

ATTACHMENT A

SPECIFIC MODIFICATION REQUESTS

The exact requested change to the Permit is as follows:

1. a. Modify Permit Condition III.A.1 as follows:

Replace the following sentence:

"The Permittee shall maintain groundwater monitoring wells MW-1D, MW-1S, MW-2DR, MW-2SR, MW-3S, MW-4SR, MW-6D, MW-6S, MW-7D, MW-7S, MW-8D, MW-8S, MW-9D, MW-9S, MW-12D, MW-12S, MW-13S, MW-15D, MW-15S, MW-16D, MW-16S, MW-17D, MW-17S, MW-19D, MW-19S, MW-21D, MW-21S, MW-23D, MW-23S, MW-24D, MW-26D, MW-26S, MW-27D, MW-27S, MW-28D, MW-28S, MW-29D, MW-29S, MW-31D, MW-36D, MW-36S, MW-37D, MW-37S, MW-39D, MW-40D, MW-42S, MW-43S, MW-44D, MW-44S, MW-45S, MW-46S, MW-47S, OS-1D, OS-1S, OS-2D, OS-2S, OS-4D, OS-4S, OS-5D, OS-5S, OS-6D, OS-7D, OS-8D, BR-1, BR-2, BR-3, BR-5, and BR-6 at the locations on Exhibit E1.1 of the permit application and any additional wells as deemed appropriate by the Director to monitor groundwater conditions within and adjacent to all plumes of contamination."

with the following sentence:

"The Permittee shall maintain groundwater monitoring wells MW-1D, MW-1S, MW-2DR, MW-2SR, MW-4SR, MW-7D, MW-7S, MW-8D, MW-8S, MW-9D, MW-9S, MW-13S, MW-17D, MW-17S, MW-19D, MW-19S, MW-21D, MW-21S, MW-23D, MW-23S, MW-24D, MW-26D, MW-26S, MW-27D, MW-27S, MW-28D, MW-28S, MW-36D, MW-36S, MW-37D, MW-37S, MW-39D, MW-40D, MW-42S, MW-43S, MW-44D, MW-44S, MW-45S, MW-48S, MW-49D, MW-49S, OS-1D, OS-1S, OS-2D, OS-2S, OS-4D, OS-4S, OS-5D, OS-5S, OS-6D, OS-7D, OS-8D, BR-1, BR-2, BR-3, BR-5, and BR-6 at the locations on Exhibit E1.1 of the permit application and any additional wells as deemed appropriate by the Director to monitor groundwater conditions within and adjacent to all plumes of contamination."

- b. Reason: MW-3S, MW-6D, MW-6S, MW-12D, MW-12S, MW-15D, MW-15S, MW-16D, MW-16S, MW-46S, and MW-47S were all dry as a result of removing the head caused by the water and sludge in the Surface Impoundment, and were destroyed as a result of closure of the Surface Impoundment.

Therefore, the only remaining compliance wells are MW-2SR, MW-7D, and MW-7S. MW-7D and MW-7S are too far away from the final closure area to serve as compliance wells. As can be seen from the attached potentiometric surface map, MW-2SR does not monitor either the sand drying beds or the remainder of the hazardous waste management area (CrOH sand drying beds and surface impoundment unit). Therefore, MW-2SR, MW-3S, MW-6S, MW-7D, MW-7S, MW-12S, MW-15S, MW-46S, and MW-47S must be replaced with more appropriate well locations. Wells MW-48S, MW-49D, and MW-49S would replace these wells. See below for the definition of compliance point by wells for the closed Surface Impoundment. The exact location of the wells will be field determined. However, the approximate location is depicted on the attached drawing. The timing of the well installation will be in December after the pond water pumping has been turned off for at least two weeks to allow the groundwater to stabilize. In addition, the quarterly sampling event will be postponed until the new wells are installed.

Monitoring wells 29S and 29D were drilled through a pipe connected to the inactive oil/water separator in SWMU 23. When the pipe was removed during remediation of the SWMU, these wells came out with the and were destroyed.

2. a. Modify Permit Condition III.A.5 as follows:

Replace the following sentence:

Monitoring wells MW-2SR, MW-3S, MW-6S, MW-7D, MW-7S, MW-12S, MW-15S, MW-46S, and MW-47S shall define the point of compliance for the hazardous waste management area (CrOH sand drying beds and surface impoundment unit).

with the following sentence:

Monitoring wells MW-48S, MW-49D, and MW-49S shall define the point of compliance for the hazardous waste management area (CrOH sand drying beds and surface impoundment unit).

- b. Reason: MW-3S, MW-6D, MW-6S, MW-12D, MW-12S, MW-15D, MW-15S, MW-16D, MW-16S, MW-46S, and MW-47S were all dry as a result of removing the head resulting from the water and sludge in the Surface Impoundment, and were destroyed as a result of closure of the Surface Impoundment. Therefore, the only remaining compliance wells are MW-2SR, MW-7D, and MW-7S. MW-7D and MW-7S are too far away from the final closure area to serve as compliance wells. As can be seen from the attached

potentiometric surface map, MW-2SR does not monitor either the sand drying beds or the remainder of the hazardous waste management area (CrOH sand drying beds and surface impoundment unit). Therefore, MW-2SR, MW-3S, MW-6S, MW-7D, MW-7S, MW-12S, MW-15S, MW-46S, and MW-47S must be replaced with more appropriate well locations. Wells MW-48S, MW-49D, and MW-49S would replace these wells. The exact location of the wells will be field determined. However, the approximate location is depicted on the attached drawing. The three proposed wells adequately provide a groundwater monitoring system consisting of a sufficient number of wells meet the requirements of 40CFR264.97(a). The location and depth, when installed, will provide groundwater samples sufficient to meet the goals of 40CFR264.97(a).

As additional information, the goals of clean closure for the Polishing Pond have been achieved. Those goals were

1. visually remove all sludge and bottom sediments, and
2. demonstrate that all sludge and bottom sediments were removed through a sampling plan providing an adequate number of samples to ensure a representative sampling of the bottom and sides of the pond. The samples were to be analyzed for trichloroethene; toluene; xylenes; ethylbenzene; tetrachlorethene; 1,1-dichloroethene; vinyl chloride; barium; cadmium; chromium; lead; and nickel. Results were to be compared to the background concentration for the site. Clean closure is demonstrated if the analytical results are at or less than the background concentration.

The attached letter from EMCON to Bonnell provides certification that EMCON visually inspected the site and that, in their profession, independent opinion, sludges and bottom sediments were removed to competent substrate materials..

Table 1 presents the analytical results for all samples by the grid number and location as depicted on the attached map. EMCON, as stated in the attached letter, states The analytical results indicate that the remaining substrate materials in the former polishing pond do not contain any constituents above the background levels established by the Surface Impoundment Closure Plan, as amended, approved by the Georgia EPD. The visual inspection and analytical results demonstrate that the former polishing pond has been clean-closed in accordance with the performance standards contained in Section IC (as amended) of the RCRA Part B Permit Application for Post Closure Care, and in accordance with the closure

performance standards in 40 CFR 264.111, and the closure requirements of 40 CFR 264.228..

In addition to the permit constituents listed above, Bonnell analyzed the samples for total petroleum hydrocarbons (TPH). Bonnell considered that the same cleanup standard applied to the solid waste management units would apply to polishing pond in demonstrating removal of TPH. The standard was 500 mg/kg. If analytical results indicated any of the permit constituents or TPH to be above the established cleanup standard, more material was removed from the grid and the area was resampled. This process was repeated until results were below the established cleanup levels. This process is in accordance with the approved closure plan.

Table 2 presents those grids with constituents that were initially above cleanup levels. Results of subsequent samples are also shown.

I certify under penalty of law that this October 19, 1995, request to modify the Post Closure Care Permit for The William L Bonnell Company, Inc., to replace certain wells at the facility in order to maintain a groundwater monitoring program consistent with 40CFR264.97. and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Douglas R. Monk
General Manager

Date: _____

TABLE 1: ANALYTICAL RESULTS OF BOTTOM SOIL SAMPLES
SURFACE IMPOUNDMENT CLEAN CLOSURE DETERMINATION
(Sorted by Report Number, by Grid Number)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
1	79	64014 - 1	07/11/95	Trichloroethene	BDL	DL (2)
1	79	64014 - 1	07/11/95	Toluene	BDL	DL (2)
1	79	64014 - 1	07/11/95	Xylenes	BDL	DL (2)
1	79	64014 - 1	07/11/95	Ethylbenzene	BDL	DL (2)
1	79	64014 - 1	07/11/95	Tetrachloroethene	BDL	DL (2)
1	79	64014 - 1	07/11/95	1,1-Dichloroethene	BDL	DL (2)
1	79	64014 - 1	07/11/95	Vinyl Chloride	BDL	DL (2)
1	C	64014 - 2	07/11/95	Total Barium	86	318
1	C	64014 - 2	07/11/95	Total Cadmium	BDL	DL (1)
1	C	64014 - 2	07/11/95	Total Chromium	20	73
1	C	64014 - 2	07/11/95	Total Lead	15	45
1	C	64014 - 2	07/11/95	Total Nickel	11	66
1	C	64014 - 2	07/11/95	TPH	41	500
2	32	64014 - 3	07/11/95	Trichloroethene	BDL	DL (2)
2	32	64014 - 3	07/11/95	Toluene	BDL	DL (2)
2	32	64014 - 3	07/11/95	Xylenes	BDL	DL (2)
2	32	64014 - 3	07/11/95	Ethylbenzene	BDL	DL (2)
2	32	64014 - 3	07/11/95	Tetrachloroethene	BDL	DL (2)
2	32	64014 - 3	07/11/95	1,1-Dichloroethene	BDL	DL (2)
2	32	64014 - 3	07/11/95	Vinyl Chloride	BDL	DL (2)
2	C	64014 - 4	07/11/95	Total Barium	80	318
2	C	64014 - 4	07/11/95	Total Cadmium	BDL	DL (1)
2	C	64014 - 4	07/11/95	Total Chromium	19	73
2	C	64014 - 4	07/11/95	Total Lead	15	45
2	C	64014 - 4	07/11/95	Total Nickel	9.8	66
2	C	64014 - 4	07/11/95	TPH	63	500
3	70	64014 - 5	07/11/95	Trichloroethene	BDL	DL (2)
3	70	64014 - 5	07/11/95	Toluene	BDL	DL (2)
3	70	64014 - 5	07/11/95	Xylenes	BDL	DL (2)
3	70	64014 - 5	07/11/95	Ethylbenzene	BDL	DL (2)
3	70	64014 - 5	07/11/95	Tetrachloroethene	BDL	DL (2)
3	70	64014 - 5	07/11/95	1,1-Dichloroethene	BDL	DL (2)
3	70	64014 - 5	07/11/95	Vinyl Chloride	BDL	DL (2)
3	C	64014 - 6	07/11/95	Total Barium	150	318
3	C	64014 - 6	07/11/95	Total Cadmium	BDL	DL (1)
3	C	64014 - 6	07/11/95	Total Chromium	31	73
3	C	64014 - 6	07/11/95	Total Lead	21	45
3	C	64014 - 6	07/11/95	Total Nickel	22	66
3	C	64014 - 6	07/11/95	TPH	BDL	500
4	82	64014 - 7	07/11/95	Trichloroethene	BDL	DL (2)
4	82	64014 - 7	07/11/95	Toluene	BDL	DL (2)
4	82	64014 - 7	07/11/95	Xylenes	BDL	DL (2)
4	82	64014 - 7	07/11/95	Ethylbenzene	BDL	DL (2)
4	82	64014 - 7	07/11/95	Tetrachloroethene	BDL	DL (2)
4	82	64014 - 7	07/11/95	1,1-Dichloroethene	BDL	DL (2)
4	82	64014 - 7	07/11/95	Vinyl Chloride	BDL	DL (2)
4	C	64014 - 8	07/11/95	Total Barium	110	318
4	C	64014 - 8	07/11/95	Total Cadmium	BDL	DL (1)
4	C	64014 - 8	07/11/95	Total Chromium	30	73
4	C	64014 - 8	07/11/95	Total Lead	20	45
4	C	64014 - 8	07/11/95	Total Nickel	18	66
4	C	64014 - 8	07/11/95	TPH	33	500
5	22	64014 - 9	07/11/95	Trichloroethene	BDL	DL (2)

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(Sorted by Report Number, by Grid Number)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
5	22	64014 - 9	07/11/95	Toluene	BDL	DL (2)
5	22	64014 - 9	07/11/95	Xylenes	BDL	DL (2)
5	22	64014 - 9	07/11/95	Ethylbenzene	BDL	DL (2)
5	22	64014 - 9	07/11/95	Tetrachloroethene	BDL	DL (2)
5	22	64014 - 9	07/11/95	1,1-Dichloroethene	BDL	DL (2)
5	22	64014 - 9	07/11/95	Vinyl Chloride	BDL	DL (2)
5	C	64014 - 10	07/11/95	Total Barium	100	318
5	C	64014 - 10	07/11/95	Total Cadmium	BDL	DL (1)
5	C	64014 - 10	07/11/95	Total Chromium	32	73
5	C	64014 - 10	07/11/95	Total Lead	23	45
5	C	64014 - 10	07/11/95	Total Nickel	17	66
5	C	64014 - 10	07/11/95	TPH	53	500
6	7	64014 - 11	07/11/95	Trichloroethene	BDL	DL (2)
6	7	64014 - 11	07/11/95	Toluene	BDL	DL (2)
6	7	64014 - 11	07/11/95	Xylenes	BDL	DL (2)
6	7	64014 - 11	07/11/95	Ethylbenzene	BDL	DL (2)
6	7	64014 - 11	07/11/95	Tetrachloroethene	BDL	DL (2)
6	7	64014 - 11	07/11/95	1,1-Dichloroethene	BDL	DL (2)
6	7	64014 - 11	07/11/95	Vinyl Chloride	BDL	DL (2)
6	C	64014 - 12	07/11/95	Total Barium	33	318
6	C	64014 - 12	07/11/95	Total Cadmium	BDL	DL (1)
6	C	64014 - 12	07/11/95	Total Chromium	18	73
6	C	64014 - 12	07/11/95	Total Lead	19	45
6	C	64014 - 12	07/11/95	Total Nickel	6.2	66
6	C	64014 - 12	07/11/95	TPH	25	500
7	25	64014 - 13	07/11/95	Trichloroethene	BDL	DL (2)
7	25	64014 - 13	07/11/95	Toluene	BDL	DL (2)
7	25	64014 - 13	07/11/95	Xylenes	BDL	DL (2)
7	25	64014 - 13	07/11/95	Ethylbenzene	BDL	DL (2)
7	25	64014 - 13	07/11/95	Tetrachloroethene	BDL	DL (2)
7	25	64014 - 13	07/11/95	1,1-Dichloroethene	BDL	DL (2)
7	25	64014 - 13	07/11/95	Vinyl Chloride	BDL	DL (2)
7	C	64014 - 14	07/11/95	Total Barium	130	318
7	C	64014 - 14	07/11/95	Total Cadmium	BDL	DL (1)
7	C	64014 - 14	07/11/95	Total Chromium	24	73
7	C	64014 - 14	07/11/95	Total Lead	16	45
7	C	64014 - 14	07/11/95	Total Nickel	18	66
7	C	64014 - 14	07/11/95	TPH	BDL	500
8	18	64014 - 15	07/11/95	Trichloroethene	BDL	DL (2)
8	18	64014 - 15	07/11/95	Toluene	BDL	DL (2)
8	18	64014 - 15	07/11/95	Xylenes	BDL	DL (2)
8	18	64014 - 15	07/11/95	Ethylbenzene	BDL	DL (2)
8	18	64014 - 15	07/11/95	Tetrachloroethene	BDL	DL (2)
8	18	64014 - 15	07/11/95	1,1-Dichloroethene	BDL	DL (2)
8	18	64014 - 15	07/11/95	Vinyl Chloride	BDL	DL (2)
8	C	64014 - 16	07/11/95	Total Barium	120	318
8	C	64014 - 16	07/11/95	Total Cadmium	BDL	DL (1)
8	C	64014 - 16	07/11/95	Total Chromium	17	73
8	C	64014 - 16	07/11/95	Total Lead	9	45
8	C	64014 - 16	07/11/95	Total Nickel	14	66
8	C	64014 - 16	07/11/95	TPH	BDL	500
9	2	64014 - 17	07/11/95	Trichloroethene	BDL	DL (2)
9	2	64014 - 17	07/11/95	Toluene	BDL	DL (2)

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(Sorted by Report Number, by Grid Number)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
9	2	64014 - 17	07/11/95	Xylenes	BDL	DL (2)
9	2	64014 - 17	07/11/95	Ethylbenzene	BDL	DL (2)
9	2	64014 - 17	07/11/95	Tetrachloroethene	BDL	DL (2)
9	2	64014 - 17	07/11/95	1,1-Dichloroethene	BDL	DL (2)
9	2	64014 - 17	07/11/95	Vinyl Chloride	BDL	DL (2)
9	C	64014 - 18	07/11/95	Total Barium	70	318
9	C	64014 - 18	07/11/95	Total Cadmium	BDL	DL (1)
9	C	64014 - 18	07/11/95	Total Chromium	21	73
9	C	64014 - 18	07/11/95	Total Lead	17	45
9	C	64014 - 18	07/11/95	Total Nickel	8.1	66
9	C	64014 - 18	07/11/95	TPH	47	500
10	29	64014 - 19	07/11/95	Trichloroethene	BDL	DL (2)
10	29	64014 - 19	07/11/95	Toluene	BDL	DL (2)
10	29	64014 - 19	07/11/95	Xylenes	BDL	DL (2)
10	29	64014 - 19	07/11/95	Ethylbenzene	BDL	DL (2)
10	29	64014 - 19	07/11/95	Tetrachloroethene	BDL	DL (2)
10	29	64014 - 19	07/11/95	1,1-Dichloroethene	BDL	DL (2)
10	29	64014 - 19	07/11/95	Vinyl Chloride	BDL	DL (2)
10	C	64014 - 20	07/11/95	Total Barium	91	318
10	C	64014 - 20	07/11/95	Total Cadmium	BDL	DL (1)
10	C	64014 - 20	07/11/95	Total Chromium	33	73
10	C	64014 - 20	07/11/95	Total Lead	24	45
10	C	64014 - 20	07/11/95	Total Nickel	16	66
10	C	64014 - 20	07/11/95	TPH	36	500
11	99	64014 - 21	07/11/95	Trichloroethene	BDL	DL (2)
11	99	64014 - 21	07/11/95	Toluene	BDL	DL (2)
11	99	64014 - 21	07/11/95	Xylenes	BDL	DL (2)
11	99	64014 - 21	07/11/95	Ethylbenzene	BDL	DL (2)
11	99	64014 - 21	07/11/95	Tetrachloroethene	BDL	DL (2)
11	99	64014 - 21	07/11/95	1,1-Dichloroethene	BDL	DL (2)
11	99	64014 - 21	07/11/95	Vinyl Chloride	BDL	DL (2)
11	C	64014 - 22	07/11/95	Total Barium	77	318
11	C	64014 - 22	07/11/95	Total Cadmium	1.4	DL (1)
11	C	64014 - 22	07/11/95	Total Chromium	23	73
11	C	64014 - 22	07/11/95	Total Lead	49	45
11	C	64014 - 22	07/11/95	Total Nickel	20	66
11	C	64014 - 22	07/11/95	TPH	46	500
12	41	64014 - 23	07/11/95	Trichloroethene	BDL	DL (2)
12	41	64014 - 23	07/11/95	Toluene	BDL	DL (2)
12	41	64014 - 23	07/11/95	Xylenes	BDL	DL (2)
12	41	64014 - 23	07/11/95	Ethylbenzene	BDL	DL (2)
12	41	64014 - 23	07/11/95	Tetrachloroethene	BDL	DL (2)
12	41	64014 - 23	07/11/95	1,1-Dichloroethene	BDL	DL (2)
12	41	64014 - 23	07/11/95	Vinyl Chloride	BDL	DL (2)
12	C	64014 - 24	07/11/95	Total Barium	84	318
12	C	64014 - 24	07/11/95	Total Cadmium	BDL	DL (1)
12	C	64014 - 24	07/11/95	Total Chromium	31	73
12	C	64014 - 24	07/11/95	Total Lead	15	45
12	C	64014 - 24	07/11/95	Total Nickel	11	66
12	C	64014 - 24	07/11/95	TPH	37	500
13	31	64014 - 25	07/11/95	Trichloroethene	BDL	DL (2)
13	31	64014 - 25	07/11/95	Toluene	BDL	DL (2)
13	31	64014 - 25	07/11/95	Xylenes	BDL	DL (2)

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(Sorted by Report Number, by Grid Number)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
13	31	64014 - 25	07/11/95	Ethylbenzene	BDL	DL (2)
13	31	64014 - 25	07/11/95	Tetrachloroethene	BDL	DL (2)
13	31	64014 - 25	07/11/95	1,1-Dichloroethene	BDL	DL (2)
13	31	64014 - 25	07/11/95	Vinyl Chloride	BDL	DL (2)
13	C	64014 - 26	07/11/95	Total Barium	58	318
13	C	64014 - 26	07/11/95	Total Cadmium	BDL	DL (1)
13	C	64014 - 26	07/11/95	Total Chromium	20	73
13	C	64014 - 26	07/11/95	Total Lead	11	45
13	C	64014 - 26	07/11/95	Total Nickel	7.2	66
13	C	64014 - 26	07/11/95	TPH	56	500
14	78	64014 - 27	07/11/95	Trichloroethene	BDL	DL (2)
14	78	64014 - 27	07/11/95	Toluene	BDL	DL (2)
14	78	64014 - 27	07/11/95	Xylenes	BDL	DL (2)
14	78	64014 - 27	07/11/95	Ethylbenzene	BDL	DL (2)
14	78	64014 - 27	07/11/95	Tetrachloroethene	BDL	DL (2)
14	78	64014 - 27	07/11/95	1,1-Dichloroethene	BDL	DL (2)
14	78	64014 - 27	07/11/95	Vinyl Chloride	BDL	DL (2)
14	C	64014 - 28	07/11/95	Total Barium	84	318
14	C	64014 - 28	07/11/95	Total Cadmium	BDL	DL (1)
14	C	64014 - 28	07/11/95	Total Chromium	45	73
14	C	64014 - 28	07/11/95	Total Lead	33	45
14	C	64014 - 28	07/11/95	Total Nickel	18	66
14	C	64014 - 28	07/11/95	TPH	550	500
15	7	64014 - 29	07/11/95	Trichloroethene	BDL	DL (2)
15	7	64014 - 29	07/11/95	Toluene	BDL	DL (2)
15	7	64014 - 29	07/11/95	Xylenes	BDL	DL (2)
15	7	64014 - 29	07/11/95	Ethylbenzene	BDL	DL (2)
15	7	64014 - 29	07/11/95	Tetrachloroethene	BDL	DL (2)
15	7	64014 - 29	07/11/95	1,1-Dichloroethene	BDL	DL (2)
15	7	64014 - 29	07/11/95	Vinyl Chloride	BDL	DL (2)
15	C	64014 - 30	07/11/95	Total Barium	82	318
15	C	64014 - 30	07/11/95	Total Cadmium	BDL	DL (1)
15	C	64014 - 30	07/11/95	Total Chromium	30	73
15	C	64014 - 30	07/11/95	Total Lead	23	45
15	C	64014 - 30	07/11/95	Total Nickel	13	66
15	C	64014 - 30	07/11/95	TPH	BDL	500
16	25	64014 - 31	07/11/95	Trichloroethene	BDL	DL (2)
16	25	64014 - 31	07/11/95	Toluene	BDL	DL (2)
16	25	64014 - 31	07/11/95	Xylenes	BDL	DL (2)
16	25	64014 - 31	07/11/95	Ethylbenzene	BDL	DL (2)
16	25	64014 - 31	07/11/95	Tetrachloroethene	BDL	DL (2)
16	25	64014 - 31	07/11/95	1,1-Dichloroethene	BDL	DL (2)
16	25	64014 - 31	07/11/95	Vinyl Chloride	BDL	DL (2)
16	C	64014 - 32	07/11/95	Total Barium	180	318
16	C	64014 - 32	07/11/95	Total Cadmium	BDL	DL (1)
16	C	64014 - 32	07/11/95	Total Chromium	35	73
16	C	64014 - 32	07/11/95	Total Lead	18	45
16	C	64014 - 32	07/11/95	Total Nickel	22	66
16	C	64014 - 32	07/11/95	TPH	32	500
17	74	64014 - 33	07/11/95	Trichloroethene	BDL	DL (2)
17	74	64014 - 33	07/11/95	Toluene	BDL	DL (2)
17	74	64014 - 33	07/11/95	Xylenes	BDL	DL (2)
17	74	64014 - 33	07/11/95	Ethylbenzene	BDL	DL (2)

TABLE 1: ANALYTICAL RESULTS OF BOTTOM SOIL SAMPLES
SURFACE IMPOUNDMENT CLEAN CLOSURE DETERMINATION
(Sorted by Report Number, by Grid Number)

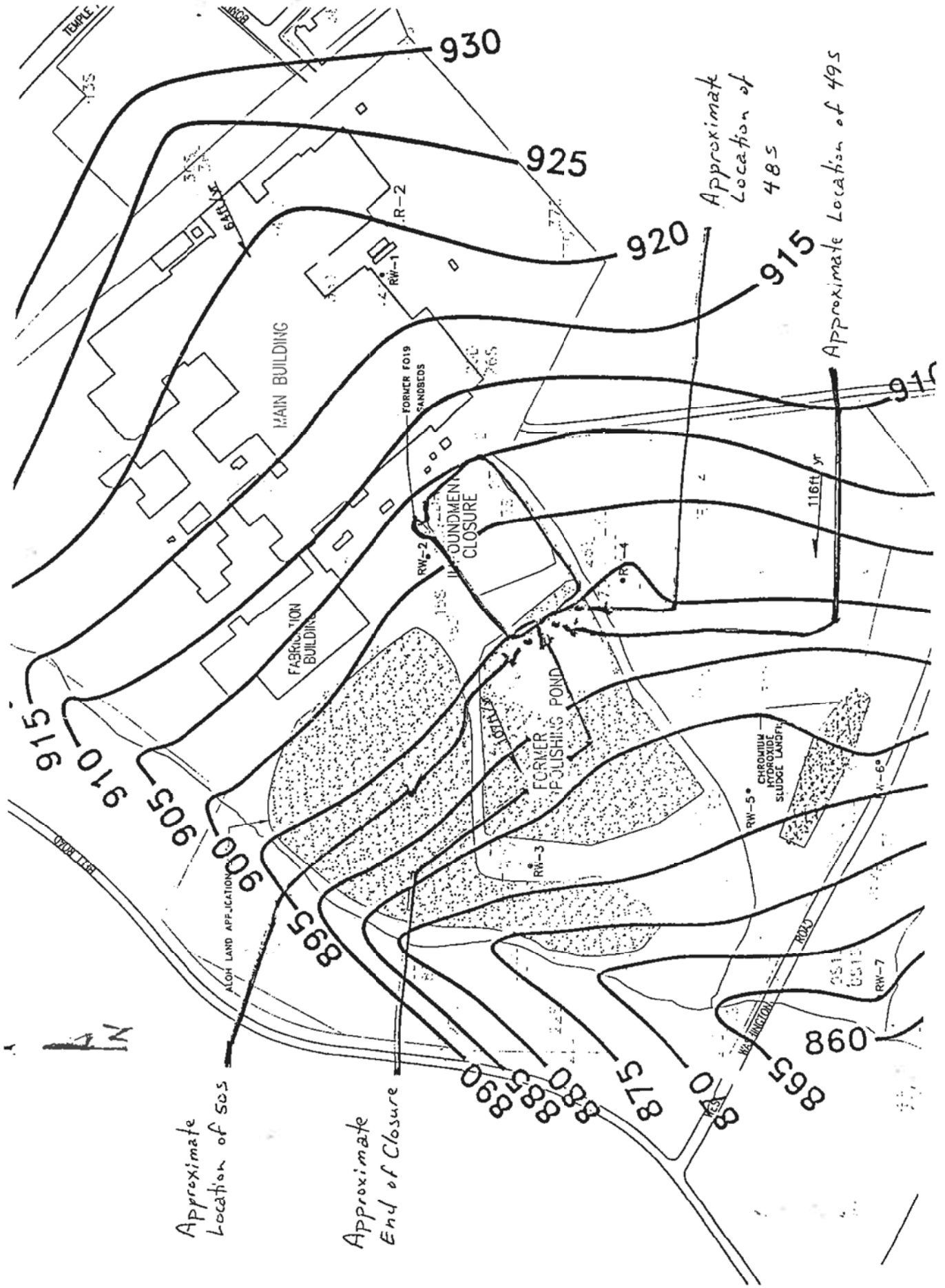
GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
17	74	64014 - 33	07/11/95	Tetrachloroethene	BDL	DL (2)
17	74	64014 - 33	07/11/95	1,1-Dichloroethene	BDL	DL (2)
17	74	64014 - 33	07/11/95	Vinyl Chloride	BDL	DL (2)
17	C	64014 - 34	07/11/95	Total Barium	230	318
17	C	64014 - 34	07/11/95	Total Cadmium	BDL	DL (1)
17	C	64014 - 34	07/11/95	Total Chromium	54	73
17	C	64014 - 34	07/11/95	Total Lead	20	45
17	C	64014 - 34	07/11/95	Total Nickel	27	66
17	C	64014 - 34	07/11/95	TPH	BDL	500
18	52	64014 - 35	07/11/95	Trichloroethene	BDL	DL (2)
18	52	64014 - 35	07/11/95	Toluene	BDL	DL (2)
18	52	64014 - 35	07/11/95	Xylenes	BDL	DL (2)
18	52	64014 - 35	07/11/95	Ethylbenzene	BDL	DL (2)
18	52	64014 - 35	07/11/95	Tetrachloroethene	BDL	DL (2)
18	52	64014 - 35	07/11/95	1,1-Dichloroethene	BDL	DL (2)
18	52	64014 - 35	07/11/95	Vinyl Chloride	BDL	DL (2)
18	C	64014 - 36	07/11/95	Total Barium	120	318
18	C	64014 - 36	07/11/95	Total Cadmium	BDL	DL (1)
18	C	64014 - 36	07/11/95	Total Chromium	50	73
18	C	64014 - 36	07/11/95	Total Lead	22	45
18	C	64014 - 36	07/11/95	Total Nickel	16	66
18	C	64014 - 36	07/11/95	TPH	88	500
19	83	64014 - 37	07/11/95	Trichloroethene	BDL	DL (2)
19	83	64014 - 37	07/11/95	Toluene	BDL	DL (2)
19	83	64014 - 37	07/11/95	Xylenes	BDL	DL (2)
19	83	64014 - 37	07/11/95	Ethylbenzene	BDL	DL (2)
19	83	64014 - 37	07/11/95	Tetrachloroethene	BDL	DL (2)
19	83	64014 - 37	07/11/95	1,1-Dichloroethene	BDL	DL (2)
19	83	64014 - 37	07/11/95	Vinyl Chloride	BDL	DL (2)
19	C	64014 - 38	07/11/95	Total Barium	140	318
19	C	64014 - 38	07/11/95	Total Cadmium	BDL	DL (1)
19	C	64014 - 38	07/11/95	Total Chromium	41	73
19	C	64014 - 38	07/11/95	Total Lead	25	45
19	C	64014 - 38	07/11/95	Total Nickel	23	66
19	C	64014 - 38	07/11/95	TPH	BDL	500
20	41	64014 - 39	07/11/95	Trichloroethene	BDL	DL (2)
20	41	64014 - 39	07/11/95	Toluene	BDL	DL (2)
20	41	64014 - 39	07/11/95	Xylenes	BDL	DL (2)
20	41	64014 - 39	07/11/95	Ethylbenzene	BDL	DL (2)
20	41	64014 - 39	07/11/95	Tetrachloroethene	BDL	DL (2)
20	41	64014 - 39	07/11/95	1,1-Dichloroethene	BDL	DL (2)
20	41	64014 - 39	07/11/95	Vinyl Chloride	BDL	DL (2)
20	C	64014 - 40	07/11/95	Total Barium	87	318
20	C	64014 - 40	07/11/95	Total Cadmium	BDL	DL (1)
20	C	64014 - 40	07/11/95	Total Chromium	49	73
20	C	64014 - 40	07/11/95	Total Lead	18	45
20	C	64014 - 40	07/11/95	Total Nickel	35	66
20	C	64014 - 40	07/11/95	TPH	180	500
21	11	64014 - 41	07/11/95	Trichloroethene	BDL	DL (2)
21	11	64014 - 41	07/11/95	Toluene	BDL	DL (2)
21	11	64014 - 41	07/11/95	Xylenes	BDL	DL (2)
21	11	64014 - 41	07/11/95	Ethylbenzene	BDL	DL (2)
21	11	64014 - 41	07/11/95	Tetrachloroethene	BDL	DL (2)

TABLE 1: ANALYTICAL RESULTS OF BOTTOM SOIL SAMPLES
SURFACE IMPOUNDMENT CLEAN CLOSURE DETERMINATION
(Sorted by Report Number, by Grid Number)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
21	11	64014 - 41	07/11/95	1,1-Dichloroethene	BDL	DL (2)
21	11	64014 - 41	07/11/95	Vinyl Chloride	BDL	DL (2)
21	C	64014 - 42	07/11/95	Total Barium	110	318
21	C	64014 - 42	07/11/95	Total Cadmium	BDL	DL (1)
21	C	64014 - 42	07/11/95	Total Chromium	38	73
21	C	64014 - 42	07/11/95	Total Lead	21	45
21	C	64014 - 42	07/11/95	Total Nickel	15	66
21	C	64014 - 42	07/11/95	TPH	240	500
14	C	64597 - 2	07/28/95	TPH	BDL	500
14	C	64386 - 1	07/21/95	TPH	1300	500
11	C	64386 - 2	07/21/95	Total Cadmium	BDL	DL (1)

TABLE 2: ANALYTICAL RESULTS OF BOTTOM SOIL SAMPLES
SURFACE IMPOUNDMENT CLEAN CLOSURE DETERMINATION
 (Data Shown includes only those parameters at or above cleanup standardst)
 (Sorted by Parameter by Grid)

GRID NUMBER	SQUARE LOCATION	REPORT NUMBER	DATE SAMPLED	PARAMETER	ANALYTICAL RESULT (MG/KG)	BACKGROUND CONCENTRATION (MG/KG)
11	C	64014 - 22	07/11/95	Total Cadmium	1.4	Detection Limit
11	C	64386 - 2	07/21/95	Total Cadmium	BDL	Detection Limit
11	C	64014 - 22	07/11/95	Total Lead	49	45
11	C	64386 - 2	07/21/95	Total Lead	16	45
14	C	64014 - 28	07/11/95	TPH	550	500
14	C	64386 - 1	07/11/95	TPH	550	500
14	C	64597 - 2	07/11/95	TPH	550	500



Approximate
Location of 505

Approximate
End of Closure

Approximate
Location of
485

Approximate Location of 495

GRID NORTH
MAGNETIC NORTH



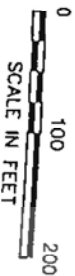
BLOCK NUMBERING SCHEME

01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	00



1-19
21
20

LEGEND
 ■ VOC AND METAL SAMPLE LOCATION
 ● SAMPLES COMPOSITED FOR METALS ALONG WITH SAMPLE TAKEN AT VOC LOCATION



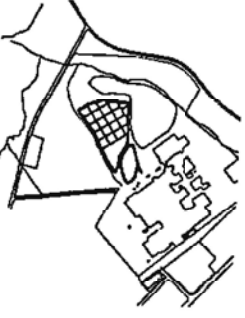
WILLIAM L. BONNELL COMPANY
 SURFACE IMPOUNDMENT CLOSURE
 NEWMAN, GEORGIA
 PRIMARY CLOSURE SOIL SAMPLE LOCATIONS

FIGURE 1
 PROJECT NO. 72040.006-092

DATE 4/24/95
 DWN GHA
 APP BLT
 REV



REFERENCE LOCATION

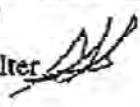


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M E M O R A N D U M

TO: Doug Fidler

DATE: September 15, 1995

FROM: Dave Buchalter 

RE: EPA Standard RCRA Cap

I have researched the design of capping systems for hazardous waste impoundments in order to determine what is generally accepted engineering practice. More importantly, I tried to determine what is an acceptable leakage rate through a cap. There were two guidance documents that specifically addressed capping: The first is entitled "Design, Construction, and Operation of Hazardous and Non-Hazardous Waste Surface Impoundments" (EPA June 1991), and the second is "Seminars - Design and Construction of RCRA/CERCLA Final Covers" (EPA, 1990).

Here are some important points brought out by these two documents:

1. 40 CFR 264.228 states that the cover should:

1. provide long-term minimization of liquid migration through the closed facility
2. function with minimum maintenance
3. promote surface water drainage and minimize erosion or abrasion of the cover to accommodate settling
4. have a hydraulic barrier with a permeability less than or equal to that of the lowest permeability bottom liner or natural subsoil layer present immediately beneath the facility.

The EPA recommended cover system consists of the following from top to bottom:

1. Vegetation/Soil Top Layer - a 60 cm (24 inches) thick layer consisting of a vegetative and topsoil layers.
2. Granular or Geotextile filter
3. Drainage layer - a 30 cm (12 inches) thick layer which laterally drains the water. This material should have a minimum hydraulic conductivity of 1×10^{-2} cm/sec and a minimum slope of 2 percent. The layer may be constructed of granular drainage material classified by the USCS as SP (poorly graded sand).
4. Geomembrane layer - USEPA recommends a 20 mil HDPE geomembrane
5. Low permeability layer - a 60 cm (24 inches) thick layer of clay with a minimum hydraulic conductivity of 1×10^{-7} cm/sec.

To:
September 15, 1995
Page 2

I did not find any information specifying maximum leakage rates, probably because it would depend on the amount of rainfall, evapotranspiration, and the susceptibility of the waste to leaching.

However, we did determine a leakage rate for the EPA recommended cover using the same hydrologic data used for the cover at Bonnell. This leakage rate can then be compared to the present system, and if the EPA recommended cover has a higher leakage rate then our cover design should be adequate with respect to minimizing infiltration.

The HELP model was run for the EPA Standard RCRA CAP and the results were:
Average Annual Totals

Runoff:	44,516 gallons
Evapotranspiration:	1,336,347 gallons
Lateral Drainage	638,096 gallons
Leakage	495 gallons

The model run for the present capping system using a 9.4×10^{-6} clay layer were:

Runoff:	24,728 gallons
Evapotranspiration:	1,407,938 gallons
Lateral Drainage	580,732 gallons
Leakage	2.77 gallons

The present system, even with the more permeable clay layer is a more effective hydraulic barrier than the Standard RCRA cap. This is probably because the thicker HDPE geomembrane 60 mil versus 20 mil is assumed to have less defects per acre (2 compared to 4 holes/acre), and the geonet is a much more effective lateral drainage layer than the sand used in the EPA Standard RCRA cap. This effectively reduces the head on the geomembrane and the residence time of the water within the capping system.

Distribution:

Barbara Turner
George Alexander

Attachments: HELP model for Standard RCRA cap



MEMORANDUM

Date: September 12, 1995
To: Terry Snell
From: George Alexander
Re: Bonnell Closure
72040.009.092

This memorandum is written to summarize and transmit the results of several HELP models I have run. In all cases, input regarding all elements of the closed system not associated with the closure cap (climate, vegetation, run-off coefficient, etc.) was made to equal the HELP run included in Appendix IC-B of the Surface Impoundment Closure Plan dated April 30, 1992. In all cases Version 3 of the HELP model was used to predict flow through the liner system.

Three distinct areas were modeled:

Area A is a 0.15-acre, 2.5H:1V sideslope 11 feet in length.

Area B is a 0.32-acre, 2.5H:1V sideslope, 42 feet in length.

Area C is the relatively flat 1.53-acre top of the landfill, with a 4% slope and 220 feet long.

Following is a description of the input and results of each of the HELP models that I conducted:

Run A-1

Title: BONNELL CLOSURE - SHORT SIDESLOPE - CLOSURE PLAN INPUT

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .000 cubic feet

Run A-3

Title: BONNELL-SHORT SIDESLOPE-RUN A3: 3.6E-5 LINER & 6" & 18" SOIL
TIME: 9:56
DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE liner and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .005 cubic feet

Run B-1

Title: BONNELL-LONG SIDESLOPE-CLOSURE PLAN INPUT RUN B1
TIME: 10:46
DATE: 9/12/1995

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .001 cubic feet

Run B-3:

Title: BONNELL-LONG SIDESLOPE-RUN B3: 3.6E-5 LINER & 6" & 18" SOIL
TIME: 10:12
DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .003 cubic feet

Run C-1:

Title: BONNELL-TOP AREA-RUN C1

TIME: 11:35

DATE: 9/12/1995

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .144 cubic feet

Run C-2:

Title: BONNELL-LONG SIDESLOPE-RUN B3: $3.6E-5$ LINER & 6" & 18" SOIL

TIME: 11:27

DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 9.4×10^{-6} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .163 cubic feet

CONCLUSIONS

Total leakage through the liner is the sum of the leakage through the three areas defined above. Thus, for the closure cap system approved in the Closure Plan, Version 3 of the HELP model estimates the total leakage through the landfill cap as:

	Average Annual Leakage (cf)
Area A	.000
Area B	.001
Area C	<u>.144</u>
TOTAL	.145

Using worst-case values for field-measured permeabilities, and 60-mil HDPE instead of 40-mil HDPE, Version 3 of the HELP model estimates the total leakage through the landfill cap as:

	Average Annual Leakage (cf)
Area A	.005
Area B	.003
Area C	<u>.163</u>
TOTAL	.171

According to the HELP model, the average annual leakage through the liner would increase from 0.145 cubic feet (1.1 gallons per year) to .171 cubic feet (1.3 gallons per year). The practical impact of an additional 0.2 gallons per year of leakage is nil.

It is my conclusion, based upon the HELP modeling presented herein, that the cap system to be installed, which will consist of a 60-mil HDPE liner and a 6-inch clay component with a permeability of no greater than 9.4×10^{-6} cm/sec on the top and 3.6×10^{-5} cm/sec on the side slopes, provides equal protection to that of the originally proposed cap system of a 40-mil HDPE liner and a 6-inch clay component with a permeability of 3.2×10^{-6} cm/sec.



EMCON

1560 Oakbrook Drive • Suite 100 • Norcross, GA 30093-2286 • (404) 447-4665 • Fax (404) 447-9079 • (800) 966-4665

September 12, 1995
Project #72040.009.092

Mr. Terry Snell, P.E.
Environmental Manager
The William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, GA 30264.

**RE: Surface Impoundment Closure
Permeability testing of the 6" Clay Cover**

Dear Mr. Snell:

The following is a summary of the activities and findings for the construction and CQA testing of the 6" select clay fill portion of the composite cover system :

- The select clay fill was placed and compacted over the closure area.
- EMCON verified through representative sampling that the minimum 6" of material had been placed and that the minimum compaction value of 92% had been achieved over the closure area.
- Two shelby tube samples (ST-1 and ST-2) were tested representing the top of the closure, and one shelby tube sample (ST-3) was tested representing the slopes of the closure.
- ST-1 exhibited a permeability of 4.21×10^{-5} . The sample was found to have roots in it and the results determined to be not representative.
- One shelby tube sample (ST-2A) was tested representing the area represented by ST-1. ST-2A exhibited a permeability of 9.4×10^{-6} .
- The area represented by ST-1 and ST-2A was hydrated and re-compacted and a shelby tube sample (ST-2A-1) was tested. ST-2A-1 exhibited a permeability of 2.75×10^{-6} .
- ST-2 exhibited a permeability of 7.746×10^{-6} .
- ST-3 exhibited a permeability of 3.6×10^{-5} .

Sincerely,

Brian Dolihite
Project Manager





EMCON

1560 Oakbrook Drive • Suite 100 • Norcross, GA 30093-2286 • (404) 447-4665 • Fax (404) 447-9079 • (800) 966-4665

August 23, 1995
Project No. 72040.009.092

Mr. Terry Snell
The William L. Bonnell Company
P.O. Box 4281
Newnan, GA 30264

Re: Polishing Pond Closure

Dear Terry:

This letter confirms our inspection of the former polishing pond area on July 25 & 28, 1995. The pond visual inspection indicates that sludges have been removed to competent substrate materials. Certification sampling of the pond has been conducted in conjunction with the sludge removal effort. The analytical results indicate that the remaining substrate materials in the former polishing pond do not contain any constituents above the background levels established by the Surface Impoundment Closure Plan, as amended, approved by the Georgia EPD. The visual inspection and analytical results demonstrate that the former polishing pond has been clean-closed in accordance with the performance standards contained in Section IC (as amended) of the RCRA Part B Permit Application for Post Closure Care, and in accordance with the closure performance standards in 40 CFR 264.111, and the closure requirements of 40 CFR 264.228.

Please feel free to contact me if you have any questions.

Sincerely,

EMCON

Doug Fidler, PG
Senior Remediation Engineer

Dave Buchalter, PE
Senior Consultant



Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Lonice C. Barrett, Commissioner
Environmental Protection Division

Harold F. Reheis, Director
404/656-7802

July 18, 1995

Certified Mail

Return Receipt Requested

Mr. Terry Snell
Environmental Manager
William L Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

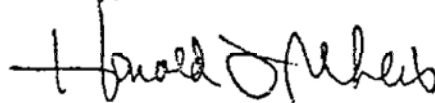
Re: Hazardous Waste Facility
Permit Amendment No. HW-087
William L Bonnell Company, Inc.
EPA ID No. GAD003273224

Dear Mr. Snell:

Enclosed is the permit amendment issued to William L Bonnell Company, Inc. for Hazardous Waste Facility Permit No. HW-087. The permit amendment contains specific conditions which must be met. The permit amendment is now in effect.

No comments were received during the public comment period. Should you have any questions, please contact Ken Grall at (404) 656-7802.

Sincerely,



Harold F Reheis, Director
Environmental Protection Division

HFR/kjg
Attachments
File: Bonnell (Y)
r:\grall\permits\bonnell2.ltr

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Lonice C. Barrett, Commissioner

Environmental Protection Division

Harold F. Reheis, Director

404/656-7802

July 12, 1995

CERTIFIED MAIL

Return Receipt Requested

received 7/14/95
H/

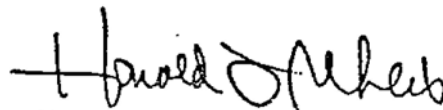
Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: Temporary Authorization Request
Permit No. HW-087
EPA ID No. GAD003272224

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has received and reviewed the temporary authorization request to place contaminated soils and sediments from Solid Waste Management Units (SWMUs) 13, 14, 16, 17, 19, 23, 29, 35, 42, and 50 into the Corrective Action Management Unit (CAMU). Since these requests were found to meet the requirements of 40 CFR 270.42(e)(3)(ii)(A) for approving a temporary authorization request, 40 CFR 270.42(e)(2)(iii) for public notice, and 40 CFR 264.552(c) criteria for designating a CAMU; GAEPD grants Bonnell temporary authorization to conduct these activities. This temporary authorization shall be effective for one hundred eighty (180) days from receipt of this letter. Should you have any questions, please contact Ken Grall at (404) 656-7802.

Sincerely,



Harold F. Reheis, Director
Environmental Protection Division

SE:kg

cc: Kent Williams (EPA Region IV)

File: Bonnell (Y)

c:\grall\Bonnell\tempauth.spr



THE WILLIAM L BONNELL COMPANY, INC.

AND CAPITOL PRODUCTS CORPORATION

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

25 Bonnell Street • P.O. Box 428 • Newnan, Georgia 30263

Phone 404-253-2020 Fax 404-254-7711

July 5, 1995

Harold F. Reheis, P.E.

Director

Georgia Environmental Protection Division

205 Butler Street, Suite 1152 East

Atlanta, GA 30334

Re: Request for Temporary Authorization
EPD Permit HW-087

Dear Harold

The purpose of this letter is to provide additional information related to our June 15, 1995, request for temporary authorization to remediate certain Solid Waste Management Units (SWMUs) by excavating the contaminated soils and placing the soils in the Surface Impoundment Closure Area prior to modification of the referenced permit as requested in the November 17, 1994, Class 3 Permit Modification Request. This information was discussed with Ken Grall on July 3.

In the February 17, 1995, letter approving the November 17, 1994, and January 10, 1995, temporary authorization requests, EPD stated that those "...requests were found to meet the requirement of...40 CFR 264.552(c) criteria for designating a CAMU..." Bonnell must also meet the criteria for placement of any SWMU soils into the CAMU. In order to ensure that, Bonnell conducted TCLP tests for metals on samples collected from the units listed in Table 1, attached. Table 1 has been revised to correct some errors found by your staff.

We have also enclosed a copy of the lab reports for the TCLP analyses in your staff's copy of this letter. In addition, the attached Table 2 summarizes the results of the TCLP analyses. As the lab reports indicate, there are no TCLP results above any RCRA regulatory limit.

As stated in Bonnell's June 15 letter, there could not be any TCLP concentrations in the SWMU soils since no TCLP organics were detected as total. In addition, the soils are neither flammable nor reactive by their very nature. In addition, the pH the soils are not pH corrosive. It should again be noted that the detected volatile organic compounds (VOCs) are not spent solvents because the SWMUs were areas where virgin materials, but not wastes, were handled. Therefore, the VOCs are not listed hazardous wastes.

We appreciate the effort of your staff in reviewing the June 15 temporary authorization request. On July 3, Ken Grall and I discussed additional information EPD would like to see in order to be able to approve this request. Therefore, Bonnell requests that EPD consider the following points:

1. Bonnell will provide a Corrective Action Plan for all the SWMUs (SWMU CAP) being remediated.
2. The SWMU CAP will demonstrate that most environmentally sound and most cost effective alternative for remediation of the SWMUs listed in the Table 1 will be removal of the soils and placement under the Surface Impoundment Closure cap. This is not a foregone conclusion, but a conclusion reached by evaluating alternatives. For instance, Bonnell could remove the soils and transport them to a Class C landfill. The difference between this and placing the soils under the Surface Impoundment cap would be a bottom liner system in the Class C landfill. We submit that human health and the environment, as a whole, would be more protected by placing the remediated soils under the Surface Impoundment cap. Although the Class C landfill would have a bottom liner, we submit that our solidified polishing pond material is very protective of human health and the environment since it has so much lime kiln dust (LKD) added that it is, for all practical purposes, compacted soil cement. The binder material would be very fine, resulting in a very low permeability on the order of 10^{-7} cm/sec. This is not like concrete that would have cracks, but is a very compacted, homogeneous material. Since it is approximately 30 feet thick, this layer provides more than adequate protection. The point is that, even if water were to permeate the HDPE cap, it would have little chance of flowing through the waste layer anyway. The HDPE cap has a permeability of approximately 4.5×10^{-10} cm/sec, and will serve its purpose of preventing water from passing through the waste layer as well.

In addition, the air emissions from operating trucks in the Atlanta non-attainment area resulting from hauling the material to a landfill seems an unnecessary burden on air quality.

In the July 3 conversation, Ken mentioned bio-remediation of the some of the SWMUs. We have considered this. However, we have an active industrial operation on this site. In order to conduct business, we must keep the site active and operable. Bio-remediation would preclude this on most of the SWMUs. In addition, bio-remediation works well in large areas. But when there is a small area here and a small area there, it becomes an unmanageable form of treatment. It would require more burden on the overall environment due to production of fertilizers, operation of air injection equipment, and other resources than any benefit gained by the bio-remediation process.

3. The remediation soils will be stabilized using LKD as necessary to prevent leaching of any materials, including TPH.

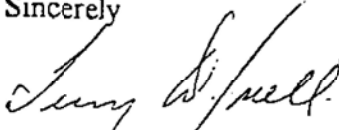
We appreciate the effort of your staff. However, it should again be pointed out that the review and comment response time continues to put Bonnell in a predicament. Beginning this week, the Surface Impoundment closure work will be at a point where we will have equipment and people sitting idle waiting on the requested permit modification to take effect. This will result in a cost between \$4,000 and \$5,000 per day. In addition, the local contractor we are using may not be as readily available to continue with his labor pool. This could result in further delays and associated costs.

Bonnell has worked very hard to achieve the goals established by our Permit. To subject Bonnell to such exorbitant costs, in effect, penalizes Bonnell despite this effort. Therefore, we respectfully request that you grant this temporary request not later than July 7 so that we may continue work and not suffer wasted costs.

Again, this request is based on 40 CFR 270.42(e)(3)(ii)(A), which would facilitate timely implementation of corrective action activities. The referenced November 17, 1994, permit modification request provides compliance with 40 CFR 270.42(e)(2)(I)(B). In compliance with 40 CFR 270.42(e)(2)(ii)(A), the specific activities would be to excavate the soils and place and compact them in the Surface Impoundment closure. Since the approved closure plan has already been deemed to comply with 40 CFR 264 standards and all activities for placement and compaction would be in accordance with the approved plan, this request is in compliance with 40 CFR 270.42(e)(2)(ii)(C).

If you have any questions, please contact me at 254-7690.

Sincerely



Terry D. Snell, P.E.
Manager Environmental

w/Attachments
w/o Enclosures

cc: Susan Eason, w/Attachments, w/o Enclosures
Ken Grall, w/Attachments, w/Enclosures

TABLE 1: DETECTED CONSTITUENTS IN SWMUSs

	SWMU		RANGE		CLEANUP
SWMU	NAME	CONSTITUENT	DETECTED	UNITS	LEVEL
13	Truck Shop Pipe Discharge	toluene	9 - 24	mg/kg	DL
14	Truck Shop Parking	TPH	810 - 2180	mg/kg	500
16	Storage Yard Ditch	chloroform (1)	2.0 - 8.0	mg/kg	DL
		1,1-dichloroethane (1)	5	mg/kg	DL
		1,1,1-trichloroethane (1)	4 - 37	mg/kg	DL
		TPH (1)	890 - 3000	mg/kg	500
		1,1,1-trichloroethane (2)	4 - 7	micro g/kg	DL
		TPH (2)	1.5 - 3.5	micro g/kg	DL
		chloroform (2)	2 - 8	micro g/kg	DL
17	Drum Chrusher Area	TPH	1800	mg/kg	500
		chromium	130	mg/kg	73
		1,1,1-trichloroethane	19	mg/kg	DL
		lead	4	mg/kg	45
19	Area West of Die Shop	TPH	525 - 560	mg/kg	500
		chromium	83 - 1600	mg/kg	73
		methylene chloride	130 - 260	mg/kg	DL
		cadmium	1.1 - 1.4	mg/kg	1
		nickel	97 - 110	mg/kg	66
23	Inactive Oil/Water Sep.	TPH	660 - 1140	mg/kg	500
		cis-1,2-dichloroethane	22	mg/kg	DL
		Oil & Grease (3)	6	mg/L	DL
29	Steam Cleaner Area	TPH	500 - 1840	mg/kg	500
		cis-1,2-dichloroethane	10 - 25	micro g/kg	DL
		toluene	12	micro g/kg	DL
35	Sink Frame Bldg.	lead	110	mg/kg	45
		toluene	5 - 39	micro g/kg	DL
		xylenes, total	5 - 21	micro g/kg	DL
		ethylbenzene	5	micro g/kg	DL
42	Cooling Towers	chromium	140	mg/kg	73
		lead	83 - 460	mg/kg	45
		cadmium	3 - 14	mg/kg	1
50	F019 Spill Area	chromium	1600	mg/kg	73

1. SOIL
2. SURFACE WATER
3. GROUNDWATER

TABLE 2: TCLP ANALYTICAL RESULTS FOR SWMUs

SWMU	LOCATION	SAMPLE TYPE	PARAMETER	TCLP RESULTS	REGULATORY LIMIT
13	4-15-2	COMPOSITE	BARIUM	0.2	100
14	8	GRAB	BARIUM	0.2	100
14	7	GRAB	BARIUM	0.2	100
14	6	GRAB	BARIUM	0.3	100
14	4	GRAB	BARIUM	0.2	100
16D	1-2-3	COMPOSITE	BARIUM	0.3	100
16	14	GRAB	BARIUM	0.2	100
18	1-2	COMPOSITE	BARIUM	0.8	100
18	1-2	COMPOSITE	LEAD	0.2	5
19	1-2-3	COMPOSITE	BARIUM	0.3	100
19	1-2-3	COMPOSITE	CHROMIUM	0.02	5
23	3-10	COMPOSITE	BARIUM	0.3	100
23	7-2	COMPOSITE	BARIUM	0.3	100
29	7	GRAB	LEAD	0.1	5
29	5-6	COMPOSITE	BARIUM	0.3	100
29	5-6	COMPOSITE	CADMIUM	0.02	1
29	7	GRAB	BARIUM	0.6	100
35	2	GRAB	BARIUM	0.7	100
35	2	GRAB	CHROMIUM	0.06	5
35	2	GRAB	LEAD	0.4	5
50	8-ALL	COMPOSITE	CHROMIUM	0.06	5
50	8-ALL	COMPOSITE	BARIUM	0.3	100



THE WILLIAM L BONNELL COMPANY, INC.
AND CAPITOL PRODUCTS CORPORATION
SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.
25 Bonnell Street • P.O. Box 428 • Newnan, Georgia 30263
Phone 404-253-2020 Fax 404-254-7711

June 15, 1995

Harold F. Reheis, P.E.
Director
Georgia Environmental Protection Division
205 Butler Street, Suite 1152 East
Atlanta, GA 30334

Re: Request for Temporary Authorization
EPD Permit HW-087

Dear Harold

The purpose of this letter is to request a temporary authorization to remediate certain Solid Waste Management Units (SWMUs) by excavating the contaminated soils and placing the soils in the Surface Impoundment Closure Area prior to modification of the referenced permit as requested in the November 17, 1994, Class III Permit Modification Request. As you are aware, EPD issued a Notice of Intent to Amend the referenced permit to designate the Surface Impoundment Unit as a Corrective Action Management Unit (CAMU). This request is made in accordance with 40 CFR 270.42(e)(3)(ii)(A).

In the February 17, 1995, letter approving the November 17, 1994, and January 10, 1995, temporary authorization requests, EPD stated that those "...requests were found to meet the requirement of...40 CFR 264.552© criteria for designating a CAMU..." Bonnell must also meet the criteria for placement of any SWMU soils into the CAMU. In order to ensure that, Bonnell will conduct TCLP tests for metals on samples collected from the units that we propose to remediate by excavating soils and placing the excavated soils in the CAMU. Since no TCLP organics were detected as total, there could not be any TCLP concentrations in the SWMU soils. In addition, the soils are neither flammable nor reactive by their very nature. In addition, the pH the soils are not pH corrosive.

We have attached a table indicating which SWMUs we propose to remediate by placing excavated soils in the Surface Impoundment closure area. The table indicates the constituents detected, the level detected for each constituent, and the cleanup level for each constituent. It should be noted that the detected volatile organic compounds (VOCs) are not spent solvents because the SWMUs were areas

where virgin materials, but not wastes, were handled. Therefore, the VOCs are not listed hazardous wastes.

We appreciate the effort of you staff in reviewing the RFI report and working with us and our consultants. We believe the list of SWMUs to be remediated and the cleanup levels will protect human health and the environment, but is not overly burdensome on Bonnell. However, the review and comment response time has put Bonnell in a predicament. In about ten working days, the Surface Impoundment closure work will be at a point where we will have equipment and people sitting idle waiting on the requested permit modification to take effect. This would result in a cost between \$4,000 and \$5,000 per day. In addition, the local contractor we are using may not be as readily available to continue with his labor pool. This could result in further delays and associated costs.

Bonnell has worked very hard to achieve the goals established by our Permit. To subject Bonnell to such exorbitant costs would be, in effect, penalizing Bonnell despite this effort. Therefore, we respectfully request that you grant this temporary request not later than June 30 so that we may continue work and not suffer wasted costs.

This request is based on 40 CFR 270.42(e)(3)(ii)(A), which would facilitate timely implementation of corrective action activities. The referenced November 17, 1994, permit modification request provides compliance with 40 CFR 270.42(e)(2)(I)(B). In compliance with 40 CFR 270.42(e)(2)(ii)(A), the specific activities would be to excavate the soils and place and compact them in the Surface Impoundment closure. Since the approved closure plan has already been deemed to comply with 40 CFR 264 standards and all activities for placement and compaction would be in accordance with the approved plan, this request is in compliance with 40 CFR 270.42(e)(2)(ii)(C).

If you have any questions, please contact Terry Snell at 254-7690.

Sincerely



D.R. Monk
President

cc: Susan Eason
Ken Grall

TABLE 1: DETECTED CONSTITUENTS IN SWMUSs

SWMU		RANGE		CLEANUP	
SWMU	NAME	CONSTITUENT	DETECTED	UNITS	LEVEL
13	Truck Shop Pipe Discharge	toluene	9 - 24	mg/kg	DL
14	Truck Shop Parking	TPH	810 - 2180	mg/kg	500
16	Storage Yard Ditch	chloroform (1)	2.0 - 8.0	mg/kg	DL
		1,1-dichloroethane (1)	5	mg/kg	DL
		1,1,1-trichloroethane (1)	4 - 37	mg/kg	DL
		TPH (1)	890 - 3000	mg/kg	500
		1,1,1-trichloroethane (2)	4 - 7	micro g/kg	DL
		TPH (2)	1.5 - 3.5	micro g/kg	DL
		chloroform (2)	2 - 8	micro g/kg	DL
17	Drum Chrusher Area	TPH	1800	mg/kg	500
		chromium	130	mg/kg	73
		1,1,1-trichloroethane	19	mg/kg	DL
		lead	4	mg/kg	45
19	Area West of Die Shop	TPH	525 - 560	mg/kg	500
		chromium	83 - 1600	mg/kg	73
		methylene chloride	130 - 260	mg/kg	DL
		cadmium	1.1 - 1.4	mg/kg	1
		nickel	97 - 110	mg/kg	66
23	Inactive Oil/Water Sep.	TPH	660 - 1140	mg/kg	500
		cis-1,2-dichloroethane	22	mg/kg	DL
		Oil & Grease (3)	6	mg/L	DL
29	Steam Cleaner Area	TPH	500 - 1840	mg/kg	500
		cis-1,2-dichloroethane	10 - 25	micro g/kg	DL
		toluene	12	micro g/kg	DL
35	Sink Frame Bldg.	lead	110	mg/kg	45
		toluene	5 - 39	micro g/kg	DL
		xylenes, total	5 - 21	micro g/kg	DL
		ethylbenzene	5	micro g/kg	DL
42	Cooling Towers	chromium	140	mg/kg	73
		lead	83 - 460	mg/kg	45
		cadmium	3 - 14	mg/kg	1
50	F019 Spill Area	chromium	1600	mg/kg	73

SWMU TEMPORARY AUTHORIZATION REQUEST LIST

	SWMU		RANGE	CLEANUP
SWMU	NAME	CONSTITUENT	DETECTED	LEVEL
13	Truck Shop Pipe Discharge	toluene	9 - 24	DL
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		cis-1,2-dichloroethane	10 - 25	DL
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		xylenes	5 - 21	DL
42	Cooling Towers	chromium	140	73
		lead	83 - 460	45

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Lonice C. Barrett, Commissioner
Environmental Protection Division

Harold F. Reheis, Director
404/856-7802

June 14, 1995

CERTIFIED MAIL

Return Receipt Requested

Received 6/19/95

Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: RFI Report Addendum Reviewed,
Corrective Action Call-In

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has completed its review of the RCRA Facility Investigation (RFI) Report Addendum required by Hazardous Waste Permit HW-087 Condition IV.E.6. Pursuant to Condition IV.E.5. of the Permit, GAEPD is notifying the William L Bonnell Company, Inc. (Bonnell) of the findings of the review and specifying which Solid Waste Management Units (SWMUs) require corrective action at this time.

General Discussion On Conducting Corrective Action By The Use Of A Gross Indicator Parameter

Underground Storage Tank (UST) rules now incorporate cleanup criteria that utilize polynuclear aromatic hydrocarbons (PAH), rather than total petroleum hydrocarbons (TPH). Bonnell proposes to use PAH analysis for cleanup criteria. While the contaminants in question are not attributable to an underground storage tank release, Bonnell contends these PAH cleanup levels are protective of human health and the environment.

UST sites are traditionally associated with gasoline, which contains more chemicals than benzene, toluene, ethylbenzene and xylene - namely acenaphthalene and naphthalene. Acenaphthalene and naphthalene are contained in the analyte list of PAH analysis. Therefore, PAH analysis at UST sites can supplement BTEX analysis. However, the sites under discussion are primarily vehicle maintenance or die shop operations, which contain motor oils (used and otherwise), virgin hydraulic oil and lubricating oil.

A second iteration of field work performed at SWMU-16 used PAH analysis at four locations: SD-16-5, 16-6, 16-7, and 16-8. All four locales were non-detect for PAH's with

RFI Report Addendum Review,
Corrective Action Call In - Bonnell
June 14, 1995
Page 2

a detection limit of .330 mg/kg for each of the sixteen parameters selected from the semivolatiles listed in method 8270. However, each of these samples indicated TPH, ranging from 1380(16-5) to 2633 mg/kg(16-6). As a gross indicator of contamination, TPH analysis has the best possibility of characterizing the oil contamination at these SWMUs. GAEPD suggests that the additional characterization and confirmation sampling continue with the use of TPH analysis.

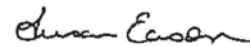
SWMUs Requiring Corrective Action

Corrective action is required at the following SWMUs for hazardous constituents that exceed the established background concentration, and areas with TPH concentrations greater than 500 ppm:

SWMU-50	SWMU-7	SWMU-46	SWMU-13	SWMU-14
SWMU-16	SWMU-17	SWMU-18	SWMU-19	SWMU-23
SWMU-29	SWMU-35	SWMU-42	SWMU-47	SWMU-49

Pursuant to the requirements of Condition IV.F. of the Permit, Bonnell must submit a corrective action plan (CAP) for these SWMUs. This CAP must be submitted as a request to modify the Permit and is due September 15, 1995. Should you have any questions, please contact Ken Grall at (404) 656-7802.

Sincerely,



Susan Eason
Unit Coordinator

SSE:kjg
File: Bonnell (R)
r:\grall\bonnell\vfirpt.apr



EMCON

1560 Oakbrook Drive • Suite 100 • Norcross, GA 30093-2286 • (404) 447-4665 • Fax (404) 447-9079 • (800) 966-4665

May 2, 1995
Project No. 72040.009.092

Mr. Terry Snell
William L Bonnell Company
Post Office Box 428
Newnan, GA 30264

Re: Surface Impoundment Closure

Dear Terry:

Attached for your use are four copies of the proposed grading plan for the closure of the Surface Impoundment. The existing grades shown in the area of the landfill are based upon survey data of April 5 which was provided to us by Bonnell.

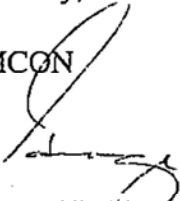
The plan was developed to accommodate the anticipated volume of material to be removed from the western end of the polishing pond. Darold Wiggins estimated that 7,000 CY of material was placed in the landfill between April 5 and April 19, when we met at the site. As discussed in my April 21 letter to you, we estimated an additional 24,100 CY of material to come from the pond as of April 19, resulting in a total volume of 31,100 CY of material after the date of the survey.

The proposed grades shown on this plan allow for the placement of some 32,000 CY of material. By bringing the landfill grade up evenly, the final grade of the landfill can be easily adjusted to accommodate the actual volume of material removed from the polishing pond and still maintain the final drainage patterns established by this plan.

If you have any questions or comments concerning this, please do not hesitate to call me.

Sincerely,

EMCON


George H. Alexander, P. E.
Senior Engineer

cc: Dave Buchalter (w/attachment)
Darold Wiggins (w/attachment)





EMCON

1560 Oakbrook Drive • Suite 100 • Norcross, GA 30093-2286 • (404) 447-4665 • Fax (404) 447-9079 • (800) 966-4665

April 21, 1995

Project No. 72040.009.092

Mr. Terry Snell
William L. Bonnell Company
P.O. Box 428
Newnan, GA 30264

Re: Closure of Polishing Pond

Dear Terry:

Recent test pits dug in the polishing pond revealed the presence of soils containing oil and grease in the northwest portion of the polishing pond. Affected soils ranged in depth from an estimated 3 to 10 feet over a 2.2-acre area (refer to Figure 1). In light of this discovery, you have asked that EMCON determine the cost-effective manner of completing the closure of the polishing pond.

With you, we determined that there are two acceptable methods of closure to be considered. First, you could continue the current practice of excavating, solidifying and placing the material in the landfill being constructed in the area of the old settling pond and eastern portion of the settling pond. This would result in clean-closure of the western portion of the polishing pond area in question. The alternative would be to leave the contaminated soils in place and to construct a landfill closure cap over the area.

Based on the estimated horizontal and vertical extents of contaminated soil shown in Figure 1, we estimate 20,100 CY of material would need to be handled under the current program to clean-close the area. Based on conversations with you and Darold Wiggins, we understand that Bonnell's incremental cost of excavating, solidifying and placing soil is \$4.20/CY. Note that this is incremental cost only, and does not include the costs of dewatering, water treatment, decontamination, etc. It also does not address extensive working of the soil to solidify it so that it can be readily compacted in the landfill area. Visual inspection of the soils in question lead us to believe that additional effort will be required to solidify the soils. Darold estimated that this would add an additional \$1.00/CY to the cost. Applying a total unit cost of \$5.20/CY to the estimated 20,100 CY of soil provides an estimated cost of \$104,000 to continue the current method of closure and clean-close the area.

The alternative solution is to cap the contaminated soils in place. This would involve grading the area to drain, and then covering the area with a geotextile fabric, a soil bridging layer (estimated at 3 feet thick), a 6-inch thick clay soil cap component, an HDPE cap component, an 18-inch thick drainage layer, and a 6 inches of topsoil with grass. For the 2.2-acre area in question, we estimate the construction cost of this alternative at \$190,000 (see attached spreadsheet).

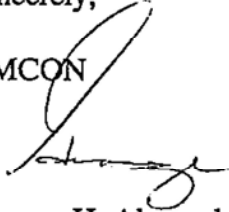


From an economic standpoint, based on the assumed volumes of material and unit costs presented herein, we recommend that closure of the polishing pond be accomplished through the current practice of excavating, solidifying and placing the material in the landfill unit which is being constructed in the vicinity of the old settling pond and the eastern portion of the polishing pond.

If you have any questions or comments concerning this, please do not hesitate to call me.

Sincerely,

EMCON

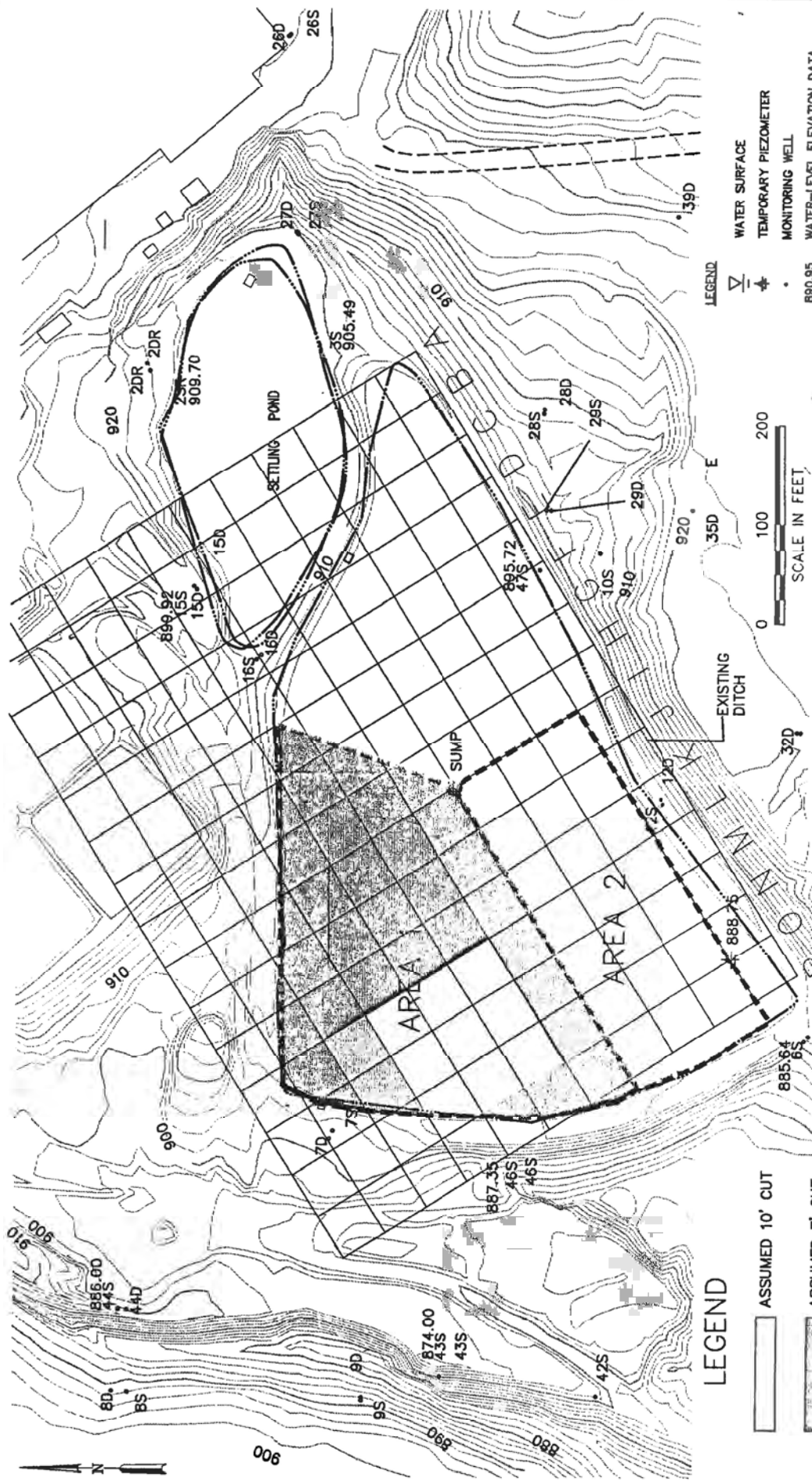
A handwritten signature in black ink, appearing to read "George H. Alexander", written over the printed name below.

George H. Alexander, P. E.
Senior Engineer

ESTIMATED CONSTRUCTION COST OF CLOSURE CAP				
CAP COSTS:				
Task	Quantity	Units	Unit Price	Cost
Grade Surface to Drain	2.2	Acres	\$ 500	\$ 1,100
Purchase/Place Geotextile Fabric	10,648	SY	\$ 1.50	\$ 15,972
Purchase/Transport 3' Soil Bridging Layer	6,648	CY	\$ 5.15	\$ 34,237
Place/Compact 3' Soil Bridging Layer	6,648	CY	\$ 2.50	\$ 16,620
Purchase/Transport 6" Soil Cap Component	1,775	CY	\$ 5.15	\$ 9,140
Place, Compact 6" Soil Cap Component	1,775	CY	\$ 2.50	\$ 4,437
60-mil Liner, Including 5% wastage	100,624	SF	\$ 0.45	\$ 45,281
Liner QA/QC	100,624	SF	\$ 0.08	\$ 8,006
Purchase/Transport 24" Drainage Layer/Topsoil	7,099	CY	\$ 5.15	\$ 36,558
Place, Compact 24" Drainage Layer/Topsoil	7,099	CY	\$ 1.50	\$ 10,648
Fine Grading	10,648	SY	\$ 0.20	\$ 2,130
Grassing	2.2	Acres	\$ 1,500	\$ 3,300
Drainage Structures	2.2	Acres	\$ 1,000	\$ 2,200
SUBTOTAL, CAP SYSTEM				\$ 189,628

Notes:

1) A 3-foot thick soil bridging layer over a 2.2-acre area results in the need for 10,600 CY of material. Approximately 4,000 CY of suitable material is available from the southwestern portion of the Polishing Pond (Area 2 in Figure1). This material must be excavated and placed in a capped landfill area regardless of which alternative is chosen for handling the soils in Area 1 of the Polishing Pond. Therefore, there is no incremental cost for using this soil as part of the soil bridging layer if this approach is taken; the incremental effort involved in placing the bridging material is reduced from 10,600 CY to 6,600 CY.



LEGEND

- ASSUMED 10' CUT
- ASSUMED 7' CUT
- ASSUMED 5' CUT
- ASSUMED 3' CUT

LEGEND

- WATER SURFACE
- TEMPORARY PIEZOMETER
- MONITORING WELL
- 890.95 WATER-LEVEL ELEVATION DATA

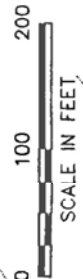


FIGURE #1

WILLIAM L BONELL COMPANY
NEWNAN, GEORGIA

POLISHING POND VOLUME DETERMINATION

DATE 4/20/95
DWN. JCHA
APPR. _____
REVIS. _____
PROJECT NO. 2040.009.092





THE WILLIAM L BONNELL COMPANY, INC.

AND CAPITOL PRODUCTS CORPORATION

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

25 Bonnell Street • P.O. Box 428 • Newnan, Georgia 30263

Phone 404-253-2020 Fax 404-254-7711

April 12, 1995

Mrs. Susan Eason
Unit Coordinator
Environmental Protection Division
Floyd Towers East, Suite 1154
205 Butler Street
Atlanta, GA 30334

Re: Notice of Deficiency
RFI REPORT

Dear Susan,

The purpose of this letter is to respond to your January 13, 1994 letter to me regarding the Notice of Deficiency for the RFI REPORT. We are responding to each comment with the action we have already taken or plan to take, as appropriate.

GENERAL COMMENTS ON THE RFI REPORT:

The field screening was done using a photoionization detector (PID) which utilizes a lamp of specified voltage that ionizes passing vapors. With SWMUs that indicated the presence of TPH there appeared to be little, if any, correlation between the PID values and TPH concentrations. One SWMU in particular contained a sample which was field screened at 35 ppm with the PID (the lowest of the field screened samples collected for analysis) and detected the highest TPH value of all samples at that SWMU, 890 ppm.

A flame ionization detector (FID) is capable of ionizing organic compounds with potentials of 15.4 e V and below as opposed to the PID that was used which would ionize compounds with potentials of 10.6 e V and below. The ability for a FID to ionize compounds with higher potentials may provide better field screening capabilities even though their sensitivity is not as great as a PID's. The use of a FID should be considered for future site investigation work.

In reviewing this report, as mentioned previously, there exists limited correlation between field screening with a PID and the analytical results for TPH. Additionally, samples that underwent volatile organic analysis also provided very limited correlation between PID and organic results. This may indicate the PID is screening vapors or contaminants that fall into the category of semi-volatiles rather than volatiles. For further investigations, the PID screening will require a follow-up analysis of semi-volatiles in addition to the traditional volatiles requirement. This will supplement the TPH and VOX's analysis and provide better evaluations of the constituents responsible for PID readings.

BONNELL RESPONSE:

Bonnell and EMCON believe the PID readings do correlate fairly well with the VOC results. What seems to be occurring is that most of the contamination at the site is from oils which do not contain compounds that volatilize and, therefore, would be detected by the PID. The only SWMU which contained significant concentrations of VOCs was SWMU 7/46. The PID was an effective tool in this area. However, it should be noted that the absence of PID readings is also useful. This occurred at some SWMUs including, but not limited to, SWMUs 23, 29, and 35.

It should also be noted that PID readings can be affected by the moisture content of the soil, temperature, and humidity. For this reason, the PID is adequate only as a field indicator. Therefore, we believe that, for most areas of the facility, organic vapor screening with a PID will determine if VOCs are present. We agree with EPD that heavier, less volatile oils will not be detected by the PID or FID.

SWMU 1, CALCIUM ALUMINATE LANDFILL AREA

On figure SWMU # 1/50 two SO-1-10 samples are shown and no SO-1-14 sample is shown. Also p. 1 of 2 of ASI's Laboratory Report No. 49649-16 is missing from the Report. Please correct figure SWMU # 1/50 and submit the missing laboratory report page.

The waste in this SWMU was analyzed for pH and if a sample had the characteristic green color of CrOH sludge the sample was to be analyzed for chromium. The boring logs for these samples indicate that no sample possessed a green coloration. Seven of the samples had a pH of greater than 12.5. These samples must be analyzed for permit metals along with groundwater samples to be taken from wells 18s, 31d, and 32s. Also submit a characterization of this waste in accordance to § 262.11.

BONNELL RESPONSE:

Figure #1/50 has been corrected. Page 1 of Missing lab report 49649-16 has been included in Appendix B.

The generation of calcium aluminate is from a caustic etching process of aluminum. The aluminum alloy does not contain detectable amounts of the RCRA metals Ba, Cd, Cr, Pb, or Ni. Since caustic does not attack steel, no permit metals could be leached from the caustic tanks. Therefore, there would not be any permit metals in the high pH calcium aluminate.

In reference to a waste determination, EPA stated in a background document to caustic 40 CFR Part 261.22 (dated May 2, 1980) that a material which is solid will not be considered hazardous for pH. The background document states "The Agency has concluded that there is no demonstrated need to address solids which may become corrosive in its corrosiveness definition at this time." Therefore, this material is not characteristically hazardous due to corrosivity. Based on operator knowledge, the calcium aluminate would not be hazardous due to the characteristics of ignitability, toxicity, or reactivity. Based on this information, the calcium aluminate material in the landfill is not a RCRA hazardous waste.

SWMU 50, F019 SPILL AREA

The "Soil Sample Field Data Sheets", "Boring Sample Description Logs", and the photographs of discolored soils/fills for this SWMU were not submitted with the Report. Please submit this information.

The two foot soil sample at location SO-50-9 was not taken as depicted on figure SWMU # 1/50. Please explain the reasoning for not collecting this sample.

Bonnell should proceed with the additional sampling that was recommended in the RFI Report.

BONNELL RESPONSE:

Soil sample Field Data Sheets have been included in Appendix C. No Boring logs were included since these were hand augured. Photos taken of samples collected from SWMU 50 are included in Appendix D. SO-50-9 was a duplicate of SO-50-7, so it was not collected as shown on the diagram.

Eight additional samples were collected at one and two foot depths from four locations. No green discoloration indicative of chromium hydroxide was noted in the samples. The pHs varied from 7.93 to 12.13, and all of the samples tested for chromium were below the background level for chromium.

SWMU 7/46, ACCUMULATION TANK FOR WASTE SOLVENT and SOLVENT TANK FARM AREA

SWMU # 7 is stated as being an accumulation tank for waste solvent and SWMU # 46 is stated as being a solvent tank farm area. From compliance evaluation inspections GAEPD was under the understanding that the tank at SWMU # 7 contained virgin solvent and the tank at SWMU # 46 contained waste solvent. Please clarify this issue.

On figure SWMU 7/46C, 1,2,4-trichlorobenzene was misreported as 1,2,4-trimethylbenzene, PCE was misreported as tetrachlorobenzene, and some of the laboratory results were not reported in the tables as indicated by the presence of blank spaces in the tables. Also, in the appendices the following analytical report pages were missing: p.2 Report #52604-2, p.3 Report #52604-5, and pp.2 and 3 of Report #52604-6.

The figures listed in the first paragraph of Section 3.3.3, page 3-11 are incorrect. Please correct these references.

Bonnell should proceed with the additional sampling that was recommended but should analyze the samples for VOC's (Method 8260) instead of just permit VOCs. Please inform EPD prior to sampling whether Bonnell intends to collect groundwater samples as part of the soil sample collection using the hydropunch.

BONNELL RESPONSE:

The tanks were shown correctly in the report. SWMU 7 is the waste solvent tank, and SWMU 46 is the virgin solvent tank

Figure 7/46 C has been corrected to show 1,2,4-trichlorobenzene and 1,2,4-trimethylbenzene with their correct respective values. The missing lab reports have been incorporated into the Appendix B. The tables in Figure 7/46 have been corrected by filling in the missing information.

The references listed in the first paragraph of Section 3.3.3 have been corrected.

Additional sampling has been performed which has delineated the horizontal and vertical extent of contamination. The sampling is described in revised section SWMU 7/46. Although a hydropunch was considered, it was not used because of the amount of rocks and cobbles in the area.

**SWMU 11, ANODIZING WASTEWATER TREATMENT SYSTEM AND PIPING
UPSTREAM OF SETTLING POND**

Lead levels for sampling point SO-11-32 were 216 mg/kg at a depth of one foot below the pipe. Further investigation around this sampling point is warranted due to the background concentration for lead being 13 mg/kg.

BONNELL RESPONSE:

Additional sampling has been performed to re-evaluate the background value for lead. The original background sampling was performed at depth since the parent rock material from which the saprolite weathered from was to be identified. While this sampling technique was good for the permit metals not associated with environmental sources, it did not take into account for elevated levels of lead associated with our

industrialized society. In a recent EPA guidance document entitled "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA CA Facilities" (dated August 1994), EPA recommended that sites which exhibit levels of lead at or below 400 ppm should not even be considered for further action. Since Bonnell must clean soils to background levels, additional sampling was performed at some of the same background locations as the original background locations. These samples were collected from 0 to 6 inches below the land surface. Statistical analyses showed that the background level should be approximately 45 mg/kg. Lab reports and sample locations are shown in Attachment A.

SWMU 15, OIL WATER SEPARATOR

Bonnell must analyze sampling location SO-15-2 5' BGS for SVOCs (Method 8270) due to the TPH concentration being greater than 100 ppm.

BONNELL RESPONSE:

In order to minimize the amount of investigation and move into remediation, Bonnell has agreed to enter into corrective action at this SWMU. TPH is an indicator parameter and does not necessarily indicate any hazardous substances listed in Appendix VIII. Bonnell requests that the TPH contaminated areas be cleaned to background levels of polynuclear aromatics (PAHs). Although the SWMUs at Bonnell affected by the TPH are not USTs, this analysis is consistent with the Georgia Underground Storage Tank Rules. These rules replace TPH cleanup criteria with PAHs. This approach is appropriate since no consensus risk approach methodology has evolved for evaluating complex mixtures such as petroleum hydrocarbons in assessing baseline health risk or in setting environmental corrective action goals.

SWMU 14, TRUCK SHOP PARKING AREA

Seven soil sampling locations showed TPH concentrations greater than 100 ppm. These sampling locations must be analyzed for SVOCs. Since the depth of impacted soils is not known, additional sampling to define the vertical extent as well as further characterization of the areal extent is required.

BONNELL RESPONSE:

See response to comment on SWMU, Oil Water Separator.

**SWMU 16, STORAGE YARD BEHIND MAINTENANCE BUILDING PLUS DITCH
AND DRUM STORAGE AREA**

In the text, the contamination is attributable to sinks located in a building that drain to the ditch. Do these sinks continue to drain to the ditch?

The four soil sampling locations with TPH concentrations greater than 100 ppm. must be analyzed for VOCs and SVOCs.

The sediment samples must be analyzed for SVOCs due to the TPH concentrations being greater than 100 ppm.

Sediment sample SD-16-4 is not on figure SWMU #16/17/B. Though this is a duplicate of SD-16-3 it should be added to the figure.

TPH and 1,1,1-trichloroethane concentrations in sediments increase downstream. Evaluation of surface waters and sediments past the fence line is necessary to define the impact of contamination.

As discussed earlier, the correlation between field screening equipment and actual TPH values is limited. Therefore, reliance upon PID readings for determining areas needing cleanup is not acceptable. Additionally, confirmation sampling will be required.

The laboratory reports for SWMU # 16's soil samples were not present in the Report. Please submit these reports.

BONNELL RESPONSE:

The sinks no longer drain to the ditch.

See response to comment on SWMU 15, Oil Water Separator, with regard to analyzing samples with TPH concentrations greater than 100 ppm for VOCs and SVOCs.

Sediment sample SD-16-4 has been added to figure SWMU #16/17B. See the response to the general comments concerning use of the PID.

Additional sampling of surface water and sediment was performed define the extent of contamination. The data is included on Figure SWMU 16/17B and in Appendix B.

The missing lab reports for SWMU 16 soil samples have been included in the Appendix B.

SWMU 17, DRUM CRUSHER AREA

Page 3-34 states that at SWMU # 17 chromium was the only permit metal that exceeded background concentrations. Lead was detected above the background concentration of 13 ppm. Please correct this statement in the Report.

Four more soil samples must be collected at this SWMU. This should occur at two locations, 1' BGS and 3' BGS. These samples should be analyzed for permit metals, SVOCs and VOCs.

BONNELL RESPONSE:

The statement on page 3-34 have been corrected.

See response to comment on SWMU 15, Oil Water Separator.

SWMU 18, STORM SEWER SYSTEM

When comparing the laboratory reports for SWMU # 18 to the figures, it was noted that cis-1,2-dichloroethene was mistakenly reported as 1,2-dichloropropane.

In the Recommendations section (3.10.8) it is stated that the drainage ditch flow is expected to cease once the surface impoundment closure activities are complete and improvements are made to the low point collector. Please elaborate on the specifics of this issue.

Figure 2 from the RFI Report depicts a line running through the polishing pond. Is this the former locale of a sewer line? Where is the NPDES outfall located? Does SW-18-4 approximate this outfall or sewer line entry point?

BONNELL RESPONSE:

Figure SWMU #18 and Figure SWMU #18A have been corrected to indicate the correct values for cis-1,2-dichloroethene and 1,2-dichloropropane are both included with respective values. Due to the removal of the hydraulic head at the two former ponds, the groundwater levels in the area of the drainage ditch has dropped several feet. The water level will continue to drop until the Surface Impoundment Closure is completed. Therefore, it is likely that the drainage ditch will no longer act as a groundwater collector. However, there will always be some water flowing into the ditch, since surface water runoff from the parking lot and areas to the southeast flow into the ditch.

The line on Figure 2 is not a sewer, but depicts the old location of the drainage ditch which is being remediated as part of the Surface Impoundment Closure. The NPDES outfall is located on the other side of the Surface Impoundment. It empties into Mineral Springs Branch, between monitoring wells 43S and 44S which is about 500 feet north of the terminus of the drainage ditch into Mineral Springs Branch. The location of the SW-18-A approximates neither the NPDES outfall or any sewer lines.

SWMU 19, AREA WEST OF DIE SHOP

The three samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

BONNELL RESPONSE:

See response to comment on SWMU 15, Oil Water Separator.

Bonnell will perform corrective action at this SWMU. See response to comment on SWMU 15, Oil Water Separator.

SWMU 27, ACID SPILL AREA NEAR PHOSPHORIC ACID STORAGE

The map scale is in error for either Figure 11A or 27, provided these figures depict the same phosphoric acid storage room.

BONNELL RESPONSE:

The scale on Figure 27 was incorrect and was changed to a scale of 10 to 20 feet.

SWMU 29, STEAM CLEANER AREA

The eight samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

The reporting of cis-1,2-dichloroethane should be cis-1,2-dichloroethene as is reported in the laboratory reports from ASI.

BONNELL RESPONSE:

Corrective action will be performed at this site (see comment No. 5).

The misreporting of cis-1,2-dichloroethane was corrected to cis-1,2-dichloroethene.

SWMU 42, COOLING TOWER AREAS

Bonnell must take one additional sample at each cooling tower and analyze for permit metals.

BONNELL RESPONSE:

One additional sample was collected at each tower and analyzed for permit metals. The sample results indicated that all of the metals were below background with the

exception of cadmium in Sample No. 42-13. The results are shown on Figure SWMU 42. The laboratory reports are included in Appendix B.

SWMU 44. CHROMIUM HYDROXIDE SAND DRYING BEDS CLOSURE STOCKPILE AREA

The text states the subsurface samples were collected in the northeastern part of the unit. The figure depicts sample points in the western portion of the SWMU. Please clarify.

BONNELL RESPONSE:

Northeastern should have been reported as southwestern on Figure #44. The correction has been made.

SWMU 45. CONTAINER CLEANING UNIT

Is this unit still in operation?

BONNELL RESPONSE:

Yes.

SWMU 51. OIL CHANGING AREA

The PID data for this SWMU needs to be submitted, and the three soil samples with a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

BONNELL RESPONSE:

Unfortunately, EMCON failed to screen this area with a PID. There are, therefore, no readings.

Eason/RFI Comments

Page 13

April 12, 1995

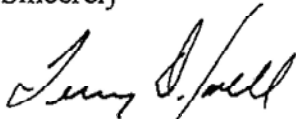
This area has been excavated as part of the Surface Impoundment Closure. EPD granted temporary authorization to incorporate the material from this SWMU into the Surface Impoundment Closure. Therefore, no additional analyses were completed.

I have provided a redline/strikeout version of Section 3 of the RFI report. In addition, I have provided four copies of the revised Section 3 in its entirety. Although some sections were not changed, page numbers changed significantly.

EMCON has prepared a letter explaining how to incorporate the tables, graphics, and other data into the report. I have attached copies to each of four revised sets for your convenience.

If you have any questions, please call me at 404-254-7690.

Sincerely

A handwritten signature in cursive script, appearing to read "Terry D. Snell".

Terry D. Snell, P.E.
Manager Environmental

cc: Barbara Turner, EMCON

Attachment A

The background concentration for lead was recalculated. Previous lead background samples were taken at significant depth resulting in a low average background level of 13 ppm. To determine an accurate background level, ten samples were taken at a depth of 0-6 inches from the Bonnell site. See figure A for sample locations.

The calculation of background concentration was performed with the new lead sample data. The tolerance limit was calculated using the previous method. The one side upper tolerance limit is calculated by $TL = \bar{X}_b + K(S_b)$. The tolerance limit is based on the mean of background sample, the standard deviation of background data, the number of background samples, and a percentage of the population covered by the tolerance limit (95 percent is used). A tolerance limit of 95 percent means that one has a confidence level of 95 percent that the upper tolerance limit will contain at least 95 percent of the distribution of observations from background well data.

From the equation $TL = \bar{X}_b + K(S_b)$,

TL = Tolerance limit

$\bar{X}_b$ = Mean of background samples

K = Upper tolerance limit factor, which is based on the number of background samples
(Tabulated value = x, from Table Appendix IC-F-2)

S_b = Estimator of background samples standard deviation

For the lead background concentration,

$$\bar{X}_b = (36 + 31 + 8.6 + 12 + 19 + 12 + 10 + 6.6 + 21 + 19) / 10 = 17.52$$

$$K = 2.911 \text{ (from Table Appendix IC-F-2)}$$

$$S_b = 9.75$$

$$TL = 17.52 + 2.911(9.75) = 45.91$$

$$TL = 45.91 \text{ ppm}$$

**SWMUs 20/28, DISCHARGE FROM FABRICATION BUILDING and SCRUBBERS
SERVING FABRICATION BUILDING**

The two samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs. Also, additional sampling is needed at depths greater than two feet.

BONNELL RESPONSE:

See response to comment on SWMU 15, Oil Water Separator.

SWMU 23, INACTIVE OIL/WATER SEPARATOR

Page 1 of 2 of Laboratory Report #50960-1 was not present in the Report along with Laboratory Report #50845-2's page 2 of 2.

The reporting of cis-1,2-dichloroethane should be cis-1,2-dichloroethene as is reported in the laboratory reports from ASI.

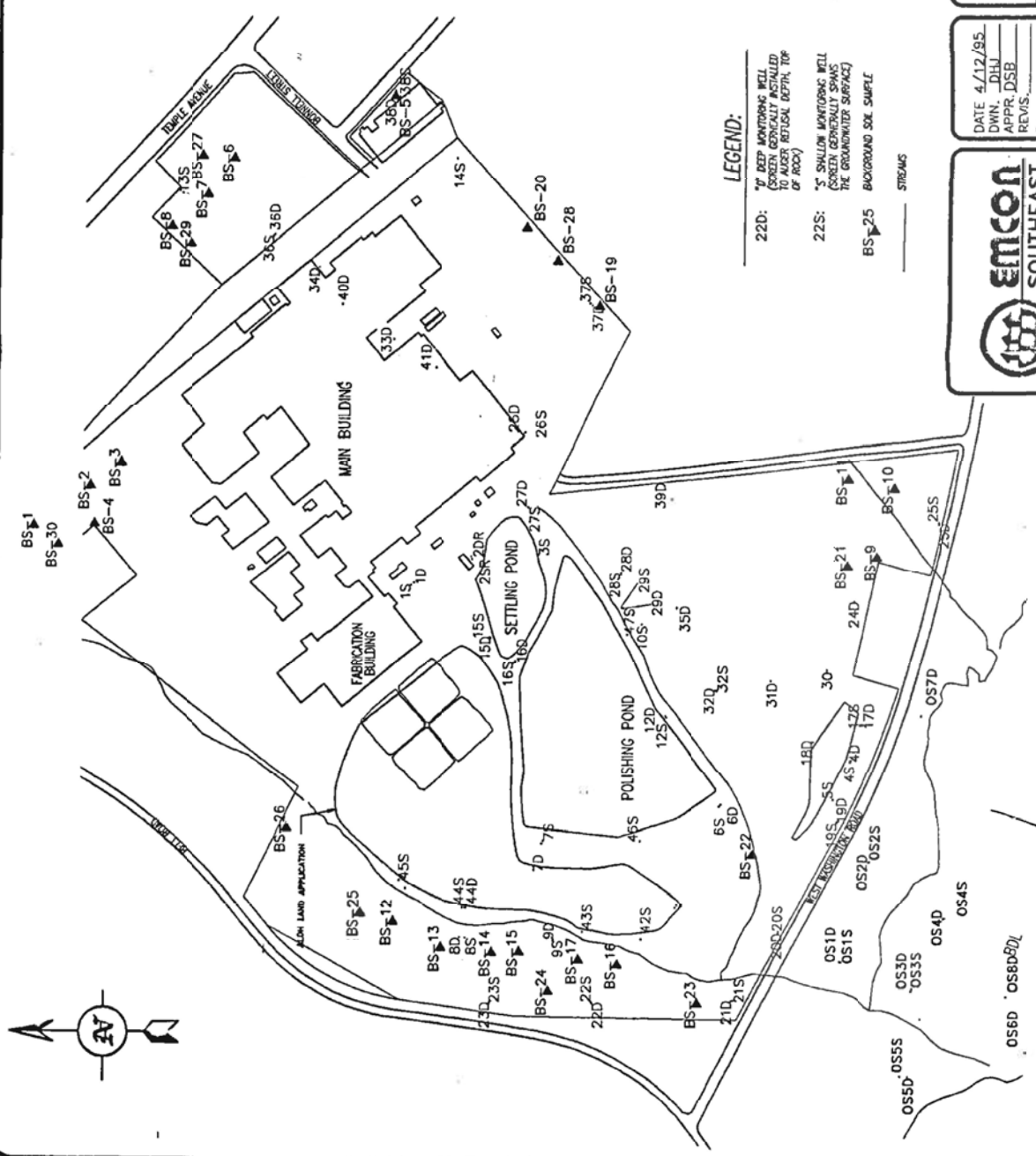
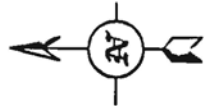
Page 3-47 states, "Soil samples were collected and analyzed for VOCs at ten locations which exhibited more than 100 ppm organic vapor as measured by a PID." No location showed a PID reading greater than 100 ppm.

Page 3-48 states, "None of the soil samples tested for VOCs by EPA Method 8260 indicated constituents above detection limits." Cis-1,2-dichloroethene was detected 3' BGS at 22 ppb.

The groundwater and soil sampling locations must be analyzed for SVOCs. In addition, the soils must be evaluated at a depth of greater than two feet.

BONNELL RESPONSE:

Page 1 of 2 of lab report #50960-1 and page 2 of 2 of #50845-2 is included in the Appendix. Figure 23 is included with the reporting of cis-1,2-dichloroethane corrected to cis-1,2-dichloroethene. It was also noted that this reporting error occurred on page 49 of text. This was also corrected.



LEGEND:

- 22D: "D" DEEP MONITORING WELL (SCREEN GENERALLY PERFORATED TO WATER TABLE DEPTH, TOP OF ROCK)
- 22S: "S" SHALLOW MONITORING WELL (SCREEN GENERALLY SPANS THE GROUNDWATER SURFACE)
- BS-25: BACKGROUND SOIL SAMPLE
- STREAMS



DATE 4/12/95
DWN. DHU
APPR. DSB
REVIS.
PROJECT NO. 2040.004.92

FIGURE - A
THE WILLIAM L BONNELL COMPANY
NEWNAN, GEORGIA
BACKGROUND LEAD LOCATIONS



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-11

Sample: Soil, grab, RFI, Project #1.2026.61, BS-21, 3/23/95, 5:00,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	36	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-12

Sample: Soil, grab, RFI, Project #1.2026.61, BS-22, 3/23/95, 5:30,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	31	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-13

Sample: Soil, grab, RFI, Project #1.2026.61, BS-23, 3/23/95, 5:45,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	8.6	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-14

Sample: Soil, grab, RFI, Project #1.2026.61, BS-24, 3/23/95, 6:00,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	12	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-15

Sample: Soil, grab, RFI, Project #1.2026.61, BS-25, 3/23/95, 6:30,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	19	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-16

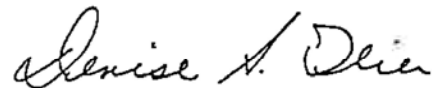
Sample: Soil, grab, RFI, Project #1.2026.61, BS-26, 3/23/95, 6:40,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	12	2.5

Respectfully submitted,

By:



cc: Mr. Dave Buchalter
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-17

Sample: Soil, grab, RFI, Project #1.2026.61, BS-27, 3/23/95, 6:50,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	10	2.5

Respectfully submitted,

By:

Denise S. Oliver

cc: Mr. Dave Buchalter
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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(404) 734-4200 • FAX (404) 734-4201LABORATORY REPORTWilliam L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-18Sample: Soil, grab, RFI, Project #1.2026.61, BS-28, 3/23/95, 7:00,
received 3/24/95RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	6.6	2.5

Respectfully submitted,

By:

*Denise A. Olier*cc: Mr. Dave Buchalter
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-19

Sample: Soil, grab, RFI, Project #1.2026.61, BS-29, 3/23/95, 7:15,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	21	2.5

Respectfully submitted,

By:

cc: Mr. Dave Buchalter
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-20

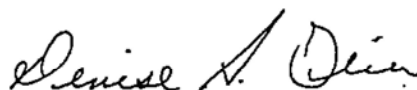
Sample: Soil, grab, RFI, Project #1.2026.61, BS-30, 3/23/95, 7:40,
received 3/24/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	19	2.5

Respectfully submitted,

By:



cc: Mr. Dave Buchalter
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

April 5, 1995

P.O. No. 210010-OP

Attention: Mr. Terry Snell

Report No. 60768-21

Sample: Equipment Blank, RFI, Project #1.2026.61, Lead,
received 3/24/95

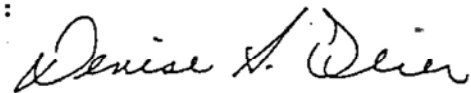
RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/l) (EPA 6010)	BDL	0.025

BDL - Below Detection Limit

Respectfully submitted,

By:



cc: Mr. Dave Buchalter
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS
110 TECHNOLOGY PARKWAY • NORCROSS GEORGIA 30092
(404) 734-4200 • FAX (404) 734-4201

CHAIN OF CUSTODY RECORD

CLIENT NAME <u>William L. Bonnell</u>		PROJECT NAME <u>REF</u>		PROJECT NUMBER <u>1-2026.61</u>		PURCHASE ORDER NO.	
CLIENT ADDRESS AND PHONE NUMBER		ANALYSES REQUESTED		L A B I D		FOR LAB USE ONLY	
PROJECT MANAGER <u>Tom Sell</u>		COPY TO (if applicable) <u>B. Buchalter</u>				LAB # <u>60768</u>	
REQUESTED COMPLETION DATE <u>3/31/95</u>		SAMPLING REQUIREMENTS SDWA ☐ NPDES ☐ RCRA ☐ OTHER ☐				PROJECT NO.	
		SAMPLE DESCRIPTIONS				ACK ☐ VERIFIED	
		C G O R M P B S O I L				QUOTE # ☐ BS	
SAMPLE ID		DATE		TIME		NO. OF SAMP <u>21</u> PG <u>2</u> OF <u>2</u>	
						REMARKS/ADDITIONAL INFORMATION	
<u>B5-21</u>		<u>3/23/95</u>		<u>5:00</u>		<u>On ice</u>	
<u>B5-22</u>		<u>3/23/95</u>		<u>5:30</u>			
<u>23</u>		<u>3/23/95</u>		<u>5:45</u>			
<u>24</u>		<u>3/23/95</u>		<u>6:00</u>			
<u>25</u>		<u>3/23/95</u>		<u>6:30</u>			
<u>26</u>		<u>3/23/95</u>		<u>6:40</u>			
<u>27</u>		<u>3/23/95</u>		<u>6:50</u>			
<u>28</u>		<u>3/23/95</u>		<u>7:00</u>			
<u>29</u>		<u>3/23/95</u>		<u>7:15</u>			
<u>30</u>		<u>3/23/95</u>		<u>7:40</u>			
<u>Eg Blank</u>							
SAMPLER BY AND TITLE <u>William L. Bonnell</u>		DATE/TIME <u>3/23/95</u>		RELINQUISHED BY <u>William L. Bonnell</u>		DATE/TIME <u>3/24/95</u>	
RECEIVED BY <u>William L. Bonnell</u>		DATE/TIME <u>3/24/95 16:33</u>		RELINQUISHED BY <u>William L. Bonnell</u>		DATE/TIME <u>3/24/95 16:53</u>	
RECEIVED BY <u>William L. Bonnell</u>		DATE/TIME		RELINQUISHED BY		DATE/TIME	
RECEIVED BY <u>William L. Bonnell</u>		DATE/TIME <u>3/24/95 17:00</u>		SAMPLE SHIPPED VIA <u>HAND</u>		AIR BILL #	
REMARKS <u>9.8 mont 3/24/95 17:38 H containers</u>				ENTERED INTO LIMS		COC REVIEWD	

THE WILLIAM L BONNELL COMPANY, INC.

AND CAPITOL PRODUCTS CORPORATION

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

25 Bonnell Street • P.O. Box 428 • Newnan, Georgia 30263

Phone 404-253-2020 Fax 404-254-7711

March 31, 1995

Ms. Susan Eason
Unit Coordinator
Environmental Protection Division
Floyd Towers East, Suite 1154
205 Butler Street
Atlanta, GA 30334

Re: Notice of Deficiency Response
Class 3 Permit Modification Request

Dear Susan,

The purpose of this letter is to respond to your February 10, 1994 letter to me regarding the Notice of Deficiency for the Class 3 Permit Modification Request dated . We are responding to each comment with the action we have already taken or plan to take, as appropriate.

EPD COMMENT NO. 1.

1. The PCE Degreaser Corrective Action Plan (CAP) does not contain an inspection schedule nor inspection log. Please include these items.

BONNELL RESPONSE:

1. We have prepared an inspection log (Figure 18) to denote the date of the inspection, the extraction well No., the flow rate, the vacuum reading, and the volatile vapor reading before the carbon canisters, between the first and second canister, and the effluent from the second canister. See Response to Comment No. 4 for the inspection schedule.

EPD COMMENT NO. 2.

2. The CAP needs to include a cross-section of the PCE Degreaser Unit. This cross-section should depict at least the degreaser unit, the pipe that was encountered during the excavation, vapor extraction wells, area of excavation, known soil types, and the groundwater elevation.

BONNELL RESPONSE:

2. A cross section has been included as Figure 17.

Eaton/EPD
March 31, 1995
Page 2

EPD COMMENT NO. 3.

3. The boring logs for the vapor extraction wells were not included in the Cap. Please include these logs.

BONNELL RESPONSE:

3. Boring logs for VEW-1 thru VEW-6 are included as Appendix B.

EPD COMMENT NO. 4.

4. The CAP does not discuss how the vapor extraction system will be monitored and in what form and frequency this data will be submitted to GAEPD. Please include this information.

BONNELL RESPONSE:

4. Bonnell presently monitors and will monitor the system approximately twice a month. A report will be submitted as part of the Semi-Annual GW Monitoring Report. The monitoring is described in more detail in the newly added Subsection 4.2.2.

EPD COMMENT NO. 5.

5. No plan nor profile views of the PCE Degreaser Unit show the area that was excavated. Please include figures that depict this area.

BONNELL RESPONSE:

5. The PCB Degreaser Unit is depicted in plan view on Figure 4. New Figure 17 depicts the profile view of the excavation.

EPD COMMENT NO. 6.

6. On page 3-5, Tables 2, 4, and 4A, the ideal gas constant is stated twice in the equation to estimate the mass of PCE removed. The ideal gas constant included in the conversion constant should be removed.

BONNELL RESPONSE:

6. Page 3-5 and Tables 2 and 4 have been corrected. However, Table 4A was correct and has not been modified.

EPD COMMENT NO. 7.

7. Tables 2, 4, and 4A report PCE with a mass of 10.9 lbs/gal. This should read "Density of PCE (@ 25° C) = 13.46 lbs/gal."

BONNELL RESPONSE:

7. These tables have been corrected and the resulting gallons of PCE removed has been changed in the text.

EPD COMMENT NO. 8.

8. The location of the pre-filter vacuum gage on the vapor extraction system does not measure the vacuum being applied at the vapor extraction well head. A vacuum gage needs to be added to the well head to measure the vacuum being applied at the well. Also, update Figure 16 to include such gage.

BONNELL RESPONSE:

8. There is a vacuum gauge on the well. This is now reflected on Figure 16.

EPD COMMENT NO. 9.

9. On pages 2-1 to 2-2, the CAP states that the details of the well construction and surface seals are presented in Section 4.3. This section does not exist.

BONNELL RESPONSE:

9. This sentence has been changed to reference Figure 16.

EPD COMMENT NO. 10.

10. On page 2-2, the CAP states "A vapor sampling port was placed in line before the first carbon drum and another between the first and second drums." Was the air sampled after the second carbon drum to ensure no VOCs were being released to the environment?

BONNELL RESPONSE:

10. Yes, every time the unit is inspected this measurement is made.

EPD COMMENT NO. 11.

11. What criteria will be used to determine when the first carbon drum will be replaced by the second and a new second carbon drum added?

BONNELL RESPONSE:

11. When PID readings are detected between the first and second drum, the first drum is removed and properly disposed or regenerated. The second drum is placed first in line as the new first drum, and a new drum is added to the system as the new second drum. This is stated in the report in Section 4.2.2.

EPD COMMENT NO. 12.

12. The first paragraph of Section 2.2 states the vapor extraction tests are summarized in Tables 2, 3, and 4. This reference should be to only Tables 3 and 4.

BONNELL RESPONSE:

12. We disagree. All of the tables are relevant since they all contain data related to VES testing.

EPD COMMENT NO. 13.

13. On page 4-2, Bonnell states "The cleanup targets for PCE and TCE contaminated soils required by the regulatory agency for this site are the current goals of Bonnell." This sentence should reference the specific goals of background.

BONNELL RESPONSE:

13. This sentence has been changed to reflect the target of achieving background levels for PCE and TCE.

EPD COMMENT NO. 14.

14. The last sentence of Section 4.2.1 should reference Figures 14 and 16 instead of 15 and 16.

BONNELL RESPONSE:

14. This sentence has been changed to reference Figure 14 and 16.

EPD COMMENT NO. 15.

15. The CAP does not address improving the efficiency of the design (ex. increasing the vacuum, moving the location of the extraction well, conducting vapor extraction through a french system,...) prior to shutting down the vapor extraction system. This consideration of changing the design to improve the extraction efficiency needs to be addressed prior to system shutdown.

BONNELL RESPONSE:

15. If vapor extraction concentrations remain low, the extraction system will be moved to one of the other five extraction wells. This process will be repeated depending on the vapor concentrations measured at the particular VEW. This should help optimize the system (see Section 4.2.2).

EPD COMMENT NO. 16.

16. Increase the five day time frame in criteria number one for shutdown of the vapor extraction system to ten days.

BONNELL RESPONSE:

16. The five day time frame has been increased to ten days.

EPD COMMENT NO. 17.

17. Increase the ten day time frame in criteria number two for shutdown of the vapor extraction system to thirty days.

BONNELL RESPONSE:

17. The ten day time frame has been increased to thirty days. We also changed the monitoring frequency to Monday, Wednesday, and Friday. This was done to prevent an EMCON employee from having to visit the plant on Sundays, when we are not operating.

EPD COMMENT NO. 18.

18. In criteria number three for shutdown of the vapor extraction system, monitoring point VEW-3 was left off of the monitoring point list. Include this well.

Eason/EPD
March 31, 1995
Page 6

BONNELL RESPONSE:

18. VIEW 3 has been added to the list.

EPD COMMENT NO. 19.

19. No reference to sampling and analysis procedures were made in Sections 4.2.2 and 4.2.3. Laboratory analysis will be required on all samples that are used to determine system shutdown.

BONNELL RESPONSE:

19. This is clarified in Section 4.2.3. The sampling and analysis method is specified in Section 4.2.4.

EPD COMMENT NO. 20.

20. In item number one, zinc is requested to have a groundwater protection standard of 2 mg/l. The groundwater protection standard for this constituent will be background in accordance to 40 CFR Part 264.94(a)(1).

BONNELL RESPONSE:

20. This has been changed in the Permit Modification.

EPD COMMENT NO. 21.

21. In item number two, Bonnell requests to modify the permit so that corrective action may be performed at SWMUs and AOCs prior to GAEPD's approval. This request cannot be granted due to it conflicting with the regulatory requirements for permit modifications.

If you have any questions, please call me at 404-254-7690.

Sincerely

Terry D. Snell, P.E.
Manager Environmental

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Joe D. Tanner, Commissioner
Environmental Protection Division

Harold F. Reheis, Director
404/656-7802

February 17, 1995

CERTIFIED MAIL

Return Receipt Requested

Received 2/24/95

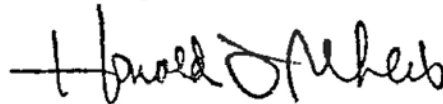
Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: Temporary Authorization Request
Permit No. HW-087
EPA ID No. GAD003272224

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has received two temporary authorization requests from the William L Bonnell Company, Inc. (Bonnell). These requests to place the dam soils and drainage ditch sediments within the surface impoundment units that have been requested to be designated as a Corrective Action Management Unit (CAMU) in the November 17, 1994 Class III Permit Modification Request have been reviewed. Since these requests were found to meet the requirement of 40 CFR 270.42(e)(3)(ii)(A) for approving a temporary authorization request, 40 CFR 270.42(e)(2)(iii) for public notice, and 40 CFR 264.552(c) criteria for designating a CAMU; GAEPD grants Bonnell temporary authorization to conduct these activities. This temporary authorization shall be effective for 180 (one hundred eighty) days from receipt of this letter. Should you have any questions, please contact Ken Grall at (404) 656-7802.

Sincerely,



Harold F. Reheis, Director
Environmental Protection Division

SE:kg
cc: Kent Williams (EPA Region IV)
File: Bonnell (R)

r:\grall\bonnell\tempauth.ltr

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Jos D. Tanner, Commis
Environmental Protection D
Harold F. Reheis, D
404/656

February 10, 1995

CERTIFIED MAIL

Return Receipt Requested

Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: Notice Of Deficiency
Class 3 Permit Modification Request

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has completed its review of the Class III Permit Modification Request to Hazardous Waste Permit HW-087. The following comments address specific deficiencies in the Request.

Comments On The PCE Degreaser Unit Corrective Action Plan

1. The PCE Degreaser Corrective Action Plan (CAP) does not contain an inspection schedule nor inspection log. Please include these items.
2. The CAP needs to include a cross-section of the PCE Degreaser Unit. This cross-section should depict at least the degreaser unit, the pipe that was encountered during the excavation, vapor extraction wells, area of excavation, known soil types, and the groundwater elevation.
3. The boring logs for the vapor extraction wells were not included in the CAP. Please include these logs.
4. The CAP does not discuss how the vapor extraction system will be monitored and in what format and frequency this data will be submitted to GAEPD. Please include this information.
5. No plan nor profile views of the PCE Degreaser Unit show the area that was excavated. Please include figures that depict this area.
6. On page 3-5, Tables 2, 4, and 4A the ideal gas constant is stated twice in the equation to estimate the mass of PCE removed. The ideal gas constant included in the conversion constant should be removed.
7. Tables 2, 4 and 4A report PCE with a mass of 10.9 lbs/gal. This should read "Density of PCE (@ 26°C) = 13.46 lbs/gal."
8. The location of the pre-filter vacuum gage on the vapor extraction system does not measure the vacuum being applied at the vapor extraction well head. A vacuum gage needs to be added to

the well head to measure the vacuum being applied at the well. Also update Figure 16 to include such gage.

9. On pages 2-1 to 2-2 the CAP states that the details of the well construction and surface seals are presented in Section 4.3. This section does not exist.
10. On page 2-2 the CAP states "A vapor sampling port was placed in line before the first carbon drum and another between the first and second drums." Was the air sampled after the second carbon drum to ensure no VOCs were being released to the environment?
11. What criteria will be used to determine when the first carbon drum will be replaced by the second and a new second carbon drum added?
12. The first paragraph of Section 2.2 states the vapor extraction tests are summarized in Tables 2, 3, and 4. This reference should be to only Tables 3 and 4.
13. On page 4-2 Bonnell states "The cleanup targets for PCE and TCE contaminated soils required by the regulatory agency for this site are the current goals of Bonnell." This sentence should reference the specific goals of background.
14. The last sentence of Section 4.2.1 should reference Figures 14 and 16 instead of 15 and 16.
15. The CAP does not address improving the efficiency of the design (ex. increasing the vacuum, moving the location of the extraction well, conducting vapor extraction through a trench system, ...) prior to shutting down the vapor extraction system. This consideration of changing the design to improve the extraction efficiency needs to be addressed prior to system shutdown.
16. Increase the five day time frame in criteria number one for shutdown of the vapor extraction system to ten days.
17. Increase the ten day time frame in criteria number two for shutdown of the vapor extraction system to thirty days.
18. In criteria number three for shutdown of the vapor extraction system, monitoring point VEW-3 was left off of the monitoring point list. Include this well.
19. No reference to sampling and analysis procedures were made in Sections 4.2.2 and 4.2.3. Laboratory analysis will be required on all samples that are used to determine system shutdown.

Comments On Attachment A

20. In item number one zinc is requested to have a groundwater protection standard of 2 mg/l. The groundwater protection standard for this constituent will be background in accordance to 40 CFR 264.94(a)(1).
21. In item number two Bonnell requests to modify the permit so that corrective action may be

Notice Of Deficiency - Bonnell
Class III Permit Modification Request
February 10, 1995
Page 3

performed at SWMUs and AOCs prior to GAEPD's approval. This request can not be granted due to it conflicting with the regulatory requirements for permit modifications.

Please respond to these comments and resubmit the permit modification request by March 31, 1995. If you have any questions please contact Ken Grall at (404) 656-7802.

Sincerely,



Susan Eason
Unit Coordinator

SSE:kjg
File: Bonnell (R)
r:\grall\bonnell\class3.nod

Itsnell

From: ese1!EMCON!NORCROSS!DBuchalter
To: Chad Doiron
Cc: ese1!EMCON!NORCROSS!ese1!EMCON!NORCROSS!BTURNER
Subject: Automating the Groundwater Recovery Syst
Date: Friday, January 20, 1995 11:11AM

The purpose of this memo is to summarize our discussion with Randy Robbins (Bothell, EMCON) concerning the installation of a control system on the dewatering system.

We proposed three options:

1. Install level transducers in each of the seven recovery wells and the sump. Rewire the alarms. Hook up analog feeds to the existing PLC. This would give the operator in the Wastewater plant water levels in each of the wells, and since we know the pump setting depth, we could determine if the system was operating in the range of acceptable drawdowns.
2. Install Level transducers in each well, Rewire the alarms. Put a simple flow meter in each of the eight discharge lines. Hook up analog feeds to the existing PLC. In addition to the scenario 1 information, this would give the operator the total flow from each well and a rough indication of flow rate from each well.
3. Install level transducers in each well. Rewire the alarms. Put a flowmeter, and control valve in each discharge line. Hook up analog and frequency feeds to the existing PLC. This would give the most control for the system. For example if the water level in a well was too high, the operator would simply increase the flow rate, by hitting a button at the computer control system at the wastewater plant. The valve would open more and the flowmeter would feedback to the valve to adjust it to the proper opening for the specified flow rate. The operator would never have to go to any of the pumping stations or wells unless there was a maintenance problem. Also the system would document all of the flow rates, accumulated discharge water volumes, and water levels. Of course this would be the most expensive option.

I have instructed Randy to spend no more than 8 hours preparing a description of each of these options, as well as equipment costs, and equipment specifications. The costs to program the Allan Bradley PLC system, and to install the wiring will not be included in his work. I would recommend that once Randy completes his work that this document be given to the Allan Bradley people and any firm which will install the wire, controls, etc., to develop the total cost.

Please have Claire pass this along to Ray Underwood..

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Joe D. Tanner, Commissioner

Environmental Protection Division

Harold F. Reheis, Director

404/656-7802

January 13, 1995

CERTIFIED MAIL

Return Receipt Requested

Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: Notice Of Deficiency
RFI Report

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has completed its review of the RCRA Facility Investigation (RFI) Report required by Hazardous Waste Permit HW-087 Condition IV.E.4. Pursuant to Condition IV.E.5. of the Permit, GAEPD is notifying the William L Bonnell Company, Inc. (Bonnell) of the findings of the review.

Standards The RFI Report Review Were Based On

Volatile organic compounds (VOCs) soil and sediment concentrations were compared to background concentrations to determine if further action was necessary. Background concentrations for VOCs are considered to be below detection limits (BDL) since VOCs do not occur naturally.

Background concentrations for metals were determined during sampling for the surface impoundments closure. These background metal concentrations were used as the standard to evaluate metal concentrations in soil and sediment at the solid waste management units (SWMUs).

Total petroleum hydrocarbons (TPH), and oil & grease analyses were used as an indicator parameter for contamination presence. If any TPH results were above 100 ppm or oil & grease was detected, VOCs and/or semi-volatile organic compounds (SVOCs) analyses will be required as follow-up analyses to determine if any hazardous constituents comprise the TPH and oil & grease results.

Groundwater analytical results were compared to the national primary drinking water standards maximum contaminant levels (MCLs). Where an MCL did not exist for a particular constituent, a comparison to background concentrations occurred to determine if further action was necessary.

Surface water analytical results were compared to two standards; MCLs and the Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6-.03, (Water Quality Standards). For a particular constituent, the standard with the lowest protective concentration was used in the evaluation of the SWMUs. If a protection standard did not exist for a particular constituent then that analyte was compared to background. Background concentrations for VOCs are considered to be below detection limits (BDL) since these compounds do not occur naturally.

Comments On The RFI Report

In this letter GAEPD does not request corrective action for any SWMU. After additional sampling and analyses are conducted and submitted in Bonnell's response to this letter GAEPD will formally request the submittal of corrective action plans for various SWMUs as needed.

The field screening was done using a photoionization detector (PID) which utilizes a lamp of specified voltage that ionizes passing vapors. With SWMUs that indicated the presence of TPH there appeared to be little, if any, correlation between the PID values and TPH concentrations. One SWMU in particular contained a sample which was field screened at 35 ppm with the PID (the lowest of the field screened samples collected for analysis) and detected the highest TPH value of all samples at that SWMU, 890 ppm.

A flame ionization detector (FID) is capable of ionizing organic compounds with potentials of 15.4 eV and below as opposed to the PID that was used which would ionize compounds with potentials of 10.6 eV and below. The ability for a FID to ionize compounds with higher potentials may provide better field screening capabilities even though their sensitivity is not as great as a PID's. The use of a FID should be considered for future site investigation work.

In reviewing this report, as mentioned previously, there exists limited correlation between field screening with a PID and the analytical results for TPH. Additionally, samples that underwent volatile organic analysis also provided very limited correlation between PID and organic results. This may indicate the PID is screening vapors or contaminants that fall into the category of semi-volatiles rather than volatiles. For further investigations, the PID screening will require a follow-up analysis of semi-volatiles in addition to the traditional volatiles requirement. This will supplement the TPH and VOCs analyses and provide better evaluations of the constituents responsible for PID readings.

SWMU #1 - Calcium Aluminate Landfill Area

On figure SWMU #1/50 two SO-1-10 samples are shown and no SO-1-14 sample is shown. Also p.1 of 2 of ASI's Laboratory Report No. 49649-16 is missing from the Report. Please correct figure SWMU #1/50 and submit the missing laboratory report page.

The waste in this SWMU was analyzed for pH and if a sample had the characteristic green color of CrOH sludge the sample was to be analyzed for chromium. The boring logs for these samples indicate that no sample possessed a green coloration. Seven of the samples had a pH of greater than 12.5. These samples must be analyzed for permit metals along with groundwater samples to be taken from wells 18S, 31D, and 32S. Also submit a characterization of this waste in accordance to § 262.11.

SWMU #50 - F019 Spill Area

The "Soil Sample Field Data Sheets", "Boring Sample Description Logs", and the photographs of discolored soils/fills for this SWMU were not submitted with the Report. Please submit this information.

The two foot soil sample at location SO-50-9 was not taken as depicted on figure SWMU #1/50. Please explain the reasoning for not collecting this sample.

Bonnell should proceed with the additional sampling that was recommended in the RFI Report.

SWMU #7/46 - Accumulation Tank For Waste Solvent & Solvent Tank Farm Area

SWMU #7 is stated as being an accumulation tank for waste solvent and SWMU #46 is stated as being a solvent tank farm area. From compliance evaluation inspections GAEPD was under the understanding that the tank at SWMU #7 contained virgin solvent and the tank at SWMU #46 contained waste solvent. Please clarify this issue.

On figure SWMU #7/46C 1,2,4-trichlorobenzene was misreported as 1,2,4-trimethylbenzene, PCE was misreported as tetrachlorobenzene, and some of the laboratory results were not reported in the tables as indicated by the presence of blank spaces in the tables. Also, in the appendices the following analytical report pages were missing; p.2 Report #52604-2, p.3 Report #52604-5, and pp.2 and 3 of Report #52604-6.

The figures listed in the first paragraph of Section 3.3.3, page 3-11 are incorrect. Please correct these references.

Bonnell should proceed with the additional sampling that was recommended but should analyze the samples for VOCs (Method 8260) instead of just permit VOCs. Please inform GAEPD prior to sampling whether Bonnell intends to collect groundwater samples as part of the soil sample collection using the hydropunch.

SWMU #11 - Anodizing Wastewater Treatment System And Piping Upstream Of Settling Pond

Lead levels for sample point SO-11-32 were 216 mg/kg at a depth of one foot below the pipe. Further investigation around this sampling point is warranted due to the background concentration for lead being 13 mg/kg.

SWMU #15 - Oil Water Separator

Bonnell must analyze sampling location SO-15-2 5' BGS for SVOCs (Method 8270) due to the TPH concentration being greater than 100 ppm.

SWMU #14 - Truck Shop Parking Area

Seven soil sampling locations showed TPH concentrations greater than 100 ppm. These sampling locations must be analyzed for SVOCs. Since the depth of impacted soils is not known, additional sampling to define the vertical extent as well as further characterization of the areal extent is required.

SWMU #16 - Storage Yard Behind Maintenance Building Plus Ditch And Drum Storage Area

In the text, the contamination is attributable to sinks located in a building that drain to the ditch. Do these sinks continue to drain to the ditch?

The four soil sampling locations with TPH concentrations greater than 100 ppm must be analyzed for VOCs and SVOCs.

The sediment samples must be analyzed for SVOCs due to the TPH concentrations being greater than 100 ppm.

Sediment sample SD-16-4 is not on figure SWMU #16/17B. Though this is a duplicate of SD-16-3 it should be added to the figure.

TPH and 1,1,1-trichloroethane concentrations in sediments increase downstream. Evaluation of surface waters and sediments past the fence line is necessary to define the impact of contamination.

As discussed earlier, the correlation between field screening equipment and actual TPH values is limited. Therefore, reliance upon PID readings for determining areas needing cleanup is not acceptable. Additionally, confirmation sampling will be required.

The laboratory reports for SWMU #16's soil samples were not present in the Report. Please submit these reports.

SWMU #17 - Drum Crusher Area

Page 3-34 states that at SWMU #17 chromium was the only permit metal that exceeded background concentrations. Lead was detected above the background concentration of 13 ppm. Please correct this statement in the Report.

Four more soil samples must be collected at this SWMU. This should occur at two locations, 1' BGS and 3' BGS. These samples should be analyzed for permit metals, SVOCs, and VOCs.

SWMU #18 - Storm Sewer System

When comparing the laboratory reports for SWMU #18 to the figures, it was noted that cis-1,2-dichloroethene was mistakenly reported as 1,2-dichloropropane.

In the Recommendations section (3.10.8) it is stated that the drainage ditch flow is expected to cease once the surface impoundment closure activities are complete and improvements are made to the low point collector. Please elaborate on the specifics of this issue.

Figure 2 from the RFI Report depicts a line running through the polishing pond. Is this the former locale of a sewer line? Where is the NPDFS outfall located? Does SW-18-4 approximate this outfall or sewer line entry point?

SWMU #19 - Area West Of Die Shop

The three samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

SWMU #20/28 - Discharge From Fabrication Building & Scrubbers Serving Fabrication Building

The two samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs. Also, additional sampling is needed at depths greater than two feet.

SWMU #23 - Inactive Oil/Water Separator

Page 1 of 2 of Laboratory Report #50960-1 was not present in the Report along with Laboratory Report #50845-2's page 2 of 2.

The reporting of cis-1,2-dichloroethane should be cis-1,2-dichloroethene as is reported in the laboratory reports from ASI.

Page 3-47 states, "Soil samples were collected and analyzed for VOCs at ten locations which exhibited more than 100 ppm organic vapor as measured by a PID." No location showed a PID reading greater than 100 ppm.

Page 3-48 states, "None of the soil samples tested for VOCs by EPA Method 8260 indicated constituents above detection limits." Cis-1,2-dichloroethene was detected 3' BGS at 22 ppb.

The groundwater and soil sampling locations must be analyzed for SVOCs. In addition, the soils must be evaluated at a depth of greater than two feet.

SWMU #27 - Acid Spill Area Near Phosphoric Acid Storage

The map scale is in error for either Figure 11A or 27, provided these figures depict the same phosphoric acid storage room.

SWMU #29 - Steam Cleaner Area

The eight samples that have a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

The reporting of cis-1,2-dichloroethane should be cis-1,2-dichloroethene as is reported in the laboratory reports from ASI.

SWMU #42 - Cooling Tower Areas

Bonnell must take one additional sample at each cooling tower and analyze for permit metals.

SWMU #44 - Chromium Hydroxide Sand Drying Beds Closure Stockpile Area

The text states the subsurface samples were collected in the northeastern part of the unit. The

RFI Report NOD - Bonnell
January 13, 1995
Page 5

figure depicts sample points in the western portion of the SWMU. Please clarify.

SWMU #45 - Container Cleaning Unit

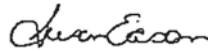
Is this unit still in operation?

SWMU #51 - Oil Changing Area

The PID data for this SWMU needs to be submitted, and the three soil samples with a TPH concentration greater than 100 ppm must be analyzed for SVOCs.

Please respond to these comments and submit the analytical data requested by April 12, 1995. If Bonnell would like to request a meeting to discuss the RFI Report NOD or have any questions about this letter, please contact Ken Grall at (404) 656-7802. Also please note that if a meeting is to be requested, this request should be made as soon as possible after Bonnell receives this letter.

Sincerely,



Susan Eason
Unit Coordinator

SSE:kjg
File: Bonnell (R)
r:\grall\bonnell\rfirpt1.nod



THE WILLIAM L BONNELL COMPANY, INC.
AND CAPITOL PRODUCTS CORPORATION

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

25 Bonnell Street • P.O. Box 428 • Newnan, Georgia 30263

Phone 404-253-2020 Fax 404-254-7711

January 10, 1995

Harold F. Reheis, P.E.
Director
Georgia Environmental Protection Division
205 Butler Street, Suite 1152 East
Atlanta, GA 30334

Re: Request for Temporary Authorization
EPD Permit HW-087

Dear Harold

The purpose of this letter is to request that soils moved from the surface impoundment dam ("dam soils") to an area adjacent to the dam be allowed to be placed into the settling pond for storage pending approval of the Class 3 Permit Modification Request submitted in November 1994. This letter also provides an explanation of the placement of the soil in the area shown on the attached drawing and designated as "Excavated Soils Outside HWMU Boundary."

As part of the closure of the surface impoundment, Bonnell was moving soil from the dam that we did not consider to be contaminated. The soil was to be placed adjacent to the dam in order to provide a more stable base for the road crossing the ditch near well pair 6S/6D. As we moved soil from the dam, we discovered particles of F019 within the soil matrix. The contractor immediately stopped moving any more soils until we could determine the steps necessary to proceed.

Bonnell's Terry Snell discussed the situation with your staff by telephone. As a result of the conversations, we are submitting this request to excavate the "dam soils" and temporarily place them in the settling pond portion of the surface impoundment pending modification of the Permit to allow permanent placement in the Surface Impoundment after the surface impoundment is designated as a CAMU. The area will be bermed using clean soil and lined with polyethylene plastic. Once all the "dam soils" are in place within the lined berm, they will be covered with additional polyethylene plastic and fastened appropriately. The cover will be designed to prevent any pooling of water within the bermed area. It will be inspected daily and any ruptures to the plastic cover will be repaired immediately.

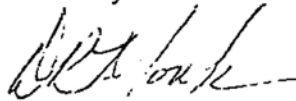
Once the Permit modification is approved, allowing the use of the surface impoundment as a CAMU, the plastic will be removed, treatment will be performed if necessary, and the waste incorporated into the unit in accordance with the requirements of the closure plan.

Reason for the request is that we believe that the "dam soils" contain on particles of sludge and would in no risk to human health and the environment if placed in the surface impoundment closure. Hauling the soils to a landfill would constitute a greater risk of contamination during transportation. In addition, it would unnecessarily occupy valuable landfill space.

In accordance with 40 CFR 270.42(e), "Upon request by the permittee, the Director may, without public notice and comment, grant the permittee a temporary authorization...for any Class 3 modification that meets the criteria in paragraph (#)(ii)(A)...of this section...". Paragraph (3)(ii)(A) provides reasoning that the request may be granted if "The temporary authorization is necessary to achieve..." the objective of facilitation "...timely implementation of closure...activities...".

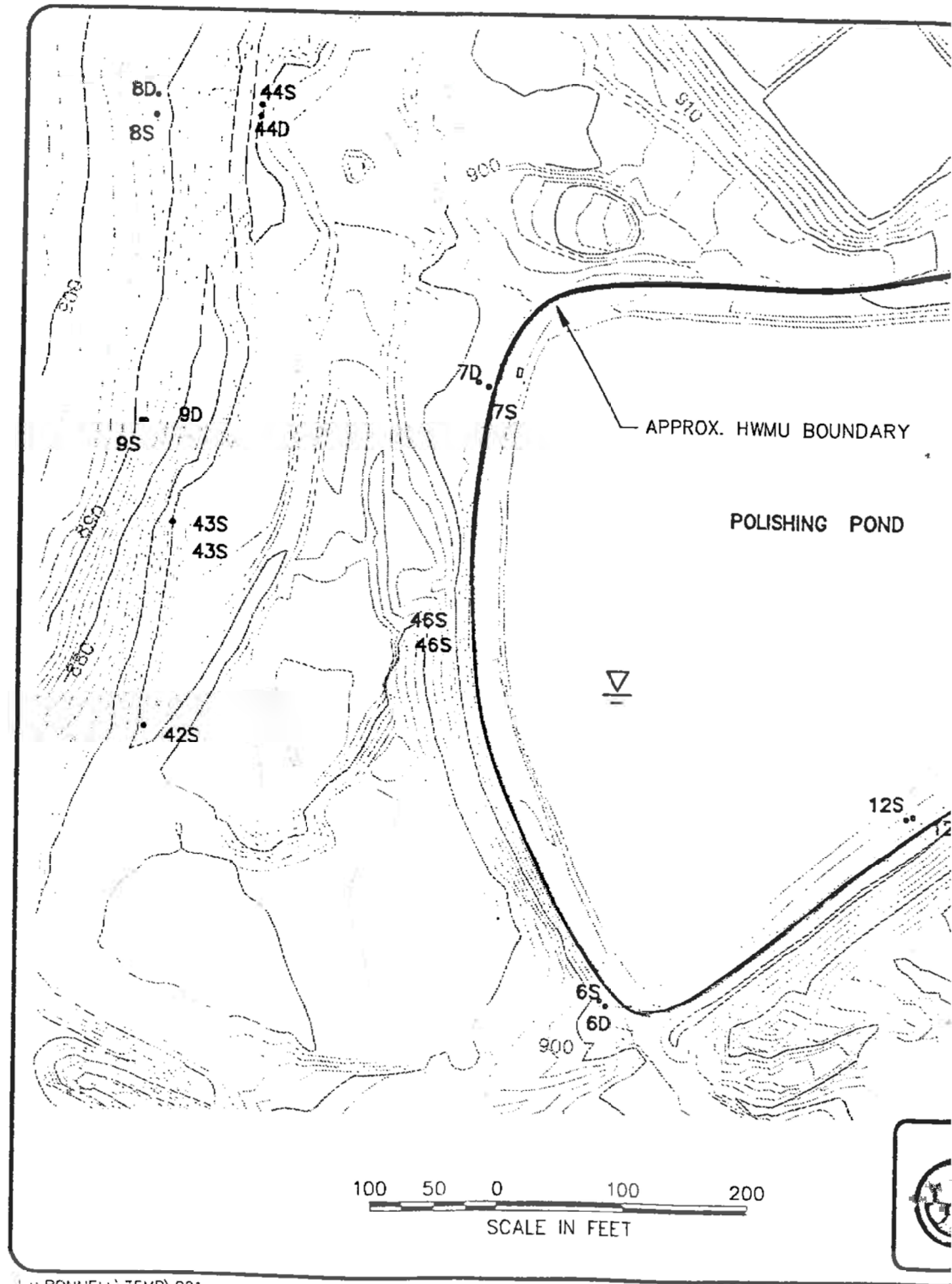
If you have any questions, please call Terry Snell at 404-254-7690.

Sincerely



D.R. Monk
President

cc: Susan Eason
Ken Grall



THE WILLIAM L BONNELL CO., INC.

And Capitol Products Corporation

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC

September 30, 1994

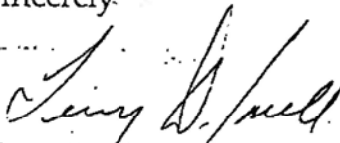
Re: Georgia Environmental Protection Division Permit HW-087

To Whom It May Concern

The purpose of this letter is to notify you of the extension of time granted to us by the Georgia Environmental Protection Division for closure of our Surface Impoundment. The deadline in the amended Post-Closure Care Permit was August 12, 1994. Due to unexpected problems with an outside contractor and with the weather (heavy rainfall), we were unable to meet this deadline. However, we were granted an extension of time to complete the project. A revised closure schedule is attached. This amendment is a Class I permit modification in accordance with 40 CFR 270.42(a). The basis of the request as a Class I modification is contained in D. Closure, 1. b. of Appendix I to 270.42.

If you have any questions, please contact me at (404) 254-7690.

Sincerely,



Terry D. Snell, P.E.
Manager, Environmental

SURFACE IMPOUNDMENT CLOSURE SCHEDULE

FIGURE IC-2

08/09/84

Sheet 2 of 3

SCHEDULED ACTIVITIES	TIME (MONTHS)																
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
DETAILED DESIGN AND BIDDING																	
PILOT STUDY																	
PUMP SETTLING POND SLUDGE TO POLISHING POND																	
SLUDGE DEWATERING & STABILIZATION																	
BOTTOM SEDIMENT STABILIZATION																	
SOILS EVALUATION																	
BACKFILL AND COVER																	
EQUIPMENT DECONTAMINATION																	
ENGINEERING CERTIFICATION																	
LEGEND PROJECTED TIME LINE CERTIFICATION TO BE COMPLETED WITHIN 60 DAYS AFTER CLOSURE COMPLETE																	

16 MONTHS

9 MONTHS

WILLIAM L BONNELL COMPANY, INC
NEWMAN, GEORGIA

SURFACE IMPOUNDMENT CLOSURE SCHEDULE

FIGURE IC-2

08/09/94

Sheet 3 of 3

SCHEDULED ACTIVITIES

TIME (MONTHS)
34 35 36 37 38 39 40 41 42 43 44

DETAILED DESIGN AND BIDDING

PILOT STUDY

PUMP SETTLING POND SLUDGE TO
POLISHING POND

SLUDGE DEWATERING & STABILIZATION

BOTTOM SEDIMENT STABILIZATION

SOILS EVALUATION

BACKFILL AND COVER

EQUIPMENT DECONTAMINATION

ENGINEERING CERTIFICATION

WILLIAM L BONNELL COMPANY, INC
NEWMAN, GEORGIA

LEGEND

PROJECTED TIME LINE

CERTIFICATION TO BE COMPLETED WITHIN 60 DAYS AFTER

CLOSURE COMPLETE

2 MONTHS

8 MONTHS

1/2 MONTH

Georgia Department of Natural Resources

205 Butler Street, S.E., Suite 1154, Atlanta, Georgia 30334

Joe D. Tanner, Commissioner
Environmental Protection Division

Harold F. Reheis, Director
404/656-7802

August 12, 1994

CERTIFIED MAIL

Return Receipt Requested

Mr. Terry Snell
Environmental Manager
William L. Bonnell Co., Inc.
P.O. Box 428
Newnan, Georgia 30264

Re: Class I Modification
(Surface Impoundment
Closure Schedule)
Permit No. HW-087
EPA ID No. GAD003273224

Dear Mr. Snell:

The Georgia Environmental Protection Division (GAEPD) has completed its review of the Class I Permit Modification Request to Hazardous Waste Permit HW-087 and has found it acceptable. The new surface impoundment closure schedule shall replace the existing schedule in the Part B permit application.

Pursuant to the requirements of 40 CFR 270.42(a)(1)(ii) Bonnell must send a notice of the modification to all persons on the facility mailing list and appropriate units of State and local government. This notification must be made within 90 days of your receipt of this letter. Enclosed are mailing labels of all persons maintained on the Director's mailing list. Additional labels will need to be made by Bonnell for the appropriate State and local governments as specified in 40 CFR 124.10(c)(ix).

If you have any questions please contact Ken Grall at (404) 656-7802.

Sincerely,



Susan Eason
Acting Unit Coordinator

SE:kg
Enclosure: Mailing List
cc: Kent Williams (EPA Region IV)
File: Bonnell (R)

r:\grall\Bonnell\class1\#2\tr

THE WILLIAM L BONNELL CO., INC.

And Capitol Products Corporation

SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

August 3, 1994

Harold Reheis, P.E.
Director
Environmental Protection Division
Floyd Towers East, Suite 1154
205 Butler Street
Atlanta, GA 30334

Re: Surface Impoundment Closure Schedule
The William L Bonnell Co., Inc.
GAD 003273224
Permit No. HW-087

Dear Harold

The purpose of this letter is to request an extension of the time necessary to complete the closure of the Surface Impoundment at our facility. The contractor we selected to conduct the closure activities demobilized in February. The Contractor's demobilization has caused delays in the closure of the Surface Impoundment. I am sure your staff can fill you in on the details of the cause for demobilization.

The Contractor's demobilization resulted in our having to resume the closure by using local Contractors. There was a necessary time delay for the remobilization of equipment. In addition, it was necessary to expand the closure into the Polishing Pond since the capacity of the Settling Pond was virtually expended by the former Contractor's activities. The expansion of the closure into the Polishing Pond caused an additional time delay in dewatering and placement/compaction efforts in order to prepare the bottom of the Surface Impoundment and keep the F019 sludge above the groundwater.

In spite of the delays, we believed we would still finish dewatering before the August 12 deadline established in the amended Post-Closure Care Permit referenced above.

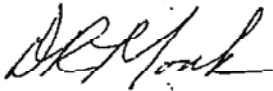
EPD/Reheis
Surface Impoundment Closure Schedule
August 3, 1994
Page 2

However, the tremendous rainfall we received during July and continue to receive prevents us from finishing dewatering by August 12.

In accordance with 40 CFR 270.42(a), Bonnell requests a Class 1 permit modification. The basis of the request as a Class I modification is contained in D. Closure, 1. b. of Appendix I to 270.42. We have attached a revised Figure IC-2, Impoundment Closure Schedule, from our Part B Post-Closure Care Permit Application.

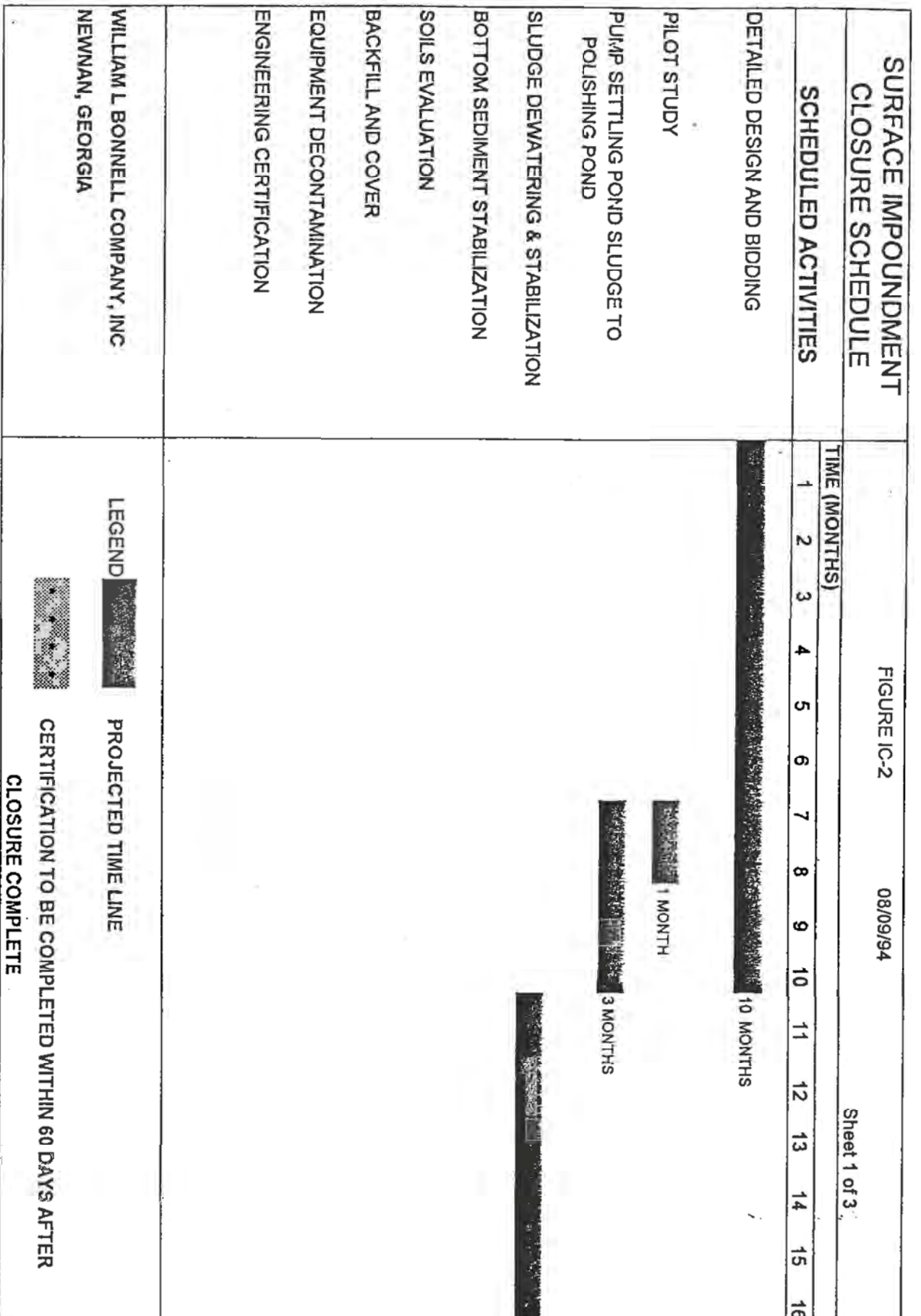
Terry Snell of Bonnell has discussed the need for an extension in detail with Ken Grall, Bonnell's compliance officer. If you have any questions, please contact Terry at (404) 254-7690.

Sincerely



D.R. Monk
President

cc: Ken Grall (w/enclosure)
Terry Snell (w/enclosure)



SURFACE IMPOUNDMENT CLOSURE SCHEDULE

FIGURE IC-2

08/09/94

Sheet 2 of 3

SCHEDULED ACTIVITIES	TIME (MONTHS)																
	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
DETAILED DESIGN AND BIDDING																	
PILOT STUDY																	
PUMP SETTLING POND SLUDGE TO POLISHING POND																	
SLUDGE DEWATERING & STABILIZATION																	
BOTTOM SEDIMENT STABILIZATION																	
SOILS EVALUATION																	
BACKFILL AND COVER																	
EQUIPMENT DECONTAMINATION																	
ENGINEERING CERTIFICATION																	
WILLIAM L BONNELL COMPANY, INC NEWNAN, GEORGIA																	

LEGEND		PROJECTED TIME LINE
		CERTIFICATION TO BE COMPLETED WITHIN 60 DAYS AFTER CLOSURE COMPLETE

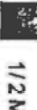
LEGEND

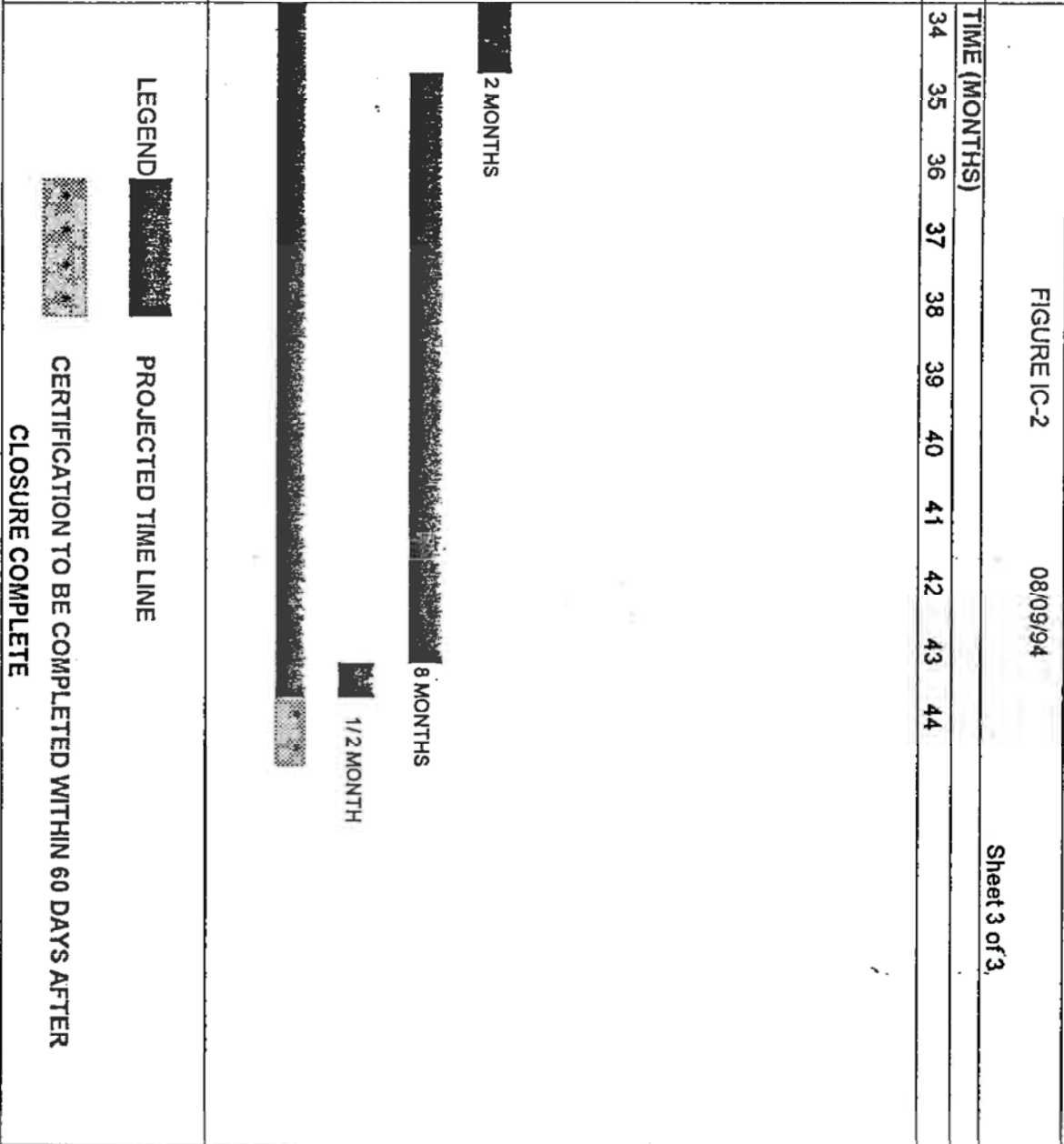
PROJECTED TIME LINE

CERTIFICATION TO BE COMPLETED WITHIN 60 DAYS AFTER
CLOSURE COMPLETE

16 MONTHS

9 MONTHS

SURFACE IMPOUNDMENT CLOSURE SCHEDULE		FIGURE IC-2 08/09/94												Sheet 3 of 3.	
SCHEDULED ACTIVITIES	TIME (MONTHS)														
	34	35	36	37	38	39	40	41	42	43	44				
DETAILED DESIGN AND BIDDING															
PILOT STUDY															
PUMP SETTLING POND SLUDGE TO POLISHING POND															
SLUDGE DEWATERING & STABILIZATION															
BOTTOM SEDIMENT STABILIZATION															
SOILS EVALUATION	 2 MONTHS														
BACKFILL AND COVER	 8 MONTHS														
EQUIPMENT DECONTAMINATION	 1 1/2 MONTH														
ENGINEERING CERTIFICATION															
WILLIAM L BONNELL COMPANY, INC NEWMAN, GEORGIA	LEGEND  PROJECTED TIME LINE CERTIFICATION TO BE COMPLETED WITHIN 60 DAYS AFTER CLOSURE COMPLETE														



THE WILLIAM L BONNELL COMPANY, INC.

And Capitol Products Corporation
SUBSIDIARIES OF TREDEGAR INDUSTRIES, INC.

June 13, 1994

Susan Eason
Acting Unit Coordinator
Hazardous Waste Management Program
Environmental Protection Division
Floyd Towers East, Suite 1154
205 Butler Street
Atlanta, GA 30334

Re: EPD Permit No. HW-087

Dear Susan

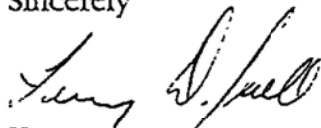
When Bob Ringer was on-site for the groundwater monitoring evaluation, I discussed the necessity of removing groundwater monitoring wells 16S and 16D. These two wells are within the capped area of the Surface Impoundment. The Post-Closure Care Permit requires Bonnell to maintain these two wells, but does not require us to sample them. However, we cannot install the HDPE cap with the wells within the cap

As you are aware, if we are able to achieve clean closure, we will have to move more wells in order to maintain a proper compliance point. Wells 16S and 16D will not be functional as compliance point wells since they would be within the unit. In addition, the wells serve no useful purpose at this time.

In order to proceed with closure activities, we need to remove the wells ASAP. Please reply as quickly as you can to this request.

If you have any questions, please contact me at (404) 254-7690.

Sincerely



Terry D. Snell, P.E.
Manager, Environmental



Subsidiaries,

The William L. Bonnell Co., Inc.
Capitol Products Corporation

June 8, 1993

Mr. Harold Reheis, P.E.
Director
Environmental Protection Division
Floyd Towers East, Suite 1154
205 Butler Street
Atlanta, GA 30334

Re: Modifications to Georgia Permit HW-087

Dear Harold

The purpose of this letter is to request a modification to the referenced Permit. The requested modifications are submitted as a Class 1 Permit Modification Request.

The exact requested change to the Permit is as follows:

1. a. Modify Permit Condition II.D.1 as follows:

Replace the following sentence:

"The Permittee shall perform closure of the ALOH land treatment unit, CrOH landfill, and the surface impoundment unit accordance with the closure plans in Sections IE, IA, and IC of the permit application, respectively."

with the following sentence:

"The Permittee shall perform closure of the ALOH land treatment unit, CrOH landfill, and the surface impoundment unit accordance with the closure plans in Sections IE (as amended), IA (as amended), and IC (as amended) of the permit application, respectively."

Section IC (Closure and Post-Closure Care Plan for the Surface Impoundment Unit) of the Permit Application should be amended as follows:

The schedule presented as Figure IC-2 should be deleted and the attached schedule should be included in the revision to Section IC as Figure IC-2.

- b. Reason! We are selecting a contractor to perform the closure instead of completing the closure with Bonnell employee forces. The time required to select a contractor, to negotiate a contract, and for the contractor mobilization preclude a polishing pond start date before August 10, 1993. Although the specific contractor has not been selected as of the date of this letter, the enclosed schedule reflects a schedule that will allow any of the proposed contractors to complete the dewatering of the polishing pond in a timely manner. The schedule does account for inclement weather and other potential down-time scenarios.

It should be noted that we are nearing completion of pumping the settling pond sludge from the settling pond to the polishing pond. In addition, the pilot study reflected in the schedule is also nearing completion.

If you have any questions, please contact Terry Snell at 404/254-7690.

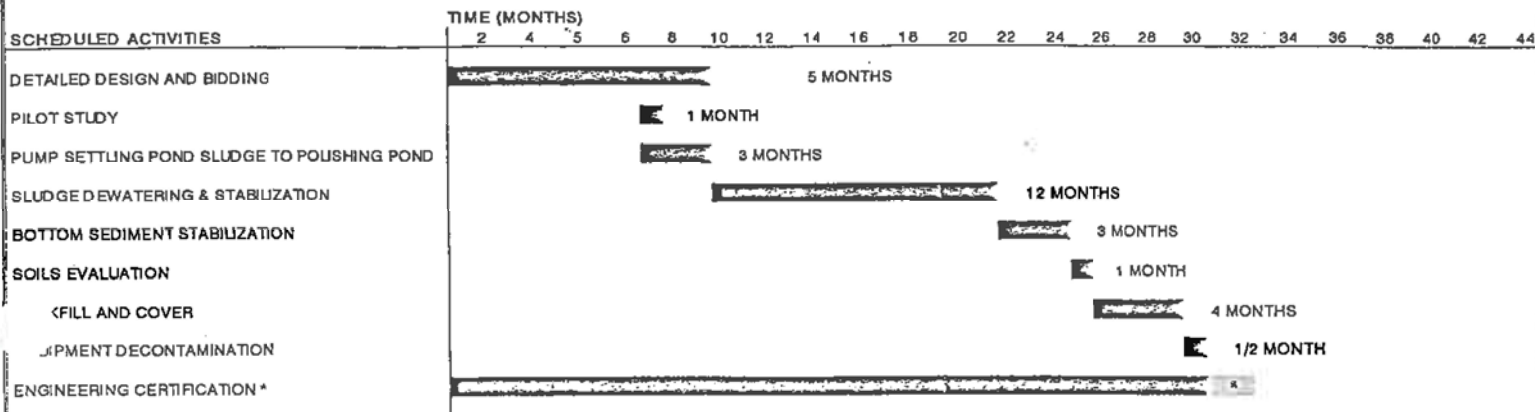
Sincerely



Douglas R. Monk
General Manager

cc: Susan Eason

SURFACE IMPOUNDMENT CLOSURE SCHEDULE



* CERTIFICATION TO BE SUBMITTED WITHIN 60 DAYS AFTER CLOSURE COMPLETION

LEGEND

PROJECTED TIME LINE

WILLIAM L BONNELL COMPANY, INC
NEWNAN, GEORGIA

FIGURE IC--2

IMPOUNDMENT
CLOSURE SCHEDULE

Revised 6/8/93



APPENDIX G

POLISHING POND SAMPLING RESULTS



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
(404) 734-4200 • FAX (404) 734-4201

JUL 21 1995

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-1

Sample: Soil, grab, SO-SWMU-4, 1-79, 7/11/95, 10:35, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Xylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: *[Signature]*

cc: Mr. Brian Dolihite ✓
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-2

Sample: Soil, composite, SO-SWMU-4, 1, 7/11/95, 10:44, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	86	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	20	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	15	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	11	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	41	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-3

Sample: Soil, grab, SO-SWMU-4, 2-32, 7/11/95, 10:55, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Xylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-4

Sample: Soil, composite, SO-SWMU-4, 2, 7/11/95, 10:59, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	80	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	19	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	15	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	9.8	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	63	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-5

Sample: Soil, grab, SO-SWMU-4, 3-70, 7/11/95, 11:15, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

BY: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
(404) 734-4200 • FAX (404) 734-4201

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-6

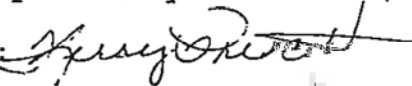
Sample: Soil, composite, SO-SWMU-4, 3, 7/11/95, 11:17, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	150	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	31	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	21	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	22	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-7

Sample: Soil, grab, SO-SWMU-4, 4-82, 7/11/95, 11:27, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-8

Sample: Soil, composite, SO-SWMU-4, 4, 7/11/95, 11:30, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	110	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	30	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	20	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	18	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	33	10

BDL - Below Detection Limit

Respectfully submitted,

By: *Henry Prescott*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-9

Sample: Soil, grab, SO-SWMU-4, 5-22, 7/11/95, 11:35, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-10

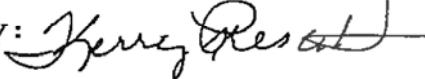
Sample: Soil, composite, SO-SWMU-4, 5, 7/11/95, 11:42, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	100	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	32	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	23	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	17	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	53	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



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William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-11

Sample: Soil, grab, SO-SWMU-4, 6-7, 7/11/95, 14:12, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-12

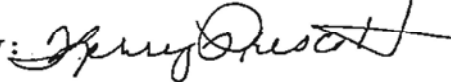
Sample: Soil, composite, SO-SWMU-4, 6, 7/11/95, 14:23, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	33	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	18	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	19	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	6.2	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	25	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-13

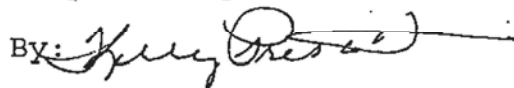
Sample: Soil, grab, SO-SWMU-4, 7-25, 7/11/95, 14:28, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-14

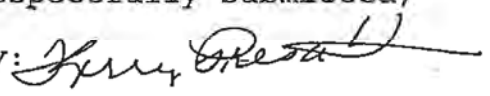
Sample: Soil, composite, SO-SWMU-4, 7, 7/11/95, 14:35, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	130	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	24	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	16	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	18	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-15

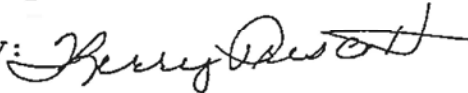
Sample: Soil, grab, SO-SWMU-4, 8-18, 7/11/95, 14:39, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-16

Sample: Soil, composite, SO-SWMU-4, 8, 7/11/95, 14:45, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	120	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	17	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	9.0	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	14	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: *[Signature]*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-17

Sample: Soil, grab, SO-SWMU-4, 9-2, 7/11/95, 14:50, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Ylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: *Harry Prescott*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-18

Sample: Soil, composite, SO-SWMU-4, 9, 7/11/95, 14:58, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	70	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	21	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	17	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	8.1	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	47	10

BDL - Below Detection Limit

Respectfully submitted,

By: *Kerry Prescott*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-19

Sample: Soil, grab, SO-SWMU-4, 10-29, 7/11/95, 15:10, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: *Kerry Prescott*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-20

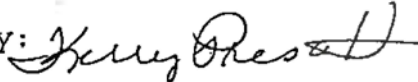
Sample: Soil, composite, SO-SWMU-4, 10, 7/11/95, 15:12, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	91	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	33	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	24	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	16	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	36	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-21

Sample: Soil, grab, SO-SWMU-4, 11-99, 7/11/95, 15:45, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-22

Sample: Soil, composite, SO-SWMU-4, 11, 7/11/95, 15:47, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	77	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	1.4	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	23	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	49	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	20	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M).....	46	10

Respectfully submitted,

By: *Kerry Russell*

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-23

Sample: Soil, grab, SO-SWMU-4, 12-41, 7/11/95, 15:57, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Xylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-24

Sample: Soil, composite, SO-SWMU-4, 12, 7/11/95, 16:02, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	84	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	31	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	15	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	11	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	37	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-25

Sample: Soil, grab, SO-SWMU-4, 13-31, 7/11/95, 16:10, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Xylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-26

Sample: Soil, composite, SO-SWMU-4, 13, 7/11/95, 16:20, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	58	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	20	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	11	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	7.2	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	56	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-27

Sample: Soil, grab, SO-SWMU-4, 14-78, 7/11/95, 16:25, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-28

Sample: Soil, composite, SO-SWMU-4, 14, 7/11/95, 16:33, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	84	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	45	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	33	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	18	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	550	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-29

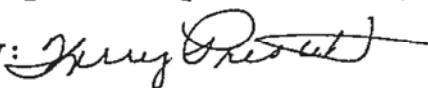
Sample: Soil, grab, SO-SWMU-4, 15-7, 7/11/95, 16:45, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-30

Sample: Soil, composite, SO-SWMU-4, 15, 7/11/95, 16:45, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	82	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	30	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	23	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	13	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-31

Sample: Soil, grab, SO-SWMU-4, 16-25, 7/11/95, 17:13, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-32

Sample: Soil, composite, SO-SWMU-4, 16, 7/11/95, 17:18, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	180	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	35	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	18	2.0
Total Nickel (Ni) (mg/kg) (EPA 6010)	22	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	32	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-33

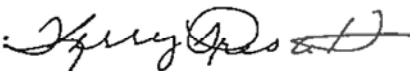
Sample: Soil, grab, SO-SWMU-4, 17-74, 7/11/95, 17:26, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-34

Sample: Soil, composite, SO-SWMU-4, 17, 7/11/95, 17:28, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	230	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	54	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	20	2.0
Total Nickel (Ni) (mg/kg) (EPA 6010)	27	2.5
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-35

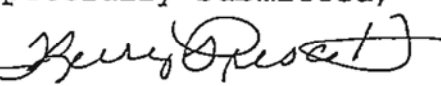
Sample: Soil, grab, SO-SWMU-4, 18-52, 7/11/95, 17:25, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260).....	BDL	10
Toluene (ug/kg) (EPA 8260).....	BDL	10
Xylenes (ug/kg) (EPA 8260).....	BDL	20
Ethylbenzene (ug/kg) (EPA 8260).....	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260).....	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260).....	BDL	10
Vinyl chloride (ug/kg) (EPA 8260).....	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-36

Sample: Soil, composite, SO-SWMU-4, 18, 7/11/95, 17:28, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010).....	120	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010).....	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010).....	50	1.0
Total Lead (Pb) (mg/kg) (EPA 6010).....	22	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010).....	16	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	88	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-37

Sample: Soil, grab, SO-SWMU-4, 19-83, 7/11/95, 17:36, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: *Terry Snell*

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-38

Sample: Soil, composite, SO-SWMU-4, 19, 7/11/95, 17:37, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	140	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	41	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	.25	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	23	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	BDL	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092
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PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-39

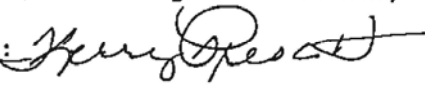
Sample: Soil, grab, SO-SWMU-4, 20-41, 7/11/95, 17:48, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

BY: cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-40

Sample: Soil, composite, SO-SWMU-4, 20, 7/11/95, 17:48, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	87	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	49	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	18	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	35	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	180	10

BDL - Below Detection Limit

Respectfully submitted,

By: *Mary Prescott*

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-41

Sample: Soil, grab, SO-SWMU-4, 21-11, 7/11/95, 17:52, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Trichloroethene (ug/kg) (EPA 8260)	BDL	10
Toluene (ug/kg) (EPA 8260)	BDL	10
Xylenes (ug/kg) (EPA 8260)	BDL	20
Ethylbenzene (ug/kg) (EPA 8260)	BDL	10
Tetrachloroethene (ug/kg) (EPA 8260)	BDL	10
1,1-Dichloroethene (ug/kg) (EPA 8260)	BDL	10
Vinyl chloride (ug/kg) (EPA 8260)	BDL	20

BDL - Below Detection Limit

Respectfully submitted,

By: *Kerry O'Keefe*

cc: Mr. Brian Dolihite
EMCON

ASI**ANALYTICAL SERVICES, INC.**

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 18, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64014-42

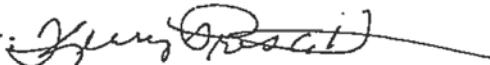
Sample: Soil; composite, SO-SWMU-4, 2i, 7/11/95, 17:57, received 7/11/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Barium (Ba) (mg/kg) (EPA 6010)	110	1.0
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0
Total Chromium (Cr) (mg/kg) (EPA 6010)	38	1.0
Total Lead (Pb) (mg/kg) (EPA 6010)	21	2.5
Total Nickel (Ni) (mg/kg) (EPA 6010)	15	2.0
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M)	240	10

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON

ASI

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ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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OCT 30 1995

LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

October 24, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

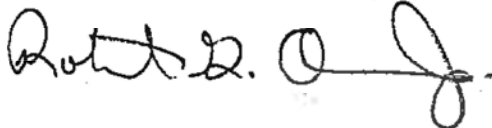
Report No. 64386AT1

Sample: Soil, composite, Polish Pond Grid #11, 7/21/95, 15:15,
received 7/21/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Lead (Pb) (mg/kg) (EPA 6010)	16	2.5

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite ✓
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 31, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64386-2

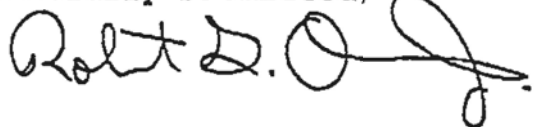
Sample: Soil, composite, Polish Pond Grid #11, 7/21/95, 15:15,
received 7/21/95

RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Cadmium (Cd) (mg/kg) (EPA 6010)	BDL	1.0

BDL - Below Detection Limit

Respectfully submitted,

By: 

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS

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LABORATORY REPORT

William L. Bonnell Co. Inc.
PO Box 428
Newnan, GA 30264

July 31, 1995

P.O. No. 212181-OP

Attention: Mr. Terry Snell

Report No. 64386-1

Sample: Soil, composite, Polish Pond Grid #14, 7/21/95, 15:00,
received 7/21/95

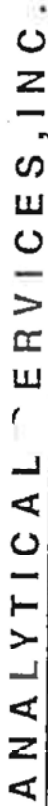
RESULTS

	<u>Result</u>	<u>Detection Limit</u>
Total Petroleum Hydrocarbons (mg/kg) (EPA 418.1M) ..	1300	10

Respectfully submitted,

BY:

cc: Mr. Brian Dolihite
EMCON



ANALYTICAL SERVICES, INC.

ENVIRONMENTAL MONITORING & LABORATORY ANALYSIS
110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092 • (404) 734-4200
FAX (404) 734-4201 • Federal I.D. #58-1625655

CHAIN OF CUSTODY RECORD

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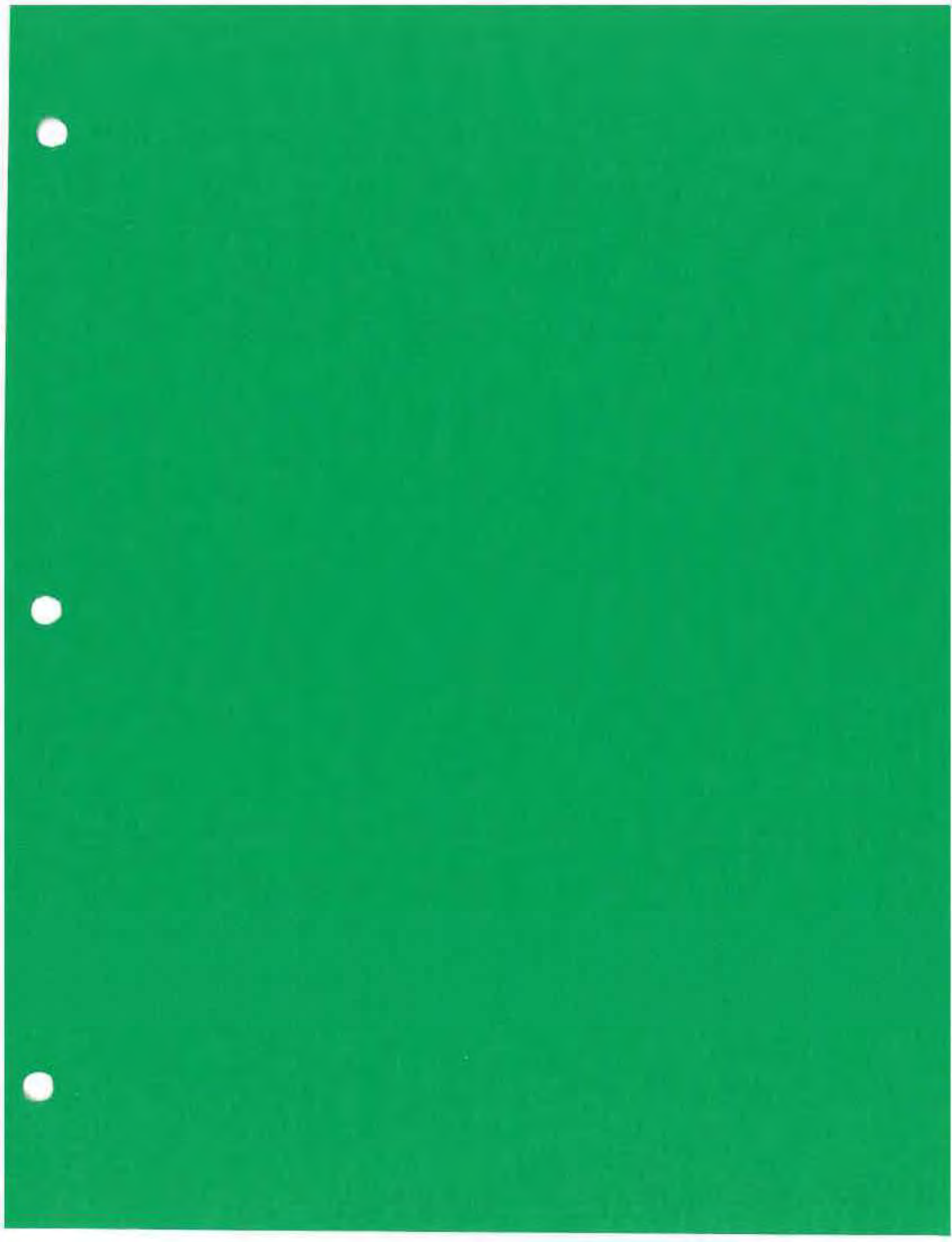


ANALYTICAL SERVICES, INC.

CHAIN OF CUSTODY RECORD

ENVIRONMENTAL TORING & LABORATORY ANALYSIS
110 TECHNOLOGY PARKWAY • NORCROSS, GA 30092 • (404) 734-4200
FAX (404) 734-4201 • Federal I.D. #58-1626655

PROJECT NUMBER		PROJECT NAME		CLIENT ADDRESS AND PHONE NUMBER		FOR LAB USE ONLY	
PROJECT NAME		PROJECT NUMBER		LAB#		LAB#	
William L. Bunnell		25 Bunnell St. Union Ga. 30264		60-014			
PROJECT MANAGER		ANALYSES REQUESTED		PROJECT NO.			
Terry D. Snell							
REQUESTED COMP. DATE		COPY TO:		ACK		VERIFIED	
Fax Results 7/18/95		Brian Deltelle Esq.					
7/17 per JW		SAMPLING REQUIREMENTS		QUOTE#		BS	
		SDWA NPDES RCRA OTHER		NO. OF SAMP		42 12 PG 3 OF 3	
STA NO.		DATE		TIME		REMARKS	
15		7-11		1645		* see attached sheet	
16		7-11		1713			
17		7-11		1726			
18		7-11		1728			
19		7-11		1736			
20		7-11		1748			
21		7-11		1752			
		7-11		1757			
SAMPLED BY AND TITLE		DATE/TIME		DATE/TIME		HAZWRAP/NEESA Y N	
Johnson / Morgan		7-11-95 see above		7-11-95 1900		OC LEVEL 1 2 3	
RECEIVED BY:		DATE/TIME		DATE/TIME		COC	
						ANA REO	
RECEIVED BY:		DATE/TIME		DATE/TIME		CUST SEAL	
						NO	
RECEIVED BY LAB:		DATE/TIME		DATE/TIME		SAMPLE COND.	
7-12-95 10:00		7-12-95 10:00				Good	
REMARKS		SAMPLE SHIPPED VIA		OTHER		AIR BILL #	
		UPS BUS FED-EX		(HAND)			
See Bill For Detection Limits		Cpl. M. Miguel		7/12/95 8:00		ENTERED INTO LIMS	
Received 7/11/95 logged in 7/12/95						COC REVIEWED	



APPENDIX H

**SIX-INCH CLAY LAYER COMPACTION
AND PERMEABILITY TEST RESULTS**



EMCON Southeast

DAILY REPORT

Report #: Nº 196

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Date: 8-17-95 (THUR), 19 95
Contract Day _____ of _____
Time Enter Site 1400
Time Leave Site 1700

Project Name: Bonnel/Surf. Imp. Closure

Project #: 72040.009.092

Weather: Sunny & Hot

Mean Temp. 92

Working Conditions: Good & Hot

Location: Surf. Imp. Closure

Prime Contractor's Personnel: Payton's Sons

Subcontractors on the Site: _____

Visitors: _____

Hours On Site: Contractor _____

EMCON 3

Other _____

Progress: The site was visited on the above date to apine Nike
gauges to use @ Morgan Co. Upon arrival it was observed
that clay placement & compaction had begun. The North half
of the Surface Improvement Closure had material spread with
approximately 1/2 of this area being compacted. Testing of
areas thought to be compacted was performed using CEN gauges
results of all tests revealed low compaction and high moisture.
Darryl Wiggins stated that he would continue working the material
in tested & failed areas. No official compaction results were
recorded in light of the fact that spreading and compaction
activities had just begun.

Darryl Wiggins consulted me on procedure for placement
and compaction of material on slopes. My recommendation due
to the steepness of the slopes was to run horizontal benches
placed in 10 inch loose lifts and backing into slope each lift.
Bring horizontal bench up to top crest of slope then cut
back excess material to desired and specified thickness.

T. Hanson

Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast



EMCON Southeast

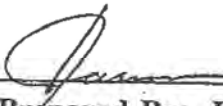
DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: 197
Date: 8-24-95 (Thur), 19____
Contract Day _____ of _____
Time Enter Site _____
Time Leave Site _____

Project Name: Bonnet / Surf. Imp. Closure Project #: 72040.009.092
Weather: Ht Mean Temp. _____
Working Conditions: Good
Location: Surf. Imp. Closure
Prime Contractor's Personnel: Payton & Sons
Subcontractors on the Site: _____
Visitors: _____
Hours On Site: Contractor _____ EMCON _____ Other _____

Progress: The site was visited on the above date to take in-situ density tests of clay liner. Tests were taken on both top of cell and on slopes of cell. Compaction and moisture on closure were taken. Results were very inconsistent, moisture was found to be on the dry side while compaction was low. Discussion with Darryl Wiggins resulted in the agreement that he would rework area once again until better numbers for retesting.


Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast



EMCON Southeast

DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: _____
Date: 8-30-95, 19_____
Contract Day _____ of _____
Time Enter Site _____
Time Leave Site _____

Project Name: Bonnet / Surf Imp Closure Project #: _____
Weather: _____ Mean Temp. _____
Working Conditions: _____
Location: Surf Imp Closure
Prime Contractor's Personnel: Dayton & Sons
Subcontractors on the Site: _____
Visitors: _____
Hours On Site: Contractor _____ EMCON _____ Other _____

Progress:

Sample A	WD	122.5	mils	24.5	DD	98	m/l	25.0	Comp	95.5%
1		121.5		24.0		97.5		24.6		95.0%
2		119.		23		96		23.9		93.6
3		Not completed								
4		122.5		22		100.5		22.0		97.9
5		115.5		24		91.5		26.2		89.1
6		118.5		21.5		96.7		22.2		94.2
7		Not completed								
S3		113		22.75		90.25		25.2		87.9
S2		95.5		23.75		71.75		33.0		69.9
T2		114.5		25.0		89.5		27.9		87.2

Jeff J. [Signature]
Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast

Polishing
Pond

DL ML
4414 4487

→ 24.50 DD → 98

→ 95.5%

→ 24.0 DD → 97.5

→ 95%

→ 23.0 DD → 96.0

→ 93.6%

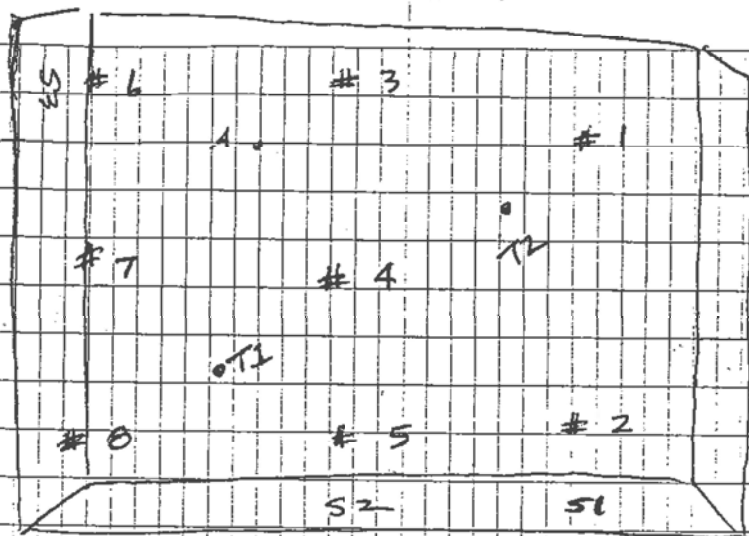
→ 22.0 DD → 100.5

→ 97.9

→ 24.0 DD → 91.5

→ 89.1

W. Water Plant



Creek

#6 WD → 118.5 MIBS 21.5 DD → 96.7
M% → 22.2 Comp 94.2

#7 WD 120.5 MIBS 23.0 DD

S2
#8 WD → 113.0 MIBS → 22.75 DD → 90.25
M% → 25.2 Comp → 82.9

#S2 WD → 95.5 MIBS → 23.75 DD → 71.75
M% → 33.0

#2 WD → 114.5 MIBS → 25.0 DD → 89.5
M% → 22.9 Comp → 87.2



EMCON Southeast

DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: _____
Date: 9-5-95, 19 95
Contract Day _____ of _____
Time Enter Site _____
Time Leave Site _____

Project Name: Bonne / Surf. Imp Closure Project #: 72040 029.092
Weather: _____ Mean Temp. _____
Working Conditions: _____
Location: _____
Prime Contractor's Personnel: _____
Subcontractors on the Site: _____
Visitors: _____
Hours On Site: Contractor _____ EMCON _____ Other _____

Progress: _____

Sample #	WD	h lbs	DP	M%	% Compaction
#01	111	20.75	90.25	23.0	68
#02	Not tested				
#03	111.5	21.25	89.25	24.3	87
#04	115	24	91	21	89
#05	} Not tested				
#06					
#07					
#08					
#09					
#10					

Sat in samples ST-1 and ST-2 for permeability testing

Prepared By: JEP/Revision
EMCON Southeast

Reviewed By: EMCON Southeast

ML

→ 45.16

→ 20.75 DD → 90.25

→ 100

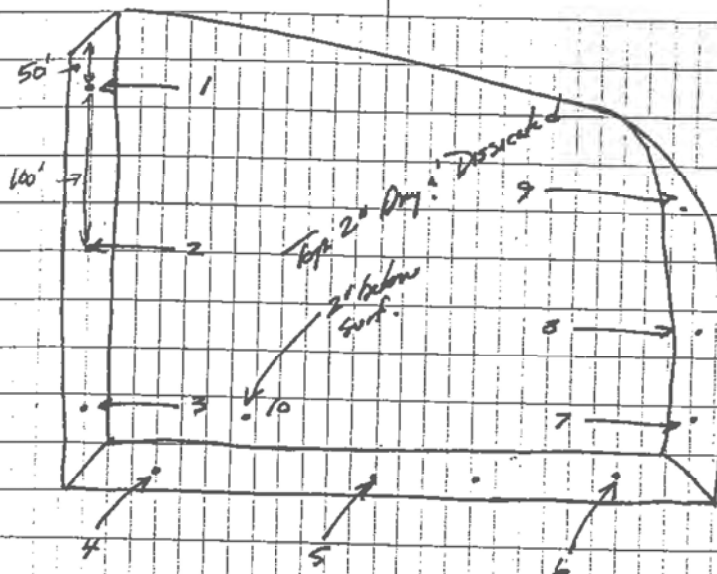
→ DD →

21.75

89.25

Dr / Low Comp

→ 24.0 DD 91.0



5858 1793
#10



EMCON
Southeast

DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: _____
Date: 9-7-95, 19 95
Contract Day _____ of _____
Time Enter Site _____
Time Leave Site _____

Project Name: Bonnel/S.F. Imp Closure Project #: 72090.009.092
Weather: _____ Mean Temp. _____
Working Conditions: _____
Location: _____
Prime Contractor's Personnel: _____
Subcontractors on the Site: Payton & Sons
Visitors: _____
Hours On Site: Contractor _____ EMCON _____ Other _____

Progress: Collected Shelly tube ST-3

Compaction Sample #01

WD = 119.5 Mlbs = 2425 PD = 95.25 M/I = 25.5 Comp = 93%

Submitted to GeoHydro

Jeff Hamilton
Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast



EMCON Southeast

DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: 200
Date: Sept 8, 19 9
Contract Day _____ of _____
Time Enter Site 11:30
Time Leave Site 15:00

Project Name: Surf. Imp. Closure Project #: 72040.009.092
Weather: P-Cloudy Mean Temp. 85°
Working Conditions: GOOD
Location: BONNELL - NEWNAN, GA PLANT
Prime Contractor's Personnel: Payton & Sons
Subcontractors on the Site: _____
Visitors: _____
Hours On Site: Contractor _____ EMCON 3.5 Other _____

Progress: Arrive on-site as requested by Terry Snell (Bonnell) to perform nuclear density testing and obtain shelby tube permeability samples for the 6" clay layer of the composite cover system. Testing the area represented by shelby tube sample ST-2A previously tested. ~~Bonnell~~ Payton & Sons re-hydrated and re-compacted the area to try to lower the permeability. The ~~or~~ density test results are as follows:

Sample	STA #	WD	DD	%M	% Compaction	Proctor
B	B# 200	126.8	108.8	16.5	106%	102.3 / 21.4%
C	C-150	124.5	105.5	18.0	103%	/
CC	CC-175	123	103.4	19.0	101%	↓

*Shelby tube sample ST-2A-1 (Re-Test of ST-2A) taken @ STA #CC-175.
Met w/ T. Snell to review QC documents sent by Serrot. No documents sent for the rolls delivered to site on 9/8/95 from Parkersburg, WV site. Cut a sample from Roll # 84045603 for conformance testing. Sent sample to EMCON-Tuxedo, NY lab for testing (Fed-Ex).

Brian E. Wadsworth

Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast



EMCON
Southeast

DAILY REPORT

Route To: Master - White (Original)
On-Site - Yellow
Project Manager - Pink

Report #: _____
Date: 9-13, 19 95
Contract Day _____ of _____
Time Enter Site _____
Time Leave Site _____

Project Name: Bonnel / Surf. Imp. Closure Project #: 72040.009.092
Weather: _____ Mean Temp. _____
Working Conditions: _____
Location: Surface Imp Closure
Prime Contractor's Personnel: Dayton & Sons
Subcontractors on the Site: _____
Visitors: _____
Hours On Site: Contractor _____ EMCON _____ Other _____

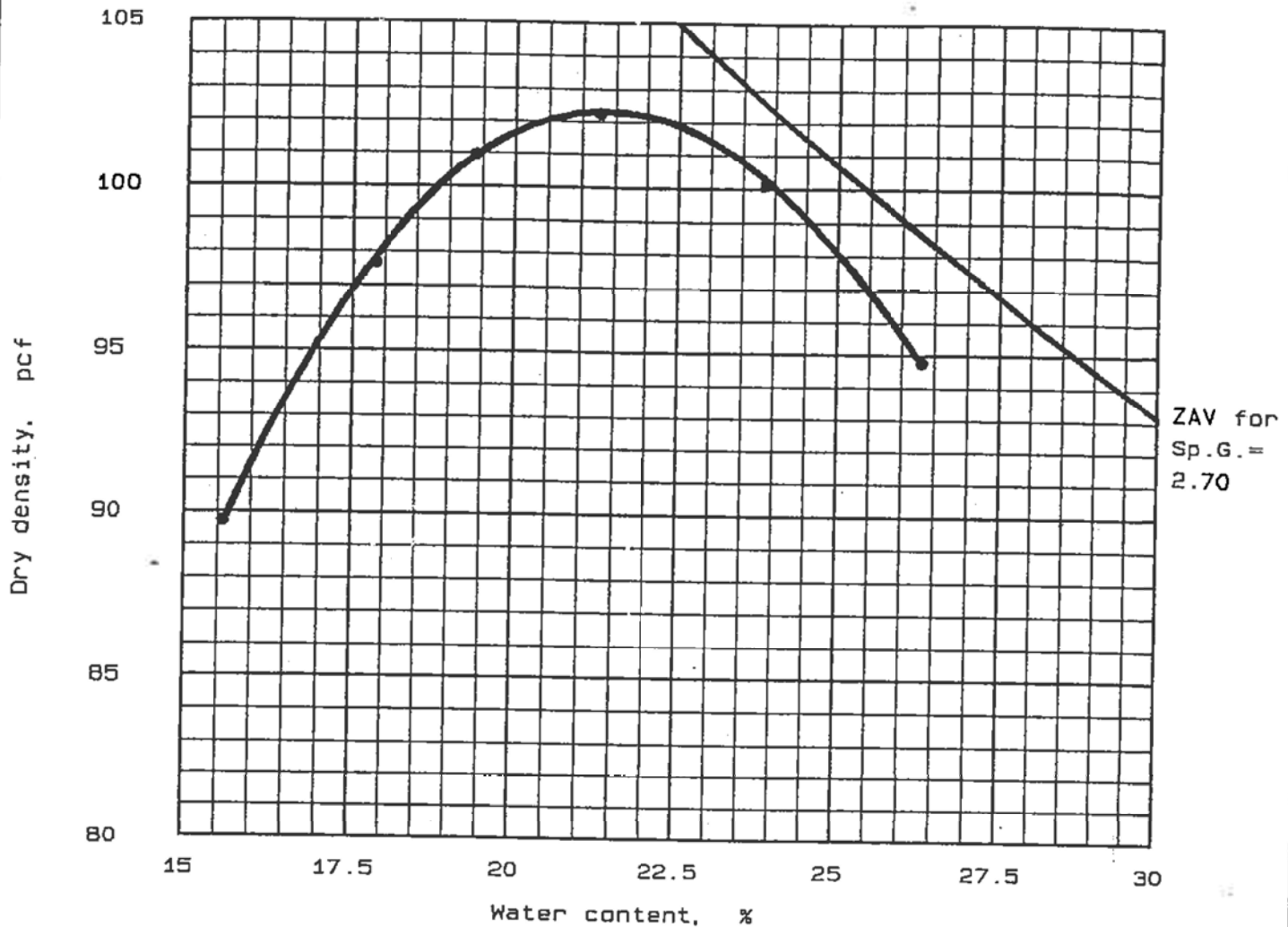
Progress: Collected two Shelby tubes ST-4 and ST-5
Compaction test results for each site.

	M+sw	M	Sw	V	WD	DD	% Comp.
DL #01 (ST-4)	5.59	1.38	4.21	.033	122.58	105.1	102
DL #02 (ST-5)	5.52	1.38	4.14	0.033	125.5	103.4	100

Jeff Hanlon
Prepared By: EMCON Southeast

Reviewed By: EMCON Southeast

PROCTOR TEST REPORT



"Standard" Proctor, ASTM D 698, Method A

Elev/ Depth	Classification			Nat. Moist.	Sp.G.	LL	PI	% > No. 4	% < No. 200
	ASTM	BURMISTER	AASHTO						
					2.70				

MATERIAL DESCRIPTION

TEST RESULTS

Optimum moisture = 21.4 %
Maximum dry density = 102.3 pcf

Project No.: Date: 8-10-95

Project: SURFACE IMPOUNDMENT CLOSURE

Client: WILLIAM L. BONELL CO.

Sample: BS-1

Sample No.: BS-1

Performed by: P.P.

Entered by: D.L.

Checked by: R.S.A.

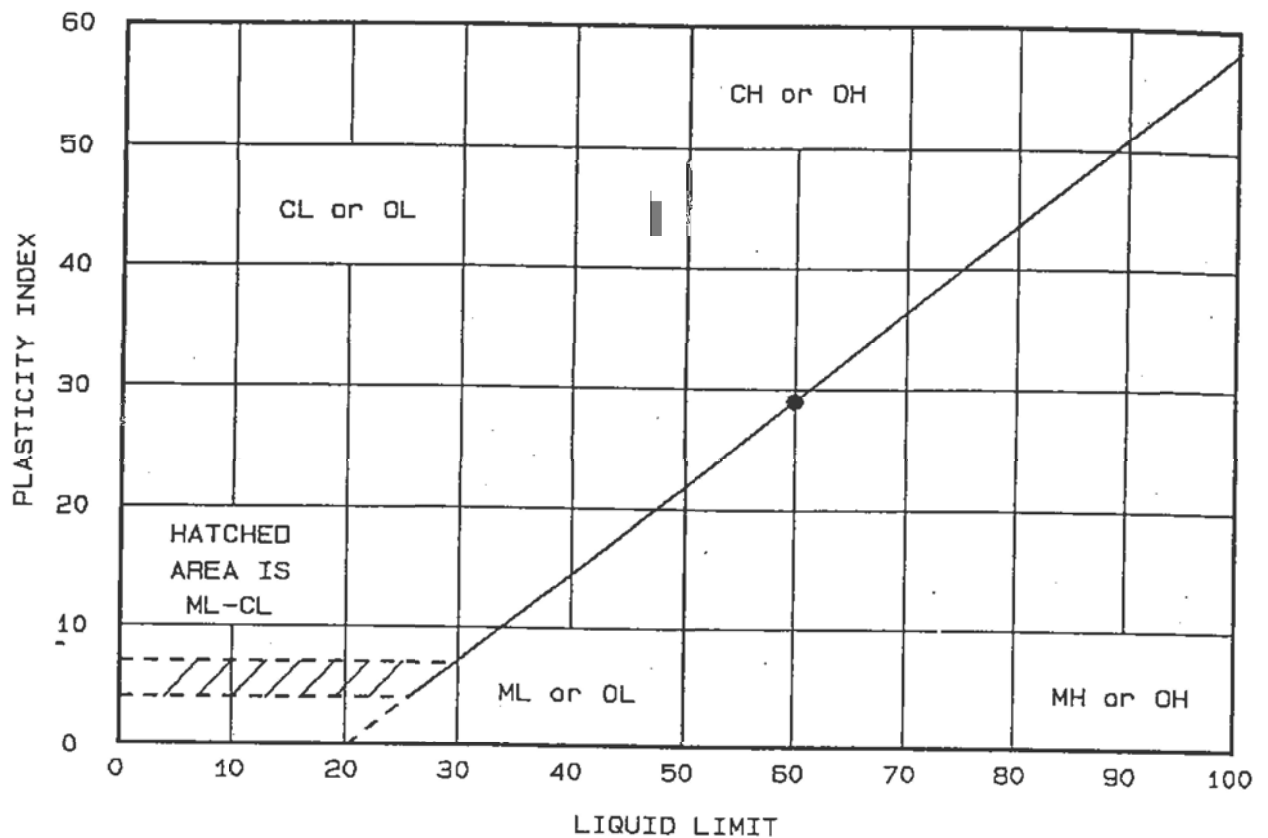
Remarks:

PROJECT #72040.009.092

EMCON

Figure No. _____

LIQUID AND PLASTIC LIMITS TEST REPORT



SAMPLE IDENTIFICATION	LL	PL	PI	-200	MATERIAL DESCRIPTION
● BS-1	60	31	29		BURMISTER ☐ ASTM D 2487 ☒

Project No.:
 Project: SURFACE IMPOUNDMENT CLOSURE
 Client: WILLIAM L. BONNELL CO.
 Location:

Date: 8-11-95

Performed by: K.J.
 Entered by: D.L.
 Checked by: R.S.A.
 Remarks:
 ASTM-D4318
 PROJECT#72040.009.092

EMCON

Fig. No.

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: SURFACE IMPOUNDMENT CLOSURE

Proj. No.

Tested by: K.H.

Sample: BS-1

Date: 8-11-95

Entered by: K.H.

Checked by: R.S.A.

Remarks: RECOMPACTED

Cell 7

Panel 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	3.866	1.	2.825
2.	3.867	2.	2.845
3.	3.868	3.	2.840
4.	3.863	4.	2.835
5.	3.866	5.	2.810

Weight of Specimen:

Initial Weight	737.2 Grams
	1.624 Lbs.
Final Weight	776.4 Grams
	1.710 Lbs.
Dry Weight	599.9 Grams
	1.321 Lbs.

Avg. 3.866 In
9.820 CM

Ave 2.831 In
7.191 CM

Moisture Content:

Initial	22.89 %
Final	29.42 %

Area 6.295 In²
40.610 CM²

Volume 24.335001 In³
0.0140828 Cft.

Density, Wet Initial 115.41 pcf

Density, Dry 93.91 pcf

Eff. Confining Pressure 0.5 tsf

Density, Wet Final: 121.54 pcf

Back Pressure: 90 psi

Specific Gravity 2.7

Saturation: 100 %

$K = \frac{Q \times L \times R_t}{h \times A \times t}$
20 -

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.18	0.20	0.26	0.23
L cms	9.820	9.820	9.820	9.820
Rt (Temp)	0.976	0.976	0.976	0.976
h cms	66.44	66.44	66.44	66.44
A Sq. cms	40.610	40.610	40.610	40.610
t Sec.	338	377	505	457
K				
20 cm/sec	1.892E-06	1.884E-06	1.829E-06	1.788E-06

K
20 Avg. cm/sec

1.848E-06

(Composite Sample)
LOCATION P1-5 (Payton Property)

DEPTH 1.0' - 4.0'

GECHYDRO

DESCRIPTION Red brown silty clay (CH)

NATURAL MOISTURE CONTENT _____

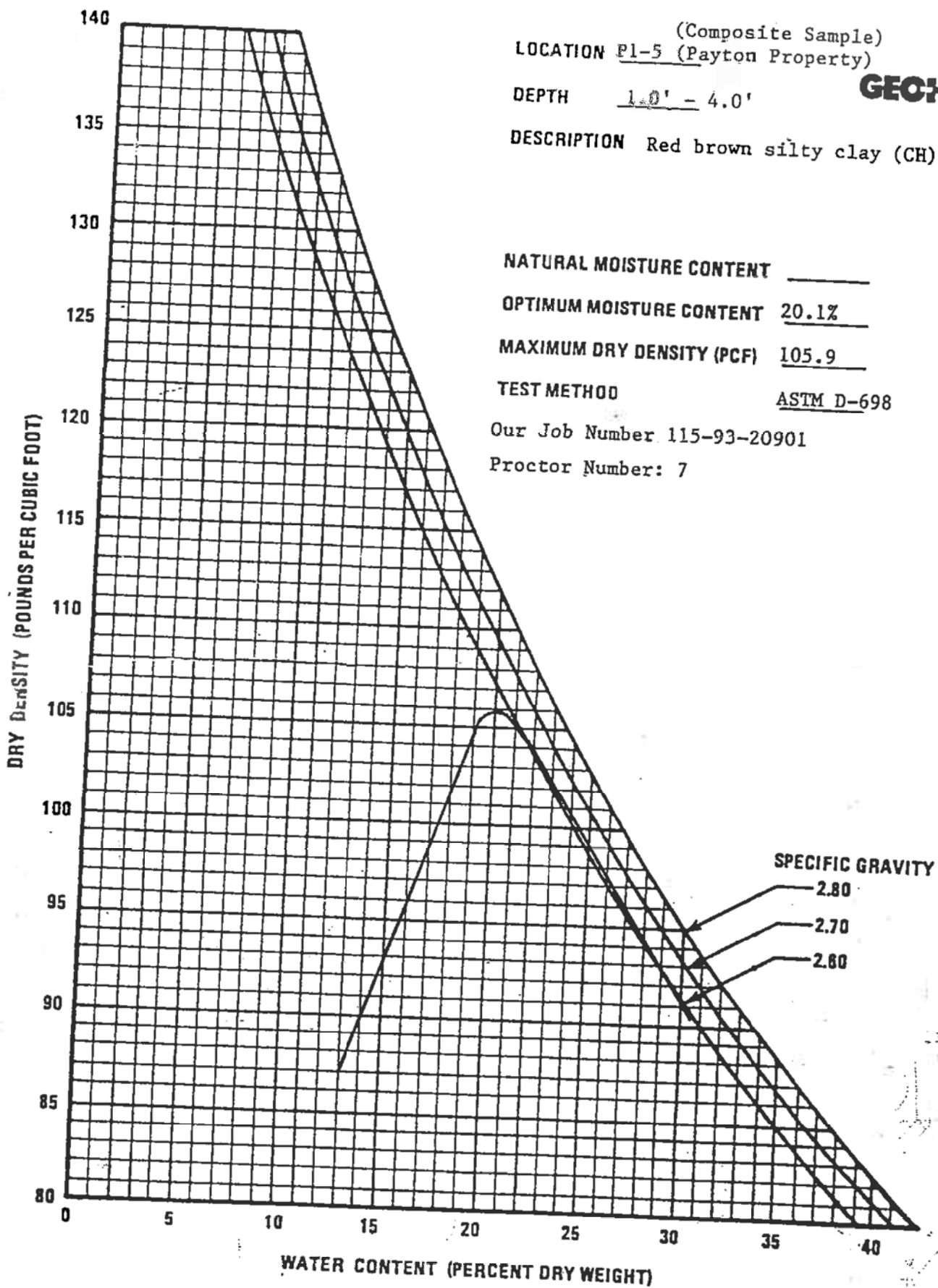
OPTIMUM MOISTURE CONTENT 20.1%

MAXIMUM DRY DENSITY (PCF) 105.9

TEST METHOD ASTM D-698

Our Job Number 115-93-20901

Proctor Number: 7

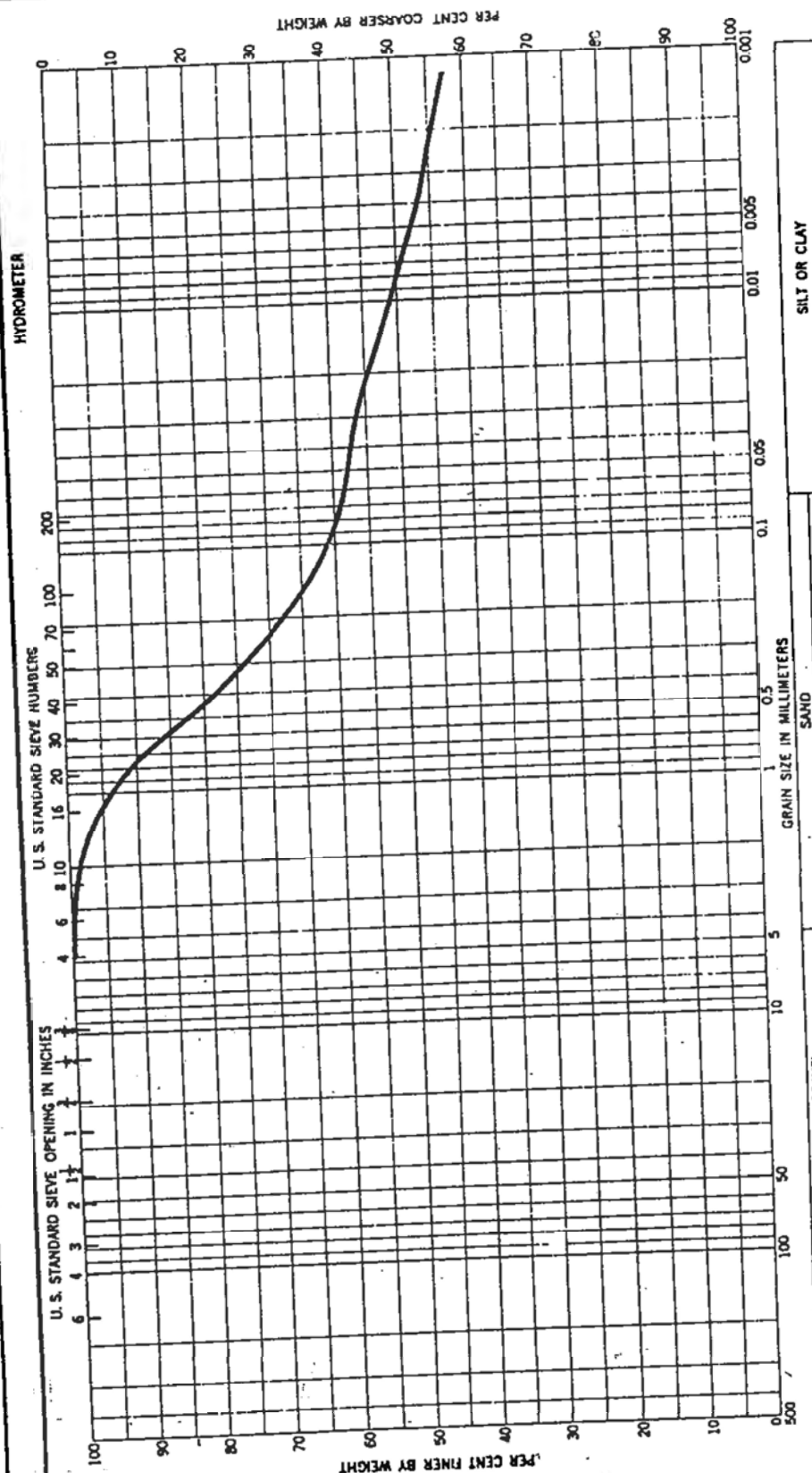


PROCTOR TEST RESULTS

CrOH Landfill Closure

Date 5/19/93

William L. Bonnell Co., Newnan, Georgia



Boring No.	Sample No.	Elev or Depth	GRAVEL		COARSE	FINE	Classification	Nat %	LL	PL	PI
			COARSE	FINE							
	P1-5 *	1' - 4'					Red brown silty clay (CH)	--	56	26	30

GEOHYDRO

GRADATION CURVES

... Committee

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.

Sample: ST-1

Date: 9-5-95

Entered by: K.H.

Checked by: R.S.A.

Remarks:

Cell 7
Panel 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	3.810	1.	2.811
2.	3.818	2.	2.820
3.	3.816	3.	2.830
4.	3.816	4.	2.839
5.	3.818	5.	2.821

Weight of Specimen:

Initial Weight	<u>733.7</u> Grams
	<u>1.616</u> Lbs.
Final Weight	<u>773.5</u> Grams
	<u>1.704</u> Lbs.
Dry Weight	<u>609.9</u> Grams
	<u>1.343</u> Lbs.

Avg. 3.816 In Ave 2.824 In

9.692 CM 7.173 CM

Moisture Content:

Initial	<u>20.30</u> %
Final	<u>26.82</u> %

Area 6.264 In² 40.416 CM²

Volume 23.902511 In³ 0.0138325 Cft.

Density, Wet Initial 116.94 pcf

Density, Dry 97.20 pcf

Eff. Confining Pressure 0.5 tsf

Density, Wet Final: 123.28 pcf

Back Pressure: 90 psi

Specific Gravity 2.708

Saturation: 98.4 %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc				
L cms	1.00	1.00	1.00	1.00
Rt (Temp)	9.692	9.692	9.692	9.692
h cms	1.000	1.000	1.000	1.000
A Sq. cms	88.59	88.59	88.59	88.59
t Sec.	40.416	40.416	40.416	40.416
K	64	64	64	65
20 cm/sec	4.229E-05	4.229E-05	4.229E-05	4.164E-05

K
20 Avg. cm/sec

4.213E-05

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.

Sample: ST-2

Date: 9-5-95

Entered by: K.H.

Checked by: R.S.A.

Remarks:

Cell 8
Panel 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	2.985	1.	2.850
2.	2.992	2.	2.848
3.	3.002	3.	2.858
4.	3.004	4.	2.868
5.	3.000	5.	2.860

Weight of Specimen:

Initial Weight	632.2 Grams
	1.393 Lbs.
Final Weight	644.3 Grams
	1.419 Lbs.
Dry Weight	529.3 Grams
	1.166 Lbs.

Avg. 2.997 In Ave 2.857 In

7.611 CM 7.256 CM

Moisture Content:

Initial	19.44 %
Final	21.73 %

Area 6.410 In² 41.354 CM²

Volume 19.207186 In³ 0.0111153 Cft.

Density, Wet Initial 125.39 pcf

Density, Dry 104.98 pcf

Density, Wet Final: 127.79 pcf

Eff. Confining Pressure 0.5 tsf

Back Pressure: 90 psi

Specific Gravity 2.701

Saturation: 97 %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.12	0.15	0.12	0.17
L cms	7.611	7.611	7.611	7.611
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	177.18	177.18	177.18	177.18
A Sq. cms	41.354	41.354	41.354	41.354
t Sec.	1541	2029	1638	2322
K				
20 cm/sec	8.089E-08	7.679E-08	7.610E-08	7.605E-08

K
20 Avg. cm/sec

7.746E-08

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.

Sample: ST-2A

Date: 9-7-95

Entered by: K.H.

Checked by: R.S.A.

Remarks:

Cell 14
Panel 2

Dimensions of Specimen:

Weight of Specimen:

	Length (Inches)		Diameter (Inches)
1.	3.959	1.	2.865
2.	3.958	2.	2.860
3.	3.958	3.	2.865
4.	3.955	4.	2.868
5.	3.953	5.	2.868

Initial Weight	786.7 Grams 1.733 Lbs.
Final Weight	826.7 Grams 1.821 Lbs.
Dry Weight	652.0 Grams 1.436 Lbs.

Avg.	3.957 In 10.050 CM	Ave	2.865 In 7.278 CM
Area	6.448 In ² 3		41.597 CM ²
Volume	25.510667 In ³		0.0147631 Cft.

Moisture Content:

Initial	20.66 %
Final	26.79 %

Density, Wet Initial	117.48 pcf
Density, Dry	97.36 pcf
Eff. Confining Pressure	0.5 tsf

Density, Wet Final: 123.45 pcf

Back Pressure: 90 psi

Specific Gravity: 2.725

Saturation: 97.8 %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.20	0.20	0.20
L cms	10.050	10.050	10.050	10.050
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	252.36	252.36	252.36	252.36
A Sq. cms	41.597	41.597	41.597	41.597
t Sec.	20	20	21	21
K				
20 cm/sec	9.573E-06	9.573E-06	9.118E-06	9.118E-06

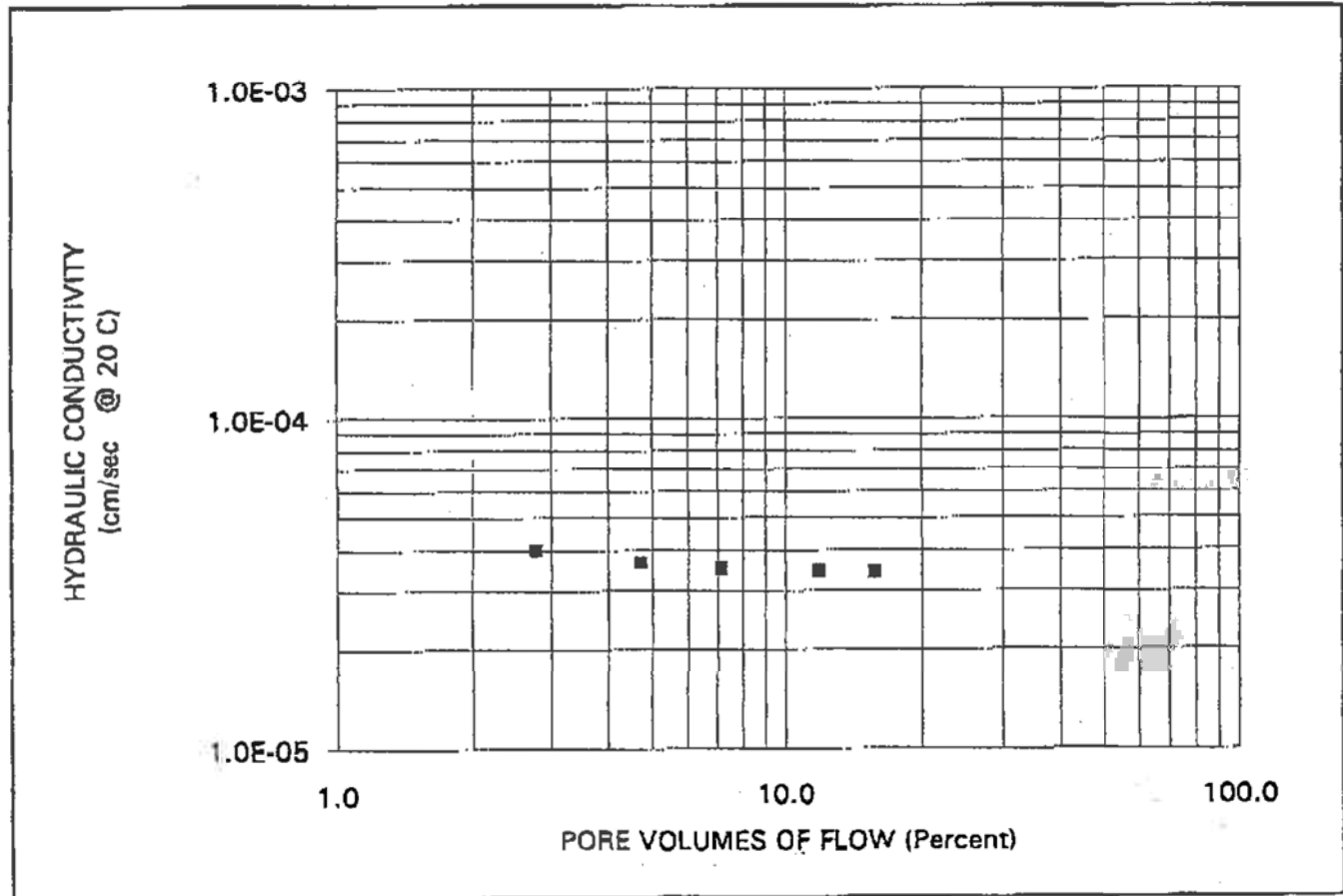
K
20 Avg. cm/sec

9.346E-06

GEO-HYDRO

HYDRAULIC CONDUCTIVITY LABORATORY TEST RESULTS

Project Name: Bonnell Surface Closure Date: 9/9/95
 Project Number: 117 - 95 - 31800 Test Method: ASTM D - 5084
 Sample Identification: ST -3 Sample Depth: _____
 Sample Description: Red-brown fine to medium sandy silt (MH)



Specimen Parameters	Before Saturation	After Permeation
Specimen Diameter (cm)	7.18	7.18
Specimen Length (cm)	7.66	7.66
Moisture Content (%)	17.5	28.0
Dry Unit Weight (pcf)	96.0	96.0
Specific Gravity (assumed)	2.70	2.70
Void Ratio	0.755	0.755
Porosity (%)	43.0	43
Saturation (%)	62.7	100.0
Sample Preparation Method	Remolded to 95% Maximum Dry Density	
Magnitude of Total Backpressure (psi)	100.0	
Type of Permeant Liquid Used	Deaired water	
Maximum Effective Consolidation Stress (psi)	3.0	
Minimum Effective Consolidation Stress (psi)	3.0	
Range of Hydraulic Gradient Used	4.0	
Hydraulic Conductivity (cm/sec @ 20° C)	3.6 E-05	

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL
 Sample: ST-2A-1
 RETEST
 Remarks:

Proj. No. 72040.009.092
 Date: 9-11-95

Tested by: K.H.
 Entered by: K.H.
 Checked by: R.S.A.

Cell 6
 Panel 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	4.360	1.	2.855
2.	4.365	2.	2.858
3.	4.368	3.	2.860
4.	4.363	4.	2.875
5.	4.364	5.	2.861

Weight of Specimen:

Initial Weight	890.4 Grams
	1.961 Lbs.
Final Weight	940.4 Grams
	2.071 Lbs.
Dry Weight	761.2 Grams
	1.677 Lbs.

Avg.	4.364 In	Ave	2.862 In
	11.085 CM		7.269 CM
Area	6.432 In ²		41.499 CM ²
Volume	28.070690 In ³		0.0162446 Cft.

Moisture Content:

Initial	16.97 %
Final	23.54 %

Density, Wet Final: 127.62 pcf

Density, Wet Initial 120.84 pcf

Density, Dry 103.30 pcf

Back Pressure: 90 psi

Efflt. Confining Pressure 0.5 tsf

Specific Gravity 2.699

Saturation: 100.7 %

$$K = \frac{Q \times L \times R_t}{20 \times h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.16	0.13	0.14
L cms	11.085	11.085	11.085	11.085
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	88.59	88.59	88.59	88.59
A Sq. cms	41.499	41.499	41.499	41.499
t Sec.	214	176	144	155
K				
20 cm/sec	2.818E-06	2.741E-06	2.722E-06	2.723E-06

K
 20 Avg. cm/sec

2.751E-06

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL
 Sample: ST-4 / SLOPE
 STA#EE-100
 Remarks:

Proj. No. 72040.009.092
 Date: 9-15-95

Tested by: K.H.
 Entered by: K.H.
 Checked by: R.S.A.

Cell 8
 Panel 5

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	2.566	1.	2.940
2.	2.536	2.	2.932
3.	2.585	3.	2.910
4.	2.580	4.	2.905
5.	2.580	5.	2.925

Weight of Specimen:

Initial Weight	538.8 Grams
	1.187 Lbs.
Final Weight	563.5 Grams
	1.241 Lbs.
Dry Weight	444.5 Grams
	0.979 Lbs.

Avg.	2.569 In	Ave	2.922 In
	6.526 CM		7.423 CM
Area	6.708 In ²		43.276 CM ²
Volume	17.234820 In ³		0.0099739 Cft.

Moisture Content:

Initial	21.21 %
Final	26.77 %

Density, Wet Final: 124.55 pcf

Density, Wet Initial 119.09 pcf

Back Pressure: 90 psi

Density, Dry 98.25 pcf

Specific Gravity 2.725

Efflt. Confining Pressure 0.5 tsf

Saturation: 99.8 %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.22	0.20	0.20	0.20
L cms	6.526	6.526	6.526	6.526
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	106.07	106.07	106.07	106.07
A Sq. cms	43.276	43.276	43.276	43.276
t Sec.	135	124	128	130
K				
20 cm/sec	2.317E-06	2.293E-06	2.222E-06	2.187E-06

K
 20 Avg. cm/sec

2.255E-06

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.082

Tested by: K.H.

Sample: ST-5 TOP

Date: 9-15-95

Entered by: K.H.

Checked by: R.S.A.

Remarks:

Cell 7
Panel 5

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	4.080	1.	2.865
2.	4.085	2.	2.840
3.	4.083	3.	2.830
4.	4.080	4.	2.838
5.	4.075	5.	2.848

Weight of Specimen:

Initial Weight	<u>835.4</u> Grams
	<u>1.840</u> Lbs.
Final Weight	<u>890.5</u> Grams
	<u>1.961</u> Lbs.
Dry Weight	<u>745.5</u> Grams
	<u>1.642</u> Lbs.

Avg. 4.081 In Ave 2.844 In

10.365 CM 7.224 CM

Area 6.353 In² 40.990 CM²

Volume 25.925914 In³ 0.0150034 Cft.

Moisture Content:

Initial	<u>12.06</u> %
Final	<u>19.45</u> %

Density, Wet Initial 122.75 pcf

Density, Dry 109.54 pcf

Efflt. Confining Pressure 0.5 tsf

Density, Wet Final: 130.85 pcf

Back Pressure: 90 psi

Specific Gravity 2.718

Saturation: 96.4 %

$$K = \frac{Q \times L \times R_t}{20 \times h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.25	0.20	0.20
L cms	10.365	10.365	10.365	10.365
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	91.22	91.22	91.22	91.22
A Sq. cms	40.990	40.990	40.990	40.990
t Sec.	29	36	29	30
K				
20 cm/sec	<u>1.912E-05</u>	<u>1.925E-05</u>	<u>1.912E-05</u>	<u>1.848E-05</u>

K
20 Avg. cm/sec

1.899E-05

EMCON

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LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-1
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches		Type of Test Performed
	23		
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9	Dark Red cmf Sand, some Silty clay, trace mf Gravel, trace roots (visual)	
	8		
	7		
	6		K
	5		
	4		
	3	separation	
	2		
	1		
Bottom of Sample	0		

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-4/SLOPRETEST
Date: 9-14-95

Project # 72040.009.092
Diameter: 3"
Recovery: 7.5"
Remarks:

Top of Sample	Inches	Type of Test
	23	Performed
	22	
	21	
	20	
	19	
	18	
	17	
	16	
	15	
	14	
	13	
	12	
	11	
	10	
	9	
	8	Dark Red Brown, trace Yellow cmf Sand, some Silty clay, trace mf Gravel (visual)
	7	
	6	
	5	K
	4	
	3	
	2	
	1	
Bottom of Sample	0	

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED
SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-2
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches		Type of Test Performed
	23		
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9	Dark Red cmf Sand, some Silty clay, trace mf Gravel, trace roots (visual)	
	8		
	7		K
	6		
	5		
	4	separation	
	3		
	2		
	1		
Bottom of Sample	0		

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-2A
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 7"
Remarks:

Top of Sample	Inches		Type of Test
			Performed
	23		
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9		
	8		
	7	Dark Red, trace Yellow cmf Sand, some Silty clay, little mf Gravel (visual)	
	6		
	5		
	4		K
	3		
	2		
	1		
Bottom of Sample	0		

EMCON

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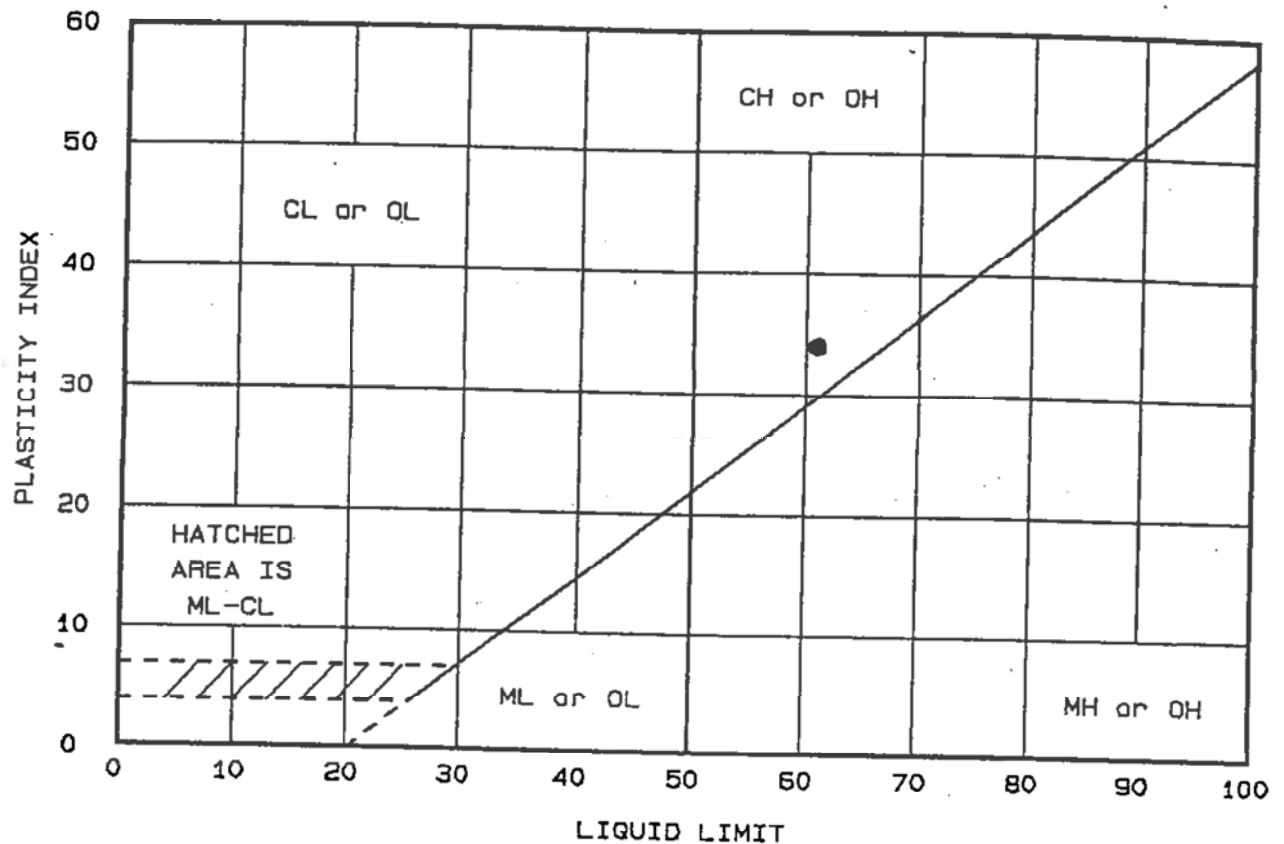
LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-5A/TOP RETEST
Date: 9-14-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8"
Remarks:

Top of Sample	Inches	Type of Test
	23	Performed
	22	
	21	
	20	
	19	
	18	
	17	
	16	
	15	
	14	
	13	
	12	
	11	
	10	
	9	
	8	Dark Red Brown, trace Yellow cmf Sand, some Silty clay, trace mf Gravel (visual)
	7	
	6	
	5	
	4	K
	3	
	2	
	1	
Bottom of Sample	0	

LIQUID AND PLASTIC LIMITS TEST REPORT



SAMPLE IDENTIFICATION	LL	PL	PI	-200	MATERIAL DESCRIPTION
					BURMISTER ☐ ASTM D 2487 ☒
● CL-2A-1	61	27	34		

Project No.: 72040009
 Project: BONNEL COUNTY
 Client: EMCON NORCROSS
 Location:

Date: 9-19-95

Performed by: K.J.
 Entered by: D.L.
 Checked by: R.S.A.
 Remarks:
 ASTM-D4318

EMCON

Fig. No. _____

EMCON

Project: BONNEL
 Client: EMCON NORCROSS
 Sample: ROLL#84045603
 Material: 60 ML TEXTURED HDPE

Proj. No. 72040.009.092

Date: 9-12-95

Test	Readings						Average
Thickness (mils) ASTM D751	59.20	60.90	61.15	60.50	60.95	61.30	60.80
	60.40	61.55	61.50	60.55	60.30	61.30	
	61.25	60.80	60.40	60.00	60.40	61.30	
	61.60	61.05	60.40				

Tear Resist. ASTM D1004 (lbs.)	Direction A	52.75	54.62	57.25	56.31	54.56	Average
		54.18	54.62	55.25	59.43	55.31	55.43
	Direction B	53.68	54.81	55.18	53.12	55.18	54.53
		54.93	54.37	52.93	56.00	55.06	

Tensile Properties: ASTM D638		Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Average
Tensile Strength							
Yield (ppi)	Direction A	169.7	180.2	176.2	178.2	169.2	174.7
	Direction B	169.5	171.0	175.2	169.0	163.7	169.7
Break (ppi)	Direction A	153.2	183.5	139.2	147.5	137.7	152.2
	Direction B	136.5	136.5	133.5	139.7	124.0	134.0
Elongation							
Yield %	Direction A	27.7	28.5	28.5	29.2	28.5	28.5
	Direction B	26.2	30.0	29.2	26.2	26.2	27.6
Break %	Direction A	392.0	404.0	228.0	260.0	220.0	300.8
	Direction B	356.0	232.0	240.0	220.0	152.0	240.0

Carbon Black, % ASTM D1603	Specimen 1	Specimen 2	Specimen 3	Average
	2.0837	2.1799	2.0293	2.0976

Remarks:

Thickness: Tested with Mitutoyo Model No. 326-711 Digital Micrometer.
 Readings taken at 1 foot intervals along length of roll.

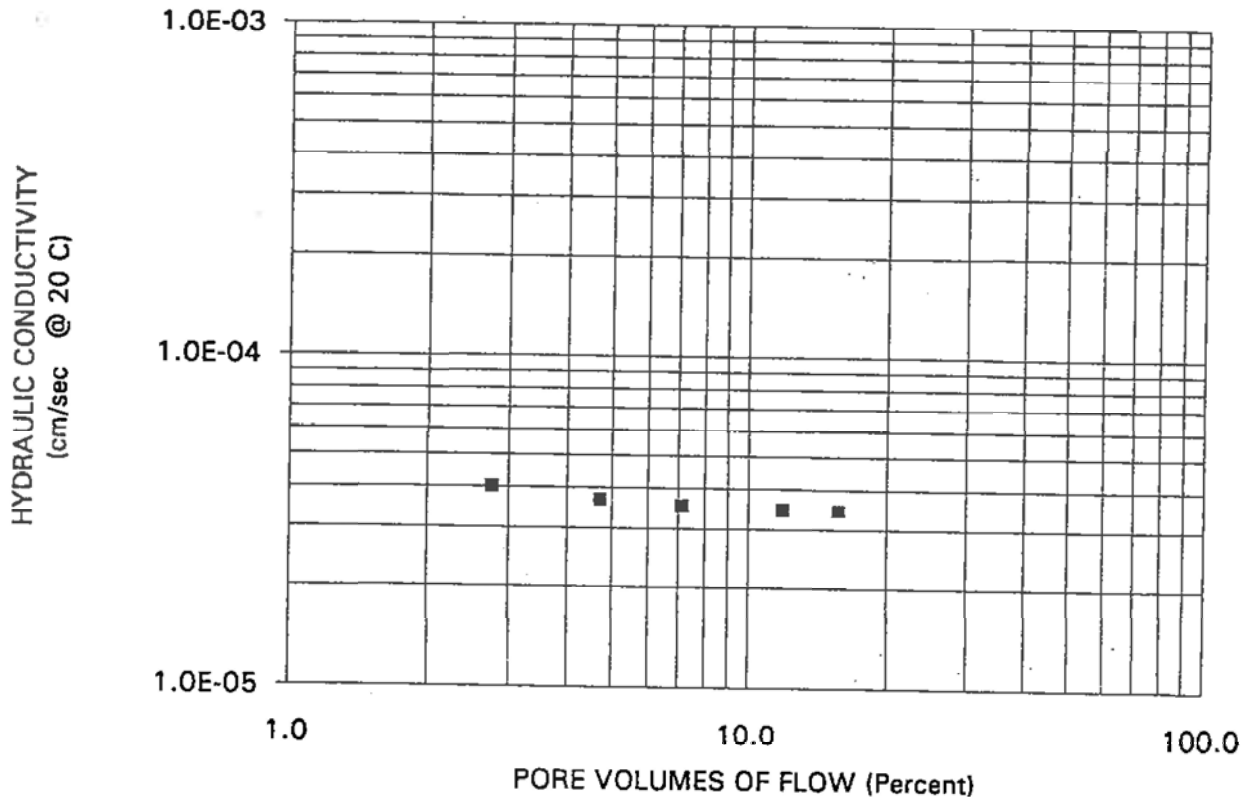
Tensile Properties:

1. Grip separation 2.5".
2. Assumed gauge length 1.3" and 2.5" for yield and break elongations, respectively (as modified by NSF).
3. Direction A = Machine Direction
 Direction B = Cross-Machine Direction

HYDRAULIC CONDUCTIVITY LABORATORY TEST RESULTS

GEOHYDRO

Project Name: Bonnell Surface Closure Date: 9/9/95
 Project Number: 117 - 95 - 31800 Test Method: ASTM D - 5084
 Sample Identification: ST - WS1 Sample Depth: _____
 Sample Description: Red-brown fine to medium sandy silt (MH)



Specimen Parameters	Before Saturation	After Permeation
Specimen Diameter (cm)	7.18	7.18
Specimen Length (cm)	7.66	7.66
Moisture Content (%)	17.5	28.0
Dry Unit Weight (pcf)	96.0	96.0
Specific Gravity (assumed)	2.70	2.70
Void Ratio	0.755	0.755
Porosity (%)	43.0	43
Saturation (%)	62.7	100.0
Sample Preparation Method		Remolded to 95% Maximum Dry Density
Magnitude of Total Backpressure (psi)		100.0
Type of Permeant Liquid Used		Deaired water
Maximum Effective Consolidation Stress (psi)		3.0
Minimum Effective Consolidation Stress (psi)		3.0
Range of Hydraulic Gradient Used		4.0
Hydraulic Conductivity (cm/sec @ 20° C)		3.6 E-05

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-2A-1 RETEST
Date: 9-11-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches	Type of Test
	23	Performed
	22	
	21	
	20	
	19	
	18	
	17	
	16	
	15	
	14	
	13	
	12	
	11	
	10	
	9	Dark Red Brown cmf Sand, some Silty clay, trace mf Gravel (visual)
	8	
	7	
	6	
	5	
	4	
	3	K
	2	
	1	
Bottom of Sample	0	

No.

4336

EMCON

Page 2 of 2

GEOTECHNICAL LABORATORY BILLING
GEOMEMBRANE/GEOSYNTHETICS

Client Emcon NorcrossDate 9.26.91Project BonnellProject No. 72040.009.092

Code	Description of Test	Price per Test (\$)	Test No.	Amount
W-1	Tensile Testing of Liner Samples (ASTM D638, Type IV)	160 150	1	100
W-2	Bonded Seam Strength (Peel 5 specimens, Shear 5 specimens) ASTM D4437	95		
W-3	Hydraulic Transmissivity of Geosynthetics, ASTM D4716 (6" x 12") * Under Specified Stress (one load) * Additional Specified Load (per load) * Extended test to monitor flow change due to creep or deformation	500 150 150/day		
R-2	Specific Gravity ASTM D792	30		
R-3	Thickness ASTM D374 or ASTM D751	30	1	30
R-4	Carbon Black Content ASTM D1603	50 80	1	50
R-5	Carbon Black Dispersion ASTM D3015	70		
R-6	Index Puncture Resistance of Geotextiles, Geomembranes and Related Products ASTM D4833	50		
R-7	Determining Apparent Opening Size of Geotextiles, ASTM D4751	150		
R-8	Determining the Coefficient of Soil and Geosynthetic Friction by Direct Shear Method ASTM D5321	600		
R-9	Thickness ASTM D1593	40		
R-A	Tensile Properties ASTM D882 (each direction) * Breaking Factor * Elongation at Break * Modulus at 100% Elongation	150		
R-B	Volatile Loss ASTM D1203	40		
R-C	Dimensional Stability ASTM D1204	40		
R-D	Initial Tear Resistance ASTM D1004	65		
R-E	Bond Strength of Ply Adhesion ASTM F904 5 Specimens in each direction	100		
R-F	Moisture Content ASTM D2216 3 Specimens (Bentomat, Claymax, etc.)	30		
R-G	Mass Per Unit Area ASTM D3776 3 Specimens	30		
R-H	Grab Breaking Load and Elongation ASTM D4632 5 Specimens in each direction 3 Specimens in each direction	100 60		
R-I	Permittivity of Geotextiles ASTM 4491 4 Specimens	90		
R-J	Trapezoidal Tearing Strength of Geotextiles ASTM D4533-91	60	1	60
Total				240

EMCON
PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.
Entered by: K.H.
Checked by: R.S.A.

Sample: ST-1

Date: 9-5-95

Remarks:

Cell 7
Panel 4

Dimensions of Specimen:

Weight of Specimen:

	Length (Inches)		Diameter (Inches)
1.	3.810	1.	2.811
2.	3.818	2.	2.820
3.	3.816	3.	2.830
4.	3.816	4.	2.839
5.	3.818	5.	2.821

Initial Weight	<u>733.7</u> Grams
	<u>1.616</u> Lbs.
Final Weight	<u>773.5</u> Grams
	<u>1.704</u> Lbs.
Dry Weight	<u>609.9</u> Grams
	<u>1.343</u> Lbs.

Avg.	<u>3.816</u> In	Ave	<u>2.824</u> In
	<u>9.692</u> CM		<u>7.173</u> CM
Area	<u>6.264</u> In ²		<u>40.416</u> CM ²
Volume	<u>23.902511</u> In ³		<u>0.0138325</u> Cft.

Moisture Content:

Initial	<u>20.30</u> %
Final	<u>26.82</u> %

Density, Wet Initial	<u>116.94</u> pcf
Density, Dry	<u>97.20</u> pcf
Eff. Confining Pressure	<u>0.5</u> tsf

Density, Wet Final:	<u>123.28</u> pcf
Back Pressure:	<u>90</u> psi
Specific Gravity	<u>2.708</u>
Saturation:	<u>98.4</u> %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	1.00	1.00	1.00	1.00
L cms	9.692	9.692	9.692	9.692
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	88.59	88.59	88.59	88.59
A Sq. cms	40.416	40.416	40.416	40.416
t Sec.	64	64	64	65
K				
20 cm/sec	4.229E-05	4.229E-05	4.229E-05	4.164E-05

K
20 Avg. cm/sec

4.213E-05

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.

Sample: ST-2

Date: 9-5-95

Entered by: K.H.

Checked by: R.S.A.

Remarks:

Cell 8
Panel 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	2.985	1.	2.850
2.	2.992	2.	2.848
3.	3.002	3.	2.858
4.	3.004	4.	2.868
5.	3.000	5.	2.860

Weight of Specimen:

Initial Weight	632.2 Grams
	1.393 Lbs.
Final Weight	644.3 Grams
	1.419 Lbs.
Dry Weight	529.3 Grams
	1.166 Lbs.

Avg. 2.997 In Ave 2.857 In

7.611 CM 7.256 CM

Moisture Content:

Initial	19.44 %
Final	21.73 %

Area 6.410 In ² 41.354 CM ²

Volume 19.207186 In ³ 0.0111153 Cft.

Density, Wet Initial 125.39 pcf

Density, Wet Final: 127.79 pcf

Density, Dry 104.98 pcf

Back Pressure: 90 psi

Eff. Confining Pressure 0.5 tsf

Specific Gravity 2.701

Saturation: 97 %

K $\frac{Q \times L \times R_t}{h \times A \times t}$
20 -

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.12	0.15	0.12	0.17
L cms	7.611	7.611	7.611	7.611
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	177.18	177.18	177.18	177.18
A Sq. cms	41.354	41.354	41.354	41.354
t Sec.	1541	2029	1638	2322
K				
20 cm/sec	8.089E-08	7.679E-08	7.610E-08	7.605E-08

K
20 Avg. cm/sec

7.746E-08

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL

Proj. No. 72040.009.092

Tested by: K.H.
Entered by: K.H.
Checked by: R.S.A.

Sample: CL-2A

Date: 9-7-95

Remarks:

Cell 14
Panel 2

Dimensions of Specimen:

Weight of Specimen:

	Length (Inches)	Diameter (Inches)
1.	3.959	2.865
2.	3.958	2.860
3.	3.958	2.865
4.	3.955	2.868
5.	3.953	2.868

Initial Weight	786.7 Grams
	1.733 Lbs.
Final Weight	826.7 Grams
	1.821 Lbs.
Dry Weight	652.0 Grams
	1.436 Lbs.

Avg.	3.957 In	Ave	2.865 In
	10.050 CM		7.278 CM
Area	6.448 In ²		41.597 CM ²
Volume	25.510667 In ³		0.0147631 Cft.

Moisture Content:

Initial	20.66 %
Final	26.79 %

Density, Wet Final: 123.45 pcf

Density, Wet Initial 117.48 pcf

Density, Dry 97.36 pcf

Back Pressure: 90 psi

Eff. Confining Pressure 0.5 tsf

Specific Gravity 2.725

Saturation: 97.8 %

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.20	0.20	0.20
L cms	10.050	10.050	10.050	10.050
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	252.36	252.36	252.36	252.36
A Sq. cms	41.597	41.597	41.597	41.597
t Sec.	20	20	21	21
K				
20 cm/sec	9.573E-06	9.573E-06	9.118E-06	9.118E-06

K
20 Avg. cm/sec

9.346E-06

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL
 Sample: CL-2A-1
 RETEST
 Remarks:

Proj. No. 72040.009.092
 Date: 9-11-95

Tested by: K.H.
 Entered by: K.H.
 Checked by: R.S.A.

Cell 6
 Pencil 4

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	4.360	1.	2.855
2.	4.365	2.	2.858
3.	4.368	3.	2.860
4.	4.363	4.	2.875
5.	4.364	5.	2.861

Weight of Specimen:

Initial Weight	890.4 Grams
	1.961 Lbs.
Final Weight	940.4 Grams
	2.071 Lbs.
Dry Weight	761.2 Grams
	1.677 Lbs.

Avg. 4.364 In Ave 2.862 In
11.085 CM 7.269 CM

Moisture Content:

Initial	16.97 %
Final	23.54 %

Area 6.432 In² 41.499 CM²
 Volume 28.070690 In³ 0.0162446 Cft.

Density, Wet Initial 120.84 pcf
 Density, Dry 103.30 pcf
 Efft. Confining Pressure 0.5 tsf

Density, Wet Final: 127.62 pcf

Back Pressure: 90 psi

Specific Gravity 2.699

Saturation: 100.7 %

$$K = \frac{Q \times L \times R_t}{20 \times h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.16	0.13	0.14
L cms	11.085	11.085	11.085	11.085
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	88.59	88.59	88.59	88.59
A Sq. cms	41.499	41.499	41.499	41.499
t Sec.	214	176	144	155
K				
20 cm/sec	2.818E-06	2.741E-06	2.722E-06	2.723E-06

K
 20 Avg. cm/sec

2.751E-06

EMCON
PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE
Constant Head Method

Project: BONNEL
Sample: ST-4 / SLOPE
STA#EE-100
Remarks:

Proj. No. 72040.009.092
Date: 9-15-95

Tested by: K.H.
Entered by: K.H.
Checked by: R.S.A.

Cell 8
Panel 5

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	2.566	1.	2.940
2.	2.536	2.	2.932
3.	2.585	3.	2.910
4.	2.580	4.	2.905
5.	2.580	5.	2.925

Weight of Specimen:

Initial Weight	538.8 Grams
	1.187 Lbs.
Final Weight	563.5 Grams
	1.241 Lbs.
Dry Weight	444.5 Grams
	0.979 Lbs.

Avg.	2.569 In	Ave	2.922 In
	6.526 CM		7.423 CM
Area	6.708 In ²		43.276 CM ²
Volume	17.234820 In ³		0.0099739 Cft.

Moisture Content:

Initial	21.21 %
Final	26.77 %

Density, Wet Final: 124.55 pcf
Back Pressure: 90 psi
Specific Gravity: 2.725
Saturation: 99.8 %

Density, Wet Initial: 119.09 pcf
Density, Dry: 98.25 pcf
Eff. Confining Pressure: 0.5 tsf

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.22	0.20	0.20	0.20
L cms	6.526	6.526	6.526	6.526
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	106.07	106.07	106.07	106.07
A Sq. cms	43.276	43.276	43.276	43.276
t Sec.	135	124	128	130
K				
20 cm/sec	2.317E-06	2.293E-06	2.222E-06	2.187E-06

K
20 Avg. cm/sec

2.255E-06

EMCON

PERMEABILITY TEST BY TRIAXIAL CELL WITH BACK PRESSURE

Constant Head Method

Project: BONNEL
 Sample: ST-5 TOP
 Remarks:

Proj. No. 72040.009.092
 Date: 9-15-95

Tested by: K.H.
 Entered by: K.H.
 Checked by: R.S.A.

Cell 7
 Panel 5

Dimensions of Specimen:

	Length (Inches)		Diameter (Inches)
1.	4.080	1.	2.865
2.	4.085	2.	2.840
3.	4.083	3.	2.830
4.	4.080	4.	2.838
5.	4.075	5.	2.848

Weight of Specimen:

Initial Weight	<u>835.4</u> Grams
	<u>1.840</u> Lbs.
Final Weight	<u>890.5</u> Grams
	<u>1.961</u> Lbs.
Dry Weight	<u>745.5</u> Grams
	<u>1.642</u> Lbs.

Avg.	<u>4.081</u> In	Ave	<u>2.844</u> In
	<u>10.365</u> CM		<u>7.224</u> CM
Area	<u>6.353</u> In ²		<u>40.990</u> CM ²
Volume	<u>25.925914</u> In ³		<u>0.0150034</u> Cft.

Moisture Content:

Initial	<u>12.06</u> %
Final	<u>19.45</u> %

Density, Wet Final: 130.85 pcf
 Back Pressure: 90 psi
 Specific Gravity: 2.718
 Saturation: 96.4 %

Density, Wet Initial: 122.75 pcf
 Density, Dry: 109.54 pcf
 Efflt. Confining Pressure: 0.5 tsf

$$K = \frac{Q \times L \times R_t}{h \times A \times t}$$

	Trial 1	Trial 2	Trial 3	Trial 4
Q cc	0.20	0.25	0.20	0.20
L cms	10.365	10.365	10.365	10.365
Rt (Temp)	1.000	1.000	1.000	1.000
h cms	91.22	91.22	91.22	91.22
A Sq. cms	40.990	40.990	40.990	40.990
t Sec.	29	36	29	30
K				
20 cm/sec	1.912E-05	1.925E-05	1.912E-05	1.848E-05

K
 20 Avg. cm/sec

1.899E-05

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-1
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches		Type of Test
	23		Performed
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9	Dark Red cmf Sand, some Silty clay, trace mf Gravel, trace roots (visual)	
	8		
	7		
	6		K
	5		
	4		
	3	separation	
	2		
	1		
Bottom of Sample	0		

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-2
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches	Type of Test
	23	Performed
	22	
	21	
	20	
	19	
	18	
	17	
	16	
	15	
	14	
	13	
	12	
	11	
	10	
	9	Dark Red cmf Sand, some Silty clay, trace mf Gravel, trace roots (visual)
	8	
	7	
	6	K
	5	
	4	separation
	3	
	2	
	1	
Bottom of Sample	0	

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: CL-2A
Date: 9-1-95

Project # 72040.009.092
Diameter: 3"
Recovery: 7"
Remarks:

Top of Sample	Inches	Type of Test Performed
	23	
	22	
	21	
	20	
	19	
	18	
	17	
	16	
	15	
	14	
	13	
	12	
	11	
	10	
	9	
	8	
	7	Dark Red, trace Yellow cmf Sand, some Silty clay, little mf Gravel (visual)
	6	
	5	
	4	
	3	K
	2	
	1	
Bottom of Sample	0	

EMCON

CONSULTING ENGINEERS

**LOG OF UNDISTURBED
SOIL SAMPLES**

Project: BONNEL
Client: EMCON NORCROSS
Sample: CL-2A-1 RETEST
Date: 9-11-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8.5"
Remarks:

Top of Sample	Inches		Type of Test Performed
	23		
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9	Dark Red Brown cmf Sand, some Silty clay, trace mf Gravel (visual)	
	8		
	7		
	6		
	5		
	4		K
	3		
	2		
	1		
Bottom of Sample	0		

EMCON

CONSULTING ENGINEERS

LOG OF UNDISTURBED
SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-4/SLOPIRETEST
Date: 9-14-95

Project # 72040.009.092
Diameter: 3"
Recovery: 7.5"
Remarks:

Top of Sample	Inches		Type of Test
	23		Performed
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9		
	8	Dark Red Brown, trace Yellow cmf Sand, some Silty clay, trace mf Gravel (visual)	
	7		
	6		
	5		K
	4		
	3		
	2		
	1		
Bottom of Sample	0		

EMCON

CONSULTING ENGINEERS

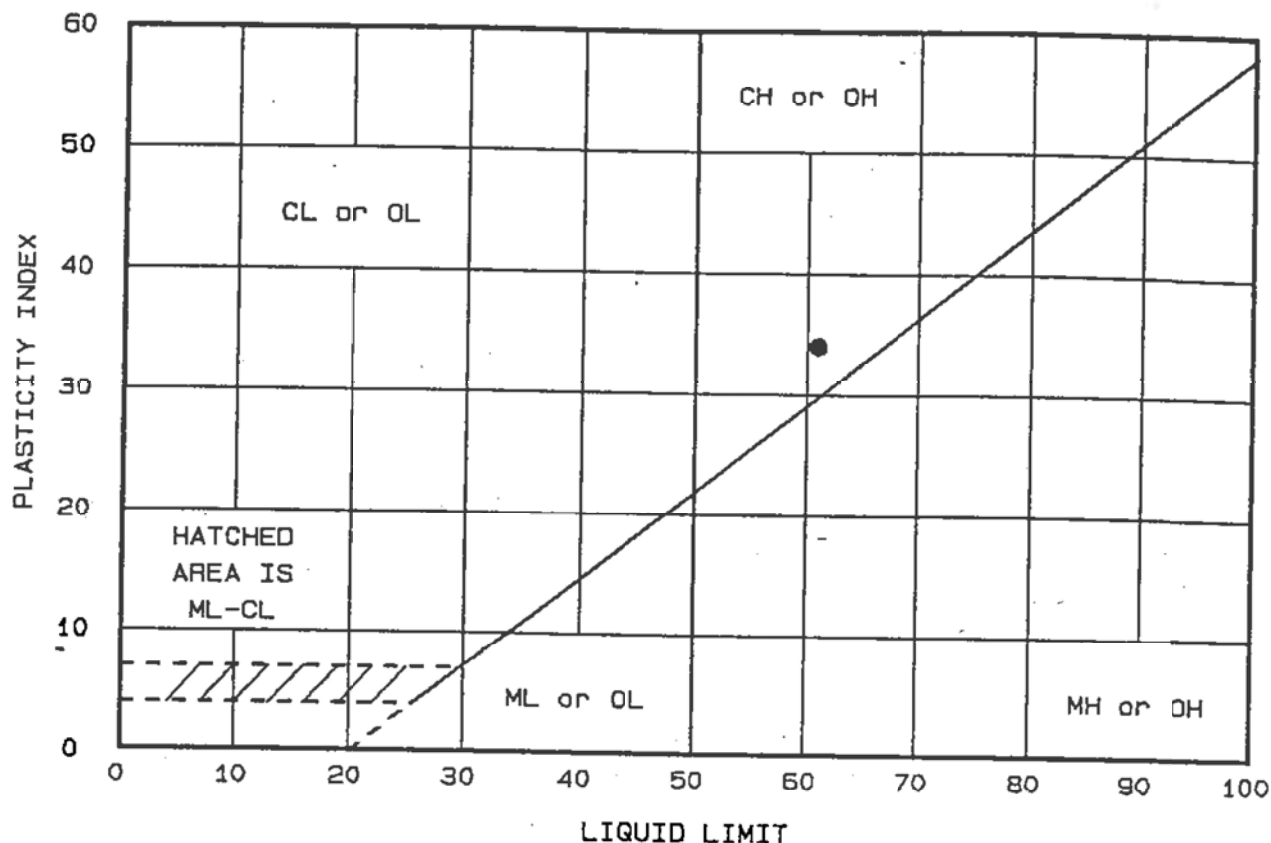
LOG OF UNDISTURBED
SOIL SAMPLES

Project: BONNEL
Client: EMCON NORCROSS
Sample: ST-5A/TOP RETEST
Date: 9-14-95

Project # 72040.009.092
Diameter: 3"
Recovery: 8"
Remarks:

Top of Sample	Inches		Type of Test Performed
	23		
	22		
	21		
	20		
	19		
	18		
	17		
	16		
	15		
	14		
	13		
	12		
	11		
	10		
	9	Dark Red Brown, trace Yellow cmf Sand, some Silty clay, trace mf Gravel	
	8	(visual)	
	7		
	6		
	5		K
	4		
	3		
	2		
	1		
Bottom of Sample	0		

LIQUID AND PLASTIC LIMITS TEST REPORT



SAMPLE IDENTIFICATION	LL	PL	PI	-200	MATERIAL DESCRIPTION
CL-2A-1	61	27	34		BURMISTER ☐ ASTM D 2487 ☒

Project No.: 72040009
 Project: BONNEL COUNTY
 Client: EMCON NORCROSS
 Location:

Date: 9-19-95

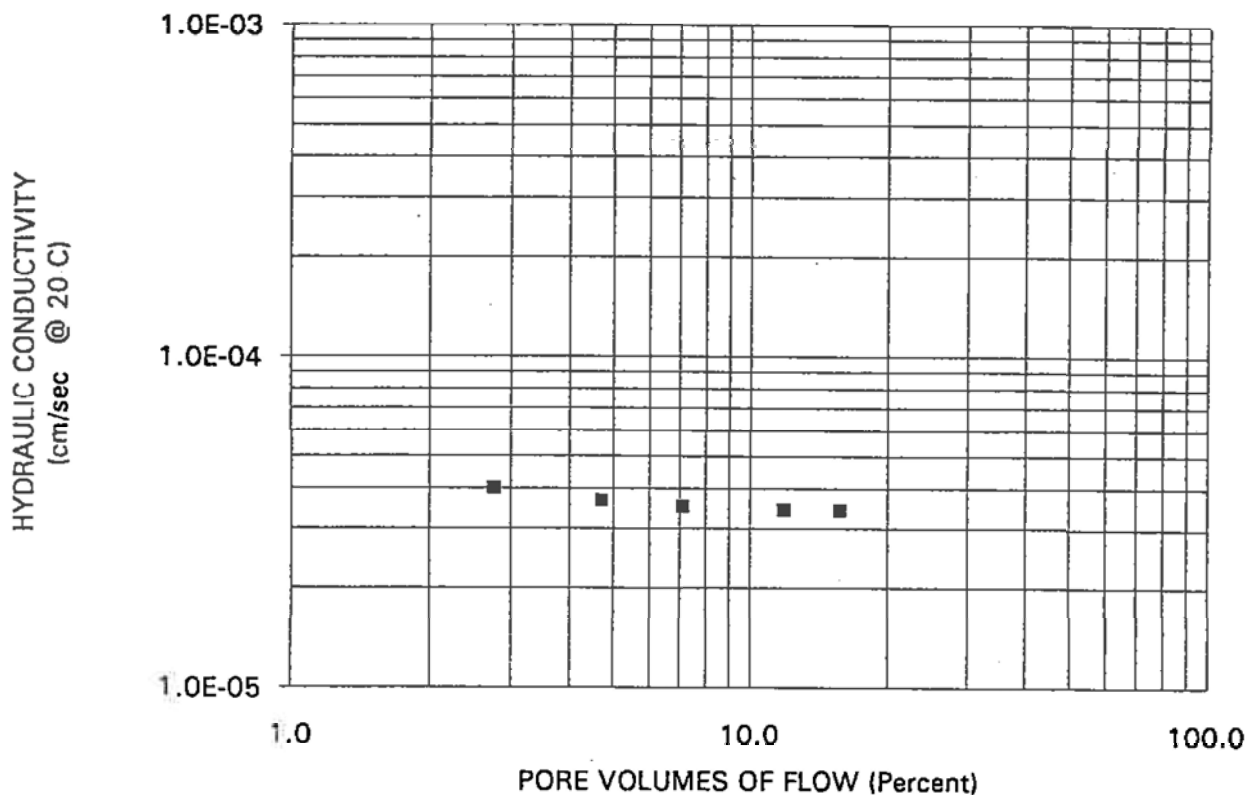
Performed by: K.J.
 Entered by: D.L.
 Checked by: R.S.A.
 Remarks:
 ASTM-D4318

EMCON

Fig. No. _____

HYDRAULIC CONDUCTIVITY LABORATORY TEST RESULTS

Project Name:	Bonnell Surface Closure	Date:	9/9/95
Project Number:	117 - 95 - 31800	Test Method:	ASTM D - 5084
Sample Identification:	ST - WS1	Sample Depth:	
Sample Description:	Red-brown fine to medium sandy silt (MH)		

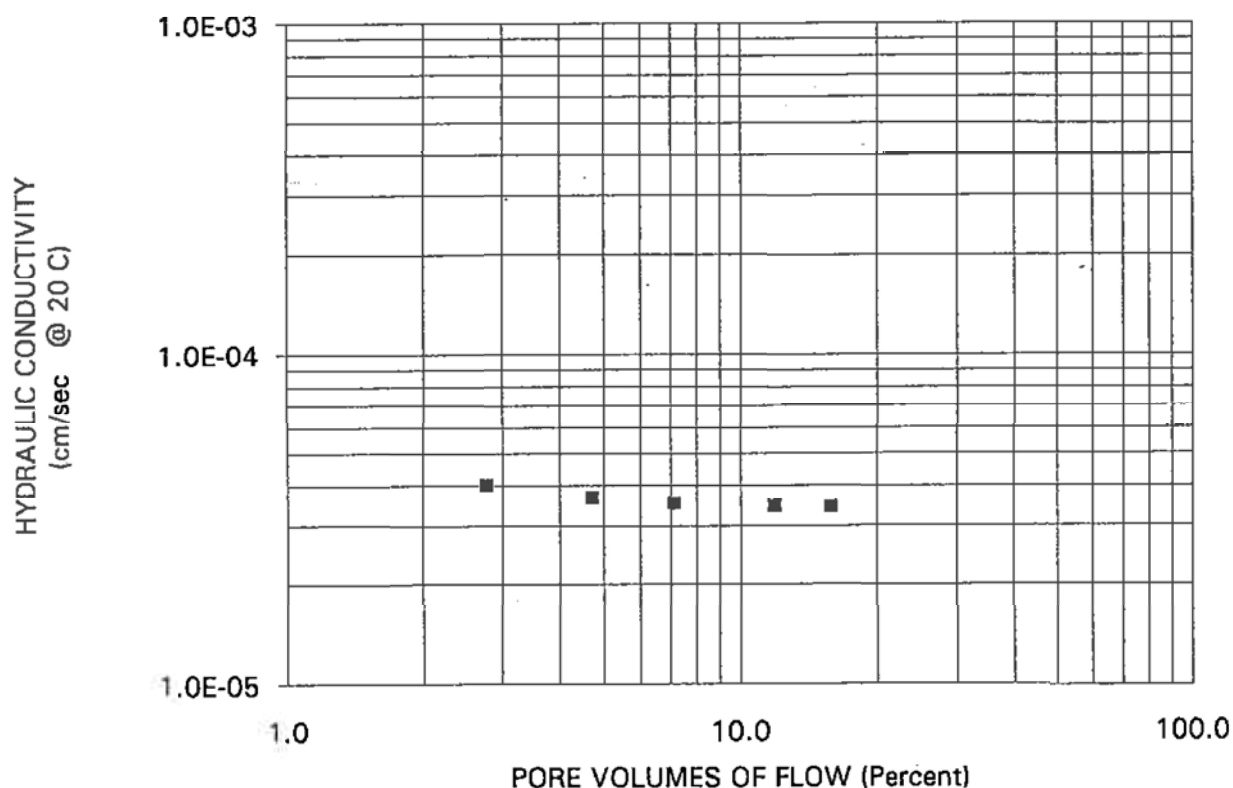


Specimen Parameters	Before Saturation	After Permeation
Specimen Diameter (cm)	7.18	7.18
Specimen Length (cm)	7.66	7.66
Moisture Content (%)	17.5	28.0
Dry Unit Weight (pcf)	96.0	96.0
Specific Gravity (assumed)	2.70	2.70
Void Ratio	0.755	0.755
Porosity (%)	43.0	43
Saturation (%)	62.7	100.0
Sample Preparation Method		Remolded to 95% Maximum Dry Density
Magnitude of Total Backpressure (psi)		100.0
Type of Permeant Liquid Used		Deaired water
Maximum Effective Consolidation Stress (psi)		3.0
Minimum Effective Consolidation Stress (psi)		3.0
Range of Hydraulic Gradient Used		4.0
Hydraulic Conductivity (cm/sec @ 20° C)		3.6 E-05

HYDRAULIC CONDUCTIVITY

LABORATORY TEST RESULTS

Project Name: Bonnell Surface Closure Date: 9/9/95
 Project Number: 117 - 95 - 31800 Test Method: ASTM D - 5084
 Sample Identification: ST - WS1 Sample Depth: _____
 Sample Description: Red-brown fine to medium sandy silt (MH)

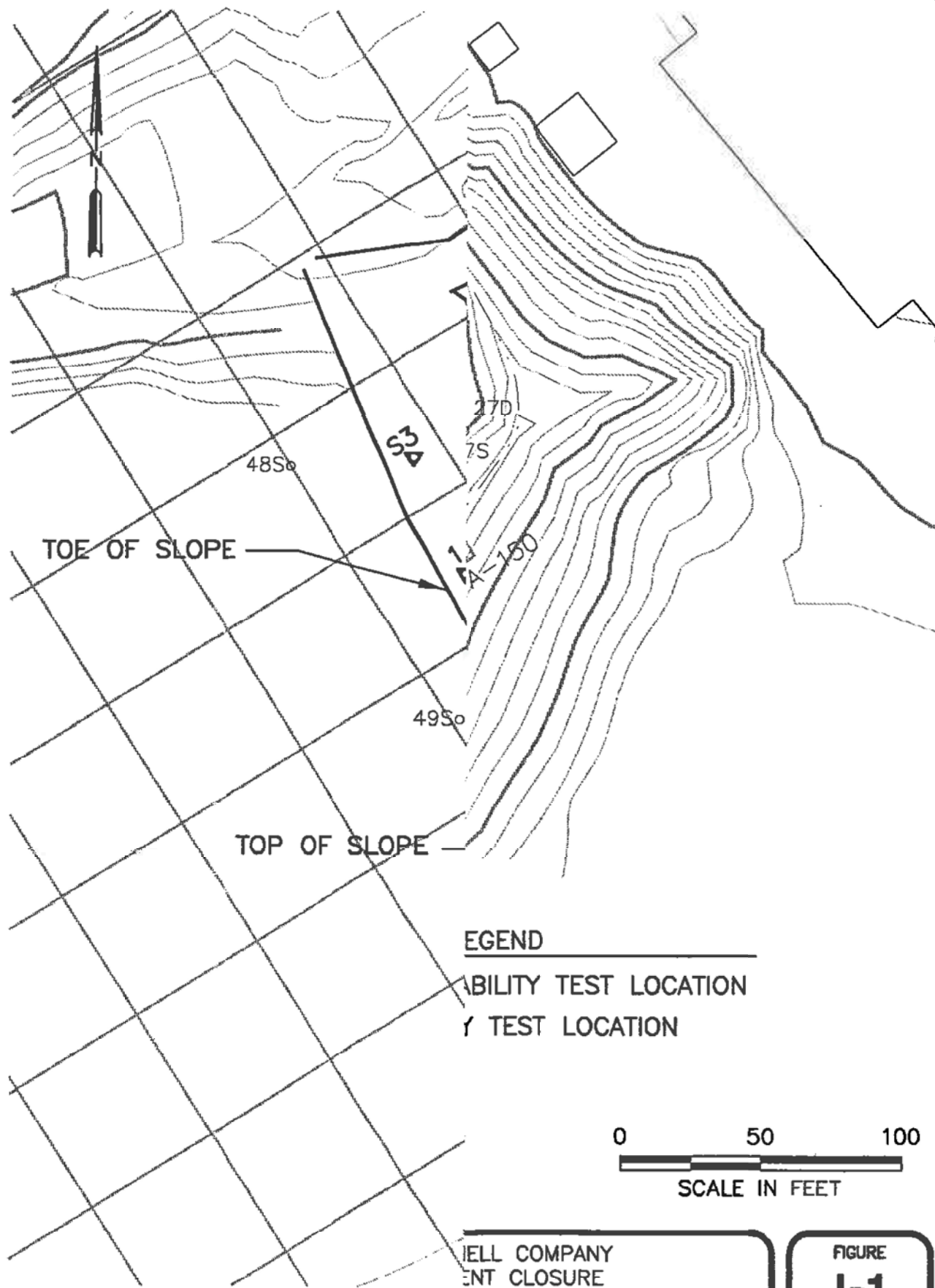


Specimen Parameters	Before Saturation	After Permeation
Specimen Diameter (cm)	7.18	7.18
Specimen Length (cm)	7.66	7.66
Moisture Content (%)	17.5	28.0
Dry Unit Weight (pcf)	96.0	96.0
Specific Gravity (assumed)	2.70	2.70
Void Ratio	0.755	0.755
Porosity (%)	43.0	43
Saturation (%)	62.7	100.0
Sample Preparation Method	Remolded to 95% Maximum Dry Density	
Magnitude of Total Backpressure (psi)	100.0	
Type of Permeant Liquid Used	Deaired water	
Maximum Effective Consolidation Stress (psi)	3.0	
Minimum Effective Consolidation Stress (psi)	3.0	
Range of Hydraulic Gradient Used	4.0	
Hydraulic Conductivity (cm/sec @ 20° C)	3.6 E-05	



APPENDIX I

**SIX-INCH CLAY LAYER COMPACTION
AND PERMEABILITY TEST LOCATIONS**



EGEND

ABILITY TEST LOCATION

Y TEST LOCATION

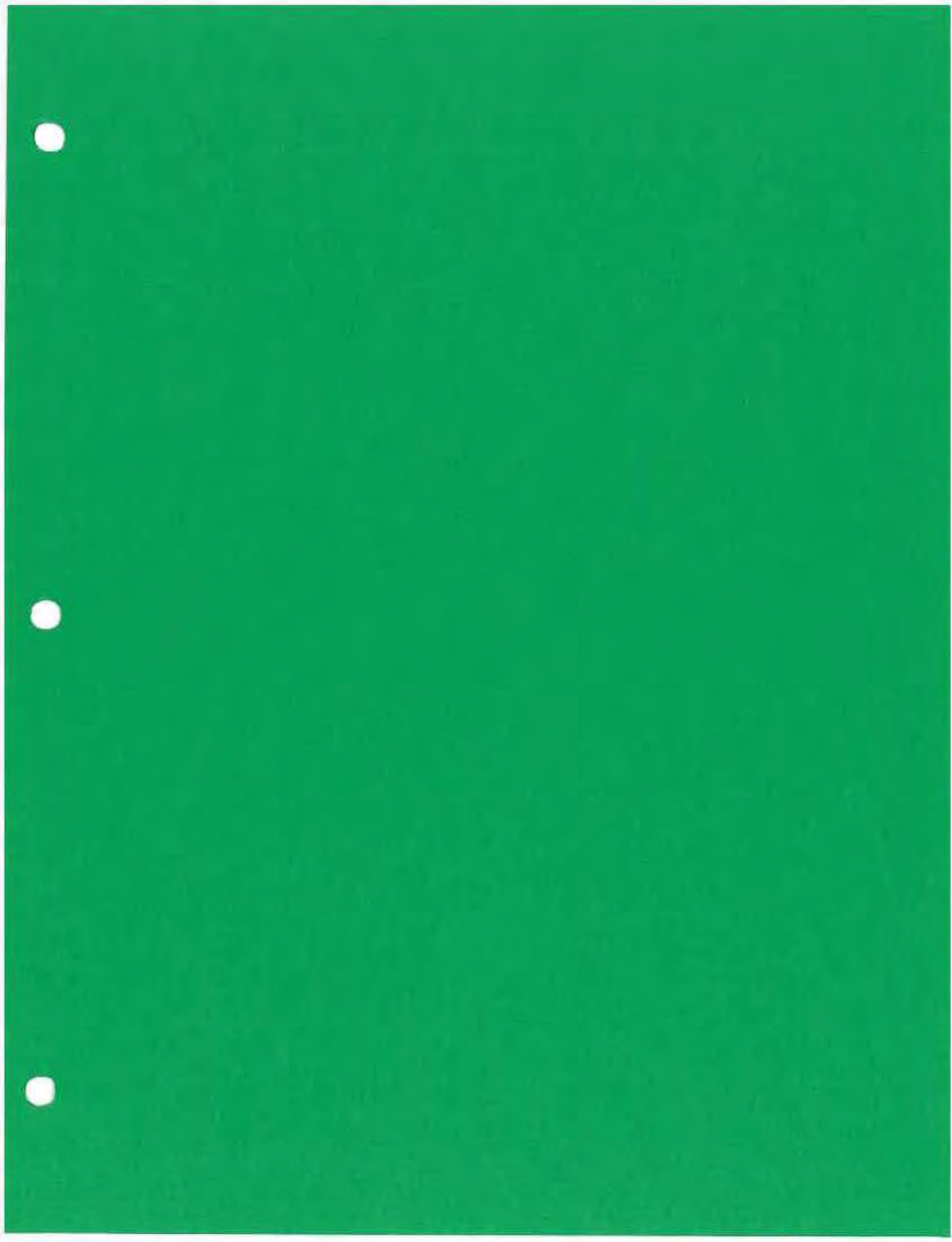
0 50 100
SCALE IN FEET

HELL COMPANY
ENT CLOSURE
ORGIA
AY TESTING

FIGURE

I-1

PROJECT NO.
72040.006.092



APPENDIX J

HELP MODEL RUNS

CERTIFICATION OF SURFACE IMPOUNDMENT CLOSURE **REV. AUGUST 1996**

Appendix J contains printouts of seven separate HELP model runs, each of which is preceded by its own cover sheet. In all cases, input regarding all elements of the closed system not associated with the closure cap (e.g.; climate, vegetation, run-off coefficient) were made to equal the HELP run included in Appendix IC-B of the Closure Plan dated April 30, 1992. In all cases, Version 3 of the HELP model was used to predict flow through the liner system.

HELP MODEL RUN A-1

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average annual percolation through the liner = .000 cubic feet.

HELP MODEL RUN A-3

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE liner and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average annual percolation through the liner = .005 cubic feet.

HELP MODEL RUN B-1

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average annual percolation through the liner = .001 cubic feet.

CERTIFICATION OF SURFACE IMPOUNDMENT CLOSURE REV. AUGUST 1996

HELP MODEL RUN B-3

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average annual percolation through the liner = .003 cubic feet.

HELP MODEL RUN C-1

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average annual percolation through the liner = .144 cubic feet.

HELP MODEL RUN C-2

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 9.4×10^{-6} cm/sec permeability for the clay component.

Results: Average annual percolation through the liner = .163 cubic feet.

HELP MODEL RUN
ENTITLED EPA STANDARD RCRA CAP

Description: This model simulated a standard RCRA cap. The purpose of this model was to compare the leakage of this cap to the one used for the Surface Impoundment at the William L. Bonnell site.

Input: Composite liner with 3 feet of 1×10^{-7} clay, a 20-mil liner, a 1-foot sand lateral drainage layer and soil percolation layer. Only the 1.53-acre top of the landfill was used in the model, corresponding to Area C in the other HELP model run printouts.

Results: Average annual percolation through the liner = 66.2 cubic feet.



MEMORANDUM

Date: September 12, 1995
To: Terry Snell
From: George Alexander
Re: Bonnell Closure
72040.009.092

This memorandum is written to summarize and transmit the results of several HELP models I have run. In all cases, input regarding all elements of the closed system not associated with the closure cap (climate, vegetation, run-off coefficient, etc.) was made to equal the HELP run included in Appendix IC-B of the Surface Impoundment Closure Plan dated April 30, 1992. In all cases Version 3 of the HELP model was used to predict flow through the liner system.

Three distinct areas were modeled:

- Area A is a 0.15-acre, 2.5H:1V sideslope 11 feet in length.
- Area B is a 0.32-acre, 2.5H:1V sideslope, 42 feet in length.
- Area C is the relatively flat 1.53-acre top of the landfill, with a 4% slope and 220 feet long.

Following is a description of the input and results of each of the HELP models that I conducted:

Run A-1

Title: BONNELL CLOSURE - SHORT SIDESLOPE - CLOSURE PLAN INPUT

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .000 cubic feet

Run A-3

Title: BONNELL-SHORT SIDESLOPE-RUN A3: 3.6E-5 LINER & 6" & 18" SOIL

TIME: 9:56

DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE liner and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .005 cubic feet

Run B-1

Title: BONNELL-LONG SIDESLOPE-CLOSURE PLAN INPUT RUN B1

TIME: 10:46

DATE: 9/12/1995

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .001 cubic feet

Run B-3:

Title: BONNELL-LONG SIDESLOPE-RUN B3: 3.6E-5 LINER & 6" & 18" SOIL

TIME: 10:12

DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 3.6×10^{-5} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .003 cubic feet

Run C-1:

Title: BONNELL-TOP AREA-RUN C1

TIME: 11:35

DATE: 9/12/1995

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average Annual Percolation Through the Liner = .144 cubic feet

Run C-2:

Title: BONNELL-LONG SIDESLOPE-RUN B3: $3.6E-5$ LINER & 6" & 18" SOIL

TIME: 11:27

DATE: 9/12/1995

Description: This model used the field-measured permeability inputs. The purpose of this model was to estimate leakage through the in-place closure cap using the updated HELP model.

Input: Composite liner with 60-mil HDPE and 9.4×10^{-6} cm/sec permeability for the clay component.

Results: Average Annual Percolation Through the Liner = .163 cubic feet

CONCLUSIONS

Total leakage through the liner is the sum of the leakage through the three areas defined above. Thus, for the closure cap system approved in the Closure Plan, Version 3 of the HELP model estimates the total leakage through the landfill cap as:

	Average Annual Leakage <u>(cf)</u>
Area A	.000
Area B	.001
Area C	<u>.144</u>
TOTAL	.145

Using worst-case values for field-measured permeabilities, and 60-mil HDPE instead of 40-mil HDPE, Version 3 of the HELP model estimates the total leakage through the landfill cap as:

	Average Annual Leakage <u>(cf)</u>
Area A	.005
Area B	.003
Area C	<u>.163</u>
TOTAL	.171

According to the HELP model, the average annual leakage through the liner would increase from 0.145 cubic feet (1.1 gallons per year) to .171 cubic feet (1.3 gallons per year). The practical impact of an additional 0.2 gallons per year of leakage is nil.

It is my conclusion, based upon the HELP modeling presented herein, that the cap system to be installed, which will consist of a 60-mil HDPE liner and a 6-inch clay component with a permeability of no greater than 9.4×10^{-6} cm/sec on the top and 3.6×10^{-5} cm/sec on the side slopes, provides equal protection to that of the originally proposed cap system of a 40-mil HDPE liner and a 6-inch clay component with a permeability of 3.2×10^{-6} cm/sec.

HELP MODEL RUN A-1

Description: This model used the same input from the Closure Plan. The purpose of this model was to estimate leakage through the approved closure cap using the updated HELP model.

Input: Composite liner with 3.2×10^{-6} cm/sec permeability for the clay component and a 40-mil HDPE component.

Results: Average annual percolation through the liner = .000 cubic feet.

```

*****
*****
**
**
.. *      HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
**      HELP MODEL VERSION 3.01   (14 OCTOBER 1994)
**      DEVELOPED BY ENVIRONMENTAL LABORATORY
**      USAE WATERWAYS EXPERIMENT STATION
**      FOR USEPA RISK REDUCTION ENGINEERING LABORATORY
**
**
*****
*****

```

```

PRECIPITATION DATA FILE:  P:\HELP3\BONNELL.D4
TEMPERATURE DATA FILE:   P:\HELP3\BONNELL.D7
SOLAR RADIATION DATA FILE: P:\HELP3\BONNELL.D13
EVAPOTRANSPIRATION DATA:  P:\HELP3\BONNELL.D11
SOIL AND DESIGN DATA FILE: P:\HELP3\BONL-A1.D10
OUTPUT DATA FILE:        P:\HELP3\BONL-A1.OUT

```

TIME: 10:34 DATE: 9/12/1995

```

*****

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TITLE: BONNELL CLOSURE - SHORT SIDESLOPE - CLOSURE PLAN INPUT

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*****

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NOTE: INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.

LAYER 1

TYPE 1 - VERTICAL PERCOLATION LAYER MATERIAL TEXTURE NUMBER 0

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4730	VOL/VOL
FIELD CAPACITY	=	0.2217	VOL/VOL
WILTING POINT	=	0.1043	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2417	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.15600000000000E-02	CM/SEC

LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0.25	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	33.0000000000	CM/SEC
SLOPE	=	40.00	PERCENT
DRAINAGE LENGTH	=	11.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.04	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	3.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	3.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3	- GOOD

LAYER 4

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 0

THICKNESS	=	6.00	INCHES
POROSITY	=	0.3949	VOL/VOL
FIELD CAPACITY	=	0.2797	VOL/VOL
WILTING POINT	=	0.1875	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3949	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.320000004000E-05	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	74.26
FRACTION OF AREA ALLOWING RUNOFF	=	100.0 PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.150 ACRES
EVAPORATIVE ZONE DEPTH	=	22.0 INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	5.251 INCHES

UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.406	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.295	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	8.172	INCHES
TOTAL INITIAL WATER	=	8.172	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
ATLANTA GEORGIA

MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	92
END OF GROWING SEASON (JULIAN DATE)	=	312
AVERAGE ANNUAL WIND SPEED	=	9.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	65.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	67.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	69.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.91	4.43	5.91	4.43	4.02	3.41
4.73	3.41	3.17	2.53	3.43	4.23

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
41.90	44.90	52.50	61.80	69.30	75.80
78.60	78.20	73.00	62.20	52.00	44.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

STATION LATITUDE = 33.65 DEGREES

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.47	26936.418	100.00
RUNOFF	0.063	34.212	0.13
EVAPOTRANSPIRATION	37.940	20658.396	76.69
DRAINAGE COLLECTED FROM LAYER 2	11.4648	6242.557	23.18
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.002	1.255	0.00
SOIL WATER AT START OF YEAR	8.172	4449.527	
SOIL WATER AT END OF YEAR	8.174	4450.782	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.002	0.00

ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	63.92	34804.449	100.00
RUNOFF	1.120	609.916	1.75
EVAPOTRANSPIRATION	37.480	20408.084	58.64
DRAINAGE COLLECTED FROM LAYER 2	24.4875	13333.433	38.31
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	0.832	453.018	1.30
SOIL WATER AT START OF YEAR	8.174	4450.782	
SOIL WATER AT END OF YEAR	9.006	4903.800	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.89	27709.605	100.00
RUNOFF	0.601	327.052	1.18
EVAPOTRANSPIRATION	36.686	19975.439	72.09
DRAINAGE COLLECTED FROM LAYER 2	13.4364	7316.118	26.40
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.167	91.001	0.33
SOIL WATER AT START OF YEAR	9.006	4903.800	
SOIL WATER AT END OF YEAR	7.550	4110.729	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.624	884.071	3.19
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.49	24224.812	100.00
RUNOFF	0.098	53.165	0.22
EVAPOTRANSPIRATION	35.023	19070.244	78.72
DRAINAGE COLLECTED FROM LAYER 2	12.3512	6725.204	27.76
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-2.982	-1623.805	-6.70
SOIL WATER AT START OF YEAR	7.550	4110.729	
SOIL WATER AT END OF YEAR	6.191	3370.996	
SNOW WATER AT START OF YEAR	1.624	884.071	3.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.005	0.00

ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.24	26811.176	100.00
RUNOFF	0.195	105.963	0.40
EVAPOTRANSPIRATION	36.781	20027.193	74.70
DRAINAGE COLLECTED FROM LAYER 2	12.3443	6721.448	25.07
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.080	-43.423	-0.16
SOIL WATER AT START OF YEAR	6.191	3370.996	
SOIL WATER AT END OF YEAR	6.111	3327.573	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 6

INCHES	CU. FEET	PERCENT
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PRECIPITATION	47.50	25863.742	100.00
RUNOFF	0.024	13.073	0.05
EVAPOTRANSPIRATION	36.571	-19912.760	76.99
DRAINAGE COLLECTED FROM LAYER 2	7.8442	4271.147	16.51
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	3.061	1666.769	6.44
SOIL WATER AT START OF YEAR	6.111	3327.573	
SOIL WATER AT END OF YEAR	9.172	4994.342	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.30	23032.354	100.00
RUNOFF	1.004	546.564	2.37
EVAPOTRANSPIRATION	29.931	16297.364	70.76
DRAINAGE COLLECTED FROM LAYER 2	11.7607	6403.698	27.80
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.395	-215.275	-0.93
SOIL WATER AT START OF YEAR	9.172	4994.342	
SOIL WATER AT END OF YEAR	8.777	4779.066	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.002	0.00

ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.92	26092.439	100.00
RUNOFF	0.957	520.948	2.00
EVAPOTRANSPIRATION	34.063	18547.398	71.08
DRAINAGE COLLECTED FROM LAYER 2	12.2038	6644.970	25.47
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.696	379.125	1.45
SOIL WATER AT START OF YEAR	8.777	4779.066	
SOIL WATER AT END OF YEAR	9.473	5158.191	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.49	30758.799	100.00
RUNOFF	0.291	158.275	0.51
EVAPOTRANSPIRATION	35.722	19450.760	63.24
DRAINAGE COLLECTED FROM LAYER 2	21.3615	11631.314	37.81
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	-0.884	-481.537	-1.57
SOIL WATER AT START OF YEAR	9.473	5158.191	

SOIL WATER AT END OF YEAR	8.589	4676.654	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.012	0.00

ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.21	24616.844	100.00
RUNOFF	0.570	310.145	1.26
EVAPOTRANSPIRATION	35.018	19067.312	77.46
DRAINAGE COLLECTED FROM LAYER 2	11.2864	6145.436	24.96
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-1.664	-906.039	-3.68
SOIL WATER AT START OF YEAR	8.589	4676.654	
SOIL WATER AT END OF YEAR	6.925	3770.615	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.009	0.00

ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.37	20347.965	100.00
RUNOFF	0.005	2.738	0.01
EVAPOTRANSPIRATION	30.799	16770.039	82.42

DRAINAGE COLLECTED FROM LAYER 2	6.9040	3759.207	18.47
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.338	-184.013	-0.90
SOIL WATER AT START OF YEAR	6.925	3770.615	
SOIL WATER AT END OF YEAR	6.587	3586.602	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

ANNUAL TOTALS FOR YEAR 12

	INCHES	CUL FEET	PERCENT
PRECIPITATION	43.59	23734.758	100.00
RUNOFF	0.737	401.362	1.69
EVAPOTRANSPIRATION	30.893	16821.176	70.87
DRAINAGE COLLECTED FROM LAYER 2	11.1975	6097.056	25.69
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.762	415.167	1.75
SOIL WATER AT START OF YEAR	6.587	3586.602	
SOIL WATER AT END OF YEAR	7.349	4001.769	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.38	24164.912	100.00
RUNOFF	0.801	436.318	1.81
EVAPOTRANSPIRATION	28.875	15722.384	65.06
DRAINAGE COLLECTED FROM LAYER 2	14.0984	7676.556	31.77
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.605	329.655	1.36
SOIL WATER AT START OF YEAR	7.349	4001.769	
SOIL WATER AT END OF YEAR	7.955	4331.424	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.41	26359.242	100.00
RUNOFF	0.858	467.059	1.77
EVAPOTRANSPIRATION	34.999	19057.098	72.30
DRAINAGE COLLECTED FROM LAYER 2	13.1386	7153.993	27.14
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.586	-318.901	-1.21
SOIL WATER AT START OF YEAR	7.955	4331.424	
SOIL WATER AT END OF YEAR	7.369	4012.523	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.007	0.00

ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.37	27970.965	100.00
RUNOFF	0.885	482.022	1.72
EVAPOTRANSPIRATION	34.524	18798.270	67.21
DRAINAGE COLLECTED FROM LAYER 2	15.0135	8174.860	29.23
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	0.947	515.829	1.84
SOIL WATER AT START OF YEAR	7.369	4012.523	
SOIL WATER AT END OF YEAR	8.317	4528.352	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.014	0.00

ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.66	17783.371	100.00
RUNOFF	0.016	8.799	0.05
EVAPOTRANSPIRATION	28.131	15317.092	86.13
DRAINAGE COLLECTED FROM LAYER 2	6.8479	3728.682	20.97
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-2.335	-1271.199	-7.15
SOIL WATER AT START OF YEAR	8.317	4528.352	
SOIL WATER AT END OF YEAR	5.982	3257.153	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.003	0.00

ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.73	24355.484	100.00
RUNOFF	1.207	657.151	2.70
EVAPOTRANSPIRATION	32.789	17853.523	73.30
DRAINAGE COLLECTED FROM LAYER 2	9.2486	5035.855	20.68
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	1.486	808.961	3.32
SOIL WATER AT START OF YEAR	5.982	3257.153	
SOIL WATER AT END OF YEAR	7.468	4066.113	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.006	0.00

ANNUAL TOTALS FOR YEAR 18

	INCHES	CU. FEET	PERCENT
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PRECIPITATION	56.79	30922.146	100.00
RUNOFF	2.099	1142.642	3.70
EVAPOTRANSPIRATION	35.031	19074.385	61.69
DRAINAGE COLLECTED FROM LAYER 2	19.9532	10864.521	35.14
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	-0.293	-159.391	-0.52
SOIL WATER AT START OF YEAR	7.468	4066.113	
SOIL WATER AT END OF YEAR	7.175	3906.722	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.010	0.00

ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.87	28787.713	100.00
RUNOFF	0.257	139.944	0.49
EVAPOTRANSPIRATION	35.388	19269.033	66.93
DRAINAGE COLLECTED FROM LAYER 2	15.7524	8577.156	29.79
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	1.472	801.584	2.78
SOIL WATER AT START OF YEAR	7.175	3906.722	
SOIL WATER AT END OF YEAR	8.647	4708.306	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 20

	INCHES	CU. FEET	PERCENT
PRECIPITATION	59.12	32190.838	100.00
RUNOFF	0.265	144.482	0.45
EVAPOTRANSPIRATION	37.132	20218.289	62.81
DRAINAGE COLLECTED FROM LAYER 2	22.6689	12343.224	38.34
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	-0.946	-515.151	-1.60
SOIL WATER AT START OF YEAR	8.647	4708.306	
SOIL WATER AT END OF YEAR	7.701	4193.155	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 20

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	4.47 4.64	4.30 3.27	5.88 3.87	4.82 2.19	4.05 3.04	3.59 4.31
STD. DEVIATIONS	2.21 2.43	2.26 1.88	2.26 2.61	2.76 1.64	1.69 1.64	1.64 2.61
RUNOFF						
TOTALS	0.075 0.035	0.109 0.000	0.152 0.050	0.060 0.007	0.030 0.030	0.000 0.055

STD. DEVIATIONS	0.171	0.364	0.317	0.115	0.067	0.000
	0.114	0.001	0.149	0.027	0.071	0.183

EVAPOTRANSPIRATION

TOTALS	1.845	2.125	3.530	3.747	4.053	3.634
	4.039	3.178	2.520	2.566	1.533	1.421

STD. DEVIATIONS	0.228	0.295	0.461	1.028	0.878	1.649
	1.511	1.451	1.110	0.774	0.471	0.287

LATERAL DRAINAGE COLLECTED FROM LAYER 2

TOTALS	2.5453	2.1561	2.5273	1.6274	1.0225	0.2012
	0.2278	0.0898	0.5155	0.6211	0.2564	1.8776

STD. DEVIATIONS	2.1573	2.0707	1.6404	1.0007	1.2148	0.3905
	0.7344	0.3179	1.1134	0.9777	0.7482	2.2790

PERCOLATION/LEAKAGE THROUGH LAYER 4

TOTALS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

STD. DEVIATIONS	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ACROSS LAYER 4

AVERAGES	0.0003	0.0003	0.0003	0.0002	0.0001	0.0000
	0.0000	0.0000	0.0001	0.0001	0.0000	0.0002

STD. DEVIATIONS	0.0003	0.0003	0.0002	0.0001	0.0001	0.0000
	0.0001	0.0000	0.0001	0.0001	0.0001	0.0003

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 20

	INCHES		CU. FEET	PERCENT
PRECIPITATION	48.44	(7.307)	26373.4	100.00
JNOFF	0.603	(0.5351)	328.09	1.244
EVAPOTRANSPIRATION	34.189	(2.9580)	18615.81	70.586
LATERAL DRAINAGE COLLECTED FROM LAYER 2	13.66817	(5.00030)	7442.321	28.21904

PERCOLATION/LEAKAGE THROUGH FROM LAYER 4	0.00000 (0.00000)	0.000	0.00000
AVERAGE HEAD ACROSS TOP OF LAYER 4	0.000 (0.000)		
CHANGE IN WATER STORAGE	-0.024 (1.3818)	-12.82	-0.049

PEAK DAILY VALUES FOR YEARS 1 THROUGH 20

	(INCHES)	(CU. FT.)
PRECIPITATION	4.71	2564.595
RUNOFF	1.177	640.7753
DRAINAGE COLLECTED FROM LAYER 2	2.29515	1249.71118
PERCOLATION/LEAKAGE THROUGH LAYER 4	0.000000	0.00001
AVERAGE HEAD ACROSS LAYER 4	0.008	
SNOW WATER	4.62	2513.8826
MAXIMUM VEG. SOIL WATER (VOL/VOL)		0.3684
MINIMUM VEG. SOIL WATER (VOL/VOL)		0.0863

FINAL WATER STORAGE AT END OF YEAR 20

LAYER	(INCHES)	(VOL/VOL)
1	5.3288	0.2220
2	0.0027	0.0108
3	0.0000	0.0000
4	2.3694	0.3949
SNOW WATER	0.000	

 TYPE 2 - LATERAL DRAINAGE LAYER
 MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0.25	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	33.0000000000	CM/SEC
SLOPE	=	40.00	PERCENT
DRAINAGE LENGTH	=	11.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
 MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	2.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	2.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 3 - BARRIER SOIL LINER
 MATERIAL TEXTURE NUMBER 0

THICKNESS	=	6.00	INCHES
POROSITY	=	0.3949	VOL/VOL
FIELD CAPACITY	=	0.2797	VOL/VOL
WILTING POINT	=	0.1875	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.3949	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.360000013000E-04	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS USER-SPECIFIED.

SCS RUNOFF CURVE NUMBER	=	74.26	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	0.150	ACRES
EVAPORATIVE ZONE DEPTH	=	22.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	5.251	INCHES

UPPER LIMIT OF EVAPORATIVE STORAGE	=	10.406	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.295	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	8.172	INCHES
TOTAL INITIAL WATER	=	8.172	INCHES
TOTAL SUBSURFACE INFLOW	=	0.00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE: EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
ATLANTA GEORGIA

MAXIMUM LEAF AREA INDEX	=	2.00
START OF GROWING SEASON (JULIAN DATE)	=	92
END OF GROWING SEASON (JULIAN DATE)	=	312
AVERAGE ANNUAL WIND SPEED	=	9.10 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	65.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	67.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	76.00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	69.00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
4.91	4.43	5.91	4.43	4.02	3.41
4.73	3.41	3.17	2.53	3.43	4.23

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
41.90	44.90	52.50	61.80	69.30	75.80
78.60	78.20	73.00	62.20	52.00	44.50

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR ATLANTA GEORGIA

STATION LATITUDE = 33.65 DEGREES

ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.47	26936.418	100.00
RUNOFF	0.063	34.212	0.13
EVAPOTRANSPIRATION	37.940	20658.396	76.69
DRAINAGE COLLECTED FROM LAYER 2	11.4648	6242.557	23.18
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.002	1.255	0.00
SOIL WATER AT START OF YEAR	8.172	4449.527	
SOIL WATER AT END OF YEAR	8.174	4450.782	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.002	0.00

ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	63.92	34804.449	100.00
RUNOFF	1.120	609.916	1.75
EVAPOTRANSPIRATION	37.480	20408.084	58.64
DRAINAGE COLLECTED FROM LAYER 2	24.4875	13333.433	38.31
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.001	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	0.832	453.018	1.30
SOIL WATER AT START OF YEAR	8.174	4450.782	
SOIL WATER AT END OF YEAR	9.006	4903.800	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	50.89	27709.605	100.00
RUNOFF	0.601	327.052	1.18
EVAPOTRANSPIRATION	36.686	19975.439	72.09
DRAINAGE COLLECTED FROM LAYER 2	13.4364	7316.117	26.40
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.167	91.001	0.33
SOIL WATER AT START OF YEAR	9.006	4903.800	
SOIL WATER AT END OF YEAR	7.550	4110.729	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	1.624	884.071	3.19
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 4

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.49	24224.812	100.00
RUNOFF	0.098	53.165	0.22
EVAPOTRANSPIRATION	35.023	19070.244	78.72
DRAINAGE COLLECTED FROM LAYER 2	12.3512	6725.203	27.76
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-2.982	-1623.805	-6.70
SOIL WATER AT START OF YEAR	7.550	4110.729	
SOIL WATER AT END OF YEAR	6.191	3370.996	
SNOW WATER AT START OF YEAR	1.624	884.071	3.65
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.005	0.00

ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	49.24	26811.176	100.00
RUNOFF	0.195	105.963	0.40
EVAPOTRANSPIRATION	36.781	20027.193	74.70
DRAINAGE COLLECTED FROM LAYER 2	12.3443	6721.448	25.07
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.080	-43.423	-0.16
SOIL WATER AT START OF YEAR	6.191	3370.996	
SOIL WATER AT END OF YEAR	6.111	3327.573	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00

ANNUAL TOTALS FOR YEAR 6

INCHES	CU. FEET	PERCENT
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PRECIPITATION	47.50	25863.742	100.00
RUNOFF	0.024	13.073	0.05
EVAPOTRANSPIRATION	36.571	19912.760	76.99
DRAINAGE COLLECTED FROM LAYER 2	7.8442	4271.147	16.51
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	3.061	1666.769	6.44
SOIL WATER AT START OF YEAR	6.111	3327.573	
SOIL WATER AT END OF YEAR	9.172	4994.342	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	42.30	23032.354	100.00
RUNOFF	1.004	546.564	2.37
EVAPOTRANSPIRATION	29.931	16297.364	70.76
DRAINAGE COLLECTED FROM LAYER 2	11.7607	6403.698	27.80
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.395	-215.275	-0.93
SOIL WATER AT START OF YEAR	9.172	4994.342	
SOIL WATER AT END OF YEAR	8.777	4779.066	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.002	0.00

ANNUAL TOTALS FOR YEAR 8

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.92	26092.439	100.00
RUNOFF	0.957	520.948	2.00
EVAPOTRANSPIRATION	34.063	18547.398	71.08
DRAINAGE COLLECTED FROM LAYER 2	12.2038	6644.970	25.47
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.696	379.125	1.45
SOIL WATER AT START OF YEAR	8.777	4779.066	
SOIL WATER AT END OF YEAR	9.473	5158.191	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	56.49	30758.799	100.00
RUNOFF	0.291	158.275	0.51
EVAPOTRANSPIRATION	35.722	19450.760	63.24
DRAINAGE COLLECTED FROM LAYER 2	21.3615	11631.314	37.81
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.001	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	-0.884	-481.537	-1.57
SOIL WATER AT START OF YEAR	9.473	5158.191	

SOIL WATER AT END OF YEAR	8.589	4676.654	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.012	0.00

ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	45.21	24616.844	100.00
RUNOFF	0.570	310.145	1.26
EVAPOTRANSPIRATION	35.018	19067.312	77.46
DRAINAGE COLLECTED FROM LAYER 2	11.2864	6145.436	24.96
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-1.664	-906.039	-3.68
SOIL WATER AT START OF YEAR	8.589	4676.654	
SOIL WATER AT END OF YEAR	6.925	3770.615	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.009	0.00

ANNUAL TOTALS FOR YEAR 11

	INCHES	CU. FEET	PERCENT
PRECIPITATION	37.37	20347.965	100.00
RUNOFF	0.005	2.738	0.01
EVAPOTRANSPIRATION	30.799	16770.039	82.42

DRAINAGE COLLECTED FROM LAYER 2	6.9040	3759.207	18.47
PERC./LEAKAGE THROUGH LAYER 4	0.000000	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.338	-184.013	-0.90
SOIL WATER AT START OF YEAR	6.925	3770.615	
SOIL WATER AT END OF YEAR	6.587	3586.602	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

ANNUAL TOTALS FOR YEAR 12

	INCHES	CU. FEET	PERCENT
PRECIPITATION	43.59	23734.758	100.00
RUNOFF	0.737	401.362	1.69
EVAPOTRANSPIRATION	30.893	16821.176	70.87
DRAINAGE COLLECTED FROM LAYER 2	11.1975	6097.055	25.69
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.762	415.167	1.75
SOIL WATER AT START OF YEAR	6.587	3586.602	
SOIL WATER AT END OF YEAR	7.349	4001.769	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.000	0.00

ANNUAL TOTALS FOR YEAR 13

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.38	24164.912	100.00
RUNOFF	0.801	436.318	1.81
EVAPOTRANSPIRATION	28.875	15722.384	65.06
DRAINAGE COLLECTED FROM LAYER 2	14.0984	7676.556	31.77
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	0.605	329.655	1.36
SOIL WATER AT START OF YEAR	7.349	4001.769	
SOIL WATER AT END OF YEAR	7.955	4331.424	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.001	0.00

ANNUAL TOTALS FOR YEAR 14

	INCHES	CU. FEET	PERCENT
PRECIPITATION	48.41	26359.242	100.00
RUNOFF	0.858	467.059	1.77
EVAPOTRANSPIRATION	34.999	19057.098	72.30
DRAINAGE COLLECTED FROM LAYER 2	13.1386	7153.993	27.14
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-0.586	-318.901	-1.21
SOIL WATER AT START OF YEAR	7.955	4331.424	
SOIL WATER AT END OF YEAR	7.369	4012.523	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00

SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.007	0.00

ANNUAL TOTALS FOR YEAR 15

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51.37	27970.965	100.00
RUNOFF	0.885	482.022	1.72
EVAPOTRANSPIRATION	34.524	18798.270	67.21
DRAINAGE COLLECTED FROM LAYER 2	15.0135	8174.860	29.23
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.001	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	0.947	515.829	1.84
SOIL WATER AT START OF YEAR	7.369	4012.523	
SOIL WATER AT END OF YEAR	8.317	4528.352	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.014	0.00

ANNUAL TOTALS FOR YEAR 16

	INCHES	CU. FEET	PERCENT
PRECIPITATION	32.66	17783.371	100.00
RUNOFF	0.016	8.799	0.05
EVAPOTRANSPIRATION	28.131	15317.092	86.13
DRAINAGE COLLECTED FROM LAYER 2	6.8479	3728.682	20.97
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00

AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	-2.335	-1271.199	-7.15
SOIL WATER AT START OF YEAR	8.317	4528.352	
SOIL WATER AT END OF YEAR	5.982	3257.153	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.003	0.00

ANNUAL TOTALS FOR YEAR 17

	INCHES	CU. FEET	PERCENT
PRECIPITATION	44.73	24355.484	100.00
RUNOFF	1.207	657.151	2.70
EVAPOTRANSPIRATION	32.789	17853.523	73.30
DRAINAGE COLLECTED FROM LAYER 2	9.2486	5035.854	20.68
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.000	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0001		
CHANGE IN WATER STORAGE	1.486	808.961	3.32
SOIL WATER AT START OF YEAR	5.982	3257.153	
SOIL WATER AT END OF YEAR	7.468	4066.113	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.005	0.00

ANNUAL TOTALS FOR YEAR 18

INCHES	CU. FEET	PERCENT
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PRECIPITATION	56.79	30922.146	100.00
RUNOFF	2.099	1142.642	3.70
EVAPOTRANSPIRATION	35.031	19074.385	61.69
DRAINAGE COLLECTED FROM LAYER 2	19.9532	10864.521	35.14
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.001	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	-0.293	-159.391	-0.52
SOIL WATER AT START OF YEAR	7.468	4066.113	
SOIL WATER AT END OF YEAR	7.175	3906.722	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.010	0.00

ANNUAL TOTALS FOR YEAR 19

	INCHES	CU. FEET	PERCENT
PRECIPITATION	52.87	28787.713	100.00
RUNOFF	0.257	139.944	0.49
EVAPOTRANSPIRATION	35.388	19269.033	66.93
DRAINAGE COLLECTED FROM LAYER 2	15.7524	8577.156	29.79
PERC./LEAKAGE THROUGH LAYER 4	0.000001	0.001	0.00
AVG. HEAD ON TOP OF LAYER 4	0.0002		
CHANGE IN WATER STORAGE	1.472	801.584	2.78
SOIL WATER AT START OF YEAR	7.175	3906.722	
SOIL WATER AT END OF YEAR	8.647	4708.306	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.004	0.00
