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REPORT ON
LEACHATE RECIRCULATION

AT

PIEDMONT LANDFILL AND RECYCLING CENTER

MARCH, 1994

PROJECT NO. 81857.000

P. BRYAN WRIGHT
3/22/94

PREPARED BY:

RUST ENVIRONMENT & INFRASTRUCTURE
GREENVILLE, SOUTH CAROLINA

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EXECUTIVE SUMMARY

Piedmont Landfill & Recycling Center has completed a twelve month study of leachate recirculation through domestic solid waste within a lined landfill cell. The project operated almost twelve months and was functioning properly until discontinued October 8, 1993 as required by the North Carolina Department of Environment, Health and Natural Resources (NC DEHNR). Results of the twelve month trial indicate that recirculating solid waste leachate through refuse can be done effectively with available equipment and without jeopardizing the environment. Additionally the analytical data collected alludes to the possibility that other beneficial effects of leachate recirculation (improved consolidation of refuse, increased gas production, and treatment of leachate as well as volume reduction) could be realized if the project had continued. These latter benefits are generally recognized to require longer than 12 months to become optimized.

INSTALLATION/OPERATION

This report discusses the installation and operation of the recirculation system. Data includes details about the construction of the leachate recirculation system, results of the analytical testing, and summary of recirculation flows.

Recirculation of leachate was done in a lined area of Piedmont Landfill (see Drawing C1, Appendix A) using equipment and materials adapted from use as an irrigation and/or treated wastewater disposal systems. The "Perc - Rite"TM Disposal System, as provided and installed by Waste Water Systems, Inc., Lilburn, Georgia, used leachate directly out of the cell's slope riser (sump) to recirculate through refuse.

Leachate was pumped out of the sump and recirculated through a network of dripperlines. There were two (2) separate zones each covering an area of 5,000 sq. ft. (see Drawing C2). Each zone consisted of 2,500 feet of dripperline spaced two (2) feet apart. Dripperline is small (1/2 inch) diameter polyethylene tubing with patented emitters at 2 foot intervals. The emitters maintained a uniform pressure and flow throughout the disposal field. Drawing C3 shows the typical field installation.

Control of leachate flows and system status was accomplished using telemetry by telephone from Lilburn, Georgia. The automatic control unit in the recirculation system (Model 20, with stainless steel pump and Model FA controller, by Waste Water Systems Inc.) was housed in a temperature controlled enclosure. The PLC controller with software were developed by Waste Water System, Inc. for use in their equipment.

Included in the control unit on site were control valves, filters and pumps (see Drawing C4 - Appendix A). Filters were disk type capable of removing solids of 115 microns and larger. The unit, automatically or when directed, would backwash the disk filters or dripperline network.

The system allowed leachate application rates to be varied and differences between each cell observed. The automatic system controller monitors:

- Total flows to each field
- Length of time pumps operate
- Frequency of filter backwashing

The processor is able to compile data as well as identify and communicate error conditions so corrections can be made remotely.

Sampling and monitoring of leachate and other parameters was performed through monitoring wells, vents, tensiometers, and lysimeters advanced into cover material over the refuse. Drawing C2 shows the locations of monitoring points as follows:

- Wells were positioned to monitor background values, Well #1; Recirculation Zone 1, Well #2; and Recirculation Zone #2, Well #3 (see Drawing C2).
- Monitoring wells; 2 inch PVC pipes as shown on Drawing C7 and C8. Monitoring wells collected free liquid available in the cover material and underlying refuse in perforated pipes. Wells provided the means to sample water from each recirculation zone. The liquid sampled was primarily leachate as well as moisture present in the intermediate cover.

- Tensiometers and gypsum blocks were used to measure moisture conductivity at the interface between the refuse and interim cover, and 3 to 4 feet deep in refuse layers. Freezing weather in January 1993 required additional tensiometers to be installed because the original units were no longer effective.
- Gas vents were installed to provide a means to collect samples of gas from each zone. The projects duration was to short to collect meaningful data.

In addition, daily inspections were performed by landfill personnel to monitor the fields condition and assure no problems were being caused by the system. Copies of the daily reports are in Appendix D.

HISTORICAL OPERATIONS

A. Recirculation

Construction of the recirculation system was completed November 24, 1992. Prior to the date when the system was to be activated two (2) inches of rain fell in two (2) days. The recirculation system was activated Tuesday, November 24, 1992 and leachate was recycled every two (2) hours at 100 gallons per zone per 2 hours during seven working days. Total leachate recycled was 7,250 gallons. From Monday, December 7, 1992 through Thursday the 10th, leachate flows were low and the system was only able to recycle 1,092 gallons. A total for the initial two weeks was 8,342 gallons.

In January and February 1993 the system was only operated intermittently because of freezing weather and low leachate volume. A shortage of available leachate in the sump, from where it was being withdrawn, was solved by redirecting leachate from other cells. A tie-in to the force main transporting leachate from other cells to storage tanks was made and flows redirected to augment the test cell sump. In March 1993 the recycle system was operational again and the system stayed operational until October 8, 1993 when it was shut down. The system was only operated during normal business hours Monday through Friday.

Flow data shown in Table 1 covers the seven months for which data has been collected. Flows are shown by zone as total gallons pumped and total hours of pumping.

TABLE 1

MONTHLY LEACHATE RECIRCULATION VOLUMES
PIEDMONT LANDFILL AND RECYCLING CENTER

MONTH	ZONE 1 (gallons)	ZONE 2 (gallons)	HOURS** OF PUMPING
MARCH	4,468	6,563	10:43:51
APRIL	4,989	8,143	12:24:35
MAY	5,432	9,017	18:09:45
JUNE	5,287	3,921	14:53:05
JULY	2,411	1,279	7:11:10
AUGUST	605	485	2:58:35
SEPTEMBER*	5,444	3,301	14:30:10

*Included 6 days in October 1993

**Includes both zones (hours:minutes:seconds)

Throughout the project, recirculation was constrained due to limited leachate volumes available. Low amounts of rainfall, the principle contributor to leachate generation, was the main reason there was insufficient liquid even after the tap into the leachate force main was completed.

Initial loading/application rates were projected to be 0.05 and 0.1 gallons per square foot per day. It was originally hoped that a variety of loading rates could be used and system capacity could be studied. However, because of a lack of leachate, the initial rates could not even be sustained. There were only fifteen (15) days when leachate availability allowed recycling at rates equal to those desired, see Table 2.

Appendix C contains flow information in monthly summary sheets.

B. Analytical Sampling

Sampling was performed once a month. Each month a sample of water was taken from the shallow monitoring wells and analyzed for:

- Total Organic Carbon (TOC)
- Organic Nitrogen and Ammonium (Total Kjeldahl Nitrogen, TKN and Ammonia)
- Nitrate Nitrogen (NO₃)
- Phosphorous (P)
- Lead (Pb)
- Zinc (Zn)
- Copper (Cu)
- Nickel (Ni)
- Cadmium (Cd)

In addition, resistance was measured in each of the three monitoring wells to indicate relative moisture levels.

TABLE 2

DAYS OF PEAK LEACHATE RECIRCULATION
 PIEDMONT LANDFILL AND RECYCLING CENTER

DATE	ZONE 1		ZONE 2		TIME OF PUMPING (hrs:min:sec)
	FLOW (gallons)	APP. RATE (gal/SF)	FLOW (gallons)	APP. RATE (gal/SF)	
5/6/93	336	0.07	704	0.14	0:58:33
5/7/93	504	0.10	1056	0.21	1:44:37
5/8/93	420	0.08	630	0.13	0:57:12
5/11/93	420	0.08	830	0.17	1:30:17
5/12/93	588	0.12	1163	0.23	2:17:57
5/13/93	504	0.10	998	0.20	2:24:31
5/14/93	671	0.13	1287	0.26	2:30:07
5/15/93	336	0.07	705	0.14	1:21:59
5/17/93	168	0.03	332	0.07	0:28:26
5/18/93	252	0.05	352	0.07	0:38:26
5/21/93	252	0.05	528	0.10	0:42:26
5/22/93	168	0.03	278	0.06	0:24:45
6/16/93	2673	0.54	1952	0.39	7:07:02
6/21/93	420	0.08	283	0.06	1:04:21
6/29/93	420	0.08	349	0.07	1:09:49

Table 3 presents results of the analysis performed on monitoring well samples during the projects 12 month duration. Also shown are monthly totals of leachate pumped to each zone. Information for the first four (4) months during start-up is inconsistent and is not shown. A minimum of 500 ml is required to conduct all tests. Both in February, when liquid in the monitoring wells froze, and late summer, (August and September) when it was too dry, the monitoring well yielded insufficient volumes of liquid for analysis.

Organic constituents (TKN, TOC, and NO_3) are expected to increase in strength when moisture in the form of recirculated leachate is introduced into the refuse. These are indicators of biological activity within the refuse as it begins to decompose. A byproduct of this reaction is also increased gas production.

Increases in the chemical parameters (P, Pb, Zn, Cu, Ni, and Cd) are the result of deposition and concentration from leachate making repeated passes through the refuse. Significant increases in these constituents is not expected to occur until the process has been underway for eighteen months, possibly more.

Analytical results from Table 3 are plotted in Appendix B.

- Figures 1 and 2 represent the fluctuation of TKN and TOC over the 12 month project compared with the rate of leachate recirculation.
- Figures 3 and 4 show the fluctuation of nitrate, phosphorous, zinc, copper, nickel and cadmium for Monitoring Wells 2 and 3 over the 12 month period.
- Figures 5 and 6 compare the variation in TOC and TKN for all 3 monitoring wells, representative of biological activity.

It is obvious that from the projects inception (November 1992) until it was ended (October 1993) there was a distinct increase in biological activity corresponding to the volume of leachate recirculated. The levels of measured parameters, biological and chemical, showed fluctuations but little sustained increase. Phosphorous, zinc, copper, nickel and cadmium were found in some samples but do not show a consistent pattern of increasing

TABLE 3
 RESULTS OF MONTHLY ANALYTICAL DATA
 NOVEMBER 1992 THROUGH OCTOBER 1993
 LEACHATE RECIRCULATION PROJECT
 PIEDMONT LANDFILL & RECYCLING CENTER

LOCATION: BACKGROUND Well # 1

ITEM	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
TOC	21.10	9.22	24.80	**	40.80	55.00	18.10	17.00	*	*	*	*
TKN	1.50	2.50	2.20	**	2.10	2.50	2.90	2.70	*	*	*	*
NO3	0.01	0.02	0.02	**	0.02	0.02	0.02	0.01	*	*	*	*
P	0.06	0.02	0.02	**	0.03	0.03	0.02	0.03	*	*	*	*
Pb	cnd	cnd	cnd	**	cnd	cnd	cnd	cnd	*	*	*	*
Zn	cnd	cnd	0.01	**	0.01	0.01	cnd	cnd	*	*	*	*
Cu	cnd	cnd	0.01	**	0.01	0.01	cnd	0.01	*	*	*	*
Ni	cnd	cnd	cnd	**	cnd	cnd	cnd	cnd	*	*	*	*
Cd	cnd	cnd	cnd	**	cnd	cnd	0.01	0.01	*	*	*	*

LOCATION Well # 2, Recirculation Zone #1

ITEM	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
TOC	27.80	41.00	68.00	**	89.20	122.00	251.40	496.00	348.00	*	*	391.00
TKN	1.80	3.60	14.10	**	15.70	31.50	34.20	47.10	55.10	*	*	51.90
NO3	0.02	0.23	0.22	**	0.07	0.18	0.20	0.14	0.10	*	*	0.10
P	0.05	0.03	0.06	**	0.07	0.08	0.08	0.09	0.10	*	*	0.03
Pb	cnd	cnd	cnd	**	cnd	cnd	cnd	cnd	cnd	*	*	cnd
Zn	cnd	cnd	cnd	**	0.02	0.02	0.01	0.01	0.01	*	*	cnd
Cu	cnd	cnd	cnd	**	cnd	0.01	cnd	0.01	0.02	*	*	0.01
Ni	cnd	cnd	cnd	**	cnd	cnd	cnd	0.09	0.01	*	*	cnd
Cd	cnd	cnd	cnd	**	cnd	0.01	cnd	0.01	cnd	*	*	cnd

GALLONS

PUMPE (X10) 446.8 498.9 543.2 528.7 241.1 60.5 544.4

LOCATION Well # 3, Recirculation Zone #2

ITEM	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
TOC	20.10	55.00	205.00	**	248.00	138.00	251.00	496.00	419.00	*	*	354.00
TKN	2.20	5.20	15.00	**	15.10	32.90	38.10	50.40	48.80	*	*	50.40
NO3	0.02	0.22	0.24	**	0.16	0.20	0.27	0.33	0.30	*	*	0.22
P	0.10	0.03	0.06	**	0.12	0.13	0.13	0.27	0.20	*	*	0.07
Pb	cnd	cnd	cnd	**	cnd	cnd	cnd	cnd	cnd	*	*	cnd
Zn	cnd	0.01	cnd	**	0.01	0.02	0.02	0.02	0.01	*	*	0.02
Cu	cnd	cnd	cnd	**	0.01	0.01	0.01	0.01	0.01	*	*	0.01
Ni	cnd	cnd	cnd	**	cnd	cnd	cnd	0.09	0.09	*	*	cnd
Cd	cnd	cnd	cnd	**	0.01	cnd	0.01	0.01	0.01	*	*	cnd

GALLONS

PUMPE (X10) 656.3 814.3 901.7 392.1 127.9 48.5 330.1

units= mg/l except for gallons pumped

cnd= Compound Not Detected

* Sample volume insufficient for analysis

** No samples available because of freezing

concentration. Each element, except lead, appears at least once in a sample from each monitoring well. Besides TKN and TOC only phosphorous and nitrate are present throughout the projects duration.

C. Inspections

Inspections of the project were performed by landfill personnel each day that leachate was being recirculated. Records were kept on daily logs, copies of which are in Appendix D.

The daily logs show that the only instances of system failure were due to outside influences. Specifically, operations were interrupted due to:

- Construction equipment cut telemetry cable
- Leachate volumes were insufficient to sustain loadings
- Leachate froze in the pipeline during February and prevented equipment from operating

Additionally, no instances of leachate seeping to the surface was observed.

CONCLUSIONS

Although this project did not operate the full 18 months as originally planned and a shortage of leachate limited opportunities to vary recirculation rates; it demonstrated that the equipment is an effective means of returning leachate into the refuse.

Conclusions include:

- Leachate recycling can be accomplished automatically and effectively through refuse with the "Perc Rite"TM Disposal System.
- Presence of bentonite clay particles in the leachate caused the filters to require frequent backwashing.

- Biological activity increased within the refuse as evidenced by increased TKN, TOC and NO_3 measurements. This can be attributed to adding moisture to the refuse which encouraged biological decomposition of the organics within the refuse.
- Application rates of 0.10 gal/sf per 8 hours are possible. Higher rates with the equipment and method of installation are possible.

RECOMMENDATIONS

The limited duration of the project and shortage of leachate available to recirculate were the primary obstacles to this project. Another recirculation project should be developed that will include:

- Larger reservoirs for leachate storage so uniform loading rates can be sustained.
- Continuous recirculation (24-hours per day, 7 days per week).
- Recirculation rates should be increased until a range of values is developed. Rates of 1.0 to 1.25 gallons per square foot per day should be applied.
- Recirculation system needs to be insulated and protected from freezing temperatures.
- The system should be tried with additional layers of refuse over the recirculation field.
- Gas collection and measurement for a longer duration.

APPENDIX A
INSTALLATION DRAWINGS

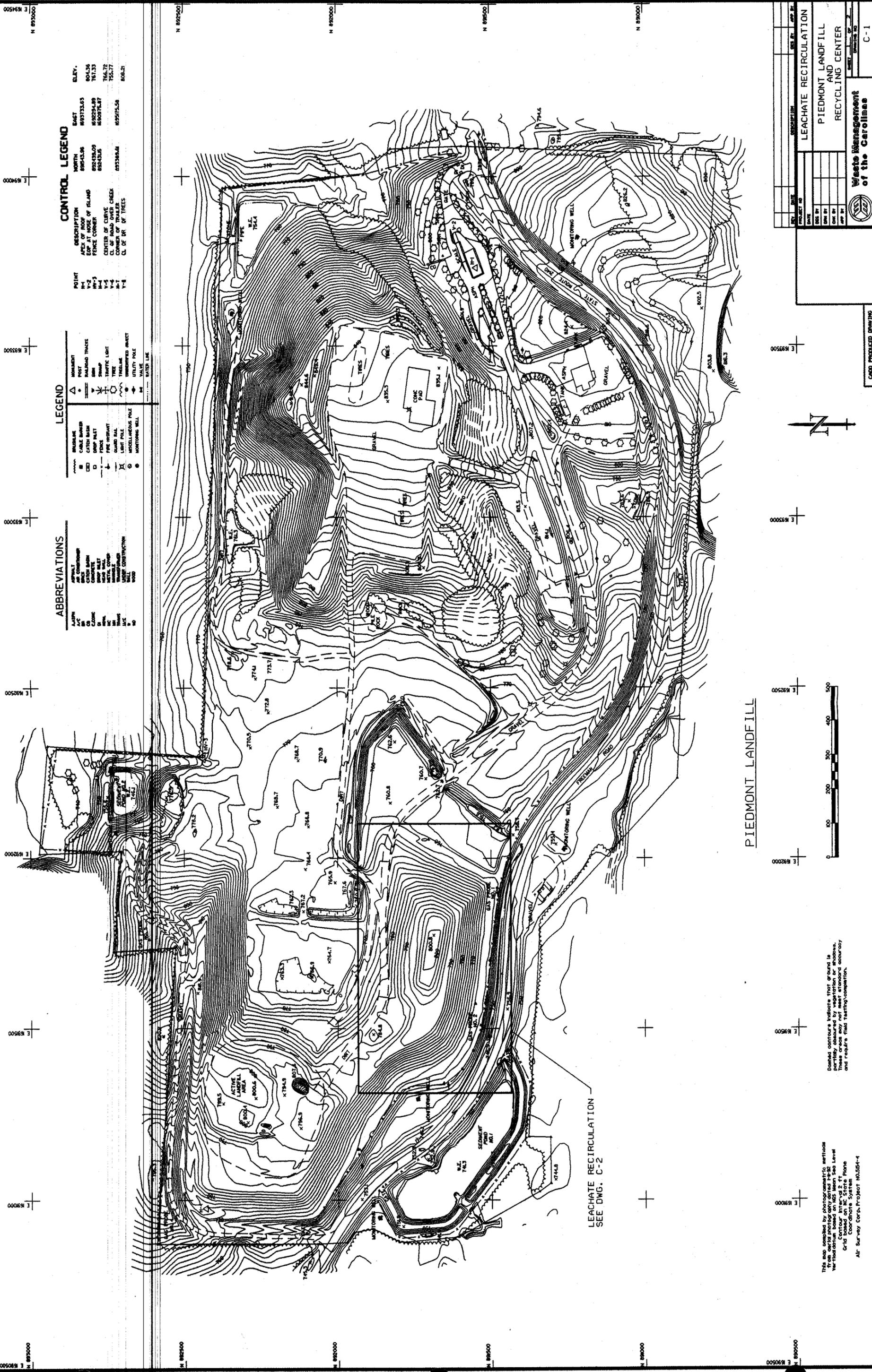
APPENDIX A

INSTALLATION DRAWINGS

DRAWING

DESCRIPTION

C1	Piedmont Landfill & Recycling Center
C2	leachate Recirculation System
C3	Dripperline Installation
C4	Leachate Recirculation System Schematic
C5	Sump Cross Section
C6	Check Valve Detail
C7	Monitoring Well Detail
C8	Monitoring Well Detail



CONTROL LEGEND

POINT	DESCRIPTION	ELEV.
BM	AREA OF ROCK	804.36
BM-2	TOP AT NOSE OF ISLAND	767.33
BM-3	FENCE CORNER	766.72
BM-4	CENTER OF CURVE CHECK	755.77
BM-5	CL OF ROAD OVER CHECK	808.21
BM-6	CORNER OF TRAILER	
BM-7	CL OF DR OF TREES	

LEGEND

SYMBOL	DESCRIPTION
▲	MONUMENT
○	POST
—	RAILROAD TRACKS
—	ROAD
—	SEWER
—	WATER MAIN
—	UTILITY POLE
—	VALVE
—	WATER LINE

ABBREVIATIONS

SYMBOL	DESCRIPTION
ASPH	ASPHALT
CONC	CONCRETE
GRV	GRAVEL
WOOD	WOOD
BRK	BRICK
CL	CLAY
CM	COMMON
CS	CORNER
CR	CURB
DR	DRAIN
EM	EMERALD
GL	GLASS
GR	GRASS
IR	IRON
MC	MASONRY
MS	METAL SHEET
MT	METAL
PL	PLASTER
ST	STEEL
TR	TRUSS
WC	WOOD

REV.	DATE	DESCRIPTION

PROJECT NO. _____

DATE _____

DRAWN BY _____

CHECKED BY _____

APP. BY _____

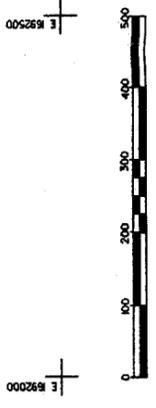
LEACHATE RECIRCULATION

PIEDMONT LANDFILL AND RECYCLING CENTER

Waste Management of the Carolinas

C-1

CARD PRODUCED DRAWING

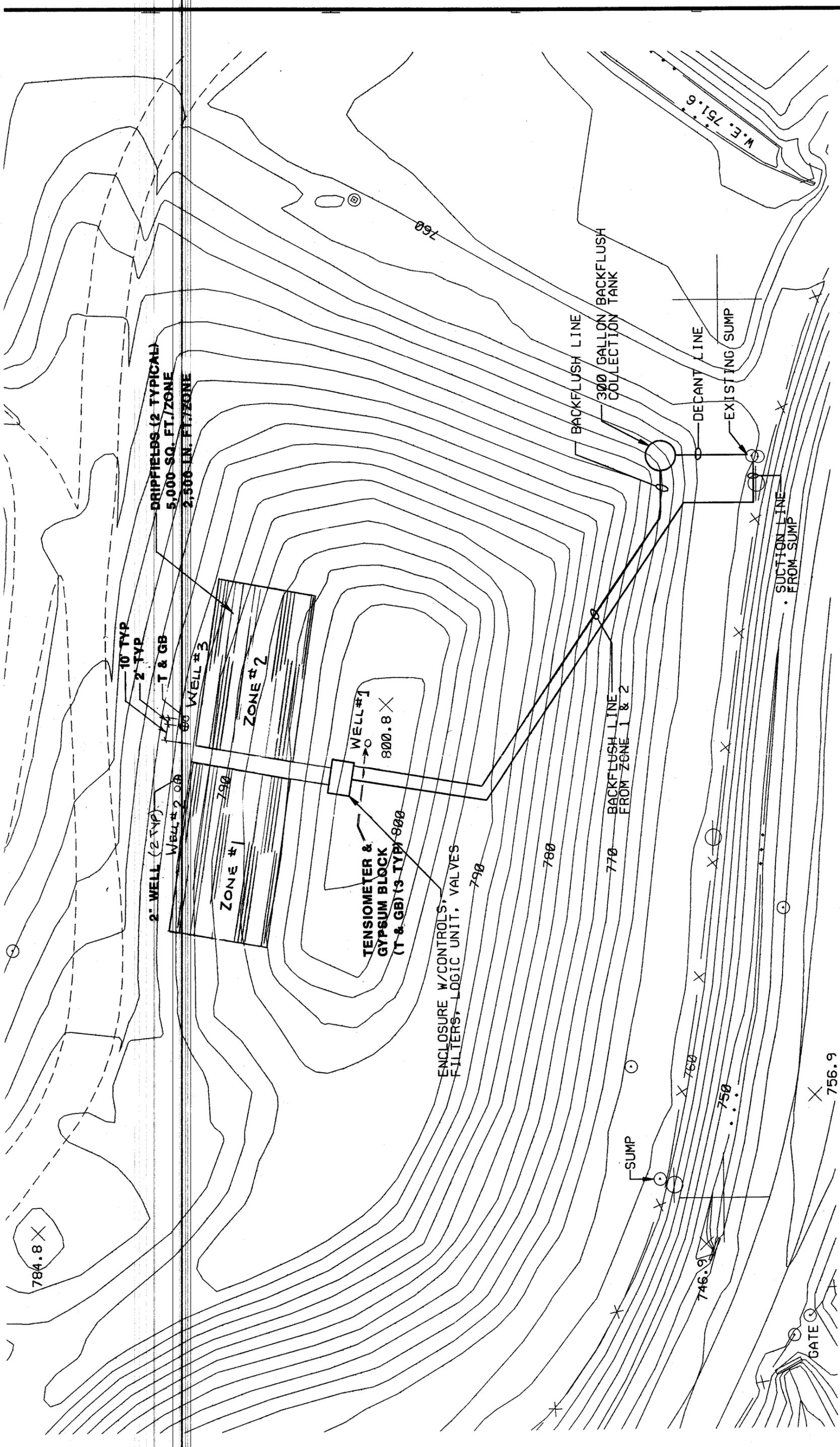


Darked contours indicate that ground is partially obscured by vegetation or shadows. These areas may not meet standard accuracy and require field testing/verification.

This map compiled by photogrammetric methods using aerial photography. Contours are based on 1985 Mean Sea Level. Contour interval is 2 feet. Grid Coordinates System: NAD 83. Air Survey Corp. Project NO.554-4

LEACHATE RECIRCULATION
SEE DWG. C-2

PIEDMONT LANDFILL



LEACHATE RECIRCULATION SYSTEM

CONTOUR INTERVAL
SEE DRAWING C-1
FOR LEGEND



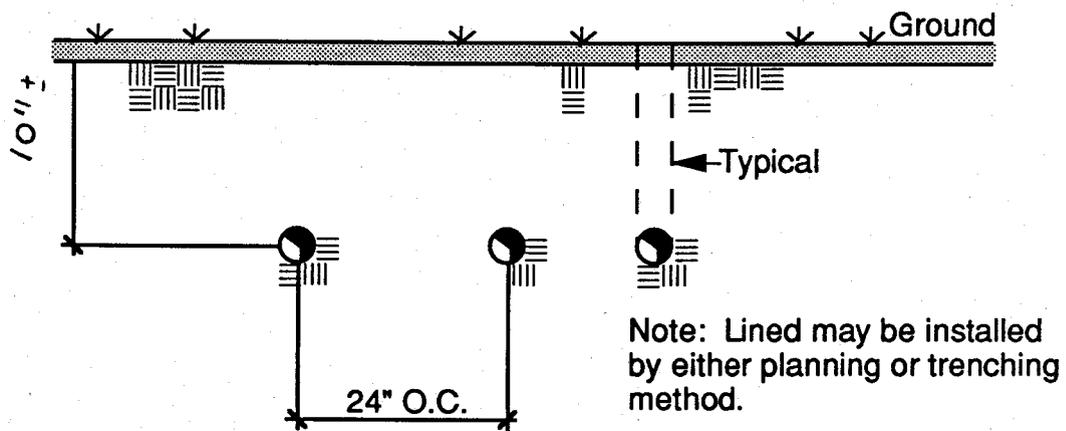
SCALE: 1" = 50'

REV	DATE	DESCRIPTION	BY	APP'D BY
1	6/30/98	Well Relocation	RG	RG

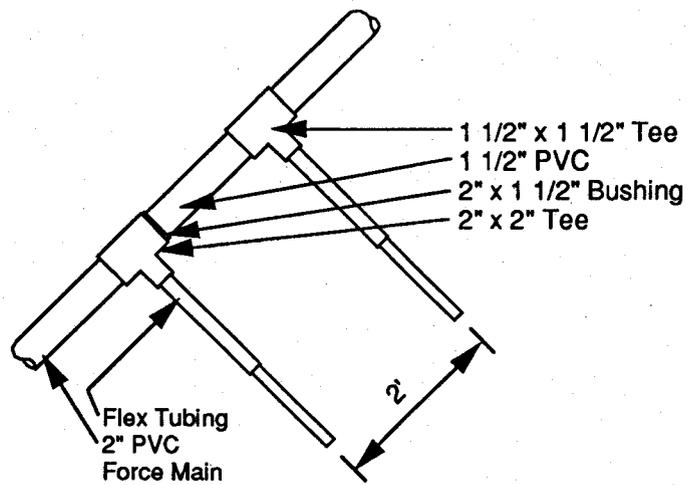
PROJECT NO.	LEACHATE RECIRCULATION
DRAWN BY	PIEDMONT LANDFILL AND RECYCLING CENTER
CHECKED BY	
APP'D BY	

Waste Management of the Carolinas	
SHEET	2 OF 2
DATE	6/30/98
SCALE	C-2

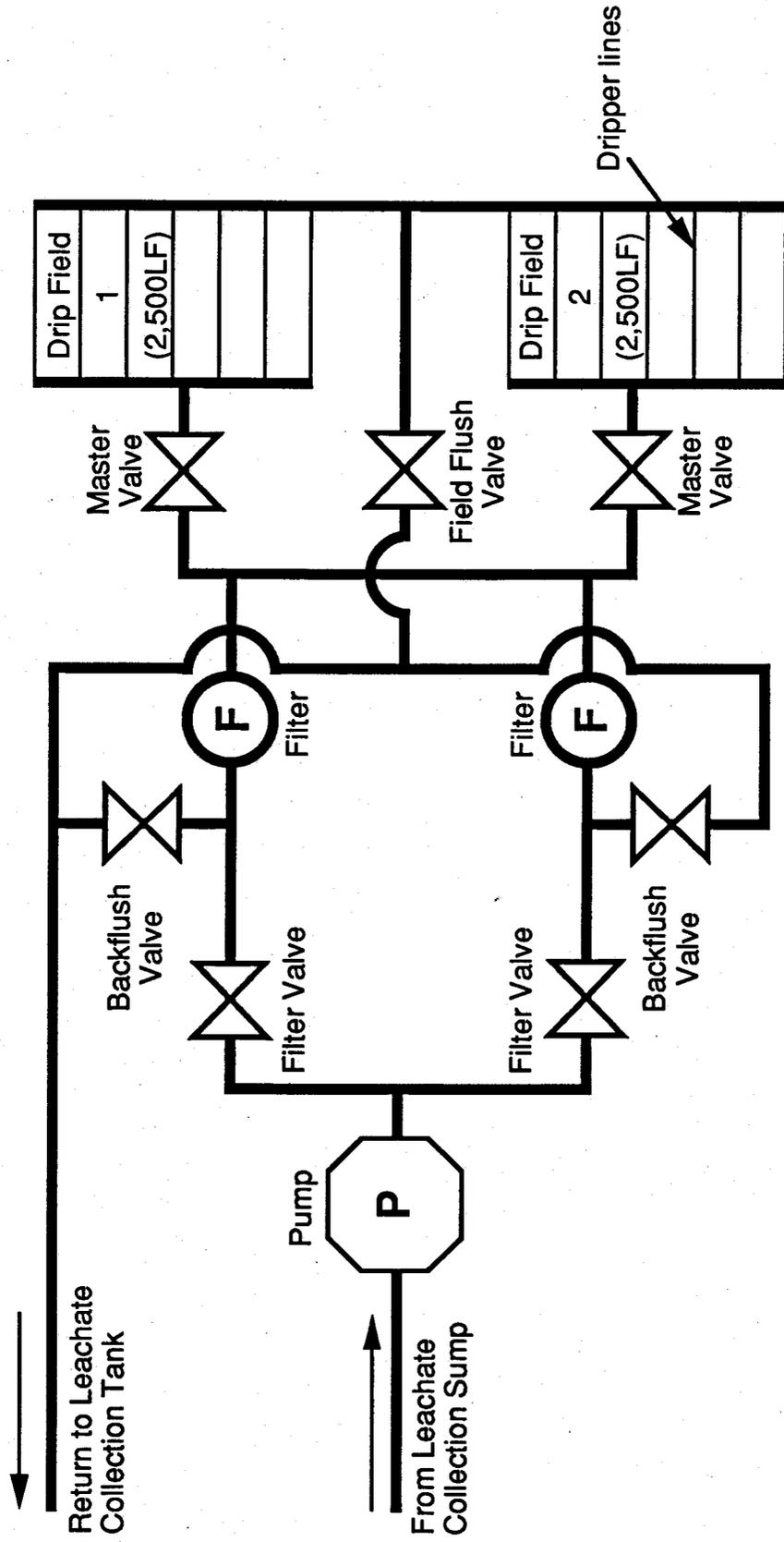
CAD PRODUCED DRAWING



Dripperline Installation Detail



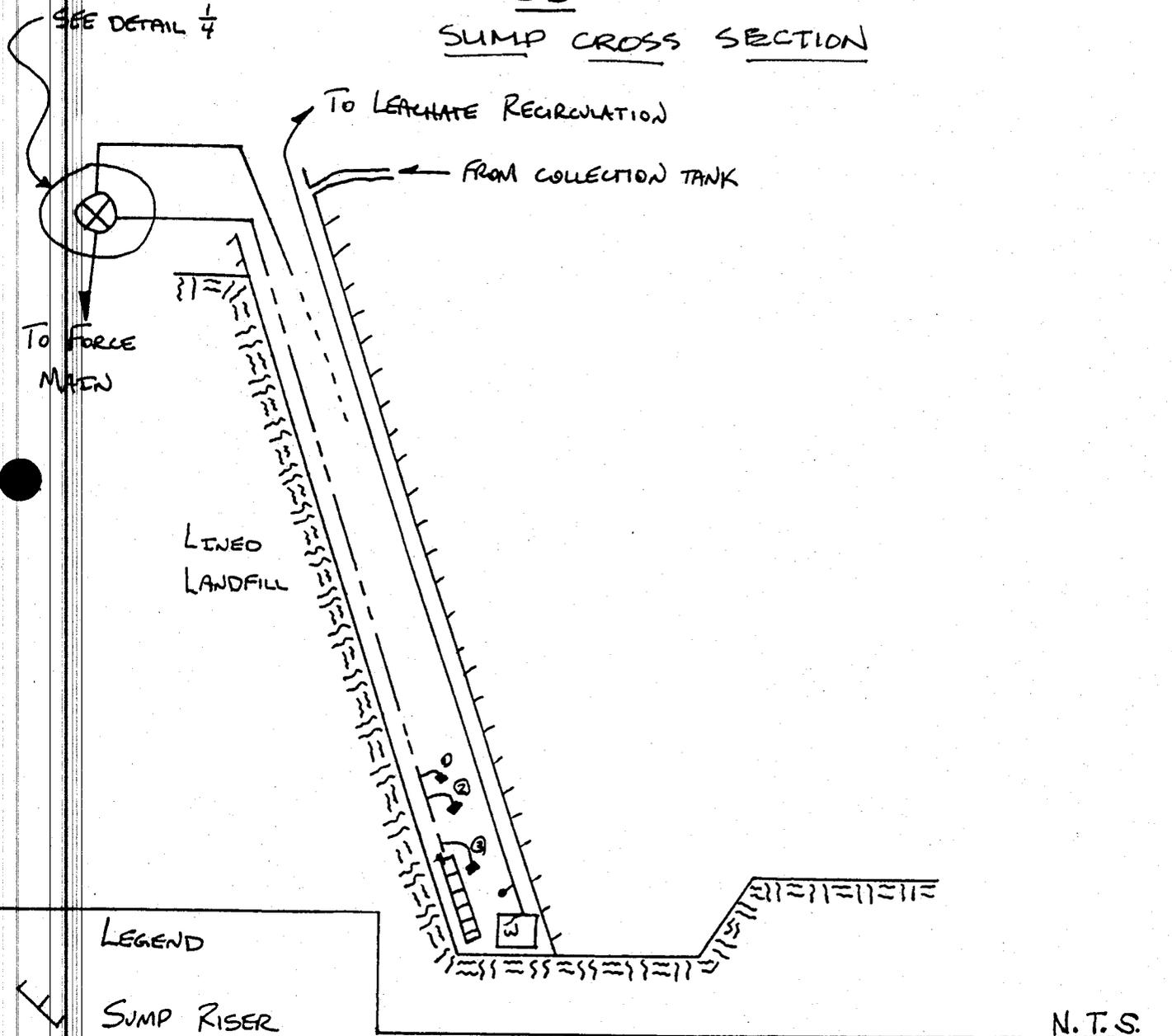
Transition to Dripperline



DETAIL $\frac{1}{3}$

C5

SUMP CROSS SECTION



LEGEND

-  SUMP RISER
-  WASTE WATER SYSTEMS PUMP
-  PLRC LEACHATE PUMP
-  PLRC PUMP DISCHARGE HOSE
-  PLRC SIGNAL SWITCHES
-  WASTE WATER SYSTEMS SWITCH
-  FORCE MAIN RETURN LINE

N.T.S.

CLIENT WMI Piedmont

SUBJECT CHECK VALVE DETAIL

Prepared By C.E.H. Date 2-4-93

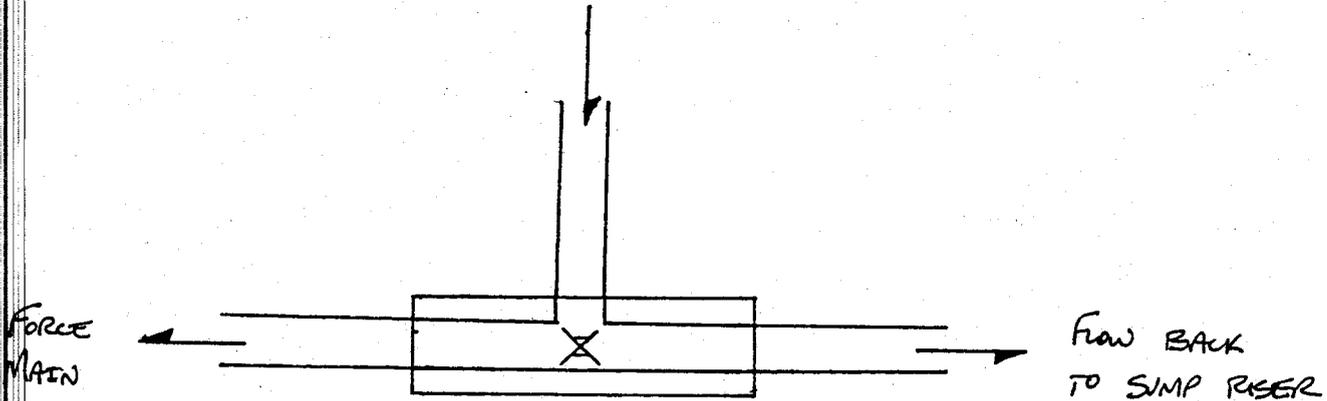
PROJECT LEACHATE RECURVATION

Reviewed By _____ Date _____

Approved By _____ Date _____

DETAIL $\frac{1}{4}$

CG
CHECK VALVE DETAIL
LEACHATE PUMP



VALVE SYSTEM IS ELECTRICALLY CONTROLLED. WHEN LEACHATE RECURVATION SYSTEM NEEDS LEACHATE, THE VALVE OPENS TO ALLOW LEACHATE FROM THE FORCE MAIN TO FLOW INTO THE EXISTING SUMP. THE VALVE WILL CLOSE WHEN THE SUMP LEACHATE PUMP IS TURNED ON. THE PRL LEACHATE PUMP IS THE CONTROLLING FACTOR FOR OPERATION OF THE VALVE.

N.T.S.

CLIENT WMI PLRC

SUBJECT MONITOR WELL

Prepared By CEH Date 2-5-93

PROJECT LEACHATE REGENERATION

PIEZOMETER DETAIL

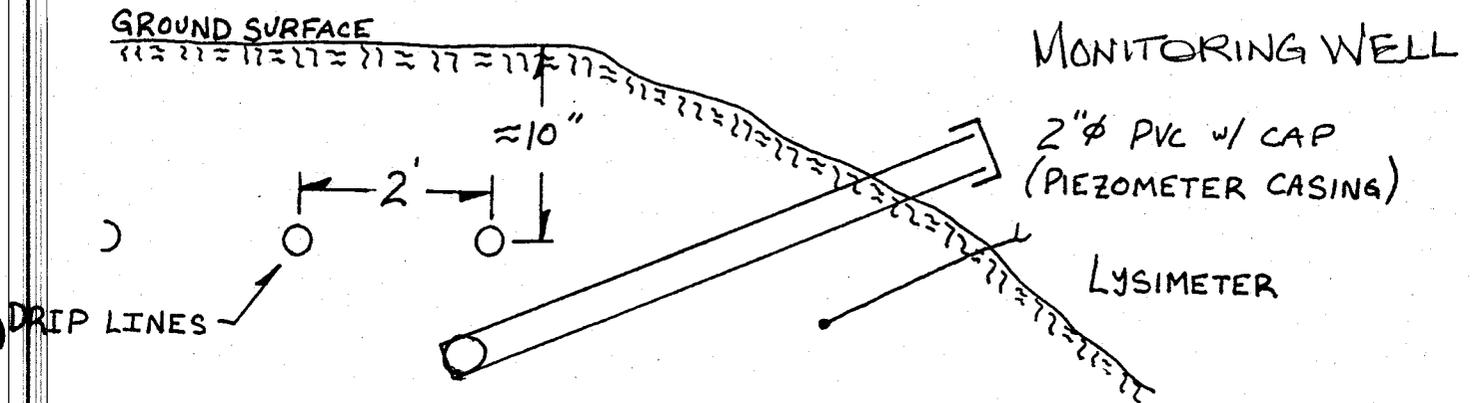
Reviewed By _____ Date _____

Approved By _____ Date _____

DETAIL $\frac{1}{5}$

C7

MONITORING WELL DETAIL



TYPICAL PIEZOMETER AND LYSIMETER ARRANGEMENT. SET TO AN APPROXIMATE DEPTH OF 6 ft (2 TO 3 VERTICAL FEET BELOW DRIP FIELD).

N.T.S.

CLIENT Piedmont L/F

SUBJECT 2" WATER

Prepared By Date

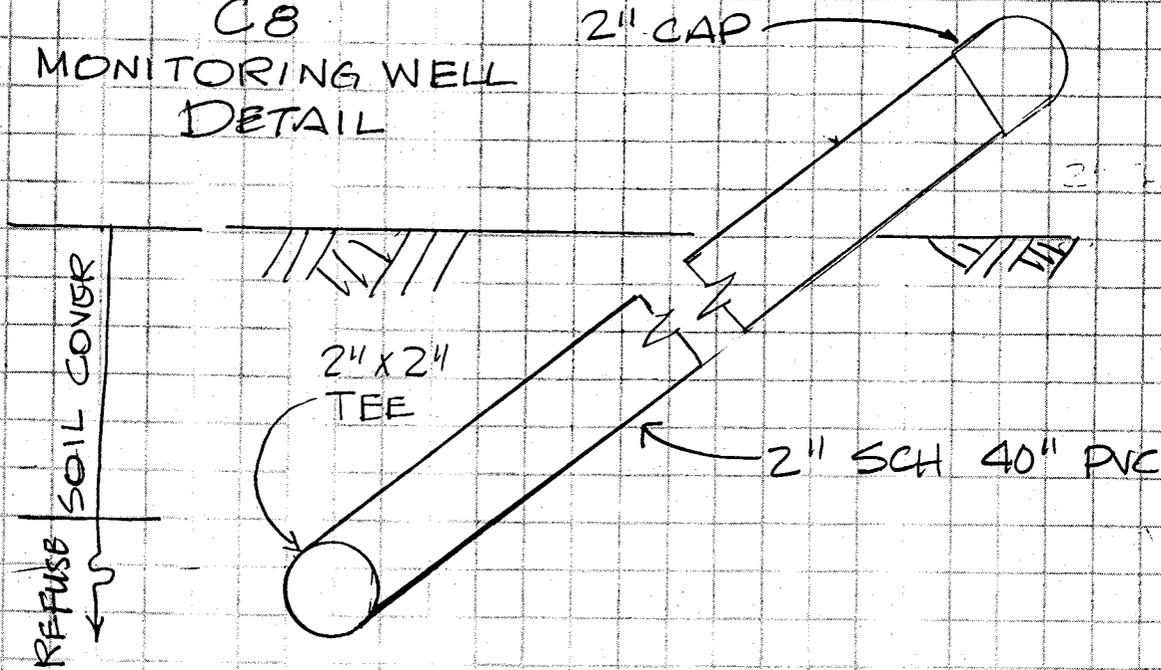
PROJECT Leachate
Recirculation

MONITORING WELLS

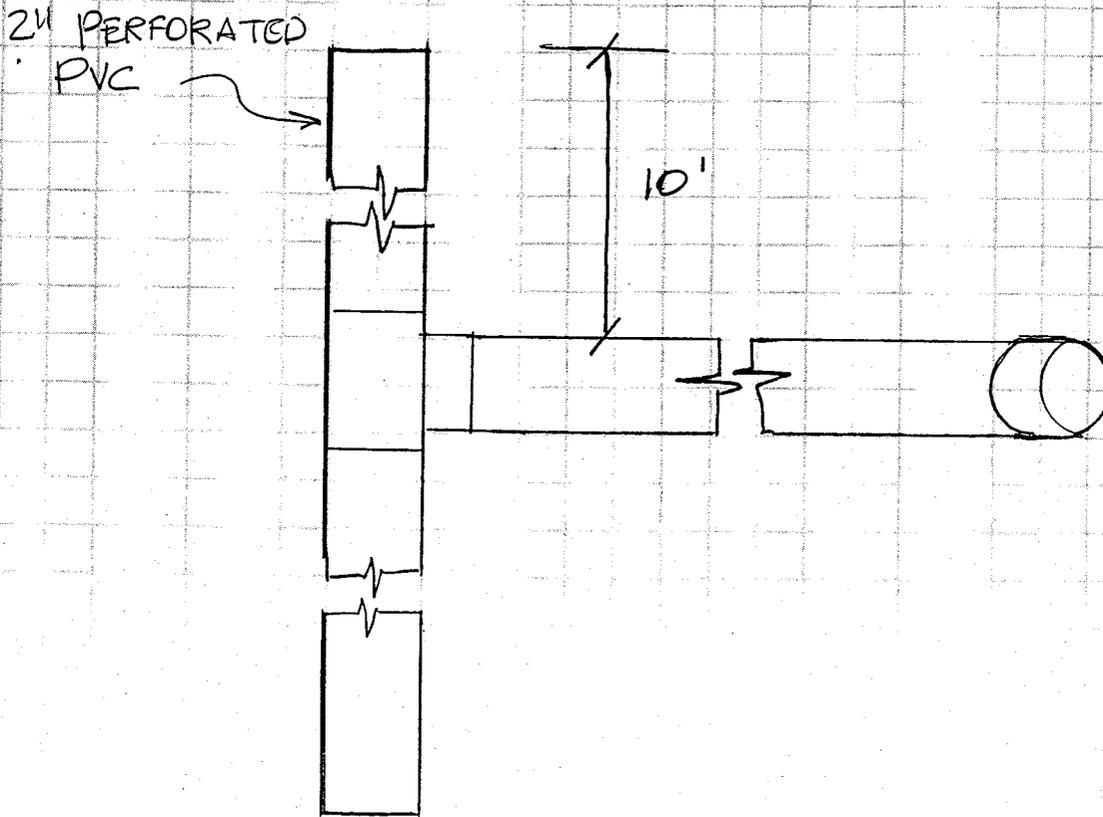
Reviewed By Date

Approved By Date

C8
MONITORING WELL
DETAIL



SECTION



PLAN

APPENDIX B

PLOTTING OF ANALYTICAL DATA

FIGURE 1
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELL # 2

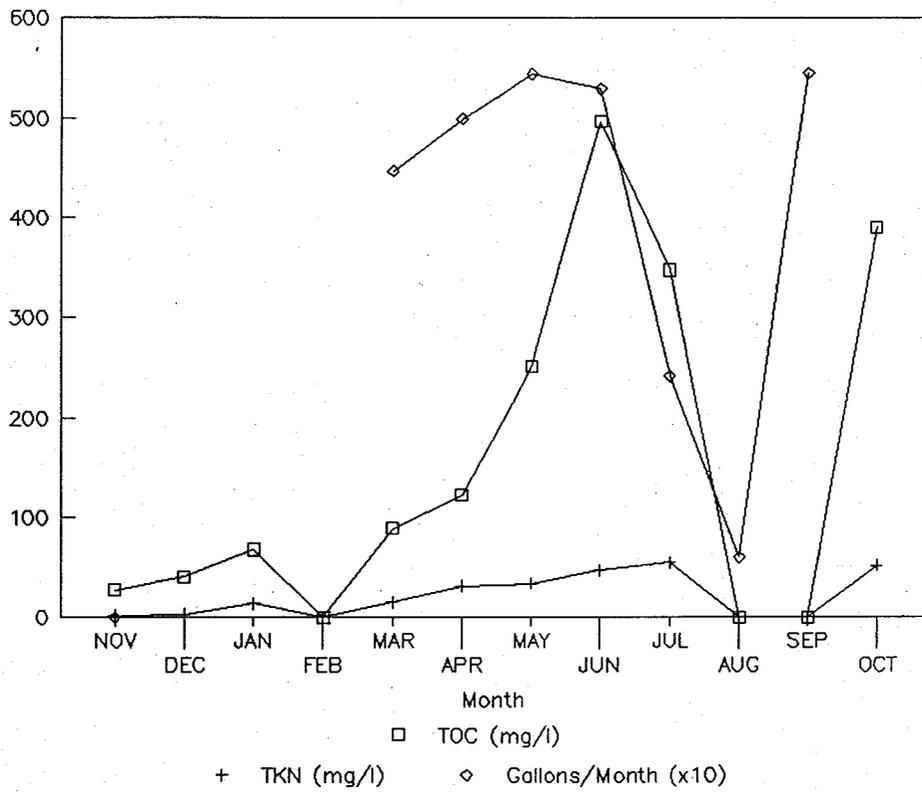


FIGURE 2
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELL # 3

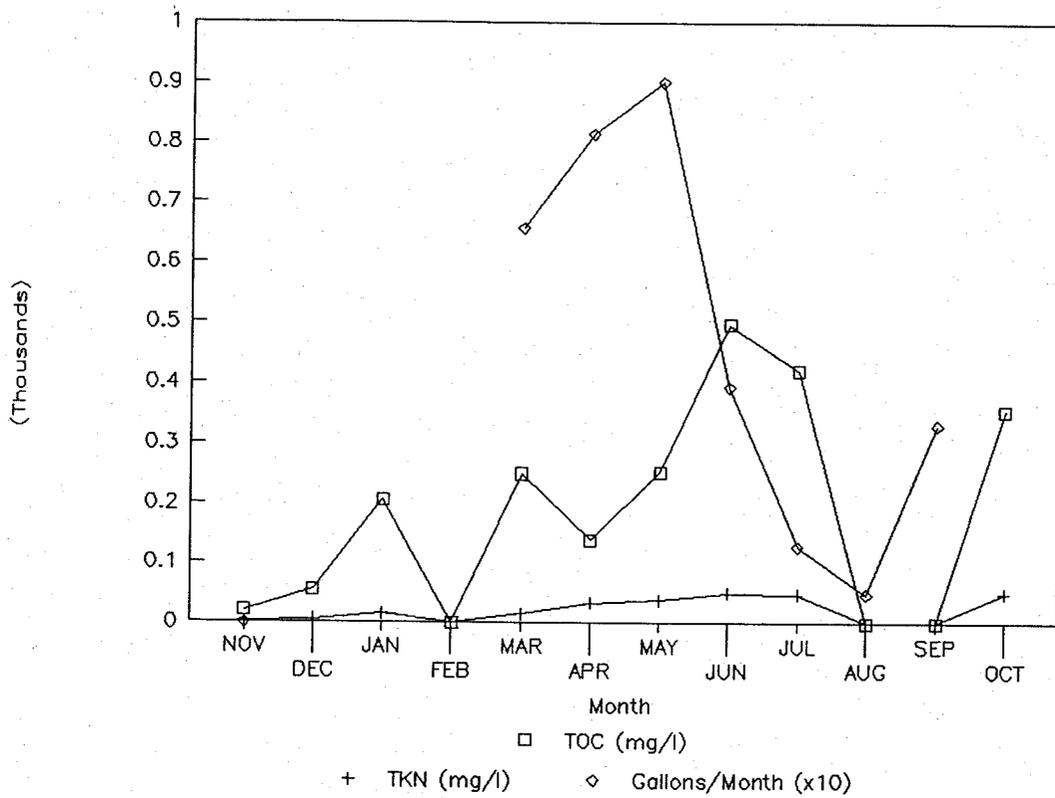


FIGURE 3
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELL # 2

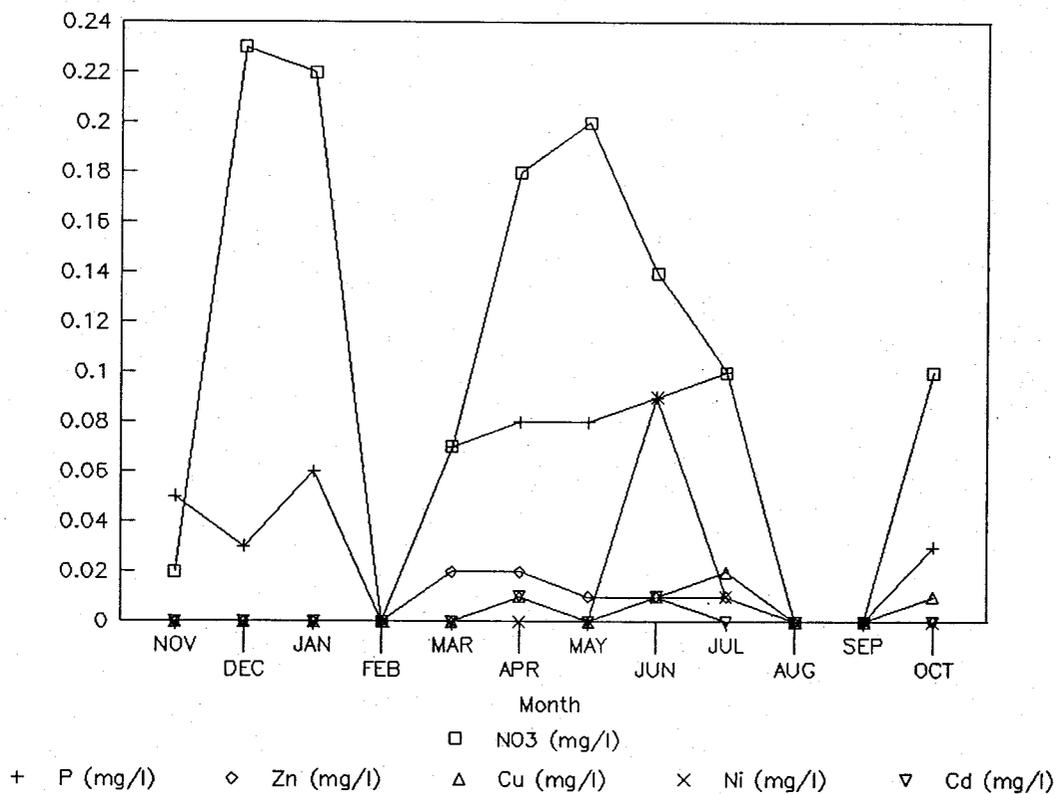


FIGURE 4
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELL # 3

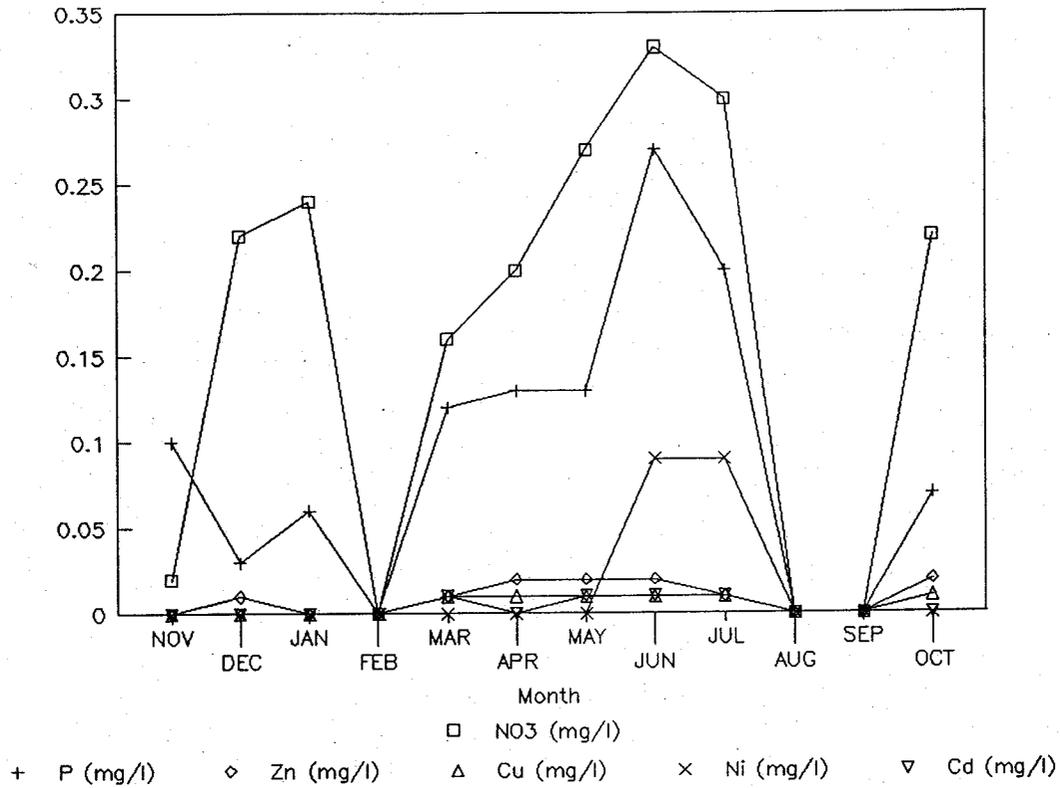


FIGURE 5
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELLS #1, #2, & #3

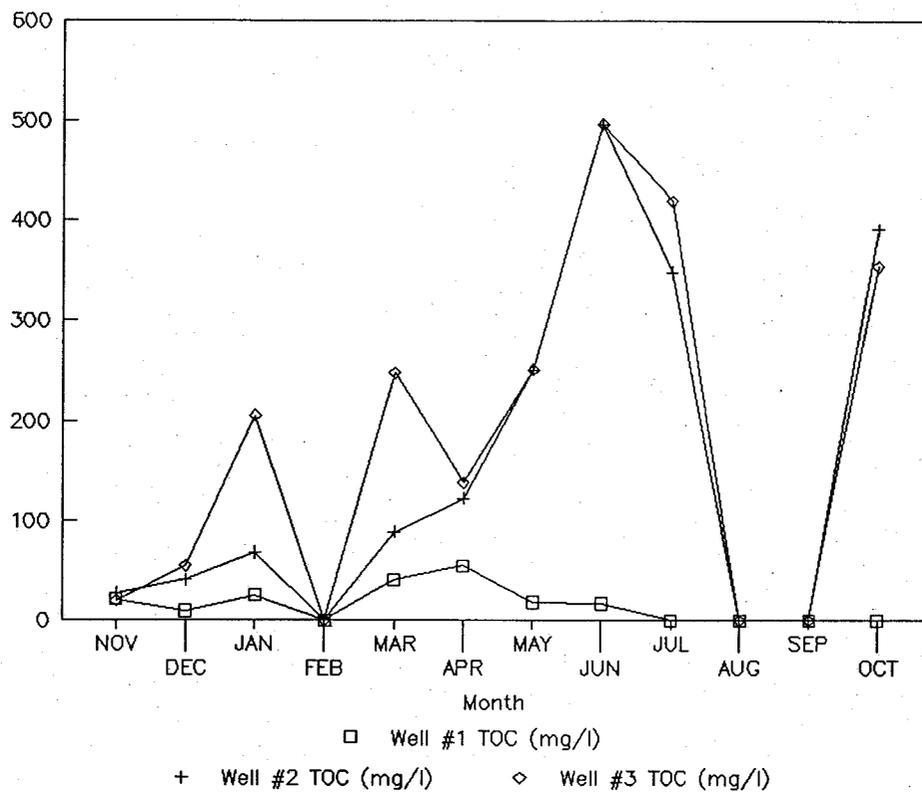
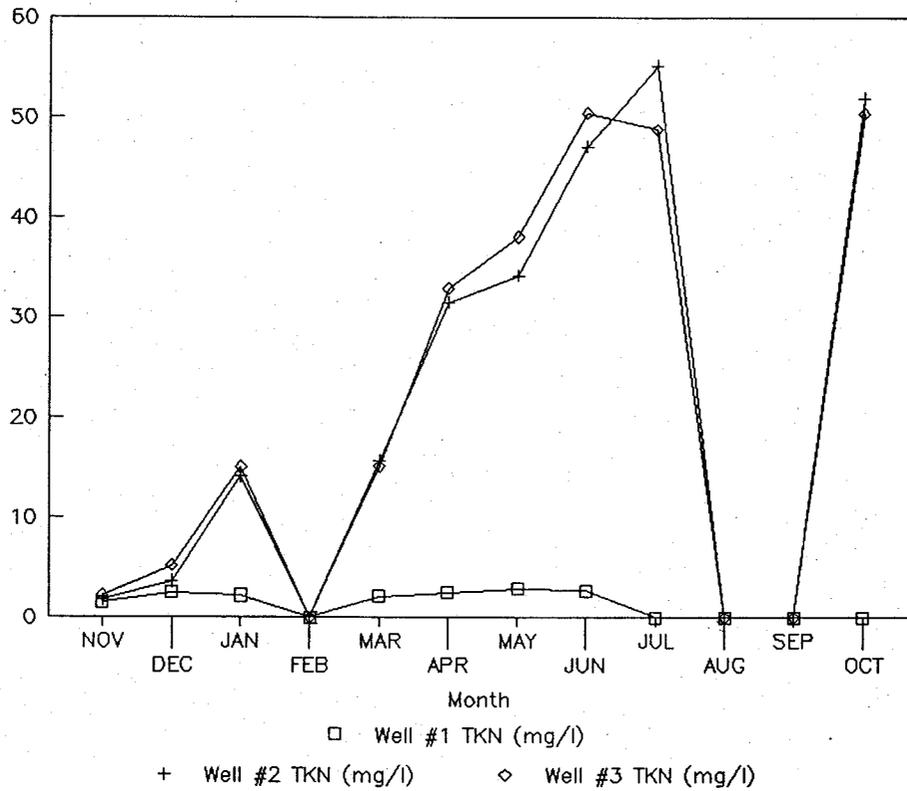


FIGURE 6
PLOT OF MONTHLY ANALYTICAL DATA
NOVEMBER 1992 THROUGH OCTOBER 1993
LEACHATE RECIRCULATION PROJECT
PIEDMONT LANDFILL AND RECYCLING CENTER

MONITORING WELLS #1, #2, & #3



APPENDIX C

MONTHLY FLOW DATA SUMMARIES

31 Mar 93

To: John Sinclair
Subject: Monthly Summary of Data from the Piedmont Landfill.

Totals for the Month of March were as follows:

Flow to Zone 1: 4468 gallons.
Flow to Zone 2: 6563 gallons.
Pump Run Time: 10hrs 43mins 51secs.
Backwash Cycles: 116 cycles.
Field Flush Zone 1: 1 cycle.
Field Flush Zone 2: 1 cycles.
Complete Cycles Zone 1: 57 cycles.
Complete Cycles Zone 2: 51 cycles.

Errors:

1. 7 Mar 93: Power Out - Weather Related - Verified by the Adcor.
Corrective Action: None Required.
2. 7 Mar 93: Power Out - Weather Related - Verified by the Adcor.
Corrective Action: None Required.
3. 15 Mar 93: Catastrophic Zone 1, 50% - Weather Related - suction line at the SUMP froze.
Corrective Action: Remote Reset via modem, and an onsite visit by Tom Sinclair on 24 Mar 93.
4. 30 Mar 93: Catastrophic Zone 2, 50% - Software disrupts all system functions at 1800 hrs daily, this error was "TXed" at 1801 hrs. I believe that this disruptions occurred during the "Measurement Compare" function of the unit.
Corrective Action: Remote Reset via modem. Sys Op verified 1 hour later, no problems.

Note: The total gallons of flow to their respective zones were affected by some software manipulation/changes originated from this office. Additionally, the inclement weather affected these totals.

I will be closely monitoring these parameters, and I will make the necessary adjustments via modem for corrections.

JOHN R. NEBBITT

33 May 93

John Sinclair

Subject: Monthly Summary of Data from the Piedmont Landfill.

Totals for the Month of April were as follows:

Flow to Zone 1: 4989 gallons.
Flow to Zone 2: 8143 gallons.
Pump Run Time: 12hrs 24mins 35secs.
Backwash Cycles: 138 cycles.
Field Flush Zone 1: 1 cycle.
Field Flush Zone 2: 0 cycle.
Complete Cycles Zone 1: 72 cycles.
Complete Cycles Zone 2: 70 cycles.

Notes:

On 7 April 93, I installed a new Hayes Accura 2400 external modem on site. The purpose for this change is to increase the performance of the remote link.....telephone network...

On 26 Apr 93, I change the software to allow irrigation 24 hours a day, Monday thru Friday. This was in accordance to my conversation with Tom Sinclair and Mr. Bill Lewis on my 23 Apr 93 visit to Kernersville.

Errors:

1. 16 Apr 93: Power Out - Verified the Adcor.
Corrective Action: None Required.

2. 20 Apr 93: Catastrophic Zone 1, 50%.
Catastrophic Zone 2, 50%.
Power out.

Phone and Pump cable cut on site by lawn mowers.
Verified by Jack Long via phone.

Corrective Action: Remote Reset via modem, and
an onsite visit by Tom Sinclair
and myself on 23 Apr 93.

3. 26 Apr 93: Catastrophic Zone 1, 50% - Due to a software "Delay" in the program, the unit will continue to execute an irrigation cycle for 15 minutes after the float switch drops out. The reason for this delay is because there is leachate in the sump after the float drops out. We originally incurred some sys op problems due to this, so adding the delay corrected them. But if there is really no leachate in the sump, or the pumps lose prime, unit will try to execute a full measurement cycle, consequentially, failing catastrophic 50% due to no flow.

Corrective Action: Remote Reset via modem has failed, therefore, an onsite visit by John Sinclair and myself is scheduled for today, 3 May 93.

JOHN R. NESBITT

Date: June 24, 1993

To: Bill Lewis - Piedmont Landfill
From: Waste Water Systems, Inc.

Subject: Monthly Summary of Data from the Piedmont Landfill.

Totals for the month of May were as follows:

Flow to zone 1: 5432 gallons
Flow to zone 2: 9017 gallons
Total flows: 14449 gallons
Pump run time: 18hrs 09mins 45secs
Backwash cycles: 160 cycles
Field flush zone 1: 1 cycle
Field flush zone 2: 1 cycle
Complete cycles zone 1: 73 cycles
Complete cycles zone 2: 65 cycles

Note: Backwash cycles total are greater than complete zone cycles.
This is due to a lack of leachate.

Low water disabled means not an adequate depth of leachate in sump.

06 July 93

To: John Sinclair
Subject: Monthly Summary of Data from the Piedmont Landfill.

Totals for the Month of June were as follows:

Flow to Zone 1: 5287 gallons.
Flow to Zone 2: 3921 gallons.
Total Flows: 9208 gallons.
Pump Run Time: 14 hrs 53 mins 05 secs.
Backwash Cycles: 188 cycles.
Field Flush Zone 1: 2 cycle. ***
Field Flush Zone 2: 3 cycle. ***
Complete Cycles Zone 1: 63 cycles.
Complete Cycles Zone 2: 23 cycles.

*** Restart of the Zone Flush cycle due to insufficient LEACHATE to complete the Zone Flush cycle, thus the Zone flush counter incremented each start. Only one Zone Flush Cycle per zone was executed.

John R. Nesbitt

08 Sept 93

To: John Sinclair
Subject: Monthly Summary of Data from the Piedmont
Landfill.

Totals for the Month of July were as follows:

Flow to Zone 1: 2411 gallons.
Flow to Zone 2: 1279 gallons.
Total Flows: 3690 gallons.
Pump Run Time: 7 hrs 11 mins 10 secs.
Backwash Cycles: 176 cycles.
Field Flush Zone 1: 4 cycle. ***
Field Flush Zone 2: 14 cycle. ***
Complete Cycles Zone 1: 35 cycles.
Complete Cycles Zone 2: 15 cycles.

*** Restart of the Zone Flush cycle due to insufficient LEACHATE to complete the Zone Flush cycle, thus the Zone flush counter incremented each time that there was sufficient LEACHATE to start a Zone Flush Cycle, nevertheless, Only one Zone Flush Cycle per zone was executed.

The total gallons value for this month is low due to the fact that the LEACHATE level was insufficient to allow for the programmed doses to be completed. There was also an extremely high occurrence of PRIORITY BACKWASH cycles and LOW FLOW run mode ERRORS due to the low level of LEACHATE.

An additional problem was encountered due to the sump liner (BENTONITE) particles clogging the filters. Per TOM SINCLAIR and Dr. Rubin, this is a direct result of the low LEACHATE levels encountered for the month.

I personally cleaned the filters twice during the month and Jack Long cleaned them atleast once.

There was also an occurrence of telemetry failure. This was due to the modem falling from it's mountings and unplugging itself. Jack Long diagnosed this failure and made the necessary corrective action.

John R. Nesbitt

08 Sept 93

To: John Sinclair
Subject: Monthly Summary of Data from the Piedmont
Landfill.

Totals for the Month of August were as follows:

Flow to Zone 1: 605 gallons.
Flow to Zone 2: 485 gallons.
Total Flows: 1090 gallons.
Pump Run Time: 2 hrs 58 mins 35 secs.
Backwash Cycles: 49 cycles.
Field Flush Zone 1: 0 cycle.
Field Flush Zone 2: 0 cycle.
Complete Cycles Zone 1: 15 cycles.
Complete Cycles Zone 2: 5 cycles.

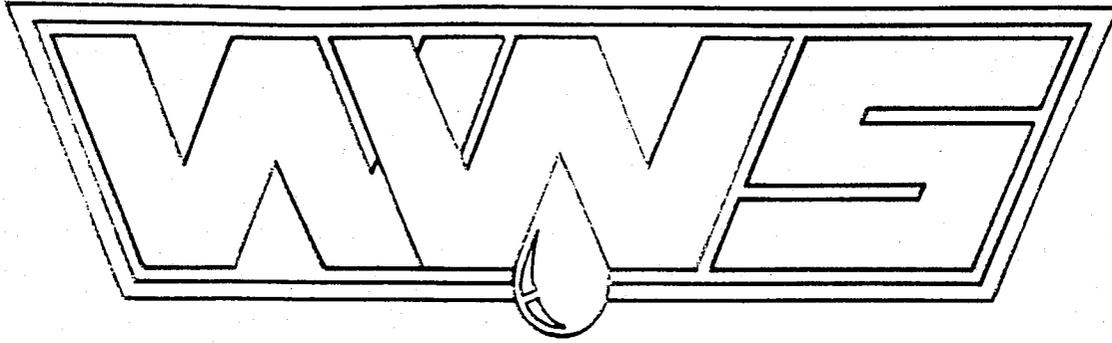
All of the totals for this month are obviously incomplete. We had telemetry problems this month due to the telephone cable being cut and then rain shorting the line out. Jack Long was unavailable to investigate this problem for a few days, then it took a couple of days to execute the corrective action.

An additionally factor contributing to this is the low LEACHATE level. There were a few occurrences of PRIORITY BACKWASH cycles and LOW FLOW run mode ERRORS due to the low level of LEACHATE.

Finally, the sump liner (BENTONITE) particles clogging the filters continued to cause errors that shut the system down.

John R. Nesbitt

WASTE WATER SYSTEMS INC.



October 27, 1993

Mr. William Lewis, P.E.
Piedmont Landfill and Recycling Center
9900 Freeman Road
Kernersville NC 27284

RE: Summary of Operation for the "Perc-Rite"[™] Leachate
Recirculation Project.

Dear Bill:

The data collection for the subject project for the month of
September through October 8, 1993 were as follows:

Flow to Zone 1:	5444 gallons
Flow to Zone 2:	3301 gallons
Total Flows:	8745 gallons
Pump Run Time:	14 hrs 30 mins. 10 secs.
Backwash Cycles:	167 cycles
Field Flush Zone 1:	1 cycle
Field Flush Zone 2:	1 cycle
Complete Cycles Zone 1:	65 cycles
Complete Cycles Zone 2:	30 cycles

The only problems encountered during operation were the low
LEACHATE level and the sump liner (BENTONITE) particles clogging
the filters continued to cause errors that shut the system down.
The cumulative amount of leachate recycled year to date is 69,687
gallons.

As you know, we were instructed to shut the "Perc-Rite"[™] system
down effective midnight October 8, 1993 until further notice. This
action of course makes us very sad. All test results to date
indicate that the technology employed as well as the concept,
"recycling leachate back through the solid waste" have produced
only positive results.

"Perc Rite"[™]
DISPOSAL SYSTEMS

APPENDIX D
DAILY INSPECTION REPORTS

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action	
9-14-93	Jack Long	NO	PROBLEMS	
9-15-93	Jack Long	NO	SEEPS	
9-16-93	Jack Long	"	"	
9-17-93	J f	"	"	
9-18-93	J f	"	"	
9-20-93	Jack Long	"	"	
9-21-93	Jack Long	"	"	
9-22-93	Jack Long	"	"	

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
			NO PROBLEMS
9-23-93		Jack Long	NO SEEPS
9-24-93		Jack Long	" "
9-25-93		Jack Long	" "
9-27-93		Jack Long	" "
9-28-93		Jack Long	" "
9-29-93		Jack Long	" "
9-30-93		Jack Long	" "
10-1-93		Jack Long	" "
10-2-93		Jack Long	" "
10-4-93		Jack Long	" "
10-5-93		Jack Long	" "
10-8-93		Jack Long	CUT OFF

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
11-24-92	7:40A		N.E	OC		0"	52°	(Signature)
11-24-92	9:00A		N.E	OC		0"	55°	(Signature)
11-24-92	12:00P		N.E	OC		0"	60°	(Signature)
11-24-92	2:09P		N.E	OC		0"	63°	(Signature)
11-24-92	4:00P		N.E	O.C		RAINING	66°	(Signature)

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOCGY/AREA	INSPECTED BY
11-24-92	7:40	NONE	0	BOTH FIELDS	(Signature)
11-24-92	9:00A	NONE	0	N.C	(Signature)
11-24-92	12:00P	NONE	0	N.C	(Signature)
11-24-92	2:09P	NONE	0	N.C	(Signature)
11-24-92	4:00P	NONE	0	N.C	(Signature)

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
11-24-92	7:45A	11750	SEE NOTES ON REVERSE SIDE				
11-24-92	9:00A	11900	* SEE REVERSE				
11-24-92	12:00P	12280	12380	5.5 MINS	✓		(Signature)
11-24-92	12:10P	12380	12480	5.5 MINS	✓	✓	(Signature)
11-24-92	2:09P	12480	12580	5.5 MINS	✓		(Signature)

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
11-24-92	5:50P		N.E	O.C		RAINING	66°	DP

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
11-24-92	5:50P	BOTH FIELDS UPPER AND LOWER	0	BOTH FIELDS	DP

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
11-24-92	2:17P	12580	12680	5.5 MINS		✓	DP
11-24-92	4:00P	12680	12780	5.5 MINS	✓		DP
11-24-92	4:08P	12780	12880	5.5 MINS		✓	DP
11-24-92	5:50P	12880	12980	5.5 MINS	✓		DP
11-24-92	6:00P	12980	13080	5.5 MINS		✓	DP

LEDMONT LANDFILL
(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
11-25-92	5:55A		CALM	O.C		4/10"	45°	(Signature)
11-25-92	8:05A		CALM	O.C		0"	50°	(Signature)
11-25-92	10:00A		E	O.C		0"	50°	(Signature)
11-25-92	12:00P		N.E	O.C		RAINING	52°	(Signature)

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
11-25-92	5:55A	LOWER FIELDS 1,2	0	BOTH FIELDS	(Signature)
11-25-92	8:05A	N.C	0	N.C	(Signature)
11-25-92	10:00A	N.C	0	N.C	(Signature)
11-25-92	12:00P	N.C	0	N.C	(Signature)

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
11-25-92	5:55A	13150	13250	5.5 MINS	✓		(Signature)
11-25-92	6:05A	13250	13350	5.5 MINS		✓	(Signature)
11-25-92	8:05A	13350	13450	5.5 MINS	✓		(Signature)
11-25-92	8:15A	13450	13550	5.5 MINS		✓	(Signature)
11-25-92	10:00A	13550	13650	5.5 MINS	✓		(Signature)

14. P.T. - PARTY CLOUDY
WEATHER OVERCAST

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
11-30-92	10:05	PTC	CALM		P.S	0"	44°	
11-30-92	12:00 P	PTC			P.S	NO CHANGE	49°	
11-30-92	2:00 P	PC	WEST 5 MPH		P.S	N/C	53°	
12-1-92	8:00 A		NW	OV	-	N.C	43°	

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
11-30-92	10:05	0%	0%	BOTH FIELDS / 100%	
11-30-92	12:00	N/C	N/C	N/C	
11-30-92	2:00	N/C	N/C	N/C	
12-1-92	8:00 A	FLOW - 4 LINES AT END OF MANIFOLD	N/C	50% B/FLOS	

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
11-30-92	10:05 A	14000	14100	5.5 mins	✓		
11-30-92	10:12 A	14100	14200	5.5 mins		✓	
11-30-92	12:00 P	14200	14300	5.5 mins	✓		
11-30-92	12:07 P	14300	14400	5.5 mins		✓	
11-30-92	2:00 P	14400	14500	5.5 mins	✓		

N.C. NO CHANGE

PIEDMONT LANDFILL
(LEACHATE RE-CARC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
11-30-92	4:10 P	MC	WEST	00		0"	48°	[Signature]
11-30-92	6:00 P	M.C.MC	NC	NC		0"	45°	[Signature]
12-1-92	10:00 A		NW	00		NC	43°	[Signature]
12-1-92	12:00 P	P.C	NW	00 P.E		NC	49°	[Signature]
12-1-92	2:00 P	P.C	W	1		NC	48°	[Signature]

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOCGY/AREA	INSPECTED BY
11-30-92	4:10 P	0	0	FLD'S 1, 2 # 90%	[Signature]
11-30-92	6:00 P	NC	ALL 0	NC	[Signature]
12-1-92	10:00 P	FLD #1 Lower Four Lines COOPED ENDS	0	50% BOTH FLD'S	[Signature]
12-1-92	12:00 P	NC	0	NC	[Signature]
12-1-92	2:00 P	NC	0	NC	[Signature]

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
11-30-92	2:07 P	14500	14600	5.5 MINS		✓	[Signature]
11-30-92	4:10 P	14600	14700	5.5 MINS	✓		[Signature]
11-30-92	4:18 P	14700	14800	5.5 MINS		✓	[Signature]
11-30-92	6:00 P	14800	14900	5.5 MINS	✓		[Signature]
11-30-92	6:07 P	14900	15000	5.5 MINS		✓	[Signature]

P.S. PARTLY SUNNY

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
12-1-92	4:00P	SCAT.	WEST		P.S	0"	47°	[Signature]

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
12-1-92	4:00P	LOWER FIELDS 10'	0	BOTH FIELDS @ 50%	[Signature]

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-1-92	8:00A	15000	15100	5.5 MINS	✓		[Signature]
12-1-92	8:06A	15100	15200	5.5 MINS	✓	✓	[Signature]
12-1-92	10:00A	15200	15300	5.5 MINS	✓		[Signature]
12-1-92	10:06A	15300	15400	5.5 MINS	✓	✓	[Signature]
12-1-92	12:00P	15400	15500	5.5 MINS	✓		[Signature]

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOCGY/AREA	INSPECTED BY

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-1-92	12:06P	15500	15600	5.5 MINS	✓	✓	DA
12-1-92	2:00P	15600	15700	5.5 MINS	✓	✓	DA
12-1-92	2:05P	15700	15800	5.5 MINS	✓	✓	DA
12-1-92	4:00P	15800	15900	5.5 MINS	✓	✓	DA
12-1-92	4:06P	15900	16000	5.5 MINS	✓	✓	DA

LEACHATE RE-CIRC PROJECT

DATE	TIME	WEATHER	WIND DIRECTION	OVERCAST	SUNNY	RAIN/FALL INCHES	TEMP.	INSPECTED BY
12-2-92	7:30A	P.C	S.E		S	0"	32°	(Signature)
12-2-92	9:30A	P.C	S		S	0"	34°	(Signature)
12-2-92	11:30A	P.C	S S	OC	S	0"	37°	(Signature)
12-2-92	1:30P	P.C	W		P.S	0"	47°	(Signature)
12-2-92	3:30P	P.C	W		P.S	0"	50°	(Signature)

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOCGY/AREA	INSPECTED BY
12-2-92	7:30A	0	0	1090 LOWER FLD'S #1, #2.	(Signature)
12-2-92	9:30A	LOWER FLD #1,2	0	N.C	(Signature)
12-2-92	11:30A	N.C	0	N.C	(Signature)
12-2-92	1:30P	N.C	0	N.C	(Signature)
12-2-92	3:36P	N.C	0	N.C	(Signature)

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-2-92	7:30A	16000	16100	5.5 MINS	✓		(Signature)
12-2-92	7:36A	16100	16200	5.5 MINS		✓	(Signature)
12-2-92	9:30A	16200	16300	5.5 MINS	✓		(Signature)
12-2-92	9:36A	16300	16400	5.5 MINS		✓	(Signature)
12-2-92	11:30A	16400	16500	5.5 MINS	✓		(Signature)

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
12-2-92								

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGCY/AREA	INSPECTED BY
12-					

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-2-92	11:36 A	16500	16600	5.5 MINS		✓	(Signature)
12-2-92	1:30 P	16600	16700	5.5 MINS	✓		(Signature)
12-2-92	1:36 P	16700	16800	5.5 MINS		✓	(Signature)
12-2-92	3:30 P	16800	16900	5.5 MINS	✓		(Signature)
12-2-92	3:36 P	16900	17000	5.5 MINS		✓	(Signature)

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY
12-3-92	7:30A		SW		S	0"	39°	DP
12-3-92	9:30A		W		S	0"	38"	DP
12-3-92	11:30A		W		S	0"	45°	DP
12-3-92	1:30P		W		S	0"	48°	DP
12-3-92	3:30P		W		S	0"	50°	DP

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
12-3-92	7:30A	0	0	0	DP
12-3-92	9:30A	MINOR PONDING ON LOWER FIELDS	0	SLIGHTLY SOGGY BOTH FIELDS	DP
12-3-92	11:30A	N.C	0	N.C	DP
12-3-92	1:30P	N.C	0	N.C	DP
12-3-92	3:30P	SEE NOTES	0	SEE NOTES	DP

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-3-92	7:30A	17000	17100	5.5 MINS	✓		DP
12-3-92	7:36A	17100	17200	5.5 MINS		✓	DP
12-3-92	9:30A	17200	17300	5.5 MINS	✓		DP
12-3-92	9:36A	17300	17400	5.5 MINS		✓	DP
12-3-92	11:30A	17400	17500	5.5 MINS	✓		DP

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	HATINCHES	INCHES	TEMP.	INSPECTED BY
12-4-92	6:15A	P.C	SW			0"		35°	DA
12-4-92	8:15A		W	OBC		0"		37°	DA
12-4-92	10:15A		W	OC		0"		34°	DA
12-4-92	12:15P		S	OC		0"		38°	DA
12-4-92	12:15P		S	OC		0"		35°	DA

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY
12-4-92	6:15A	0	0	0	DA
12-4-92	8:15A	UPPER AND LOWER FIELD 1,2	0	UPPER AND LOWER FIELDS 1,2	DA
12-4-92	10:15A	N.C	0	N.C	DA
12-4-92	12:15P	N.C	0	N.C	DA
12-4-92	2:15P	N.C	0	N.C	DA

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-3-92	11:36A	17500	17600	5.5 MINS		✓	DA
12-3-92	1:30P	17600	17700	5.5 MINS	✓		DA
12-3-92	1:36P	17700	17800	5.5 MINS		✓	DA
12-3-92	3:30P	17800	17900	5.5 MINS	✓		DA
12-3-92	3:36P	17900	18000	5.5 MINS		✓	DA

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CL-UDDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL INCHES	TEMP.	INSPECTED BY

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-4-92	6:15 A	18000	18100	5.5 MINS	✓		DP
12-4-92	6:26 A	18100	18200	5.5 MINS		✓	DP
12-4-92	8:15 A	18200	18300	5.5 MINS	✓		DP
12-4-92	8:22 A	18300	18400	5.5 MINS		✓	DP
12-4-92	10:15 A	18400	18500	5.5 MINS	✓		DP

(LEACHATE RE-CIRC PROJECT)

WEATHER

DATE	TIME	CLOUDY	WIND DIRECTION	OVERCAST	SUNNY	RAINFALL	HIGHES	TEMP	INSPECTED BY

VISUAL SITE INSPECTION

DATE	TIME	PONDING/AREA	RUN OFF/AREA	SOGGY/AREA	INSPECTED BY

SYSTEM OPERATION

DATE	TIME	FLOW METER START	STOP	RUN TIME	ZONE 1	ZONE 2	INSPECTED BY
12-4-92	10:22 A	18500	18600	5.5 MINS		✓	[Signature]
12-4-92	12:15 P	18600	18700	5.5 MINS	✓		[Signature]
12-4-92	12:22 P	18700	18800	5.5 MINS		✓	[Signature]
12-4-92	2:15 P	18800	18900	5.5 MINS	✓		[Signature]
12-4-92	2:22 P	18900	19000	5.5 MINS		✓	[Signature]

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
START DAILY INSPECTION LOG 2-24-93 *JK*

Date	Time	Inspector	Problem/Course of Action
2-24-93	1:00PM	JACK L	NO PROBLEMS
2-25-93	12:00	JACK L	LEAK ON BACK FLUSH TANK
2-26-93	2:00	JACK L	" " " " "
3-2-93	4:45 PM	JACK L	" " " " "
3-4-93	9:00 AM	JACK L	" " " " "
3-5-93	8:00 AM	JACK	" " " " "
3-8-93	4:00	JACK	LEAK FIXED ON 3-8-93
3-9-93	8:30 AM	JACK	NO PROBLEMS NO SEEPS
3-10-93	5:00	JACK	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
3-11-93	9:00 AM	JACK LONG	NO PROBLEMS NO SEEPS
3-14-93	8:00 AM	JACK LONG	" "
3-15-93	8:30 AM	JACK LONG	" "
3-16-93	9:30	JACK LONG	" "
3-17-93	11:00 AM	JACK LONG	" "
3-18-93	11:00 AM	JACK LONG	" "
3-19-93	7:20	JACK LONG	" "
3-22-93	4:30 PM	JACK LONG	" "
3-23-93	8:05 AM	JACK	" "

Piedmont Landfill & Recycling Center
Leachate Recirculation Operation
DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
3-24-93	7:05	JACK LONG	NO PROBLEMS NO SEEPS
3-25-93	8:15	JACK LONG	" "
3-26-93	9:45	JACK LONG	" "
3-27-93	7:30 AM	JACK LONG	" "
3-29-93	7:00 AM	JACK LONG	" "
3-30-93	7:30 AM	JACK LONG	" "
3-31-93	8:10 AM	JACK LONG	" "
4-1-93	7:45 AM	JACK LONG	" "
4-2-93	8:20 AM	JACK LONG	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
4-5-93	8:45 AM	JACK LONG	NO PROBLEMS NO SEEPS
4-5-93	9:10 AM	JACK LONG	" "
4-6-93	9:20 AM	JACK LONG	" "
4-7-93	7:45 AM	JACK LONG	TELEPHONE CHANGE MODEM
4-8-93	7:30 AM	JACK LONG	NO PROBLEMS NO SEEPS
4-9-93	9:20 AM	JACK LONG	" "
4-10-93	9:05 AM	JACK LONG	" "
4-10-93	8:30	JACK LONG	" "
4-13-93	7:40	JACK LONG	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
4-14-83	7:50 AM	JACK LONG	NO PROBLEMS NO SEEPS
4-15-83	7:30	JACK LONG	" "
4-16-83	7:05 PM	JACK LONG	" "
4-17-83	7:55	JACK LONG	" "
4-18-83	7:20	JACK LONG	" "
4-20-83	7:15 AM	JACK LONG	TELEPHONE & CONTROL LINE <u>CUT</u> DOWN
4-21-83	8:00 AM	JACK LONG	DOWN
4-22-83	8:40 PM	JACK LONG	DOWN
4-23-83	8:30 AM	JACK LONG	NO PROBLEMS NO SEEPS

Piedmont Landfill & Recycling Center
Leachate Recirculation Operation
DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
4-24-93	10:55 AM	JACK LONG	NO PROBLEMS NO SEEPS
4-26-93	8:00 AM	JACK LONG	" "
4-27-93	7:20 AM	JACK LONG	" "
4-28-93	7:45 AM	JACK LONG	" "
4-29-93	7:30 AM	JACK LONG	" "
4-30-93	7:45 AM	JACK LONG	" "
5-1-93	9:10 AM	JACK LONG	" "
5/3/93	9:30 AM	Bill Jones	" "
5/4/93	10:00 AM	Bill Jones	" "

Piedmont Landfill & Recycling Center
Leachate Recirculation Operation
DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
5/5/93	8:30 AM	Bill Jones	NO PROBLEMS NO SEEPS
5/6/93	7:00 AM	Bill Jones	" "
5/7/93	7:00 AM	Bill Jones	" "
5/10-93	7:25 AM	JACK	" "
5/11-93	7:30	JACK	" "
5/12/93	7:35 AM	JACK	" "
5/13/93	8:00 AM	JACK	" "
5/14/93	7:45 AM	JACK	" "
5/15/93	7:30 AM	JACK	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
5-25-93	7:30 AM	JACK LONG	NO PROBLEMS NO SEEPS
5-26-93	7:30 AM	JACK LONG	" "
5-26-93	7:30 AM	JACK LONG	" "
5-27-93	7:10 AM	JACK LONG	" "
5-27-93	7:30 AM	JACK LONG	" "
5-28-93	7:30 AM	JACK LONG	" "
5-28-93	8:00 AM	JACK LONG	" "
5-26-93	7:30 AM	JACK LONG	" "
5-27-93	7:10 AM	JACK LONG	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
5-28-93	7:45 AM	JACK SONG	NO PROBLEMS NO SEEPS
5-29-93	11:30 AM	JACK SONG	" "
5-31-93	8:20 AM	JACK SONG	" "
6-1-93	7:30 AM	Bill ford	" "
6/2/93	8:10 AM	Bill ford	" "
6/3/93	7:45 AM	Bill ford	" "
6/7/93	7:50 AM	Bill ford	" "
6/8/93	7:30 AM	Bill ford	Phone line cut John worked on repairing
6/9/93	7:30 AM	Bill ford	NO PROBLEMS NO SEEPS

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
6/10/93		[Signature]	NO PROBLEMS NO SEEPS
6/11/93		[Signature]	" "
6-12-93		[Signature]	" "
6-14-93		[Signature]	" "
6-15-93		[Signature]	" "
6-16-93		[Signature]	" "
6-17-93		[Signature]	" "
6-18-93		[Signature]	" "
6-19-93		[Signature]	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
6-21-93		[Signature]	NO PROBLEMS NO SEEPS
6-22-93		[Signature]	" "
6-23-93		[Signature]	" "
6-24-93		[Signature]	" "
6-25-93		[Signature]	" "
6-26-93		[Signature]	" "
6-28-93		[Signature]	" "
6-29-93		[Signature]	" "
6-30-93		[Signature]	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
7/1/93		J. L.	NO PROBLEMS NO SEEPS
7-2-93		J. L.	" "
7-5-93		J. L.	" "
7-5-93		J. L.	" "
7-6-93		J. L.	" "
7-7-93		J. L.	" "
7-8-93		J. L.	" "
7-9-93		J. L.	" "
7-10-93		J. L.	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
			No PROBLEMS
7-13-93		Jack Long	No SEEPS
			" "
7-13-93		JL	" "
			" "
7-14-93		JL	" "
			" "
7-15-93		Jack Long	" "
			" "
7-16-93		JL	" "
			" "
7-17-93		Jack Long	" "
			" "
7-19-93		JL	" "
			" "
7-20-93		JL	" "
7-21-93		Jack Long	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action	
			No	PROBLEMS
7-22-93		JL	No	SEEPS
			"	"
7-23-93		JL		
			"	"
7-24-93		Jack Lay		
			"	"
7-26-93		JL		
			"	"
7-27-93		JL		
			"	"
7-28-93		Jack Lay		
			"	"
7-29-93		Jack Lay		
			"	"
7-30-93		JL		
			"	"
7-31-93		Jack Lay		

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
			NO PROBLEMS NO SEEPS
8-2-93		fact log	" "
8-3-93		fact log	" "
8-4-93		fact log	" "
8-5-93		fact log	" "
8-6-93		fact log	" "
8-7-93		fact log	" "
8-9-93		fact log	" "
8-10-93		fact log	" "
8-11-93		fact log	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
8-12-93	Jack Low	NO PROBLEMS NO SEEPS	
8-13-93	Jack Low	" "	
8-14-93	Jack Low	" "	
8-16-93	Jack Low	" "	
8-17-93	Jack Low	" "	
8-18-93	Jack Low	" "	
8-19-93	Jack Low	" "	
8-20-93	Jack Low	" "	
8-21-93	Jack Low	" "	

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action	
			NO	PROBLEMS
8-23-93		Jack Low	NO	SEEPS
			"	"
8-24-93		Jack Low		
			"	"
8-25-93		Jack Low		
			"	"
8-26-93		Jack Low		
			"	"
8-27-93		Jack Low		
			"	"
8-28-93		Jack Low		
			"	"
8-30-93		Jack Low		
			"	"
8-31-93		Jack Low		
			"	"
9-1-93		Jack Low		

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
			No PROBLEMS
9-2-93		Jack Long	No SEEPS
9-3-93		Jack Long	" "
9-4-93		Jack Long	" "
9-6-93		Jack Long	" "
9-7-93		Jack Long	" "
9-8-93		Jack Long	" "
9-10-93		Jack Long	" "
9-11-93		Jack Long	" "
9-13-93		Jack Long	" "

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action	
9-14-93	Jack Long	NO	PROBLEMS	
9-15-93	Jack Long	NO	SEEPS	
9-16-93	Jack Long	"	"	
9-17-93	J f	"	"	
9-18-93	J f	"	"	
9-20-93	Jack Long	"	"	
9-21-93	Jack Long	"	"	
9-22-93	Jack Long	"	"	

Piedmont Landfill & Recycling Center
 Leachate Recirculation Operation
 DAILY INSPECTION LOG

Date	Time	Inspector	Problem/Course of Action
			NO PROBLEMS
9-23-93		Jack Long	NO SEEPS
9-24-93		Jack Long	" "
9-25-93		Jack Long	" "
9-27-93		Jack Long	" "
9-28-93		Jack Long	" "
9-29-93		Jack Long	" "
9-30-93		Jack Long	" "
10-1-93		Jack Long	" "
10-2-93		Jack Long	" "
10-4-93		Jack Long	" "
10-5-93		Jack Long	" "
10-8-93		Jack Long	CUT OFF