United States
Environmental Protection
Agency

Office of
Emergency and
Remedial Response

EPA/ROD/R04-87/029
September 1987

EPA

Superfund Record of Decision:

Powersville L.F., GA

TECHNICAL REPORT DATA

(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA/ROD/R04-87/029	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE SUPERFUND RECORD OF DECISION Powersville Landfill, GA First Remedial Action - Final		5. REPORT DATE September 30, 1987 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency 401 M Street, S.W. Washington, D.C. 20460		13. TYPE OF REPORT AND PERIOD COVERED Final ROD Report 14. SPONSORING AGENCY CODE 800/00

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The Powersville Landfill, which occupies approximately 15 acres, is located in Peach County, Georgia. General crop farming is the major agricultural practice in the region, however, cattle farms and orchards are also common. Locally the Providence aquifer system is a source of water for both consumption and irrigation. From the early 1940s to 1969 the landfill site was a borrow pit which provided sand and fill material to the County for local use. During 1969 Peach County began operating the site as a sanitary landfill receiving municipal and industrial wastes. In December 1972 the Georgia Department of Natural Resources Environmental Protection Division suggested the separation and maintenance of areas for pesticides and associated wastes which was attained. Disposal records indicate pesticide manufacturing wastes were disposed of in the municipal section of the landfill prior to June 1973 and in the hazardous waste area between June 1973 and 1978. Neither the quantity nor the location of the waste in the municipal landfill is known. The landfill was closed in 1979 due to its location in a highly permeable sand and gravel aquifer. The primary contaminants of concern affecting the soil and ground water include: VOCs (vinyl chloride), organics, heavy metals (lead and chromium) and pesticides.

The selected remedial action for this site includes: surface capping of hazardous waste and municipal fill areas using artificial material or clay, with grading, drainage and closure; installation of eight additional monitor wells (at a minimum) in the upper
(See attached sheet)

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Record of Decision Powersville Landfill, GA First Remedial Action - Final Contaminated Media: gw, soil Key contaminants: organics, heavy metals, pesticides, vinyl chloride		

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS (This Report) None	21. NO. OF PAGES 178
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16. ABSTRACT (continued)

region of the aquifer to determine cap area leaching or migration; and extension of the municipal water supply pipe line as an alternate water supply. The State of Georgia indicates an inability to pay their portion of the costs, which is 50%, if the PRPs do not come forth to conduct the remedial action. The total present worth cost for this remedial action is $4,000,000 with present worth O&M of $577,013.

RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION

SITE

Powersville Landfill

Peach County

Powersville, Georgia

STATEMENT OF PURPOSE

This decison document represents the selected remedial action for the Powersville Landfill site and is consistent with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300). The remedy described below provides adequate protection of public health, welfare, and the environment. The State of Georgia has been consulted and concurs with all points of the selected remedy. However, they do indicate that they are not presently in a position to pay their portion of the costs, which is 50%, if the PRPs do not come forth to conduct the remedial action. The selected remedy is estimated to cost $4.0 million.

STATEMENT OF BASIS

The decision is based on the Administrative Record which is on file in the EPA Region IV offices, 345 Courtland Street, Atlanta, GA, or is available at the Powersville Fire Station, Powersville, GA. The attached index indicates the documents which comprise the Administrative Record upon which the selection of a remedial action is based.

DESCRIPTION OF SELECTED REMEDY

The recommended alternative for the Powersville Landfill site includes:

° Surface capping of the hazardous waste and municipal fill areas. The cap for the municipal area will be constructed in accordance with EPA guidance document, Covers for Uncontrolled Hazardous Waste Sites, EPA/540/2-85/002. The cap for the hazardous waste area will be constructed using the same guidance indicated above, with the additional stipulation that the top liner be constructed with an artificial material or equivalent two foot thick layer of compacted clay. Closure will be in accordance with applicable State and Federal regulations.

- Grading of the area to ensure proper slope and drainage of water off of the cap. Drainage would be designed to direct surface runoff toward the present natural drainage channels.

- Installation of a minimum of eight additional monitor wells in the upper region of the aquifer to determine if contaminants are leaching or migrating from the capped areas.

- Provision of an alternate drinking water source. The most likely alternative for this water is the Byron municipal water supply. The present termination point of this water supply is approximately 2 miles north of the site on Georgia Highway 49.

- Site deed restrictions to prevent any drilling or construction activities that would compromise the integrity of the remedy. Deed restrictions need also be established to prohibit the drilling of water wells in the area between the site and Mule Creek, the area in which groundwater is likely to be affectd by the landfill.

- Operation and maintenance (O & M) will include regular inspection of the cap for signs or erosion, settlement or deterioration. Inspections should be conducted frequently during the first six months. Periodic monitoring of new and existing monitor wells will be required.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate, and is cost-effective. This remedy satisfies the preference for a treatment that reduces toxicity, mobility, or volume as a principal element.

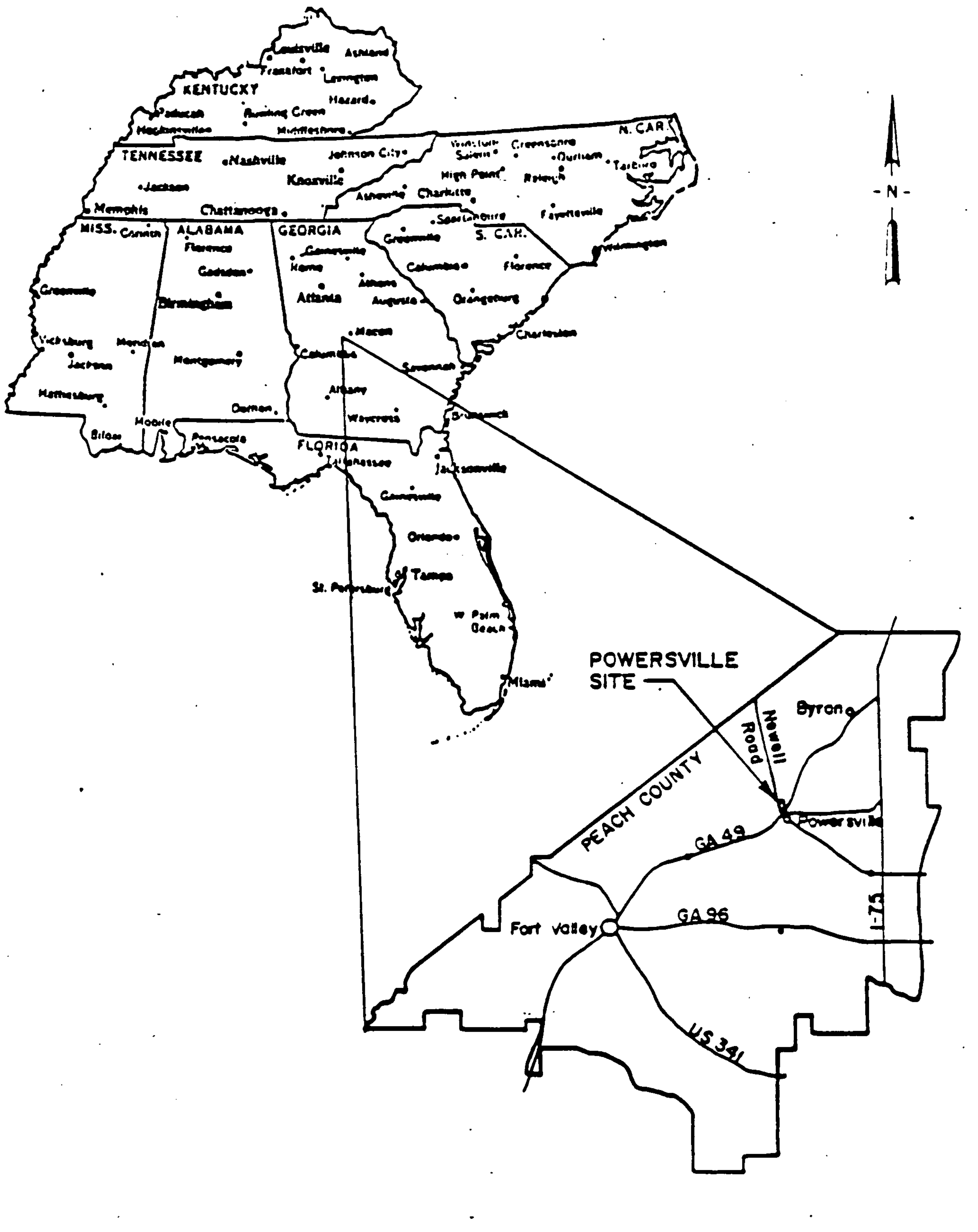
Lee A. DeHihns
Acting Regional Administrator

9/30/87
Date

SECTION I
SITE LOCATION & DESCRIPTION

The Powersville Landfill is located just north of the intersection of Georgia Highway 49 and Newell Road, a cross-roads in the small community of Powersville in Peach County, Georgia. The Landfill, which occupies approximately 15 acres, is centered on latitude 32°36'36" north and longitude 83°47'33" west (Figures 1 & 2).

The landfill is located in a rural area of Peach County. This area is characterized by broad, fairly level interfluvial areas cut by deeply incised streams. Across the county, maximum relief is on the order of 120 feet. At the site, the maximum relief is approximately 75 feet. General crop farming is the major agricultural practice in the region, however cattle farms and orchards are also common. Locally, the Providence aquifer system is a source of water for both consumption and irrigation.



REM II

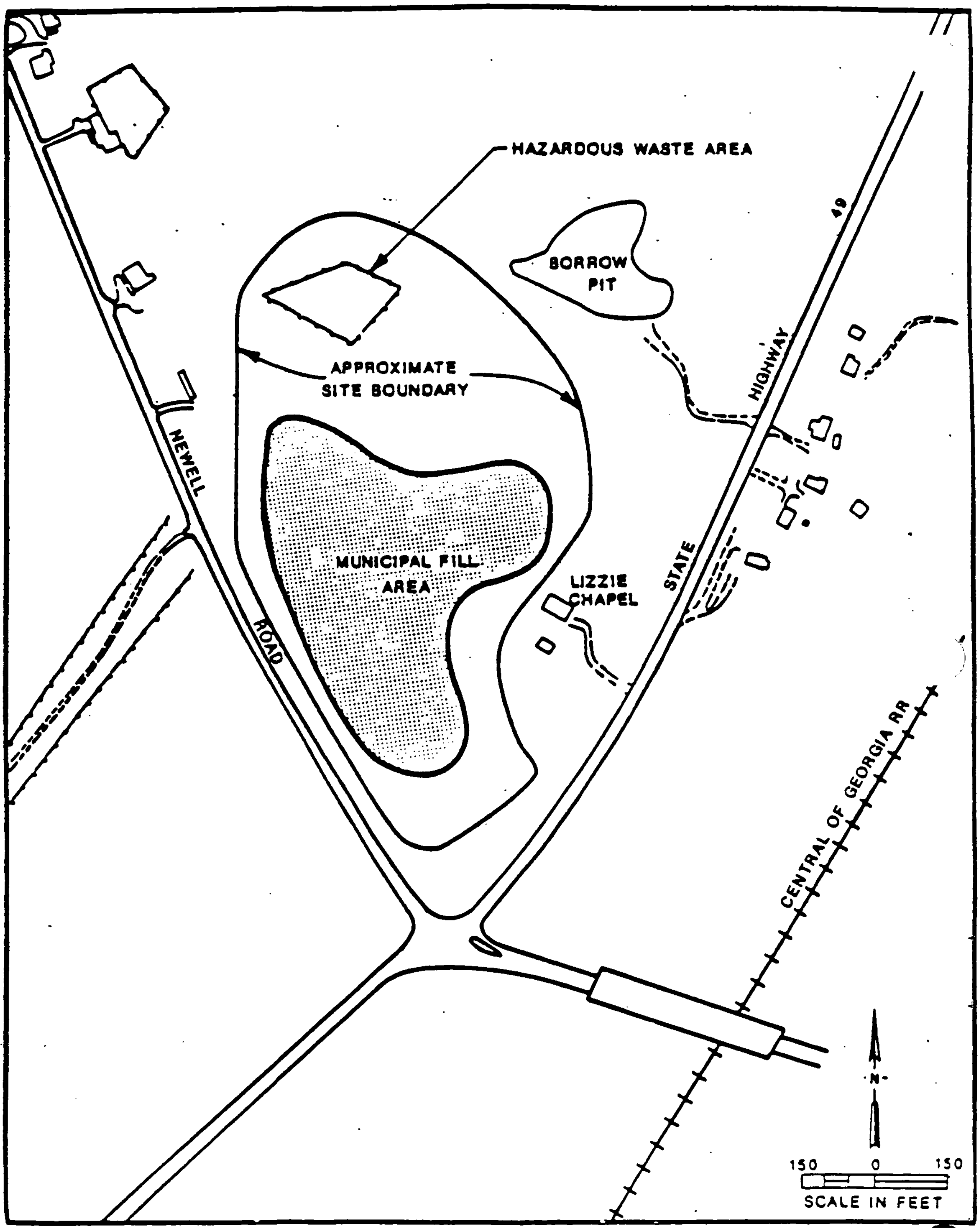
SITE LOCATION MAP

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE N

1



REM II

SITE LAYOUT MAP

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO. 2

SECTION II
SITE HISTORY

Operational History

The landfill site originated as a borrow pit which provided sand and fill material to the County for local use. The excavation of soils continued from the early 1940's to 1969. During 1969, Peach County began operating the site as a sanitary landfill receiving municipal and industrial wastes. In December 1972, Georgia Department of Natural Resources Environmental Protection Division (EPD) sent a letter following an inspection of the landfill to Peach County suggesting a separate area be set aside and maintained in a rigidly prescribed manner to contain pesticides and associated wastes. This area was established and in operation by June 1973. No information is available regarding the types and quantities of waste disposed of at the site prior to the establishment of the hazardous waste enclosure.

Disposal records indicates wastes associated with the manufacturing of pesticides were disposed of in the hazardous waste area from June 1973 through 1978. It is strongly believed, based upon citizens and EPD files, that these hazardous wastes were discarded in the municipal section of the Powersville Landfill prior to June 1973. Neither the quantity nor the location of this waste in the municipal landfill is known.

In March 1977, the Georgia EPD sent a letter to the Peach County Board of Commissioners recommending that the site be closed due to its location in the highly permeable sand and gravel of the Providence aquifer. At the time that the landfill was closed in 1979, the entire site covered approximately fifteen acres. In 1983 the site was included on the National Priorities List (NPL) issued by the EPA under mandate of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Table 1 provides a brief summary, listed chronologically, of historical events at the site.

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 FIT 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 soils sample from the site and installed eight onsite monitor wells.
March, 1984	NUS collected samples from onsite 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.

(continued)

DATE	ACTION
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.

Previous Studies

On April 21, 1983, EPD collected a water sample from the Lizzie Chapel well. Chemical analyses indicated trace amounts of pesticides as shown in Table 2. Water samples collected from surrounding private residential wells in May 1983, indicated no prescence of pesticides. The Lizzie Chapel well was sampled again on June 2, 1983. The levels of pesticides present were slightly higher than in the initial sampling. As a result, in August 1983, EPD requested that the church discontinue use of the well for drinking water.

NUS Corporation (NUS), the EPA FIT contractor, began geophysical investigations at the site in October, 1983 (NUS, 1984). The results indicated magnetic and electromagnetic anomalies in the areas known to have received general waste. Distortions in the electrical resistivity profiles indicated the presence of buried materials, but failed to identify any confining layer. However, the use of penetration resistivity at various depths in an attempt to define confining layers was possible. The results of the soundings revealed no clear evidence of any continuous confining layer beneath the site to a depth of at least 200 feet.

The hydrologic investigations began when NUS installed ten monitor wells at the site in 1984. The siting and installation of the monitor wells are presented in the NUS report, Monitoring Well Installation (NUS 1984). In addition, ground water samples were taken from nine monitor wells and five private wells. Table 3 is a summary of the private well sample analyses. The following toxic chemicals were detected in the monitor well samples: 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.

TABLE 2

SUMMARY OF GEORGIA EPD ANALYSIS CONCENTRATIONS (ug/l)
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II

Date Sample Was Taken	Well Sampled	Benzene Hexachloride (BHC) Alpha	Beta	Delta	Gamma (Lindane)	Dieldrin
April 21, 1983	Lizzie Chapel	0.30	0.01	0.06	0.22	0.15
June 22, 1983	Lizzie Chapel	0.30	0.10	0.20	0.40	0.20
May 17, 1983	Adams	UD	UD	UD	UD	UD
	Mobley	UD	UD	UD	UD	UD
	Pickens	UD	UD	UD	UD	UD
May 21, 1984	Adams	UD	UD	UD	UD	UD
	Mobley	UD	UD	UD	UD	UD
	Pickens	UD	UD	UD	UD	0.40
June 8, 1984	Pickens	---	---	---	---	UD

UD - Undetected
--- Analysis not performed

TABLE 3

SUMMARY OF NUS ANALYTICAL RESULTS OF PRIVATE WELL SAMPLING (ug/l)
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II

Date Sampled	(Adams) 01-28-84	03-16-84	07-18-84	(Mobley) 01-28-84	07-18-84	(Pickens) 01-28-84	07-18-84	(Lizzie Chapel) 01-26-84	03-17-84
Alpha-BHC*	-	-	-	-	.0042	-	.025	.98	-
Beta-BHC*	-	-	-	-	-	-	-	.28	-
Gamma-BHC (Lindane)*	-	-	-	-	.0082	-	.042	1.2	-
Delta-BHC*	-	-	-	-	-	-	.011	.95	-
Dieldrin*	-	-	-	-	.0051	-	.0088	-	-
BIS(2-Ethylhexyl)-Phthalate*	-	-	-	-	-	-	-	-	-
Di-N-Octylphthalate*	-	-	-	-	-	-	-	20A	-
Phenol*	-	-	-	-	-	-	-	-	-
Butanoic Acid	-	-	-	-	-	-	-	-	-
Hexahydroazephinone	-	-	-	-	-	-	-	-	-
Benzoic Acid	-	-	-	-	-	-	-	-	-
4-Methylphenol	-	-	-	-	-	-	-	-	-
Hexanoic Acid	-	-	-	-	-	-	-	-	-
Propanoic Acid	-	-	-	-	-	-	-	-	-
Methylbutanoic Acid	-	-	-	-	-	-	-	-	-
Pentanoic Acid	-	-	-	-	-	-	-	-	-
Methylpentanoic Acid	-	-	-	-	-	-	-	-	-
Trans-1,2-dichloroethene	-	-	-	-	-	-	-	5A	-
1,2-dichloroethane*	-	-	-	-	-	-	-	5A	-
Benzene	-	-	-	-	-	-	-	5A	7
1,1,2,2-tetrachloroethane*	-	-	-	-	-	-	-	-	-
Tetrachloroethene	-	-	-	-	-	-	-	-	-
Toluene*	-	-	-	-	-	-	-	-	-
Chlorobenzene*	-	-	-	-	-	-	-	5A	4A
O&P-xylene (Mixed)	-	-	-	-	-	-	-	-	-
Vinyl Chloride	-	-	-	-	-	-	-	-	-
Acetone	-	-	-	-	-	880	-	-	-
Propanol	-	-	-	-	-	-	-	-	-
Butanol	-	-	-	-	-	-	-	-	-
Chlorofluoromethane	-	-	-	-	-	-	-	-	-
Dichlorofluoromethane	-	-	-	-	-	-	-	-	-
Tetrahydrofuran	-	-	-	-	-	-	-	-	-
Oxybisethane	-	-	-	-	-	-	-	-	-
Chloroform*	-	-	-	-	-	-	-	-	-

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.

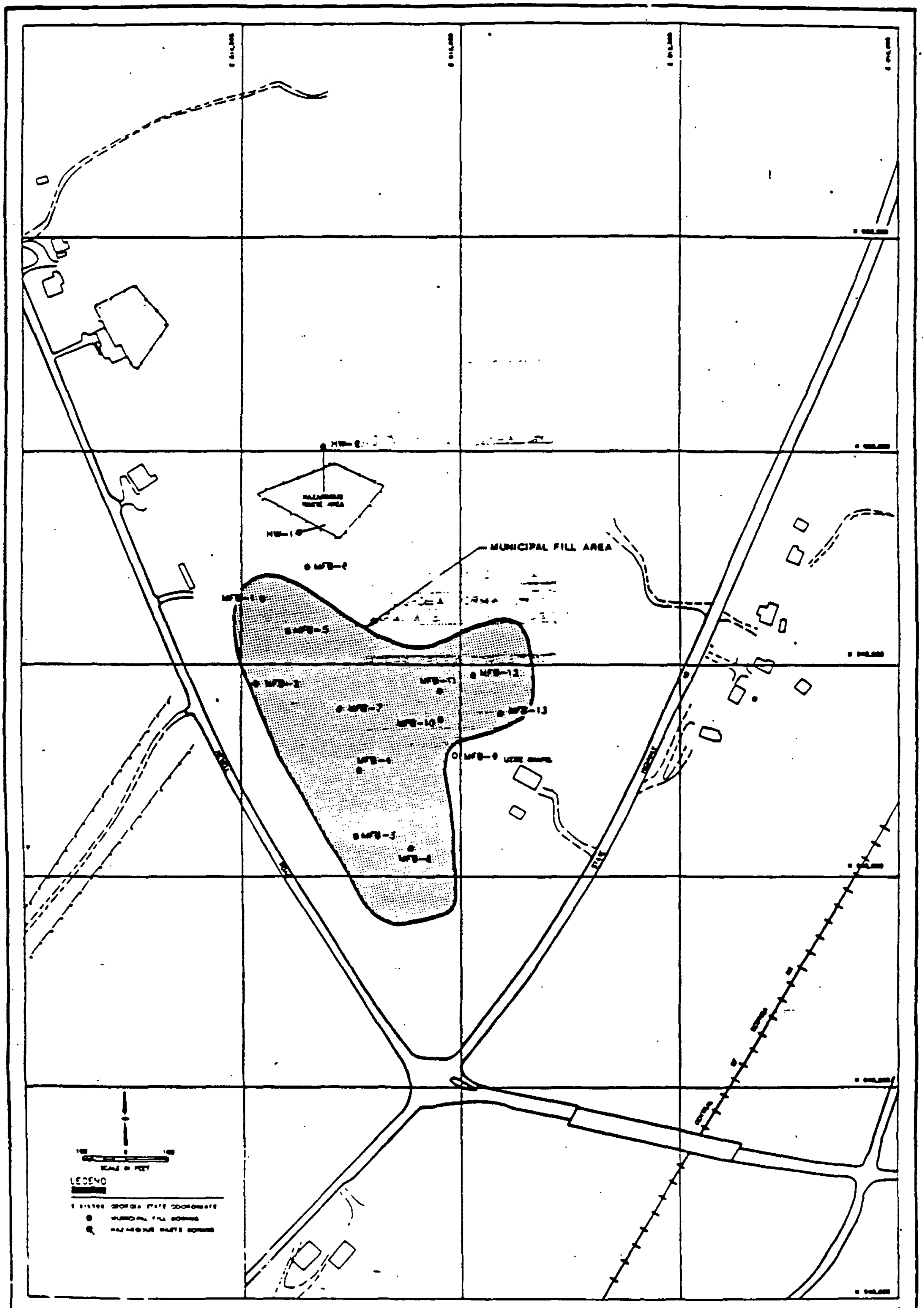
The upper soil region consists of medium grained permeable sand. The sand is part of the Gosport Sand unit common to the area. The thickness of this sand region at the site ranges from 0 to 50 feet. The majority of the municipal fill area is located in the Gosport Sand unit.

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



BEM :I

MUNICIPAL FILL & ANGLE BORING LOCATIONS

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO

TABLE 4

ANALYTICAL RESULTS FOR INDICATOR CHEMICALS IN MUNICIPAL FILL SAMPLES (ug/kg)*
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II

BORING NUMBER	CHROMIUM (mg/kg)	LEAD (mg/kg)	ALPHA-BHC	GAMMA-BHC (LINDANE)	DIELDRIN	TOXAPHENE	GAMMA-CHLORDANE	ALPHA-CHLORDANE	VINYL CHLORIDE	1,2-DI-CHLOROETHANE
MF01-001	10	7	U	U	U	U	U	U	U	U
MF01-002	8	47	U	U	U	U	U	U	U	U
MF01-003	4.8	U	130	U	U	U	U	U	U	U
MF01-005	11	7.2	U	U	U	U	U	U	U	U
MF02-001	14	4.3	U	U	U	U	U	U	U	U
MF02-002	91	320	U	U	U	U	U	U	U	U
MF02-003	9.4	U	U	U	U	U	U	U	U	U
MF03-001	15	8.7	U	U	U	U	U	U	U	U
MF03-002	23	63	U	U	74	U	U	660	U	U
MF03-003	5.4	U	U	U	U	U	6.6	6.6	U	U
MF04-001	17	U	U	U	U	U	U	U	U	U
MF04-002	4.1	U	U	U	U	2400	1400C	130	U	U
MF04-003	5.9	U	U	U	U	U	20	3.8	U	U
MF05-001	15	U	27	U	J	U	15	11	U	U
MF05-002	3.9	U	U	U	U	U	U	U	U	U
MF06-001	9.8J	U	U	U	U	U	U	U	U	U
MF06-002	1.4J	U	U	U	U	U	U	U	U	U
MF07-001	19	8	UR	UR	U	U	U	U	U	U
MF07-002	20	5	UR	UR	440	U	U	U	U	U
MF08-001	5.6J	U	U	U	U	14,000	U	U	U	U
MF09-001	28J	18	U	U	U	U	U	U	U	U
MF09-002	16J	U	U	U	U	U	U	U	U	U
MF10-001	7	U	UR	UR	U	U	U	U	U	U
MG10-002	57	16	U	U	U	U	U	U	U	U
MF11-001	13J	U	UR	UR	U	U	U	U	U	U
MF12-001	5.7J	4.8	U	U	U	U	U	U	U	U
MF12-002	23J	7.6	U	U	U	U	5.6	5.6	U	U
MF13-001	11	U	U	U	U	U	8.6	8.6	U	U
MF13-002	4	U	UR	UR	U	U	U	U	U	U
MF14-001	14	U	UR	UR	U	U	U	U	U	U

* All concentrations are in ug/kg except chromium and lead.
A - Average Value
C - Confirmed by Gas Chromatography
J - Estimated Value
R - Sample Rejected
U - Undetected
Note: Samples designated with the letters "MF" correspond to the municipal fill boring (MFB) with the same number as shown on Figure 5-1. The second designation (i.e. -002) signifies the sequential sample number taken at increasing depths.

TABLE 5

ANALYTICAL RESULTS FOR INDICATOR CHEMICALS IN ANGLE BORING SAMPLES (ug/kg)*
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA
REM II

WELL NUMBER	CHROMIUM (mg/kg)	LEAD (mg/kg)	ALPHA-BHC	GAMMA-BHC (LINDANE)	DIELDRIN	TOXAPHENE	GAMMA-CHLORDANE	ALPHA-CHLORDANE	VINYL CHLORIDE	1,2-DI-CHLOROETHANE
HW1-001	110R	U	U	U	U	U	U	U	U	U
HW1-002	410R	U	U	U	U	U	U	U	U	U
HW2-001	350R	U	U	U	U	U	U	U	U	U
HW2-002	370R	U	U	.91J	U	U	U	U	U	U
HW2-003	250R	U	U	U	U	U	U	U	U	U

* All concentrations are in ug/kg except chromium and lead.
R - Results of analysis rejected due to some indiscrepancy
U - Undetected
J - Estimated value

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 chemcials 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.

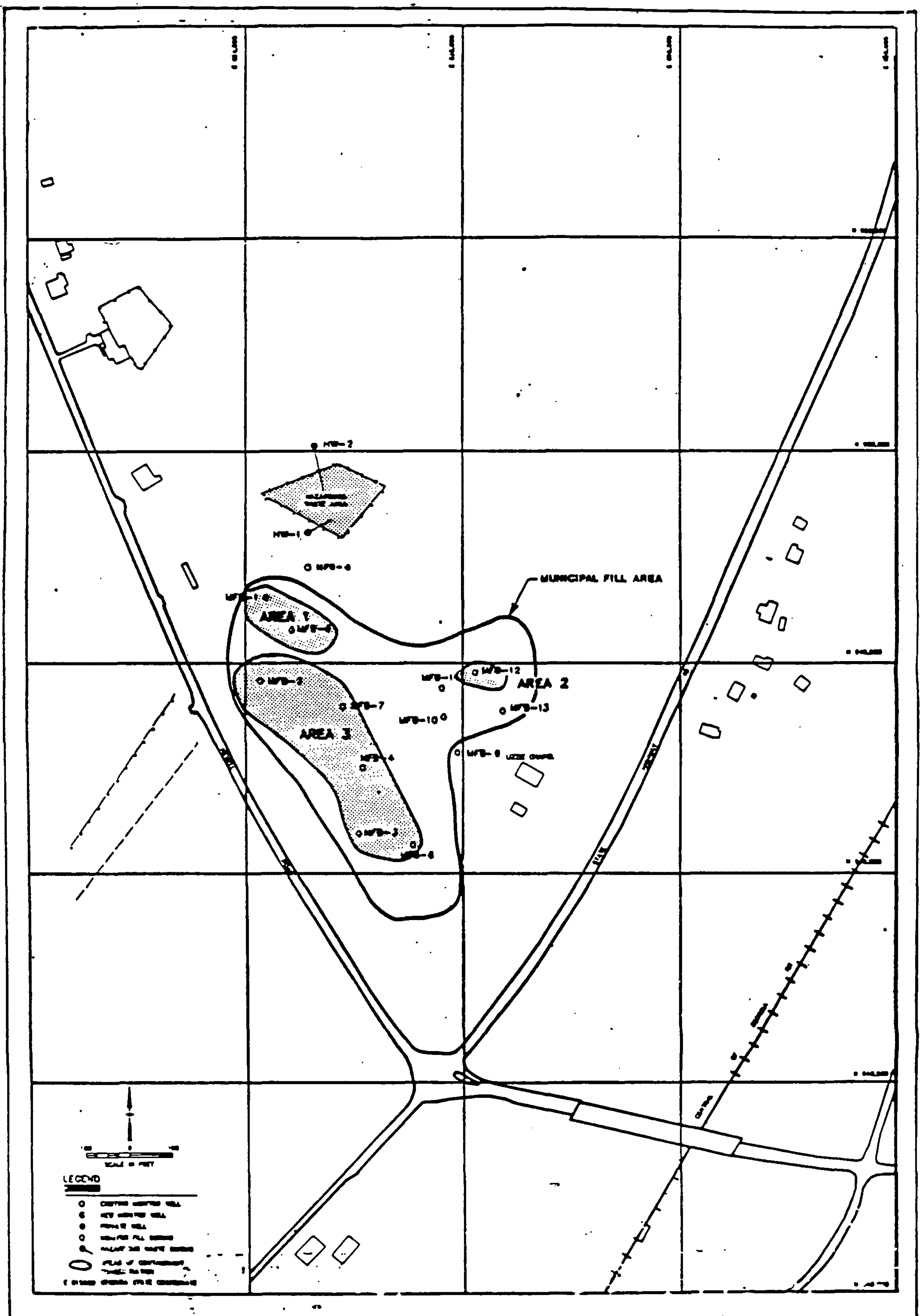
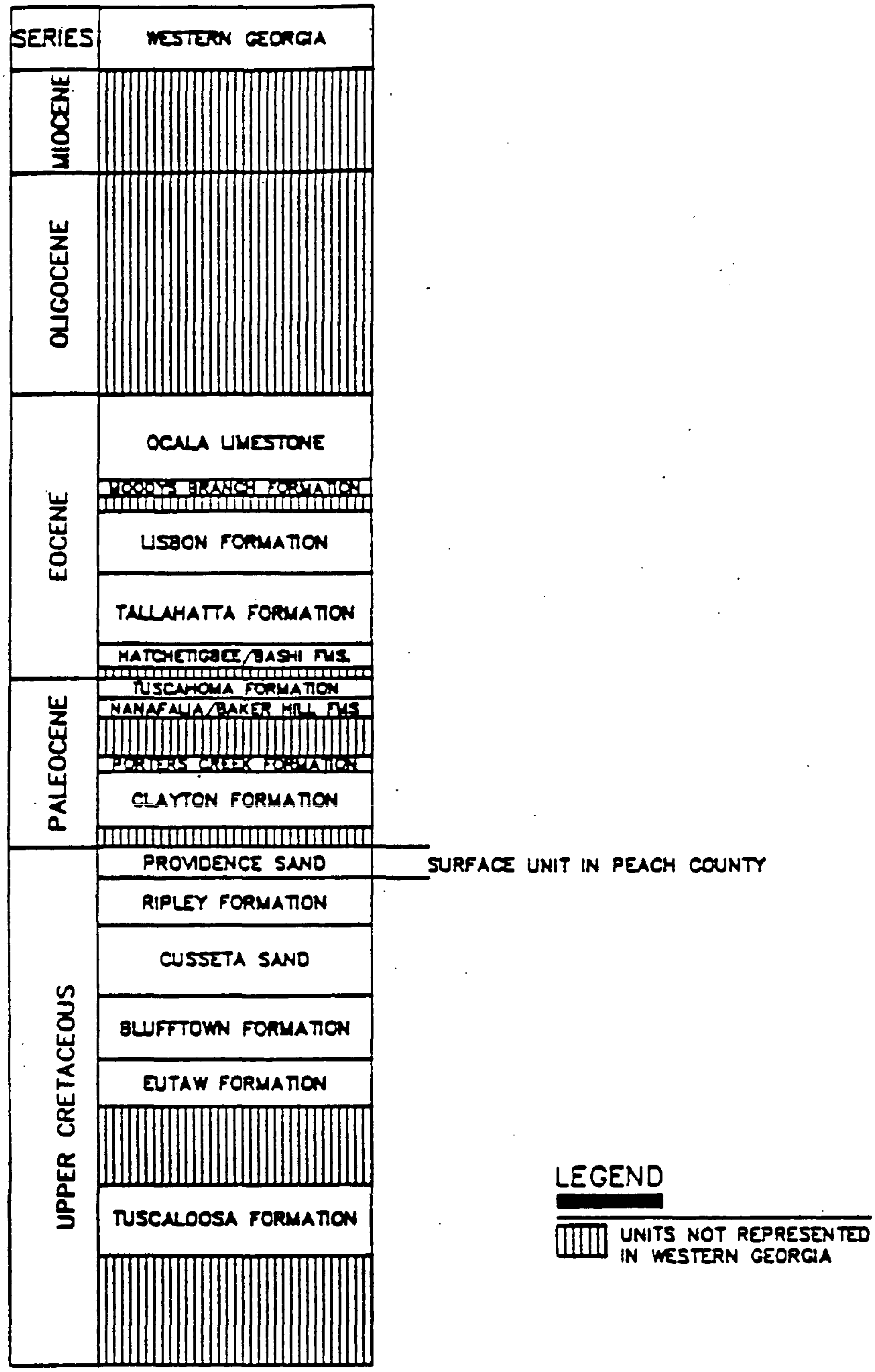


FIGURE 4

REM II

CONTAMINANT SOURCE LOCATIONS



NOTE: MODIFIED FROM BROOKS, CLARKE AND FAYE, 1985, IC #75

REM II

GENERALIZED GEOLOGIC COLUMN

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO.

5

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 transmissitivity 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.

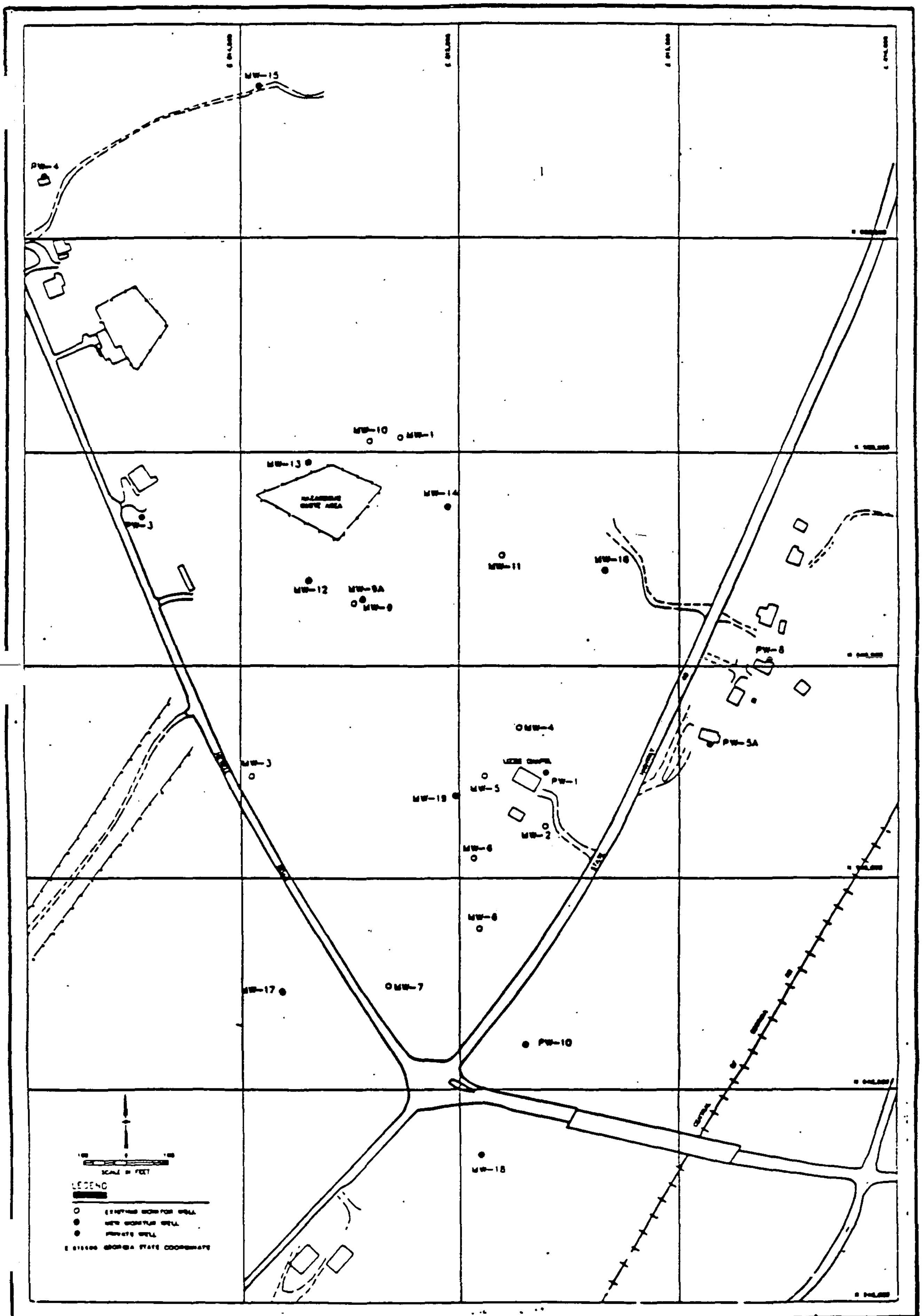


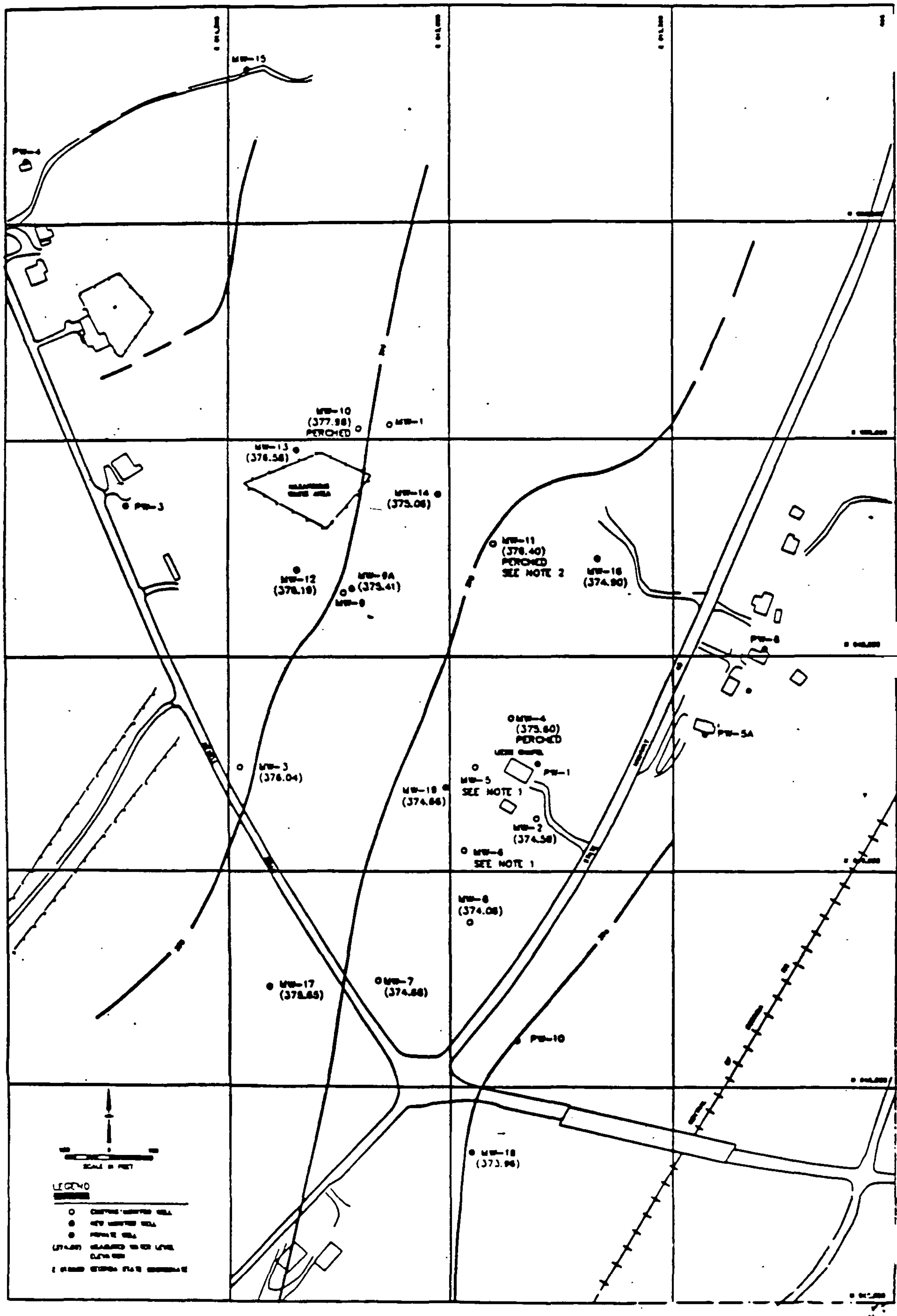
FIGURE NO 6

REM II

PRIVATE & MONITOR WELL LOCATIONS

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA



NOTES: 1) BOTTOM OF SCREEN ABOVE WATER LEVEL 2) SCREENED IN CLAY ZONE

FIGURE No. 7

REM II

GROUND WATER CONTOURS (JULY 1986)

POWERSVILLE LANDFILL SITE

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 futureuse 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 1,2Dichloroethane. 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).

TABLE 6

ANALYTICAL RESULTS FOR INDICATOR CHEMICALS
IN MONITOR AND PRIVATE WELL SAMPLES (ug/l)
Powersville Landfill Site
Peach County, Georgia
REM II

	Type of Well	Alpha-BHC	Gamma-BHC	Vinyl Chloride	1,2-Dichloroethane	Lead	Chromium
MW-01	Abandoned						
MW-02	S	U	U	U	U	U	U
MW-03	S	U	U	4J	17	2000	220
MW-04	S	U	U	U	U	220	140
MW-05	S	.42N	U	18	U	170	22
MW-06	S	U	U	6J	U	70UJ	40
MW-07	S	U	U	U	U	490	63
MW-08	D	U	U	U	U	80UJ	10
*MW-09A	S	U	U	U	U	U	7
MW-10	S	0.3	.38J	U	U	90UJ	26
MW-11	S	.19N	U	U	U	200	16
*MW-12	S	U	U	U	U	U	32
*MW-13	D	U	U	U	U	U	U
*MW-14	D	U	U	U	U	30U	14
*MW-15	D	U	U	U	U	30U	U
*MW-16	D	U	U	U	U	U	21
*MW-17	D	U	U	U	U	30UJ	21
*MW-18	S	0.3	0.32	U	U	30UJ	U
*MW-19	D	U	U	U	U	20UJ	15
PW-01	S	0.41	0.78	U	U	U	U
PW-02	-	U	U	U	U	U	U
PW-03	-	U	U	U	U	U	U
PW-04	-	U	U	U	U	U	U
PW-05	-	U	U	U	U	U	U
PW-06	-	U	U	U	U	U	U
PW-07	-	U	U	U	U	6.3	U
PW-08	-	U	U	U	U	U	U
PW-09	-	U	U	U	U	U	U
PW-11	-	U	U	U	U	U	U
PW-12	-	U	U	U	U	U	U
PW-A6	-	U	U	U	U	U	U

* Designates new monitor well
J- Estimated value
Presumptive evidence
Undetected, number shown is minimum detection limit
Shallow well
D- Deep well

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

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, dichlroethane	5 ug/l
Lead	50 ug/l
Chromium	50 ug/l

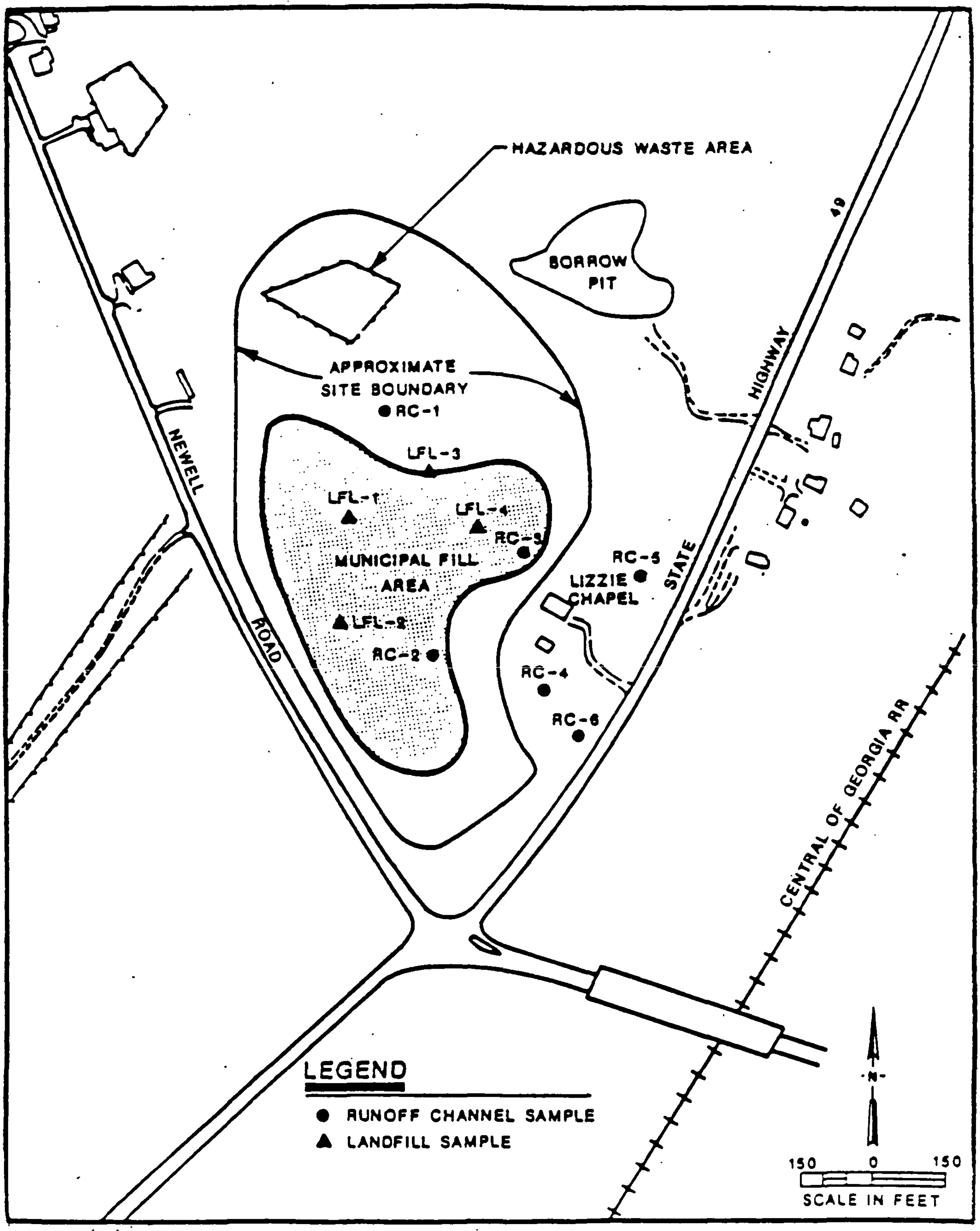
Surface Water & Sediment Investigation

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).



REM II

LEACHATE & RUNOFF CHANNEL SAMPLE LOCATIONS

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO. 8

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 ($5x10^{-6}$) 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, contamiant 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 assoicated with the site except during activities such as construction or excavation, which may expose buried contaminants.

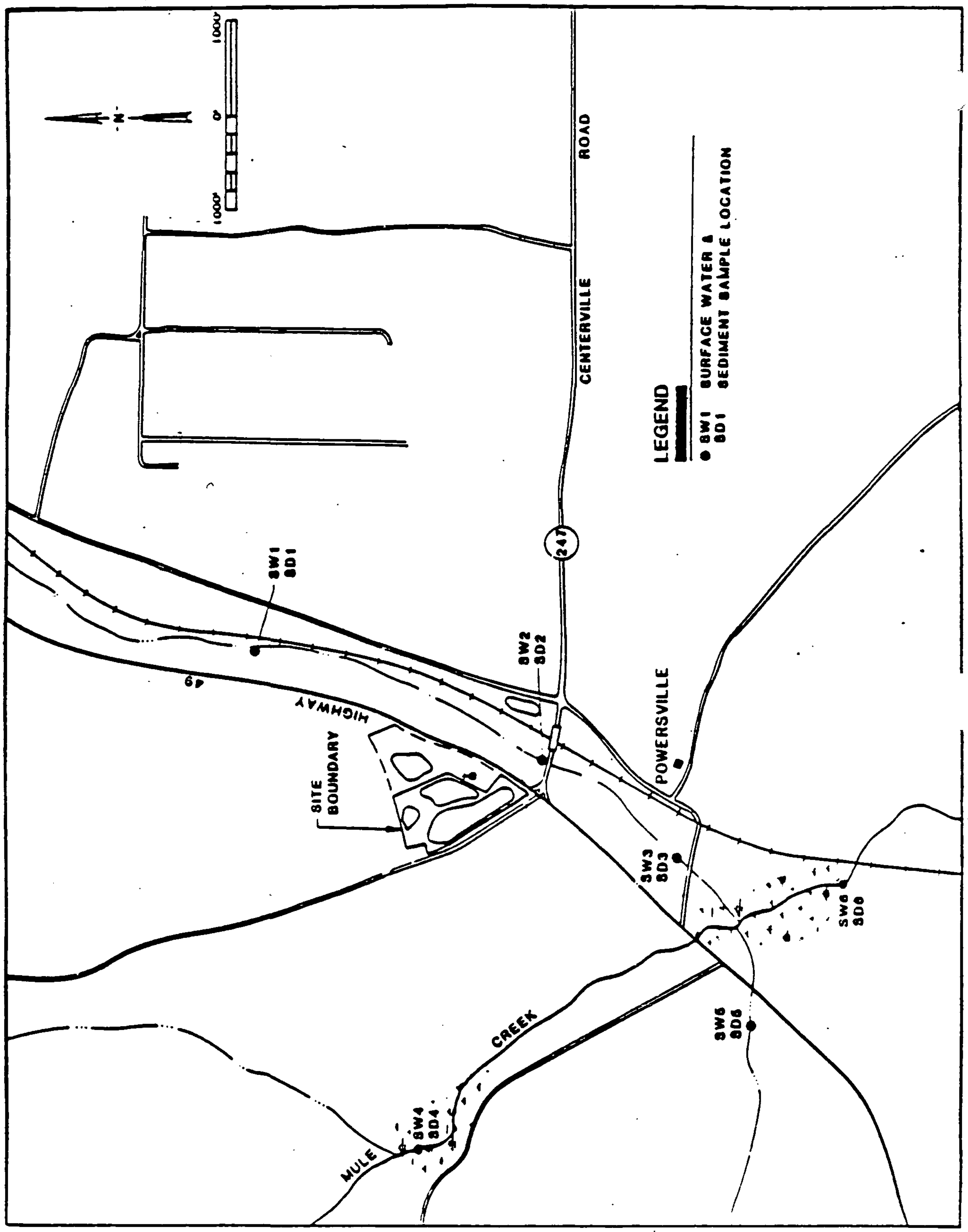
TABLE 8

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	<5.1-37	3/11	<0.2-73
Chromium	<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	<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	<160-510	5/11	200-5,000
Lead	<2.6-27	3/11	<10-15
Dieldrin	<7.9-37[b]	2/11	<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.



REM II

SURFACE WATER AND SEDIMENT SAMPLE LOCATIONS

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO. 9

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 Downgradient 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	<2.8-3	<2.8	1/3
Magnesium	1,000-1,400	440	3/3
Methylethyl ketone	<10-16	<5	1/3
Lead	<5	<5	0/3

[a] Sample locations SW 03, SW 06.

[b] Sample locations SW 04.

<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 Downgradient 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	<3.3-17	<12	1/3
Chromium	<1.7-38	44	2/3
Aluminum	450-22,000	24,000	3/3
Vanadium	<1.7-72	75	2/3
Magnesium	7.9-380	330	3/3
Cobalt	<4-14	16	1/3
Nickel	<6.7	26	0/3
Lead	<3.4-50	30	2/3

[a] Sample locations SD03, SD06.

[b] Sample location SD04.

<x = Compound not detected, where x = the detection limit.

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.

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.

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 altenatives 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 wil 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.

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 offsite transport of contaminated surface waters.

- Channels and Waterways
- Seepage Basins and Ditches

Soils and Sediments

- Excavation and Offsite Disposal
- Excavation and Onsite 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

REM II

PRELIMINARY GROUP OF TECHNOLOGIES

POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA

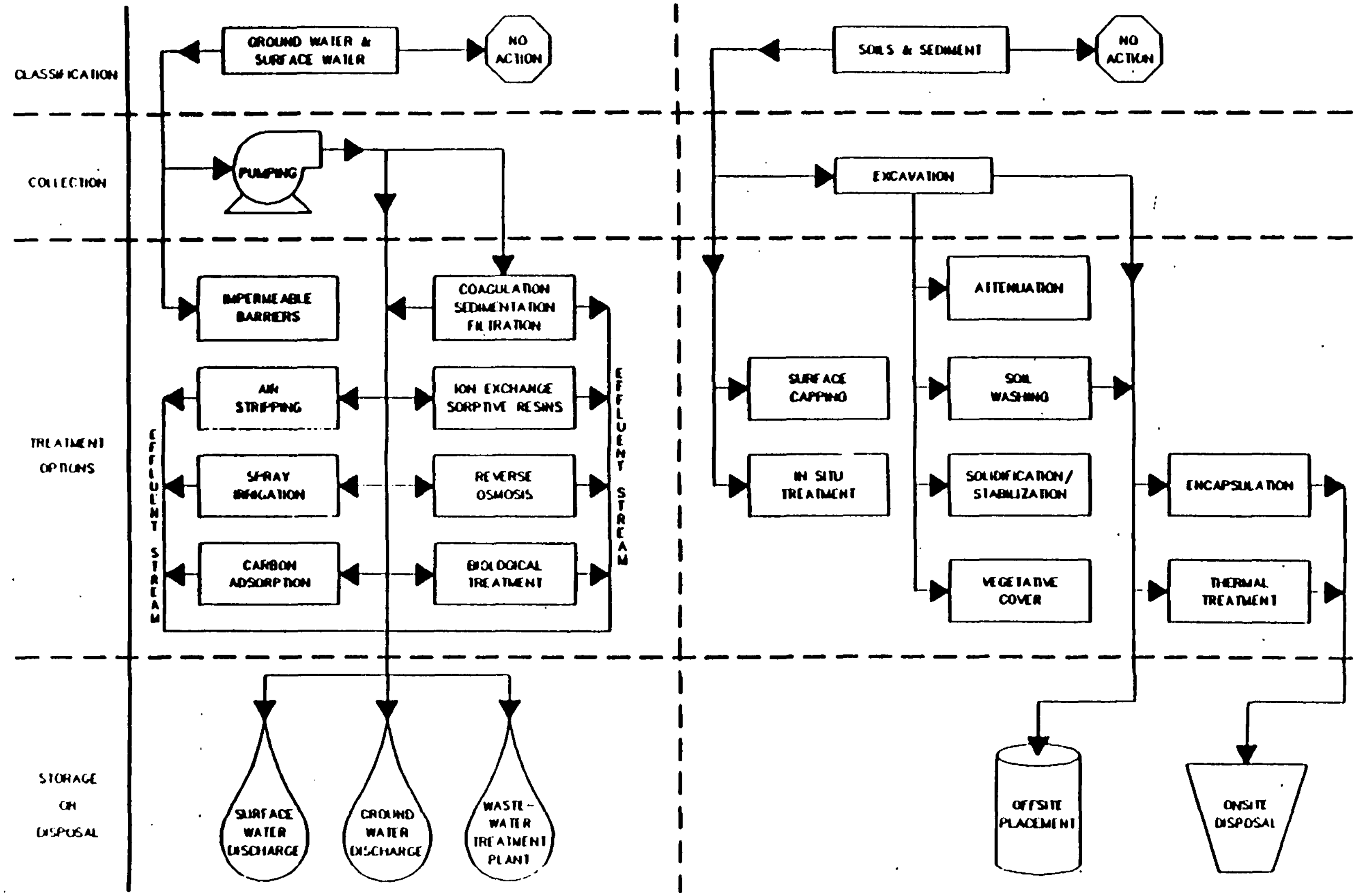


FIGURE NO. 10

Cost screening involves the elimination of technologies that have an estimated present worth cost far greater that 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	
Diedldrin	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.

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

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 wastes 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 currrent 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 availabilty 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 technical 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 considere

- 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 require 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 slection 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:

TABLE 14 Technologies Retained For Final Consideration to Remediate the Powersville Site

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Soil Technologies

No-Action Alternative
Excavation and Offsite Disposal
Excavation and Thermal Treatment
Excavation and Onsite Disposal
Capping
Encapsulation (use as onsite disposal)
Solidification and Stabilization
Restoration and Vegetation

Water Technologies

No-Action Alternative
Groundwater Extraction
Activated Carbon Adsorption
Precipitaiton/Flocculation
Air Stripping
Spray Irrigation
Horizontal Irrigation
Alternate Drinking Water Source

TABLE 15

SUMMARY OF REMEDIAL ACTION ALTERNATIVES
POWERSVILLE LANDFILL SITE
PEACH COUNTY, GEORGIA

REM II

ALTERNATIVE	TECHNICAL CONSIDERATIONS	ENVIRONMENTAL HEALTH CONSIDERATIONS	INSTITUTIONAL CONSIDERATIONS	ESTIMATED COST RANGE (50% CONFIDENCE INTERVAL)
1. No Action Alternative	Does not reduce volume of soil or water contamination; does not reduce migration.	Does not eliminate risk associated with short or long term ground water consumption.	Ground water and site use prohibited.	$ 307,000-$ 413,000
2. Cap Hazardous Waste Area; Cap Municipal Fill Area	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; does not reduce volume of contaminated soil or ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; long term ground water consumption.	Ground water and site use prohibited.	$3,106,000-$4,164,000
3. Onsite Incineration of Hazardous Waste Area; Cap Municipal Fill Area	Partially eliminates contaminated soil; should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; does not reduce volume of contaminated ground water.	Should eliminate risks associated with contact with contact with contaminated soil; airborne migration; long term ground water consumption.	Ground water and site use prohibited.	$9,754,000-$12,259,000
4. Solidification/ Stabilization of Hazardous Waste Area;	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; minor reduction in toxicity; slight increase in soil volume; does not reduce the volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; long term ground water consumption.	Ground water and site use prohibited.	$ 5,695,000-$ 7,572,000
5. Cap Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; does not reduce the volume of contaminated soil; reduces volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water; sludge disposal may have to be considered.	$ 5,425,000-$ 7,290,000

(continued)

ALTERNATIVE	TECHNICAL CONSIDERATIONS	ENVIRONMENTAL HEALTH CONSIDERATIONS	INSTITUTIONAL CONSIDERATIONS	ESTIMATED COST RANGE (50% CONFIDENCE INTERVAL)
6. Onsite Incineration of Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; does not reduce the volume of contaminated soil; reduces volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water.	$12,096,000-$15,804,000
7. Solidification/ Stabilization of Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; minor reduction in toxicity; slight increase in soil volume; does not reduce volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water.	$ 8,603,000-$11,605,000
8. Cap Hazardous Waste Area; Cap Municipal Fill Area; Alternate Water Source	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; does not reduce the volume of contaminated soil or ground water.	Should eliminate risks associated with contaminated soil; airborne migration; short and long term ground water consumption.	Ground water and site use prohibited.	$ 3,894,000-$ 5,050,000
9. Onsite Incineration of Hazardous Waste Area; Cap Municipal Fill Area; Alternate Water Source	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; reduces volume of contaminated soil but not ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Ground water and site use prohibited.	$10,266,000-$13,857,000
10. Solidification/ Stabilization of Hazardous Waste Area; Cap Municipal Fill Area; Alternate Water Source	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; minor reduction in toxicity; slight increase in soil volume; does not reduce volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Ground water and site use prohibited. Administration of water supply system.	$ 6,688,000-$ 8,623,000

(continued)

ALTERNATIVE	TECHNICAL CONSIDERATIONS	ENVIRONMENTAL HEALTH CONSIDERATIONS	INSTITUTIONAL CONSIDERATIONS	ESTIMATED COST RANGE (50% CONFIDENCE INTERVAL)
11. Cap Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water; Alternate Water Source	Should eliminate surface, airborne and ground watdr migration pathways; reduces mobility by prevention of infiltration; reduces the volume of contaminated ground water but not soil.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water. Administration of water supply system.	$ 6,083,000-$ 7,970,000
12. Onsite Incineration of Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water; Alternate Water Source	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; reduces the volume of contaminated ground water; partially reduces volume of contaminated soil.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water. Administration of water supply system.	$13,107,000-$16,755,000
13. Solidification/ Stabilization of Hazardous Waste Area; Cap Municipal Fill Area; Pump and Treat Ground Water; Alternate Water Source	Should eliminate surface, airborne and ground water migration pathways; reduces mobility by prevention of infiltration; minor reduction in toxicity; slight increase in soil volume; reduces the volume of contaminated ground water.	Should eliminate risks associated with contact with contaminated soil; airborne migration; short and long term ground water consumption.	Site use prohibited; ground water use prohibited for short term; NPDES permitting required for discharge of treated water. Administration of water supply system.	$ 9,098,000-$11,898,000

- 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 Wroth 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 minicipal 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 methodolgies 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
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 stabilizaiton/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	
Solidificaiton/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 decribed 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

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
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

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

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

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

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.

Total Construction Costs	$13,232,814

Present Worth Operation and Maintenance Costs

Municipal Fill Area Cap	$	247,094
Onsite 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 - SOLIDIFICAITON/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

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 aproximately 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.

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.

VIII. RECOMMENDED ALTERNATIVE

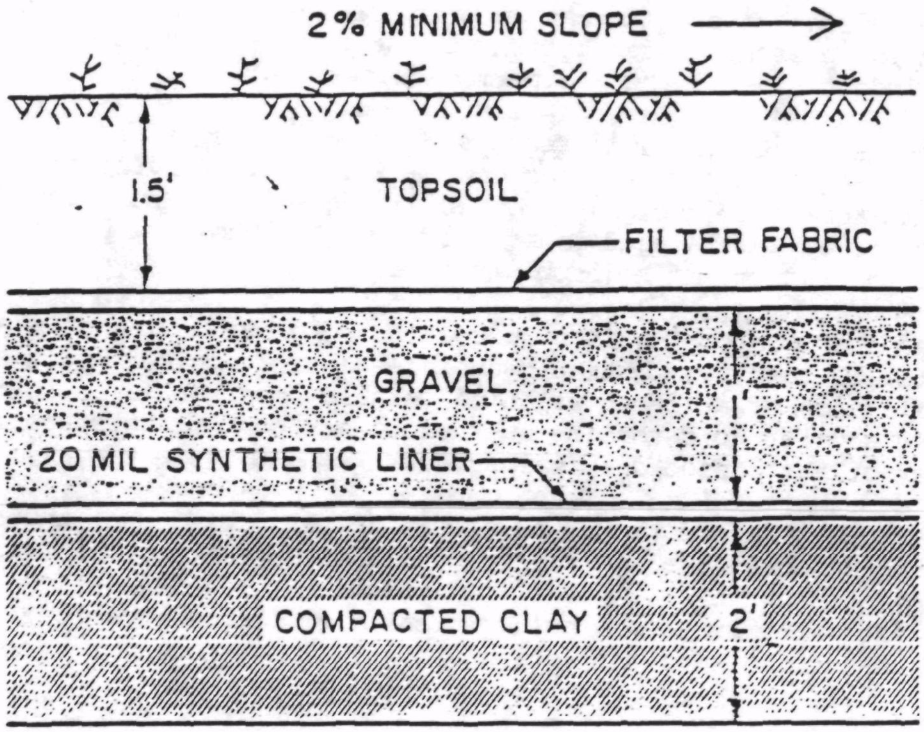
The remedial action alternative recommended for the Powersville Landfill site is construction of caps over both the hazardous waste area and the municipal landfill, coupled with an alternate drinking water source for residents living close to the site. For the municipal waste area the cap will be designed 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 paraameters referenced in the first paragraph of this section. Differential compaction and settling due to the variety of materials contained within these areas area will also influence the design parameters for these caps. Drainage will be designed to direct surface runoff toward the present natural drainage channels.



REM II

CROSS SECTION OF SURFACE CAP

POWERSVILLE LANDFILL SITE

PEACH COUNTY, GEORGIA

FIGURE NO

11

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 indentified in the endagerment 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 stablization/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 implentation of an alternate drinking water source.

The capping, in accordance with <u>Covers for Uncontrolled Hazardous Waste Sites</u> 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 disaproving 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.

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 minium 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.

SECTION X
SCHEDULE

Schedule Landmark	Date for Implentation
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

SECTION XI
FUTURE ACTIONS

Sucessful 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 maintainence plan.

No future action will be required for alternate drinking water supply, other than the standard maintenance required for such a system.

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 the non-contained areas of the landfill. In July 1975, Mr. Adams telephoned EPD officials to complain about about odors and pesticide runoff from the site. In August 1975, another resident (who no longer lives in Powersville) wrote to EPA 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 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 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 methodlogies 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 degredation of a potential drinking water source. We do not believe that this concern can be adequately addressed by the 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 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 minitoring 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 chomium 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 gama 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, drycleaning 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.

FEASIBIITY 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 labelled "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 indentifies "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 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 containined 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 not 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 short-term contact. Further, even if a risk were present, various cost 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 exeed 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 continous 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 concentrations 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 continous, 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 exist at the Site. Further, even if such risks were present, the fencing and posting of signs contmplated by a no-action alternative would eliminate any pratical 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 exist, 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 continous 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 it 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 indentified. What efforts were used to research PRPs? The presence of such contaminants as vinyl choride, 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 corrolate these waste types with other businesses that exist or once existed in Peach County? Did EPA retain a professional search firm to indentify 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° 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 Woolfork 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° 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 indentifies 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 offsite 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 disharge, 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 exist 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 phoionization 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 indentified 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 allong with all others? There appears to be an effort to eliminate "no action" from serious consideration early n the evaluation process. Why are the "potential impacts" of "no action" discussed in the initial disscusions, while such impacts were not considered in the initial discussions of the other technologies indentified?

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 indentified.

- 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 soley 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 consituents 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 offsite wells are not being violated. In fact, the highest concentration of any contaminant detected in an offsite will is less the highest concentration of any contaminant detected in an offsite 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 fo 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 offsite 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 a 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 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? Offsite 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 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 sourcewill be made during the Remedial Design. For cost purposes, a 1/2 mile radius downgradient 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 alternatives? 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 hazardous waste remedial actions and represent a "best estimate" for the site. Drainage cost estimates are provided for the constuction of ditches, culverts, etc., that will be needed to provide proper drainage for the site once a cap is constructed. The additional comments corncerning 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 assessment upon which the assessment is based are admittedly unrealistic and unlikely, how can they be seriouslly 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 silmilar 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 contmaination are not currently a concern at the site, but due to onsite 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 runnoff 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 warrented. 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 exeeded.

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-dicholroethane, are more likely to leach from soil to groundwater, whereas the less soluable pesticides will remain in the soil for a longer period. The second issue relates to potential exceedences 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 Characterizationis 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 exess lifetime cancer risk due to groundwater and soils ingestion by a factor of ten or more.

EPA response: We believe that 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.
SECURITY
FARM AND GARDEN PRODUCTS
Box 938, Fort Valley, Georgia 31030 • (912) 825-5511

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

Ed Chambless
Plant Manager

EC/js

enclosures

WOOLFOLK CHEMICAL WORKS, INC.
SECURITY
FARM AND GARDEN PRODUCTS
Box 938, Fort Valley, Georgia 31030 • (912) 825-5511

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 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

WOOLFOLK CHEMICAL WORKS, INC.
FARM AND GARDEN PRODUCTS
Box 938, Fort Valley, Georgia 31030 • (912) 825-5511

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

DATE	QUANTITY	DESCRIPTION
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.
FARM AND GARDEN PRODUCTS
Fort Valley, Georgia 31030 • Telephone (912) 825-5511

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

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
	½ 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

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
	1¼ 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.	EMULSONINE 3-E
	2 lb.	SENCOR
	1 gal.	3-D's

OBSOLETE MATERIALS BURIED AT DUMP
1977

DATE	QUANTITY	DESCRIPTION
5/2/77	1 quart	CITOWETT PLUS
	1	Empty Quart Dursban 2-EC
	½ 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.	DURSBAN 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 - ¼#	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
	4½ 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

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 DACONIL
	5 gallons	H_2O
	1	5 gallon Empty Jug
	1	Captan Empty Jar
	2 lb.	CAPTAN
	1½ 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	FALONE
	1 gallon	BELT MP
	1 gallon	ROYAL TAC
	1 sack	PEANUT SEED

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 INOCULANT
	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
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

OBSOLETE MATERIALS BURIED AT DUMP
1977

DATE	QUANTITY	DESCRIPTION
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

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-8SZ Bag
	1000	Pentac Empty Bag
9/28/78	1 Load	Floor Sweeping From Shipping Whse.

UNITED STATES DEPARTMENT OF AGRICULTURE
AGRICULTURAL RESEARCH SERVICE
SOUTHERN REGION
SOUTHEASTERN FRUIT AND TREE NUT RESEARCH STATION
P. O. Box 87
BYRON, GEORGIA 31008

February 28, 1974

The following list of agricultural chemical containers are delivered for disposal:

No.	Chemical	Container size: Metal	Container size: Plastic	Container size: Pape
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 l
10	Du-ter			5 l
10	Sevin 50W			5 l
2	Chlorodane	30 gal drums		

Delivered by Adam Marshall