set forth in the O&M Plan, but not including the provision of a financial assurance mechanism for post-closure care; provided, the County's responsibility hereunder shall not include extraordinary repairs in excess of \$5000 in any 12-month period, and that such repairs shall be the sole responsibility of CGC, provided further, that this exclusion

shall be inapplicable in such proportion as such repairs are caused by the negligence of County, its employees and agents.

Notwithstanding anything herein to the contrary, CGC shall be liable to EPA for the conduct and funding of all O&M activities and post-closure care."

Therefore, based on the Consent Decree, it is the primary responsibility of the County to implement the following:

- all "ordinary O&M activities"; and
- any "extraordinary repairs" which do not exceed \$5000 in any 12-month period.

Definitions

The Consent Decree does not provide an explicit definition of the terms "ordinary O&M activities" and "extraordinary repairs". However, based on records of past correspondence among all parties and the intent of the Consent Decree and the Side Agreement (discussed further below), these terms are defined as follows:

"Ordinary O&M activities" are those routine and predictable activities which are necessary to ensure the long-term effectiveness of the remedial actions taken at the site. Examples of "ordinary O&M activities" include regular groundwater monitoring, sampling and analysis; landfill gas monitoring, maintenance of monitoring wells and site structures such as channels, downdrains, sediment basins, fences, roads, etc.; maintenance of vegetative cover; repair of damage to the landfill cover or structure caused by differential or area-wide settlement, maintenance of the alternate drinking water system; and associated inspections and reporting. Ordinary O&M activities are described in the following sections:

O&M PLAN

Section 2.0 - Ordinary O&M Activities for Groundwater Monitoring

Section 3.0 - Ordinary O&M Activities for Site Structures

Section 4.0 - Ordinary O&M Activities for Landfill Cover Settlement

O&M MANUAL

Section 13.0 - Procedures for Groundwater Sampling

Section 14.0 - Procedures for Monitoring Well Maintenance

Section 15.0 - Procedures for Repair of Damage from Landfill Cover Settlement

Section 16.0 - Procedures for Maintenance of Cover Vegetation

Section 17.0 - Procedures for Landfill Gas Monitoring

Section 18.0 - Procedures for Site Structure Maintenance

Other sections of the O&M Plan and Manual address reporting and data management requirements, post-closure notices and financial assurance, post-closure certification, schedule, contacts, and requirements for amendments to the O&M Plan; which apply to both ordinary O&M activities as well as extraordinary repairs.

"Extraordinary repairs" are those repairs which are necessitated by damage caused by extreme conditions, highly unusual conditions, or by circumstances which are not predictable. Examples of these conditions would include such events as hurricanes, tornadoes, fires, natural disasters, vandalism, trespass onto property, riots, wars, etc. Extraordinary repairs, if necessitated by the occurrence of an event such as described above, will be conducted according to the criteria and procedures described in the O&M Plan for ordinary O&M activities. Extraordinary repairs are discussed further in Section 5.0 of the O&M Plan.

Consent Agreement (Side Agreement)

The Side Agreement between the County and EPD states that EPD will provide certain assistance to the County to help the County in fulfilling the County's responsibilities for implementing the O&M activities under the Consent Decree. This assistance includes the following:

1. EPD will perform all of the following O&M and post-closure care activities required of the County under the Consent Decree until such time as the County is relieved of the obligations to perform these activities:
 - a. Groundwater monitoring and sampling;
 - b. Laboratory analysis of groundwater samples;
 - c. Reporting of groundwater monitoring activities and data; and
 - d. Maintenance and repair of the groundwater monitoring system. In addition to this, EPD has agreed it will inspect, but not repair, wells that are not in the monitoring network. (This agreement was made during the final inspection meeting on May 24, 1993.)

2. EPD will provide technical assistance and advice to the County in connection with the other O&M and post-closure activities required of the County under the Consent Decree.
3. EPD will provide assistance and advice to the County with respect to the County's application for matching funds as set forth in the Consent Decree.

EPD Letter

The EPD letter to EPA discusses, among other things, the responsibilities of EPD and Peach County concerning O&M activities. The letter refers to a written proposal prepared by CGC laying out the terms of a funding settlement for the site. The letter states that "The Department of Natural Resources EPD will commit to nothing more than sampling and analytical functions for the groundwater monitoring system. The county will have to be responsible for any other operation and maintenance tasks, such as assuring a vegetative cover on the site and maintenance of the alternate water supply system."

Summary

Based on the Consent Decree, the Side Agreement, and the EPD Letter, as discussed above, the responsibilities for conducting O&M activities are as follows:

- EPD will conduct all groundwater monitoring, sampling, analysis, reporting, and maintenance and repair of the groundwater monitoring network; and will forward copies of all documentation thereof (as described in this O&M Plan) to the O&M Administrator. EPD's agreement to provide copies of the quarterly sampling reports to the O&M Administrator is documented in their letter of June 11, 1993 to Clean Sites.
- The County will conduct all other ordinary O&M activities, and will forward copies of all documentation thereof (as described in this O&M Plan to the O&M Administrator).
- The County will conduct any extraordinary repairs (if circumstances necessitate such repairs) which do not exceed \$5000 in any 12-month period;
- CGC will conduct or fund any extraordinary repairs (if circumstances necessitate such repairs) above the \$5000/12-month limit described above.
- CGC will act as the O&M Administrator (see Section 6.0), to coordinate documentation and submittals to EPA and other agencies. All inspection reports, test results, and other documentation generated by the County and EPD (as designated in the O&M Plan) should be forwarded to the O&M Administrator immediately following the event to which they refer.

A summary table of O&M activities is attached (Attachment 4).

ATTACHMENT 1

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF GEORGIA

UNITED STATES OF AMERICA)

Plaintiff,)

v.)

Canadyne-Georgia Corporation)
and Peach County, Georgia,)

Defendants.)

CONSENT DECREE

I. INTRODUCTION

This Consent Decree is made and entered into by and between Plaintiff, the United States of America ("United States"), and Defendants, Canadyne-Georgia Corporation ("CGC") and Peach County, (the "County") Georgia:

WHEREAS, the United States, acting on behalf of the Administrator of the United States Environmental Protection Agency ("EPA") has filed a Complaint alleging that "hazardous substances" and "pollutants and contaminants," as defined, respectively in Sections 101(14) and (33) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization Act of 1986 ("SARA"), 42 U.S.C. Sections 9601(14) and (33), were sent to and disposed at the Powersville Landfill National Priorities List Site ("Site");

WHEREAS, the Site is owned by Peach County and includes an inactive municipal landfill and separate hazardous waste area both of which may contain among other items, various hazardous substances and/or waste, pollutants, and contaminants;

WHEREAS, the Parties, acting in good faith to resolve any problems arising from the Site, recognize that the public interest is served by this settlement which avoids prolonged and complicated litigation and facilitates expeditious Site remediation;

WHEREAS, Plaintiff has determined that the actions required by this Consent Decree are consistent with the National Contingency Plan; that Settlers are qualified to perform their respective actions and that if these actions are performed according to the terms of this Decree, they will be performed properly and promptly by the Settlers;

WHEREAS, Settlers neither admit nor deny responsibility for the presence at, or any release of hazardous substances, pollutants and contaminants from the Site and deny any legal or equitable liability under any Federal, state or local statute or regulation. EPA and Settlers agree that any payment made hereunder (other than stipulated penalties paid pursuant to Section XXV) shall not be deemed a fine, penalty, or monetary sanction;

NOW, THEREFORE, without trial, adjudication or admission of any issue of law, fact, liability or responsibility by Settlers, and without this Consent Decree being admissible as evidence in any proceeding except in a proceeding to enforce the terms of this Decree or as otherwise specifically provided in or contemplated by this Consent Decree, it is hereby ORDERED, ADJUDGED AND DECREED that:

II. JURISDICTION

This Court has jurisdiction over this matter and of the parties consenting hereto. The parties agree not to contest the jurisdiction of the Court to enter this Consent Decree or, in any subsequent action, to enforce or terminate it. The Complaint filed by the Plaintiff states a claim upon which relief can be granted.

III. STATEMENT OF PURPOSE

The purpose of this Consent Decree, as well as the intention of the Parties, is to: (A) protect the public health and welfare and the environment from the release or threat of release of hazardous substances at and from the Site; (B) mitigate and avoid current and/or future property damage at the Site; (C) further the public interest by avoiding protracted litigation between the Parties; and (D) encourage the early and equitable resolution of claims by the United States against the Settlers.

IV. PARTIES BOUND

This Consent Decree shall apply to and be binding upon the Parties and their respective successors and assigns. Each Settlor shall provide a copy of this Consent Decree to the Contractor, and shall instruct the Contractor to provide a copy thereof to its sub contractors retained to perform the work. All work and contractor work undertaken pursuant to this Decree shall be conditioned upon compliance with the terms of this Decree.

V. DEFINITIONS

The following definitions shall apply to this Consent Decree:

A. Powersville Landfill NPL Site ("Site") means both the municipal and hazardous waste areas of a landfill owned by Peach County and located on Newell Road, just north of Highway 49, in Powersville, Peach County, Georgia and all areas contaminated with hazardous substances emanating from the Site. The Site's approximate geographic coordinates are 32°36'36" north latitude and 83°47'33" west longitude.

B. CERCLA means the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. Sections 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Public Law 99-499.

C. Defendants mean Canadyne-Georgia Corporation, a Georgia corporation doing business in the State of Georgia, and Peach County, Georgia, a political subdivision of the State of Georgia, hereinafter, collectively referred to as "Settlers".

D. Georgia Department of Natural Resources ("GDNR") means the State of Georgia, Department of Natural Resources.

E. Hazardous Substances means any hazardous substance as defined by 42 U.S.C. Section 9601(14), and 40 C.F.R. 302.4.

F. The National Contingency Plan ("NCP") means the plan promulgated pursuant to CERCLA Section 105, 42 U.S.C. Section 9605, and codified at 40 C.F.R. Part 300 et seq., as amended.

G. Parties means all parties who are signatories to this Consent Decree.

H. Project Operations Plan ("POP") is a subpart to the remedial action plan which specifies site health & safety plans, QA/QC procedures, sampling and analysis, and other matters.

I. Remedial Design Work Plan ("RD Work Plan") means a detailed outline and schedule of activities necessary to perform the Remedial Design. The Remedial Design Work Plan will be attached as Attachment I to this Consent Decree upon approval by EPA.

J. Remedial Design ("RD") means all work undertaken to design the technical aspects of the remedial activities to be implemented at the Site.

K. RD Document means a detailed description of the Remedial Design.

L. Remedial Action Plan ("RAP") means the Remedial Action Plan which will be based on the Remedial Design and which will provide for the scheduled performance of the Remedial Action performed at the Site.

M. Remedial Action ("RA") means the implementation of the Remedial Design in accordance with the RAP consistent with the NCP and the Superfund Remedial Design and Remedial Action Guidance dated June 1986, including construction on-site, treatment processes, removals, and any other tasks necessary to effectuate the Site's cleanup, by means of the remedy-of-choice as set out in the ROD.

N. RCRA means the Resource Conservation and Recovery Act, 42 U.S.C. Sections 6901, et seq. as amended.

O. Release shall be used as that term is defined in Section 101(22) of CERCLA, 42 U.S.C. Section 9601(22).

P. Response Costs means costs incurred by EPA in connection with response activities taken by EPA at the Site pursuant to Sections 104, 106 and 107 of CERCLA, 42 U.S.C. Sections 9604, 9606, and 9607.

Q. ROD means the Record of Decision prepared by EPA with respect to the Site dated September 30, 1987.

R. Data Quality Objectives for Remedial Response Activities are qualitative and quantitative statements which specify the quality of the data required to support Agency decisions during remedial response activities.

S. Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual - a manual which contains the standard operating and field quality control procedures (SOP) to be followed during field operations.

VI. GENERAL PRINCIPLES

A. The Appendices and Attachments to this Consent Decree (sometimes hereinafter referred to as the "Decree") are a part of this Decree, and the various Remedial Design Work Plans, Remedial Action Plans, Project Operations Plans and other schedules and reports prepared as required in this Decree shall, upon their approval by EPA, be incorporated by reference in the Decree, but shall not be attached to the Decree. These plans and reports shall be maintained by the Parties and, in the event of a dispute to be resolved by this Court, shall be presented to the Court.

B. Except as provided in Paragraph XVIII (Covenant Not to Sue), nothing in this Consent Decree shall be deemed to limit the response authority of EPA under Section 104 of CERCLA, 42 U.S.C. Section 9604, under Section 106 of CERCLA, 42 U.S.C. Section 9606, or under any other federal response authority.

VII. WORK TO BE PERFORMED

A. EPA's Remedy as Specified in the Record of Decision

CGC agrees to implement the remedy selected by EPA for the site as set out in the Record of Decision ("ROD"), and as further set forth in the RD Work Plan and RD Document.

B. Remedial Design Work Plan

CGC shall develop and submit the Remedial Design ("RD") Work Plan within forty-five (45) calendar days from the entry of this Consent Decree. The RD Work Plan shall describe in detail how CGC will design the remedy and provide a schedule for completion of the various components of the pre-design and design work. The completed design will explain how the remedial action will be implemented. CGC agrees to implement the RD Work Plan in accordance with the standards, specifications and schedules contained therein, and the schedule(s) set forth in this Consent Decree.

Within forty-five (45) calendar days after EPA's receipt of the RD Work Plan, EPA shall notify Settlers in writing of EPA's approval or disapproval of the RD Work Plan or any part thereof. In the event of any disapproval of the RD Work Plan, EPA shall specify in writing both the deficiencies and any EPA recommended modifications to the RD Work Plan.

Within fifteen (15) calendar days of the receipt of EPA notification of disapproval, CGC shall amend and submit to EPA the revised RD Work Plan and EPA shall have fifteen (15) days in which to approve or disapprove the revised RD Work Plan in writing. In the event of EPA's subsequent disapproval of the RD Work Plan, EPA

retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

Upon approval by EPA, the RD Work Plan will be attached to and incorporated in this Consent Decree as Attachment I.

C. Remedial Design Document

In accordance with the schedule set forth in the Remedial Design Work Plan, CGC shall develop and submit the RD Document, which shall set forth in detail the design of the remedy and explain how the remedy will be implemented. Within sixty (60) calendar days after EPA's receipt of the RD Document, the EPA shall notify Settlers in writing of EPA's approval or disapproval of the RD Document or any part thereof. In the event of any disapproval of the RD Document, the EPA shall specify in writing the deficiencies, any EPA recommended modifications to the RD Document, and the reasons for EPA's position.

Within forty-five (45) calendar days after the receipt of EPA notification of disapproval, if any, CGC shall amend and submit to EPA the revised RD Document, and EPA shall have thirty (30) days in which to approve or disapprove the revised RD Document in writing. In the event of EPA's subsequent disapproval of the RD Document, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

D. Remedial Action Plans/Project Operation Plan

Within sixty (60) calendar days of receipt of notice that EPA has approved the RD, CGC will submit to EPA a Remedial Action Plan ("RAP") and Project Operations Plan ("POP") which will describe

in detail the methods CGC intends to use to execute the Remedial Design and the QA/QC and safety plan. The POP will be developed according to the Data Quality Objective for Remedial Response Activities EPA/540/G-87/003. This document shall be provided to CGC by EPA. All field procedures will be developed pursuant to the Engineering Support Branch Standard Operating Procedures and Quality Assurance. The RAP/POP must specify the time schedules for implementation and completion of the work, the materials to be used, the technical aspects of conducting the work and all other items necessary for proper and timely performance of the work. The POP must include (1) a Site Health and Safety Plan, (2) a Field Activity Quality Assurance/Quality Control Plan, consistent with the requirement of Paragraph XII (Quality Assurance), (3) a detailed sampling and analysis plan, (4) a plan for satisfaction of permitting requirements and (5) a description of chain-of-custody procedures.

Within thirty (30) calendar days after EPA's receipt of the RAP/POP, EPA shall notify Settlers in writing of EPA's approval or disapproval of the plan or any part thereof. In the event of any disapproval of the RAP/POP, EPA shall specify in writing both the deficiencies and any EPA recommended modifications to the RAP/POP.

Within thirty (30) calendar days of the receipt of EPA notification of disapproval, CGC shall amend and submit to EPA the revised RAP/POP, and EPA shall have thirty (30) days thereafter in

which to approve or disapprove the RAP/POP Plan in writing. In the event of subsequent disapproval of the RA Plan, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

Upon approval by EPA, the RAP/POP will be attached to and incorporated in this Consent Decree as Attachment II. Within thirty (30) calendar days after receipt of EPA approval of the RAP/POP, CGC shall implement the required work under the RA Plan Report in accordance with the schedule and requirements contained therein and in accordance with the POP.

The RAP/POP shall be designed to insure that all pre-design, design and remedial field activities under this Decree will be conducted in accordance with the applicable requirements of the NCP and the EPA Remedial Design and Remedial Action ("RD/RA") guidance document, dated June 1986. Should there be any inconsistencies between the NCP and RD/RA guidance, the NCP shall control.

E. Operation and Maintenance

Upon completion of the implementation of the RA Plan for each task, the operation and maintenance ("O&M") period will begin for that portion of the remedy to the extent O&M is required for that portion of the remedy.

CGC shall be responsible for designing O&M activities undertaken in connection with the remedial work. CGC shall prepare an O&M Plan that ensures the long-term effectiveness of the remedial activities required by this Decree. The O&M Plan will contain the post-closure care requirements found in 40 C.F.R. Part 264 including but not limited to:

- i) maintaining the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;
- ii) preventing run-on and run-off from eroding or otherwise damaging the final cover by maintaining and monitoring the run-on and run-off control system;
- iii) maintaining the ground water monitoring system and complying with relevant and appropriate requirements of 40 C.F.R. Section 264 Subpart F;
- iv) protecting and maintaining surveyed benchmarks;
- v) a schedule for completion of each activity;
- vi) a cost estimate for post-closure care consistent with 40 C.F.R. Section 264.144;
- vii) establishment of a financial assurance mechanism for post-closure activities consistent with 40 C.F.R. Section 264.145, or other mechanism mutually satisfactory to the parties;
- viii) a post-closure care inspection schedule for a minimum of at least thirty (30) years as provided in 40 C.F.R. Section 264.117 (a)(1) and (2), and subject to extension of the site security care period as provided by 40 C.F.R. Section 264.117(b).

CGC shall submit a draft O&M Plan to EPA, within thirty (30) days after CGC submits its RD Document. The O&M Plan shall be subject to the review and approval procedures and schedules outlined in Section D of this Paragraph. CGC shall submit a draft O&M Plan to GDNR and the County at least sixty (60) days prior to the date the O&M Plan

must first be submitted to EPA. Within thirty (30) days after receipt of the O&M Plan by GDNR and the County, the County shall submit to CGC its comments to the O&M Plan, together with any suggested changes thereto.

i) In the event CGC does not receive the written comments of the County during the time indicated above, the County shall be deemed to have approved the O&M Plan submitted by CGC;

ii) In the event CGC does receive the written comments of the County within the time indicated above, the County and CGC shall have twenty (20) days thereafter to resolve any disputes between the County and CGC. In the event the County and CGC resolve any dispute within the time provided for herein, each party shall indicate its approval of the O&M Plan in writing, and CGC shall submit the Plan to EPA.

In the event that at the end of the time period provided for herein for resolving disputes, the County disagrees with the Plan, CGC shall submit its O&M Plan to EPA, and the County shall state the grounds for such disagreement in writing to be submitted to the EPA on or before the date upon which the O&M Plan is due to be submitted to the EPA.

The County shall be responsible to, and hereby covenants in favor of CGC that it will, conduct and fund ordinary O&M activities undertaken in connection with the remedial work and ordinary post-closure requirements, as set forth in the O&M Plan, but not including the provision of a financial assurance mechanism for post-closure care; provided, the County's responsibility hereunder shall not include extraordinary repairs in excess of \$5,000 in any 12-month period, and that such repairs shall be the sole

responsibility of CGC; provided further, that this exclusion shall be inapplicable in such proportion as such repairs are caused by the negligence of County, its employees and agents.

Notwithstanding anything herein to the contrary, CGC shall be liable to EPA for the conduct and funding of all O&M activities and post-closure care.

F. County's Contribution to Project

i) The County shall contribute the sum of \$100,000 toward the implementation of the RD and/or the RA, \$50,000 of which shall be contributed within 1 year of the execution of this Consent Decree, and the remaining \$50,000 of which shall be contributed within two years of the execution of this Consent Decree.

ii) In addition to the foregoing, in the event that CGC provides the County with monies to be applied to the implementation of the RD/RA, the County shall contribute such monies, up to a maximum of \$100,000, to the implementation of the RD or RA, in such manner as is agreed to between CGC and the County.

iii) The contribution of the County referenced in subsections i) and ii) hereof shall be accomplished by means of one or more payments to or on behalf of CGC in connection with the RD or RA, specifically in such manner and at such times as shall be agreed to by the County and CGC, and as shall be acceptable to the GDNR for purposes of providing matching funds to the extent available. The County and CGC shall each use best efforts and cooperate with the other toward the County's obtaining from GDNR such matching funds

VIII. REMEDIAL ACTION PROGRESS REPORTS

A. CGC shall provide or cause their contractors or agents to provide written reports to EPA (hereinafter referred to as RAP Reports) and its contractor on a monthly basis from the entry of this Consent Decree until all on-Site construction activities are completed and approved by EPA. RAP Reports are to be received no later than the 15th day of the month following the month covered by the report. The RAP Reports shall describe the actions that have been taken toward achieving compliance with this Consent Decree, including a general description of remedial action activities projected to be commenced or completed during the next reporting period, a summary of results from any analytical work conducted pursuant to this Consent Decree, and a description of any problems that have been encountered or are anticipated by CGC in commencing or completing the activities.

B. If a RAP Report is deemed to be incomplete or otherwise deficient, EPA shall notify CGC within twenty-one (21) days of receipt of such RAP Report by EPA. The notice shall include a description of the deficiencies. CGC or their contractors are responsible to make the necessary changes and resubmit the RAP Report with twenty-one (21) days of receipt of EPA's notice.

C. The Agency will, within thirty (30) days after receipt of a resubmitted RAP Report, approve or disapprove in writing the RAP Report.

D. If EPA determines that a resubmitted RAP Report fails to address previously identified deficiencies, CGC shall be deemed to be out of compliance with this Consent Decree.

E. After EPA issues a Certificate of Compliance, semiannual reports of operation and maintenance activities for site maintenance (e.g. maintenance of landfill cover, and groundwater monitoring system) shall be submitted to EPA and its contractor by the County on April 1 and October 1 of each year until termination of this Consent Decree. A separate schedule will be established for monitoring the groundwater conditions as specified in Section VIII of the ROD.

IX. APPOINTMENT AND DUTIES OF REMEDIAL PROJECT MANAGER
AND REMEDIAL ACTION COORDINATOR

A. On or before the effective date of this Consent Decree EPA shall appoint a Remedial Project Manager ("RPM") and CGC shall appoint, subject to EPA approval pursuant to Paragraph XI (Approval of Contractor), a Remedial Action Coordinator ("RAC") to act on their respective behalfs to oversee completion of the RD/RA. EPA and CGC each shall have the right to change their respective RPM and RAC. EPA and CGC shall accomplish this change by notifying the other party in writing at least thirty (30) days prior to the change and subject to the procedures set forth in Paragraph XI.

B. EPA's RPM will observe and monitor the progress of the RD/RA being performed pursuant to this Consent Decree. The RPM shall have the authority vested in RPM's by 40 C.F.R. Sections 300 et seq. and other applicable federal laws and regulations. The RPM does not have the authority to make major modifications to this Consent Decree, including the Appendices and Attachments, any design or construction plans, or any schedules submitted thereunder.

C. EPA's RPM will have the authority, inter alia, to halt, conduct, or direct any tasks required by this Consent Decree when conditions present an immediate risk to public health or welfare or the environment.

D. Neither the absence of the EPA RPM from the Site nor the lack of availability of an EPA representative by phone shall be cause for the stoppage of work except where stoppage of work is necessary to abate an immediate risk of harm to public health or the environment or Site workers. CGC shall notify EPA's RPM or other designated EPA representative by phone as soon as possible that work has been discontinued. Further, within twenty-four (24) hours after work is discontinued, CGC shall submit to EPA a written explanation of why work was discontinued.

X. FAILURE TO IMPLEMENT THE REQUIREMENTS OF CONSENT DECREE

A. Subject to the Force Majeure clause, Paragraph XXII, CGC is obligated to take all steps necessary to ensure that the RD/RA is completed according to the schedule(s) established pursuant to this Consent Decree. If CGC fails to comply in a timely manner with any performance date or other material requirement of this Decree and such delay is not caused by Force Majeure, CGC shall be deemed to be out of compliance with this Consent Decree.

B. In the event EPA determines that the CGC has failed without good cause to timely implement the RD/RA, or any portion thereof, EPA may, after notice to CGC and consistent with the Dispute Resolution procedures of Paragraph XXIII, perform any or all portions of the RD/RA that remain incomplete. If EPA performs all or portions of the RD/RA because of CGC's failure to comply with its obligations under this Consent Decree, CGC shall reimburse EPA for the costs of doing

such work which costs are not inconsistent with the National Contingency Plan within thirty (30) days of receipt of demand for payment of such costs and itemization thereof.

XL APPROVAL OF CONTRACTOR

All response work performed pursuant to the RD Work Plan and RA Plans shall be under the direction and supervision of qualified personnel. Within thirty (30) days prior to the initiation of remedial design, field work and actual construction, CGC shall notify EPA in writing regarding the identity of the contractor carrying out such work. EPA may, within thirty (30) days of receipt of the notice, reasonably disapprove the use of any contractor, subcontractor, laboratory and/or Remedial Action Coordinator (collectively, "Contractor") which EPA reasonably determines to be unqualified to perform the work or any portion thereof, provided that in such event the Agency will state in writing the grounds for such disapproval. In the event of a disapproval, the date for the completion of the RD Work Plan will be ninety days after the entry of this Consent Decree and CGC shall notify EPA within sixty (60) days of the identity and the qualifications of the replacement contractor, subcontractor, laboratory and/or Remedial Action Coordinator. EPA shall either approve or disapprove of the Replacement Contractor within thirty (30) days thereafter. In the event of subsequent disapproval of any contractor, subcontractor, laboratory and/or Remedial Action Coordinator which EPA reasonably determines to be unqualified to perform the work or any portion thereof, EPA retains the right to conduct a complete Remedial Design and Remedial Action and seek cost recovery pursuant to its authority under CERCLA.

XII. QUALITY ASSURANCE

Settlors shall use the quality assurance, quality control and chain of custody procedures in accordance with the U.S. EPA Region IV Environmental Services Division Engineering Support Branch Standard Operating Procedures and Quality Assurance Manual dated April 1, 1986 (ESDSOP and QA) throughout all sample collection and analysis activities. This manual will be provided to Settlers by EPA. In order to provide quality assurance and maintain quality control regarding all samples collected pursuant to this Consent Decree, Settlers shall:

A. Ensure that EPA personnel and/or EPA authorized representatives are allowed reasonable access to the laboratories and personnel utilized for analyses.

B. Ensure that the laboratories utilized for analyses perform such analyses according to EPA methods or methods deemed satisfactory to EPA and submit all protocols to be used for analysis to EPA either in the Sampling and Analysis Plan or at least twenty-one (21) calendar days prior to commencement of analysis.

C. Ensure that the laboratories utilized by Settlers for analyses participate in a quality assurance/quality control program equivalent to that which is followed by EPA and which is consistent with "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans", a copy of which will be provided to Settlor by EPA. As part of such a program, and upon reasonable request by EPA, such laboratories shall perform analyses of samples provided by EPA to demonstrate the quality of each laboratory's analytical data.

XIII. SAMPLING AND DATA/DOCUMENT AVAILABILITY

A. Sampling

Each Settlor shall make the results of all sampling and/or tests or other data generated by such Settlor, or on such Settlers' behalf, with respect to the implementation of this Consent Decree, available to EPA in a summary form and shall submit these results in progress reports as described in Paragraph VIII of this Consent Decree.

At the request of the EPA, each Settlor shall allow split or duplicate samples to be taken by EPA and/or its authorized representatives, of any samples collected by such Settlor pursuant to the implementation of this Consent Decree. Such Settlor shall notify EPA not less than four (4) calendar weeks in advance of any proposed sample collection activity and again not less than three (3) working days prior to commencing sampling activities. The RPM and RAC may agree in writing to a shorter notification period.

B. Data/Document Availability

Upon request by EPA, each Settlor shall provide copies to EPA of all records, documents and information generated by such Settlor and its contractors in the course of performing the Remedial Design Work, Remedial Action and Operation and Maintenance Activities including, but not limited to, sampling and analysis records, field sheets and field notes, engineering logs, chain of custody records, contracts, bills of lading, trucking logs and correspondence. Additionally, each Settlor's employees, agents or representatives with knowledge of relevant facts concerning the performance of the RD/RA or O&M activities shall be made available to EPA upon reasonable notice and at reasonable times and places to provide

C. Claim of Confidentiality

Each Settlor may assert a confidentiality claim, if appropriate, covering part or all of the information requested by this Consent Decree pursuant to 40 C.F.R. Section 2.203(b). Such an assertion shall be adequately substantiated when the assertion is made. Analytical data shall not be claimed as confidential by the Settlers. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA without further notice to the Settlor (see also Paragraph XXX).

XIV. COMPLETION OF REMEDIAL CONSTRUCTION WORK

CGC shall notify EPA and its contractor in writing, within ten (10) days after the completion of the construction phase of the RA Plan for each task (except O&M), that the required work has been completed. EPA shall review the construction phase of the RA plan for each task and indicate its agreement or disagreement as to the completion of the construction phase within forty-five (45) days of receipt of the notification. The construction phase of each RA plan task shall be deemed to have been completed when EPA provides Settlers with written notification that the elements set forth in the RA Plan have been completed satisfactorily and in conformity with the Plan and this Decree.

If EPA believes that the construction phase of the RA Plan has not been completed in accordance with the standards and specifications set out in the Plan, in this Decree, and under CERCLA, it shall notify CGC in writing of what it believes should be done to complete the construction, referencing the specific portion(s) of the RA Plan

thirty (30) days thereafter, object to the measures proposed by EPA, CGC shall expeditiously undertake and complete such measures in accordance with the proposed schedule of completion. The Agency intends to notify CGC of its objections with respect to any proposed or completed task promptly after first becoming aware of any such objections. The RA Plans for all tasks shall be deemed to have been finally completed when the EPA certifies in writing and in conformity with Section 122(f)(3) of CERCLA, 42 U.S.C. Section 9622(f)(3), that all of the elements set forth in the RD Work Plan, the RA Plans and in accordance with the requirements of CERCLA, 42 U.S.C. Section 9601 et seq., have been satisfactorily completed.

XV. ASSURANCE OF ABILITY TO COMPLETE WORK

CGC will demonstrate its financial ability to complete the Remedial Action and to pay all claims that arise from the performance of the Remedial Action by obtaining, and presenting to EPA for approval within 30 days after the effective date of this Decree, one of the following items: 1) performance bond; 2) letter of credit; or 3) guarantee by a third party.

XVI. OVERSIGHT COSTS

The parties acknowledge that the United States and its oversight contractor will incur costs at the Site after the effective date of this Consent Decree for oversight of the Remedial Design work and the Remedial Action to be performed by the Settlers. CGC shall reimburse the United States for all such costs which are not inconsistent with the NCP, provided however that CGC shall not reimburse EPA for oversight costs in excess of \$100,000. EPA plans to use GDNR as its contractor for the oversight work. EPA may in its discretion use other contractors to conduct part or all of the

oversight which EPA determines that GDNR cannot, will not or does not perform to EPA's satisfaction.

The United States shall send CGC a demand for payment, together with an accounting of the costs claimed, on an annual basis, with the first demand to be made on or before December 1 of the first year in which oversight costs are incurred by the United States. Thereafter, demands will be made on or before December 1 of each succeeding year in which the United States incurs costs for oversight. The payment shall be due within thirty (30) days of receipt of the demand for payment, shall be made by certified or cashiers check payable to "EPA Hazardous Substance Superfund", and shall specifically reference the Site and shall be sent to:

United States Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365

XVII. COST REIMBURSEMENT

CGC agrees to reimburse the Plaintiff for \$450,000 of its Response Costs incurred by the United States pursuant to CERCLA in connection with this Site. Upon receipt of the foregoing payment, the United States releases the Settlers for all of the United States past costs incurred by the United States pursuant to CERCLA in connection with this Site. The United States represents and warrants that the Response Costs were not inconsistent with the NCP and have been paid. EPA shall provide cost documentation within sixty (60)

days after the effective date of this Consent Order. Said payment shall be made by CGC within thirty (30) days of receipt of EPA's cost documentation and shall be by certified or cashiers check made payable to the EPA Hazardous Substances Superfund, shall specifically reference the Site, and shall be sent to:

United States Environmental Protection Agency
Hazardous Substances Superfund
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365

Except as provided in this paragraph XVII, Settlers shall be liable for no other costs incurred by the United States pursuant to CERCLA prior to the effective date of this Consent Decree..

XVIII. COVENANT NOT TO SUE

A. Except as provided in Section C and D of this Paragraph, upon the issuance by EPA of a Certificate of Compliance for the successful completion of all Remedial Action Activities, the United States covenants not to sue the Settlers under the provisions of CERCLA for claims arising from or related to the Site. Provided, however, that EPA shall not issue a Certificate of Compliance until Settlers can demonstrate that O&M Operations have been designed, are in place, and can reasonably be expected to achieve the requirements of this Consent Decree. This Paragraph is not and shall not be construed as a covenant not to sue any other person or entity not a party to this Consent Decree.

B. The Settlers hereby covenant not to sue the United States for any claims related to or arising from the Remedial Action or this Consent Decree, including any direct or indirect claims for reimbursement from the Hazardous Substance Response Trust Fund, 42 U.S.C. Section 9611. Nothing in this Consent Decree shall be deemed to constitute preauthorization of a CERCLA claim within the meaning of Section 111 of CERCLA and 40 C.F.R. Section 300.25(d).

C. The Covenant Not to Sue does not apply to the following:

1. Claims based on a failure by the Settlers to meet the requirements of this Consent Decree;
2. Liability arising from the past, present or future disposal, release or threat of release of hazardous substances outside of the Site and not attributable to the Site;
3. Liability for the disposal of any hazardous substances taken from the Site;
4. Claims for any costs incurred by EPA as a result of the failure of the Settlers to implement the Remedial Action in accordance with this Consent Decree;
5. Liability for injury to natural resources;
6. Criminal liability;
7. Claims arising from contamination of ground water at and in the vicinity of the Site.

D. Notwithstanding any other provisions of this Consent Decree the United States reserves the right to institute proceedings in this action, or to institute a new action (1) to compel the Settlers to perform additional response work at the Site, or (2) to reimburse the United States for response costs, if:

1. For proceedings prior to issuance of the EPA Certificate of Compliance of the Remedial Action,

a. conditions at the Site, previously unknown to the United States, are discovered after the entry of this Consent Decree, or

b. information is received, in whole or in part, after the entry of this Consent Decree;

and these previously unknown conditions or this information indicates that the Remedial Action is not protective of human health and the environment; and

2. For proceedings subsequent to EPA's issuance of the Certificate of Compliance of the Remedial Action,

a. conditions at the site, previously unknown to the United States, are discovered after EPA's issuance of the Certificate of Compliance, or

b. information received, in whole or in part, after the Certificate of Compliance by EPA;

and these previously unknown conditions or this information indicates that the remedial action is not protective of human health and the environment.

XIX. INSURANCE AND INDEMNIFICATION

A. Prior to commencing any on-site work, CGC shall obtain or require its contractor(s) to obtain a policy or policies of insurance providing at least the following coverages in connection with the activities performed at the Site by CGC or its employees, agents, contractors or subcontractors under this Consent Decree:

1. Comprehensive General Liability Insurance, including Contractors Protective Coverage, in an amount of not less than five million dollars (\$5,000,000) per occurrence, combined single limit;
2. Automobile Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence;
3. Professional Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence;
4. Worker's Compensation Insurance adequate to meet the statutory requirements of all jurisdictions having authority over such claims, including but not limited to the State of Georgia, and Employer's Liability Insurance in an amount of not less than one million dollars (\$1,000,000) per occurrence. The United States shall be named as an additional insured in the policy or policies required under subsections 1, 2 and 3 above. CGC shall maintain such insurance or require its contractor(s) to maintain such insurance in force until EPA issues a Certification of Compliance for all remedial activities.

B. Prior to commencing any on-site work, and annually thereafter, CGC shall provide to the United States certification of coverages maintained in compliance with this Paragraph. In addition, CGC shall furnish the United States with copies of those policies purchased specifically for activities undertaken pursuant to this Consent Decree.

C. Anything herein notwithstanding, in no event shall CGC be relieved of its obligation to implement in a timely fashion the remedial action under this Consent Decree by

reason of any inability to obtain or failure to maintain in force any insurance policies required in this Paragraph, or by reason of any dispute between CGC and any of its insurers pertaining to any claim arising out of the design, construction, implementation, or operation of the remedy or arising out of any other activity required under this Consent Decree.

D. Failure by CGC to obtain or maintain any insurance required by this Paragraph shall not be deemed to be a violation of this Consent Decree if CGC demonstrates that it or its contractor(s) have made good faith efforts to obtain such insurance.

E. CGC agrees to indemnify and save and hold harmless the United States, its agencies, departments, agents and employees from any and all claims or causes of action arising from or on account of acts or omissions of the Settlers or their employees, agents, contractors or subcontractors in carrying out activities under this Consent Decree. The County agrees to indemnify and save and hold harmless the United States, its agencies, departments, agents and employees from any and all claims or causes of action arising from or on account of acts or omissions of the County or their employees, agents, contractors or subcontractors in carrying out activities under this Consent Decree. The United States shall not be considered a party to any contracts between Settlers and persons retained to perform the work.

F. The County agrees to indemnify, save and hold harmless CGC to the extent permitted by and to the extent permitted under the Constitution of the State of Georgia from all third party claims arising out of the sole negligence of the County. CGC agrees to indemnify, save and hold harmless the County from all third party claims arising out of the sole negligence of CGC.

XX. COMPLIANCE WITH LAWS AND PERMITS

A. All activities undertaken by the Settlers pursuant to this Consent Decree shall be undertaken in accordance with the requirements of all applicable local, state and federal laws and regulations, and this Decree shall in no way relieve the Settlers of their obligation to comply with such laws and regulations governing their respective performances hereunder. The parties contemplate that all permits or other approvals required to implement the RD/RA or O&M will be identified in the Remedial Design Work Plan and Remedial Action Plans required under Paragraph VII of this Decree.

B. The parties agree that if a Settlor or its contractor(s) arrange for the storage, treatment, disposal, or transportation for disposal, of any hazardous substances at locations other than the Site, such Settlor will obtain EPA's prior approval of the use of any such off-site facility and will comply with the applicable provisions of RCRA, 40 C.F.R. Parts 261, 262, 263, 264, 265.

XXI. SITE ACCESS

A. The parties acknowledge that the Site is presently owned by one of the parties to this Consent Decree, i.e., the County, and that the County hereby grants Site access to CGC, EPA and their respective contractors for all purposes hereunder including effectuating and monitoring the terms of this Consent Decree and performing the RD/RA.

B. To the extent the Site is presently owned by persons that are not parties to this Consent Decree, the Settlers have obtained or will use their best efforts to obtain site access agreements from the owners within thirty (30) days of learning of the necessity of such access. Such access agreements shall provide the United States, EPA, the Settlers, and their representatives and contractors access to the

Site at all times for purposes of effectuating and monitoring the terms of this Consent Decree and performing the RD/RA. In the event that Site access agreements are not obtained within the thirty day (30) period, the Settlers shall notify EPA within five (5) days thereafter regarding both the lack of such agreements and the efforts made to obtain them.

C. To the extent access to or use of property other than the Site is required for the proper and complete performance of this Consent Decree, the Settlers shall use their best efforts to gain such access to or use of such property. EPA agrees, if necessary, to use its best efforts, consistent with its legal authority, to assist the Settlers in obtaining such access or use.

D. EPA's right of access under this Decree shall not be conditioned and shall be in addition to and not in substitution for, EPA's right of entry and access under applicable federal laws. During the effective period of this Decree, the United States, EPA, and their representatives, including contractors, shall have access at all times to the Site and any activity authorized by CERCLA, including but not limited to:

1. Monitoring the progress of Remedial Design and Remedial Action activities;
2. Reviewing or verifying any data or information developed by Settlor or Settlor's contractors including data or information submitted to EPA with respect to the RD/RA or the Site;
3. Conducting investigations relating to contamination at or near the Site;
4. Obtaining samples at the Site; and

5. Inspecting and copying records, files, sampling and monitoring data, operating logs, contracts, photographs, or other documents related to the Site or required to assess the Settlor's compliance with this Consent Decree; and

6. Inspecting sampling procedures and obtaining samples collected by the Settlers at the Site.

E. The United States shall provide a list of all EPA personnel, contractors or other parties who shall have the aforementioned access to this site at all times. All other parties shall provide reasonable notice prior to coming onto the Site.

F. Nothing herein limits or otherwise affects any right of entry held by the United States or EPA pursuant to applicable laws, regulations, or permits.

G. The Force Majeure clause, Paragraph XXII shall govern any delays caused by or attributed to difficulties in obtaining access to the Site or access to or use of any other property required for the proper and complete performance of this Consent Decree, provided the Settlers have used their best efforts to obtain such access to or use of the property.

XXII. FORCE MAJEURE

Settlers' activities under this Consent Decree shall be performed within the time limits set forth in the RD Work Plan and RAP/POP referenced in VII above, unless performance is delayed by events which constitute a force majeure. For purposes of this Consent Decree, a force majeure is defined as any event arising from causes beyond the reasonable control of Settlers (for example, but not limited to, fires, natural disasters, riots and wars) which could not have been prevented by the exercise of due diligence and causes a

delay in the performance of the work. Increased costs incurred by Settlers in conducting the RD/RA or changed economic circumstances of Settlers shall not be considered as constituting a force majeure.

A Settlor shall notify EPA in writing no later than ten (10) business days from the inception of any event which Settlor contend constitutes a force majeure as defined above. The written notice shall describe fully the nature of the delay, why the delay is beyond the control of the Settlor, the actions taken and/or that will be taken to mitigate, prevent and/or minimize the delay will be taken. The Settlor shall adopt all reasonable measures to avoid or minimize any such delay.

Delay that results from circumstances beyond the control of the Settlers that cannot be overcome by due diligence on the Settlers' part shall not be deemed to be a violation of this Consent Decree. To the extent a delay is caused by circumstances beyond the control of the Settlers, the schedule affected by the delay shall be extended for a period equal to the delay resulting from such circumstances, if deemed necessary by EPA.

Failure of the Settlers to comply with the notice requirements of this Section shall constitute a waiver of the Settlers' right to invoke the benefits of this Section with respect to that event.

XXIII. DISPUTE RESOLUTION

A. Any dispute which arises under or with respect to this Consent Decree, or the Appendix and Attachments hereto shall in the first instance be the subject of informal negotiations between EPA and the respective Settlor for a period of up to twenty (20) calendar days from the time EPA and/or the Settlor gives notice of the

existence of the dispute, or for a longer period if both parties agree in writing.

B. In the event that the parties cannot resolve a dispute by informal negotiations under Paragraph A of this Section, then the decision or interpretation advanced by the United States shall be considered binding unless, within twenty (20) days after the end of the informal negotiations period, a Settlor files a petition with this Court setting forth the matter in dispute and the relief requested. Except as otherwise agreed to by the parties, the filing of a petition asking the Court to resolve a dispute shall not serve to extend or postpone the Settlor's respective obligations under this Consent Decree provided that payment of stipulated penalties with respect to the disputed issue(s) shall be stayed pending resolution of the dispute. In the event that the Settlers do not prevail on the dispute, stipulated penalties shall accrue as provided in Paragraph XXV.

C. In any dispute resolution proceeding involving matters covered by Section 113(j)(2) of CERCLA, 42 U.S.C. Section 9613(j)(2), the Court shall apply the standards and provisions of Section 113(j)(2). In all other disputes the Court shall adopt the position proposed by EPA unless the Court finds that position to be arbitrary and capricious. In all disputes covered by this Paragraph, the burden of proof shall rest with the Settlers.

XXIV. PURPOSE OF SETTLEMENT

This Consent Decree was negotiated and executed by the United States and the Settlers in good faith to avoid expensive and protracted litigation and represents a fair, reasonable and equitable settlement of the matters addressed herein.

XXV. STIPULATED PENALTIES

A. Except as provided in Paragraph XXII (Force Majeure) and as may be otherwise provided in this Consent Decree, each Settlor shall be liable to the EPA for the stipulated penalties set forth below for each day during which it fails to comply with the requirements of this Consent Decree including but not limited to any implementation schedule, payment or funding requirement, or completion deadline.

B. For each day during which CGC fails to perform any of the following activities:

1. Submittal and, if necessary, modification of the RD Work Plan;
2. Submittal and, if necessary, modification of RD;
3. Submittal and, if necessary, modification of RA Plan/POP;
4. Implementation of RA Plan/POP;
5. Assurance of Ability to Complete Work.

CGC shall be liable to EPA for stipulated penalties in the following amounts:

<u>Period of Failure to Comply</u>	<u>Penalty Per Violation Per Day</u>
1st through 14th day	\$1,000
15th through 44th day	\$2,000
45th day and beyond	\$3,000

C. CGC shall be liable to EPA for stipulated penalties in the amount of \$300 per violation for each day during which it fails to submit, in accordance with the period set forth herein and, if necessary, modify, monthly RAP Reports. The County shall be liable for \$300.00 per day for each day during which the County fails to submit its semiannual report.

D. Each Settlor shall be liable to EPA for stipulated penalties in the amount of \$1,000 per violation for each day during which such Settlor fails to comply with any other requirements of this Consent Decree applicable to it including but not limited to any implementation schedule, payment or funding requirement, notification requirement or completion deadline. All penalties described in this subprograms begin to accrue ten (10) days after Settlers receive EPA's notification of violation , and shall continue through the final day of correction of the noncompliance.

E. Upon EPA's determination that a Settlor has failed to comply with the activities described in Sections B and C of Paragraph XXV, EPA shall give such Settlor written notice describing the noncompliance and stating the amount of penalties due.

F. All penalties owed to the EPA under this section shall be payable upon demand by EPA within 30 days of receipt of the notification of noncompliance. Such penalties shall be paid by certified or cashiers check made payable to "EPA Hazardous Substances Superfund", shall specifically reference the site and shall be sent to:

United States Environmental Protection Agency
Superfund Accounting
P.O. Box 371003M
Pittsburgh, PA 15251
Attention: Superfund Collection Officer

with a copy to:

Benjamin Moore
Remedial Project Manager
EPA, Region IV
145 Courtland St., N.E.
Atlanta, Georgia 30365

G. All penalties related to activities described in Sections B and C of Paragraph XXV begin to accrue on the day that complete

performance is due, and continue through the final day of correction of the noncompliance.

H. Neither the filing of a petition to resolve a dispute nor the payment of penalties shall in any way alter Settlers' ultimate obligation to complete their respective performances as required under this Decree.

I. Settlers may dispute EPA's right to the stated amount of penalties by filing a petition with the Court in accord with Section XXIII (Dispute Resolutions) herein, within 30 days of receipt of the notification of noncompliance. Penalties shall accrue but will not be demanded during this period. If such Settlor loses upon resolution, however, EPA has the right to collect all penalties[†] which accrued prior to and during the period of dispute. Settlers bear the burden of proving that any dispute brought under this subsection is a good faith dispute. If it is found that a Settlor has not invoked the dispute resolution provisions in good faith, EPA reserved the right to seek additional or other sanctions against Settlers.

J. Should CGC fail to meet any interim deadline by not more than ten (10) business days but meet the final deadline, the stipulated penalties for failure to meet any such interim deadline shall, upon meeting such final deadline, be forgiven.

K. If a Settlor refuses to pay stipulated penalties, EPA may institute contempt proceedings in the U.S. District Court for relief. However, nothing in this section shall be construed as prohibiting, altering, or in any way limiting the ability of EPA to seek any other remedies or sanctions available by virtue of a Settlor's violation of this Decree or of the statutes and regulations upon which it is based.

L. No penalties shall accrue during any previously agreed upon extension period or any delay caused by a force majeure. If an extension of time is not granted and force majeure does not apply, EPA has the right to collect penalties which accrued prior to and during the pendency of the Settlor's request for time or claim of force majeure.

M. This section shall remain in full force and effect for the term of this Decree.

XXVI. MODIFICATION

No major modification shall be made to this Consent Decree, without written notification to and written approval of the parties to this Consent Decree and the Court. The notification required by this Section shall set forth the nature of and reasons for the requested modification. No oral modification of this Decree shall be effective.

XXVII. EFFECTIVE AND TERMINATION DATES

A. This Consent Decree shall be effective upon the date of its entry by the Court.

B. Termination of this Consent Decree may only be effected upon completion of all Remedial Action activities as set forth is in Paragraph VII of this Consent Decree or as determined by the Court. Termination of this Consent Decree shall not affect the Covenant Not To Sue, Paragraph XVIII, or Confidentiality Provision, Paragraph XIII or Operating and Maintenance, Paragraph VIII which shall remain in effect as an agreement between the parties.

C. If a Settlor believes that all required work has been completed and EPA disagrees, the dispute resolution process (Paragraph XXII) may be invoked.

D. CGC's liability for response and oversight costs shall not terminate upon termination of this Consent Decree.

XXVIII. RETENTION OF JURISDICTION

A. This Court shall retain jurisdiction over this matter for the purposes of insuring compliance with the terms and conditions of this Consent Decree, and of adjudicating disputes between the parties under this Decree.

B. Plaintiff and Settlers each retain their own right to enforce the terms of this Consent Decree and take any action authorized by federal or state law not inconsistent with the terms of this Consent Decree to achieve or maintain compliance with the terms and conditions of this Consent Decree.

XXIX. NOTICES

Whenever, under the terms of this Consent Decree, written notice is required to be given or a report or other document is required to be forwarded by one party to another, it shall be directed to the individuals at the addresses specified below, unless those individuals or their successors give notice in writing to the other parties. Written notice to the individuals listed below shall constitute complete satisfaction of any written notice requirement of the Consent Decree with respect to the United States, the Remedial Project Manager (on behalf of EPA), and the Remedial Action Coordinator (on behalf of the Settlers), respectively.

As to the United States:

Chief, Environmental Enforcement Section
Land and Natural Resources Division
United States Department of Justice
10th and Pennsylvania Ave., N.W.
Washington, D.C. 20530

and

Benjamin Moore
Remedial Project Manager
Environmental Protection Agency, Region IV
345 Courtland St., N.E.
Atlanta, GA 30365

As to the Settlers:

Canadyne-Georgia Corporation
c/o Powell, Goldstein, Frazer & Murphy
Suite 1050
400 Perimeter Center Terrace
Atlanta, Georgia 30346
ATTENTION: Thomas R. McNeill, Esquire
and the Remedial Action Coordinator

Chairman, Peach County Board of Commissioners
Peach County Courthouse
Fort Valley, Georgia 31030

Jeff Liipfert, Esquire
Culpepper & Liipfert
202 Central Avenue
Fort Valley, Georgia 31030

Mill V. Toulme, Esquire
Alston & Bird
1200 C&S Bank Building
35 Broad Street
Atlanta, Georgia 30335

XXX. PUBLIC ACCESS TO INFORMATION

A. All data, factual information and documents submitted by the Settlers to EPA pursuant to this Consent Decree shall be subject to public inspection unless Settlers assert a confidential business information or trade secret claim pursuant to applicable federal law. The Settlers shall not assert a confidentiality claim regarding any hydrogeological or chemical data generated as a result of or as part of the Remedial Design or Remedial Action, data submitted in support of a remedial proposal or any other scientific or engineering tests or data generated as a result of or as part of the Remedial Design or Remedial Action (See Section XIII herein).

B. The parties will cooperate in developing a public relations plan which will include periodic public meetings. The Settlers will participate in public meetings if requested to do so by the United States.

XXXI. ADMISSIBILITY OF DATA

For the purposes of any proceeding to resolve a dispute concerning the implementation of this Consent Decree, the parties waive any evidentiary objection to the admissibility into evidence of data gathered or generated or evaluated pursuant to this Decree.

XXXII. RETENTION OF RECORDS

A. Until six (6) years after the completion of the Remedial Action, the Settlers shall preserve and retain all records and documents now in their possession or control that relate in any manner to the Site.

B. Until completion of the Remedial Action and termination of this Consent Decree, the Settlers shall preserve, and shall instruct all contractors, subcontractors, and anyone else acting on the Settlers' behalf at the Site to preserve, all records, documents, and information of whatever kind, nature or description relating to the performance of the Remedial Action at the Site. Upon the completion of the Remedial Action, copies of all such records, documents and information shall be delivered to the EPA Remedial Project Manager. CGC shall provide GDNR and the County one copy of each document not previously provided to those parties.

XXXIII. OTHER PROVISIONS

Each Settlor hereby consents to the terms of this Consent Decree, and hereby knowingly, willingly, and with advice of counsel waives any and all rights to appeal the entry of this Consent Decree.

Each Settlor hereby agrees that except as otherwise set forth herein, service of notice or any legal process for any purpose under this Consent Decree, including its enforcement, may be made by mailing a copy by first class mail, postage prepaid, to its undersigned attorney and representative identified in Section XXIX above. EPA agrees that service of notice or any legal process for any purpose under this Consent Decree including any dispute resolution action may be made by mailing a copy by first class mail, postage prepaid, to representatives of the United States and of EPA identified in Section XXIX.

XXXIV. LODGING OF DECREE WITH THE COURT AND PUBLIC COMMENT

This Consent Decree shall be lodged with the Court for a period of thirty (30) days for public comment pursuant to the provisions of 28 C.F.R. Section 50.7, and for public notice pursuant to the provisions of CERCLA 42 U.S.C. Section 9622(i) and it shall not be submitted to the Court for execution until the expiration of that period. Plaintiff reserves the right to withdraw or withhold its consent to a judgment based on this Consent Decree if the comments, views, and allegations concerning the Decree disclose facts or considerations which indicate that the Decree is inappropriate, improper, or inadequate. All parties reserve the right to oppose an attempt by any person to intervene in this action.

Comments on the Consent Decree shall be submitted to:

William Weinischke
Assistant Attorney General
Land and Natural Resources Division
U.S. Department of Justice
Washington, D.C. 20530

and

Charles E. Rooks
Assistant Regional Counsel
U.S. Environmental Protection Agency - Region IV
345 Courtland St., N.E.
Atlanta, GA 30365

Department of Justice

Environmental Protection Agency

Roger J. Marzulla
Acting Assistant Attorney General
for Land and Natural Resources
Washington, D.C. 20530

Thomas L. Adams, Jr.
Assistant Administrator for
Enforcement and Compliance
Monitoring
Washington, D.C. 20460

Samuel A. Wilson, Jr.
United States Attorney by

Assistant United States Attorney
Middle District of Georgia
P.O. Box U
Macon, Georgia 31202

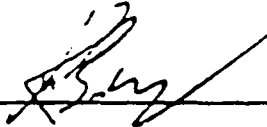
James H. Sargent
Regional Counsel
EPA, Region IV
Atlanta, Georgia 30365

M. Elizabeth Cox
Attorney Advisor
Office of Enforcement and
Compliance Monitoring
Washington, D.C.

William Weinischke
Trial Attorney - Land and
Natural Resources Division
Environmental Enforcement Section
Washington, D.C. 20530

Charles E. Rooks
Assistant Regional Counsel
EPA - Region IV
Atlanta, Georgia 30365

Canadyne-Georgia Corporation



Peach County, Georgia

ENTERED THIS

DAY OF

1987.

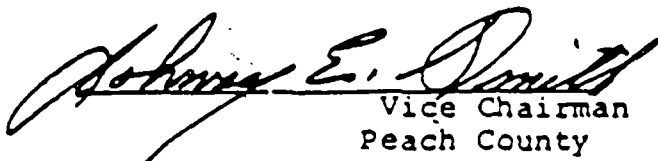
United States District Judge

William Weinischke
Trial Attorney - Land and
Natural Resources Division
Environmental Enforcement Section
Washington, D.C. 20530

Charles E. Rooks
Assistant Regional Counsel
EPA - Region IV
Atlanta, Georgia 30365

Canadyne-Georgia Corporation

Peach County, Georgia


Vice Chairman
Peach County
Commissioners


Clerk, Peach County Commissioners

ENTERED THIS

DAY OF

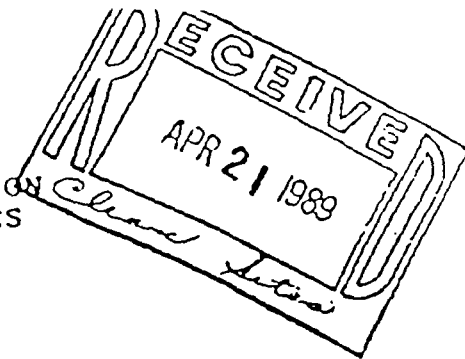
1988

United States District Judge

ATTACHMENT 2

Received for
GONR

ENVIRONMENTAL PROTECTION DIVISION
DEPARTMENT OF NATURAL RESOURCES
STATE OF GEORGIA



CONSENT AGREEMENT

Peach County, Georgia

AGREEMENT NO. EPD-HW-416

WHEREAS, Peach County, Georgia ("County") is the owner of the Powersville Landfill National Priorities List Site ("Site"); and

WHEREAS, County, acting in good faith to resolve any problems arising from the Site, desires to enter into a settlement with the United States Environmental Protection Agency ("EPA") and Canadyne-Georgia Corporation in connection therewith; and

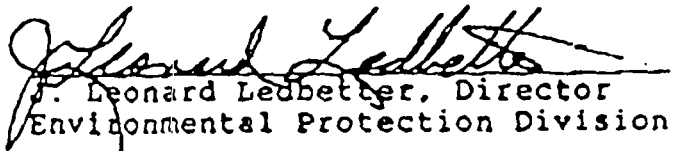
WHEREAS, in reliance upon the Environmental Protection Division's (the "Division") undertaking to provide certain assistance to County in connection therewith, County expects to execute that certain Consent Decree ("EPA Consent Decree"), a copy of which is attached hereto, in order to effectuate such settlement;

NOW, THEREFORE, it is hereby AGREED that:

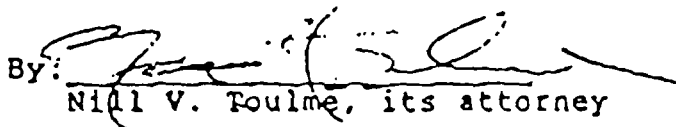
1. The Division shall assist and advise County in reviewing and commenting upon the proposed Operations and Maintenance (O&M) Plan as set forth in Section VII.E. of the EPA Consent Decree, in accordance with the time limitations set forth therein.

2. The Division shall undertake and perform all of the following O&M and post-closure care activities required of County under the EPA Consent Decree, until such time as County is relieved of the obligation to perform such activities:
 - a. Groundwater monitoring and sampling;
 - b. Analysis of groundwater samples;
 - c. Reporting of groundwater monitoring activities and data; and
 - d. Maintenance and repair of the groundwater monitoring system.
3. The Division shall provide technical assistance and advice to County in connection with the other O&M and post-closure activities required of County under the EPA Consent Decree.
4. The Division shall provide assistance and advice to County with respect to County's application for matching funds as set forth in Section VII.F. of the EPA Consent Decree.

It is so AGREED this 29th day of January, 1988.


J. Leonard Ledbetter, Director
Environmental Protection Division

PEACH COUNTY

By: 
Neil V. Toulme, its attorney

ATTACHMENT 3

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1252, Atlanta, Georgia 30334
J. Leonard Ledbetter, Commissioner
404/656-3500

December 22, 1987

Mr. Lee DeHihns
Acting Regional Administrator
United States Environmental Protection Agency
Region IV
345 Courtland Street
Atlanta, Georgia 30365

RE: Powersville Landfill Site

Dear Mr. DeHihns:

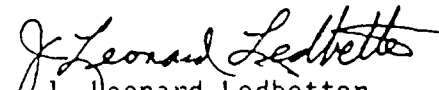
As a follow-up to our meeting with you on December 2, 1987 Canadyne - Georgia Corp. has prepared a written proposal laying out the terms of a proposed funding settlement for the Powersville NPL site.

We have reviewed and endorse the settlement proposal dated December 21, 1987. As proposed, the Department of Natural Resources would commit to award Peach County up to \$200,000.00 in Solid Waste and Water Supply grants to be matched on an equal basis by Peach County. This offer is of course contingent upon such grant funds being made available to the Department of Natural Resources by the Legislature in their annual appropriation.

One additional condition of this endorsement relates to paragraph B.(1) of the December 21 letter from Scott Italiaander, regarding operation and maintenance of the project. The Department of Natural Resources will commit to nothing more than sampling and analytical functions for the ground water monitoring system. The county will have to be responsible for any other operation and maintenance tasks, such as assuring a vegetative cover on the site and maintenance of the alternate water supply system.

We encourage your favorable consideration of this proposal.

Sincerely,


J. Leonard Ledbetter
Commissioner

JLL:jtd(7-10)

cc: John D. Taylor, Jr.
Robert Bomar
Scott Italiaander ✓
Neil Toulme
Pat Tobin

ATTACHMENT 4

Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Groundwater Sampling and Analysis Georgia EPD	Quarterly for 2 years; reevaluate thereafter	quarterly	quarterly	TBD	TBD	2-8, 9-1, 10-6, 13-1	CD Section VII, E	Activity reports to O & M Administrator
Maintenance of Vegetation Peach County						1-20, 9-2, 10-3, 16-2 through 16-7	CD Section VII, E, ii	Activity reports to O & M Administrator
Mowing	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually			
Fertilization	annually	annually	annually	annually	annually			
Application of Lime	every 4-6 years, if necessary							
Inspection and Monitoring for Cover Settlement (includes surveying settlement monitoring stations) Peach County	Quarterly for 2 years; semi-annually thereafter; after all extreme weather events	quarterly	quarterly	semi-annually	semi-annually	9-2, 10-8, 15-1 through 15-7	CD Section VII, E, i	Activity reports to O & M Administrator
Inspection of Site Structures Peach County Concrete channels, rip-rap, fence & signs, drainage areas, benchmarks, gas vents, settlement monitoring stations, guard posts, cover drainage pipe clearout ports	semi-annually	semi-annually	semi-annually	semi-annually	semi-annually	9-3, 10-8, 10-9, 18-1	CD Section VII, E, ii, iv	Activity reports to O & M Administrator
maintenance roads	annually	annually	annually	annually	annually			
cover drainage pipes	every 5 years				every 5 years			
resurvey benchmarks	every 10 years				every 10 years			

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

Summary of O&M Activities

O&M Activity	Required Frequency	Year 1	Year 2	Year 3-5	Year 6-30	Page References in Text	Basis for Requirement	Reporting Requirements (section)
Gas Vent Monitoring Peach County	Semi-annually for 2 years; annually for 3 years; reevaluate according to section 9.0	semi-annually	semi-annually	annually	TBD	9-4, 10-9, 17-1	CD Section VII, E, i	Activity reports to O & M Administrator
Monitoring Well Maintenance Georgia EPD	Semi-annually for 2 years; annually thereafter	semi-annually	semi-annually	annually	annually	14-1, 3-8	CD Section VII, E, i, ii	Activity reports to O & M Administrator
Inspection of grout seals for all wells	Beginning of O&M period; every 5 years thereafter	initial inspection		every 5 years	every 5 years			
FML Testing Peach County	Following the first cover repair activity after 5, 15, and 25 years; after 4 depressed areas have been repaired				following first cover repair activity after 5 years, 15 years, 25 years	4-10, 4-11, 15-13	CD Section VII, E, i	Activity reports to O & M Administrator
Sprinkling and weed/rodent/insect control Peach County	As necessary					16-6, 16-7	CD Section VII, E, i	Activity reports to O & M Administrator
Renew Deed Restrictions Peach County Advise EPA should zoning status (R-1) on Property #3 change to allow drilling of wells.	Every 20 years When change occurs				every 20 years	9-4 1-13, 19-1	ROD	Activity reports to O & M Administrator

TBD = To Be Determined

*The O&M Activity Report should contain information noted in Section 6.3

EPA Superfund
Record of Decision:

POWERSVILLE SITE
EPA ID: GAD980496954
OU 01
PEACH COUNTY, GA
09/30/1987

BENZENE HEXACHLORIDE (BHC), VINYL CHLORIDE, 1,2 DICHLOROETHANE, LEAD AND CHROMIUM.

DRILLING LOGS FOR ALL THE MONITOR WELLS AND GAMMA LOGS PERFORMED AT THREE OF THE MONITOR WELLS INDICATED THE EXISTENCE OF MULTIPLE CLAY LENSES. THE DEPTH TO THE WATER TABLE RANGED FROM 30 TO 80 FEET. THE AVERAGE WATER TABLE ELEVATION WAS REPORTED TO BE 373 FEET ABOVE MEAN SEA LEVEL (MSL) EXCEPT AT MONITOR WELL MW-9, WHERE THE ELEVATION AVERAGED 385 FEET, APPROXIMATELY 12 FEET HIGHER THAN THE SURROUNDING AREA. THIS APPARENT MOUND WAS INCONSISTENT WITH THE GENERALLY PLANAR WATER SURFACE. THE DIRECTION OF GROUND WATER FLOW COULD NOT BE COMPLETELY DEFINED BASED UPON THE EXISTING DATA. THE NUS REPORT CONCLUDED THAT THE AQUIFER BENEATH THE SITE APPEARED TO BE UNCONFINED WITH VARIOUS ISOLATED CLAY LENSES THROUGHOUT. HOWEVER, THIS PARTICULAR REPORT WAS INCONCLUSIVE WITH REGARDS TO THE DIRECTION OF GROUND WATER FLOW.

IN DECEMBER 1984, CAMP, DRESSER & MCKEE INC. (CDM) WAS GIVEN THE WORK ASSIGNMENT TO PERFORM A REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) ON THE SITE. INFORMATION GATHERED DURING THIS STUDY INDICATED THAT GROUNDWATER FLOW IS TO THE SOUTHEAST. THE COMBINED RI/FS REPORT WAS COMPLETED IN JULY OF 1987 AND PRESENTED TO THE PUBLIC FOR COMMENT ON AUGUST 4, 1987 AT THE FEASIBILITY STUDY PUBLIC MEETING. THE AGENCY'S RESPONSE TO COMMENTS AND QUESTIONS GENERATED BY THIS MEETING ARE FOUND IN THE RESPONSIVENESS SUMMARY.

PREVIOUS SITE RESPONSE ACTIONS

FOLLOWING THE CLOSURE OF THE LANDFILL IN 1979, THE ONLY RESPONSE ACTION AT THE SITE WAS UNDERTAKEN BY PEACH COUNTY AT THE REQUEST OF BOTH THE STATE AND EPA DURING EARLY 1986. THE ACTIVITY WAS LIMITED TO THE REGRADING OF A STEEP BANK LEADING UP TO THE HAZARDOUS WASTE DISPOSAL AREA THAT HAD ERODED AWAY DUE TO PAST RAIN EVENTS. IT WAS FEARED IF THE EROSION WAS LEFT UNCHECKED THAT THE DISPOSAL CELLS IN THE HAZARDOUS WASTE AREA WOULD BE BREACHED.

#CSS

SECTION III

CURRENT SITE STATUS

THE PHYSICAL CHARACTERISTICS OF THE POWERSVILLE SITE WERE DETERMINED AND EVALUATED IN THE REMEDIAL INVESTIGATION (RI) PROCESS. AS A RESULT OF THE RI FIELD STUDY, THE CURRENT STATUS OF THE SITE HAS BEEN WELL DEFINED. IN ORDER TO UNDERSTAND THE CURRENT SITE CONDITIONS, IT IS NECESSARY TO KNOW WHAT CHEMICAL COMPOUNDS WERE DISPOSED OF THAT CREATED THE CONCERN ASSOCIATED WITH THE SITE, E.G., DOA AND WOOLFOLK DISPOSAL LISTS. THIS INFORMATION IS PRESENTED IN APPENDIX B. THE DATA CAN BE BEST UNDERSTOOD BY BREAKING IT DOWN INTO SOIL, GROUNDWATER, SURFACE WATER, AIR, AND GENERAL HYDROGEOLOGICAL PORTIONS.

SOILS

THE OBJECTIVE OF THE SOIL SAMPLING WAS TO DEFINE THE LIMITS, DEPTH AND COMPOSITION OF MATERIALS IN THE PORTION OF THE SITE USED FOR THE DISPOSAL OF MUNICIPAL WASTE AND TO DETERMINE IF ANY CONTAMINANT LEACHING IS OCCURRING FROM THE HAZARDOUS WASTE AREA.

AS SHOWN IN FIGURE 3, THIRTEEN VERTICAL SOIL BORINGS WERE DRILLED IN OR AROUND THE MUNICIPAL FILL AREA (MFB-1 TO MFB-13) AND TWO ANGLED BORINGS WERE DRILLED UNDER THE HAZARDOUS WASTE AREA (HW-1 & HW-2). TABLE 4 SUMMARIZES THE INDICATOR CHEMICALS FROM SAMPLES COLLECTED FROM THE SOIL BORINGS. THE SOIL BORING SAMPLES WERE COLLECTED AT FIVE FOOT INTERVALS, STARTING AT TEN FEET BELOW GROUND SURFACE.

THE UPPER SOIL REGION CONSISTS OF MEDIUM GRAINED PERMEABLE SAND. THE SAND IS PART OF THE GOSPORT SAND UNIT COMMON TO THE AREA. THE THICKNESS OF THIS SAND REGION AT THE SITE RANGES FROM 0 TO 50 FEET. THE MAJORITY OF THE MUNICIPAL FILL AREA IS LOCATED IN THE GOSPORT SAND UNIT.

UNDERLYING THE UPPER SAND REGION IS THE PROVIDENCE SAND UNIT WHICH CONTAINS MANY CLAY LENSES AND SEAMS. ALTHOUGH THE LOWER SAND IS USUALLY FINE GRAINED WITH A LESS UNIFORM SIZE DISTRIBUTION, IT IS DIFFICULT TO DIFFERENTIATE BETWEEN THE TWO REGIONS AT THE POWERSVILLE LANDFILL SITE.

THE BOUNDARY OF THE MUNICIPAL FILL AREA SHOWN ON FIGURE 3 WAS DERIVED USING THE BORING LOGS. THE REGION CONTAINING DEBRIS AND OTHER WASTE MATERIAL WAS DISTINGUISHED BY ITS BLACK COLOR. SIMILARLY, THE DEPTH OF THE FILL AREA WAS DETERMINED. USING THE AREA AND VARYING DEPTHS DERIVED, THE VOLUME OF THE MUNICIPAL FILL AREA WAS CALCULATED TO BE APPROXIMATELY 292,000 CUBIC YARDS.

TWO BORINGS WERE DRILLED UNDER THE HAZARDOUS WASTE AREA AT THE LOCATIONS SHOWN ON FIGURE 3. A NOTICEABLE PESTICIDE ODOR WAS PRESENT DURING THE FINAL SAMPLING OF HW-2. TABLE 5 SUMMARIZES THE ANALYTICAL RESULTS FOR THE HW-1 & HW-2 SAMPLES. THE ENDANGERMENT ASSESSMENT IDENTIFIED THE FOLLOWING CHEMICALS AS INDICATORS FOR THE LANDFILL SOILS:

- ALPHA - BHC
- TOXAPHENE
- CHLORDANE.

ANALYTICAL RESULTS FROM THE SOIL SAMPLES WERE USED TO LOCATE SOURCE AREAS OF THE INDICATOR CHEMICALS. AT THE BEGINNING OF THE INVESTIGATION, THE PRIMARY AREA OF CONCERN WAS THE HAZARDOUS WASTE AREA. HOWEVER, THE SAMPLES COLLECTED FROM UNDER THE HAZARDOUS WASTE AREA FAILED TO SHOW ANY DETECTABLE CONCENTRATIONS OF INDICATOR CHEMICALS. THE HAZARDOUS WASTE AREA SHOULD STILL BE CAREFULLY CONSIDERED SINCE RECORDS (REFER TO APPENDIX B) SHOW THAT SIGNIFICANT AMOUNTS OF THE INDICATOR CHEMICALS WERE DEPOSITED THERE. THE ABSENCE OF INDICATORS REVEALS ONLY THAT NO RESIDUAL CONTAMINANTS WERE PRESENT IN THE SOIL BELOW THE HAZARDOUS WASTE AREA WHERE THE SAMPLES WERE COLLECTED. HOWEVER, MIGRATION OF CONTAMINANTS FROM THE HAZARDOUS WASTE AREA TO THE GROUND WATER BY INFILTRATION AND PERCOLATION WILL OCCUR IF CONDITIONS AT THE SITE REMAIN UNCHANGED.

THREE OTHER AREAS WITHIN THE MUNICIPAL FILL AREA WERE IDENTIFIED AS POTENTIAL CONTAMINANT SOURCES. FIGURE 4 SHOWS THE LOCATIONS OF THESE AREAS. THE CONTAMINANTS DETECTED WITHIN THESE POTENTIAL SOURCE AREAS CAN BE GENERALLY CLASSIFIED AS SLIGHTLY SOLUBLE AND INSOLUBLE. THE AREAS CONTAINING SLIGHTLY SOLUBLE CHEMICALS MUST BE CONSIDERED AS SOURCES FOR GROUND WATER CONTAMINATION. THE AREAS WHICH CONTAIN INSOLUBLE CHEMICALS CAN BE CONSIDERED IMMOBILE WITH REGARDS TO TRANSPORT BY INFILTRATION AND GROUND WATER. BASED UPON THE AVAILABLE RECORDS, THE HAZARDOUS WASTE AREA IS KNOWN TO CONTAIN SLIGHTLY SOLUBLE CONTAMINANTS. BECAUSE OF THE PRESENCE OF ALPHA-BHC, AREA NUMBER ONE CAN BE CLASSIFIED AS SLIGHTLY SOLUBLE SOURCES. AREA NUMBER TWO, WHICH CONTAINS LOW CONCENTRATIONS OF DIELDRIN AND CHLORDANE RELATED CHEMICALS, CAN BE CLASSIFIED AS A STABLE INSOLUBLE SOURCE. AREA NUMBER THREE, WHICH IS ACTUALLY CONNECTED TO AREA NUMBER ONE, WAS IDENTIFIED SEPARATELY BECAUSE IT CONTAINED CONCENTRATIONS OF MOSTLY INSOLUBLE CHEMICALS SUCH AS CHLORDANE, TOXAPHENE AND DIELDRIN, WHICH ARE STABLE IN SOIL. PHOTOGRAPHS TAKEN BY GEORGIA EPD PERSONNEL CONFIRM THAT PESTICIDES WERE DEPOSITED IN AREA THREE.

FIGURE 5 SHOWS THE AGE RELATIONSHIP OF COASTAL PLAIN GEOLOGICAL UNITS IN WESTERN GEORGIA. THESE UNITS WERE CONFIRMED AT THE SITE BY LITHOLOGICAL AND GEOPHYSICAL LOGGING OF THE MUNICIPAL FILL BORE HOLES AND MONITOR WELL HOLES. THE LOGGING INDICATED THAT THE SUBSURFACE IS COMPOSED OF ALTERNATING LAYERS OF SANDS AND CLAYS WITH VARYING MIXTURES OF THE TWO. THE LAYERS VARY IN THICKNESS FROM LESS THAN AN INCH TO APPROXIMATELY 30 FEET.

THE OVERLYING GOSPORT SAND UNIT IS COMPOSED PREDOMINANTLY OF MEDIUM GRAINED SAND AND OUTCROPS MAINLY IN THE NORTHERN PORTION OF THE SITE, OUTSIDE THE AREA OF WASTE BURIAL. THE PROVIDENCE UNIT IS COMPOSED OF INTERLAYERED SANDS, CLAYS AND CLAY SANDS WHICH ARE COMMONLY CROSS-BEDDED AND CHanneled. MINOR GRAVEL LAYERS OCCUR BUT FORM NO PERSISTENT UNITS. BOTH UNITS ARE OF RECENT CRETACEOUS AGE.

THE THICKNESS OF THE GOSPORT SAND UNIT WAS NOT DETERMINED IN THE SITE AREA BUT HAS BEEN REPORTED IN SIMILAR AREAS AS BEING UP TO 60 FEET THICK. THE BOREHOLES INDICATE THAT THE PROVIDENCE SANDS AND CLAYS EXTEND FROM AN AVERAGE SURFACE ELEVATION OF 460 FEET ABOVE MSL TO AT LEAST 270 FEET ABOVE MSL. THE BASE OF THE OLDEST CRETACEOUS UNIT IN THE POWERSVILLE AREA OCCURS AT AN ELEVATION OF APPROXIMATELY 480 FEET BELOW SEA LEVEL. THUS, A THICKNESS OF APPROXIMATELY 1,000 FEET CAN BE ASSUMED FOR THE CRETACEOUS UNITS IN THE AREA. THE CRETACEOUS UNCONFORMABLY OVERLIES THE METAMORPHIC PIEDMONT COMPLEX IN THE REGION.

HYDROGEOLOGY

THE GOALS OF THE HYDROGEOLOGIC INVESTIGATION WERE TO DEVELOP A MORE DEFINITIVE UNDERSTANDING OF THE LOCAL GEOLOGY, TO ESTABLISH THE DIRECTION OF GROUND WATER FLOW, TO DETERMINE THE VARIOUS PHYSICAL PARAMETERS ASSOCIATED WITH THE SITE AND TO DETERMINE THE SOURCES AND EXTENT OF CONTAMINATION. TO ACCOMPLISH THIS, NINE ADDITIONAL MONITOR WELLS WERE INSTALLED - (MW-9A, MW-12 THROUGH MW-19). FIGURE 6 SHOWS THE LOCATION OF THE MONITOR WELLS AND PRIVATE WELLS THAT WERE SAMPLED. THE GROUNDWATER FLOW IN THE VICINITY OF THE SITE OCCURS IN AN UNCONFINED SAND AQUIFER WITH THE PHREATIC SURFACE AT A DEPTH RANGING FROM 50 TO 75 FEET BELOW THE GROUND LEVEL. CONSIDERING THE GEOLOGY OF THE REGION, THE BOTTOM OF THE AQUIFER SHOULD BE LOCATED AT THE BASE OF THE PROVIDENCE SAND UNIT SEVERAL HUNDRED FEET BELOW. THE DIRECTION OF FLOW IS GENERALLY TOWARD THE SOUTHEAST (FIGURE 7).

SOME WATER APPEARS TO BE PERCHED ON SEVERAL CLAY LENSES WHICH OCCUR IN THE PERMEABLE SANDS. THIS PERCHING EFFECT WAS NOTED BY THE SLIGHTLY ELEVATED WATER LEVELS MEASURED IN THE SHALLOW MONITOR WELLS WHICH WERE SCREENED ABOVE THE CLAY. FROM THE RESULTS OF THE GEOPHYSICAL AND LITHOGRAPHIC LOGGING, THERE APPEARS TO BE NO CONTINUOUS CLAY LAYER PRESENT IN THE UPPER REGION WHICH COULD FORM AN EXTENSIVE CONFINING UNIT, SO THE PERCHING EFFECT MUST BE CONSIDERED AS A LOCAL CONDITION. THE PERCHED REGIONS MUST, LIKEWISE, BE CONSIDERED HYDRAULICALLY CONNECTED TO THE LOWER REGION.

THE VALUES OF THE HYDRAULIC CONDUCTIVITY RANGED FROM 3.5 TO 11 FEET PER DAY IN THE UPPER SAND AND SILTY SAND ZONES. IN THE LOWER SAND ZONES, AT DEPTHS GREATER THAN 120 FEET, THE VALUES RANGED FROM 5 TO 7 FEET PER DAY. THE MAIN REGION OF INTEREST IN THE AQUIFER AS A MIGRATION PATHWAY IS THE UPPER ZONE WHERE THE CLAY LENSES CAUSE THE PERCHING OF THE GROUND WATER. THE PERCHED ZONES AVERAGED ABOUT 30-60 FEET IN THICKNESS ABOVE THE CLAY. USING AVERAGE VALUES FOR THICKNESS AND HYDRAULIC CONDUCTIVITY OF 40 FEET AND 7 FEET PER DAY RESPECTIVELY, THE TRANSMISSIVITY FOR THE UPPER ZONE WAS DETERMINED TO BE 280 SQUARE FEET PER DAY PER. THE SLOPE OF THE HYDRAULIC GRADIENT AT THE SITE AVERAGES IN 9 VERTICAL DROP OF .0025 TO .0030 FEET PER FOOT OF LENGTH.

THE ANALYTICAL RESULTS OF THE GROUND WATER SAMPLES COLLECTED DURING THE REMEDIAL INVESTIGATION (FEBRUARY-JULY, 1986) FROM THE EXISTING MONITOR WELLS, THE NEW MONITOR WELLS AND THE PRIVATE WELLS DURING THE STUDY ARE SUMMARIZED IN TABLE 6. THOSE RESULTS AND THE RESULTS REPORTED IN THE PREVIOUS NUS STUDY WERE USED IN THE ENDANGERMENT ASSESSMENT TO EVALUATE THE POTENTIAL HEALTH RISK ASSOCIATED WITH THE CONSUMPTION OF GROUND WATER FROM THE SITE. TWO SCENARIOS WERE USED TO EVALUATE THE POTENTIAL HEALTH RISKS: A CURRENT-USE SCENARIO AND A FUTURE USE SCENARIO. THE ASSESSMENT WAS PERFORMED ON THE BASIS THAT NO REMEDIAL ACTION WOULD BE PERFORMED. THE FUTURE-USE SCENARIO ASSUMED THE LEACHING OF CONTAMINANTS FROM THE SOIL WOULD BE CONTINUOUS WITH TIME. THE ASSESSMENT CALCULATED THE CHRONIC DAILY INTAKE OF CONTAMINANTS USING AVERAGE CONCENTRATIONS FOUND AT THE SITE AND ALSO PROJECTED MAXIMUM CONCENTRATIONS, THUS DEVELOPING A WORST CASE SCENARIO. THE ENDANGERMENT ASSESSMENT IDENTIFIED THE FOLLOWING CHEMICALS AS INDICATORS FOR GROUND WATER:

- ALPHA-BHC
- GAMMA-BHC

- VINYL CHLORIDE
- 1,2-DICHLOROETHANE
- LEAD
- CHROMIUM.

THE ENDANGERMENT ASSESSMENT CONCLUDES THAT THERE IS A POTENTIAL LONG TERM HEALTH RISK ASSOCIATED WITH THE CONSUMPTION OF CONTAMINATED GROUND WATER FROM THE SITE. THE RISK IS ASSOCIATED WITH CONTAMINANTS WHICH ARE CLASSIFIED AS BOTH CARCINOGENS AND NONCARCINOGENS. THE CARCINOGENS ARE VINYL CHLORIDE AND 1,2-DICHLOROETHANE. THE NONCARCINOGENS ARE CHROMIUM AND LEAD. THE BENZENE HEXACHLORIDE (BHC) ISOMERS ARE CONSIDERED POSSIBLE CARCINOGENS. TABLE 7 SUMMARIZES THE CURRENT AND PROPOSED STANDARDS FOR THE ABOVE CHEMICALS (ALSO REFERRED TO AS APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, ARAR).

THE MONITOR WELLS AT THE SITE CAN BE CLASSIFIED AS SHALLOW AND DEEP WELLS. THE SHALLOW WELLS ARE THOSE WITH SCREENS SET ABOVE THE LOCALLY CONFINING CLAY LENSES IDENTIFIED IN THE PREVIOUS SUBSECTION. THESE LENSES OCCUR AT DEPTHS OF 30 TO 60 FEET. CONVERSELY, THE DEEP WELLS ARE THOSE WITH SCREENS INSTALLED BELOW THE CLAY LENSES. THE LARGER CONCENTRATIONS OF CONTAMINANTS WERE FOUND IN SHALLOW WELLS.

VINYL CHLORIDE WAS DETECTED IN THREE SHALLOW EXISTING MONITOR WELLS AND 1,2-DICHLOROETHANE WAS DETECTED IN ONE SHALLOW EXISTING MONITOR WELL. TWO OF THE ANALYTICAL VALUES FOR VINYL CHLORIDE WERE ESTIMATED VALUES.

CONCENTRATIONS OF CHROMIUM AND LEAD WERE FOUND IN ALMOST ALL OF THE MONITOR WELLS. THE HIGHEST CONCENTRATIONS WERE FOUND IN THE EXISTING SHALLOW WELLS WHICH ARE CONSTRUCTED OF GALVANIZED STEEL. NONE OF THE CONCENTRATIONS OF LEAD OR CHROMIUM DETECTED IN THE NEW OR DEEP WELLS EXCEEDED THE MCL (50 UG/L FOR BOTH CHEMICALS) ESTABLISHED UNDER THE SAFE DRINKING WATER ACT (SDWA).

THE BENZENE HEXACHLORIDE ISOMERS (ALPHA AND GAMMA) WERE DETECTED IN FIVE SHALLOW WELLS. AREA 1 AND THE HAZARDOUS WASTE AREA, SHOWN IN FIGURE 4, WERE CONSIDERED AS SOURCES OF THE SLIGHTLY SOLUBLE BHC CHEMICALS. GAMMA BHC IS THE ONLY BHC ISOMER WITH AN MCL (4 UG/L) ESTABLISHED UNDER THE SDWA. NONE OF THE BHC CONCENTRATIONS EXCEEDED THE MCL SET UNDER THE SDWA.

ALL OF THE CONTAMINANT CONCENTRATIONS WHICH EXCEEDED EXISTING STANDARDS WERE DETECTED IN SHALLOW WELLS WITH SCREENS LOCATED ABOVE THE CLAY LENSES. THESE DATA INDICATE THAT THE CONTAMINATION IS LIMITED TO THE UPPER ZONE OF THE AQUIFER WHERE THE WATER IS PERCHED ON THE CLAY LENSES. ALTHOUGH THE DEEPER ZONES OF THE AQUIFER ARE HYDRAULICALLY CONNECTED TO THE PERCHED REGIONS, THEY APPEAR TO BE FREE OF CONTAMINATION. THIS WOULD INDICATE THAT DOWNWARD MOVEMENT OF THE CONTAMINANTS IS PRESENTLY BEING RESTRICTED BY THE MULTIPLE OVERLAPPING CLAY LENSES.

BASED UPON THE ANALYTICAL RESULTS AND EXISTING STANDARDS, THE FOLLOWING GOALS FOR CLEANUP OF CONTAMINATED GROUND WATER WERE SELECTED, SHOULD SUCH A TASK BE REQUIRED.

GAMMA - BHC	4 UG/L
VINYL CHLORIDE	1 UG/L
1-2, DICHLOROETHANE	5 UG/L
LEAD	50 UG/L
CHROMIUM	50 UG/L.

SURFACE WATER & SEDIMENT INVESTIGATION

THE PURPOSE OF THIS SECTION WAS TO DETERMINE IF ANY CONTAMINANT MIGRATION BY WAY OF RUNOFF HAD REACHED THE LOCAL STREAMS.

SITE DRAINAGE & RUNOFF

SURFACE SOIL AND LEACHATE SAMPLES WERE COLLECTED FROM THE SITE AREA TO DETERMINE IF SURFACE RUNOFF SHOULD BE CONSIDERED AS A MIGRATION PATHWAY.

ALTHOUGH SURFACE RUNOFF IN THE AREA IS MINIMAL DUE TO THE SANDY SOIL, HEAVY RAINS ARE OFTEN SUFFICIENT TO PRODUCE EROSION AND POSSIBLY CARRY CONTAMINANTS OFF THE SITE. FIGURE 8 IDENTIFIES THE LOCATIONS OF WHERE THESE SAMPLES (RC-1 THROUGH RC-6) WERE COLLECTED.

THERE WAS LITTLE EVIDENCE OF LEACHATE PRESENT AT THE SITE, HOWEVER, FOUR SAMPLES, LFL 1-4, WERE COLLECTED FROM SUSPECTED LEACHATE POINTS AS SHOWN IN FIGURE 8. SURFACE RUNOFF IS GENERALLY TOWARD THE SOUTHEAST THROUGH RUNOFF CHANNELS THAT DIRECT SURFACE WATER TO A DITCH PARALLEL TO STATE HIGHWAY 49. THE CHANNELS ARE LOCATED TO THE NORTHEAST AND SOUTHWEST OF LIZZIE CHAPEL. SEDIMENT SAMPLES WERE COLLECTED FROM BOTH CHANNELS (SAMPLES RC 2-5). IN ADDITION, SEDIMENT SAMPLES WERE COLLECTED AT THE CULVERT WHICH CROSSES UNDER HIGHWAY 49 (RC-6) AND FROM THE EROSION CHANNELS THAT CARRY SURFACE RUNOFF DOWN THE HILL FROM THE HAZARDOUS WASTE AREA (RC-1).

TABLE 8 SUMMARIZES THE ANALYTICAL RESULTS OF THE SURFACE SOIL AND RUNOFF CHANNEL SAMPLES. THE ENDANGERMENT ASSESSMENT IDENTIFIED DIELDRIN AS AN INDICATOR CHEMICAL FOR SURFACE SOILS ALTHOUGH IT WAS ONLY DETECTED IN TWO SAMPLES. TYPICAL BACKGROUND CONCENTRATIONS FOR THE AREA WERE TAKEN FROM STANDARD PUBLICATIONS FOR COMPARISON. DIELDRIN WAS FOUND TO EXCEED THE TYPICAL BACKGROUND CONCENTRATIONS.

HOWEVER, ONLY ONE OF THE SOILS SAMPLES CONTAINED A CONCENTRATION HIGHER THAN THE TYPICAL VALUES. SINCE THERE ARE NO EXISTING STANDARDS FOR MAXIMUM ALLOWABLE CONTAMINANT CONCENTRATION IN SOIL, TYPICAL BACKGROUND LEVELS WERE USED TO DETERMINE THE CLEANUP GOALS. THE CLEANUP GOAL OF 20 UG/KG WAS SELECTED FOR DIELDRIN. BASED UPON THE ANALYTICAL RESULTS OF THE SAMPLING AND THE ABSENCE OF INDICATOR CHEMICALS IN THE ASSOCIATED SEDIMENT, SURFACE RUNOFF IS NOT A PATHWAY FOR CONTAMINANT MIGRATION. THE EROSION OBSERVED AT THE SITE DOES, HOWEVER, INDICATE POTENTIAL FUTURE PROBLEMS WITH SURFACE RUNOFF.

THE POSSIBILITY OF A POTENTIAL HEALTH RISK RESULTING FROM PHYSICAL CONTACT WITH SURFACE SOIL WAS ALSO CONSIDERED. THE ENDANGERMENT ASSESSMENT EVALUATED THE RISK ASSOCIATED WITH DIRECT CONTACT WITH THE SOIL OVER BOTH A SHORT AND LONG TERM PERIOD. THE ENDANGERMENT ASSESSMENT CONSIDERED THE RESULTS OF ALL SAMPLES COLLECTED DURING THIS REMEDIAL INVESTIGATION IN ADDITION TO THE RESULTS OF TWO SOIL AND ONE LEACHATE SAMPLE TAKEN FROM THE SITE DURING A PREVIOUS INVESTIGATION IN JANUARY 1984. THE CONCLUSION OF THE ENDANGERMENT ASSESSMENT WAS THAT NO HEALTH RISK IS ASSOCIATED WITH SHORT TERM CONTACT WITH THE SURFACE SOILS AND ONLY A MARGINAL RISK (5×10^{-6}) WOULD BE ASSOCIATED WITH LONG TERM CONTACT.

SURFACE WATER & SEDIMENT

IN CONJUNCTION WITH THE COLLECTION OF SAMPLES FROM RUNOFF CHANNELS, SURFACE WATER AND SEDIMENT SAMPLES WERE TAKEN AT LOCATIONS ADJACENT TO THE LANDFILL TO DETERMINE IF ANY CONTAMINANT MIGRATION TO NEARBY STREAMS HAD OCCURRED. (FIGURE 9). HOWEVER, DUE TO DROUGHT CONDITIONS, THE COLLECTION OF BOTH SURFACE WATER AND SEDIMENT SAMPLES WERE POSSIBLE AT ONLY THREE LOCATIONS AS INDICATED IN TABLE 9. THE SAMPLE LOCATION ON MULE CREEK UPGRADIENT OF THE SITE (SW-4/SD-4) WAS SELECTED AS BACKGROUND FOR COMPARISON. TABLE 10 AND TABLE 11 SHOW THE ANALYTICAL RESULTS FOR SURFACE WATER AND SEDIMENT SAMPLES, RESPECTIVELY. NO CHLORINATED ORGANICS OR OTHER COMPOUNDS ASSOCIATED WITH THE PESTICIDES DISPOSED OF AT THE SITE WERE DETECTED IN EITHER THE SURFACE WATER OR THE SEDIMENT SAMPLES. THE ENDANGERMENT ASSESSMENT FOUND NONE OF THE DETECTED CHEMICALS IN THESE SAMPLES TO BE TOXIC TO HUMAN OR AQUATIC LIFE.

NO INDICATOR CHEMICAL WAS IDENTIFIED FOR SURFACE WATER. BASED UPON THE ANALYTICAL RESULTS,

CONTAMINANT TRANSPORT BY RUNOFF FOR THE SITE TO LOCAL STREAMS WAS DETERMINED NOT TO BE A MIGRATION PATHWAY AT THIS TIME.

AIR INVESTIGATION

AIR MONITORING LEVELS NEVER EXCEEDED THE ACTION LEVEL OF 5 PPB ABOVE BACKGROUND DURING THE REMEDIAL INVESTIGATION. THE ENDANGERMENT ASSESSMENT DETERMINED THAT THERE WAS NO SHORT TERM HEALTH RISK ASSOCIATED WITH THE SITE EXCEPT DURING ACTIVITIES SUCH AS CONSTRUCTION OR EXCAVATION, WHICH MAY EXPOSE BURIED CONTAMINANTS.

ENDANGERED & THREATENED SPECIES

THE DEPARTMENT OF THE INTERIOR (DOI), IN THEIR PRELIMINARY NATURAL RESOURCES SURVEY OF THE SITE, STATES THAT THE HABITAT IN THE AREA IS NOT USED OR SUITABLE FOR USE BY ANY ENDANGERED SPECIES. DOI DID, HOWEVER, DETERMINE THAT MIGRATORY BIRDS USE THE SITE FOR FEEDING, NESTING AND COVER. THERE ARE NO DOI LANDS OR TRUST RESOURCES IN THE VICINITY. THE INFORMATION CONTAINED IN THE RI/FS AND OTHER INVESTIGATIONS INDICATES THAT OFF-SITE CONTAMINATION OF SURFACE WATERS OR SURFACE SOILS IS UNLIKELY AT PRESENT. BASED ON PRE-RI/FS INVESTIGATIONS, DOI DOES NOT BELIEVE THAT MIGRATORY BIRDS WILL BE EXPOSED TO CONTAMINANTS, AND HAS THEREFORE DETERMINED THAT NO CAUSE EXISTS TO PURSUE A CLAIM FOR DAMAGES TO NATURAL RESOURCES UNDER THEIR TRUST FOR THIS SITE.

#ENF

SECTION IV

ENFORCEMENT PROFILE

THE INITIAL RI/FS NOTICE LETTERS WERE SENT OUT ON SEPTEMBER 28, 1984. THE RECIPIENTS INCLUDED PEACH COUNTY AND THE UNITED STATES DEPARTMENT OF AGRICULTURE. ON NOVEMBER 20, 1984, A NOTICE LETTER WAS ALSO SENT TO CANADYNE GEORGIA CORPORATION, WHICH OWNS WOOLFOLK CHEMICAL COMPANY. ON JULY 15, 1985, EPA REGION IV ISSUED AN ADMINISTRATIVE ORDER ON CONSENT, AND PEACH COUNTY AND CANADYNE GEORGIA WERE GRANTED UNTIL NOVEMBER 1, 1985, TO PRESENT A REVISED CONSENT ORDER TO EPA. SINCE NEITHER PARTY EVER SUBMITTED A REVISED ORDER BY THAT DATE NEGOTIATIONS WERE TERMINATED AND EPA INITIATED RI/FS ACTIVITIES. A NOVEMBER 4, 1985 LETTER TO CANADYNE GEORGIA CONFIRMED THEIR UNWILLINGNESS TO CONDUCT THE RI/FS DUE TO A LACK OF ADDITIONAL PRPS WILLING TO CONDUCT THE RI/FS.

NOTICE LETTERS FOR THE RD/RA WERE ISSUED ON AUGUST 21, 1987, TO CANADYNE GEORGIA, PEACH COUNTY, THE DEPARTMENT OF AGRICULTURE, AND EAGLE BRIDGES PAINT COMPANY. THE LATTER PARTY WAS DISCOVERED THROUGH PRP SEARCH EFFORTS CONDUCTED AFTER THE RI/FS NOTICE LETTERS WERE ISSUED. ON SEPTEMBER 18, 1987, A GROUP OF PRPS MET WITH EPA TO INITIATE NEGOTIATIONS ON THE SITE.

#AE

SECTION V

ALTERNATIVES EVALUATION

PUBLIC HEALTH & ENVIRONMENTAL OBJECTIVES

THE PROBLEM AT THE POWERSVILLE LANDFILL SITE CAN BE DIVIDED INTO TWO CATEGORIES, CONTAMINATED SOIL AND CONTAMINATED GROUND WATER. BOTH ARE POTENTIAL PATHWAYS FOR MIGRATION OF CONTAMINANTS. SOIL IS A PATHWAY BY PHYSICAL CONTACT OR INGESTION OF CONTAMINATED SOILS. GROUND WATER ACTS AS A PATHWAY WHEN CONTAMINANTS IN THE AQUIFER ARE TRANSPORTED TO WELLS WHICH SUPPLY DRINKING WATER. THE REMEDIAL INVESTIGATION IDENTIFIED AREAS OF CONTAMINATED SOILS WHICH CONTAIN THE FOLLOWING TYPES OF CHLORINATED ORGANICS AND PESTICIDES:

- BENZENE HEXACHLORIDE (BHC) - SLIGHTLY SOLUBLE

- 1,2-DICHLOROETHANE - SOLUBLE
- DIELDRIN - INSOLUBLE
- CHLORDANE - INSOLUBLE
- TOXAPHENE - INSOLUBLE.

THE CONTAMINATED GROUND WATER CONTAINS THE FOLLOWING CHEMICALS:

- BENZENE HEXACHLORIDE (BHC)
- 1,2-DICHLOROETHANE
- VINYL CHLORIDE
- LEAD
- CHROMIUM.

THE ENDANGERMENT ASSESSMENT FOR THE POWERSVILLE LANDFILL SITE HAS EVALUATED THE POTENTIAL RISKS TO PUBLIC HEALTH AND THE ENVIRONMENT FROM CHEMICALS DETECTED IN GROUND WATER AND SOIL ON SITE BASED ON DATA GENERATED PRIOR TO THE RI/FS REPORT. USING AN EXCESS LIFETIME CANCER RISK OF 10^{-6} AND A HAZARD INDEX OF ONE AS POINTS OF COMPARISON, UNDER THE CURRENT-USE SCENARIO, THE ASSESSMENT INDICATES THAT THERE IS A POTENTIAL LONG-TERM HEALTH RISK ASSOCIATED WITH CONSUMPTION OF GROUND WATER FOR THE LIZZIE CHAPEL WELL; NO HEALTH RISK IS ASSOCIATED WITH CONTACT WITH LANDFILL SURFACE SOILS. UNDER A FUTURE-USE SCENARIO IN WHICH THE SITE IS REDEVELOPED AND A DRINKING-WATER WELL IS ESTABLISHED ON SITE, A POTENTIAL LONG-TERM HEALTH RISK IS ASSOCIATED WITH GROUND-WATER CONSUMPTION, BUT NOT WITH SOIL CONTACT DURING CONSTRUCTION. A MARGINAL RISK OF 5×10^{-6} IS ASSOCIATED WITH FUTURE RESIDENTS WHO MAY COME IN CONTACT WITH LANDFILL SOILS UNDER A PLAUSIBLE MAXIMUM CASE SCENARIO.

THE ASSESSMENT OF RISK FROM GROUND WATER AT THE SITE IS BASED IN PART ON AN EQUILIBRIUM MODEL THAT ASSUMES THAT PESTICIDES IN THE SOIL WILL LEACH INTO THE GROUND WATER. THE MODEL PROBABLY OVERESTIMATES THE ACTUAL LEACHING. BECAUSE PESTICIDES HAVE GENERALLY LOW MOBILITY IN SOIL-GROUND WATER SYSTEMS, THE ACTUAL LEACHING AND A GRADUAL INCREASE IN GROUND-WATER CONCENTRATIONS MAY TAKE PLACE OVER A LONG PERIOD OF TIME.

A COMPARISON OF DATA COLLECTED UNDER A PREVIOUS INVESTIGATION BY NUS (IN 1984-1985) WITH THE CURRENT STUDY INDICATES THAT THE OVERALL RISK LEVELS FOR SOIL EXPOSURE, DRINKING WATER WELLS, AND MONITOR WELLS ARE SIMILAR. FOR THE PRIVATE WELLS, THE NUS DATA INDICATES THE POSSIBLE PRESENCE OF LOW LEVELS OF VOLATILE ORGANICS, WHICH WOULD ADD SLIGHTLY TO THE OVERALL RISK. THE NUS DATA FOR MONITORING WELLS INDICATES A LOWER RISK COMPARED TO THE CDM DATA; HOWEVER, PREDICTED BY THE SOIL LEACHING MODEL.

TECHNOLOGIES CONSIDERED

SEVERAL TECHNOLOGIES WERE CONSIDERED FOR REMEDIATING THE POWERSVILLE SITE. THE TECHNOLOGIES WERE PRESENTED IN GROUPS TARGETED AT REMEDIATING A SINGLE ASPECT OF THE SITE. TABLE 12 SHOWS THE TECHNOLOGIES CONSIDERED FOR REMEDIATION OF SURFACE AND GROUNDWATER CONTAMINATION, TECHNOLOGIES CONSIDERED FOR REMEDIATION OF SOIL CONTAMINATION, AND TECHNOLOGIES RESPONDING TO INSTITUTIONAL CONTROLS.

SEVERAL COMBINATIONS OF TECHNOLOGIES WILL PROVIDE REMEDIAL ACTIONS WHICH COMPLY WITH APPLICABLE, RELEVANT AND APPROPRIATE ENVIRONMENTAL LAWS. HOWEVER, PREFERENCE WAS GIVEN TO TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY OPTIONS WHICH REDUCE THE TOXICITY, MOBILITY OR VOLUME OF THE WASTE TO THE MAXIMUM EXTENT PRACTICABLE. REMEDIATION OF THE SITE WILL RESPOND TO ISSUES RAISED UNDER THE SAFE DRINKING WATER ACT (SDWA), CLEAN WATER ACT (CWA), THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA).

FIGURE 10 IS A SCHEMATIC DIAGRAM SHOWING THE PRELIMINARY GROUP OF TECHNOLOGIES IDENTIFIED. THE

REMAINDER OF THIS SECTION PROVIDES A BRIEF DESCRIPTION OF EACH REMEDIAL RESPONSE TECHNOLOGY THAT WAS SCREENED.

SCREENING OF TECHNOLOGIES

THE SCREENING OF REMEDIAL ACTION TECHNOLOGIES AND ALTERNATIVES USES A BROAD EVALUATION CRITERIA BASED ON TECHNICAL FEASIBILITY, PUBLIC HEALTH, ENVIRONMENTAL PROTECTION AND COST. THE PURPOSE OF THE INITIAL SCREENING IS TO ELIMINATE ALL TECHNOLOGIES EXCEPT THOSE THAT ARE APPLICABLE AND FEASIBLE BASED ON THE SITE CONDITIONS. THE RETAINED TECHNOLOGIES WILL BE USED TO DEVELOP REMEDIAL ACTION ALTERNATIVES. A MORE DETAILED SCREENING WILL THEN BE PERFORMED ON EACH OF THE SELECTED ALTERNATIVES.

SCREENING BASED UPON TECHNICAL CRITERIA INVOLVES ELIMINATING TECHNOLOGIES THAT MAY PROVE EXTREMELY DIFFICULT TO IMPLEMENT, THAT WILL NOT ACHIEVE THE REMEDIAL OBJECTIVES IN A REASONABLE TIME PERIOD, OR THAT RELY ON UNPROVEN TECHNOLOGY. TECHNICAL FEASIBILITY FACTORS CONSIDERED IN THE NON-ECONOMIC ANALYSIS OF TECHNOLOGIES INCLUDE EFFECTIVENESS AND RELIABILITY OF THE PROPOSED SYSTEMS. THE REMEDIAL ACTION'S EFFECTIVENESS IS MEASURED IN TERMS OF ITS ABILITY TO CONTROL AND ELIMINATE PUBLIC HEALTH AND ENVIRONMENTAL RISKS AND TO PROTECT NATURAL RESOURCES. RELIABILITY CAN BE EXPRESSED AS THE DEGREE OF ASSURANCE THAT THE SELECTED REMEDY WILL MEET OR EXCEED THE CLEANUP OBJECTIVES AS WELL AS THE REMEDIAL ACTION EXPECTATIONS.

USING ENVIRONMENTAL AND PUBLIC HEALTH CRITERIA, TECHNOLOGIES POSING SIGNIFICANT ADVERSE ENVIRONMENTAL EFFECTS WILL BE EXCLUDED. ONLY THOSE TECHNOLOGIES THAT SATISFY THE RESPONSE OBJECTIVES AND CONTRIBUTE SUBSTANTIALLY TO THE PROTECTION OF PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT ARE CONSIDERED FURTHER. THE EVALUATION OF PUBLIC HEALTH AND ENVIRONMENTAL PROTECTION INVOLVES A COLLECTIVE ASSESSMENT OF DEMOGRAPHIC, GEOGRAPHIC, PHYSICAL, CHEMICAL, AND BIOLOGICAL FACTORS THAT CONTRIBUTE TO THE IMPACTS OF HAZARDOUS SUBSTANCES.

COST SCREENING INVOLVES THE ELIMINATION OF TECHNOLOGIES THAT HAVE AN ESTIMATED PRESENT WORTH COST FAR GREATER THAN THE OTHER TECHNOLOGIES UNDER CONSIDERATION. FOR THE INITIAL SCREENING, THE COST ESTIMATES HAVE AN ACCURACY OF PLUS 50 PERCENT AND MINUS 30 PERCENT. THE TOTAL COST INCLUDES THE COST OF IMPLEMENTING (PLANNING, PERMITTING, TESTING AND CONSTRUCTION) THE TECHNOLOGY IN ADDITION TO THE COST OF OPERATION AND MAINTENANCE (O&M). THE RATIO OF PRESENT WORTH CAPITAL COSTS TO THE PRESENT WORTH OPERATION, MONITORING, AND MAINTENANCE COSTS ARE ALSO CONSIDERED.

THE SUPERFUND AMENDMENT AND REAUTHORIZATION ACT (SARA) OF 1986 STIPULATES THAT PREFERENCE SHOULD BE GIVEN TO TREATMENTS THAT REDUCE THE VOLUME, TOXICITY OR MOBILITY OF THE HAZARDOUS WASTE EVEN IF THE ESTIMATED PRESENT WORTH COST MAY BE GREATER THAN OTHER TECHNOLOGIES THAT DO NOT.

CLEANUP CRITERIA FOR ASSESSING THE EFFECTIVENESS OF THE REMEDIAL TECHNOLOGIES SELECTED FOR USE AT THE POWERSVILLE LANDFILL SITE WILL BE BASED ON APPLICABLE OR RELEVANT FEDERAL AND STATE STANDARDS AND CRITERIA. THE CONTAMINANTS SELECTED AS INDICATOR CHEMICALS IN THE ENDANGERMENT ASSESSMENT WILL BE USED TO EVALUATE THE CLEANUP OPERATIONS. APPLICABLE DRINKING WATER STANDARDS FOR THE INDICATOR CHEMICALS ARE SUMMARIZED IN TABLE 7. THERE ARE NO ESTABLISHED CRITERIA OR STANDARDS FOR SOIL. CLEANUP CRITERIA FOR SOIL WERE BASED ON BACKGROUND SOIL CONCENTRATIONS.

THE FOLLOWING CLEANUP GOALS WILL BE CONSIDERED FOR PRELIMINARY SCREENING PURPOSES:

- SURFACE SOILS
DIELDRIN 20 UG/KG
- SUBSURFACE SOILS
ALPHA-BHC *

TOXAPHENE	*
CHLORDANE	*

- GROUND WATER	
GAMMA-BHC	4 UG/L
VINYL CHLORIDE	1 UG/L
1-2, DICHLOROETHANE	5 UG/L
LEAD	50 UG/L
CHROMIUM	50 UG/L

* NO STANDARD EXISTS AND NO CONCENTRATIONS ABOVE DETECTION LIMITS WERE FOUND IN BACKGROUND SAMPLES.

TECHNOLOGIES ELIMINATED

SEVERAL TECHNOLOGIES WERE ELIMINATED IN THE PRELIMINARY SCREENING PHASE AND IN THE DETAILED SCREENING (TABLE 13). THE FOLLOWING IS A LIST OF REMEDIAL OPTIONS WHICH WERE ELIMINATED DURING THE SCREENING PHASE AND THE REASONS FOR ELIMINATION.

SOIL TECHNOLOGIES

- IN SITU-CHELATION - THIS TECHNOLOGY IS EFFECTIVE FOR IMMOBILIZING METAL CATIONS BUT IS INEFFECTIVE FOR TREATING PESTICIDES. CHELATION WOULD BE DIFFICULT TO USE IN COMBINATION WITH OTHER TECHNOLOGIES. RESEARCH ON THIS TECHNIQUE FOR APPLICATION TO HAZARDOUS WASTE SITES IS VERY LIMITED. THIS TECHNOLOGY WILL NO LONGER BE CONSIDERED.
- ENZYMATIC DEGRADATION - ENZYMATIC TREATMENT IS A VERY PRECISE TECHNOLOGY. SPECIFIC ENZYMES MUST BE MATCHED WITH SPECIFIC CONTAMINANTS. THE CURRENT STATE OF DEVELOPMENT OF THIS TECHNOLOGY DOES NOT PROVIDE ANY PRACTICAL METHOD FOR APPLICATION TO LARGE AMOUNTS OF SOIL, THEREFORE IT WILL NO LONGER BE CONSIDERED.
- EXTRACTION (SOIL FLUSHING) - COMPLEXING AND CHELATING AGENTS WOULD HAVE TO BE USED IN THE FLUSHING SOLUTION TO REMOVE HEAVY METALS. SURFACTANTS CAN BE USED TO IMPROVE THE TREATMENT OF LOW SOLUBLE COMPOUNDS, HOWEVER, THE AVAILABILITY OF APPROPRIATE SURFACTANTS FOR USE WITH THE LOW SOLUBLE CHLORINATED ORGANICS FOUND AT THE POWERSVILLE SITE IS LIMITED. BECAUSE OF THE COMBINATION OF PESTICIDES AND METALS FOUND AT THE SITE, THIS TECHNIQUE WOULD BE DIFFICULT TO APPLY. THE TECHNIQUE IS ALSO DIFFICULT TO USE IN COMBINATION WITH OTHER TECHNOLOGIES. EXTRACTION IS BETTER SUITED FOR USE WITH SOLUBLE COMPOUNDS OTHER THAN PESTICIDES AND WILL NO LONGER BE CONSIDERED.
- ATTENUATION OF SOIL - CLEAN SOIL MAY NOT BE READILY AVAILABLE ONSITE, AND USE OF ATTENUATION IS NOT TECHNICALLY FEASIBLE FOR CONTAMINATION AT A DEPTH GREATER THAN 3 FEET. THE CONTAMINATED SOIL AT THE POWERSVILLE SITE EXTENDS TO A DEPTH OF APPROXIMATELY 30 FEET. THIS TECHNOLOGY WILL NOT BE RETAINED FOR FURTHER CONSIDERATION.

WATER TECHNOLOGIES

- INJECTION WELLS - INJECTION WELLS COULD BE USED FOR ONE OF TWO PURPOSES. THE FIRST TECHNIQUE INVOLVES THE INJECTION OF CLEAN WATER INTO THE AQUIFER TO FORCE CONTAMINATED WATER TOWARD EXTRACTION WELLS. THIS METHOD WOULD BE DIFFICULT TO USE AT THE POWERSVILLE LANDFILL SITE DUE TO THE MULTIPLE CLAY LENSES AND PERCHED WATER

TABLE. IN ADDITION, THERE IS NO READILY AVAILABLE SOURCE FOR CLEAN WATER AT THE SITE OTHER THAN PUMPING FROM DEEPER IN THE AQUIFER. INJECTION OF TREATED GROUND WATER BACK INTO THE AQUIFER CAN ALSO BE DONE. HOWEVER, STATE REGULATIONS PROHIBIT SUCH INJECTION. THIS TECHNOLOGY IS IMPRACTICAL AND WILL NO LONGER BE CONSIDERED.

- BIOLOGICAL TREATMENT - BIOLOGICAL TREATMENT HAS A LIMITED EFFECTIVENESS FOR THE DEGRADATION OF HALOGEN-SUBSTITUTED ORGANIC COMPOUNDS AND INSOLUBLE COMPOUNDS. THIS METHOD SHOULD NOT BE USED WHEN THE TREATED WATER IS TO BE USED FOR FINAL CONSUMPTION BY HUMANS OR ANIMALS UNLESS THE WATER IS PROCESSED AFTERWARD FOR REMOVAL OF ALL BACTERIA. THIS METHOD WILL NO LONGER BE CONSIDERED.
- ION EXCHANGE/SORPTIVE RESINS - ION EXCHANGE IS USEFUL FOR THE TREATMENT OF WATER WITH LOW LEVELS OF HEAVY METALS AND SORPTIVE RESINS CAN REMOVE A VARIETY OF ORGANIC COMPOUNDS. THE TREATMENT PROCESS IS EXPENSIVE AND DIFFICULT TO APPLY. OTHER TECHNOLOGIES ARE MORE RELIABLE AND PRACTICAL, THEREFORE, THIS TECHNIQUE WILL NO LONGER BE CONSIDERED.
- REVERSE OSMOSIS - REVERSE OSMOSIS REQUIRES A HIGH LEVEL OF MAINTENANCE TO PREVENT MEMBRANE PLUGGING. COMPARED WITH OTHER TREATMENT TECHNOLOGIES, THIS IS A COMPLICATED PROCESS TO OPERATE AND IS SIGNIFICANTLY MORE EXPENSIVE WITHOUT ADDITIONAL BENEFITS. THEREFORE, REVERSE OSMOSIS WILL NOT BE RETAINED FOR FURTHER CONSIDERATION.
- IN SITU NEUTRALIZATION - THIS TECHNOLOGY IS USEFUL FOR THE TREATMENT OF ACIDIC OR BASIC PLUMES IN GROUND WATER. THESE CONDITIONS ARE NOT APPLICABLE TO THE POWERSVILLE SITE AND THIS TECHNOLOGY WILL NOT BE RETAINED FOR FURTHER CONSIDERATION.
- IN SITU HYDROLYSIS - THIS TECHNOLOGY REQUIRES AN IN DEPTH RESEARCH OF THE CONTAMINANTS PRESENT AND THE REACTION PATHWAYS. HYDROLYSIS REACTION PRODUCTS MAY BE MORE TOXIC THAN THE ORIGINAL COMPOUNDS. THIS IS THEREFORE NOT A GOOD METHOD FOR THE IN SITU TREATMENT OF GROUND WATER. IT WILL NOT BE RETAINED FOR SCREENING.
- IN SITU OXIDATION-REDUCTION - OXIDATION-REDUCTION IS USEFUL FOR THE TREATMENT OF WASTEWATER BUT IT IS NOT PRACTICAL FOR THE IN SITU TREATMENT OF GROUND WATER. THERE IS ALSO THE POSSIBILITY OF THE FORMATION OF MORE TOXIC OR MOBILE DEGRADATION PRODUCTS. THIS METHOD WILL NOT BE RETAINED FOR FURTHER CONSIDERATION.
- PERMEABILITY TREATMENT BEDS - THIS TECHNOLOGY IS APPLICABLE FOR AREAS WITH A SHALLOW WATER TABLE. PERMEABLE TREATMENT BEDS REQUIRE A HIGH DEGREE OF MAINTENANCE RESULTING FROM BED SATURATION, PRECIPITATE PLUGGING OF BED, AND SHORT LIFE TREATMENT OF MATERIALS. DUE TO THE DEPTH OF THE WATER TABLE AT THE POWERSVILLE LANDFILL SITE AND THE DEGREE OF MAINTENANCE REQUIRED FOR THIS TECHNOLOGY, IT WILL NO LONGER BE CONSIDERED.
- POLYMERIZATION - THIS TECHNIQUE IS APPLICABLE FOR THE TREATMENT OF GROUND WATER CONTAMINATED WITH A SINGLE COMPOUND. POLYMERIZATION DOES NOT REMOVE CONTAMINANTS FROM THE AQUIFER; SOME CHEMICAL REACTIONS CAN BE REVERSED ALLOWING CONTAMINANTS TO AGAIN MIGRATE WITH GROUND WATER FLOW. THIS PROCEDURE HAS LIMITED APPLICATION AT AN UNCONTROLLED HAZARDOUS WASTE SITE WITH A MIXTURE OF CHEMICALS. POLYMERIZATION WILL NOT BE RETAINED FOR FURTHER CONSIDERATION.
- SLURRY WALLS - THE USE OF SLURRY WALLS IS GENERALLY LIMITED TO SITES WITH SHALLOW WATER TABLES. THE WATER TABLE AT THE POWERSVILLE SITE RANGES APPROXIMATELY 50 - 70 FEET IN DEPTH. THE EXISTENCE OF MULTIPLE CLAY LENSES WOULD MAKE IT VERY DIFFICULT

TO SELECT THE APPROPRIATE IMPERVIOUS LAYER FOR CONFINEMENT. THIS TECHNOLOGY IS, THEREFORE, IMPRACTICAL FOR USE AT THIS SITE AND WILL NO LONGER BE CONSIDERED.

- GROUTING - IN ORDER TO APPLY THIS TECHNOLOGY AT THE POWERSVILLE SITE, THE GROUT WOULD HAVE TO BE INJECTED INTO THE SOIL SURROUNDING THE SOURCE OF CONTAMINANTS. BECAUSE A GROUT CURTAIN CAN BE THREE TIMES AS COSTLY AS A SLURRY WALL, IT IS RARELY USED WHEN GROUND WATER HAS TO BE CONTROLLED IN UNCONSOLIDATED SOIL SUCH AS PRESENT AT THIS SITE. THE BEST APPLICATION OF THIS METHOD AT WASTE SITES IS FOR SEALING VOIDS IN ROCKS. THIS TECHNOLOGY IS THEREFORE IMPRACTICAL AND WILL NO LONGER BE CONSIDERED.
- SHEET PILING - BECAUSE THE SOURCES OF CONTAMINATION ARE LOCATED IN THE UNSATURATED ZONE APPROXIMATELY 50-70 FEET ABOVE THE WATER TABLE, THE FLOW DIRECTION OF WATER THROUGH THE SOURCE AREA IS PRIMARILY VERTICAL IN LIEU OF HORIZONTAL. THE USE OF SHEET PILES IS GENERALLY LIMITED TO HORIZONTAL BARRIERS. THEREFORE, THIS TECHNOLOGY IS IMPRACTICAL AND WILL NO LONGER BE CONSIDERED.
- SUBSURFACE DRAINS - THE USE OF SUBSURFACE DRAINS TO INTERCEPT THE FLOW OF GROUND WATER IS LIMITED TO SITES WITH A SHALLOW WATER TABLE. THE 50 - 70 FEET DEPTH OF THE WATER TABLE MAKE THE USE OF SUBSURFACE DRAINS IMPRACTICAL. THEREFORE, THIS TECHNOLOGY WILL NO LONGER BE CONSIDERED. HOWEVER, THE USE OF COLLECTION DRAINS FOR SURFACE RUNOFF WILL BE RETAINED IN COMBINATION WITH CONTROL OF SURFACE WATER.
- RELOCATION OF RECEPTORS - ALTHOUGH RELOCATION OF LOCAL RESIDENTS AND RECEPTORS IS POSSIBLE, THIS IS NOT A PRACTICAL OPTION. LEGAL ASPECTS, COST AND CONSIDERATION OF PUBLIC OPINION MAKE SUCH A SOLUTION QUESTIONABLE. THE OPTION OF AN ALTERNATE WATER SOURCE PROVIDES THE SAME SOLUTION IN A MUCH MORE PRACTICAL MANNER, THEREFORE THIS TECHNOLOGY WILL NO LONGER BE CONSIDERED.

SURFACE WATER

SINCE SURFACE WATER HAS NOT BEEN IDENTIFIED AS A PROBLEM AT THE POWERSVILLE LANDFILL SITE, COLLECTION OF SURFACE WATER AND RUNOFF WILL ONLY BE CONSIDERED IN COMBINATION WITH OTHER TECHNOLOGIES WHICH ALTER THE AREA OR CAUSE A DIVERSION OF WATER. THIS TECHNOLOGY WILL NOT BE DISCUSSED SEPARATELY, BUT WILL BE INCLUDED IN THE CONSIDERATION AND PRICING OF OTHER RELATED TECHNOLOGIES.

AIR CONTROL TECHNOLOGIES

AIR CONTAMINATION WAS NOT IDENTIFIED AS A PROBLEM AT THE POWERSVILLE LANDFILL SITE, HOWEVER, THE APPLICATION OF OTHER TECHNOLOGIES MAY REQUIRE THE CONSIDERATION OF PROVISIONS FOR AIR MONITORING. ANY TECHNOLOGY WHICH INVOLVES EXCAVATION WILL REQUIRE TEMPORARY DUST CONTROL AND AIR MONITORING PROCEDURES. SIMILARLY, ANY APPLICATION OF SOURCE CAPPING OR ENCAPSULATION WILL REQUIRE GAS CONTROL PROVISION FOR VENTING GAS GENERATED DURING DECOMPOSITE OF WASTES. AIR CONTROL TECHNOLOGIES WILL NOT BE CONSIDERED SEPARATELY ANY FURTHER. AIR CONTROL PROVISIONS WILL ONLY BE CONSIDERED AND INCLUDED IN COMBINATION WITH OTHER TECHNOLOGIES AS REQUIRED.

TECHNOLOGIES RETAINED

SEVERAL TECHNOLOGIES WERE RETAINED FOR FINAL CONSIDERATION AS ALTERNATIVES FOR REMEDIATING THE SITE. THESE INDIVIDUAL TECHNOLOGIES ARE LISTED IN TABLE 14. IN DEPTH DISCUSSION OF EACH TECHNOLOGY CAN BE FOUND IN THE FS.

DURING THE FEASIBILITY STUDY PROCESS, THE RETAINED TECHNOLOGIES WERE GROUPED INTO REMEDIAL UNITS

WHICH WOULD ACCOMPLISH SPECIFIC REMEDIAL OBJECTIVES. THESE REMEDIAL UNITS WERE THEN COMBINED TO DEVELOP FULL REMEDIAL ALTERNATIVES WHICH WOULD RESPOND TO THE CONDITIONS SURROUNDING THE POWERSVILLE SITE. A TOTAL OF 13 COMPREHENSIVE REMEDIAL ALTERNATIVES WERE DESIGNED FROM THE VARIOUS TECHNOLOGIES RETAINED AFTER THE SCREENING PROCESS. EACH OF THE POSSIBLE ALTERNATIVES WAS ANALYZED BASED ON EFFECTIVENESS, IMPLEMENTABILITY AND COST. A GENERAL SUMMARY OF THE CONCERNS SURROUNDING EACH TECHNOLOGY IS PRESENTED IN TABLE 15. IT IS IMPORTANT TO NOTE THAT THE NO-ACTION ALTERNATIVE IS INCLUDED IN THE 13 ALTERNATIVES CONSIDERED FOR FINAL REMEDY SELECTION ALTHOUGH IT WAS ELIMINATED DURING THE INITIAL SCREENING PHASE. THE NO-ACTION ALTERNATIVE MUST BE INCLUDED AT THIS POINT TO FULLY COMPLY WITH THE LEGAL REQUIREMENTS.

ALTERNATIVE DESCRIPTIONS

ALTERNATIVE 1 - NO-ACTION ALTERNATIVE

UNDER THE NO-ACTION ALTERNATIVE, SOILS AND GROUNDWATER WOULD REMAIN CONTAMINATED WITH TOXIC SUBSTANCES REGULATED BY LOCAL, STATE, AND FEDERAL LAWS. POTENTIAL IMPACTS OF NO REMEDIATION MIGHT INCLUDE THE FOLLOWING:

- OCCUPATIONAL OR PUBLIC EXPOSURE
- DECLINE IN PROPERTY VALUES
- DEPRESSED AREA GROWTH
- ENVIRONMENTAL IMPACTS.

SEVERAL ACTIVITIES WOULD NEED TO OCCUR UNDER THIS ALTERNATIVE. A FENCE WOULD NEED TO BE ERECTED AROUND THE ENTIRE SITE AND WARNING SIGNS POSTED. PERIODIC MONITORING OF EXISTING MONITOR WELLS AS WELL AS THE INSTALLATION OF SEVERAL ADDITIONAL SHALLOW/DEEP MONITOR WELLS.

TOTAL CONSTRUCTION COSTS	\$103,572
PRESENT WORTH OPERATION & MAINTENANCE COSTS	\$239,048
TOTAL PRESENT WORTH COST	\$342,620.

ALTERNATIVE 2 - CAPPING THE HAZARDOUS WASTE AREA AND MUNICIPAL FILL AREA

SURFACE CAPPING INVOLVES CONSTRUCTING A THREE LAYERED CAP ACCORDING TO RCRA GUIDELINES. THE INSTALLATION OF A SURFACE CAP WILL REDUCE THE INFILTRATION THROUGH THE CONTAMINATED SOIL AND THEREBY REDUCE THE MIGRATION OF POLLUTANTS TO THE GROUNDWATER. THE CAP WOULD BE INSTALLED OVER THE HAZARDOUS WASTE AREA, WHICH ENCOMPASSES APPROXIMATELY ONE ACRE, AND THE MUNICIPAL FILL AREA, WHICH COVERS 7.5 ACRES.

CAPPING WOULD FIRST INCLUDE THE PLACEMENT OF A TWO FOOT CLAY LAYER COMPACTED IN SIX INCH LIFTS. A TWENTY MIL THICK SYNTHETIC LINER WOULD THEN BE PLACED OVER THE CLAY. NEXT, A ONE FOOT THICK DRAINAGE LAYER OF GRAVEL WOULD BE SPREAD AND A FILTER FABRIC PLACED ON TOP OF THE GRAVEL. THE FILTER FABRIC WOULD HELP TO STABILIZE A FINAL LAYER OF EIGHTEEN INCHES OF TOPSOIL. THE TOPSOIL WOULD BE VEGETATED TO PREVENT EROSION. ALSO, THE CAP WOULD HAVE A MINIMUM SLOPE OF TWO PERCENT GENERALLY TOWARD THE SOUTHEAST. DRAINAGE WOULD BE DESIGNED TO DIRECT SURFACE RUNOFF TOWARD THE PRESENT NATURAL DRAINAGE CHANNELS.

SINCE THE MUNICIPAL FILL AREA WAS PREVIOUSLY USED AS A SANITARY LANDFILL, THE GENERATION OF NATURAL GAS CAN BE EXPECTED. PROVISIONS FOR VENTING AND MONITORING OF THE GAS PRODUCED WOULD BE REQUIRED. INITIAL GAS MONITORING WOULD PROBABLY BE PERFORMED QUARTERLY AND LATER REDUCED IF NO PROBLEMS OCCUR.

GROUNDWATER MONITORING WOULD BE REQUIRED IN CONJUNCTION WITH THIS ALTERNATIVE. MONITORING WOULD INVOLVE CONTINUED USE OF EXISTING MONITOR WELLS AND THE INSTALLATION OF A MINIMUM OF EIGHT NEW SHALLOW MONITOR WELLS IN THE UPPER REGION OF THE AQUIFER TO DETERMINE WHETHER CONTAMINANTS ARE LEACHING OR MIGRATING FROM THE CAPPED AREAS.

THE FOLLOWING IS A SUMMARY OF THE ESTIMATED COST ASSOCIATED WITH THIS ALTERNATIVE:

TOTAL CONSTRUCTION COSTS	\$3,460,670
PRESENT WORTH OPERATION & MAINTENANCE COSTS	
HAZARDOUS WASTE AREA CAP	\$ 122,527
MUNICIPAL FILL AREA CAP	\$ 247,527
TOTAL PRESENT WORTH COSTS	\$3,830,724.

ALTERNATIVE 3 - EXCAVATE AND INCINERATE THE HAZARDOUS WASTE AREA ONSITE; CAP THE MUNICIPAL FILL AREA

THIS ALTERNATIVE WOULD INVOLVE THE USE OF SOURCE CONTROL FOR THE HAZARDOUS WASTE AND MUNICIPAL FILL AREAS. A SURFACE CAP WOULD BE USED ON THE MUNICIPAL FILL AREA TO REDUCE MIGRATION OF CONTAMINANTS TO THE GROUND WATER. INCINERATION OF THE CONTENTS OF THE HAZARDOUS WASTE AREA WOULD ELIMINATE THAT SOURCE OF CONTAMINANTS.

THE SURFACE CAPPING OF THE MUNICIPAL FILL AREA WOULD COVER APPROXIMATELY 7.5 ACRES AND WOULD INVOLVE THE SAME CONSIDERATIONS AND PROCEDURES DESCRIBED IN ALTERNATIVE 2.

THE HAZARDOUS WASTE AREA OCCUPIES APPROXIMATELY ONE ACRE. IT IS ESTIMATED THAT REMOVAL OF TOP SOIL AND SUBSOIL IN THE AREA WILL REQUIRE THE REMOVAL AND INCINERATION OF APPROXIMATELY 19,300 CUBIC YARDS OF SOLIDS CONTAMINATED WITH DIELDRIN, BHC, TOXAPHENE, CHLORDANE, AND OTHER PESTICIDES. EXCAVATION OF THE HAZARDOUS WASTE AREA COULD BE ACCOMPLISHED USING STANDARD EXCAVATION EQUIPMENT. THE PITS WOULD THEN BE BACKFILLED WITH TREATED SOIL. THE INCINERATION PROCESS TYPICALLY REMOVES GREATER THAN 99 PERCENT OF THESE CONTAMINANTS.

THE MOST COMMONLY USED INCINERATION METHODOLOGIES FOR HAZARDOUS WASTE REMEDIATION INCLUDE ROTARY KILN, FLUIDIZED BED, AND MULTIPLE HEARTH TECHNOLOGIES. IN ADDITION, THERE ARE SEVERAL EMERGING TECHNOLOGIES THAT ARE GAINING ACCEPTANCE INCLUDING MOLTEN SALT BED AND INFRARED INCINERATION. THE TWO THAT ARE CONSIDERED VIABLE FOR THE POWERSVILLE SITE ARE EITHER THE ROTARY KILN OR THE INFRARED INCINERATOR.

TOTAL CONSTRUCTION COSTS	\$11,098,746
PRESENT WORTH OPERATION & MAINTENANCE COSTS	
ONSITE INCINERATION OF HAZARDOUS WASTE AREA	\$ 466,582
MUNICIPAL FILL AREA CAP	\$ 247,094
TOTAL PRESENT WORTH	\$11,812,422.

ALTERNATIVE 4 - SOLIDIFICATION/STABILIZATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL AREA

THIS ALTERNATIVE INVOLVES THE USE OF SOURCE CONTROLS TO REDUCE LEACHING AND MIGRATION OF CONTAMINANTS TO THE GROUNDWATER. A SURFACE CAP WOULD BE INSTALLED OVER THE MUNICIPAL FILL AREA AND SOLIDIFICATION/STABILIZATION TECHNIQUES WOULD BE APPLIED TO THE HAZARDOUS WASTE AREA.

THE PROCEDURES AND CONSIDERATIONS ASSOCIATED WITH THE SURFACE CAPPING OF THE MUNICIPAL FILL AREA ARE IDENTICAL TO THOSE DESCRIBED FOR THE SAME AREA IN ALTERNATIVE 2. THE SOLIDIFICATION OF THE HAZARDOUS WASTE AREA, APPROXIMATELY 19,300 CUBIC YARDS, WOULD INVOLVE A CEMENTACIOUS FIXATION OF THE CONTAMINATED SOIL ENABLING IT TO BE PERMANENTLY STORED AT THE SITE.

TOTAL CONSTRUCTION COSTS	\$6,587,852
PRESENT WORTH OPERATION AND MAINTENANCE COSTS	
SOLIDIFICATION/STABILIZATION - HAZARDOUS WASTE AREA	\$ 195,114
MUNICIPAL FILL AREA CAP	\$ 247,094
TOTAL PRESENT WORTH COST:	\$7,030,060.

ALTERNATIVE 5 - CAP THE HAZARDOUS WASTE AREA AND MUNICIPAL FILL; PUMP AND TREAT THE GROUNDWATER

IMPLEMENTATION OF THIS ALTERNATIVE INVOLVES BOTH SOURCE CONTROL OF CONTAMINATED SOIL AND DIRECT TREATMENT OF CONTAMINATED GROUNDWATER. SOURCE CONTROL OF THE SOIL WOULD BE ACCOMPLISHED BY INSTALLING A SURFACE CAP ON BOTH THE HAZARDOUS WASTE AREA AND THE MUNICIPAL FILL AREA. THE PROCEDURES AND CONSIDERATIONS ASSOCIATED WITH THE SURFACE CAP ARE IDENTICAL TO THOSE DESCRIBED IN ALTERNATIVE 2.

THE TREATMENT OF THE CONTAMINATED GROUNDWATER WOULD BE ACCOMPLISHED BY THE USE OF A PACKAGE TREATMENT PLANT AND ACTIVATED CARBON COLUMNS. TREATMENT WOULD INCLUDE EXTRACTION AND STORAGE OF THE GROUNDWATER, PRECIPITATION, FLOCCULATION, SEDIMENTATION, FILTRATION, CARBON ADSORPTION AND DISCHARGE OF THE TREATED WATER TO LOCAL SURFACE WATER.

TOTAL CONSTRUCTION COSTS	\$4,816,626
PRESENT WORTH OPERATION AND MAINTENANCE COSTS	
MUNICIPAL FILL CAP	\$ 247,094
HAZARDOUS WASTE AREA CAP	\$ 122,527
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 394,363
TREATMENT OF GROUNDWATER	\$ 759,262
TOTAL PRESENT WORTH COST	\$6,339,872.

ALTERNATIVE 6 - EXCAVATION AND ONSITE INCINERATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL AREA; PUMP AND TREAT THE GROUNDWATER

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVES 3 AND 5. THE CONSIDERATIONS AND PROCEDURES WILL BE THE SAME AS THOSE DESCRIBED IN ALTERNATIVE 3 FOR ONSITE INCINERATION OF THE HAZARDOUS WASTE AREA AND CAPPING OF THE MUNICIPAL FILL AREA. LIKewise, THE CONSIDERATIONS FOR PUMPING AND TREATING THE GROUNDWATER WILL BE THE SAME AS DESCRIBED IN ALTERNATIVE 5.

TOTAL CONSTRUCTION COST	\$12,688,971
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PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

MUNICIPAL FILL CAP	\$ 247,094
ONSITE INCINERATION OF HAZARDOUS WASTE AREA	\$ 466,582
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 394,363
TREATMENT OF GROUNDWATER	\$ 759,262

TOTAL PRESENT WORTH COST \$14,456,272.

ALTERNATIVE 7 - SOLIDIFICATION/STABILIZATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL AREA; PUMP AND TREAT THE GROUNDWATER

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVES 4 AND 5. THE CONSIDERATIONS AND PROCEDURES WILL BE THE SAME AS THOSE DESCRIBED IN ALTERNATIVE 4 FOR STABILIZATION/SOLIDIFICATION OF THE HAZARDOUS WASTE AREA AND CAPPING OF THE MUNICIPAL FILL AREA. LIKEWISE, THE CONSIDERATIONS FOR PUMPING AND TREATING THE GROUNDWATER WILL BE THE SAME AS DESCRIBED IN ALTERNATIVE 5.

TOTAL CONSTRUCTION COSTS \$ 9,512,702

PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

SOLIDIFICATION/STABILIZATION OF HAZARDOUS WASTE AREA	\$ 195,114
MUNICIPAL FILL AREA CAP	\$ 247,094
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 394,363
TREATMENT OF GROUNDWATER	\$ 759,262

TOTAL PRESENT WORTH COST \$11,108,535.

ALTERNATIVE 8 - CAP THE HAZARDOUS WASTE AREA AND THE MUNICIPAL FILL AREA; PROVIDE AN ALTERNATE DRINKING WATER SOURCE

IMPLEMENTATION OF THIS ALTERNATIVE WOULD INVOLVE SOURCE CONTROL BY THE INSTALLATION OF A SURFACE CAP ON THE HAZARDOUS WASTE AREA AND THE MUNICIPAL FILL AREA. THE CONSIDERATIONS AND PROCEDURES FOR THE CAP WOULD BE IDENTICAL TO THOSE DESCRIBED IN ALTERNATIVE 2.

UNDER THIS ALTERNATIVE, AN ALTERNATE SOURCE OF DRINKING WATER WOULD BE SUPPLIED TO THE LOCAL RESIDENCES WHICH PRESENTLY HAVE WELLS THAT ARE POTENTIAL RECEPTORS OF CONTAMINANTS. THE PROVISIONS OF THIS ALTERNATE SOURCE WOULD NOT IMPROVE OR TREAT THE PRESENT CONTAMINATION, BUT WOULD ELIMINATE THE LONG TERM POTENTIAL RISK IDENTIFIED IN THE ENDANGERMENT ASSESSMENT (APPENDIX C).

THE ALTERNATE WATER SOURCE CONSIDERED BY THIS STUDY CONSISTED OF THE EXTENSION OF THE MUNICIPAL WATER SUPPLY PIPELINE FROM THE CITY OF BYRON. THE BYRON SYSTEM IS THE CLOSEST EXISTING MUNICIPAL SUPPLY TO THE POWERSVILLE LANDFILL SITE. THE PRESENT TERMINATION POINT IS LOCATED APPROXIMATELY TWO AND A HALF MILES NORTH OF THE SITE ON GEORGIA HIGHWAY 49.

TOTAL CONSTRUCTION COSTS \$3,928,920

PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

HAZARDOUS WASTE AREA CAP	\$ 122,527
MUNICIPAL FILL AREA CAP	\$ 247,094
ALTERNATE WATER SOURCE	\$ 207,392

TOTAL PRESENT WORTH COST	\$4,505,933.
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ALTERNATIVE 9 - EXCAVATE AND INCINERATE THE HAZARDOUS WASTE AREA ONSITE; CAP THE MUNICIPAL FILL AREA; PLUS ALTERNATE DRINKING WATER SOURCE

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVE 3 AND THE PROVISION OF AN ALTERNATE DRINKING WATER SOURCE AS DESCRIBED IN ALTERNATIVE 8. THE CONSIDERATIONS AND PROCEDURES WILL BE IDENTICAL TO THOSE DISCUSSED IN THE RESPECTIVE ALTERNATIVES.

TOTAL CONSTRUCTION COSTS	\$11,742,589
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PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

MUNICIPAL FILL AREA CAP	\$ 247,094
ONSITE INCINERATION OF HAZARDOUS WASTE AREA	\$ 466,582
ALTERNATE WATER SOURCE	\$ 207,392

TOTAL PRESENT WORTH COST	\$12,663,657.
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ALTERNATIVE 10 - SOLIDIFICATION/STABILIZATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL AREA; PLUS ALTERNATE DRINKING WATER SOURCE

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVE 4 AND THE PROVISION OF AN ALTERNATE DRINKING WATER SOURCE AS DESCRIBED IN ALTERNATIVE 8. THE CONSIDERATION AND PROCEDURES WILL BE IDENTICAL TO THOSE DISCUSSED IN THE RESPECTIVE ALTERNATIVES.

TOTAL CONSTRUCTION COSTS	\$7,231,696
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PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

MUNICIPAL FILL AREA CAP	\$ 247,094
SOLIDIFICATION/STABILIZATION OF HAZARDOUS WASTE AREA	\$ 195,114
ALTERNATE WATER SOURCE	\$ 207,392

TOTAL PRESENT WORTH COST	\$7,881,296.
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ALTERNATIVE 11 - CAP THE HAZARDOUS WASTE AREA AND MUNICIPAL FILL AREA; PUMP AND TREAT THE GROUNDWATER; PLUS ALTERNATE DRINKING WATER SOURCE

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVE 5 AND THE PROVISION OF AN ALTERNATE DRINKING WATER SOURCE AS DESCRIBED IN ALTERNATIVE 8. THE CONSIDERATIONS AND PROCEDURES WILL BE IDENTICAL TO THOSE DISCUSSED IN THE RESPECTIVE ALTERNATIVES.

TOTAL CONSTRUCTION COSTS	\$5,460,470
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PRESENT WORTH OPERATION AND

MAINTENANCE COSTS

MUNICIPAL FILL AREA CAP	\$ 247,094
HAZARDOUS WASTE AREA CAP	\$ 122,527
ALTERNATE WATER SOURCE	\$ 207,392
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 394,363
TREATMENT OF GROUNDWATER	\$ 759,262

TOTAL PRESENT WORTH COST \$7,191,108.

ALTERNATIVE 12 - EXCAVATION AND ONSITE INCINERATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL; PUMP AND TREAT THE GROUNDWATER; PLUS ALTERNATE DRINKING WATER SOURCE

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVE 6 AND THE PROVISION OF AN ALTERNATE DRINKING WATER SOURCE AS DESCRIBED IN ALTERNATIVE 8. THE CONSIDERATIONS AND PROCEDURES WILL BE IDENTICAL TO THOSE DISCUSSED IN THE RESPECTIVE ALTERNATIVES.

TOTAL CONSTRUCTION COSTS \$13,232,814

PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

MUNICIPAL FILL AREA CAP	\$ 247,094
ON SITE INCINERATION	\$ 466,582
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 374,363
TREATMENT OF GROUNDWATER	\$ 759,262
ALTERNATE WATER SOURCE	\$ 207,392

TOTAL PRESENT WORTH COST \$15,287,507.

ALTERNATIVE 13 - SOLIDIFICATION/STABILIZATION OF THE HAZARDOUS WASTE AREA; CAP THE MUNICIPAL FILL AREA; PUMP AND TREAT GROUNDWATER; PLUS ALTERNATE DRINKING WATER SOURCE

THIS ALTERNATIVE IS A COMBINATION OF ALTERNATIVE 7 AND THE PROVISION OF AN ALTERNATE DRINKING WATER SOURCE AS DESCRIBED IN ALTERNATIVE 8. THE CONSIDERATIONS AND PROCEDURES WILL BE IDENTICAL TO THOSE DISCUSSED IN THE RESPECTIVE ALTERNATIVES.

TOTAL CONSTRUCTION COSTS \$ 8,672,421

PRESENT WORTH OPERATION AND
MAINTENANCE COSTS

SOLIDIFICATION/STABILIZATION OF HAZARDOUS WASTE AREA	\$ 195,114
MUNICIPAL FILL AREA CAP	\$ 247,094
EXTRACTION/DISPOSAL OF GROUNDWATER	\$ 394,363
TREATMENT OF GROUNDWATER	\$ 759,262
ALTERNATE WATER SOURCE	\$ 207,392

TOTAL PRESENT WORTH COST \$10,475,646.

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SECTION VI

COMMUNITY RELATIONS

COMMUNITY RELATIONS EFFORTS FOR THE POWERSVILLE LANDFILL WERE INITIATED IN JULY OF 1985 WHEN EPA COMPLETED THE SITE COMMUNITY RELATIONS PLAN. AREA RESIDENTS WERE CONTACTED AS PART OF COMMUNITY RELATIONS WORK. THE MAJOR CONCERN EXPRESSED BY RESIDENTS AT THAT TIME CONCERNED CONTAMINATION OF THEIR DRINKING WATER, BUT HISTORICALLY, CONCERNS ALSO INCLUDED ODOR AND AIRBORNE CONTAMINATION. OVERALL COMMUNITY INTEREST HAS BEEN MODERATE. AN INFORMATION REPOSITORY WAS ESTABLISHED AT THE POWERSVILLE FIRE STATION, WHICH IS NEAR THE SITE. ALL FINAL DOCUMENTS, PLUS THE DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY WERE SENT TO THE REPOSITORY FOR PUBLIC ACCESS.

IN PREPARATION FOR THE PUBLIC MEETING, A FACT SHEET WAS SENT TO INTERESTED PARTIES LISTED IN THE COMMUNITY RELATIONS PLAN. THE FACT SHEET PROVIDED INTERESTED PARTIES WITH A SUMMARY OF ALL REMEDIAL ALTERNATIVES BEING CONSIDERED BY EPA FOR REMEDIATING THE PROBLEMS ASSOCIATED WITH THE POWERSVILLE LANDFILL SITE. ADDITIONALLY, NOTICE WAS PLACED IN THE LOCAL PAPER INDICATING ALL REMEDIAL ALTERNATIVES AND ANNOUNCING THE TIME AND LOCATION OF THE PUBLIC MEETING.

ON AUGUST 4, 1987, A PUBLIC MEETING WAS HELD TO DISCUSS THE FINDINGS OF THE RI/FS. THE PUBLIC MEETING SERVED TO INITIATE A 3 WEEK PUBLIC COMMENT PERIOD WHICH CLOSED ON AUGUST 25, 1987. ATTENDANCE AT THE PUBLIC MEETING WAS MODERATE, WITH APPROXIMATELY 30 PEOPLE IN ATTENDANCE. A NUMBER OF WRITTEN COMMENTS WERE RECEIVED DURING THE PUBLIC COMMENT PERIOD. THESE COMMENTS HAVE BEEN FULLY ADDRESSED IN THE RESPONSIVENESS SUMMARY (ATTACHED), WHICH WILL BE PLACED IN THE INFORMATION REPOSITORY.

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SECTION VII

CONSISTENCY WITH OTHER ENVIRONMENTAL LAWS

OTHER ENVIRONMENTAL LAWS WHICH MAY BE APPLICABLE OR RELEVANT TO THE REMEDIAL ACTIVITY BEING PROPOSED FOR THE POWERSVILLE LANDFILL SITE ARE:

- SAFE DRINKING WATER ACT
- RESOURCE AND CONSERVATION RECOVERY ACT (RCRA)
- CLEAN AIR ACT
- EPA GROUNDWATER PROTECTION STRATEGY
- CLEAN WATER ACT.

LOCALLY, RESIDENTS OBTAIN THEIR WATER SUPPLIES FROM THE PROVIDENCE SAND UNIT, WHICH IS THE SHALLOW SATURATED UNIT. THEREFORE, THE MANDATES OF THE SAFE DRINKING WATER ACT APPLY TO THIS AQUIFER. AT PRESENT, HOWEVER, NONE OF THE CONTAMINANTS EXCEED THE STANDARDS ESTABLISHED UNDER THIS ACT. CAPPING SHOULD GREATLY REDUCE THE MOBILITY OF THE CONTAMINANTS AT THE SITE, WHICH WILL REDUCE OR ELIMINATE THEIR INFILTRATION INTO THE GROUNDWATER. THE ALTERNATE WATER SUPPLY WILL PROVIDE ADDITIONAL INSURANCE THAT LOCAL RESIDENTS HAVE A LONG-TERM SOURCE OF CLEAN WATER.

THE CAPS WILL BE CONSTRUCTED IN ACCORDANCE WITH EPA GUIDANCE DOCUMENT COVERS FOR UNCONTROLLED HAZARDOUS SITES, EPA/540/2-85/002, SEPTEMBER, 1985 AND ALL APPLICABLE STATE AND FEDERAL REGULATIONS. SINCE ALL CONTAMINATED MATERIALS WILL BE LEFT IN PLACE AT THE SITE, COMPLIANCE WITH RCRA DISPOSAL REGULATIONS IS NOT A FACTOR. CONSISTENT WITH RCRA ADDITIONAL MONITOR WELLS WILL BE CONSTRUCTED AND LONG TERM SITE MONITORING INSTITUTED.

FUTURE EROSION OF SURFACE SEDIMENTS, ESPECIALLY AROUND THE HAZARDOUS WASTE AREA, MAY LEAD TO SURFACE WATER AND AIR CONTAMINATION, ALTHOUGH NEITHER OF THESE MEDIA ARE PRESENTLY CONSIDERED AT RISK. CAPPING, WHICH INCORPORATES GRADING, DRAINAGE CONTROL, AND THE ESTABLISHMENT OF A VEGETATIVE COVER, WILL ELIMINATE THE POTENTIAL FOR LONG TERM EROSION PROBLEMS. WITH THESE EROSIONAL CONCERNS ELIMINATED FUTURE CONCERN WITH SURFACE WATER AND AIR ROUTES WILL ALSO BE

REMOVED. DURING CONSTRUCTION OF THE CAPS, AIR MONITORING WILL BE USED TO GUARD AGAINST A RELEASE OF CONTAMINANTS INTO THE AIR.

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VIII. RECOMMENDED ALTERNATIVE

THE REMEDIAL ACTION ALTERNATIVE RECOMMENDED FOR THE POWERSVILLE LANDFILL SITE IS CONSTRUCTION OF CAPS OVER BOTH THE HAZARDOUS WASTE AREA AND THE MUNICIPAL LANDFILL, COUPLED WITH AN ALTERNATE DRINKING WATER SOURCE FOR RESIDENTS LIVING CLOSE TO THE SITE. FOR THE MUNICIPAL WASTE AREA THE CAP WILL BE DESIGNED TO PROVIDE LONG-TERM MINIMIZATION OF LIQUIDS THROUGH THE CLOSED LANDFILL. THE HAZARDOUS WASTE AREA SHOULD BE CONSTRUCTED WITH AN ARTIFICIAL LINER AND/OR AN EQUIVALENT TWO FOOT LAYER OF COMPACTED CLAY. THESE CAPS SHALL BE CONSTRUCTED IN ACCORDANCE WITH EPA GUIDANCE, COVERS FOR UNCONTROLLED HAZARDOUS SITES, EPA/540/2-85/002, SEPTEMBER 1985, AND IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS. THIS RECOMMENDED ALTERNATIVE IS SIMILAR TO ALTERNATIVE #8, AS OUTLINED IN SECTION V OF THIS DOCUMENT. DUE TO DIFFERENCES IN THE SPECIFICATIONS FOR CAP CONSTRUCTION, THE RECOMMENDED REMEDY CAN BE EXPECTED TO COST \$0.5 MILLION LESS THAN ALTERNATIVE #8, OR ABOUT \$4.0 MILLION.

IMPLEMENTATION OF THIS ALTERNATIVE WOULD PROVIDE SOURCE CONTROL WITH THE INSTALLATION OF SURFACE CAPS OVER THE HAZARDOUS WASTE AREA AND THE MUNICIPAL FILL AREA. COUPLED WITH THE CAPS WOULD BE THE INSTALLATION OF AN ALTERNATE WATER SUPPLY. RESIDENTS UPGRADIENT OF THE SITE WHOSE PROPERTY IS IMMEDIATELY ADJACENT TO THE SITE AND RESIDENTS DOWNGRADIENT OF AND LIKELY TO BE IMPACTED BY CONTAMINANTS LEAVING THE SITE WILL BE CONNECTED TO THIS ALTERNATE WATER SYSTEM, THUS SUPPLYING THEM WITH A RELIABLE, LONG-TERM SOURCE OF SAFE DRINKING WATER.

FINALLY, DEED RESTRICTIONS NEED TO BE ESTABLISHED FOR THOSE LANDS BETWEEN THE SITE AND MULE CREEK PROHIBITING THE DRILLING OF WATER WELLS. THIS LAND DEFINES THE AREAL EXTENT OF THE GROUNDWATER THAT IS EXPECTED TO BE EFFECTED BY THE SITE. SIMILAR RESTRICTIONS NEED TO BE ESTABLISHED FOR THE SITE ITSELF, BUT SHOULD ALSO PROHIBIT ANY ADDITIONAL ACTIVITIES THAT COULD CAUSE DAMAGE TO THE REMEDY IMPLEMENTED AT THE SITE.

SURFACE CAPPING INVOLVES CONSTRUCTION OF THE CAPS IN ACCORDANCE WITH THE PARAMETERS AND GUIDANCE INDICATED ABOVE. THE INSTALLATION OF SURFACE CAPS WILL REDUCE THE INFILTRATION OF RAIN AND OTHER SURFACE WATER THROUGH THE CONTAMINATED SOIL AND THEREBY REDUCE THE MIGRATION OF POLLUTANTS TO THE GROUNDWATER. THE CAPS WOULD BE INSTALLED OVER THE HAZARDOUS WASTE AREA WHICH ENCOMPASSES APPROXIMATELY 0.8 ACRE AND THE MUNICIPAL FILL AREA, WHICH COVERS 7.5 ACRES.

A CROSS SECTION OF A CAP TYPICAL FOR THIS TYPE OF SITE IS PRESENTED IN FIGURE 11. THIS DIAGRAM IS PRESENTED ONLY AS AN EXAMPLE, AND ACTUAL CAP CONSTRUCTION WILL BE BASED ON THE GUIDANCE AND PARAMETERS REFERENCED IN THE FIRST PARAGRAPH OF THIS SECTION. DIFFERENTIAL COMPACTION AND SETTLING DUE TO THE VARIETY OF MATERIALS CONTAINED WITHIN THESE AREAS WILL ALSO INFLUENCE THE DESIGN PARAMETERS FOR THESE CAPS. DRAINAGE WILL BE DESIGNED TO DIRECT SURFACE RUNOFF TOWARD THE PRESENT NATURAL DRAINAGE CHANNELS.

AS THE PART OF THIS ALTERNATIVE, AN ALTERNATE SOURCE OF DRINKING WATER WILL BE SUPPLIED TO THE LOCAL RESIDENCES WHICH PRESENTLY HAVE WELLS THAT ARE POTENTIAL RECEPTORS OF CONTAMINANTS. IT IS KNOWN THAT THE BYRON MUNICIPAL SYSTEM IS THE CLOSEST SUPPLY SYSTEM, BEING A MAXIMUM OF TWO AND A HALF MILES FROM THE SITE. CONVERSATIONS WITH COUNTY OFFICIALS ON AUGUST 4, 1987, INDICATE THAT THE TERMINATION POINT FOR THAT SYSTEM MAY NOW BE AS CLOSE AS ONE MILE AWAY. ENGINEERING CONSIDERATIONS WILL NEED TO EVALUATE THE PRESENT CAPACITY OF THE SYSTEM TO SEE IF:

- ADDITIONAL WELLS WILL BE NEEDED,
- THE TREATMENT PLANT CAN HANDLE THE EXTRA DEMAND, AND
- ADDITIONAL PUMP STATIONS AND STORAGE TANKS WILL BE NEEDED.

THE PROVISION OF AN ALTERNATIVE DRINKING WATER SOURCE WILL NOT IMPROVE OR TREAT THE PRESENT CONTAMINATION, BUT WOULD ELIMINATE THE LONG TERM POTENTIAL RISK IDENTIFIED IN THE ENDANGERMENT ASSESSMENT.

SINCE THE MUNICIPAL FILL AREA WAS PREVIOUSLY USED AS A SANITARY LANDFILL THE GENERATION OF NATURAL GAS CAN BE EXPECTED. PROVISIONS FOR VENTING AND MONITORING OF THE GAS PRODUCED WILL NEED TO BE CONSIDERED. IF VENTING IS REQUIRED, INITIAL GAS MONITORING WOULD PROBABLY BE PERFORMED QUARTERLY AND LATER REDUCED IF NO PROBLEMS OCCUR.

GROUNDWATER MONITORING IS REQUIRED IN CONJUNCTION WITH THIS ALTERNATIVE. MONITORING INVOLVES CONTINUED USE OF EXISTING MONITOR WELLS AND THE INSTALLATION OF AT LEAST EIGHT NEW SHALLOW MONITOR WELLS IN THE UPPER REGION OF THE AQUIFER TO DETERMINE WHETHER OR NOT CONTAMINANTS ARE LEACHING FROM EITHER OF THE CAPPED DISPOSAL AREAS.

SITE CAPPING SHOULD REDUCE OR ELIMINATE THE MOBILITY OF THE CONTAMINANTS IN BOTH DISPOSAL AREAS. PUBLIC CONCERN FROM THE SHORT AND LONG TERM THREAT TO THE GROUNDWATER WILL BE ELIMINATED WITH THE INSTALLATION OF AN ALTERNATE DRINKING WATER SOURCE. INCINERATION OR STABILIZATION/SOLIDIFICATION ALTERNATIVES FOR THE LANDFILL WERE CONSIDERED INFEASIBLE FOR THREE REASONS:

- THERE IS NOT ENOUGH INFORMATION AVAILABLE TO LOCATE THE CONTAMINATED AREAS WITHIN THE MUNICIPAL LANDFILL. ADDITIONAL SAMPLING DOES NOT ENSURE THAT ALL SUCH AREAS WILL BE LOCATED.
- COSTS OF TREATMENT WOULD BE VERY HIGH. IF IT IS ASSUMED THAT THE WHOLE LANDFILL WAS TREATED THEN VERY LARGE VOLUMES OF WASTES WOULD NEED PROCESSED AND TREATED. COSTS WOULD ALSO BE HIGH IF AN ATTEMPT WERE MADE TO LOCATE AND TREAT ONLY THE "HOT SPOTS" IN THE LANDFILL, DUE TO THE LARGE NUMBER OF SAMPLES THAT WOULD NEED TO BE TAKEN TO ATTEMPT TO LOCATE AND CONFIRM THESE AREAS. SUCH SAMPLING ALSO WOULD PRESENT A RISK TO PERSONNEL FROM HAVING TO DRILL FREQUENTLY INTO THE LANDFILL WHERE POCKETS OF EXPLOSIVE GASES COULD BE LOCATED.
- THE THIRD DRAWBACK IS THE TECHNICAL COMPLEXITIES ASSOCIATED WITH THESE TWO ALTERNATIVES. THE MUNICIPAL LANDFILL CONTAINS DEBRIS THAT WOULD HAVE TO BE SORTED OUT AND/OR SHREDDED TO ENSURE COMPATIBILITY WITH THE CHOSEN PROCESS, A TASK THAT MAY BE DIFFICULT TO ACCOMPLISH GIVEN THE VARIETY OF MATERIALS THAT ONE CAN EXPECT TO FIND IN SUCH AN AREA. IN THE CASE OF STABILIZATION/SOLIDIFICATION, A SOLIDIFICATION MIX WOULD NEED TO BE DEVELOPED THAT WAS OF SATISFACTORY PERFORMANCE IN REDUCING LEACHABILITY AND PROVIDING LONG TERM STABILITY. MIXING OR MIXING/DRILLING TECHNIQUES WOULD LIKEWISE NEED TO BE DEVELOPED TO ASSURE ADEQUATE PERFORMANCE OF THE MIX. INCINERATION IS A HIGHLY AUTOMATED PROCESS THAT IS HIGHLY PRONE TO MECHANICAL FAILURE WHEN AMORPHOUS MATERIALS ARE TO BE INCINERATED, AND MUST BE CONSTANTLY MONITORED FOR THE RELEASE OF CONTAMINANTS INTO THE AIR.

APPLYING SOLIDIFICATION/STABILIZATION OR INCINERATION TO ONLY THE SMALLER HAZARDOUS WASTE AREA REMOVES THE PROBLEM OF LOCATING "HOT SPOTS" AS THE WHOLE AREA WOULD BE TREATED. BEING A SMALLER AREA AND SO OF SMALLER VOLUME, TREATMENT COSTS WOULD BE REDUCED, BUT STILL SIGNIFICANTLY HIGHER THAN THE PROPOSED ALTERNATIVE. STABILIZATION/SOLIDIFICATION OF THE HAZARDOUS WASTE AREA WOULD COST ABOUT \$3.0 MILLION MORE THAN CONSTRUCTING A CAP FOR THE SAME AREA. INCINERATION WOULD COST APPROXIMATELY \$8 MILLION MORE THAN CAPPING THE HAZARDOUS WASTE AREA. THE PROBLEM OF TECHNICAL COMPLEXITY WOULD NOT CHANGE SIGNIFICANTLY IF TREATING THE HAZARDOUS WASTE AREA INSTEAD OF THE MUNICIPAL LANDFILL.

PUMPING AND TREATING THE WATER IS OF QUESTIONABLE FEASIBILITY AS THE PROVIDENCE UNIT IS A COMPLEX ASSEMBLAGE OF INTERLAYERED SANDS AND CLAYS. SUCH GEOLOGY LENDS ITSELF TO THE EXISTENCE

OF SATURATED OR "PERCHED" WATER ZONES. TO BE MOST EFFECTIVE, ALL SUCH SATURATED ZONES WOULD HAVE TO BE DEFINED WITH SOIL BORINGS OR OTHER MEASURES BEFORE WITHDRAWAL WELLS WERE INSTALLED. THE COMPLEXITY OF THE GEOLOGY MAKES IT DIFFICULT TO PREDICT THE VIABILITY OF THIS METHODOLOGY.

PRESENTLY, NO ARARS ARE BEING EXCEEDED OR ARE IN DANGER OF BEING EXCEEDED. THUS, THE PREFERRED ALTERNATIVE WILL NOT BE CONCERNED WITH MEETING THESE STANDARDS. THE DATA INDICATING THAT ARARS ARE NOT PRESENTLY BEING MET FOR LEAD AND CHROMIUM DOES NOT APPEAR TO BE VALID FOR TWO REASONS. FIRST, HIGH LEAD AND CHROME VALUES ARE ASSOCIATED ONLY WITH THE OLDER GALVANIZED WELLS, WHICH IS A MATERIAL THAT SHOULD NOT TO BE RELIED UPON FOR THE MONITORING OF METALS. SECONDLY, THE SAMPLES FROM NEWER STAINLESS STEEL WELLS DO NOT SHOW HIGH LEAD AND CHROME CONTENT, WHICH SUPPORTS THE CONCERN THAT THE GALVANIZED PIPE WELLS ARE THE CAUSE OF THE HIGH VALUES OF LEAD AND CHROMIUM. SHORT AND LONG TERM CONCERNS ABOUT EXCEEDING ARARS IN PRIVATE WELLS WILL BE ELIMINATED BY THE IMPLEMENTATION OF AN ALTERNATE DRINKING WATER SOURCE.

THE CAPPING, IN ACCORDANCE WITH COVERS FOR UNCONTROLLED HAZARDOUS WASTE SITES AND THE OTHER PARAMETERS SPECIFIED, WILL SATISFY A KEY ELEMENT OF CONCERN BY REDUCING THE MOBILITY OF THE HAZARDOUS WASTES IN BOTH AREAS. THIS WILL BE ACCOMPLISHED BY ELIMINATING THE INFILTRATION OF RAIN WATER AND OTHER SURFACE WATERS THROUGH THE HAZARDOUS WASTES. WITH LEACHATE GENERATION ELIMINATED CONTAMINANTS WILL NOT SEEP DOWN INTO THE SATURATED ZONE OF THE PROVIDENCE SAND UNIT. A MINIMUM OF EIGHT ADDITIONAL MONITOR WELLS WILL CONFIRM THE PERFORMANCE OF THE TWO CAPS.

CAPPING WILL PROVIDE MINIMUM DIRECT EXPOSURE OF WORKERS TO HAZARDOUS MATERIALS AS THEY WILL REMAIN IN PLACE. THUS SHORT TERM RISKS TO ON-SITE MATERIALS AND TO THE ENVIRONMENT WILL REMAIN LOW SINCE THERE IS A MINIMUM OF DISTURBANCE AND EXPOSURE. THE RELATIVE SIMPLICITY OF THIS ALTERNATIVE ALSO REDUCES RISKS TO A MINIMUM. IN CONTRAST INCINERATION REQUIRES CONSTANT MONITORING TO ENSURE NO RELEASE OF CONTAMINANTS INTO THE AIR AND GROUNDWATER PUMP AND TREAT METHODOLOGIES REQUIRE MONITORING OF THE DISCHARGED TREATED WATER.

THE INSTALLATION OF AN ALTERNATE DRINKING WATER SUPPLY PROVIDES BOTH SHORT-TERM AND LONG-TERM RELIEF FOR CONCERNS ABOUT DRINKING WATER. THIS PORTION OF THE REMEDY PROVIDES IMMEDIATE RELIEF ONCE IN PLACE, AND WILL ASSURE A RELIABLE SOURCE OF WATER FOR THE LONG-TERM PERIOD. LIKE CAPPING, THE ALTERNATE WATER SOURCE IS AN EASY TO IMPLEMENT TECHNOLOGY AND EXPOSES THE WORKERS AND THE PUBLIC TO A MINIMUM OF RISKS.

LONG TERM RELIABILITY OF THE CAPS WILL DEPEND ON THE QUALITY OF THE DESIGN, THE CARE TAKEN DURING INSTALLATION, AND ON LONG TERM MAINTENANCE. THE ADDITIONAL MONITORING WELLS WILL EVALUATE THE LONG-TERM PERFORMANCE OF THE CAPS. IT IS EXPECTED THAT THE MONITORING WILL SHOW A DECREASE IN CONTAMINATION OVER TIME DUE TO THE ELIMINATION (OR HIGH DEGREE OF REDUCTION) OF CONTAMINANT MOBILITY. THUS THE POTENTIAL FOR EXPOSURE TO CONTAMINANTS THROUGH GROUNDWATER, WHICH IS CONSIDERED LOW, WILL BE EVEN LOWER. INSTALLATION OF THE CAPS WILL ALSO REDUCE SHORT TERM AND LONG TERM CONCERNS THAT COULD ARISE FROM THE EXPOSURE OF HAZARDOUS WASTES DUE TO EROSION. THERE PRESENTLY IS A SIGNIFICANT AMOUNT OF EROSION AT THE SITE AND CAPPING WOULD REDUCE SUCH EROSION TO A MINIMUM.

BOTH CAPPING AND THE INSTALLATION OF AN ALTERNATE WATER SUPPLY ARE COMPARATIVELY SIMPLE, ESTABLISHED TECHNOLOGIES. THE RELIABILITY OF BOTH TECHNOLOGIES IS EXPECTED TO BE GOOD AND WITH THE ADDITIONAL MONITOR WELLS IN PLACE IT IS POSSIBLE TO CONFIRM THE PERFORMANCE IN ELIMINATING OR REDUCING THE AMOUNT OF LEACHATE FROM THE MUNICIPAL AND HAZARDOUS WASTE AREAS. NO PERMITS ARE NEEDED TO IMPLEMENT THIS ALTERNATIVE BUT COORDINATION WITH PEACH COUNTY WILL BE NECESSARY IN IMPLEMENTING THE ALTERNATE DRINKING WATER SUPPLY. THE EQUIPMENT NECESSARY TO IMPLEMENT THE ALTERNATIVE SHOULD BE EASILY AVAILABLE AS THE TECHNOLOGIES ARE WELL ESTABLISHED AND WIDELY IN USE.

COMMUNITY ACCEPTANCE

VERY LITTLE SPECIFIC COMMENT WAS RECEIVED FROM THE COMMUNITY CONCERNING WHAT ELEMENTS OF THE RECOMMENDED ALTERNATIVE WERE ACCEPTABLE BUT ONE RESIDENT COMMENTED THAT HE PREFERRED THE PROPOSED REMEDY. THE MAJOR CONCERN OF RESIDENTS PRESENT WAS THAT THE QUALITY OF THEIR DRINKING WATER IS GOOD AND THAT IT CONTINUE TO BE GOOD. WHILE NOT SPECIFICALLY APPROVING OR DISAPPROVING THE ALTERNATE DRINKING WATER SUPPLY, IT SEEMED CLEAR FROM THE PUBLIC MEETING THAT THIS PROPOSAL ALLEVIATES CITIZEN CONCERN ABOUT HAVING DRINKABLE WATER. SOME CONCERN WAS EXPRESSED ABOUT THE DAMAGE THAT CONSTRUCTION OF HOUSES COULD CAUSE AT THE SITE ONCE THE REMEDY WAS IN PLACE, BUT EPA INDICATED THAT DEED RESTRICTIONS WOULD ELIMINATE THE POSSIBILITY OF SUCH CONSTRUCTION. THERE WERE ALSO SEVERAL RESIDENTS AT THE PUBLIC MEETING WHO STATED THAT THEY WANTED THE SITE "CLEANED UP", BUT DID NOT ELABORATE ON WHAT THEY MEANT BY "CLEANED UP".

STATE ACCEPTANCE

THE STATE OF GEORGIA CONCURS WITH THE IMPLEMENTATION OF AN ALTERNATIVE WATER SUPPLY FOR ALL RESIDENTS WHOSE PROPERTY IS UPGRADIENT AND IMMEDIATELY ADJACENT TO THE SITE, AND THOSE RESIDENTS LYING DOWNGRADIENT OF AND LIKELY TO BE IMPACTED BY CONTAMINANTS LEAVING THE SITE.

THE STATE ALSO AGREES WITH EPA THAT PERIODIC GROUNDWATER MONITORING ON AND AROUND THE SITE SHOULD BE CONDUCTED WITH A MINIMUM OF EIGHT MONITOR WELLS. FOR THE MUNICIPAL LANDFILL, THE STATE AGREES WITH EPA THAT THE AREA BE CAPPED IN ACCORDANCE WITH EPA GUIDANCE, COVERS FOR UNCONTROLLED HAZARDOUS WASTE SITES. THEY BELIEVE THAT A PROPERLY DESIGNED AND INSTALLED TWO FOOT THICK CLAY CAP OR EQUIVALENT ARTIFICIAL LINER CONSTRUCTED IN ACCORDANCE WITH THE GUIDANCE REFERENCED ABOVE AND THE GEORGIA HAZARDOUS WASTE MANAGEMENT ACT, CORRECTIVE ACTION PROVISIONS, WILL PROVIDE ADEQUATE PROTECTION FOR THE HAZARDOUS WASTE AREA.

THIS SITE, SINCE IT WAS OPERATED BY A COUNTY OF THE STATE, IS A 50% COST SHARE SITE. BECAUSE OF THIS, THE STATE HAS A STRONG INTEREST IN THE COSTS ASSOCIATED WITH THE ALTERNATIVE SELECTED. IF A REMEDY MORE COSTLY THAN THE RECOMMENDED ALTERNATIVE IS SELECTED, IT IS HIGHLY LIKELY THAT THE STATE WOULD NOT CONCUR. THE COST FACTOR MAY ALSO BE A SIGNIFICANT FACTOR IN THE STATE'S DISAPPROVAL OF PORTIONS OF THE RECOMMENDED ALTERNATIVE.

STATEMENT OF COMPLIANCE WITH SECTION 121 OF SARA

THE REMEDY PROPOSED FOR THE POWERSVILLE LANDFILL SITE IS THE MOST EFFECTIVE ALTERNATIVE IN TERMS OF REMOVING THE THREATS POSED BY THE SITE, AND IS CONSIDERED THE MOST EFFECTIVE CHOICE GIVEN THE CURRENT STATE OF CLEAN-UP TECHNOLOGIES. THIS REMEDY IS A COST-EFFECTIVE REMEDY WHICH ACHIEVES AN ACCEPTABLE LEVEL OF PUBLIC HEALTH PROTECTION AND WILL REMOVE THE THREATS THIS SITE POSES TO THE ENVIRONMENT. THE REMEDY WILL PROVIDE PROTECTION WHICH WILL MEET ALL APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS, AND IS COST-EFFECTIVE. FINALLY, THE REMEDY UTILIZES PERMANENT TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

#OM

SECTION IX

OPERATIONS AND MAINTENANCE

THE CAP SHOULD BE INSPECTED ON A REGULAR BASIS FOR SIGNS OF EROSION, SETTLEMENT, OR DETERIORATION. IT IS RECOMMENDED THAT INSPECTIONS BE CONDUCTED FREQUENTLY IN THE FIRST SIX MONTHS BECAUSE PROBLEMS ARE MOST LIKELY TO APPEAR DURING THIS PERIOD. MAINTENANCE OF THE FINAL CAP WOULD BE LIMITED TO PERIODIC MOWING OF THE VEGETATIVE LAYER TO PREVENT INVASION BY DEEP ROOTED VEGETATION AND BURROWING ANIMALS. ANY SIGNS OF UNEXPECTED SETTLING OR DETERIORATION SHOULD BE ADDRESSED IMMEDIATELY BY REMOVING THE OVERBURDEN TO INSPECT AND REPAIR THE AFFECTED AREAS.

IN ADDITION TO THE OPERATION AND MAINTENANCE REQUIRED FOR THE SURFACE CAPS, STANDARD MAINTENANCE

AND REPAIR OF PUMPING EQUIPMENT, VALVES, STRUCTURES, METERS, ETC. ASSOCIATED WITH THE NEW PIPELINE WOULD BE REQUIRED. PROVISIONS FOR ADDITIONAL USE MONITORING AND BILLING PROCEDURES WOULD BE REQUIRED.

SINCE THE MUNICIPAL FILL AREA WAS PREVIOUSLY USED AS A SANITARY LANDFILL, THE GENERATION OF NATURAL GAS CAN BE EXPECTED. PROVISIONS FOR VENTING AND MONITORING OF THE GAS PRODUCED WILL NEED TO BE EXAMINED. IF VENTING IS NECESSARY, INITIAL GAS MONITORING WOULD PROBABLY BE PERFORMED QUARTERLY AND LATER REDUCED IF NO PROBLEMS OCCUR.

GROUNDWATER MONITORING WOULD BE REQUIRED IN CONJUNCTION WITH THIS ALTERNATIVE. MONITORING WOULD INVOLVE CONTINUED USE OF EXISTING MONITOR WELLS AND THE INSTALLATION OF A MINIMUM OF EIGHT NEW SHALLOW MONITOR WELLS IN THE UPPER REGION OF THE AQUIFER TO DETERMINE WHETHER CONTAMINANTS ARE LEACHING OR MIGRATING FROM THE CAPPED AREAS. FOR THE FIRST AND SECOND YEAR, QUARTERLY MONITORING WILL PROBABLY BE REQUIRED. AFTER THE FIRST TWO YEARS, AND DEPENDING ON RESULTS FROM THE INITIAL MONITORING PERIOD, THE MONITORING WILL PROBABLY BE LIMITED TO ONCE OR TWICE PER YEAR.

#SCH
SECTION X
SCHEDULE

SCHEDULE LANDMARK	DATE FOR IMPLEMENTATION
1. FINALIZATION OF ROD	9/23/87
2. COMPLETE ENFORCEMENT NEGOTIATIONS	12/14/87
3. INITIATE DESIGN	1/14/87
4. COMPLETE DESIGN	7/14/87
5. INITIATE REMEDIAL ACTION	7/14/87
6. COMPLETE REMEDIAL ACTION	7/14/89.

#FA
SECTION XI
FUTURE ACTIONS

SUCCESSFUL IMPLEMENTATION OF THE SELECTED REMEDY WILL ULTIMATELY REMOVE THE POWERSVILLE LANDFILL SITE FROM UNDER THE JURISDICTION OF THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) AND AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA). IMPLEMENTATION OF THE SELECTED REMEDY WILL PROVIDE A PERMANENT SOLUTION TO THE PROBLEMS SURROUNDING THIS SITE AND WILL REQUIRE NO SUBSEQUENT ACTIONS UNDER CERCLA OR SARA.

IT WILL BE NECESSARY TO CONFIRM THE PERFORMANCE OF THE CAPS TO INSURE THAT CONTAMINANTS ARE NOT MIGRATING FROM THE SITE. THIS WILL BE ACCOMPLISHED BY THE INSTALLATION OF A MINIMUM OF EIGHT MONITOR WELLS AT THE SITE. IT WILL ALSO BE NECESSARY TO MAINTAIN THE CAP TO ASSURE THE PERFORMANCE OF THIS PORTION OF THE REMEDY, A TASK THAT WILL BE CARRIED OUT AS PART OF THE OPERATIONS AND MAINTENANCE PLAN.

NO FUTURE ACTION WILL BE REQUIRED FOR ALTERNATE DRINKING WATER SUPPLY, OTHER THAN THE STANDARD MAINTENANCE REQUIRED FOR SUCH A SYSTEM.

#TMA
TABLES, MEMORANDA, ATTACHMENTS

#RS

APPENDIX A

RESPONSIVENESS SUMMARY

POWERSVILLE LANDFILL, PEACH COUNTY GEORGIA RESPONSIVENESS SUMMARY

1. OVERVIEW

THE ALTERNATIVE PROPOSED AT THE TIME OF THE PUBLIC COMMENT PERIOD WAS ALTERNATIVE #8, WHICH IS COMPRISED OF CONSTRUCTING A RCRA THREE LAYER CAP OVER THE MUNICIPAL AND HAZARDOUS WASTE AREAS. THIS ALTERNATIVE ALSO INCLUDES AN ALTERNATE DRINKING WATER SUPPLY FOR RESIDENTS LIVING CLOSE TO THE SITE.

THE ONLY RESPONSIBLE PARTY TO COMMENT DID NOT SUPPORT THE CAPPING PROPOSAL BUT DID AGREE WITH THE ALTERNATE DRINKING WATER SUPPLY AND CONTINUED MONITORING. THE PRP BELIEVES THAT NON-RCRA CAPS SHOULD BE EXAMINED, BUT PRESENTLY RECOMMENDS ONLY SITE GRADING AND DRAINAGE CONTROL. GEORGIA EPD FAVORS A CAP ON THE HAZARDOUS WASTE AREA, GRADING AND DRAINAGE CONTROL FOR THE MUNICIPAL FILL AREA, AND AN ALTERNATE DRINKING WATER SUPPLY. THE PUBLIC DID NOT, EXCEPT IN ONE COMMENT, INDICATE A CLEAR PREFERENCE FOR ANY SPECIFIC REMEDIAL ALTERNATIVE. THE MAJOR PUBLIC CONCERNS CENTERED ON THE SAFETY OF THE DRINKING WATER, AND TO A LESSER DEGREE, MAKING SURE THE SITE WAS CLEANED UP. THE ONE SPECIFIC COMMENT FROM THE PUBLIC ON A REMEDIAL ACTION SUPPORTED EPA'S RECOMMENDED ALTERNATIVE.

2. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

COMMUNITY CONCERN REGARDING THE POWERSVILLE SITE HAS BEEN MOST PRONOUNCED DURING TWO PERIODS. FROM 1963 UNTIL 1979, WHEN THE PEACH COUNTY LANDFILL RECEIVED WASTE REGULARLY, RESIDENTS COMPLAINED OFTEN ABOUT PROBLEMS ASSOCIATED WITH THE LANDFILL. SINCE THE DISCOVERY OF GROUND WATER CONTAMINATION IN 1983 AND THE INSTALLATION OF MONITORING WELLS IN 1984, RESIDENTS HAVE BEEN CONCERNED ABOUT THE QUALITY OF THEIR DRINKING WATER.

IN AUGUST 1973, ALVAH E. ADAMS, WHO LIVED IMMEDIATELY ADJACENT TO THE LANDFILL ALONG NEWELL ROAD, COMPLAINED TO EPD OFFICIALS ABOUT BLOWING PESTICIDE DUST AT THE LANDFILL AND UNCONTAINED SURFACE WATER RUNOFF. MR. ADAMS ALSO EXPRESSED CONCERN THAT BUNDLES OF EMPTY PESTICIDE BAGS WERE BEING DUMPED IN THE NON-CONTAINED AREAS OF THE LANDFILL. IN JULY 1975, MR. ADAMS TELEPHONED EPD OFFICIALS TO COMPLAIN ABOUT ODORS AND PESTICIDE RUNOFF FROM THE SITE. IN AUGUST 1975, ANOTHER RESIDENT (WHO NO LONGER LIVES IN POWERSVILLE) WROTE TO EPD OFFICES IN ATLANTA "TO SEE IF WE HERE IN POWERSVILLE CANNOT GET SOMETHING DONE ABOUT THE COUNTY DUMP."

WHEN DUMPING AT THE LANDFILL WAS TERMINATED IN 1979, ADDITIONAL LETTERS FROM RESIDENTS EXPRESSED CONCERN THAT THE COUNTY MIGHT NOT HAVE TAKEN SUFFICIENT MEASURES TO COVER AND REGRADE THE FILL AREA. RENEWED COMMUNITY COMPLAINTS REGARDING THE POWERSVILLE SITE DURING 1983 COINCIDED WITH THE INITIAL PRESENCE OF EPA AND EPD OFFICIALS INVESTIGATING THE GROUND WATER FOR CONTAMINATION AT THE SITE, ACCORDING TO PEACH COUNTY ADMINISTRATOR FRANKLIN. EPD FILES SUPPORT THIS CLAIM, ALTHOUGH SOME RESIDENTS APPEAR TO HAVE BEEN CONCERNED ABOUT GROUND WATER QUALITY PRIOR TO 1983.

AFTER THE DISCOVERY OF PESTICIDES IN THE LIZZIE CHAPEL BAPTIST CHURCH WELL IN AUGUST 1983, CITIZENS BEGAN REQUESTING SAMPLING OF THEIR WELLS AND PRESS COVERAGE OF THE SITE INCREASED. ON MAY 1984, EPD OFFICIALS RECEIVED A COMPLAINT FROM AN AREA RESIDENT ABOUT A SKIN RASH THAT THE

RESIDENT THOUGHT TO BE ATTRIBUTABLE TO CONTAMINATED WELL WATER. MRS. WILLIE C. PICKENS WROTE A LETTER TO EPA HEADQUARTERS THAT DESCRIBED HEALTH PROBLEMS IN THE COMMUNITY THAT SHE BELIEVED HAD BEEN CAUSED BY DRINKING CONTAMINATED WATER. EPD OFFICIALS STATED THAT MRS. PICKENS ALSO CONTACTED HER CONGRESSMAN ABOUT PROBLEMS AT THE POWERSVILLE SITE.

3. SUMMARY OF PUBLIC COMMENTS DURING PUBLIC COMMENT PERIOD AND AGENCY RESPONSES

1. COMMENT: IS THAT WATER SAFE TO DRINK?

EPA RESPONSE: THE WATER SAMPLED AT THE PICKENS RESIDENCE DID HAVE AN EXTREMELY SMALL AMOUNT OF CONTAMINATION. THIS AMOUNT WAS SIGNIFICANTLY BELOW THE MAXIMUM CONTAMINANT LEVEL (MCL) ESTABLISHED BY THE EPA. THE MCL IS THE MAXIMUM LEVEL OF CONTAMINATION THAT IS SAFE TO DRINK AND SINCE THE WATER IS FAR BELOW THIS LEVEL, YES, THE WATER IS SAFE TO DRINK.

2. COMMENT: WHO WILL PAY FOR LATER DEVELOPING HEALTH ILLNESSES?

EPA RESPONSE: BEFORE ONE CAN DETERMINE WHO WILL PAY FOR A DEVELOPING ILLNESS, ONE MUST SHOW THAT SOMETHING OR SOMEONE IN PARTICULAR CAUSES SUCH AN ILLNESS. THE POWERSVILLE SITE HAS NOT CONTAMINATED ANYONE'S WATER TO AN EXTENT WHICH SHOULD CAUSE ANY HEALTH PROBLEMS. THE REASON FOR THE CONCERN AT THE POWERSVILLE SITE IS NOT THAT PEOPLE ARE PRESENTLY IN DANGER FROM EXPOSURE, IT IS TO PREVENT EXPOSURE TO PEOPLE IN THE FUTURE WHICH MAY RESULT IF SOMETHING IS NOT DONE AT THE SITE. THE POSSIBLE THINGS THAT CAN BE DONE ARE THE ALTERNATIVES THAT EPA PRESENTED AT THE PUBLIC MEETING.

3. COMMENT: SUGGEST CAPPING BOTH AREAS WITH ALTERNATE WATER SOURCE.

EPA RESPONSE: THIS IS THE ONLY PUBLIC COMMENT THAT SPECIFICALLY ENDORSED A SPECIFIC ALTERNATIVE.

4. COMMENT: WHO IS PAYING FOR ALL THE TESTING THAT WAS CARRIED OUT AT THE LANDFILL AND FOR WHATEVER ACTION IS TAKEN NOW? IS WOOLFOLK CHEMICAL BEING HELD RESPONSIBLE FOR PAYING OR AM I AND THE OTHER TAXPAYERS OF THIS COUNTRY?

EPA RESPONSE: THE WORK DONE BY THE ENVIRONMENTAL PROTECTION AGENCY (EPA) TO DATE HAS BEEN PAID FOR WITH SUPERFUND MONEY, WHICH IS A TAX LEVIED ON CHEMICAL PRODUCTS. THE UPCOMING WORK WILL BE PAID FOR EITHER BY EPA OR WOOLFOLK CHEMICAL AND OTHER POTENTIALLY RESPONSIBLE PARTIES (PRPS). IF WOOLFOLK AND OTHER PRPS DO NOT PAY FOR OR CARRY OUT THE REMAINING WORK NEEDED TO CLEAN UP THE SITE, EPA WILL SEEK TO RECOVER COSTS THROUGH LITIGATION.

5. COMMENT: WHO WILL PAY FOR THE EXTENSION OF WATER SERVICE TO THIS AREA? WILL IT COME FROM FT. VALLEY OR BYRON?

EPA RESPONSE: FIRST, IT SHOULD BE MADE CLEAR THAT RESIDENTS WILL NOT HAVE TO PAY ANYTHING TO BE HOOKED UP TO THE MUNICIPAL WATER SERVICE. WHO WILL PAY IS NOT YET CLEAR, BUT WILL BE DETERMINED THROUGH NEGOTIATIONS WITH WOOLFOLK AND THE OTHER PRPS AS INDICATED IN THE ANSWER TO COMMENT #1.

BASED ON DISCUSSIONS WITH COUNTY OFFICIALS, IT IS MOST LIKELY THAT WATER WILL COME FROM THE BYRON MUNICIPAL WATER SYSTEM, AS PIPELINES FROM BYRON ARE ALREADY CLOSE TO THE AREA.

6. COMMENT: WILL THIS SITE BE USED AS A LANDFILL AGAIN?

EPA RESPONSE: THE POSSIBILITY HAS BEEN DISCUSSED, BUT IS VERY UNLIKELY. THE SITE NEEDS TO BE LEVELED OUT TO PREVENT EROSION AND TO PREPARE THE AREA FOR CAPPING. AS YOU MAY BE AWARE, THERE ARE STEEP SLOPES AT THE SITE THAT SHOW SOME EROSION. BY FILLING IN THE SITE WITH SOME KIND OF

MATERIAL, WITH GARBAGE BEING ONE POSSIBILITY, THE AREA CAN BE MADE LEVEL. THE PROBLEMS WITH SUBSIDENCE AND SETTLING DUE TO THE INHOMOGENEOUS NATURE OF GARBAGE MAKE HIGHLY UNLIKELY THAT IT WILL BE USED.

7. COMMENT: AM I WRONG TO FEAR FOR THE FUTURE OF THIS COUNTRY AND THE WORLD IF CHEMICAL AND NUCLEAR CONTAMINATION ISN'T STOPPED? CAN WE CONTINUE TO CLEAN UP BEHIND INDUSTRY?

EPA RESPONSE: WHILE EPA SHARES THIS CONCERN FOR CHEMICAL AND NUCLEAR CONTAMINATION, LAWS & REGULATIONS HAVE BEEN ESTABLISHED TO CURB SUCH CONTAMINATION. A MAJOR PROBLEM THAT REMAINS IS WHEN THESE LAWS ARE NOT COMPLIED WITH BY POLLUTERS. THAT IS WHERE THE PUBLIC CAN BE OF HELP, BY CONTACTING THE LOCAL, STATE, OR FEDERAL GOVERNMENT IF THEY BELIEVE THERE ARE VIOLATIONS OCCURRING.

AS FOR CLEANING UP BEHIND INDUSTRY, LAWS NOW REGULATE HOW AND WHERE INDUSTRIES DISPOSE OF HAZARDOUS WASTES THEY GENERATE, AND ARE SET UP TO MAKE SURE THAT THESE WASTES WILL NOT ENDANGER THE PUBLIC. ONCE AGAIN, THE MAJOR CONCERN IS WHEN THE LAWS ARE NOT ADHERED TO BY POLLUTERS. IN SUMMARY, THERE ARE REASONS BOTH FOR OPTIMISM AND FOR CONCERN. PUBLIC INVOLVEMENT PLAYS A SIGNIFICANT ROLE IN BRINGING PROBLEMS TO LIGHT SO THAT ACTION CAN BE TAKEN.

REMEDIAL INVESTIGATION COMMENTS FROM PRPS

COMMENT ON HAZARDOUS WASTE AREA: THE REPORT DOES NOT DISCUSS THE DESIGN AND CONSTRUCTION OF THE HAZARDOUS WASTE AREA. THE REPORT FAILS TO NOTE THAT GEORGIA ENVIRONMENTAL PROTECTION DIVISION ("EPD") DIRECTED THAT A SPECIALLY DESIGNED AREA BE CONSTRUCTED FOR THE DISPOSAL OF HAZARDOUS SUBSTANCES. THE EPD SUPERVISED THE DESIGN AND APPROVED THE CONSTRUCTION OF THIS AREA. THE EPD REGULARLY INSPECTED THE AREA DURING ITS CONSTRUCTION AND ACCORDING TO WRITTEN MEMORANDA, DETERMINED THAT THE AREA WAS CONSTRUCTED PROPERLY ACCORDING TO APPROVED SPECIFICATIONS. IN FACT, DURING THE PERIOD IN WHICH THE HAZARDOUS WASTE AREA WAS OPERATED ALL DISPOSAL ACTIVITIES WERE UNDERTAKEN WITH THE FULL KNOWLEDGE AND CONSENT OF THE EPD.

THE BOTTOM SURFACES OF THE TRENCHES IN THE HAZARDOUS WASTE AREA WERE LINED WITH AN IMPERVIOUS CLAY LAYER OF AT LEAST FIVE FEET. THE CONSTRUCTION OF THESE TRENCHES IS CRUCIAL TO AN UNDERSTANDING AND EVALUATION OF THE ULTIMATE POTENTIAL FOR LEACHING FROM THE AREA. IT DOES NOT APPEAR THAT THE EPA PROPERLY CONSIDERED THE PHYSICAL CHARACTERISTICS OF THESE TRENCHES.

THE REPORT INDICATES THAT THE EPA CONDUCTED SEVERAL ANGLED BORINGS UNDER THE HAZARDOUS WASTE AREA. IT IS NOT CLEAR FROM THE REPORT HOW THE LOCATIONS FOR THESE BORINGS WERE SELECTED, AND WHETHER THEY WERE DESIGNED TO GIVE MAXIMUM INFORMATION CONCERNING LEACHING FROM THE AREA. FURTHER, IT IS NOT EVIDENT THAT THE EPA HAS TAKEN INTO ACCOUNT ALL OF THE AVAILABLE INFORMATION CONCERNING THE HAZARDOUS WASTE AREA IN DETERMINING THESE LOCATIONS, INCLUDING THE GRADE OF THE TRENCHES AND THE MOST LIKELY SOURCE OF LEACHATE.

EPA RESPONSE: WHILE THE PRP INDICATES THAT THE TRENCHES IN THE HAZARDOUS WASTE AREA ARE CLAY LINED, THE PRP HAS YET TO PROVIDE DOCUMENTATION THAT CONCLUSIVELY INDICATES HOW THE HAZARDOUS WASTE AREA WAS CONSTRUCTED. EPA DOES NOT ARGUE THAT THE SITE WAS CONSTRUCTED IN A MANNER THAT WAS CONSIDERED ACCEPTABLE AT THE TIME, BUT IS MORE CONCERNED THAT SUCH CLOSURE METHODOLOGIES WOULD BE INADEQUATE BY TODAY'S STANDARDS.

ALTHOUGH THE REPORT DOES NOT INDICATE HOW THE ANGLED BORINGS WERE DRILLED OR SELECTED, EPA DID EXAMINE LOCATIONS AND DRILLING METHODOLOGIES BEFORE SELECTING THE APPROPRIATE LOCATIONS AND TECHNIQUES. THE BORINGS WERE LOCATED IN SUCH A MANNER THAT THEY WOULD COLLECT ANY CONTAMINANTS THAT WERE LEACHING DOWN INTO THE SOIL FROM THE HAZARDOUS WASTE AREA.

COMMENT ON CAPPING: THE REPORT SHOWS A CLEAR PREFERENCE BY THE EPA THAT CAPPING OF THE SITE BE

THE FOCUS OF REMEDIAL ACTIONS AT THE SITE. UNLIKE THE "NO ACTION ALTERNATIVE", EPA FAILS TO ADDRESS THE NEGATIVE ASPECTS OF THIS ALTERNATIVE. FIRST, A SIGNIFICANT AMOUNT OF SITE PREPARATION WOULD BE REQUIRED, SUCH AS RE-GRADING AND BACKFILLING PRIOR TO CAPPING THE SITE. SECOND, BECAUSE OF THE ORIGINAL CONSTRUCTION AND USE OF THE MUNICIPAL LANDFILL, A SIGNIFICANT DIFFERENTIAL SETTLEMENT PROBLEM EXISTS AT THE SITE. THEREFORE, EXTENSIVE STUDY AND DESIGN WOULD BE REQUIRED PRIOR TO THE CONSTRUCTION OF THE CAP. THIRD, THE POTENTIAL FOR THE BUILD-UP OF METHANE GAS WOULD HAVE TO BE ADDRESSED AND SOPHISTICATED VENTING PROCEDURES WOULD HAVE TO BE DESIGNED AND IMPLEMENTED.

WE NOTE THAT THE REPORT ONLY CONSIDERED A MULTI-LAYER CAP WHICH IS DESIGNED IN ACCORDANCE WITH THE APPLICABLE RESOURCE CONSERVATION AND RECOVERY ACT ("RCRA") REGULATIONS. THE REPORT DID NOT CONSIDER ALTERNATE SURFACE ACTIONS, SUCH AS GRADING AND DRAINAGE CONTROL, WHICH WOULD ACHIEVE THE PURPOSE OF THE RCRA-TYPE CAP AT A SUBSTANTIAL SAVINGS IN COST.

FINALLY, WE NOTE THAT THE JUSTIFICATION FOR CAPPING THE SITE APPEARS TO BE THE CONCERN THAT THE HAZARDOUS WASTE AREA WILL LEACH EVENTUALLY AND THAT CONTAMINANTS FOUND IN THE LANDFILL WILL MOVE INTO THE GROUNDWATER. HOWEVER, AS NOTED EARLIER, THESE ASSUMPTIONS ARE BASED ON DATA THAT IS, BY THE EPA'S OWN ACKNOWLEDGEMENT, INCONCLUSIVE.

EPA RESPONSE: EPA'S PREFERENCE FOR CAPPING THE SITE IS BASED ON THE CONCERN THAT BOTH THE HAZARDOUS WASTE AREA AND MUNICIPAL LANDFILL AREA ARE SOURCES OF THE CONTAMINATION OBSERVED IN THE GROUNDWATER, AND IT IS OUR POLICY NOT TO PERMIT THE DEGRADATION OF A POTENTIAL DRINKING WATER SOURCE. WE DO NOT BELIEVE THAT THIS CONCERN CAN BE ADEQUATELY ADDRESSED BY THE MINIMAL ACTION OUTLINED IN THE "NO ACTION" ALTERNATIVE, OR BY ANY ACTION THAT DOES NOT COMPARE WITH THE PERFORMANCE OF A CAP.

SOME OF THE NEGATIVE ASPECTS OF CAPPING ARE PRESENTED IN SECTION #13 OF THE RI/FS. THIS INDICATES THAT WE ARE AWARE OF THE PROBLEMS MENTIONED BY THE PRP THAT ARE ASSOCIATED WITH THE RCRA TYPE "C" CAP. OTHER CAPPING METHODOLOGIES ARE CURRENTLY UNDER CONSIDERATION.

COMMENT ON GROUNDWATER: OF THE FIVE INDICATOR CONTAMINANTS DETECTED IN THE MONITORING WELLS ON-SITE, ONLY ONE, LINDANE, IS NORMALLY ASSOCIATED WITH PESTICIDE-TYPE WASTES. VINYL CHLORIDE, 1,2-DICHLOROETHANE, LEAD AND CHROMIUM ARE NOT GENERALLY ASSOCIATED WITH PESTICIDES. THE EXISTENCE OF THESE COMPOUNDS SUPPORTS THE VIEW EXPRESSED ABOVE THAT THE SEARCH FOR POTENTIALLY RESPONSIBLE PARTIES SHOULD CONTINUE UNABATED.

THE REPORT INDICATED THAT CONCENTRATIONS OF LEAD AND CHROMIUM IN EXCESS OF DRINKING WATER STANDARDS WERE FOUND ONLY IN CERTAIN SHALLOW MONITORING WELLS. FURTHER, THESE WELLS WERE ALL CONSTRUCTED OF GALVANIZED STEEL. THE EPA ACKNOWLEDGES THAT IT IS NOT UNCOMMON FOR THESE COMPOUNDS TO BE PRESENT AS A RESULT OF CORROSION OF WELLS OF THIS TYPE. IN LIGHT OF THE FACT THAT LEAD AND CHROMIUM WERE DETECTED IN SIGNIFICANT CONCENTRATIONS ONLY IN THESE GALVANIZED WELLS, THE RESULTS SHOULD BE DEEMED SUSPECT AND DISCARDED.

FINALLY, WE NOTE THAT SAMPLING OF THE OFF-SITE PRIVATE WELLS REVEALED ONLY TRACES OF CONTAMINATION, IN EACH CASE WELL BELOW THE DRINKING WATER STANDARD FOR THE RESPECTIVE CONTAMINANT. WE NOTE THAT THE HIGHEST CONCENTRATION FOUND BY THE EPA DURING THE RI/FS WAS .78 UG/L OF GAMMA BHC (LINDANE), FAR BELOW THE DRINKING WATER STANDARD OF 4 UG/L.

EPA RESPONSE: SINCE CANADYNE GEORGIA AGREES WITH EPA THAT THE LEAD AND CHROMIUM VALUES ARE A PROBABLE RESULT OF THE WELL CONSTRUCTION, THERE IS NO NEED TO SEEK OUT PRPS ASSOCIATED WITH THESE COMPOUNDS. VINYL CHLORIDE IS A WIDELY USED COMPOUND THAT COULD COME FROM ANY ONE OF A NUMBER OF SOURCES: PLASTIC PACKAGING, RESINS, PVC MATERIALS SUCH AS PIPES, AND PROPELLANTS IN AEROSOL SPRAYS. A NUMBER OF THESE MATERIALS ARE QUITE COMMON IN MUNICIPAL LANDFILLS. SIMILARLY, 1,2-DICHLOROETHANE IS A WIDELY USED COMPOUND, MAINLY IN THE MANUFACTURE OF A VARIETY

OF PRODUCTS AND AS A SOLVENT. IT IS USED IN EXTRACTING AGENTS, DRY-CLEANING FLUIDS, GASOLINES, WATER SOFTENING, AND PHOTOGRAPHY, TO NAME A FEW. SUCH WIDELY USED COMPOUNDS AS THESE TWO WOULD BE DIFFICULT, IF NOT IMPOSSIBLE, TO ASSOCIATE WITH A SPECIFIC MANUFACTURER WITHOUT ADDITIONAL INFORMATION.

WHILE THE LEVELS OF LINDANE IN OFF-SITE WELLS ARE BELOW DRINKING STANDARDS, IT DOES VERIFY THAT THERE IS A RELEASE OF PESTICIDES INTO THE GROUNDWATER. ALSO, HISTORIC SAMPLING HAS SHOWN LEVELS AS HIGH AS 1.2 UG/L, NOT THE .78 UG/L MENTIONED BY THE PRP. IT IS THE POTENTIAL THREAT POSED BY THESE COMPOUNDS THAT PROVIDES THE AGENCY REASON FOR CONCERN.

FEASIBILITY STUDY

COMMENT ON NO ACTION ALTERNATIVE: THROUGHOUT THE REPORT, THE EPA STATES THAT THE "NO-ACTION ALTERNATIVE" WAS CONSIDERED ONLY BECAUSE ITS CONSIDERATION IS REQUIRED BY THE NATIONAL CONTINGENCY PLAN. IN FACT, IT DOES NOT APPEAR THAT THE EPA ACTUALLY CONSIDERED A NO-ACTION ALTERNATIVE ON ITS MERITS. THIS IS ILLUSTRATED BY THE FACT IN ITS DISCUSSION OF THIS ALTERNATIVE, THE EPA NOTED THE FOLLOWING SO-CALLED "POTENTIAL IMPACTS" WHICH MIGHT RESULT FROM THIS ALTERNATIVE:

- A. OCCUPATIONAL OR PUBLIC EXPOSURE
- B. DECLINE IN PROPERTY VALUES
- C. EXPENDITURE FOR LEGAL SERVICES
- D. DEPRESSED AREA GROWTH
- E. EXPENDITURE FOR LABORATORY ANALYSES AND MONITORING
- F. RESTRICTED ACCESS TO THE SITE
- G. ENVIRONMENTAL IMPACTS.

WHILE THESE ARE LABELED "POTENTIAL IMPACTS," THEY ARE ALL IN FACT WHAT THE EPA CONSIDERS TO BE POTENTIALLY ADVERSE EFFECTS OF IMPLEMENTING THIS ALTERNATIVE. BY PRESENTING ONLY THE ADVERSE EFFECTS OF THE NO-ACTION ALTERNATIVE, THE REPORT SUGGESTS THAT THERE IS NO VIRTUE WHATSOEVER IN SERIOUSLY CONSIDERING THIS ALTERNATIVE.

FURTHER, THE LISTING OF THESE "IMPACTS" IN THE DISCUSSION OF THE NO-ACTION ALTERNATIVE SUGGESTS THAT THESE POTENTIAL ADVERSE EFFECTS ARE NOT PRESENT UNDER THE OTHER REMEDIAL ALTERNATIVES WHICH WERE CONSIDERED. IN FACT, EACH OF THESE "IMPACTS" WOULD BE PRESENT UNDER ANY ALTERNATIVE SELECTED. NEVERTHELESS, NONE OF THESE EFFECTS ARE LISTED IN THE DISCUSSIONS OF THE ALTERNATIVES. IT APPEARS FROM THE FOREGOING THAT WHILE THE EPA STATES THAT IT "CONSIDERED" THE NO-ACTION ALTERNATIVE, IN FACT THE EPA DID NOT ACCORD THAT ALTERNATIVE THE WEIGHT GIVEN TO THE ALTERNATIVES ACTUALLY CONSIDERED.

EPA RESPONSE: THE "NO ACTION" ALTERNATIVE INCREASES THE RISK TO THE PUBLIC TO UNACCEPTABLE LEVELS, AND ALLOWS THE CONTINUED CONTAMINATION OF A POTENTIAL SOURCE OF DRINKING WATER. THESE FACTORS MAKES THIS ALTERNATIVE UNACCEPTABLE.

IT IS AGREED THAT SOME OF THE "POTENTIAL IMPACTS" WOULD EXIST FOR OTHER ALTERNATIVES. THE REPORT DOES DISCUSS AND ELIMINATE, IN SECTION 9, UNACCEPTABLE ALTERNATIVES. AFTER THAT SECTION, THE REPORT THEN MORE CLOSELY EXAMINES THE "PROS" AND "CONS" OF THE REMAINING REMEDIAL ALTERNATIVES.

COMMENT ON THE MUNICIPAL LANDFILL: THROUGHOUT THE REPORT, IT IS SUGGESTED THAT PESTICIDES AND "RELATED INDUSTRIAL WASTES" WERE DISPOSED OF IN THE MUNICIPAL LANDFILL AREA. WHILE THE REPORT CLEARLY IDENTIFIES "PESTICIDES", NO EFFORT HAS BEEN MADE TO IDENTIFY "RELATED INDUSTRIAL WASTES," AS WELL AS THE PROBABLE GENERATORS OF THESE WASTES. AN ATTEMPT TO IDENTIFY THE NATURE OF THE "RELATED INDUSTRIAL WASTES" WOULD UNDOUBTEDLY AID IN THE DETERMINATION OF ADDITIONAL POTENTIALLY RESPONSIBLE PARTIES WITH RESPECT TO THE POWERSVILLE SITE.

AS INDICATED IN THE PREVIOUS SUBSECTION, THE EPD REGULARLY VISITED THE POWERSVILLE SITE AND INSPECTED ITS OPERATIONS. TO THE EXTENT THAT THE EPD BECAME AWARE OF DISPOSAL PRACTICES AT THE SITE DURING THIS PERIOD, EPD PERSONNEL WOULD BE AN INVALUABLE RESOURCE IN HELPING TO IDENTIFY ADDITIONAL POTENTIALLY RESPONSIBLE PARTIES.

WE UNDERSTAND THAT WITH RESPECT TO PREVIOUS NPL SITES, THE EPA HAS RETAINED A PROFESSIONAL SEARCH FIRM TO HELP IDENTIFY POTENTIALLY RESPONSIBLE PARTIES. WE ALSO UNDERSTAND THAT IN THIS CASE THIS COURSE OF ACTION WAS NOT FOLLOWED. THIS RAISES THE QUESTION AS TO WHETHER THE EPA SHOULD HAVE EMPLOYED SUCH A FIRM IN ORDER TO IDENTIFY ALL POSSIBLE POTENTIALLY RESPONSIBLE PARTIES.

EPA RESPONSE: "RELATED INDUSTRIAL WASTES" ARE MENTIONED IN THE REPORT AND, TO THE EXTENT POSSIBLE, EPA HAS SOUGHT OUT PRPS ASSOCIATED WITH THESE WASTES. EPA HAS REQUESTED PRP INFORMATION FROM PEACH COUNTY, WHICH OPERATED THE LANDFILL, AND THE CITIES OF FORT VALLEY AND BYRON. THESE PARTIES EITHER OPERATED THE LANDFILL OR WERE MAJOR CONTRIBUTORS AND ARE THE BEST SOURCES OF INFORMATION REGARDING ADDITIONAL PRPS. THEIR RESPONSES HAVE PROVIDED NO INFORMATION THAT WOULD PROVIDE ADDITIONAL PRPS. EPD HAS WORKED WITH EPA ON THIS SITE, AND THE INFORMATION PROVIDED BY THEM HAS NOT HELPED TO LOCATE ADDITIONAL PRPS.

IT IS EPA'S OPTION TO EMPLOY THE SERVICES OF A PROFESSIONAL SEARCH FIRM TO HELP IDENTIFY PRPS. IN THE CASE OF THE POWERSVILLE LANDFILL SITE, EPA BELIEVES THAT THE COST OF SUCH A FIRM WOULD NOT BE JUSTIFIABLE AS THE PARTIES KNOWLEDGEABLE ABOUT THE SITE HAD ALREADY BEEN CONTACTED AND HAD PROVIDED THE INFORMATION AVAILABLE TO THEM.

ENDANGERMENT ASSESSMENT

THE ULTIMATE CONCLUSION OF THE EPA THAT A THREAT OF OFF-SITE CONTAMINATION EXISTS AT THE SITE IS BASED IN LARGE PART ON THE ENDANGERMENT ASSESSMENT CONTAINED IN APPENDIX "C" OF THE REPORT. HOWEVER, IT IS NOT CLEAR WHETHER THIS IS A PRELIMINARY ASSESSMENT, AS IS SUGGESTED IN THE EXECUTIVE SUMMARY SECTION OF THE REPORT, OR A FINAL ENDANGERMENT ASSESSMENT. WE BELIEVE THAT ANY CONCLUSIONS AND RECOMMENDED REMEDIAL ALTERNATIVES SHOULD BE BASED ON A FINAL ENDANGERMENT ASSESSMENT.

WE ARE PRIMARILY CONCERNED WITH THE ASSUMPTION MADE AS TO THE CURRENT-USE AND FUTURE-USE SCENARIO AT THE SITE, AND THE DEPENDENCE OF THESE MODELS IN EVALUATING AND SELECTING A REMEDY. UNDER EPA'S CURRENT-USE SCENARIO, ONLY GROUNDWATER AND SOIL ARE CONSIDERED TO BE SIGNIFICANT EXPOSURE PATHWAYS. THE OFF-SITE EXPOSURE POINT FOR GROUNDWATER EVALUATED IS THE LIZZIE CHAPEL WELL. ALTHOUGH CONCENTRATIONS OF LINDANE IN THIS WELL ARE LESS THAN 25 PERCENT OF CURRENT DRINKING WATER STANDARDS, THE REPORT SUGGESTS THAT UNDER A "PLAUSIBLE MAXIMUM CASE" LINDANE WOULD EXCEED THE SAFE DRINKING WATER ACT MAXIMUM CONCENTRATION LEVEL GOALS ("MCLG") OF .2 UG/L. WE NOTE THAT THE USE OF MCLG'S DO NOT REPRESENT ANY EXISTING STANDARD. FURTHER, WE POINT OUT THAT THE EPA ITSELF IS NOT IN FAVOR OF USING THESE MCLG'S AS GROUNDWATER STANDARDS.

AS TO POTENTIAL SOIL EXPOSURE, WE NOTE THAT THE CURRENT-USE SCENARIO IS BASED ON ASSUMPTIONS REGARDING THE INGESTION RATES FOR CHILDREN OF CERTAIN AGES. WE NOTE THAT THE "MAXIMUM PLAUSIBLE CASE" UNDER THIS SCENARIO WOULD RESULT IN THE INGESTION BY EACH CHILD OF 130 LITERS OF SOIL OVER A 5-YEAR PERIOD. EVEN IF SUCH A SCENARIO IS INDEED "PLAUSIBLE", THE FACT IS THAT THE SURFACE

SOILS DO NOT CURRENTLY POSE A SIGNIFICANT HEALTH RISK. AS THE REPORT STATES, ONLY A MARGINAL RISK IS ASSOCIATED WITH LONG-TERM CONTACT WITH SOIL, AND NO RISK IS ASSOCIATED WITH SHORT-TERM CONTACT. FURTHER, EVEN IF A RISK WERE PRESENT, VARIOUS COST EFFECTIVE MEASURES, ALREADY INCLUDED IN THE NO-ACTION ALTERNATIVE, COULD BE TAKEN TO SATISFACTORILY ADDRESS ANY SUCH RISKS.

AS TO THE FUTURE-USE SCENARIO, WE NOTE THAT THE EPA PROJECTS THAT CERTAIN PARAMETERS WILL EXCEED MCGLS IN OFF-SITE WELLS IN THE FUTURE. IN ADDITION TO OUR RESERVATIONS CONCERNING THE MCGLS, WE FIND NO SUPPORT FOR THE ASSERTION THAT THESE PARAMETERS WILL EXCEED SUCH LEVELS. THE ASSUMPTIONS MADE CONCERNING THE POTENTIAL FOR LEACHING INTO THE GROUNDWATER OR THE RATES OF FLOW FROM THE LANDFILL SITE DO NOT TAKE INTO ACCOUNT THE ACTUAL CONSTRUCTION OF THE SITE. FURTHER, THE ASSUMPTIONS CONCERNING GROUNDWATER FLOW DO NOT CONSIDER THE FACT THAT, WHILE NO CONTINUOUS CLAY LAYER WAS OBSERVED, A SERIES OF CLAY LENSES AND OVERLAPPING CONFINING STRUCTURES APPEARS TO BE PRESENT WHICH WOULD RETARD THE MOVEMENT OF CONTAMINATED WATER INTO POTENTIAL RECEPTORS. BY THE EPA'S OWN ACKNOWLEDGEMENT, THE MODEL USED IN ASSESSING THE FUTURE-USE SCENARIO ACTUALLY OVERESTIMATES THE ACTUAL CONCENTRATIONS WHICH WOULD BE EXPECTED OVER TIME.

WITH RESPECT TO SOILS, THE FUTURE-USE SCENARIO ASSUMES ON-SITE DEVELOPMENT OF HOMES OR OTHER BUILDINGS, THE INSTALLATION OF DRINKING WATER WELLS ONSITE AND EXPOSURE OF CONSTRUCTION WORKERS AND OTHERS TO THE ON-SITE SOILS. IN REALITY, ANY SUCH DEVELOPMENT ON-SITE IS VIRTUALLY PRECLUDED. AS WAS ACKNOWLEDGED BY THE EPA AT THE AUGUST 4, 1987, PUBLIC MEETING AT FORT VALLEY, GEORGIA, DEED RESTRICTIONS WOULD PRECLUDE ANY SUCH DEVELOPMENT. WE QUESTION THE USE OF THIS SCENARIO IN EVALUATING THE RISK OF EXPOSURE OR THE REMEDY TO BE IMPLEMENTED WHEN THE ASSUMPTIONS UNDERLYING THE SCENARIO ARE IMPLAUSIBLE.

THROUGHOUT THE ENDANGERMENT ASSESSMENT, THE EPA ACKNOWLEDGES THAT CONCENTRATION LEVELS AND EXPOSURE POTENTIAL IS OVERESTIMATED, BUT WERE ADEQUATE FOR PURPOSES OF A "PRELIMINARY ASSESSMENT.". IT IS OUR BELIEF THAT THE EVALUATION OF THE ACTUAL RISK POSED BY THE POWERSVILLE SITE, AND THE SELECTION AND IMPLEMENTATION OF A REMEDY, MUST BE BASED NOT ON A PRELIMINARY RISK ASSESSMENT BUT ON A FINAL RISK ASSESSMENT.

BASED ON OUR REVIEW OF THE REPORT, WE CONCLUDE THAT NO GROUNDWATER CONTAMINATION CURRENTLY EXISTS OFF-SITE. FURTHER, BECAUSE OF FACTS KNOWN BY US AND THE EPD AS TO THE CONSTRUCTION OF THE HAZARDOUS WASTE LANDFILL, AND THE INCONCLUSIVE NATURE OF THE GROUNDWATER RESULTS REPORTED, WE BELIEVE THE RISK OF GROUNDWATER CONTAMINATION OFF-SITE IN THE FORESEEABLE FUTURE IS LOW. HOWEVER, EVEN IF A FUTURE THREAT OF OFF-SITE GROUNDWATER CONTAMINATION EXISTS, WE BELIEVE THAT THIS THREAT CAN BE ADDRESSED BY CONTINUOUS, OPEN-ENDED GROUNDWATER MONITORING, AS WOULD BE CONTEMPLATED BY A NO-ACTION ALTERNATIVE.

WITH REGARD TO SOILS, NO REALISTIC PRESENT CONTAMINATION OR FUTURE THREAT OF CONTAMINATION EXISTS AT THE SITE. FURTHER, EVEN IF SUCH RISKS WERE PRESENT, THE FENCING AND POSTING OF SIGNS CONTEMPLATED BY A NO-ACTION ALTERNATIVE WOULD ELIMINATE ANY PRACTICAL RISK OF EXPOSURE. WE FEEL THAT SUCH ACTIONS WOULD BE ADEQUATE AND COST EFFECTIVE IN LIGHT OF THE OBSERVED RISK OR THREAT OF FUTURE RISKS.

WHILE WE DO NOT BELIEVE THAT A SIGNIFICANT RISK OF OFF-SITE GROUNDWATER CONTAMINATION EXISTS, WE ACKNOWLEDGE AND ARE SENSITIVE TO THE CONCERNS OF THE LOCAL RESIDENTS REGARDING THEIR DRINKING WATER SUPPLIES. WE RECOGNIZE THAT WHILE NO DANGER IS PRESENTED TO THESE RESIDENTS, THE PERCEPTION BY THESE RESIDENTS THAT A DANGER EXISTS AND THE ANXIETIES ATTENDANT TO SUCH A PERCEPTION CONSTITUTE A PUBLIC HEALTH ISSUE WHICH SHOULD BE ADDRESSED. THEREFORE, IN ADDITION TO ENDORSING A NO ACTION ALTERNATIVE WITH RESPECT TO THE POWERSVILLE SITE, WE SUPPORT THE INVESTIGATIONS CURRENTLY BEING CONDUCTED REGARDING THE ESTABLISHMENT OF AN ALTERNATE DRINKING WATER SUPPLY FOR THESE RESIDENTS. WE HOPE THAT ALL POSSIBLE ALTERNATE DRINKING WATER SOURCES WOULD BE INVESTIGATED, SO THAT ONE MAY BE SELECTED WHICH BOTH MEETS THE NEEDS OF THE LOCAL RESIDENTS AND CAN BE IMPLEMENTED AND MAINTAINED IN AS EFFICIENT AND COST-EFFECTIVE A MANNER AS

POSSIBLE.

EPA RESPONSE: THE ENDANGERMENT ASSESSMENT IS A FINAL DOCUMENT. THE WORD "PRELIMINARY" IN THE EXECUTIVE SUMMARY IS AN ERROR THAT WAS NOT DISCOVERED DURING EDITORIAL REVIEW. AS NOTED BY THE COMMENTOR, MCLGS ARE USED IN THE ENDANGERMENT ASSESSMENT. PLEASE BE AWARE THAT MCLS ARE INDEED THE PARAMETERS PREFERRED BY THE AGENCY, AND THAT THE MCLGS ARE INCLUDED FOR INFORMATIONAL PURPOSES ONLY. WHILE MCLS PLAY AN IMPORTANT ROLE, MANY OTHER FACTORS CONTRIBUTE TO THE FINAL DECISION MADE BY THE AGENCY, AND EACH NPL SITE IS DECIDED ON ITS OWN MERIT. AT THE POWERSVILLE LANDFILL IT IS CLEAR THAT THERE IS A RELEASE INTO THE GROUNDWATER OF HAZARDOUS COMPOUNDS. THERE IS NO ASSURANCE THAT THE RELEASE WILL NOT WORSEN OVER TIME. EPA THUS BELIEVES THERE IS A POTENTIAL FOR ENDANGERMENT OF THE PUBLIC HEALTH, THEREFORE ACTION SHOULD BE TAKEN TO REDUCE, IF NOT COMPLETELY ELIMINATE, THAT POTENTIAL.

FUTURE USE, AS INDICATED ABOVE, IS A MAJOR CONCERN FOR THE POWERSVILLE LANDFILL. CANADYNE GEORGIA HAS YET TO PROVIDE DOCUMENTATION THAT CONFIRMS THE ACTUAL FINAL CONSTRUCTION OF THE HAZARDOUS WASTE SITE. THE STATEMENT THAT THERE ARE OVERLAPPING CONFINING STRUCTURES IS NOT ONE THAT EPA AGREES WITH OR THAT AVAILABLE INFORMATION COULD SUPPORT. ANY SUCH INFERENCES TO THE CONTRARY MADE IN THE RI/FS REPORT WILL BE REVISED AS MAY BE NECESSARY. THE CROSS SECTIONS PROVIDED IN SECTION 5 OF THE RI/FS SUPPORT EPA'S CONCERN THAT:

- NO CONTINUOUS AQUICLUDE CAN BE CONSIDERED TO EXIST, AND
- IN THE PROVIDENCE AND GOSPORT UNITS, HYDRAULIC INTERCONNECTIONS ARE LIKELY TO EXIST, THUS PROVIDING A PATHWAY FOR MIGRATIONS OF LEACHATE INTO THE GROUNDWATER.

THE ENDANGERMENT ASSESSMENT, WHICH IS A FINAL DOCUMENT, IS VALID IN DISCUSSING THE ON-SITE DEVELOPMENT OF HOMES IN THE CURRENT AND FUTURE USE SCENARIOS, AS IT EVALUATES A COMPLETE NO ACTION SITUATION, AS STATED ON PAGE 11 OF THE ENDANGERMENT ASSESSMENT. IT APPEARS THAT THE NO ACTION ALTERNATIVE INDICATED EARLIER IN THE REPORT, WHERE DEED RESTRICTIONS ARE MENTIONED, IS BEING CONFUSED WITH A NO-ACTION SITUATION, WHERE ABSOLUTELY NO REMEDIAL STEPS ARE TAKEN. DEED RESTRICTIONS WERE MENTIONED AT THE AUGUST 4, 1987 MEETING, BUT NOT IN THE CONTEXT OF A RISK ASSESSMENT AND SUCH RESTRICTIONS ARE NOT IN PLACE AT THIS TIME. RISK EXPOSURE IS BASED ON THE PRESENT STATUS OF THE SITE AND ON FUTURE SITUATIONS, WHERE NO ACTION IS TAKEN.

EPA APPRECIATES THAT THE PRP AGREES THAT CONTINUOUS MONITORING SHOULD BE CARRIED OUT AT THE SITE. THE PRP STATES THAT THERE IS NO GROUNDWATER CONTAMINATION OCCURRING OFF-SITE, BUT WE BELIEVE THAT DATA FROM THE GROUNDWATER MONITORING CARRIED OUT DURING THE RI/FS DOES CONFIRM LIMITED OFF-SITE CONTAMINATION.

THE FOLLOWING COMMENTS FROM THE PRP REFER TO THE JULY 23, 1987 DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY FOR THE POWERSVILLE LANDFILL SITE.

COMMENT: ON PAGE ES-1, THE POWERSVILLE LANDFILL SITE IS REFERRED TO AS A CLASS 3 SITE. WHAT DOES THIS CLASSIFICATION MEAN AND WHAT IS THE SIGNIFICANCE OF THIS CLASSIFICATION?

EPA RESPONSE: THE CLASS 3 DESIGNATION IS NOT RELEVANT TO THE SUMMARY PRESENTED AND WILL BE DELETED.

COMMENT: ON PAGE ES-3, THE ENDANGERMENT ASSESSMENT IS REFERRED TO AS "PRELIMINARY". HOWEVER, THE ENDANGERMENT ASSESSMENT (APPENDIX C) TO THE RI/FS DOCUMENT DOES NOT INDICATE THAT IS PRELIMINARY. ARE THERE TWO VERSIONS OF THE ENDANGERMENT ASSESSMENT, AND WILL THE FINAL ENDANGERMENT ASSESSMENT BE APPENDED TO THE FINAL REPORT?

EPA RESPONSE: AS INDICATED PREVIOUSLY, THE WORD "PRELIMINARY" IS AN ERROR THAT WAS NOT FOUND

DURING EDITORIAL REVIEW. THE ENDANGERMENT ASSESSMENT IS THE FINAL DOCUMENT.

COMMENT: ON PAGE ES-1, THREE POTENTIALLY RESPONSIBLE PARTIES (PRPS) WERE IDENTIFIED. WHAT EFFORTS WERE USED TO RESEARCH PRPS? THE PRESENCE OF SUCH CONTAMINANTS AS VINYL CHLORIDE, 1,2-DICHLOROETHANE, LEAD AND CHROME IN SOIL AND GROUNDWATER SAMPLES AT THE SITE INDICATE THE PRESENCE OF NONPESTICIDE RELATED HAZARDOUS MATERIALS. WERE ANY EFFORTS MADE TO CORRELATE THESE WASTE TYPES WITH OTHER BUSINESSES THAT EXIST OR ONCE EXISTED IN PEACH COUNTY? DID EPA RETAIN A PROFESSIONAL SEARCH FIRM TO IDENTIFY PRPS AS IT HAS FOR OTHER SITES?

EPA RESPONSE: THIS QUESTION HAS BEEN ANSWERED IN A PREVIOUS PORTION OF THIS SUMMARY. A PROFESSIONAL SEARCH FIRM WAS NOT REQUIRED AND THUS NOT USED FOR THE POWERSVILLE LANDFILL SITE.

COMMENT: THE RI/FS SHOULD INCLUDE A QUALITY ASSURANCE (QA) PROJECT PLAN IN ACCORDANCE WITH THE DECEMBER 29, 1980 INTERIM GUIDANCE FROM EPA. THIS REQUIREMENT INCLUDES A FINAL QA REPORT. THE REPORT DOES NOT DISCUSS QUALITY CONTROL OVER SUCH ACTIVITIES AS SOIL BORINGS, PARTICULARLY THE 148 FOOT, 45 DEGREE ANGLED BORING UNDER THE HAZARDOUS WASTE (HW) AREA, LABORATORY QA ACTIVITIES, AND FIELD SAMPLING ACTIVITIES. WILL THE QA PROJECT PLAN AND FINAL QA REPORTS BE MADE PART OF THE APPENDIX IN THE FINAL REPORT?

EPA RESPONSE: THE QUALITY ASSURANCE PROJECT PLAN IS IN THE RECORDS AT OUR OFFICE AND AT THE PUBLIC REPOSITORY FOR PUBLIC REVIEW. IT IS PART OF THE RI/FS BUT WILL NOT BE INCLUDED AS PART OF THIS PARTICULAR REPORT.

COMMENT: ON PAGE 1-1, THE REPORT STATES THAT EPA NOTIFIED PEACH COUNTY OF THE UNACCEPTABILITY OF THE LANDFILL FACILITY FOR SOLID WASTE DISPOSAL. WAS IT THE EPA OR THE GEORGIA EPD WHICH IN FACT MADE THIS DETERMINATION. SHOULDN'T THE REPORT INDICATE THAT THE GEORGIA EPD ALLOWED THE SITE TO OPERATE FROM 1972 UNTIL 1979 BEFORE MAKING THIS DETERMINATION?

EPA RESPONSE: THE REPORT SHOULD STATE THAT EPD NOTIFIED PEACH COUNTY. IT IS ALREADY CLEAR THAT THE SITE WAS ALLOWED TO OPERATE UNTIL 1979.

COMMENT: ON PAGE 1-1, THE REPORT INDICATES THAT GEORGIA EPD OFFICIALS OBSERVED THE DUMPING OF PESTICIDES BY THE WOOLFOLK CHEMICAL COMPANY. THIS OBSERVATION IS NOT DOCUMENTED IN THE APPENDIX TO THE REPORT. WILL THIS OBSERVATION BE DOCUMENTED AND DETAILED IN THE FINAL REPORT?

EPA COMMENT: NO. THOSE PICTURE AND ASSOCIATED DOCUMENTS ARE IN EPD AND EPA FILES AND AVAILABLE FOR REVIEW.

COMMENT: ON PAGE 1-6, TABLE 1-1 INDICATES THAT THE USGS CONDUCTED A SURVEY OF ALL WELLS WITHIN 1 MILE RADIUS OF THE SITE. THE RESULTS OF THIS SURVEY WERE NEITHER DISCUSSED NOR INCLUDED IN THE REPORT. WILL THIS DATA BE ATTACHED AS AN APPENDIX ITEM IN THE FINAL REPORT?

EPA RESPONSE: NO. THE SURVEY IS IN THE FILES AT EPA AND THE PUBLIC REPOSITORY AND AVAILABLE FOR REVIEW.

COMMENT: ON PAGES 1-9 AND 1-10, THE REPORT CONCLUDES THAT THE HW AREA WAS CONSTRUCTED IN UNDISTURBED SOIL AND THE DISPOSAL TRENCHES WERE NOT LINED. A LETTER FROM THE GEORGIA EPD TO THE PEACH COUNTY COMMISSION, DATED DECEMBER 29, 1972, SPECIFIED THAT THE TRENCHES IN THE HW AREA BE LINED WITH 3 FEET OF CLAY. SUBSEQUENT EPD MEMORANDA, DATED APRIL 13, 1973, AND JULY 26, 1973, INDICATE THAT THE TRENCHES WERE LINED WITH CLAY AS SPECIFIED AND THE SITE WAS "CONSTRUCTED PROPERLY" AND WAS BEING "OPERATED SATISFACTORILY.". DID THE EPA CONSIDER THESE MEMORANDA AND TAKE INTO ACCOUNT THE CONSTRUCTION OF THE TRENCHES?

EPA RESPONSE: EPA HAS GIVEN FULL CONSIDERATION TO THE ISSUES MENTIONED ABOVE, BUT THERE IS

STILL A CONCERN AS TO WHETHER OR NOT THE SITE WAS ACTUALLY CONSTRUCTED AS INDICATED. FOR EXAMPLE, WHAT DOES "LINED WITH CLAY" REALLY INDICATE? WAS COMPACTED LOW PERMEABILITY CLAY PUT ON THE BOTTOM AND SIDE WALLS OF THE TRENCHES, OR WERE THE TRENCHES DUG DOWN TO A DEPTH WHERE A CLAY BED OF UNESTABLISHED PERMEABILITY WAS LOCATED? IN ADDITION, EVEN A COMPACTED, LOW PERMEABILITY CLAY DOES NOT GUARANTEE THE INTEGRITY OF THE SITE. WHILE THE SITE WAS CONSTRUCTED ON STANDARD PRACTICES OF THE TIME, SUCH PRACTICES OFTEN ARE INSUFFICIENT BY TODAY'S STANDARDS.

COMMENT: ON PAGE 5-6, THE REPORT DISCUSSES THE TWO 45 DEGREE BORINGS UNDER THE HW AREA. WAS THE TRENCH SLOPE DESIGN AND TRENCH CONSTRUCTION CONSIDERED BY THE EPA WHEN SELECTING THE BORING LOCATIONS?

EPA RESPONSE: YES, TO THE DEGREE THAT THE AVAILABLE INFORMATION ALLOWED.

COMMENT: ON PAGE 5-8, THE REPORT CONCLUDES THAT THE HW AREA WILL EVENTUALLY LEACH UNLESS REMEDIAL ACTIVITY IS INITIATED. THIS GENERALIZED COMMENT CAN BE MADE ABOUT ANY SITE, INCLUDING THOSE THAT HAVE BEEN REMEDIATED. IN THIS CONTEXT, THE STATEMENT DOES NOT AID IN AN UNDERSTANDING OF THE CONDITION OF THE SITE. THIS STATEMENT SHOULD BE REMOVED OR CLARIFIED.

EPA RESPONSE: WE DISAGREE WITH THE COMMENTOR, AND THE STATEMENT WILL REMAIN IN THE REPORT. REMEDIATED SITES TAKE STEPS TO REDUCE OR ELIMINATE LEACHING. FOR EXAMPLE, REMEDIAL ACTIVITIES THAT INCORPORATE INCINERATION CAN DESTROY AND THUS EFFECTIVELY REMOVE THE LEACHABLE HAZARDOUS WASTES.

COMMENT: ON PAGE 5-8, THE REPORT REFERS TO THE FACT THAT PHOTOGRAPHS TAKEN BY GEORGIA EPD PERSONNEL CONFIRM PESTICIDE DISPOSAL IN AREA 3 OF THE MUNICIPAL LANDFILL. IT IS NOT CLEAR HOW PHOTOGRAPHS CAN ACTUALLY CONFIRM THAT "PESTICIDES" WERE IN FACT DISPOSED OF AT THIS SITE? WILL THESE PHOTOGRAPHS BE INCLUDED IN THE APPENDIX OF THE FINAL REPORT TO DOCUMENT THIS CONCLUSION?

EPA RESPONSE: WE BELIEVE THAT THE PHOTOGRAPHS, COUPLED WITH INFORMATION IN EPA AND EPD FILES, SUPPORT THE STATEMENT. THE PHOTOGRAPHS ARE IN EPA RECORDS BUT WILL NOT BE INCLUDED IN THE REPORT.

COMMENT: ON PAGE 5-8, THE REPORT DESCRIBES THE CONCLUSIONS REACHED REGARDING THREE CONTAMINATED AREAS OF THE MUNICIPAL LANDFILL. CONSIDERING THE FACT THAT THE LANDFILL WAS UNCONTROLLED AND OPEN TO ALL COUNTY CITIZENS AND BUSINESS, THE PLACEMENT OF ANY WASTES WOULD HAVE BEEN HAPHAZARD AT BEST. THE METHOD OF DELINEATING THE THREE CONTAMINATED AREAS IS UNCONVINCING AND INCONCLUSIVE. THE MANNER IN WHICH THESE CONCLUSIONS WERE REACHED SHOULD BE CLARIFIED.

EPA RESPONSE: PLEASE NOTE THAT THE REPORT IDENTIFIES THESE THREE AREAS AS POTENTIAL CONTAMINANT SOURCES. BEARING THAT IN MIND, THE CONCLUSIONS REACHED AND THE METHODS USED TO REACH THOSE CONCLUSIONS ARE ADEQUATE.

COMMENT: ON PAGE 5-28, THE STUDY OF SATURATED SOILS BENEATH THE SITE CONCLUDES THAT THE HYDRAULIC CONDUCTIVITY IS BETWEEN 3.5-11 FEET PER DAY IN THE UPPER AQUIFER AND 5-7 FEET PER DAY IN THE LOWER AQUIFER. ASSUMING THAT THIS WATER MOVEMENT CAPACITY OF THE SOILS IS CORRECT, HOW DOES THE REPORT RECONCILE THE FACT THAT NO UNACCEPTABLE LEVELS OF CONTAMINATION HAVE BEEN MEASURED IN OFF SITE GROUNDWATER WELLS IN THE UPPER OR LOWER AQUIFERS?

EPA RESPONSE: THE COMMENTOR DOES NOT ARGUE THE FACT THAT CONTAMINATION HAS BEEN OBSERVED OFF-SITE AND THIS CONTAMINATION DOES INDICATE THAT SUCH WATER MIGRATION IS POSSIBLE. PLEASE NOTE THAT HYDRAULIC CONDUCTIVITY DOES NOT, BY ITSELF, DETERMINE THE SPEED AT WHICH GROUNDWATER TRAVELS. THE OTHER MAJOR FACTOR THAT MUST BE TAKEN INTO ACCOUNT IS THE HYDRAULIC GRADIENT (I), WHICH IS BASICALLY THE "SLOPE" OF THE WATER TABLE. THE FORMULA IS $V = KI$, WHERE V IS THE SPECIFIC DISCHARGE, OR VELOCITY, AT WHICH THE GROUNDWATER MOVES. THE LOW HYDRAULIC GRADIENT AT

THIS SITE WOULD KEEP SPECIFIC DISCHARGE LOW.

COMMENT: ON PAGE 5-34, THE REPORT CONCLUDES THAT THE HIGHEST CONCENTRATIONS OF LEAD AND CHROME WERE DISCOVERED IN THE OLDER, POSSIBLY DETERIORATING, GALVANIZED STEEL MONITORING WELLS. THE EPA RELIES ON THESE RESULTS TO CONCLUDE THAT SIGNIFICANT CONTAMINATION EXISTS IN THE UPPER AQUIFER. SINCE THE REPORT SUGGESTS THAT THIS DATA IS POSSIBLY INFLUENCED BY THE WELL CONSTRUCTION MATERIALS, SHOULD NOT THIS DATA EITHER BE DISCARDED AND NOT CONSIDERED IN THE REMEDIAL ALTERNATIVE SELECTION PROCESS OR CONFIRMED BY ADDITIONAL FIELD INVESTIGATION AND WATER QUALITY ANALYSIS? WE NOTE THAT THESE WELLS CONTAIN THE ONLY EVIDENCE OF CONCENTRATIONS OF CONTAMINANTS ABOVE DRINKING WATER STANDARDS ON OR OFF SITE. THEREFORE, A REMEDY SHOULD NOT BE SELECTED BASED ON RESULTS FROM THESE WELLS IF THEY ARE IN ANY WAY UNRELIABLE.

EPA RESPONSE: THE INFLUENCE OF WELL CONSTRUCTION MATERIALS IN OLDER WELLS CAN EXPLAIN THE ELEVATED LEAD AND CHROMIUM VALUES, BUT IT DOES NOT EXPLAIN THE PRESENCE OF OTHER CONTAMINANTS IN THESE WELLS. DATA FROM THE GALVANIZED WELLS CAN THEREFORE BE USED IN CONJUNCTION WITH THE DATA FROM NEWER WELLS. IT CANNOT, HOWEVER, BE RELIED UPON BY ITSELF. IT IS THE COMBINED USEABLE DATA FROM ALL WELLS THAT WAS EVALUATED.

COMMENT: ON PAGE 6-1, THE REPORT VERY BRIEFLY DESCRIBES THE AIR INVESTIGATION AT THE SITE. WHILE IT IS GENERALLY AGREED THAT NO AIR CONTAMINATION IS PRESENTLY ASSOCIATED WITH THE SITE, THE REPORT HAS INSUFFICIENTLY DOCUMENTED THIS CONCLUSION. A PHOTOIONIZATION DETECTOR IS AN INADEQUATE INSTRUMENT TO MEASURE ALL CONTAMINANTS THAT COULD POTENTIALLY BE PRESENT IN THE AMBIENT AIR AROUND THIS SITE, E.G., LEAD AND CHROME TRANSPORTED ON DUST PARTICLES. THE INVESTIGATION SHOULD HAVE INCLUDED STRATEGICALLY PLACED VACUUM PUMPS WITH FILTERS ALONG WITH OTHER INSTRUMENTS TO CONCLUSIVELY SUPPORT THE AIR INVESTIGATIVE EFFORTS.

EPA RESPONSE: IT APPEARS THAT LEAD AND CHROME CONTAMINATION IS A RESULT OF THE GALVANIZED MONITOR WELLS AND CONSEQUENTLY NOT A SIGNIFICANT CONCERN. THE PRESENT CONDITION OF THE LANDFILL IS SUCH THAT AIRBORNE PARTICLES WERE NOT CONSIDERED TO BE A PROBLEM, AND THE ENDANGERMENT ASSESSMENT SUPPORTS THAT CONCLUSION.

COMMENT: ON PAGE 7-2, THE LAST PARAGRAPH OF SECTION 7.2 SHOULD READ, "THE ENDANGERMENT ASSESSMENT IDENTIFIED NO SHORT OR LONG TERM HEALTH RISK....".

EPA RESPONSE: AGREED. NO SHORT OR LONG TERM HEALTH RISK MAY BE ASSOCIATED WITH CONTACT WITH SURFACE SOIL AT THE SITE, UNLESS EROSION ALTERS THE CHARACTERISTIC OF THE AREA.

COMMENT: ON PAGE 8-2 AND AT SEVERAL OTHER LOCATIONS WITHIN THE REPORT, THE TERM "CAPPING" IS DESCRIBED AS A TREATMENT TECHNOLOGY. THIS TECHNOLOGY IS MORE APPROPRIATELY DESCRIBED AS A SOURCE CONTROL OF CONTAMINANTS, SINCE THE PLACEMENT OF A SITE CAP DOES NOT ACTUALLY RESULT IN ANY PHYSICAL OR CHEMICAL CHANGE TO THE WASTE, SOILS, OR CONTAMINANTS.

EPA RESPONSE: AGREED.

COMMENT: ON PAGE 8-4 AND IN NUMEROUS OTHER LOCATIONS IN THE REPORT, THE EPA STATES THAT IT CONSIDERED THE "NO ACTION" ALTERNATIVE SIMPLY BECAUSE THERE IS A REQUIREMENT TO DO SO IN THE NATIONAL CONTINGENCY PLAN (NCP). WHY WAS THIS ALTERNATIVE NOT SERIOUSLY CONSIDERED ALONG WITH ALL OTHERS? THERE APPEARS TO BE AN EFFORT TO ELIMINATE "NO ACTION" FROM SERIOUS CONSIDERATION EARLY IN THE EVALUATION PROCESS. WHY ARE THE "POTENTIAL IMPACTS" OF "NO ACTION" DISCUSSED IN THE INITIAL DISCUSSIONS, WHILE SUCH IMPACTS WERE NOT CONSIDERED IN THE INITIAL DISCUSSIONS OF THE OTHER TECHNOLOGIES IDENTIFIED?

THE POTENTIAL IMPACTS OF "NO ACTION" SHOULD BE DISCUSSED IN LIGHT OF THE ACTUAL SIGNIFICANCE OF THOSE IMPACTS. SUCH A DISCUSSION SHOULD ALSO ACKNOWLEDGE THAT ALTERNATIVE, AND THAT EACH OF

THESE IMPACTS WOULD ACCOMPANY ANY REMEDY SELECTED AT THE SITE.

- OCCUPATIONAL OR PUBLIC EXPOSURE - NO ACTION SPECIFIES FENCING AROUND THE SITE TO RESTRICT ACCESS AND PUBLIC EXPOSURE. DEED RECORDATIONS WOULD RESTRICT OCCUPATIONAL EXPOSURES. THERE ARE NO AIR OR SURFACE SOIL OR WATER PATHWAYS IDENTIFIED.
- DECLINE OF PROPERTY VALUES - PROPERTY VALUES IN RURAL AREA SURROUNDING A CLOSED MUNICIPAL LANDFILL SHOULD NOT DECLINE ANY FURTHER THAN THEY MAY HAVE ALREADY. THE RCRA CAPPING OF THE SITE OR ANY OTHER SELECTED REMEDY COULD HAVE A NEGATIVE EFFECT ON PROPERTY VALUES SURROUNDING THE SITE, AND SUCH A DECLINE SHOULD NOT BE ATTRIBUTED SOLELY TO A NON-ACTION ALTERNATIVE.
- EXPENDITURES FOR LEGAL SERVICES - WHAT LEGAL SERVICES WOULD BE REQUIRED FOR THIS ALTERNATIVE? THE REPORT'S COST ESTIMATES PROJECT NO LEGAL FEES FOR "NO ACTION". INDEED, OTHER ALTERNATIVES WOULD REQUIRE EVEN HIGHER EXPENDITURES FOR LEGAL FEES.
- DEPRESSED AREA GROWTH - AS THIS IS AN AGRICULTURAL COMMUNITY, GROWTH RATE IS EXPECTED TO BE EXTREMELY LOW. WOULD THIS RATE BE AFFECTED BY THE SELECTION OF ANY OTHER ALTERNATIVE.
- EXPENDITURES FOR LABORATORY ANALYSIS AND MONITORING - WHETHER COVERED WITH A RCRA-TYPE CAP OR TREATED ONSITE, HAZARDOUS CONSTITUENTS WILL NEED TO BE MONITORED IN GROUNDWATER FOR INDEFINITE PERIODS OF TIME. THE "NO ACTION" ALTERNATIVE ANALYSIS AND MONITORING EXPENDITURES WOULD BE NO HIGHER THAN THOSE REQUIRED FOR ANY OTHER ALTERNATIVE.
- RESTRICTED ACCESS TO SITE - SHORT OF A REMOVAL ACTION, ACCESS TO THE SITE WOULD BE RESTRICTED REGARDLESS OF THE REMEDIAL ACTION IMPLEMENTED.
- ENVIRONMENTAL IMPACTS - THE ENDANGERMENT ASSESSMENT REVEALED THE ONLY REALISTIC ENVIRONMENTAL IMPACT AS LONG TERM EXPOSURE TO CONTAMINATED GROUNDWATER OFFSITE. TO DATE, DRINKING WATER STANDARDS IN OFF SITE WELLS ARE NOT BEING VIOLATED. IN FACT, THE HIGHEST CONCENTRATION OF ANY CONTAMINANT DETECTED IN AN OFF SITE WELL IS LESS THE HIGHEST CONCENTRATION OF ANY CONTAMINANT DETECTED IN AN OFF SITE WELL IS LESS THAN 20% OF THE DRINKING WATER STANDARD FOR THAT CONTAMINANT.

EPA RESPONSE: THE "NO ACTION" ALTERNATIVE WAS CONSIDERED AND JUDGED TO BE UNSUITABLE FOR THIS SITE. IT IS AGREED THAT SOME OF THE IMPACTS MENTIONED UNDER THE "NO ACTION" ALTERNATIVE WOULD APPLY TO SOME OF THE OTHER ALTERNATIVES.

- DEED RESTRICTIONS AND FENCING DO NOT ENSURE THE ELIMINATION OF OCCUPATIONAL OR PUBLIC EXPOSURE. ACCESS TO THE SITE CAN STILL BE GAINED WITH SUCH MEASURES IN PLACE. ALSO, EROSION AND SUBSEQUENT RUNOFF COULD ALTER THE SITE CHARACTERISTICS TO SUCH A DEGREE THAT EXPOSURE WOULD BE A PROBLEM BOTH OFF SITE AND ON SITE.
- LEGAL FEES WOULD MOST LIKELY BE A PART OF ANY ALTERNATIVE. TO STATE THAT LEGAL FEES WOULD BE HIGHER FOR ALTERNATIVES OTHER THAN THE NO ACTION ALTERNATIVE IS SPECULATIVE.

- THE COMMENTOR ALSO STATES THAT GROWTH IN THE AREA WOULD BE EXTREMELY LOW. WE BELIEVE THE STATEMENT IS STRICTLY SPECULATIVE.
- MONITORING COSTS COULD BE REDUCED UNDER SOME ALTERNATIVES. THE INCINERATION OF WASTES IN THE HAZARDOUS WASTE AREA WOULD REDUCE MONITORING REQUIREMENTS, AS IT PERMANENTLY REMOVES THE SOURCE OF CONTAMINATION.
- THE COMMENTOR DRAWS UPON PRESENT CONTAMINATION CONCENTRATIONS TO ARGUE LONG-TERM HEALTH EFFECTS. THERE IS NO ASSURANCE THAT THESE CONTAMINATION LEVELS WILL REMAIN LOW, AND THIS IS THE REAL CONCERN WHERE LONG TERM HEALTH IMPACTS ARE INVOLVED.

COMMENT: ON PAGE 8-6, SHOULD NOT THE DESIGN PROBLEMS ASSOCIATED WITH CAPPING THIS PARTICULAR SITE BE DISCUSSED? THESE WOULD INCLUDE DIFFERENTIAL SETTLEMENT, SIGNIFICANT REGRADING PROVISIONS, AND METHANE VENTING.

EPA RESPONSE: MORE DETAILED DISCUSSIONS OF CAPPING ARE INCLUDED IN LATER SECTIONS OF THE REPORT.

COMMENT: ON PAGE 8-6, THE STATEMENT IS MADE THAT "A THREE LAYER CAP IS REQUIRED BY THE RCRA LAND DISPOSAL REGULATIONS". THIS SITE IS NOT A HAZARDOUS WASTE LAND DISPOSAL FACILITY REGULATED BY RCRA. WHY SHOULD THE RCRA REGULATORY STANDARDS BE REQUIRED FOR SITE CAPPING? WHY WEREN'T OTHER SURFACE ACTIVITIES CONSIDERED WHICH MIGHT BE MORE COST EFFECTIVE?

EPA RESPONSE: EPA BELIEVES IT IS IMPORTANT TO USE METHODOLOGIES THAT ARE COMPATIBLE WITH OTHER LAWS THAT APPLY TO SIMILAR TYPES OF SITES OR THAT ACHIEVE A SIMILAR LEVEL OF PERFORMANCE. WHILE THE RCRA TYPE "C" CAP IS THE ALTERNATIVE MENTIONED IN THE REPORT, OTHER CAPPING METHODOLOGIES ARE ALSO BEING EXAMINED.

COMMENT: ON PAGE 9-23, TABLE 9-3, WHAT IS THE SIGNIFICANCE OF LISTING CAPPING THE MUNICIPAL SITE WITH ASPHALT? NO DISCUSSION OF ASPHALTIC CAPS IS OFFERED TO EXPLAIN THIS REFERENCE.

EPA RESPONSE: PAGE 8-6 OF THE RI/FS REPORT DOES BRIEFLY DISCUSS ASPHALT CAPS. HOWEVER, THE PRESENTATION OF THESE COSTS IS CHIEFLY FOR COMPARISON PURPOSES.

COMMENT: ON TABLE 9-3, UNDER DISPOSAL OF GROUNDWATER, WHAT DOES THE TERM "TRUCKING" REFER TO AND WHAT IS THE COST? OFF SITE DISPOSAL INTO A POTW? DOES THE DISPOSAL HAVE A COST?

EPA RESPONSE: TRUCKING REFERS TO TRANSPORTING THE WATER TO A NEARBY TREATMENT PLANT. THE COST WOULD BE APPROXIMATELY \$400,000.

COMMENT: ON PAGE 10-4, ALL THE ALTERNATIVES TO BE CONSIDERED ARE LISTED. WHY WAS THE ALTERNATIVE OF AN ALTERNATE DRINKING WATER SUPPLY ONLY NOT LISTED? PRESUMING THE SITE TO BE THE SOURCE, THE GROUNDWATER TO BE THE PATHWAY AND THE SURROUNDING RESIDENCES TO BE THE RECEPTORS OF CONTAMINATION, PROVIDING AN ALTERNATE DRINKING WATER SUPPLY WOULD ELIMINATE THE RECEPTORS AND ELIMINATE ANY PRESENT OR FUTURE THREAT OF CONTAMINATION.

EPA RESPONSE: THE ALTERNATE DRINKING WATER SUPPLY DOES NOT ELIMINATE OR REDUCE THE LEACHING OF CONTAMINANTS INTO THE AQUIFER AND THUS WAS NOT CONSIDERED BY ITSELF. EPA WILL NOT ACCEPT ANY ALTERNATIVE THAT ALLOWS THE CONTINUED CONTAMINATION OF THE AQUIFER, AS THIS AQUIFER IS STILL A POTENTIAL DRINKING WATER SOURCE.

COMMENT: ON PAGE 11-35, THE EPA-PREFERRED ALTERNATIVE IS DESCRIBED. APPENDIX F OUTLINES THE COSTS ASSOCIATED WITH THIS REMEDY. WHY WAS A DEEP PUBLIC WELL SYSTEM TO PROVIDE ALTERNATE

DRINKING WATER NOT CONSIDERED? ITS COSTS COULD BE SIGNIFICANTLY LESS THAN UTILIZING THE CITY OF BYRON WATER SYSTEM. WHAT RESIDENCES WOULD RECEIVE THE ALTERNATE DRINKING WATER AND WHAT JUSTIFICATION WOULD BE USED TO DISTINGUISH BETWEEN RESIDENCES IN THE POWERSVILLE AREA. WILL AN ALTERNATE SUPPLY BE OFFERED TO ANY NEW RESIDENTS OF POWERSVILLE?

EPA RESPONSE: A DEEP WELL IS A POSSIBLE ALTERNATIVE WHICH WILL BE CONSIDERED DURING THE REMEDIAL DESIGN PHASE. THE FINAL DECISION AS TO WHICH RESIDENCES WILL BE TIED INTO THE MUNICIPAL WATER SOURCE WILL BE MADE DURING THE REMEDIAL DESIGN. FOR COST PURPOSES, A 1/2 MILE RADIUS DOWNGRAIENT OF THE SITE WAS USED TO ESTABLISH WHICH RESIDENTS WILL GET DRINKING WATER.

COMMENT: THE FOLLOWING COMMENTS RELATE TO THE ALTERNATE 8 COST ESTIMATE FROM APPENDIX F.

- CONTRACTOR'S BONDS ARE GENERALLY 2% OR MORE FOR HAZARDOUS WASTE WORK. THE \$10,000 AMOUNT REFERRED TO SEEMS LOW.
- SITE PREPARATION COSTS ARE TOO LOW. EXCESSIVE REGRADING AND COMPACTION OF THE MUNICIPAL FILL AREA IS REQUIRED.
- FENCING IS AVAILABLE AT \$12 PER LINEAR FOOT, AND WOULD NOT COST \$16.50. AT THIS CALCULATION, \$61,875 IS TOO HIGH. IN THE TECHNOLOGY COST ESTIMATES, FENCING COSTS ARE PROJECTED AT \$30.00 PER LINEAR FOOT, SIGNIFICANTLY HIGHER THAN NECESSARY.
- GRAVEL IS AVAILABLE AT \$4.00 PER TON, (EPA QUOTES \$12.50). LOCAL SAND IS AVAILABLE IN LARGE QUANTITIES AT EVEN LOWER PRICES AND MEETS PERMEABILITY REQUIREMENTS FOR CAP DRAINAGE LAYER.
- TOPSOIL CAN BE PURCHASED AND INSTALLED FOR \$10 PER CUBIC YARD (EPA QUOTES \$18.00).
- WHAT DOES \$20,000 FOR DRAINAGE SPECIFY?
- CONTRACTOR SUPERVISION IS A FUNCTION OF JOB TIME AND NOT CAPITAL COSTS.
- ESTIMATE IS TOO HIGH.
- LEGAL FEES AND PERMIT COST SHOULD BE LIMITED. COST ESTIMATES ARE TOO HIGH.

IN TECHNOLOGY COST ESTIMATES, COSTS FOR CAPPING THE HAZARDOUS WASTE AREA ARE MISSING DRAINAGE LAYER AND TOPSOIL LAYER ESTIMATES. COSTS FOR CAPPING THE MUNICIPAL LANDFILL AREA ARE MISSING TOPSOIL ESTIMATE.

IN GENERAL, THE OVERALL COST ESTIMATE TABLES AND ASSOCIATED DISCUSSIONS TEND TO BE GENERIC IN NATURE AND NOT SITE SPECIFIC. FOR EXAMPLE, WHAT PERMITS WILL BE REQUIRED FOR EACH ALTERNATIVE? WHAT DRAINAGE PROVISIONS NEED IMPLEMENTING?

EPA RESPONSE: ESTIMATING COSTS FOR HAZARDOUS WASTE SITE CONSTRUCTION IS MORE DIFFICULT THAN WITH A NORMAL CONSTRUCTION SITE. ADDITIONAL COSTS INCLUDE ON SITE MONITORING, SPECIAL INSURANCE, PROTECTIVE GEAR, AND MEDICAL MONITORING OF THE WORKERS. CONSEQUENTLY, THE ADDITIONAL COST IS REFLECTED IN THE COSTING ESTIMATES. THESE ESTIMATES IN THE REPORT WERE GENERATED BY A CONTRACTOR WITH EXPERIENCE IN HAZARDOUS WASTE REMEDIAL ACTIONS AND REPRESENT A "BEST ESTIMATE" FOR THE SITE. DRAINAGE COST ESTIMATES ARE PROVIDED FOR THE CONSTRUCTION OF DITCHES, CULVERTS, ETC., THAT WILL BE NEEDED TO PROVIDE PROPER DRAINAGE FOR THE SITE ONCE A CAP IS CONSTRUCTED. THE ADDITIONAL COMMENTS CONCERNING THE COST ESTIMATE WILL BE TAKEN INTO CONSIDERATION AND REVISIONS MADE AS IS NECESSARY.

COMMENT: THE FOLLOWING COMMENTS AND QUESTION RELATES TO THE REVIEW OF THE ENDANGERMENT ASSESSMENT.

THE ENDANGERMENT ASSESSMENT UTILIZES SEVERAL MODELS AND SCENARIOS TO PROJECT RISKS ASSOCIATED WITH CONTACT WITH SOILS AND WATERS POTENTIALLY AFFECTED BY THE POWERSVILLE SITE. THE ENDANGERMENT ASSESSMENT ACKNOWLEDGES THAT THESE SCENARIOS ARE UNREALISTIC AND OVERESTIMATIONS. FOR INSTANCE, THE FUTURE-USE SCENARIO OF THE LANDFILL SITE FOR RESIDENTIAL DEVELOPMENT AND DRINKING WATER WELLS IS STATED AS UNREALISTIC (PAGE 11). THE ASSESSMENT ACKNOWLEDGES THAT THE MODEL USED TO PROJECT THE DIFFUSION RATE INTO GROUNDWATER OF CONTAMINANTS OVERESTIMATES ACTUAL CONCENTRATIONS EXPECTED (PAGE 16). THE ASSESSMENT STATES THAT THE ACTUAL RISK FROM EXPOSURE TO CARCINOGENS COULD BE CONSIDERABLY LOWER BUT UNLIKELY HIGHER (PAGE 23). IF THE ASSESSMENTS UPON WHICH THE ASSESSMENT IS BASED ARE ADMITTEDLY UNREALISTIC AND UNLIKELY, HOW CAN THEY BE SERIOUSLY UTILIZED TO PROJECT RISKS FOR DECISION MAKING PURPOSES?

EPA RESPONSE: THE EVALUATION OF PUBLIC HEALTH AND ENVIRONMENTAL IMPACTS IS IN ACCORDANCE WITH EPA GUIDANCE AND ARE CONSISTENT WITH ASSUMPTIONS USED AT SIMILAR SITES. AS STATED IN THE ENDANGERMENT ASSESSMENT, THE LONG-TERM STATUS OF THE SITE CANNOT ALWAYS BE PREDICTED. THUS, THE SCENARIOS PRESENTED PROVIDE AN ADEQUATE UPPERBOUND WORST-CASE ASSESSMENT.

RESPONSIVENESS SUMMARY FOR STATE COMMENTS

COMMENT: THE PRESENTATION OF EXTENSIVE GEOLOGICAL INTERPRETATION IS NOTED. IN ACCORDANCE WITH THE 1985 AMENDMENTS TO THE GEORGIA WATER WELLS STANDARDS ACT, IT IS REQUESTED THAT A GEORGIA REGISTERED GEOLOGIST COSIGN/CERTIFY THE FINAL REPORT.

EPA RESPONSE: EPA AGREES. THE REPORT WAS PREPARED WITH THE HELP OF A GEORGIA REGISTERED GEOLOGIST AND WE WILL REQUEST THAT HE SIGN THE REPORT.

COMMENT: IN OVERVIEW, THE REMEDIAL INVESTIGATIONS HAVE YET TO FOCUS ATTENTION ON THE FUNDAMENTAL REQUIREMENT FOR "WASTE CHARACTERIZATION". NO WORK IS APPARENT IN THIS REPORT REGARDING THE PHYSICAL OR CHEMICAL NATURE OF THE MATERIALS BURIED IN THE HAZARDOUS WASTE AREA. IT IS REPORTED THAT THE RESULTS OF THE ANGLE BORINGS FAILED TO DISCOVER ANY APPRECIABLE LEACHING OF CONSTITUENTS AS ANTICIPATED BENEATH THESE TRENCHES. ADDITIONALLY, THE LANDFILL BORINGS ENCOUNTERED EXTREMELY SPORADIC EVIDENCE OF CONTAMINATION EFFECTS AND LITTLE, IF ANY, INDICATION OF APPRECIABLE HAZARDOUS WASTE DEPOSITION. HOWEVER, THE APPARENT COMPLETE ESTIMATED TOTAL VOLUME (292,000 CU. YDS.) OF SOLID WASTE IN THE LANDFILL IS USED AS A DESIGN CRITERION BASED ON THE DATA PRESENTED IN TABLE 5-1, PAGE 5-5.

EPA RESPONSE: THE PHYSICAL AND CHEMICAL NATURE OF THE MATERIALS BURIED IN THE LANDFILL IS WELL DOCUMENTED BY THE DISPOSAL RECORDS CONTAINED IN APPENDIX B OF THE RI/FS REPORT. EPA FELT THAT BORING INTO OR THROUGH THE HAZARDOUS WASTE AREA WOULD CAUSE RISKS THAT WERE UNNECESSARY TO THIS INVESTIGATION.

THE TOTAL VOLUME OF THE LANDFILL WAS USED DUE TO THE SPORADIC NATURE OF THE CONTAMINATION IN THAT AREA. THE LOGIC IN USING TOTAL VOLUME OF THE LANDFILL IS TO MAKE CERTAIN THAT ALL CONTAMINATED AREAS WOULD HAVE TO BE REMEDIATED, AS IT WOULD BE VERY DIFFICULT TO SEPARATE THE CONTAMINATED AREAS IN THE MUNICIPAL FILL AREA FROM THE UNCONTAMINATED AREAS.

COMMENT: WE CONCUR THAT GROUNDWATER AND SOIL REPRESENT CURRENT EXPOSURE PATHWAYS, HOWEVER, WE NOTE THAT SOIL EFFECTS ARE DEFINED BY THE CONSULTANT AS NOT REPRESENTING A HEALTH RISK IN CHAPTER 4 AND THEN IN CHAPTER 8 CONCLUDING THAT SOILS EXPOSURE IS A DESIGN CRITERION FOR REMEDY SELECTION. EPD DOES NOT BELIEVE THAT SOLUTIONS SHOULD BE DESIGNED FOR PROBLEMS WITH NO APPARENT ASSOCIATED RISK. ADDITIONALLY, WE ALSO CONCUR THAT AIR AND SURFACE WATER ARE NOT EXPOSURE PATHWAYS.

EPA RESPONSE: SHORT TERM HEALTH RISKS DUE TO SOIL CONTAMINATION ARE NOT CURRENTLY A CONCERN AT THE SITE, BUT DUE TO ON SITE EROSIONAL PROBLEMS SURFACE SOIL CONTAMINATION COULD BE A CONCERN IF LEFT UNCHECKED. FOR THIS REASON THE REMEDY SELECTION SHOULD TAKE INTO ACCOUNT THE POSSIBILITY OF FUTURE SURFACE CONTAMINATION PROBLEMS. PLEASE NOTE, HOWEVER, THAT THE INTENT OF SECTION 8 IS TO PRESENT OVERALL REMEDIAL TECHNOLOGIES FOR THE PURPOSE OF SCREENING TO SELECT THE MOST FEASIBLE OF THESE TECHNOLOGIES.

COMMENT: A POTENTIOMETRIC MAP IS INCLUDED WHICH COVERS BOTH THE SHALLOW AND DEEP FLOW COMPONENTS TOGETHER. HOWEVER, WATER LEVEL DATA ARE REPORTED ON ONE EVENT ONLY. IF THE SHALLOW WELLS AND DEEP WELLS ARE CONTOURED SEPARATELY, TWO SEPARATE FLOW REGIMES EMERGE. THE DEEP WELLS CONFORMS TO THE POTENTIOMETRIC MAP PRESENTED IN THE REPORT(EAST-SOUTHEAST); HOWEVER, THE SHALLOW COMPONENT IS DISTINCTLY SOUTH. THIS IS IMPORTANT BECAUSE THE SHALLOW WELLS SHOW MOST OF THE MEASURED CONTAMINATION. IT IS ALSO WORTH NOTING THAT THE SHALLOW WATER LEVELS FORM A TOPOGRAPHIC IMAGE OF THE FORMER BORROW PIT USED FOR THE DISPOSAL SITE. ONE COULD EXPECT FLOW THROUGH THE BORROW PIT AREA TO BE SEVERAL MAGNITUDES GREATER THAN THE DEEPER FLOW REGIME.

EPA RESPONSE: EPA AGREES THAT THE WATER LEVEL DATA IS SOMEWHAT SUBJECT TO INTERPRETATION, BUT WE DO NOT FEEL THAT THE DATA CONCLUSIVELY SUPPORTS EPD'S BELIEF THAT THERE ARE TWO SEPARATE FLOW REGIMES. WE BELIEVE THAT, BASED ON AVAILABLE DATA, THE REPORT'S POTENTIOMETRIC MAP PROVIDES A SOUND INTERPRETATION OF THE FLOW REGIME BENEATH THE SITE.

COMMENT: PRIORITY POLLUTANTS WERE RUN ON GROUNDWATER AND SOIL SAMPLES; HOWEVER, INDICATOR PARAMETERS WERE CHOSEN TO TRACK THE PLUME. WHILE THIS APPROACH IS COST EFFECTIVE AND SATISFACTORY FOR PLUME TRACKING, NO ANALYSIS WAS PERFORMED ON PLUME PERIPHERY WELLS TO CONFIRM THE ORIGINAL SELECTION OF INDICATORS. SINCE SPEED OF MIGRATION WAS NOT A CRITERION FOR INDICATOR SELECTION, A CONTAMINANT OF HIGHER MOBILITY COULD CONCEIVABLY BE BEYOND THE INDICATOR PLUME.

WHILE INDICATOR PARAMETERS WERE USED TO TRACK THE PLUME, ALL ANALYSES WERE EVALUATED FOR PRIORITY POLLUTANTS. THE REFERENCED INDICATOR PLUME HAS BEEN REMOVED FROM THE REVISED REPORT, AS WE BELIEVE THAT THERE IS NOT ENOUGH DATA TO CONCLUDE THAT THERE ACTUALLY IS A PLUME IN THE AREA.

COMMENT: THE DATA SUGGEST, THAT ALTHOUGH THERE MAY BE AQUIFER INTERCONNECTION, THERE IS SIGNIFICANT INTERLAYERING OF FORMATION CLAYS. THESE CLAYS ARE, IN FACT, NATURALLY FILTERING THE GROUNDWATER. NO PUMP TEST DATA OR COMPLETE BORING LOGS TO CONFIRM THE PRESENCE AND EXTENT OF A CONFINING UNIT ARE PRESENTED. THE LOCATION OF THIS INTERLAYERING MAY INFLUENCE THE SELECTION OF A PROPOSED ALTERNATIVE.

EPA RESPONSE: SLUG TEST DATA AND SOME GAMMA LOGS ARE AVAILABLE. BORING LOGS COULD BE HELPFUL, BUT GIVEN THE GEOLOGY OF THE AREA IT WOULD TAKE A SUBSTANTIAL NUMBER TO ADEQUATELY DEFINE THE LOCATION OF THE CLAY LAYERS. CONDUCTING PUMPING TESTS FOR THE DEEPER WELLS RAISES THE RISK OF DRAWING CONTAMINANTS DOWN FROM SHALLOWER, ALREADY CONTAMINATED, ZONES.

COMMENT: THE FUTURE-USE SCENARIO, AS EMPLOYED BY THE CONSULTANT, USES AN ENVIRONMENTAL TRANSPORT MODEL. THIS MODEL AS DESCRIBED IN APPENDICES A AND C IS BASED ON THE WORK OF SUMMERS, ET AL, 1980. SUMMERS' WORK, HOWEVER, WAS DESIGNED TO ASSESS CONTAMINATION FROM INORGANIC SALTS IN GEOTHERMAL SYSTEMS (E.G., GEYSERS, HOT VOLCANIC ROCK, ETC.).

THE MODEL IS NOT APPROPRIATE FOR TRACE ORGANIC CHEMICALS IN COASTAL PLAIN AQUIFERS. FOR THIS REASON, TOXAPHENE AND CHLORDANE CANNOT BE ESTIMATED WITH THIS MODEL. MOREOVER, IN ADDITION TO USING AN INAPPROPRIATE MODEL, THE CONSULTANT ALSO MADE ERRORS IN THE HYDROGEOLOGIC CALCULATIONS. FOR EXAMPLE, RUNOFF WAS IGNORED IN CALCULATING RECHARGE AND THE AQUIFER THICKNESS WAS INCORRECTLY ESTIMATED. ADDITIONALLY, NO INFORMATION IS FOUND REGARDING THE PHYSIOCHEMICAL

PROPERTIES OF THE SOIL MATERIALS BENEATH THE SITE. PROPERTIES SUCH AS: VERTICAL PERMEABILITY, ORGANIC CONTENT, ATTENUATION CAPACITIES, DIRECTLY IMPACT LEACHATE MODELING/PREDICTION.

EPA RESPONSE: THE SUMMERS MODEL, USED TO PREDICT FUTURE GROUNDWATER CONCENTRATIONS, IS APPLICABLE TO RELEASES OF TRACE ORGANICS. THE PARTICULAR FORM OF THE SUMMERS MODEL CITED IN THE ENDANGERMENT ASSESSMENT IS SIMPLY A FORM OF MASS-BALANCE EQUATION, AND AS SUCH, IS APPLICABLE TO ANY TYPE OF POLLUTANT RELEASE. THE SAME APPROACH HAS BEEN USED ON NUMEROUS SUPERFUND SITES TO ASSESS FUTURE RISK. AT THE GEIGER AND INDEPENDENT NAIL SITES THE MODEL WAS USED TO DEVELOP SOIL CLEANUP LEVELS. SUMMERS IS CITED ONLY TO PROVIDE A REFERENCE FOR THE NOMENCLATURE USED. IN ORDER TO PREVENT FURTHER CONFUSION, IT MIGHT BE BEST TO REMOVE THE CITATION TO SUMMERS AND SIMPLY REFER TO A MASS-BALANCE EQUATION. WE MAY WISH TO MODIFY THE RESULTS TO ACCOUNT FOR RUNOFF OR A DIFFERENT AQUIFER THICKNESS, ALTHOUGH THESE MODIFICATIONS ARE NOT LIKELY TO HAVE A LARGE IMPACT ON THE RESULTS. HOWEVER, TRYING TO ACCOUNT FOR ADDITIONAL SOIL PARAMETERS AS IS SUGGESTED IS, IN OUR JUDGEMENT, NOT WARRANTED. THE MODEL ACCOUNTS FOR ORGANIC CARBON CONTENT OF THE SOIL, WHICH IS THE MAJOR COMPONENT TO BE CONSIDERED IN THIS NON-TIME DEPENDENT MODEL. SOIL TESTING FOR PARAMETERS SUCH AS PERMEABILITY WAS NOT INCLUDED IN THE RI. ESTIMATING THESE PARAMETERS OR TRYING TO USE A MORE SOPHISTICATED MODEL WOULD SIMPLY ADD ADDITIONAL UNCERTAINTY TO THE ASSESSMENT.

COMMENT: THE GROUNDWATER MONITORING RESULTS DO NOT INDICATE A RELATIONSHIP REGARDING THE GROUNDWATER CONTAMINATION DISCOVERED ON THE SITE AND THE IDENTIFIED WASTE PRODUCTS OR SUSPECTED SOURCE AREAS. THERE ARE NO RELIABLE DATA TO SUGGEST DRINKING WATER QUALITY STANDARDS FOR GROUNDWATER USED DOMESTICALLY WILL BE EXCEEDED.

EPA RESPONSE: THIS COMMENT APPEARS TO ADDRESS TWO SEPARATE ISSUES. THE FIRST IS THE RELATIONSHIP OF THE GROUNDWATER CONTAMINATION TO WASTE CHARACTERISTICS. IT IS NOT INCONSISTENT TO SEE DIFFERENT CONTAMINANTS IN GROUNDWATER AND SOIL. THE MORE MOBILE CONTAMINANTS, SUCH AS VINYL CHLORIDE AND 1,2-DICHLOROETHANE, ARE MORE LIKELY TO LEACH FROM SOIL TO GROUNDWATER, WHEREAS THE LESS SOLUBLE PESTICIDES WILL REMAIN IN THE SOIL FOR A LONGER PERIOD. THE SECOND ISSUE RELATES TO POTENTIAL EXCEEDANCES OF GROUNDWATER STANDARDS. THE ASSESSMENT INDICATES THAT LEVELS OF CONTAMINANTS DETECTED IN MONITORING WELLS EXCEED MCLS OR PROPOSED MCLS FOR VINYL CHLORIDE, 1,2-DICHLOROETHANE, AND TOXAPHENE. THIS ASSESSMENT IS BASED ON ASSUMING THAT A DRINKING WATER WELL IS ESTABLISHED ON SITE, OR ALTERNATELY THAT THE GROUNDWATER REPRESENTS A CLASS I OR CLASS II AQUIFER CAPABLE OF BEING USED AS A DRINKING WATER SOURCE. THEREFORE, ACCORDING TO EPAS' MOST RECENT GUIDANCE ON ARARS, MCLS ARE APPLICABLE STANDARDS FOR COMPARISON TO CONTAMINATION LEVELS.

COMMENT: THE QUANTITATIVE RISK CHARACTERIZATION IS NOT REALISTIC. THE SITE IS CURRENTLY UNUSED. THUS, THE CURRENT CHRONIC DAILY INTAKE (CDI) CALCULATIONS ARE INCORRECT. IN THIS REGARD, THE CDI FOR DRINKING WATER FROM THE LIZZIE CHAPEL WELL CAN BE SIGNIFICANTLY REDUCED FROM THE WORST CASE ASSUMPTION USED. FURTHER, THE CDI FOR SOIL INGESTION CAN BE SIGNIFICANTLY REDUCED BY USING A MUCH MORE REASONABLE ASSUMPTION FOR CHILDREN PLAYING ON THE SITE. INCORPORATING THESE CHANGES CAN READILY REDUCE THE CALCULATED EXCESS LIFETIME CANCER RISK DUE TO GROUNDWATER AND SOILS INGESTION BY A FACTOR OF TEN OR MORE.

EPA RESPONSE: WE BELIEVE THAT THE EXPOSURE ASSUMPTIONS UNDERLYING THE QUANTITATIVE RISK CHARACTERIZATION ARE REASONABLE. THEY ARE IN KEEPING WITH EPA GUIDANCE AND ARE CONSISTENT WITH ASSUMPTIONS USED AT SIMILAR SITES. IN ADDITION, THE SCENARIOS INVOLVING SOIL INGESTION BY CHILDREN DO NOT RESULT IN UNACCEPTABLE RISK LEVELS, IF A 10^{-6} EXCESS LIFETIME CANCER RISK LEVEL IS TAKEN AS AN ACCEPTABLE LEVEL. THEREFORE, THE SCENARIOS PRESENTED PROVIDE AN ADEQUATE UPPERBOUND WORST-CASE ASSESSMENT.

APPENDIX B

**INVENTORY OF MATERIALS DISPOSED OF
AT PEACH COUNTY LANDFILL**

WOOLFOLK CHEMICAL WORKS, INC.

MR. HOWARD L. BAREFOOT
UNIT COORDINATOR
INDUSTRIAL & HAZARDOUS WASTE
MANAGEMENT PROGRAM
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION
270 WASHINGTON STREET, S. W.
ATLANTA, GEORGIA 30334

DEAR MR. BAREFOOT:

ENCLOSED YOU WILL FIND OUR RECORDS THAT INDICATE THE DATE AND APPROXIMATE QUANTITIES FOR ALL PESTICIDE WASTES PLACED IN WOOLFOLK'S PESTICIDE WASTE DISPOSAL AREA AT THE POWERSVILLE SITE. DURING THIS TIME, THIS AREA AND RECORDS WERE BEING CONSTANTLY CHECKED BY MR. CLYDE FEHN, INDUSTRIAL ENGINEER, GEORGIA DEPARTMENT OF NATURAL RESOURCES.

YOURS VERY TRULY,

WOOLFOLK CHEMICAL WORKS, INC.

ED CHAMBLESS
PLANT MANAGER

EC/JS

ENCLOSURES.

WOOLFOLK CHEMICAL WORKS, INC.

**OBSOLETE MATERIALS BURIED AT DUMP
1975**

DATE	QUANTITY	DESCRIPTION
1/7/75	4000#	CLEAN-OUT FROM LEAD PLANT
1/9/75	7000#	CLEAN-OUT FROM N.O. WAREHOUSE
3/4/75	2000#	CLEAN-OUT FROM N.O. PLANT
4/22/75	5000#	CLEAN-OUT CLAY FROM DUST PLANT
8/5/75	2000#	EMPTY 25-D PARATHION BAGS
8/7/75	5000#	SEVIN (EMPTY) BAGS N. O. PLANT CLEAN-OUT N.O. WAREHOUSE
8/12/75	2000#	EMPTY SEVIN BAGS
	5000#	EMPTY BAGS DUST PLANT PLUS DUST PLANT CLEAN-UP
8/14/75	4000#	CLEAN-OUT FLOOR SWEEPINGS N.O. PLANT
	4000#	CLEAN-OUT FLOOR SWEEPINGS DUST PLANT
9/4/75	500#	FLOOR SWEEPINGS SHIPPING WAREHOUSE
	2000#	EMPTY SEVIN BAGS
	1000#	EMPTY TECH. HEPTA. DRUMS
9/10/75	3000#	FLOOR SWEEPINGS N.O. WAREHOUSE PLUS HEPTA. EMPTY DRUMS
9/16/75	1000#	SEVIN PLANT FLOOR SWEEPINGS
	500#	EMPTY HEPTA. DRUMS
	1000#	N.O. PLANT CLEAN-OUT
9/29/75	4000#	CLEAN-OUT FROM N.O. PLANT
10/1/75	3000#	FLOOR SWEEPINGS FROM DUST PLANT
	1000#	FLOOR SWEEPINGS FROM SHIPPING WAREHOUSE
10/14/75	1000#	FLOOR SWEEPINGS FROM SHIPPING WAREHOUSE
	1000#	FLOOR SWEEPINGS FROM N.O. WAREHOUSE
10/16/75	5000#	FLOOR SWEEPINGS FROM N.O. PLANT
	1000#	EMPTY ARSENIC FIBER DRUMS
10/29/75	2000#	CLEAN-OUT CLAY FROM SEVIN PLANT
	500#	EMPTY ARSENIC DRUMS
	2000#	FLOOR SWEEPINGS SHIPPING WAREHOUSE
	500#	EMPTY BSZ & L/A BAGS N.O. PLANT
11/4/75	2000#	CLEAN-OUT CLAY FROM DUST PLANT
11/18/75	3000#	CLEAN-OUT CLAY FROM N.O. PLANT
	2000#	CLEAN-OUT FROM SEVIN PLANT

WOOLFOLK CHEMICAL WORKS, INC.

**OBSOLETE MATERIALS BURIED AT DUMP
1974**

DATE	QUANTITY	DESCRIPTION
12/5/74	18 - 50#	POLYRAM DUST
	25 - 50#	T.V. SPECIAL DUST
	8 - 50#	1/2% PARA. -86% SUL.
	56 - 50#	CLEAN-OUT MOTOX
	20 - 50#	3-WAY TOB. DUST
	51 - 50#	TRI KAL DUST
	35 - 50#	GUARDEX DUST
12/10/74	250 - 50#	CLEAN-OUT DUST PLANT
	40 - 40#	BHC-DIELDRIN MIXTURE
	20 - 50#	5% POLYRAM
12/12/74	7000#	CLEAN-OUT FROM DUST PLANT

WOOLFOLK CHEMICAL WORKS, INC.

**OBSOLETE MATERIALS BURIED AT DUMP
1977**

DATE	QUANTITY	DESCRIPTION
1/26/77	60 - 5 GAL.	EMPTY CYGON 2-E CANS
	400#	CLEAN UP DUST
	20	EMPTY DITHANE M-22 CONC. BAGS
	500#	CLEAN UP SEVIN PLANT
	5 - 24/2#	
	CASE	ROSE & FLOWER
	1 - 50#	COND. SUL.
	3 - 50#	FERROUS SULFATE
	10 - 50#	DIWEEVIL DUST
	5 - 50#	CHINCH BUG KILLER
	2 - 1 GAL.	ANTIROT EMPTY CANS
	1 - 5 GAL.	EMPTY TOX-SOL-6 CAN
	500#	FLOOR SWEEPING SHIPPING WAREHOUSE
	1 - 55 GAL.	EMPTY PLASTIC CONTAINER
2/3/77	500#	SWEEPING SEVIN PLANT
	1000#	SWEEPING N. O. PLANT
	1000#	SWEEPING N. O. WAREHOUSE
3/2/77	500#	EMPTY 30-D PARATHION BAGS
	100#	EMPTY PAN-THION BAGS
3/8/77	1000#	EMPTY SULFUR BAGS
	60	EMPTY CASES & BOTTLES AATREX 4L
3/16/77	100	EMPTY CYGON 2-E
	600	EMPTY SUL. & PARATHION BAGS
	1000#	CLEAN OUT FROM DUST PLANT
3/24/77	1000#	EMPTY SULFUR BAGS
3/25/77	500#	EMPTY 30-D PARATHION BAGS
	500#	EMPTY SULFUR BAGS
3/29/77	1000#	SEVIN PLANT CLEAN UP
	200#	EMPTY LEAD ARSENATE BAGS
	800#	CLEAN OUT FROM DUST PLANT COLLECTORS
4/18/77	1000#	CLEAN OUT CLAY DUST PLANT
	50 - 5 GAL.	EMPTY TOX-SOL-6 CANS
	14 - 5 GAL.	EMPTY CYGON 2-E CANS

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 2

DATE	QUANTITY	DESCRIPTION
5/2/77	2 - 4#	PROBE 75W
	2	EMPTY GALLON JUGS
	1	EMPTY GALLON ACCUTROL
	1	EMPTY PINT PEACH THINNER
	1 - 5 GAL.	EMPTY FLOWABLE SULPHUR
	2 - 5 GAL.	2% SODIUM AZIDE
	1 GAL.	ZECTRAN 2E
	1 GAL.	EMPTY ELGETOL
	4 LB.	MIREX BAIT
	1 LB.	DURSBAN BAIT
	2 LB.	CAPTAN 50-W
	2 LB.	KOCIDE
	2 LB.	IMIDAN
	10 LB.	UREA
	2 - 4#	SINBAR
	5 GAL.	M-2680 SOIL FUMIGANT
	10 LB.	NEMACUR
	25 LB.	FLOREX
	1 LB.	15% OIL CHINCH BUG
	2 - 2#	CORN COB WITH OIL
	1 LB.	CORN COB WITH OIL
	4 QTS.	VYDATE L
	1 GAL.	SEVIMOL 4
	2 - 1 GAL.	TARGET
	1/2 GAL.	VYDATE L
	1 GAL.	VYDATE L
	4 LB.	GALECRON SP
	10 LB.	CORN COB GRIT
	4 - 1 GAL.	HERBIMAX SURFACTANT
	1	EMPTY METAL 5 GALLON CAN
	4 - 1 GAL.	BELT MP
	4 - 25#	2% METHOMYL DUST
	1 GAL.	BELT + 6
	4 - 5 GAL.	BELT PLUS
	5 GAL.	HCS-3260-MP
	8 - 5 GAL.	BELT MP
	1 GAL.	PHOSDRIN
	5 GAL.	BUSAN 72
	11 - 5 GAL.	BIVERT M
	5 GAL.	BIVERT DPN
	1	EMPTY 5 GALLON SECURITY CAN
	5 GAL.	LIME SULPHUR
	2 - 5 GAL.	STARBROM T6-67
	15 LB.	TERRACLOR SUPER X
	1 GAL.	TCMTB
	5 GAL.	SAVOL
	10 LB.	MOCAP 10G

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 3

DATE	QUANTITY	DESCRIPTION
5/2/77	10 GAL.	BIVERT S + DPN
	1	EMPTY FIRE ANT BAIT
	1 GAL.	ENDRI-SOL
	1	EMPTY GALLON PARATHION EC-4
	1 GAL.	MURATIC ACID
	6 LB.	NUTONEX SULPHUR
	24 LB.	NUTONEX SULPHUR
	10 LB.	BLADEX
	1	EMPTY WATER JUG
	50 LB.	DYFONATE
	3 - 1 GAL.	MO-BAIT
	6 - 1 GAL.	BIVERT TM
	2 - 25#	MOCAP 10G
	8 - 1 GAL.	PENCAP E
	4 - 4/1 GAL.	
	CS.	SORBA SPRAY
	1 GAL.	BENTGRASS HERBICIDE
	1 GAL.	FAIRWAY HERBICIDE
	1	EMPTY 5 GALLON PROWL CAN
	1	EMPTY 1 GALLON CONTAINER
	2	EMPTY STARBROM T6-67
	8	EMPTY QUARTS AMBUSH
	2 GAL.	NU-FILM 17
	4 - 4#	PROBE 75W
	1-1/2 LB.	MESUROL
	2	EMPTY TEMIK BAGS
	1	CASE EMPTY DISPLAY CANS
	1	EMPTY QUART JUG
	50 LB.	TCMTB - 10G
	2	EMPTY CASES
	10 LB.	CORN COB
	8 LB.	SODIUM AZIDE
	4 GAL.	NU-FILM 17
	50 LB.	PEANUT SEED
	7 - 2 LB.	EMPTY TOPSIN 50-W
	5 GAL.	T-H ATRAZINE 4L
	24 LB.	PAN-THION
	4 LB.	GRANULAR CHINCH BUG
	1 PINT	MBR 12325-4-5
	5 LB.	TOMATO DUST
	2 GAL.	LIME SULPHUR
	1 GAL.	ANSAR 170
	6 LB.	TENORAN
	2 - 1 GAL.	ENULSONINE 3-E
	2 LB.	SENCOR
	1 GAL.	3 D'S

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 4

DATE	QUANTITY	DESCRIPTION
5/2/77	1 QUART	CITOWETT PLUS
	1	EMPTY QUART DURBAN 2-EC
	1/2 GAL.	BUTOXONE
	3	EMPTY GALLON SORBA SPRAY
	1 GAL.	FLO-MO
	1 - 4#	MANZATE 200
	2 GAL.	NALCO-TROL
	1 PINT	LIME SULPHUR
	1 BAG	SENCOR
	1 GAL.	DURBAN 2-E
	2 QUARTS	LANNATE L
	3 - 10#	SUTAN 10G
	2 - 1 GAL.	AMEX 820
	1 QUART	CHLORDANE EC-8
	4 LB.	R & H DITHANE M-45
	3 GAL.	PHOSVEL 3-EC
	5 - 1#	ED 103
	2 - 4#	ED 103
	1 GAL.	BUSAN 37
	1 LB.	TEMIK
	5 LB.	DESTUN
	1 LB.	VEL 520C
	1 GAL.	BROMOCIL
	1 GAL.	SOYEX
	1 LB.	U-27, 267 HERBICIDE
	2 LB.	BORAX WEED KILLER
	12 OZ.	MAINTAIN
	5 LB.	BROMEX
	2 - 1#	USB 3153
	6 LB.	NORLEX KERB
	1 LB.	PLICTRAN
	3 - 1/4#	VEL 5028
	2 - 1/8#	VEL 5052
	5 - 4 OZ.	SENCOR
	1 GAL.	LIME SULPHUR
	3 - GAL.	VCS-506
	1 GAL.	SORBA SPRAY
	1 GAL.	SPRAY OIL
	2 LB.	BENLATE
	10 LB.	LANNATE 90
	1 QUART	THIMET
	2 LB.	DACONIL 2787
	4 LB.	CAPTAN 50
	5 LB.	SEVIN 50-W
	3 LB.	DYLOX
	3 - 6-2/3#	BOTRAN 75W
	2 - 10#	LANNATE WP

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 5

DATE	QUANTITY	DESCRIPTION
5/2/77	2 LB.	EMPTY LANNATE WP CAN
	1 CASE	OLD DISPLAY SAMPLES
	10 LB.	CASORON 4-G
	10 LB.	DACTHAL 75W
	12 OZ.	MAINTAIN
	4 GAL.	DYMID PLUS DINITRO
	8 LB.	15% PARATHION
	5 GAL.	DOW GENERAL WK
	1 GAL.	VAPAM
	3 GAL.	SORBA SPRAY
	4 - 1 GAL.	SORBA SPRAY
	3 GAL.	GIKUL
	25 LB.	DEMOSAN 10-D
	7	EMPTY 6 GALLON JUGS
	4 LB.	MANZATE
	10 LB.	EPN 25W
	4 LB.	15% PARATHION
	3 LB.	CYPREX
	2 LB.	KOCIDE 101
	3 - 1 LB.	DUTER
	10 LB.	EPN 25W
	3 LB.	BRAVO 75W
	2 - 5 LB.	THYLATE
	2 - 2 LB.	KOCIDE 101
	4 LB.	DITHANE M-45
	2 - 2 LB.	CAPTAN
	2 LB.	DACONIL 2787
	3 LB.	CYPREX
	1 LB.	40W CHLORDANE
	2 LB.	HYVAR XP
	1	EMPTY PARATHION CL GALLON CONTAINER
	1 GAL.	THAGSBEN 200
	1 QUART	METHYL PARATHION
	1 QUART	MOTOX 63
	2 - 6 LB.	TENORAN
	2 - 5 LB.	COTORAN
	2	EMPTY 4 GALLON PLASTIC JUGS
	3 LB.	ZORIAL
	4-1/2 LB.	DACAGIN
	4 - 1 LB.	ZORIAL
	7 PINTS	TRITON X-114
	10 LB.	DYLOX
	75 LB.	DITHANE A-4C
	5 LB.	THIMET 10G
	2 - 25 LB.	BIOTROL
	5 GAL.	DYMID D

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 6

DATE	QUANTITY	DESCRIPTION
5/2/77	1 LB.	LOROX
	2 LB.	CHINCH BUG BAIT
	3 LB.	CHINCH BUG BAIT
	4 LB.	LOROX
	1 QUART	BRAVO
	1 GALLON	COBEX
	5 LB.	PRINCEP
	10 LB.	LANNATE WP
	2 - 4 LB.	HYVAR XWS
	4 LB.	DYBAR
	1 GALLON	GIB-SOL
	1 QUART	ACCUTROL
	1 QUART	PROWL
	1 PINT	LIQUID SEVIN
	1 PINT	TOX-SOL-6
	1 PINT	WET-AID
	1 QUART	MOTOX 63
	1 PINT	TOX-SOL-6
	8 OZ.	NOCULATE 3
	1 PINT	ATPLUS 403
	1 PINT	TACK TRAP
	1 LB.	SOYBEAN PROTECTANT
	1 PINT	TORAK
	1 PINT	ATPLUS 401
	8 OZ.	MOTOX 63
	1 GALLON	TD-692 PENVAL
	10 GALLONS	PAN-THION
	2 LB.	2787 DICONIL
	5 GALLONS	H2O
	1	5 GALLON EMPTY JUG
	1	CAPTAN EMPTY JAR
	2 LB.	CAPTAN
	1-1/2 LB.	DIELDRIN
	4.5 OZ.	SOROLEX
	1 QUART	BACTICIN
	1 GALLON	2,4-D
	1 - 12/8 OZ.	
	CASE	MIS. WETAIDS
	1 PINT	LAWN WEED KILLER
	5 GALLON	THAT FLOWABLE SULPHUR
	5 GALLON	MP-ENDRI-SOL
	5 GALLON	PENCAP M
	2 - 5 LB.	TEMIK-TERR. MIX
	3 LB.	NEMACUR
	1 GALLON	PALONE
	1 GALLON	BELT MP
	1 GALLON	ROYAL TAC
	1 SACK	PEANUT SEED

OBSOLETE MATERIALS BURIED AT DUMP

1977

PAGE 7

DATE	QUANTITY	DESCRIPTION
5/2/77	1 SACK	SOYBEAN SEED
	4 - 50#	AMIBEN GRANULES
	5 - 5 GAL.	BUFLOX 30
	5 GAL.	BIVERT
	4 LB.	GALECRON SP
	3 - 50#	DIPEL BAIT
	50#	FURADAN 10G
	6 - 5#	IMIDAN
	8 - 4#	TERRACLOR 75W
	25#	CASORON
	2 GAL.	BUSAN 37
	1#	VITAVAX
	1 GAL.	NUMUCUR
	1 - 4/1 GAL.	
	CASE	TEMIK-TERR. SUPER X
	1	EMPTY LIME SULPHUR 5 GALLON CONTAINER
	1	10G PAR. DISPLAY
	10#	PROBE
	1 GAL.	WEEDONE 170
	10#	CORN COB
	25#	UC-21865 75W
	2 - 50#	BIOTROL CORN COB/MOLASSES
	20#	NITROGEN INNOCULANT
	3#	MESUROL 75W
	16#	NUTONEX SULPHUR
	1	COBEX DISPLAY 5 GALLON
	1 GAL.	LO-DRIFT
	20 GAL.	GREASE
5/5/77	200#	EMPTY PARATHION & L/A BAGS
	700#	CLEAN OUT CLAY DUST PLANT
	300#	FLOOR SWEEPING N. O. PLANT
8/16/77	129	EMPTY 5 GAL. METHYL PARATHION EC-6
	2000#	FLOOR SWEEPING N.O. PLANT
	1000#	FLOOR SWEEPING SEVIN PLANT
	30 - 55#	CLEAN OUT CLAY DUST PLANT
9/1/77	5000#	FLOOR SWEEPING SEVIN PLANT
	100#	EMPTY L/A BAGS
9/22/77	2000	EMPTY 80-D SEVIN BAG
	2000	EMPTY TECH. SEVIN BAG
	25	EMPTY 5 GAL. CANS

OBSOLETE MATERIALS BURIED AT DUMP
1977
PAGE 8

DATE	QUANTITY	DESCRIPTION
10/6/77	50	EMPTY 5 GAL. PAILS
	36	EMPTY 4/1 GAL. GLASS CYGON
	8	EMPTY 6/1 GAL. ANTIROT CANS
	9	EMPTY PLASTIC 5 GAL. ACCELERATE JUG
	2000#	CLEAN OUT CLAY DUST PLANT, FLOOR SWEEPING
11/23/77	1000	EMPTY PARATHION-TOX BAG
	500	EMPTY SEVIN BAGS
12/13/77	1000	EMPTY LEAD BAGS
	1000#	CLEAN OUT SHIPPING WAREHOUSE

OBSOLETE MATERIALS BURIED AT DUMP
1978
PAGE 1

DATE	QUANTITY	DESCRIPTION
3/22/78	1000	EMPTY PAN-THION BAG
	1000	EMPTY E. PARATHION BAG
	1000	EMPTY SEVIN BAG
3/23/78	2000	EMPTY PAN-THION BAG
	1000	EMPTY E. PARATHION BAG
4/17/78	2000	EMPTY 30-D PARATHION BAG
	1000	EMPTY 80-D SEVIN BAG
	1000	75 CHLOROTHALONIL EMPTY DRUMS
4/25/78	3000	EMPTY 30-D PARATHION BAG
	1000	EMPTY 80-D SEVIN BAG
	500	75% CHLOROTHALONIL EMPTY DRUMS
5/30/78	4000	EMPTY 30-D PARATHION BAG
	2000	EMPTY 80-D SEVIN BAG
5/30/78	4000	EMPTY 30-D PARATHION BAG
	1000	EMPTY 80-D SEVIN BAG
	80	EMPTY 5 GAL. CANS LORSBAN, TOX-SOL-6
6/1/78	4000	EMPTY 30-D PARATHION BAG
	2000#	DUST PLANT FLOOR SWEEPING
6/1/78	2000	EMPTY 30-D PARATHION BAG
	2000	EMPTY SEVIN BAG
	4/1 GAL	EMPTY CYGON CONT. (APPROX. 60)
6/6/78	1000	EMPTY 50-W SEVIN BAG
	1000	EMPTY DIPEL DRUM, FIBER
	2000	EMPTY KELTHANE DRUM, FIBER
	1000#	SEVIN & N.O. PLANT FLOOR SWEEPING
6/13/78	4000	EMPTY 80-D SEVIN BAG
	4000	EMPTY PARATHION BAG
	2000	EMPTY CAPTAN BAG
	3000	EMPTY BSZ BAG
6/22/78	5000#	FLOOR SWEEPING FROM L/P & SEVIN PLANT
6/27/78	5000#	FLOOR SWEEPING FROM N.O. PLANT & SEVIN PLANT
8/29/78	5000#	FLOOR SWEEPING N. O. PLANT & SEVIN PLANT
	5000	80-D SEVIN EMPTY BAG, 50-W SEVIN EMPTY BAG
	2000	PARATHION BAG EMPTY
	500	PARATHION SULFUR EMPTY BAG
	6 - 5 GAL	1#/GAL. BHC

OBSOLETE MATERIALS BURIED AT DUMP
1978
PAGE 2

DATE	QUANTITY	DESCRIPTION
9/18/78	2000#	FLOOR SWEEPING
	2000	80-D SEVIN EMPTY BAG
	1000	CUBE' EMPTY BAG
	2000	PARATHION SULFUR EMPTY BAG
	1000	PARATHION EMPTY BAG
	1000	EMPTY CAPTAN-BSZ BAG
	1000	PENTAC EMPTY BAG
9/28/78	1 LOAD	FLOOR SWEEPING FROM SHIPPING WHSE.

UNITED STATES DEPARTMENT OF AGRICULTURE

FEBRUARY 28, 1974

THE FOLLOWING LIST OF AGRICULTURAL CHEMICAL CONTAINERS ARE DELIVERED FOR DISPOSAL:

NO.	CHEMICAL	METAL	CONTAINER SIZE	
			PLASTIC	PAPER
5	ZOLONE EC	5 GAL		
4	TORAK EC	5 GAL		
10	PARAQUAT CL		1 GAL	
5	ANZAR 529		1 GAL	
2	KELTHANE EC	1 GAL		
1	METHYL PARATHION 4 EC	5 GAL		
5	TOXAPHENE	5 GAL		
2	GALECRON EC	5 GAL		
1	SUPRACIDE EC	5 GAL		
3	META SYSTOX-R	5 GAL		
10	CAPTAN 50 W			5 # BAG
10	DU-TER			5 # BAG
10	SEVIN 50W			5 # BAG
2	CHLORODANE	30 GAL DRUMS		

DELIVERED BY ADAM MARSHALL.

TABLE 1

**CHRONOLOGY OF EVENTS
POWERSVILLE LANDFILL
PEACH COUNTY, GEORGIA
REM II**

DATE	ACTION
APRIL, 1983	GEORGIA EPD COLLECTED WATER SAMPLES FROM LIZZIE CHAPEL WELL
MAY, 1983	GEORGIA EPD SAMPLED SURROUNDING PRIVATE WELLS
JUNE, 1983	GEORGIA EPD COLLECTED WATER SAMPLES FROM LIZZIE CHAPEL WELL
AUGUST, 1983	GEORGIA EPD REQUESTED THAT EPA INVESTIGATE THE SITE
SEPTEMBER, 1983	NUS PERFORMED THE INITIAL SITE VISIT
SEPTEMBER, 1983	THE POWERSVILLE LANDFILL SITE WAS PROPOSED FOR INCLUSION ON THE NPL
OCTOBER, 1983	EPA HIR CONTRACTOR, NUS CORPORATION (NUS), PERFORMED A GEOPHYSICAL STUDY OF THE SITE TO DETERMINE THE POTENTIAL FOR AND EXTENT OF GROUND WATER CONTAMINATION. THE STUDY INCLUDED EM-31 MAGNETOMETER AND SOIL RESISTIVITY SURVEYS. ALSO, A TOPOGRAPHIC MAP WAS DEVELOPED BY NUS
JANUARY, 1984	NUS RELEASED REPORT, GEOPHYSICAL STUDY, POWERSVILLE SITE, PEACH COUNTY, GEORGIA
	NUS COLLECTED THREE SOIL SAMPLES FROM THE SITE AND FOUR WELLS LOCATED IN THE VICINITY OF THE SITE
FEBRUARY, 1984	NUS COLLECTED ONE COMPOSITE SOIL SAMPLE FROM THE SITE AND INSTALLED EIGHT ON SITE MONITOR WELLS
MARCH, 1984	NUS COLLECTED SAMPLES FROM ON SITE MONITOR WELLS AND TWO PRIVATE WELLS. DUPLICATE SAMPLES WERE SPLIT WITH CLAYTON ENVIRONMENTAL CONSULTANTS, INC. (CEC) OF ATLANTA, GEORGIA, AND THE GEORGIA EPD
APRIL, 1984	NUS RELEASED REPORT, MONITORING WELL INSTALLATION, POWERSVILLE SITE, PEACH COUNTY, GEORGIA
MAY, 1984	CEC RELEASED REPORT, HYDROGEOLOGIC INVESTIGATIONS FOR POWELL, GOLDSTEIN, FRAZIER, AND MURPHY AT POWERSVILLE LANDFILL SITE, PEACH COUNTY, GEORGIA
JULY, 1984	NUS COLLECTED THREE SAMPLES FROM PRIVATE WELLS IN THE VICINITY OF THE SITE
JULY-AUGUST, 1984	NUS INSTALLED TWO MORE WELLS AT THE SITE
DECEMBER, 1984	CDM WAS ASSIGNED TO INITIATE AN RI/FS ON THE SITE
JANUARY, 1985	CDM COMPLETED THE WORK PLAN MEMORANDUM FOR THE SITE

FEBRUARY, 1985	CDM COMPLETED LETTER REPORT ON AVAILABLE DATA
FEBRUARY, 1985	NUS RELEASED, MONITORING WELL INSTALLATION FOR POWERSVILLE SITE, PEACH COUNTY, GEORGIA, GIVING RESULTS OF ANALYSES OF MONITOR WELLS AND PRIVATE WELLS
MARCH, 1985	CDM SUBMITTED THE INTERIM REPORT FOR THE SITE TO EPA
AUGUST, 1985	USGS PERFORMED AN INVENTORY OF ALL WELLS WITH A ONE MILE RADIUS OF THE SITE
FEBRUARY, 1986	CDM COLLECTED SOIL AND WATER SAMPLES FROM THE EXISTING MONITOR WELLS AND WATER SAMPLES FROM 12 SURROUNDING PRIVATE WELLS
AUGUST, 1986	CDM COMPLETED THE INSTALLATION OF NINE NEW MONITOR WELLS
NOVEMBER, 1986	CDM SUBMITTED A SITE INVESTIGATION LETTER REPORT TO EPA SUMMARIZING THE REMEDIAL INVESTIGATE FIELD ACTIVITIES.

TABLE 7

**APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
FOR INDICATOR CHEMICALS (UG/L)
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II**

INDICATOR CHEMICAL	SAFE DRINKING WATER ACT INTERIM (MCL)	SAFE DRINKING WATER ACT (MCL)	SAFE DRINKING WATER ACT PROPOSED (RMCL)
ALPHA-BHC	---	---	---
GAMMA-BHC	4 (A)	---	0.2
TOXAPHENE	5	---	0 (B)
CHLORDANE	---	---	0 (B)
VINYL CHLORIDE	---	2	---
1,2-DICHLOROETHANE	---	5	0 (B)
LEAD	50	---	20
CHROMIUM	50 (C)	---	120 (C)

(A) ARAR IS FOR LINDANE (99% GAMMA-BHC)

(B) RECOMMENDED MAXIMUM CONTAMINANT LEVEL IS SET FOR ZERO FOR ALL
POTENTIAL CARCINOGENS

(C) TOTAL CHROMIUM (HEXAVALENT AND TRIVALENT)

--- NO ARAR AVAILABLE.

TABLE 8

SUMMARY OF ANALYTICAL RESULTS
FROM SURFACE SOIL AND RUNOFF CHANNEL SAMPLES
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II

COMPOUND	SAMPLE CONCENTRATIONS RANGE (MG/KG)	NUMBER OF SAMPLES ABOVE DETECTION LIMIT/TOTAL NUMBER OF SAMPLES	BACKGROUND CONCENTRATIONS (A) RANGE (MG/KG)
ARSENIC	LT 5.1-37	3/11	LT 0.2-73
CHROMIUM	LT 9.1-30	10/11	7-150
VANADIUM	3.1-56	10/11	10-100
ALUMINUM	260-18,000	11/11	2,000-50,000
MANGANESE	6-240	11/11	20-700
MAGNESIUM	LT 45-250	3/11	100-1,000
IRON	3,200-32,000	11/11	10,000-50,000
BARIUM	3.4-48	6/11	30-150
CALCIUM	LT 160-510	5/11	200-5,000
LEAD	LT 2.6-27	3/11	LT 10-15
DIELDRIN	LT 7.9-37 (B)	2/11	LT 10-20 (B)

(A) SOURCES: INORGANIC COMPOUNDS - USGS 1975 (SAMPLES TAKEN FROM GEORGIA PLOW ZONE); DIELDRIN-CAREY 1979 (SAMPLES TAKEN FROM GEORGIA CROPLAND SOILS). THE BACKGROUND CONCENTRATIONS WERE SELECTED AS REPRESENTATIVE OF THE AGRICULTURE AREA SURROUNDING THE POWERSVILLE LANDFILL SITE

(B) UG/KG.

TABLE 9

**LOCATIONS OF SURFACE WATER AND SEDIMENT SAMPLES
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II**

FIGURE CODE	TYPE OF SAMPLE TAKEN	SAMPLE POINT DESCRIPTION
SW-1 SD-1	NONE (DRY) NONE	UPGRADIENT ON TRIBUTARY NORTHEAST OF THE SITE, INSUFFICIENT FLOW TO SAMPLE
SW-2 SD-2	NONE (DRY) NONE	ON TRIBUTARY NORTH OF CENTERVILLE ROAD, INSUFFICIENT FLOW TO SAMPLE
SW-3 SD-3	WATER SEDIMENT	ON TRIBUTARY NORTH OF POWERSVILLE ROAD
SW-4 SD-4	WATER SEDIMENT	MULE CREEK SWAMP AREA APPROXIMATELY 0.5 MILES NORTHWEST OF GEORGIA HIGHWAY 49
SW-5 SD-5	NONE (DRY) NONE	ON TRIBUTARY WEST OF GEORGIA HIGHWAY 49
SW-6 SD-6	WATER SEDIMENT	MULE CREEK SWAMP AREA APPROXIMATELY 0.25 MILES SOUTH OF POWERSVILLE ROAD.

TABLE 10

**SUMMARY OF ANALYTICAL RESULTS FROM
SURFACE WATER SAMPLES
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II**

COMPOUND	RANGE OF DOWNGRAIDENT SAMPLES (A) (UG/L)	CONCENTRATION OF UPGRADIENT SAMPLE (B) (UG/L)	NUMBER OF SAMPLES WITH COMPOUND ABOVE DETECTION LIMIT/ TOTAL NUMBER OF SAMPLES
BARIUM	15-34	12	3/3
ZINC	7-12	6	3/3
MANGANESE	97-260	89	3/3
CALCIUM	1,400-3,900	760	3/3
IRON	1,600-4,300	1,700	3/3
SODIUM	1,700-3,600	1,900	3/3
COPPER	LT 2.8-3	LT 2.8	1/3
MAGNESIUM	1,000-1,400	440	3/3
METHYLETHYL KETONE	LT 10-16	LT 5	1/3
LEAD	LT 5	LT 5	0/3

(A) SAMPLE LOCATIONS SW 03, SW 06

(B) SAMPLE LOCATIONS SW 04

LT X = COMPOUND NOT DETECTED, WHERE X = THE DETECTION LIMIT.

TABLE 11

**SUMMARY OF ANALYTICAL RESULTS FROM
STREAM SEDIMENT SAMPLES
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II**

COMPOUND	RANGE OF DOWNGRAIDENT SAMPLES (A) (UG/L)	CONCENTRATION OF UPGRADIENT SAMPLE (B) (UG/L)	NUMBER OF SAMPLES WITH COMPOUND ABOVE DETECTION LIMIT/ TOTAL NUMBER OF SAMPLES
BARIUM	2.7-160	170	3/3
ZINC	2.3-35	56	3/3
MANGANESE	7.9-140	1,400	3/3
CALCIUM	24.8-1,000	360	3/3
IRON	4,200-15,000	59,000	3/3
COPPER	LT 3.3-17	LT 12	1/3
CHROMIUM	LT 1.7-38	44	2/3
ALUMINUM	450-22,000	24,000	3/3
VANADIUM	LT 1.7-72	75	2/3
MAGNESIUM	7.9-380	330	3/3
COBALT	LT 4-14	16	1/3
NICKEL	LT 6.7	26	0/3
LEAD	LT 3.4-50	30	2/3

(A) SAMPLE LOCATIONS SD03, SD06

(B) SAMPLE LOCATIONS SD04

LT X = COMPOUND NOT DETECTED, WHERE X = THE DETECTION LIMIT.

TABLE 12. ALL TECHNOLOGIES CONSIDERED FOR REMEDIAL RESPONSE AT THE POWERSVILLE SITE

GROUND WATER

- GROUND WATER EXTRACTION
- INJECTION WELLS
- ACTIVATED CARBON ADSORPTION
- BIOLOGICAL TREATMENT
- FILTRATION
- PRECIPITATION/FLOCCULATION
- SEDIMENTATION
- ION EXCHANGE/SORPTIVE RESINS
- REVERSE OSMOSIS
- AIR STRIPPING
- SPRAY IRRIGATION
- HORIZONTAL IRRIGATION
- IN SITU TREATMENT BY NEUTRALIZATION
- IN SITU TREATMENT BY HYDROLYSIS
- IN SITU TREATMENT BY OXIDATION-REDUCTION
- PERMEABLE TREATMENT BEDS
- POLYMERIZATION
- SLURRY WALLS
- GROUT BARRIER
- SHEET PILING
- SUBSURFACE DRAINS
- ALTERNATE DRINKING WATER SOURCE
- RELOCATION OF RECEPTORS

SURFACE WATER

ALTHOUGH SURFACE WATER WAS NOT CHARACTERIZED AS A PROBLEM AT THE POWERSVILLE SITE, SURFACE RUNOFF RESULTING FROM THE APPLICATION OF OTHER TECHNOLOGIES WILL HAVE TO BE ADDRESSED IN THE DEVELOPMENT OF REMEDIAL ALTERNATIVES. THE FOLLOWING SUB-SECTIONS DESCRIBE TECHNOLOGIES THAT DEAL WITH THE COLLECTION AND DIVERSION OF SURFACE WATER. COLLECTION AND DIVERSION TECHNIQUES ARE DESIGNED TO PREVENT BOTH SURFACE WATER INFILTRATION AND OFF SITE TRANSPORT OF CONTAMINATED SURFACE WATERS

- CHANNELS AND WATERWAYS
- SEEPAGE BASINS AND DITCHES

SOILS AND SEDIMENTS

- EXCAVATION AND OFF SITE DISPOSAL
- EXCAVATION AND ON SITE DISPOSAL
- EXCAVATION AND THERMAL TREATMENT
- CAPPING
- SOLIDIFICATION AND STABILIZATION
- IN SITU TREATMENT BY CHELATION
- ENZYMATIC DEGRADATION
- EXTRACTION (SOIL FLUSHING)
- ATTENUATION
- RESTORATION AND VEGETATION

OTHER

- NO-ACTION
- MONITORING
- RESIDENT RELOCATION
- AIR MONITORING.

TABLE 13. TECHNOLOGIES ELIMINATED DURING THE POWERSVILLE SITE SCREENING PROCESS

TECHNOLOGIES ELIMINATED	REASON
SOIL TECHNOLOGIES	
IN SITU - CHELATION	INEFFECTIVE FOR PESTICIDES
ENZYMATIC DEGRADATION	LACK OF DEVELOPMENT; IMPRACTICAL
EXTRACTION (SOIL FLUSHING)	DIFFICULT TO APPLY TO PESTICIDES AND IN COMBINATION
ATTENUATION OF SOIL	WASTE TOO DEEP FOR EFFECTIVE USE
WATER TECHNOLOGIES	
INJECTION WELL	AQUIFER IS ONLY WATER SOURCE: STATE REGULATORY PROHIBITS
BIOLOGICAL TREATMENT	INEFFECTIVE FOR HALOGEN AND INSOLUBLE COMPOUNDS
ION EXCHANGE/SORPTIVE RESINS	DIFFICULT TO APPLY; OTHER METHOD MORE EFFECTIVE
REVERSE OSMOSIS	DIFFICULT TO APPLY; OTHER METHOD MORE EFFECTIVE
IN SITU - NEUTRALIZATION	PLUME NOT ACIDIC OR BASIC
IN SITU - HYDROLYSIS	POSSIBLE TOXIC END PRODUCTS
IN SITU - OXIDATION/REDUCTION	POSSIBLE TOXIC END PRODUCTS
PERMEABLE TREATMENT BEDS	WATER TABLE TOO DEEP
POLYMERIZATION	NOT GOOD FOR A MIXTURE OF COMPOUNDS
SLURRY WALLS	WATER TABLE TOO DEEP
GROUT BARRIER	UNCONSOLIDATED SOIL AND WATER TABLE TOO DEEP
SHEET PILING	WATER TABLE TOO DEEP; PRIMARY FLOW FROM SOURCE IS VERTICAL
SUBSURFACE DRAINS	WATER TABLE TOO DEEP
RELOCATION OF RECEPTORS	IMPRACTICAL; ALTERNATE SOURCE EASIER TO IMPLEMENT.

TABLE 14. TECHNOLOGIES RETAINED FOR FINAL CONSIDERATION TO REMEDIATE THE POWERSVILLE SITE

SOIL TECHNOLOGIES

NO-ACTION ALTERNATIVE
EXCAVATION AND OFF SITE DISPOSAL
EXCAVATION AND THERMAL TREATMENT
EXCAVATION AND ON SITE DISPOSAL
CAPPING
ENCAPSULATION (USE AS ON SITE DISPOSAL)
SOLIDIFICATION AND STABILIZATION
RESTORATION AND VEGETATION

WATER TECHNOLOGIES

NO-ACTION ALTERNATIVE
GROUNDWATER EXTRACTION
ACTIVATED CARBON ADSORPTION
PRECIPITATION/FLOCCULATION
AIR STRIPPING
SPRAY IRRIGATION
HORIZONTAL IRRIGATION
ALTERNATE DRINKING WATER SOURCE.