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THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
FAX (919) 962-0227

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

June 29, 2001

RECEIVED
JUN 29 '01
DENR RALEIGH
REGIONAL OFFICE

HAND DELIVERED

Jay Zimmerman
DENR Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Notice of Violation, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina
Incident No. 15182

Dear Mr. Zimmerman:

This letter is a follow up to the February 15, 2001 Notice of Violation (NOV) and is being submitted in accordance with my letter to you dated April 27, 2001 promising to provide the Division of Environment and Natural Resources (DENR) a description of the actions and schedule to resolve the NOV's issues.

The University of North Carolina at Chapel Hill (The University) through its consultant Arcadis Geraghty & Miller is completing a groundwater Corrective Action Plan (CAP) for the site. Since the April 27, 2001 letter, fieldwork has been completed and included the following:

- Installation and sampling of groundwater monitoring wells;
- Slug testing of select wells; and
- Replacement of stream staff gauges.

Upon receipt of laboratory analyses, Arcadis Geraghty & Miller (AG&M) will begin the exposure assessment, evaluation of remedial alternatives, and other activities to prepare the written report. The University plans to submit the completed groundwater CAP to DENR by the end of 2001.

The University is also moving forward to remediate the source material at the site. Waste treatment and disposal continue to be difficult issues to resolve. However, we are committed to clean up the site in a timely manner, and we understand that establishing a schedule for the clean up is of primary importance to DENR.

With this in mind, we propose clean up of the source in two or more phases between now and July 2003. In the next 12 months, source remediation will be completed for approximately half of the site. The remainder of the source remediation will be completed by July 2003. The University plans to initiate the contracting process this summer, and we anticipate beginning excavation sometime in the fall. We will keep you informed as the process progresses.

Additionally, as we discussed yesterday on the telephone, we are reviewing the approved Corrective Action Plan (CAP) for source remediation, and we will prepare a clarification letter, if necessary, to outline the minor differences between the approved CAP and current plans.

Remediation of this site continues to be technically challenging, but we believe we have made substantial progress. We welcome the open dialog between UNC-CH and DENR over the last several months and hope it continues in the future. Please contact me at (919) 843-5913 or Larry Daw at (919) 962-6666 if you have any comments or questions.

Sincerely,

Peter A. Reinhardt
Health and Safety Director

PAR/jld

Cc: Rick Bolich, RRO Groundwater Section
Larry Daw, UNC-CH
Rich Miller, UNC-CH
Wendy Tingle, Division of Radiation Protection

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
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The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

April 27, 2001

RECEIVED
APR 27 2001
REGIONAL OFFICE

HAND DELIVERED

Jay Zimmerman
DENR Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Notice of Violation, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina
Incident No. 15182

Dear Mr. Zimmerman:

This letter is a follow up to the subject Notice of Violation (NOV) and is being submitted in accordance with our agreement to provide you additional information regarding planned investigation and remediation activities. I would like to briefly discuss The University of North Carolina at Chapel Hill (UNC-CH) plans to prepare a groundwater Corrective Action Plan (CAP), outline activities regarding source remediation, and summarize our general intent for the completion of remediation at the site.

Groundwater Corrective Action Plan

UNC-CH has authorized our consultant, Arcadis Geraghty & Miller, to complete a groundwater CAP for the site. Proposed activities include the following:

- Installation of six shallow and two Type III monitoring wells and two direct-push temporary wells to investigate the horizontal and vertical extent of impacted groundwater;
- Groundwater sampling to evaluate the presence and concentration of organic, radioactive, and biogeochemical constituents and aquifer slug testing;
- An exposure assessment, evaluation of remedial alternatives and other activities needed to prepare the groundwater CAP.

Field activities are scheduled to begin in the first week in May, and UNC-CH will submit the groundwater CAP to your office by the end of 2001.

Source Remediation

UNC-CH is actively pursuing options for source remediation at the site. Waste treatment and disposal continues to be the major stumbling block. As we have previously discussed, segregation of waste from the surrounding soils has proved to be very difficult primarily due to the high moisture content and clay composition of soils. As a result, during the first phase of remediation substantially more material was shipped off site for disposal than originally anticipated.

In order to control costs for the remainder of the source remediation, UNC-CH is investigating alternative methods of treatment and disposal of the waste materials/soils. Although the South Carolina Department of Health and Environmental Control (DHEC) did not approve our request to conduct a thermal treatment pilot study at the Southeastern Soil Recovery facility in Charleston South Carolina, we continue to explore other options for thermal treatment.

We have prepared and submitted the necessary permit documents to the Tennessee Department of Environment and Conservation (TDEC) to conduct thermal treatment of about 20 cubic yards of waste from the site. We remain optimistic that the TDEC will approve our request, but have also contacted similar facilities in Virginia and Ohio regarding their interest and ability to conduct the pilot study. Implementation of the thermal treatment pilot study onsite is also a feasible option that we are investigating.

Conclusions

UNC-CH is committed to provide the necessary resources to complete the remediation in a reasonable time period. However, we also believe the work needs to be conducted in a fiscally responsible manner. As previously stated, we plan to complete the groundwater CAP and submit it to DENR by the end of 2001. However, given the uncertainty regarding the identification and regulatory approval of an alternative waste treatment and disposal option, UNC-CH is not currently able to commit to a time frame for source remediation.

We are working closely with our environmental consultant and remediation contractor to expedite work at the site. We will update you by the end of June regarding our progress and welcome your input. Please contact me at (919) 843-5913 or Larry Daw at (919) 962-6666 if you have any comments or questions.

Sincerely,

Peter A. Reinhardt
Health and Safety Director

Cc: Rick Bolich, RRO Groundwater Section
Larry Daw, UNC-CH
Rich Miller, UNC-CH
Wendy Tingle, Division of Radiation Protection

ARCADIS GERAGHTY&MILLER

ARCADIS Geraghty & Miller of
North Carolina, Inc.
2301 Rexwoods Drive
Suite 102
Raleigh
North Carolina 27607-3366
Tel 919 782 5511
Fax 919 782 5905

ENVIRONMENTAL

APR 04 2001

Mr. Larry Daw, L.G.
The University of North Carolina at Chapel Hill
Health and Safety Office
212 Finley Golf Course Road
Chapel Hill, NC 27514

RECEIVED
APR 06 2001
DENR RALEIGH REGIONAL OFFICE

Subject:
December 2000 Groundwater/Surface Water Sampling Report
Mason Farm Low-Level Radioactive Waste Disposal Site
Chapel Hill, North Carolina

Raleigh, NC,
3 April 2001

Contact:
Donald R. Malone, P.E.

Extension:
270

Dear Mr. Daw:

ARCADIS Geraghty & Miller is pleased to provide this letter report on the findings from the December 2000 groundwater and surface water sampling event at the University of North Carolina at Chapel Hill (UNC-CH), Mason Farm Low-Level Radioactive Waste (LLRW) Disposal Site (Figure 1). This sampling event was conducted to provide continued monitoring of the site while the phased corrective actions are being implemented. UNC-CH recently received a Notice of Violation (NOV) from the NCDENR, dated February 15, 2001 that required the university to prepare and implement a Corrective Action Plan (CAP) for impacted groundwater at the site. However, prior to CAP development, UNC-CH will need to install additional monitoring wells at the site to fully delineate the horizontal and vertical extent of groundwater constituents. The additional site assessment activities are planned for May 2001. The data contained herein from the December 2000 sampling event will be used to supplement the data collected in April 2001 so that the site constituents will be completely delineated.

Field Activities and Sample Analysis

Groundwater samples were collected from the nine monitor wells at the site using disposable polyethylene bailers. In addition, surface water samples were collected from upgradient and downgradient locations in both Morgan Creek and the adjacent drainage ditch on the north side of the disposal area. Surface water samples were collected at the locations of existing staff gauges where samples had previously been collected. The water levels at all groundwater and surface water sample locations were measured prior to sample collection. The staff gauges located in Morgan Creek were missing or completely submerged at the time of sample collection, and therefore, water level at these locations could not be measured.

All samples were submitted to Severn Trent Laboratories for analysis by United States Environmental Protection Agency (USEPA) Method 8260 for volatile organic compounds (VOCs), including di-isopropyl ether; USEPA Method 8270 for semi-volatile organic compounds (SVOCs), including 1,4-dioxane; USEPA Method C01 (Carbon-14); and USEPA Method 906 (Tritium). Quality control samples included two blind duplicate samples, one field blank, one trip blank (USEPA Method 8260 only), and two equipment rinse blanks.

Purge water from previous sampling events was classified as non-hazardous, and therefore, the purge water generated during this sampling event also was considered to be non-hazardous. However, the purge water generated during the sampling activities were containerized within the fractionalization tank being used on site during the phased corrective actions ongoing during November and December 2000. At the time of use, the fractionization tank already contained groundwater from the dewatering activities. Upon completion of the phased corrective actions, the liquid contained in the fractionization tank was transferred to 55-gallon steel drums and temporarily stored on site. As of 22 March 2001, the drums still remain on site while UNC-CH obtains final approval from the Orange County Water and Sewer Authority (OWASA) for discharge to the sewer system.

Groundwater Flow Direction

Water level measurements collected on December 5, 2000 are tabulated with data from previous measurements to show historic trends (Table 1). The data from December 2000 was used to construct the potentiometric surface map shown on Figure 2. A comparison of the December 2000 data to previously obtained data indicates that the water table continues to be relatively flat. The primary flow direction for the surficial aquifer appears to be northeast toward the drainage ditch (Figure 2).

Analytical Results

Volatile and Semi-Volatile Organic Compounds

The groundwater and surface water quality analytical results for VOCs and SVOCs are summarized on Table 2 and Table 3. These tables display only detected constituents. ARCADIS Geraghty & Miller will provide copies of the laboratory analytical reports upon request. Table 2 compares the constituents detected in groundwater with the established North Carolina Administrative Code (NCAC) 2L groundwater quality standards. Historical data trends are shown in Table 4. Constituents detected in both groundwater and surface water samples are also summarized on a site map included as Figure 3.

In general, the analytical results from December 2000 are consistent with historical trends. The extent of impacted water appears to remain within close proximity to the

fenced area. Site constituents continue to remain undetected in upgradient well GM-9 and downgradient well GM-6 (Table 4). Overall, the number of constituents detected in the samples decreased from the March 1998 sampling event. Concentrations of 1,4-dioxane in monitor well MW-2 slightly increased from 23 µg/L in March 1998 to 37 µg/L in December 2000. Concentrations of 1,4-dioxane in GM-4 also increased from 1,500 µg/L to 3,800 µg/L between March 1998 and December 2000. The results of future monitoring events will be used to evaluate whether or not these changes represents a trend.

Chloroform, bromodichloromethane, and bis(2-Ethyhexyl)phthalate were detected in low concentrations in the samples obtained from surface water monitoring points SW-1 and SW-2, presumably from upgradient sources not related to the Mason Farm LLRW Disposal site. In addition, methylene chloride was detected in the sample from SW-2 (Table 3). Since Morgan Creek is upgradient of the site, it is unlikely that this contamination is related to the waste burial area.

Radionuclide Isotopes – Tritium and Carbon-14

The groundwater and surface water samples were analyzed for tritium and carbon-14 (C-14) isotopes, which are indicative of the low-level radioactive waste placed in burial pits at the site. Summaries of the tritium and C-14 analytical results are presented on Table 5 and Table 6, respectively. The tables present the data in picocuries per liter (pCi/L). The analytical data has been compared to the Federal Maximum Contaminant Levels (MCLs) and the North Carolina Division of Radiation Protection standards (NC STD) for discharges to surface water. The NC STD have been converted to pCi/L, normally it is expressed in microcuries per milliliter (µCi/mL).

None of the samples collected from the monitor wells contained tritium in excess of the MCL or NC STD (Table 5). A MCL does not exist for C-14, and therefore, the MCL was assumed to be the minimum detectable activity (MDA) for each sample run. As shown in Table 6, C-14 was only detected in one well (MW-3) above the MDA (i.e., surrogate MCL). However, none of the C-14 concentrations in any of the samples exceeded the NC STD. Based on the surface water samples and outlying groundwater wells, it does not appear that either tritium or C-14 is migrating outside the fenced border of the former waste disposal area.

Conclusions

The results of the December 2000 groundwater and surface water sampling event indicate that the environmental conditions at the Mason Farm site have remained relatively constant since the last full monitoring event conducted in March 1998. Groundwater elevations and flow direction are similar to previous measurements. The nature and extent of the impacted groundwater has not changed significantly

since the March 1998 monitoring event. The concentrations of most constituents detected in March 1998 decreased or remained about the same in December 2000 with the exception of 1,4-dioxane which increased in wells MW-2 and GM-4. Neither tritium nor C-14 was detected above NC STD standards. Tritium in well MW-3 has declined since the March 1998 event when it was detected above the MCL. However, C-14 has been detected in MW-3 at concentrations exceeding the MCL during this monitoring event. Low concentrations of three VOCs and one SVOC were detected in surface water samples collected at locations SW-1 and SW-2; however, their presence does not appear to be attributed to the Mason Farm site. The area of impacted groundwater appears to remain relatively small, with the highest concentrations remaining within the fenced area of the former disposal area.

In April 2001, ARCADIS Geraghty & Miller will conduct additional site assessment activities as requested by UNC-CH to fully delineate the horizontal and vertical extent of groundwater constituents at the site. The data contained herein from the December 2000 sampling event will be used to supplement the data to be collected in April 2001 so that the site constituents will be completely delineated.

ARCADIS Geraghty & Miller appreciates the opportunity to provide this letter report to UNC-CH. If you have any questions regarding this sampling event or this report, please contact either of the undersigned.

Sincerely,

ARCADIS Geraghty & Miller, Inc.

Jeff Hall, E.I.
Staff Engineer

Donald R. Malone, P.E.
Senior Engineer/Project Manager

NORTH CAROLINA PROFESSIONAL SEAL 20195 ENGINEER DONALD R. MALONE

Table 1. Historical Groundwater and Surface Water Elevations Measured at the Mason Farm Low-Level Radioactive Waste Disposal Site, The University of North Carolina at Chapel Hill, North Carolina.

Monitor Well ID	Measuring Point Elevation (ft msl)		August 27, 1996		December 3, 1996		March 3, 1998		December 5, 2000	
			Depth to Water (ft)	Water Level Elevation (ft msl)	Depth to Water (ft)	Water Level Elevation (ft msl)	Depth to Water (ft)	Water Level Elevation (ft msl)	Depth to Water (ft)	Water Level Elevation (ft msl)
MW-2	244.779		2.89	241.89	2.59	242.19	3.81	240.97	2.99	241.79
MW-3	246.832		4.41	242.42	4.38	242.45	4.42	242.41	4.74	242.09
MW-4	246.364		Dry	Dry	3.79	242.57	3.9	242.46	4.16	242.20
GM-4	244.628		2.64	241.99	2.08	242.55	2.19	242.44	2.59	242.04
GM-5	245.536		3.51	242.03	3.04	242.50	3.14	242.40	3.51	242.03
GM-6	246.153		3.97	242.18	3.28	242.87	3.59	242.56	3.93	242.22
GM-7	245.653		4.17	241.48	2.69	242.96	2.17	243.48	2.78	242.87
GM-8	245.394		3.28	242.11	2.75	242.64	2.85	242.54	3.17	242.22
GM-9	245.372	*	NM	NM	2.65	242.72	2.81	242.56	3.21	242.16
SW-1	244.682	**	1.80	242.18	XX	XX	XX	XX	XX	XX
SW-2	243.450		1.96	241.49	2.73	240.72	2.275	241.18	XX	XX
SW-3	244.123	*	NM	NM	NM	NM	XX	XX	1.42	242.70
SW-4	244.780	*	NM	NM	NM	NM	NM	NM	0.66	244.12

ft msl — Feet above mean sea level.
Dry — Not available - well was dry.
NM — Water level not measured.
XX — Staff gauge destroyed/missing.
* — Elevation established January 14, 1997.
** — Resurveyed on January 14, 1997 following staff gauge replacement. Original elevation = 243.982 ft msl.

ARCADIS GERAGHTY&MILLER

Table 2. Summary of Analytical Results for Groundwater Samples, December 5 - 7, 2000, Mason Farm Low-Level Radioactive Waste Disposal Site, The University of North Carolina at Chapel Hill, North Carolina.

Constituents	NCAC 2L Groundwater Standard	Sample ID: Date Sampled:	MW-2 12/7/2000	MW-3 12/6/2000	MW-4 12/7/2000	GM-4 12/5/2000	GM-5 12/6/2000	GM-6 12/6/2000	GM-7 12/7/2000	GM-8 12/6/2000	GM-9 12/6/2000	DUP-2[5] 12/6/2000	EB-1 12/6/2000	FB-1 12/6/2000	Trip Blank 12/5/2000
Volatile Organics (USEPA Method 8260B) µg/L															
Toluene	1000		<1.0[1]	270,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Semi-Volatile Organics (USEPA Method 8270C) µg/L															
1,4-Dioxane	7		37	22,000 J[3]	93	3,800 J	17	<10	<10	6.4 J	<10	<10	<10	<10	NT[6]
bis(2-Ethylhexyl)phthalate	3		<10	<10,000 J	18	<1,000 J	<10	<10	6.1 J[4]	<10	<10	3.1 J	<10	<10	NT

NCAC 2L. North Carolina Administrative Code Subchapter 2L Classifications and Water Quality Standards Applicable to Groundwaters in North Carolina

µg/L Micrograms per Liter

1 <1.0 - Constituent was not identified above the method detection limit.

2 [ ] Constituent concentration exceeds the 15A NCAC 2L Groundwater Standard.

3 Contituent concentration was quantified using a secondary dilution.

4 Constituent concentration is estimated.

5 Blind field duplicate of groundwater sample from GM-6.

6 NT - Not tested.

Table 3. Summary of Analytical Results for Surface Water Samples, December 5, 2000, Mason Farm Low-Level Radioactive Waste Disposal Site, The University of North Carolina at Chapel Hill, North Carolina.

Sample ID:	SW-1	SW-2	SW-3	SW-4	DUP-1[3]	EB-2	FB-1	Trip Blank
Date Sampled:	12/5/2000	12/5/2000	12/5/2000	12/5/2000	12/5/2000	12/7/2000	12/6/2000	12/5/2000
Constituents								
Volatile Organics (USEPA Method 8260B) µg/L								
Methylene Chloride	<2.0[1]	0.86 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chloroform	2.5	2.6	<1.0	<1.0	2.5	<1.0	<1.0	<1.0
Bromodichloromethane	0.88 J[2]	0.89 J	<1.0	<1.0	0.78 J	<1.0	<1.0	<1.0
Semi-Volatile Organics (USEPA Method 8270C) µg/L								
bis(2-Ethylhexyl)phthalate	4.0 J	5.1 J	<10	<10	4.3 J	<10	<10	NT[4]

µg/L Micrograms per Liter

1 Constituent was not detected.

2 Constituent concentration is estimated.

3 Blind field duplicate of surface water sample from SW-2.

4 Not tested.

ARCADIS GERAGHTY&MILLER

Table 4. Summary of Historical Analytical Results for Groundwater Samples, Mason Farm Low-Level Radioactive Waste Disposal Site, The University of North Carolina at Chapel Hill, North Carolina.

Constituents	Groundwater Standard[1]	Sample ID: Date Sampled (mm/dd/yr)	MW-2	MW-3	MW-4	GM-4	GM-5	GM-6	GM-7	GM-8	GM-9
Volatile Organics (USEPA Method 8260B) µg/L											
Toluene	1,000	July-96	<1.0	390,000	NS	<1.0	<1.0	<1.0	<1.0	<1.0	NS
	1,000	March-98	<1.0	330,000	<1.0	0.27 J	<1.0	<1.0	<1.0	<1.0	<1.0
	1,000	December-00	<1.0	270,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	1	July-96	<1.0	<20,000	NS	<1.0	<1.0	<1.0	<1.0	<1.0	NS
	1	March-98	<1.0	<20,000	<1.0	<1.0	<1.0	<1.0	1.9	<1.0	<1.0
	1	December-00	<1.0	<20,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon Disulfide	700	July-96	<1.0	<5,000	NS	14 J	<1.0	<1.0	<1.0	3.7	NS
	700	March-98	<1.0	<20,000	<1.0	<1.0	<1.0	<1.0	4.3	<1.0	<1.0
	700	December-00	<1.0	<20,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Semi-Volatile Organics (USEPA Method 8270C) µg/L											
1,4-Dioxane	7	July-96	26	21,000	NS	3,200	13 J	<10	<10	<10	NS
	7	March-98	23	37,000 DJ	80	1,500 J	26	<10	120	110	<10
	7	December-00	37	22,000 J	93	3,800 J	17	<10	<10	6.4 J	<10
bis(2-Ethylhexyl)phthalate	3	July-96	<10	<10	NS	<10	<10	<10	<10	<10	NS
	3	March-98	<10	22	<10	<500 J	<10	<10	<10	<10	<10
	3	December-00	<10	<10,000 J	18	<1,000 J	<10	<10	6.1 J[4]	<10	<10
Diethyl phthalate	5,000	July-96	<10	<10	NS	<10	<10	<10	<10	<10	NS
	5,000	March-98	<10	24	<10	<500 J	<10	<10	<10	<10	<10
	5,000	December-00	<10	<10	<10	<10	<10	<10	<10	<10	<10
Naphthalene	21	July-96	<10	1,500	NS	<250	<250	<10	<10	<10	NS
	21	March-98	<10	<10	<10	<10	<10	<10	<10	<10	<10
	21	December-00	<10	<10	<10	<10	<10	<10	<10	<10	<10
Radioisotopes (pCi/L)											
Tritium (H-3)	20,000	July-96	197	26,200	NS	2,450	131	16.4	-50.2	177	NS
	20,000	March-98	242 +/- 220	40,200 +/- 3,100	90 +/- 210	1,600 +/- 310	56.3 +/- 200	30.2 +/- 200	7.7 +/- 200	121 +/- 210	24.1 +/- 200
	20,000	December-00	28 +/- 207	18,200 +/- 1,150	49.6 +/- 209	1840 +/- 344	-130 +/- 193	75.4 +/- 209	399 +/- 241	326 +/- 232	-78.8 +/- 199
Carbon-14 (C-14)	No Standard	July-96	2.39	521	NS	71.2	2.93	0.676	-0.248	1.78	NS
	No Standard	March-98	-2.27 +/- 5.3	460 +/- 25	-3.02 +/- 5.3	69.8 +/- 8.0	-3.63 +/- 5.3	-6.37 +/- 5.2	-5.11 +/- 5.2	-1.19 +/- 5.4	-4.05 +/- 5.3
	No Standard	December-00	18.2 +/- 23.6	570 +/- 48.2	22 +/- 23.8	103 +/- 26.7	38.3 +/- 24.6	30 +/- 23	13.1 +/- 23.3	13.4 +/- 22.1	13 +/- 23.3

1 Groundwater Standard for Organic Constituents are the North Carolina Administrative Code (NCAC) Subchapter 2L
Groundwater Standard for Radioisotopes are the EPA Maximum Contaminant levels (MCL)

µg/L Micrograms per Liter

pCi/L Picocuries per Liter

[ ] Constituent concentration exceeds the 15A NCAC 2L Groundwater Standard.

Table 5. Summary of Tritium Analytical data from Groundwater and Surface Water Samples, December 5 - 7, 2000, Mason Farm Low-Level Radoactive Waste Disposal Site, The University of North Carolina at Chapel Hill, NC.

Sample ID	Result (pCi/L)	Total Error	MDA (pCi/L)	Validation Comments	MCL (pCi/L)	NC STD (pCi/L)
GM-4	1840	344	340		20,000	1.0E+07
GM-5	-130	193	339	ND	20,000	1.0E+07
GM-6	75.4	209	341	ND	20,000	1.0E+07
GM-7	399	241	338	J	20,000	1.0E+07
GM-8	326	232	339	ND[3]	20,000	1.0E+07
GM-9	-78.8	199	342	ND	20,000	1.0E+07
MW-2	28.0	207	337	ND	20,000	1.0E+07
MW-3	18,200	1,150	340		20,000	1.0E+07
MW-4	49.6	209	340	ND	20,000	1.0E+07
SW-1	466	246	347	J	20,000	1.0E+07
SW-2	-5.02	202	346	ND	20,000	1.0E+07
SW-3	-39.0	197	339	ND	20,000	1.0E+07
SW-4	98.6	212	344	ND	20,000	1.0E+07
DUP-1[2]	141	215	341	ND[3]	20,000	1.0E+07
DUP-2[1]	-110	195	339	ND	20,000	1.0E+07

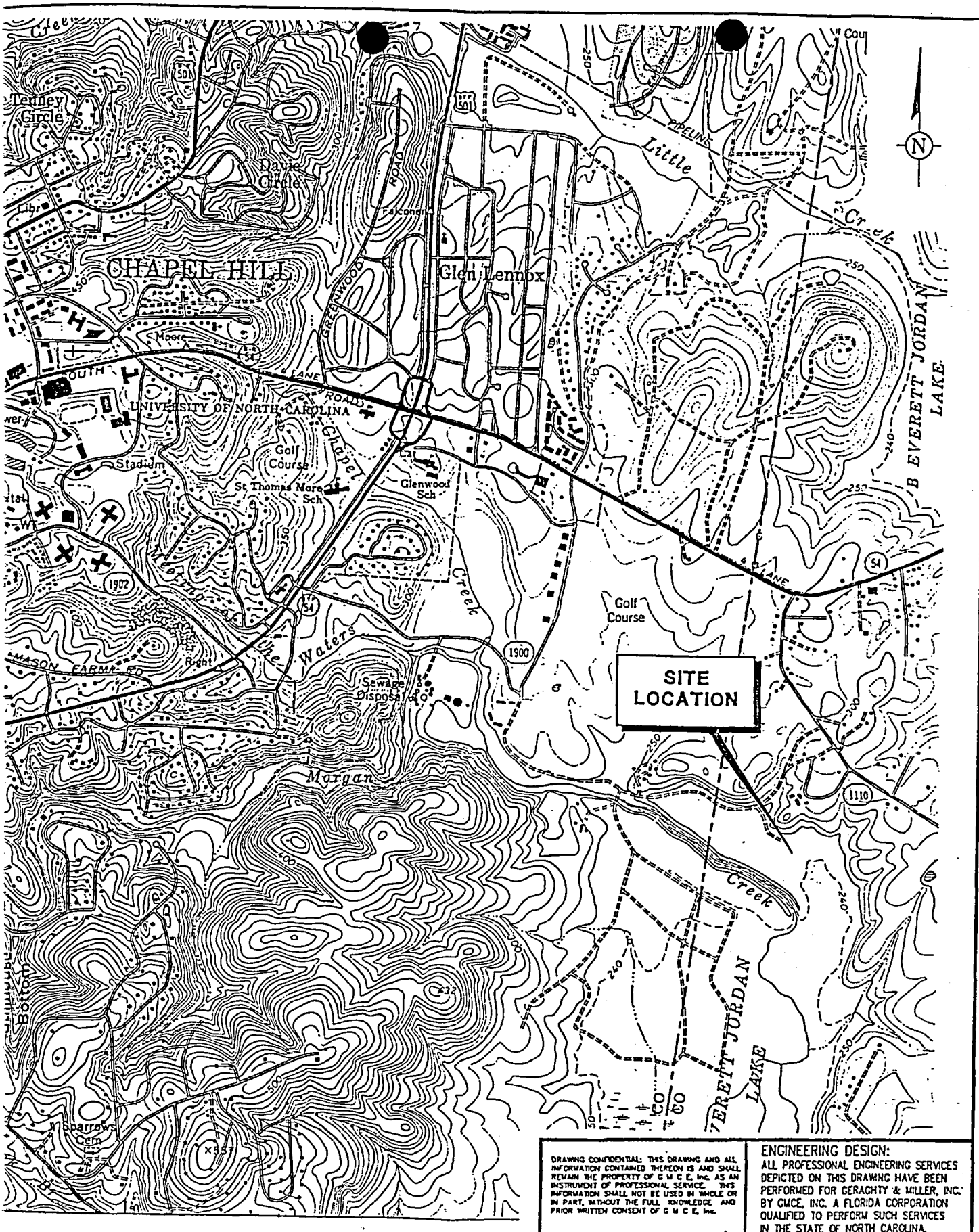
pCi/L	Picocuries per liter.
Total error	The total propagated uncertainty of the sample result; includes the counting error, sample handling, preparation, and analysis. The sample result + or - the total error gives sample activity (range) with 95 percent confidence level.
MDA	Minimum detectable activity; the smallest amount of sample activity that yields a net count for which there is confidence at a predetermined level that activity is present.
1	Blind field duplicate of groundwater sample from GM-6.
2	Blind field duplicate of surface water sample from SW-2.
ND	Non detect. Result plus total uncertainty is less than the MDA.
ND[3]	Non detect. Result is qualified as not detected due to potential bias demonstrated by associated blank activity.
J	Estimated. Result is estimated due to as associated quality control parameter that is not within specified control limits.
MCL	USEPA Interim Drinking Water Maximum Contaminant Level.
NC STD	North Carolina Division of Radiation Protection, 59 NCAC 11.0114(a)(1) Appendix B, Table 2.
	Result exceeds the MCL or NC STD for tritium.

ARCADIS GERAGHTY&MILLER

Table 6. Summary of Carbon-14 Analytical data from Groundwater and Surface Water Samples, December 5 - 7, 2000, Mason Farm Low-Level Radoactive Waste Disposal Site, The University of North Carolina at Chapel Hill, NC.

Sample ID	Result (pCi/L)	Total Error	MDA (pCi/L)	Validation Comments	MCL (pCi/L)	NC STD (pCi/L)
GM-4	103	26.7	33.1	ND[3]	33.1	3.0E+05
GM-5	38.3	24.6	34.8	ND[3]	34.8	3.0E+05
GM-6	30	23	33.1	ND[3]	33.1	3.0E+05
GM-7	13.1	23.3	34.8	ND[3]	34.8	3.0E+05
GM-8	13.4	22.1	33.1	ND[3]	33.1	3.0E+05
GM-9	13	23.3	34.8	ND[3]	34.8	3.0E+05
MW-2	18.2	23.6	34.8	ND[3]	34.8	3.0E+05
MW-3	570	48	33.2	J	33.2	3.0E+05
MW-4	22	23.8	34.8	ND[3]	34.8	3.0E+05
SW-1	33.3	23.2	33.2	ND[3]	33.2	3.0E+05
SW-2	34.8	23.2	33.1	ND[3]	33.1	3.0E+05
SW-3	33.1	23.1	33.1	ND[3]	33.1	3.0E+05
SW-4	35.1	23.3	33.2	ND[3]	33.2	3.0E+05
DUP-1[2]	36.7	23.4	33.2	ND[3]	33.2	3.0E+05
DUP-2[1]	17.7	23.5	34.8	ND[3]	34.8	3.0E+05

pCi/L	Picocuries per liter.
Total error	The total propagated uncertainty of the sample result; includes the counting error, sample handling, preparation, and analysis. The sample result + or - the total error gives sample activity (range) with 95 percent confidence level.
MDA	Minimum detectable activity; the smallest amount of sample activity that yields a net count for which there is confidence at a predetermined level that activity is present.
1	Blind field duplicate of groundwater sample from GM-6.
2	Blind field duplicate of surface water sample from SW-2.
ND	Non detect. Result plus total uncertainty is less than the MDA.
ND[3]	Non detect. Result is qualified as not detected due to potential bias demonstrated by associated blank activity.
J	Estimated. Result is estimated due to as associated quality control parameter that is not within specified control limits.
MCL	USEPA Interim Drinking Water Maximum Contaminant Level. An MCL does not exist for C-14, so data was compared to the MDA.
NC STD	North Carolina Division of Radiation Protection, 59 NCAC 11.0114(a)(1) Appendix B, Table 2.
[box]	Result exceeds the MCL or NC STD for Carbon-14.



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ENGINEERING DESIGN:
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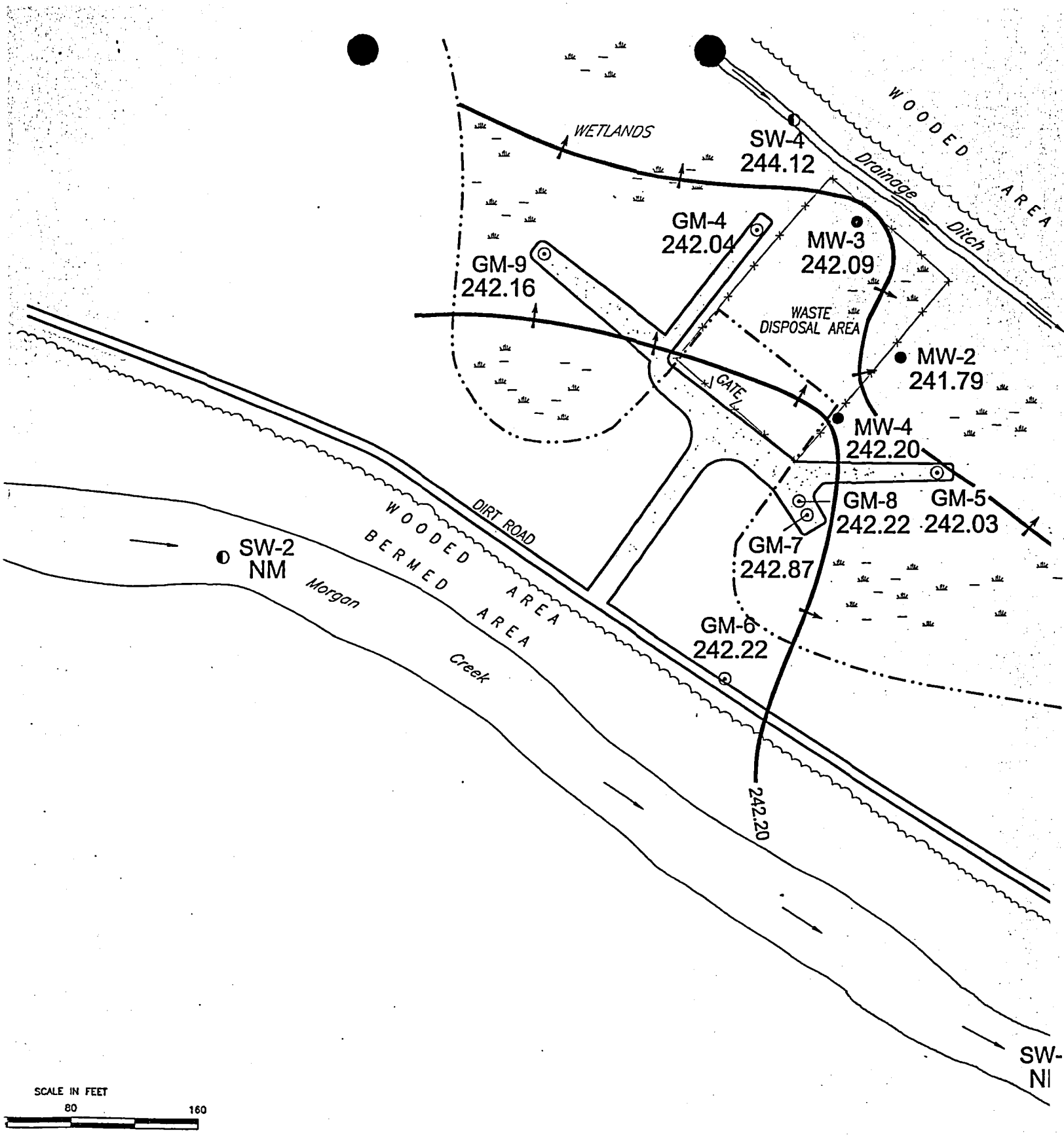
MILLER

THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

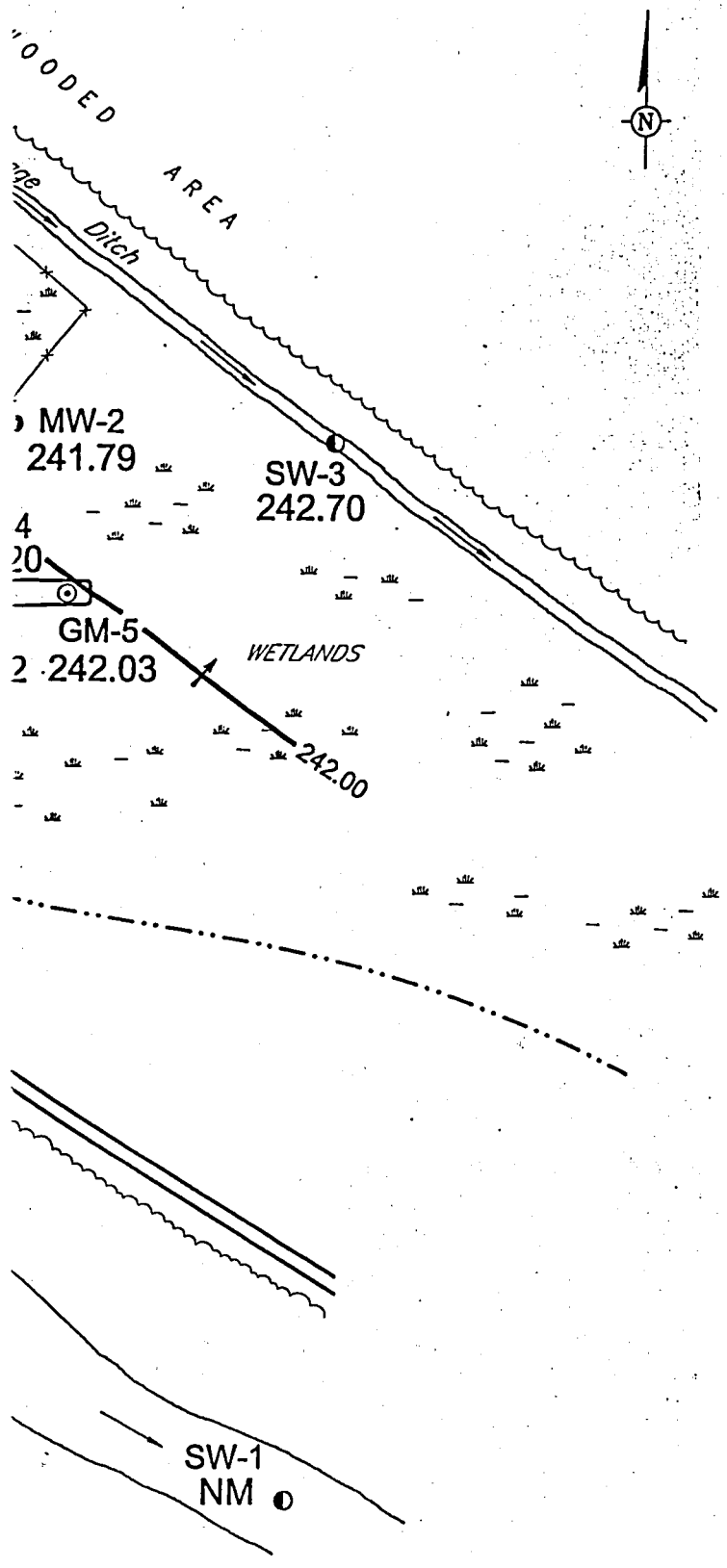
MASON FARM LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE

SITE LOCATION AND TOPOGRAPHY

DRAWN	DATE	PROJECT MANAGER	PROJECT OFFICER
B. HERRMAN	10/21/98	L. MORETZ	S. KEITH
		LEAD DESIGN PROF. N. SHETTY	CHECKED D. MALONE
		PROJECT NUMBER NC000372.0004	FIGURE NUMBER 1



AGHTY & MILLER of North Carolina, Inc. IC 27607 Fax: 919/782-5905	PRJT MANAGER: D. MALONE	CHECKED BY: A. HARTMAN	DRAFTER: A. NORTON	PROJECT NUMBER: NC000372.0006
	NOTES:		DRAWING: GW-PS	THE UNIVERSITY OF NORTH CAROLINA AT MASON FARM LOW LEVEL RADIOAC WASTE DISPOSAL SITE CHAPEL HILL, NORTH CAROLINA
			DATE: 19JAN01	



LEGEND

—×—	FENCE
●	EXISTING MONITOR WELL
⊙	NEW MONITOR WELL
◐	SURFACE WATER SAMPLE
241.18	GROUNDWATER ELEVATION (FT)
NM	NOT MEASURED
—242.50—	POTENTIOMETRIC CONTOUR (FT)
→ →	GENERALIZED GROUNDWATER FLOW DIRECTION

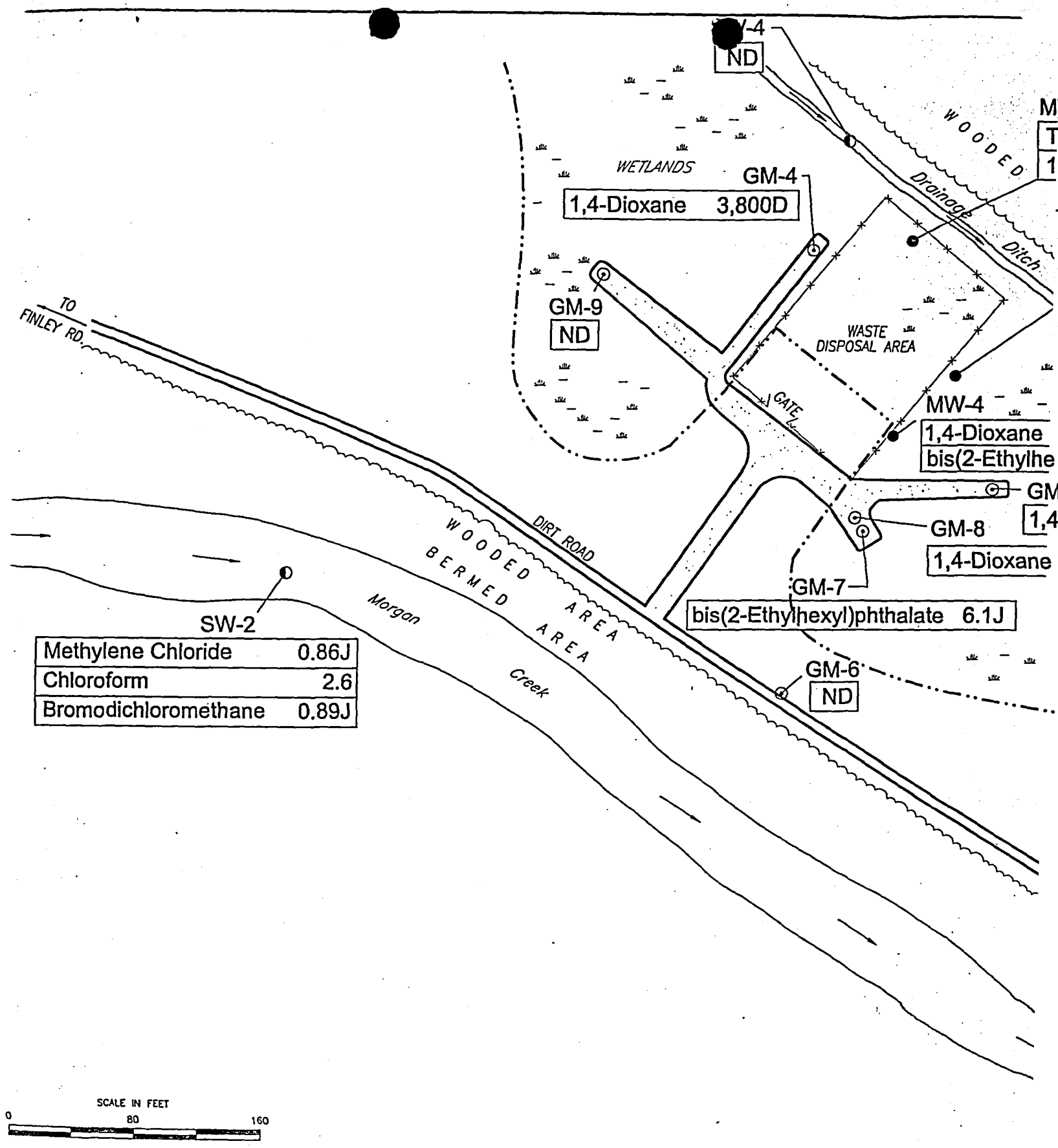
:000372.0006

NORTH CAROLINA AT CHAPEL HILL
M LOW LEVEL RADIOACTIVE
STE DISPOSAL SITE
HILL, NORTH CAROLINA

GROUNDWATER POTENTIOMETRIC SURFACE - DECEMBER 5, 2000

FIGURE:

2

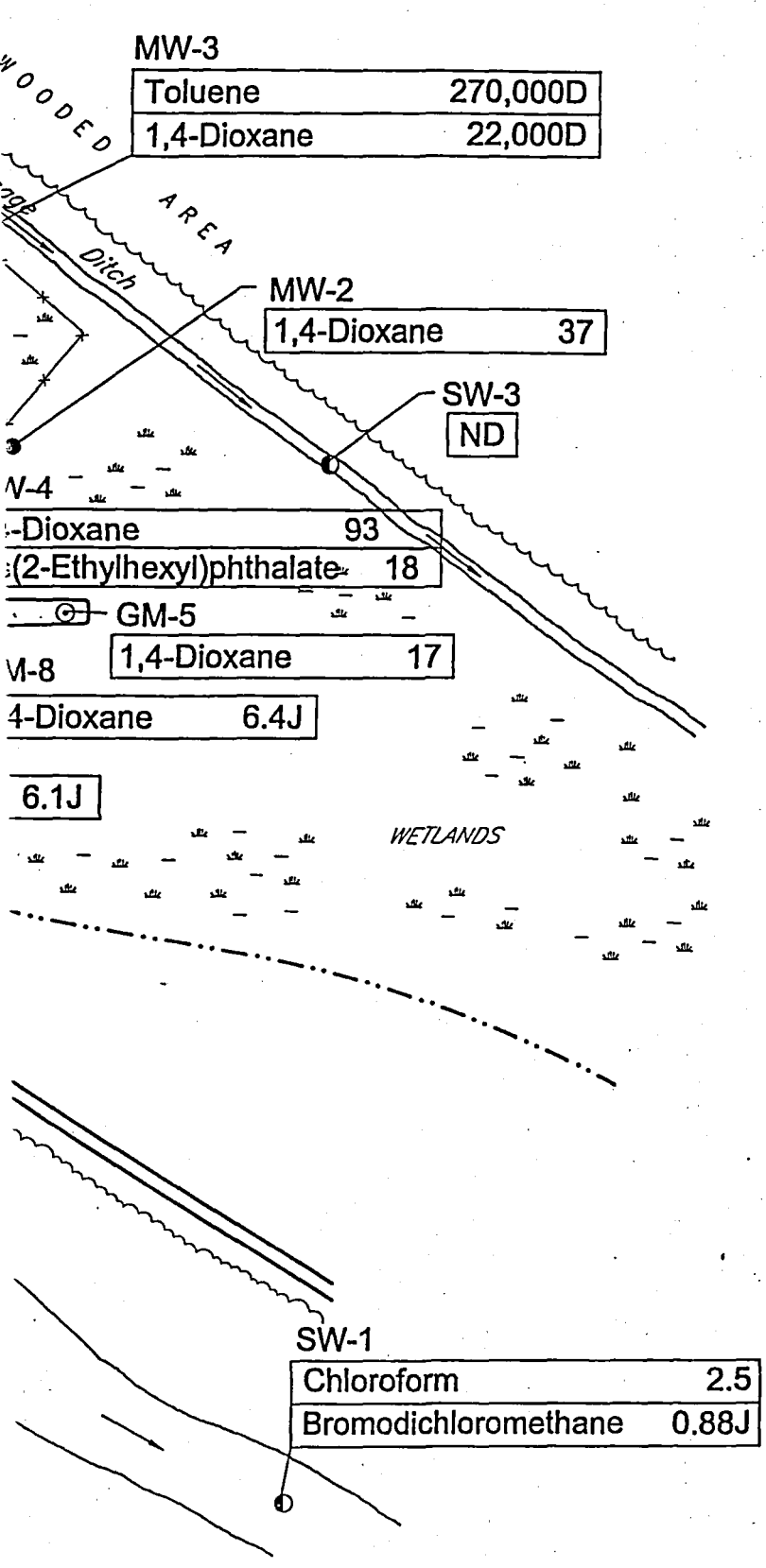


SCALE IN FEET
0 80 160

DIS GERAGHTY & MILLER of North Carolina, Inc. woods Drive RALEIGH, NC 27607 782-5511 Fax: 919/782-5905	PRJT MANAGER: D. MALONE	CHECKED BY: A. HARTMAN	DRAFTER: A. NORTON
	NOTES:		DRAWING: GW-SW-CON
			DATE: 26MAR01

PROJECT NUMBER: NC000372.00

THE UNIVERSITY OF NORTH CAR
MASON FARM LOW LEVE
WASTE DISPOSA
CHAPEL HILL, NORT



LEGEND

●	UNC MONITOR WELL
⊙	AGM MONITOR WELL
◐	SURFACE WATER SAMPLE
Toluene	CONSTITUENT
0.32 J	CONCENTRATION IN ppb
ppb	PARTS PER BILLION
J	ESTIMATED VALUE
D	SECONDARY DILUTION
ND	NON DETECT

000372.0006

NORTH CAROLINA AT CHAPEL HILL
LOW LEVEL RADIOACTIVE
TE DISPOSAL SITE
HILL, NORTH CAROLINA

GROUNDWATER AND SURFACE WATER
CONSTITUENT CONCENTRATIONS
DECEMBER 2000

FIGURE:
3

Meeting w/ UNC-CH re: Mason Farms LLRW site

3/3/01

Pete Reinhardt
Larry Dean
Rick Miller

Asked about when GW assessment could be completed i.e. - concurrent w/ source remediation?

UNC has been in regular contact w/ USACOE re: permit issues

Discussed time frame for CAP ammendment to address GW

10% excavated ⇒ extrapolated cost for whole site would be on the order of $6 Million
— could cut cost by approx 50% by using thermal treatment ∴ want to explore that possibility.

Propose time to finish GW assessment, pilot test; soil & source remediation
concrete dates for Final assessment report
time frames for

Probably have to submit an entirely new CAP for on-site treatment

Schedule a approved CAP probably unrealistic

UNC thought that a Jan 2002 deadline for GW CAP and 30 months may be required for source removal deadline

Need Letter from UNC-CH that recommends deadlines for submittals - DWQ will look at these deadlines and determine if acceptable.

Response letter with definitive dates could be accomplished within 60 days of this deadline by April 30, 2001. This date will enable UNC to give us much more reliable dates for completion.

D H E C

PROMOTE PROTECT PROSPER

2600 Bull Street
Columbia, SC 29201-1708

February 26, 2001

Mr. Chris Lock
Southeastern Soil Recovery, Inc.
PO Box 70253
Charleston, SC 29415

Re: Mason Farm Landfill Soil
UNC Chapel Hill, NC

Dear Mr. Lock:

This is concerning your request to accept approximately 21 cubic yards of soil for thermal treatment from the above referenced site. After meeting with the principals February 16 and looking at all the factors involved, we have decided to deny approval to transport this soil to your facility for thermal treatment and/or landfill disposal due to:

1) The large amount of bentonite clay that holds moisture and will certainly require the material to be burned twice.
2) The vials and needles are a concern to us and not typical of the type waste in soil you are approved to accept.
3) The fact that you have limited storage of approved soil at this time will only make a bad situation worse.
4) The fact that this soil is "tainted" with radiological materials, even though non-hazardous, could be perceived as dangerous by the public and cause unnecessary problems for you and us that we don't need.

Should you have questions or comments pertaining to our decision, please contact me.

Sincerely,

F. M. Carns
Waste Assessment Section
Bureau of Land and Waste Management

cc: Kirk Schneider – BAQ
Sue Schweikart – Trident EQC
Richard Raione – Nuclear Fuel Services, Inc.
120 Banner Hill Road
Erwin, Tennessee 37650

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
FAX (919) 962-0227

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

RECEIVED
FEB 26 2001
DENR RALEIGH REGIONAL OFFICE

February 22, 2001

Rick Bolich
DENR Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Status Report for the Excavation and Waste Segregation Activities, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina, Incident No. 15182

Dear Mr. Bolich:

The University of North Carolina at Chapel Hill (UNC-CH) has initiated remediation activities at the subject site and is submitting the attached status report for your review. The excavation and waste segregation activities were conducted pursuant to the Corrective Action Plan approved by the DENR Raleigh Regional Office on February 27, 1998.

This first phase of the remediation was conducted to identify appropriate methods for excavating, segregating, handling, and disposing of waste and impacted soil. As we have discussed, segregation of waste from the surrounding soils has proved to be very difficult primarily due to the high moisture content and clay composition of soils. As a result, during this phase of remediation substantially more material was shipped off site for disposal than originally anticipated, thereby significantly increasing our estimated costs for remediating the entire site.

In order to control remediation costs, UNC-CH is investigating alternative methods of treatment and disposal of the waste materials/soils. Our primary efforts are directed toward a thermal treatment technique provide by the Southeastern Soil Recover facility located in Charleston, South Carolina. We met with SSR representatives and South Carolina Department of Health and Environmental Control (DHEC) officials late last week to discuss permit requirements for a pilot study to treat about 20 yards of waste/soils. We are optimistic that DHEC will issue a permit for this pilot study, but we still need to resolve a few technical issues.

Yesterday, we received your Notice of Violation (NOV) regarding this site, and we will respond to the NOV separately. We look forward to meeting with you and Jay Zimmerman next week to discuss our remediation activities. UNC-CH has made tremendous progress on this difficult remediation project and we thank you for your input and patience. Please contact me at (919) 962-6666 if you have any comments or questions.

Sincerely,

J. Laurence Daw

J. Laurence Daw, P.G.
Geophysicist/Professional Geologist

Attachment

Cc: Richard Miller, UNC-CH Environmental Affairs, w/o attachment
Wendy Tingle, Division of Radiation Protection
Jay Zimmerman, Groundwater Section, w/o attachment

ARCADIS GERAGHTY & MILLER

ARCADIS Geraghty & Miller of
North Carolina, Inc.
2301 Rexwoods Drive
Suite 102
Raleigh
North Carolina 27607-3366
Tel 919 782 5511
Fax 919 782 5905

ENVIRONMENTAL BUSINESS PRACTICE

Mr. J. Laurence Daw, P.G.
Health and Safety Office
The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB#1650
Chapel Hill, North Carolina 27514

RECEIVED
FEB 26 2001
DENR RALEIGH REGIONAL OFFICE
FEB 22 2001

Subject:
Status Report for the Excavation and Waste Segregation Activities, Mason Farm Low-Level Radioactive Waste Disposal Site, The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina.

Raleigh, North Carolina
February 20, 2001

Contact:
Donald R. Malone, P.E.

Extension:
270

Dear Mr. Daw:

ARCADIS Geraghty & Miller of North Carolina, Inc. (ARCADIS Geraghty & Miller) is pleased to provide this status report for the recent remediation activities at the Mason Farm Low-Level Radioactive Waste Disposal Site in Chapel Hill, North Carolina. The remediation activities consisted of excavating approximately 450 cubic yards (cy) of soil that included eight waste disposal pits. The overall purpose of this first phase of remediation was to identify appropriate methods for excavating, segregating, handling, and disposing of waste and impacted soil contained within the former waste disposal area. This first phase of remediation also had the beneficial impact of removing approximately 10-percent of the waste and impacted soil contained within the site's perimeter. The selected remediation contractor (Nuclear Fuel Services, Inc. [NFS]) excavated, sorted, staged, and disposed of the soil and waste materials in accordance with the work plan entitled *Excavation and Waste Segregation Activities* (ARCADIS Geraghty & Miller, 2000, i.e., the Work Plan), and in accordance with the Corrective Action Plan (CAP) approved by DENR on February 27, 1998. This status report describes the field activities performed during the first phase of remediation. A more detailed report will be prepared in the near future after the field and analytical data is compiled and evaluated.

Overview of Excavation Activities

The first phase of remediation began on November 20, 2000, with NFS and their subcontractors mobilizing to the site to begin various site setup activities including expanding the existing perimeter fencing, installing a gravel staging area, and constructing a siltation fence. All required heavy equipment for excavating and handling soil and waste also were mobilized to the site during this week. A representative from The University of North Carolina at Chapel Hill (UNC-CH), collected wipe samples from the heavy equipment brought onsite to verify absence of radiological constituents. The wipe sample results indicated that none of the

equipment contained radiological constituents above background levels and thus the equipment was accepted by UNC-CH for on-site work. Other items mobilized to the site included an office trailer, port-o-john, fractionization tank, and decontamination equipment.

The excavation activities commenced on November 28, 2000 within a pre-designated area (i.e., 20-foot by 25-foot) in the southwest corner of the site, designated as Area 1. In accordance with the Work Plan, the upper 4-feet interval of overburden soil was initially excavated and staged in the "suspect clean" stockpile. No waste materials were observed within these overburden materials. The excavation then proceeded methodically to deeper soil intervals. The upper extent of three waste pits were discovered within this excavated area beginning at approximately 5 feet below land surface (bls). Subsequent excavation activities revealed that the pits extended to approximately 9 feet bls. In accordance with the Work Plan, soil was segregated and staged separately as "suspect clean" and "suspect dirty" stockpiles. Materials consisting of mostly waste were placed directly in containers for off-site disposal. The overall depth of the excavation proceeded until approximately 12 feet bls, until NFS was confident, based on field readings and observations, that the potentially impacted soil below the pits had been removed. In accordance with the Work Plan, soil samples were collected from below the waste pits, in the base of the excavation between waste pits, along the excavation sidewalls, and from the "suspect clean" stockpile. A combination of "suspect clean" soil and soil from an off-site source was then used as backfill.

Although the Work Plan identified three distinct areas slated for excavation, following backfilling of Area 1 it was decided to concentrate subsequent excavation efforts on areas immediately adjacent to this initial area. The remediation contractor began excavating Area 2, which was located immediately north of Area 1. The overall size of Area 2 was approximately 20 foot by 30 foot. As with the first excavation, the remediation contractor removed the upper 4-feet layer of overburden soil and stockpiled the soil in the "suspect clean" stockpile. After further digging, three additional waste pits were discovered in Area 2. The bases of the pits were at approximately 8 feet bls. Similar to Area 1, NFS collected the specified soil samples and then backfilled the excavation using a combination of "suspect clean" soil and soil from an off-site source.

To complete the scope of the excavation work, a narrow area (Area 3) was selected adjacent to and east of Areas 1 and 2. Area 3 was approximately 7-feet wide by 40-feet long. The excavation activities in Area 3 progressed in a similar manner as Areas 1 and 2 and two additional waste pits were discovered. Similar to Areas 1 and 2, soil samples were collected and then the area was backfilled.

Overview of Waste and Soil Processing Activities

To expedient the segregation activities, the excavated materials were determined to be "waste", if the excavator bucket contained over 75 percent waste materials. The excavated "wastes" from the pits were placed directly into B-25 containers (i.e., metal shipping containers approximately 3.5 cubic yards in size). As specified in the Work Plan, NFS attempted to segregate wastes from surrounding soils. However, because of the high moisture content and clay composition of surrounding soils, wastes were difficult to separate from soils. The soils immediately surrounding the pits were identified as "suspect dirty" if they contained less than 75-percent waste and were subsequently place in the appropriate "suspect dirty" stockpile. Animal remains were placed in red plastic bags and cardboard boxes for transportation and off-site disposal. The few bulk chemical containers removed from the pits were placed into 55-gallon drums for additional characterization.

NFS attempted to utilize a Trommel® rotary screen apparatus to process the "suspect dirty" soils and separate waste materials (e.g., scintillation vials, sharps, carcasses) from the soil. However, the wet clayey soils tended to coalesce, forming larger clods that encapsulated more of the waste materials. Therefore, the Trommel® rotary screen was not effective at separating the waste and soil. Of the materials that were processed through the Trommel®, the waste and soil mixture that did not pass through the screen were placed in B-25 containers. The fines (screenings) were considered to be "suspect dirty" and placed in a 30-yard roll-off container for additional handling. In accordance with the Work Plan, waste disposal samples were collected from representative B-25 containers and from the roll-off container of "suspect dirty" soil to characterize the materials prior to disposal.

Analytical results from the disposal analyses indicate that the materials placed in the B-25 containers either contained wastes, or were above the remediation goals established in the work plan. Therefore, B-25 containers were prepared for off-site disposal. The fines separated by the Trommel® rotary screen were below the remediation goals, and therefore were spread on the surface of the excavated areas in an 8-inch lift. A total of forty-five (45) B-25 containers of waste/soils, three (3) 55-gallon drums of waste/soil, and three (3) 55-gallon drums that contained bulk chemical containers were identified for offsite disposal. Ten (10) cardboard boxes of animal remains also were collected. The animal remains were shipped under NFS direction on December 5, 2000 to Stericycle in Haw River, North Carolina. On December 13 and 14, 2000, thirty-nine (39) of the B-25 containers of waste/soils (approximately 130-cubic yards) and the three (3) 55-gallon drums of waste/soils were shipped to Permafix for off-site treatment and disposal.

Planned Future Site-Related Activities

The overall purpose of the first phase of remediation was to identify appropriate methods for excavating, segregating, handling, and disposing of waste and impacted soil present at the site. This removal action also had the beneficial consequence of excavating and removing approximately 10-percent of the total soil and waste volume present at the site. Due to the wet clayey soils present at the site, substantially more material was shipped off site for disposal than originally anticipated, which will significantly increase our estimated costs for remediating the entire site. Additional treatability studies are planned to identify more effective and cost efficient methods to remediate the site. Therefore, ARCADIS Geraghty & Miller and UNC-CH jointly decided to retain six (6) B-25 containers, or approximately 20 cubic yards, of the waste/soil mixture onsite in order to evaluate other potential waste handling, treatment, and disposal methods. Potential treatment options for this material include using thermal treatment or a similar technology to dry the material and volatilize the organic compounds.

ARCADIS Geraghty & Miller appreciates the opportunity to work with UNC-CH. If you have any questions regarding the site, please contact me at (919) 782-5511.

Sincerely,

ARCADIS Geraghty & Miller of North Carolina, Inc.

Donald Malone, P.E.
Senior Engineer/Project Manager

Leonard Moretz, L.G.
Environmental Business Practice Manager

State of North Carolina
Department of Environment
and Natural Resources
Raleigh Regional Office

Michael F. Easley, Governor
William G. (Bill) Ross, Secretary

NCDENR
NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES

February 15, 2001

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Richard Miller
Environmental Affairs
The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

Subject: **NOTICE OF VIOLATION**
Title 15A NCAC Subchapter 2L .0106(c)(4)
Failure to Implement Approved Corrective Action Plan
University of North Carolina at Chapel Hill
Mason Farms Low Level Radioactive Waste Site
Durham, North Carolina
Durham County
Incident Number 15182
Site Ranking = 85-B

Dear Mr. Miller:

This letter is to notify you of violations of 15A NCAC 2L (Groundwater Quality Standards) and to advise you of what you are required to do to correct these violations. According to correspondence contained in the Groundwater Section's file, the Director approved a Corrective Action Plan (CAP) for the remediation of soil and groundwater contamination at the Mason Farms Low Level Radioactive Waste Site (LLRW) on December 15, 1997. The schedule contained in the CAP indicated that the remedial action(s) would be completed 14 months following approval of the CAP. Subsequent to CAP approval, the Groundwater Section has received various work plans and feasibility study proposals for corrective action that are not consistent with the schedule contained in the approved CAP. According to 15A NCAC 2L .0106(c)(4), an approved CAP must be implemented in accordance with a schedule established by the Director or his designee.

Groundwater samples from the site have revealed violations of North Carolina groundwater quality standards for toluene, naphthalene, 1,4-Dioxane, bromodichloromethane, chloroform, and tritium. The source of the groundwater contamination at the site is believed to be the buried waste material. Delays in the implementation of the approved CAP may allow the contaminant plume to migrate further away from the source and/or allow additional contaminants of concern to impact groundwater and/or surface water quality.

Due to these violations, you are required to take the following actions in accordance with applicable provisions in 15A NCAC 2L .0106 (c):

1. Take immediate action to eliminate the source or sources of contamination;

2. Submit a report to the *Raleigh Regional Office* explaining the cause and significance of the violation and any measures taken to ensure that future deadlines are met.

3. Provide information that will enable the Groundwater Section to establish a deadline to implement and complete the CAP. In establishing a schedule the Director, or his designee shall consider any reasonable schedule proposed by the person submitting the plan. A report shall be made to the Health Director of the county or counties in which the contamination occurs in accordance with the requirements of Rule .0114(a) in this section.

Your report and CAP implementation schedule must be submitted to the Raleigh Regional Office for review on or before March 15, 2001. Failure to submit the required reports or failure to expeditiously eliminate the contaminant source and restore groundwater quality in the affected area may result in the recommendation of enforcement action. Fines may be imposed under NCGS 143-215.6A(a)(1) of not more than $10,000 per violation of any classification, standard, limitation or management practice established pursuant to G.S. 143-214.1. Additional action may include the issuance of a special order against you under the authority of G.S. 143-215.2; or a request to the Attorney General to institute an action for injunctive relief. If any failure to act is continuous, penalties may be assessed not to exceed a maximum penalty of $10,000 per day per violation under NCGS 143-215.6A(b) so long as the violation continues.

We request that you respond to this notice within fifteen working days after its receipt. In your response, please confirm your intent to comply with the above requirements by specifying the actions you plan to undertake to correct the violations and by submitting a proposed schedule for accomplishing these actions.

We appreciate your attention and prompt response in this matter. If you have questions, please do not hesitate to call Rick Bolich or me at (919) 571-4700. The project manager permanently assigned to the project is Mr. Eric Rice.

Sincerely,

S. Jay Zimmerman, L.G.
Environmental Regional Supervisor
Raleigh Regional Office

cc: Arthur Mouberry
Durham County Health Department
Wendy Tingle, Division of Radiation Protection
\SJZ\reb

INCIDENT # / FACILITY ID # / or PERMIT # 15[redacted]2

GROUNDWATER SECTION STAFF REPORT

DATE OF SITE VISIT: 11/29/2000

COUNTY: Orange

FACILITY NAME & LOCATION: UNC - Mason Farms LLRW Site

TIME OF ARRIVAL: 1045

TIME OF DEPARTURE: 1205

WEATHER CONDITIONS: pt. cloudy 50's

STATE REPRESENTATIVES:

NAMES: Rick Bolich

PHONE #:

SITE REPRESENTATIVES:

NAMES:

TITLES:

PHONE#:

(circle as applicable)

REASON FOR VISIT: COMPLIANCE, COMPLAINT, UST RELEASE, AST RELEASE, SOIL STOCKPILE, OTHER source material excavation

TYPE OF SAMPLES TAKEN: SOIL (GRAB, COMPOSITE), GW, SURFACE WATER, OTHER

NO. OF SAMPLES:

TYPE OF CONTAM SUSPECTED: GAS, DIESEL, KERO, FUEL OIL, WASTE/USED OIL, SOLVENTS, PESTICIDES, OTHER radioactive waste.

SUSPECTED SOURCE Research Laboratory & hospital waste.

PHOTOS TAKEN: YES NO NUMBER OF PHOTOS 16

SUMMARY OF FINDINGS & COMMENTS: (attach additional sheets if necessary)

Excavator (trackhoe) was removing overburden from the second suspected waste pit when I arrived. Waste is mostly scintillation vials, plastic bags, animal carcasses, and glassware. Occasional metal containers. It smells horrible. The excavated material is segregated into clean, cont. soil & waste piles. Confirmation samples are being taken. Not much groundwater infiltration when I was there. There is a frac. tank on-site to store liquids. Waste pits appear to have a bottom layer of bentonite.

ATTACH A SKETCH OF SITE (show north arrow, structures, roads, well locations, sample locations, footage, & landmarks)

This form not needed for initial visit if PIRF form is used. This form should be used for all follow-up visits.

SIGNATURE(S): GW STAFF PERSON(S) Rick Bolich

REVIEWED BY: DATE:

SUPERVISOR: DATE:

COPY: FILE

FIELD.RPT 1-95

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
FAX (919) 962-0227

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

August 4, 2000

Hand Delivered

Eric Rice
Department of Environment & Natural Resources
Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

AUG - 4 2000

Subject: Work Plan to Conduct Excavation and Waste Segregation Activities, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina, Incident No. 15182

Dear Mr. Rice:

The University of North Carolina at Chapel Hill (UNC-CH) is submitting the attached work plan for your review. The proposed scope of work is being conducted in accordance with the Corrective Action Plan approved by your office. Please review the work plan and forward comments to my attention.

Although the Groundwater Section has primary oversight of this project, the Division of Radiation Protection (DRP) has requested concurrent review of this and future documents. Consequently, a copy of this work plan has also been forwarded to the DRP.

We would like to initiate field activities in early October 2000; therefore, your prompt review would be appreciated, thank you.

Sincerely,

J. Laurence Daw

J. Laurence Daw, P.G.
Geophysicist/Professional Geologist

Attachment

Cc: Richard Miller, UNC-CH Environmental Affairs, w/o attachment
Wendy Tingle, Division of Radiation Protection
Jay Zimmerman, Groundwater Section, w/o attachment

WORK PLAN TO CONDUCT EXCAVATION AND WASTE SEGREGATION ACTIVITIES

For the Phased Corrective Actions
Mason Farm Low-Level Radioactive
Waste Disposal Site

ARCADIS GERAGHTY & MILLER

July 2000

PREPARED FOR

The University of North Carolina
at Chapel Hill
Chapel Hill, North Carolina

1. Introduction

The University of North Carolina at Chapel Hill (UNC-CH) contracted ARCADIS Geraghty & Miller of North Carolina, Inc. (ARCADIS Geraghty & Miller) to develop a work plan to conduct soil-and-waste excavation, segregation, and disposal activities at the Mason Farm Low-Level Radioactive Waste Disposal Site in Chapel Hill, North Carolina. The location of the facility is shown in Figure 1-1. The purpose of this work plan is to delineate project-specific activities for qualified remediation contractors to bid on and conduct the work. The selected contractor shall be uniquely qualified to perform the work specified herein; and therefore, will use their judgment while bidding to include all work, either explicitly or implicitly stated, to complete the overall objectives of the project without the need for change orders or modifications to the work plan.

This work plan is organized into ten discrete sections, including this introduction. Section 2 provides an overview of the site's background and history. Section 3 discusses the responsibilities and authority of the remediation contract, as well key representatives from UNC-CH and ARCADIS Geraghty & Miller. Section 4 discusses key health and safety practices for the site. Sections 5 and 6 discuss site preparations and operations. Section 7 includes a sampling and analysis plan. Section 8 discusses site restoration activities. Section 9 discusses the Bidding, Contractor Selection, and Contracting aspects of the project. Section 10 discusses the final reporting activities. Section 11 contains literature references used to prepare this work plan.

1.1 Overview and Objectives of Work Activities

The site is located in a wetland environment that is subject to flash floods during torrential rains (e.g., hurricanes). Within previous work plans, ARCADIS Geraghty & Miller designed and specified elaborate plans to remediate the site that included controls to divert floodwater and inhibit groundwater infiltration into the work area so that the entire waste burial area could be excavated, handled, disposed, and backfilled within a single work period (e.g., 3- to 4-month duration). However, that option proved to be too costly, especially because we do not currently know the extent to which floodwaters or groundwater will impede the work activities.

The objectives of this work will be to excavate materials within a portion of the burial area; segregate soil and waste; handle impacted soil; package and dispose the waste; and then, backfill the excavation. After completing this work, UNC-CH and ARCADIS Geraghty & Miller will have a better understanding of the difficulties and costs associated with remediating. ARCADIS Geraghty & Miller intends for this work

plan to cover activities appropriate for the initial phase of work (e.g., excavating approximately 400 cubic yards [cy] of soil and waste) on which the contractor is bidding. However, the activities described in this work plan should also apply to future phases, so long as a work-plan addendum is prepared to delineate the extent of the future work. Modifications as appropriate to the work also shall be discussed within future addenda.

1.2 Statement of Environmental Stewardship

The site is located within a designated wetland area adjacent to a biological preserve. Therefore, UNC-CH desires that site operations commence with due consideration of the sensitive surroundings. UNC-CH's overall objective of this work is to comply with all appropriate environmental regulations while successfully removing and disposing of buried wastes. Therefore, the contractor shall perform all work in such a manner so as to be in full compliance with all federal, state and local environmental requirements, and shall, to the maximum extent practicable, control noise and minimize the generation and disposal of solid-waste materials, as well as other pollutants. The contractor shall immediately notify UNC-CH and ARCADIS Geraghty & Miller of any potential noncompliance to these environmental requirements, as well as recommend and implement suitable corrective actions to these nonconformities, upon UNC-CH approval of such work.

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
FAX (919) 962-0227

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

RECEIVED
APR 17 2000
DENR RALEIGH REGIONAL OFFICE

April 13, 2000

Eric Rice
Department of Environment & Natural Resources
Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Work Plan to Install and Test a Groundwater Recovery Well Network, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina, Incident No. 15182.

Dear Mr. Rice:

The University of North Carolina at Chapel Hill (UNC-CH) is submitting the attached work plan for your review. The proposed scope of work is being conducted, as part of the corrective action design, to further characterize the subsurface conditions at the site. Please review the work plan and forward comments to my attention.

Although the Groundwater Section has primary oversight of this project, the Division of Radiation Protection (DRP) has requested concurrent review of this and future documents. Consequently, a copy of this work plan has also been forwarded to the DRP.

We plan to initiate field activities during the week of May 22, 2000. Additionally, I would like to inform you that we are planning to conduct test pit excavations at the site on April 24, 2000.

Sincerely,

J. Laurence Daw

J. Laurence Daw, P.G.
Geophysicist/Professional Geologist

Attachment

Cc: Richard Miller, UNC-CH Environmental Affairs, w/o attachment
Wendy Tingle, Division of Radiation Protection
Jay Zimmerman, Groundwater Section, w/o attachment

THE UNIVERSITY OF NORTH CAROLINA
AT
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The University of North Carolina at Chapel Hill
212 Finley Golf Course Road, CB# 1650
Chapel Hill, North Carolina 27514

July 13, 1999

JUL 15 1999
DENR RALEIGH
REGIONAL OFFICE

Eric Rice
Department of Environment & Natural Resources
Raleigh Regional Office, Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Work Plan for Investigation of Geophysical Anomaly, The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina, Incident No. 15182.

Dear Mr. Rice:

The University of North Carolina at Chapel Hill (UNC-CH) is submitting the attached work plan for your review. The proposed scope of work is being conducted, as part of the corrective action design, to further characterize the subsurface in the geophysical anomaly area of the site. Please review the work plan and forward comments to my attention.

Although the Groundwater Section has primary oversight of this project, the Division of Radiation Protection (DRP) has requested concurrent review of this and future documents. Consequently, a copy of this work plan has also been forwarded to the DRP.

We would like to initiate field activities beginning the second week in August; therefore, your prompt review would be greatly appreciated.

Sincerely,

J. Laurence Daw

J. Laurence Daw, P.G.
Geophysicist/Professional Geologist

Attachment

Cc: Richard Miller, UNC-CH Environmental Affairs, w/o attachment
Wendy Tingle, Division of Radiation Protection
Jay Zimmerman, Groundwater Section, w/o attachment

LARRY DAW, P.G.
Geophysicist/Professional Geologist
Environmental Affairs

THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL

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rsity of North Carolina at Chapel Hill
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Chapel Hill, North Carolina 27514

RECEIVED
MAY 20 1998
RALEIGH

May 19, 1998

James McGuire
North Carolina Department on Environment and Natural Resources
Division of Water Quality
Groundwater Section
3800 Barrett Drive, Suite 101
Raleigh, NC 27609

Subject: Soil/Waste Characterization Sampling and Analysis/Quality Assurance Plan
The University of North Carolina at Chapel Hill, Mason Farm Low Level Radioactive Waste Disposal Site, Chapel Hill, North Carolina.

Dear Mr. McGuire:

The University of North Carolina at Chapel Hill (UNC-CH) is pleased to submit this combined Sampling and Analysis/Quality Assurance Plan (SAP/QAP) prepared for the referenced site. As you may be aware, the proposed corrective actions for the site include excavation, both on- and off-site soil treatment, and disposal of buried waste materials and contaminated soil.

The scope of work discussed in the SAP/QAP is being conducted to further characterize subsurface media. The planned work includes sampling activities to characterize wastes within several disposal pits and an investigation of a subsurface anomaly identified during a geophysical survey conducted in January 1997. Results from these sampling activities will then be used to facilitate waste handling, treatment, and disposal of buried media and will be incorporated in the bid documents prepared for the site.

We are prepared to initiate the sampling activities within a few weeks following your approval of the SAP/QAP. Therefore with your prompt response, we estimate that the work can commence by mid-June 1998. We will provide an exact time for the investigation at a later date so that your department can to visit the site during the sampling activities.

In November 1997, we spoke with Aaron Padgett of the Division of Radiation Protection (DRP). Mr. Padgett indicated that the Division of Water Quality (DWQ) will provide the primary oversight role, however, the DRP would like concurrent review of all related documents. Therefore, a copy of this plan has also been forwarded to the DRP.

We look forward to working with the DWQ and the DRP during the successful completion of this project. We will call you and Mr. Padgett in several weeks to discuss the status of this project and to schedule the work activities. Thank you for your review of this document. We look forward to your input.

Sincerely,

J. Laurence Daw, P.G.
Geophysicist/Professional Geologist

Attachment

Cc: Richard Miller, UNC-CH Environmental Affairs, w/o Attachment
Leonard Moretz, ARCADIS Geraghty & Miller, w/o Attachment
Aaron Padgett, Division of Radiation Protection

MAR 0 4 1998

NORTH CAROLINA DEPARTMENT OF
ENVIRONMENT AND NATURAL RESOURCES
RALEIGH REGIONAL OFFICE

NCDENR

JAMES B. HUNT JR.
GOVERNOR

WAYNE MCDEVITT
SECRETARY

Post-it® Fax Note 7671	Date 2-22-01	# of pages ▶ 3
To Rick Bolich	From Larry Daw	
Co./Dept. RRO	Co. UNC-CH	
Phone #	Phone # 962-6666	
Fax # 571-4718	Fax #	

DIVISION OF WATER QUALITY
GROUNDWATER SECTION
February 27, 1998

The University of North Carolina
Attention: Richard Miller
212 Finley Golf Course Road
Chapel Hill, NC 27514

SUBJECT: Approved Corrective Action Plan
Mason Farm Low -Level Radioactive Disposal Site
Finley Golf Course Road Extension
Chapel Hill, NC, Orange County
Incident # 15182
Site Priority Ranking 100E

Dear Mr. Miller:

On February 28, 1997 the Division of Water Quality (the "Division"), received a Source Remediation Corrective Action Plan (CAP) from the University of North Carolina for approval pursuant to North Carolina Administrative Code, Title 15A, Subchapter 2N (15A NCAC 2N) .0707. The CAP was prepared by Leonard Moretz, a Licensed Geologist with Geraghty & Miller, Inc. to address the soil and groundwater contamination at the subject site.

Upon review of the CAP, the Division is granting final approval of the source remediation.

Corrective Action Approval

Corrective Action Plan

The Division hereby approves performance of the following activities as corrective actions at the subject site:

* the removal (excavation), treatment, and offsite disposal of buried waste and contaminated soils from the vicinity of the burial pits and,

* the installation of piping and equipment associated with the groundwater extraction system and the filtration and ultraviolet/peroxide oxidation system. The groundwater treatment system is to be used temporary to dewater the contaminated area during source removal activities only.

If you determine that other corrective actions are needed at this site during the initial source remediation, submit a CAP Addendum to our office outlining the new corrective actions.

The Divisions approval of this CAP is contingent upon your adherence to the conditions listed below. Your initiation of corrective actions at this site will constitute your understanding and acceptance of these conditions of approval. Failure to fully adhere to each of the conditions of approval outlined in this letter will constitute a violation of 15A NCAC 2N.

A. **Conditions of Approval**

1) The Divisions decision in this matter was based upon the information contained in the referenced proposal, and any other accompanying/previous submittals, and would be subject to review if these sources contained any material omissions or misstatements.

2) The CAP should not be implemented until you have received all the necessary permits (federal, state, and/or local).

3) This corrective action must be performed in a manner and to a degree which ensures the protection of human health, safety, public welfare and the environment.

B. **Site Specific Conditions**

Soil contamination should be cleaned-up to the standards outlined in the CAP.

Source Remediation Reports

A report outlining all remediation steps that were taken, laboratory results of soil and groundwater samples taken during and after the source remediation has been completed, amount of

soil excavated and disposed off-site and the amount of groundwater that was pumped, treated and disposed off-site. The report should also outline general description of the overall performance of the remediation system, including system breakdowns, equipment retrofit, etc. The Source Remediation Report should bear the seal of a Licensed Geologist or Professional Engineer and be submitted to the Division within 60 days of completion of the initial source remediation.

Upon completion of the initial source remediation, further assess the site and submit a CAP Addendum outlining any further remediation that is necessary at this site within 120 days.

Per 15A NCAC 2N .0708, public notice has been posted in Orange Counties Clerk of Court, Orange Counties Health Services and in The Chapel Hill Newspaper on November 16, 1997. No public comments were received.

If you have any questions relative to this matter, please contact James McGuire or Jay Zimmerman at the letterhead address or (919) 571-4700. All future communications regarding this site should reference the Incident # and Site Name contained in the subject block of this letter.

Sincerely,

Judy Garrett

for Kenneth Schuster, P.E.
Regional Supervisor
Raleigh Regional Office

KS:JZ:JM

cc: Geraghty & Miller, Inc, ATTN: Leonard Moretz, 2840 Plaza Place, Suite 350, Raleigh, NC 27612
Radiation Protection
approval.cap\Mason.app

UNC to clean up Mason Farm waste site

Medical wastes and some radioactive liquids were buried on the one-third acre site. The clean-up will cost $3.9 million.

BY JANE STANCILL
STAFF WRITER

CHAPEL HILL — The University of North Carolina at Chapel Hill announced plans Thursday to dig up radioactive waste on Mason Farm and clean up contaminated water around the old disposal site.

The project will cost $3.9 million, although the money has not been earmarked. It was UNC-CH's second dump cleanup announced in a week. Last week, the university told the public about its plan to deal with a chemical waste site on its Horace Williams property at a cost of $4.7 million.

Both projects are voluntary. But in both cases, tests have showed groundwater contamination around the burial sites.

At the Mason Farm site off Finley Golf Course Road Extension, the contaminated area measures one-third of an acre. From 1963 to 1970, the university buried medical wastes and glass vials of radioactive liquids on 52 occasions.

At the time, those were accepted practices according to state law. Now such burials are illegal and waste must be shipped to approved radioactive waste dumps in other states.

Last year, the university hired the Raleigh environmental firm Geraghty & Miller to evaluate the Mason Farm site, which lies in the Jordan Lake floodplain. Jordan Lake provides drinking water for Cary and Apex.

The consultants found several contaminants in groundwater within the fenced-in site. The level of tritium there exceeded EPA standards for drinking water.

Outside the fence, the only chemical found above state standards was diethylene ether.

The substances are semi-volatile organic compounds and solvents commonly found in gasoline and paint thinner. They could be toxic, but there are no drinking wells near the property.

Radioactive isotopes were found only at levels below state safety standards.

Consultants said very little of the contamination had migrated because the surrounding wetlands are stable and stagnant. Tests on nearby Morgan Creek came up negative for contaminants from the burial site.

The university will hire a company to clean up the site by digging up the waste and then shipping it to a proper disposal place. During the excavation, groundwater is pumped out, the water treated, collected and finally released.

The cleanup could take only a few months, but will not start until the money is earmarked, an engineering design is approved and bids received. So far, the university has not set a timetable to clean up either site.

At this point, UNC-CH is not required by law to clean up the site. But Richard Miller, the university's environmental affairs manager, said it makes sense to do it sooner rather than later.

The plan was presented to the public Thursday night at the Friday Center.

RICHARD L. MILLER, Ph.D.
Environmental Affairs Manager
THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
Health and Safety Office
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Fax (919) 962-0227
rlm.hsafety@mhs.unc.edu

2-27-97
Mtg. @ Friday Ctr.

presenters G&M Proj. Team
Michael Grey, G&M
Leonard Mowry, Proj. Mgr., P.G.
Eric Christensen, Proj. Engineer (P.E.?)

- scintillation vial "carrier liquids" (for suspension/dispersion of experimental radionuclides): toluene, diethylene ether, naphthalene

⇒ unresolved assessment issues:

post-remediation (downstream) assessm. will be needed

addit'l borings? → - continuity of underlying silty clay zone & thickness

- need for a 2nd deeper mw near burial area "hot spot" (mw-3), northern area w.i. fence
  → only well in burial area itself (trenches)

- viol.s of 2L for bromodichloromethane, chloroform, dibromochloromethane } outside the fence

- will use Inactive Haz. Waste Site Program (DWM) soil remed. action levels as targets

Late Jan. - sampled shallow overburden soils (3-4') -- if clean will be scraped/stockpiled → use as backfill later

- conceptual excavation/dewatering plan only @ this pt.

↓ treatment

- is treatment syst. over-designed, i.e., could it handle even higher conc.s than seen @ MW-3

1° via UV oxidation

↓

to 3 21,000-gal holding tanks for pre-discharge s/a

- estimated cleanup costs ~ $4 million (1° to gw CAP)

- jurisdictional wetland/general permit to do assessm. & remed. from Corps of Engineers

- estimate 52 distinct burial pits within the fenced area : total dimensions ~ 160' X 100' (~0.4 acres)

SOIL SOLUTIONS

Tony Disher
President

1703 Vargrave Street
Winston-Salem, NC 27107

Office: (910) 725-5844
Fax: (910) 725-6244

GERAGHTY & MILLER, INC.
Environmental Services

Leonard C. Moretz, P.G.
Senior Scientist/Hydrogeologist

CrossPointe II
2840 Plaza Place, Suite 350
Raleigh, North Carolina 27612
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Update on the
Mason Farm Low Level Radioactive Waste Disposal Site
February 1997

The University used this fenced, one-third acre site, located in Durham County at the end of the Finley Golf Road Extension, from 1963 to 1970 for the burial of low level radioactive wastes. These burials were in compliance with protocols set by the State of North Carolina. Approximately 52 burials, from 5 to 8 feet deep, were made during the period. Burials were discontinued when the low level radioactive waste disposal site at Barnwell, South Carolina, was opened. Buried items included laboratory disposables, animal carcasses, and scintillation vials containing chemicals and radioactive isotopes that were commonly used in research during that time.

In early 1996, the University began exploring the possibility of removing the waste material, and sampled groundwater for chemical and radioactive constituents. Chemical contamination of the groundwater was discovered inside the burial pits. The University immediately sampled the surface water in the ditch directly north of the fenced area, both upstream and downstream from the site. Sample results were negative for toluene and other volatile organic compounds. The University contacted and met with the N. C. Division of Radiation Protection (DRP), the N. C. Division of Water Quality (DWQ) and the N. C. Division of Waste Management (DWM) to discuss investigation of the site. The parties agreed that the site would be investigated under DWQ guidelines for a Comprehensive Site Assessment (CSA).

The University retained Geraghty & Miller, environmental consultants, to conduct the CSA. No chemical constituents related to the site were found in soil samples outside the fenced area and no radioactive isotopes were detected in the soil at concentrations exceeding DRP standards. The groundwater at the site has been impacted by chemical constituents, but the extent of the chemical constituents in the groundwater is limited to the upper portion of the water-table aquifer within and near the fenced disposal area. Toluene, diethylene ether, and naphthalene were detected in the monitoring well inside the disposal area. However, diethylene ether was the only chemical detected above state groundwater standards in any of the seven wells located outside the fence. No radioactive isotopes were detected in the groundwater inside or outside the fence at concentrations exceeding DRP standards. Tritium, however, was detected above the EPA Interim Drinking Water Maximum Contaminant Limit in the groundwater well located inside the disposal area.

based on a single deep mw (GM-7)

= p-dioxane

not strictly true

The soil in the area is clay of the type used to line sanitary landfills. Because the contaminants were buried in a thick clay zone, they tend to stay inside the burial pits and are very slow to move outside of the pits. This effect is known as the "bathtub" effect. Also helping to minimize the movement of the contamination is the fact that the surface of the groundwater table in the area of the site is very flat. The contaminants are located mainly in an upper clay zone where the groundwater is moving at a rate of only six feet per year. These site conditions have resulted in most of the contamination remaining within the limits of the burial area. Very little contamination has migrated outside the fence.

Geraghty & Miller completed the CSA and submitted it to the state regulatory agencies in November, 1996, and the University held a meeting at the Friday Continuing Education Center to inform the community of the findings. Geraghty & Miller then began work on a Corrective Action Plan (CAP). A CAP describes the possible cleanup alternatives to be used at the site, and identifies a recommended alternative. The recommended corrective action for this site includes excavation, treatment and disposal of the buried wastes and contaminated soil. The site must be dewatered before excavation can take place, and groundwater extracted during the dewatering phase will be treated and disposed. It is anticipated that the most significantly contaminated groundwater will be removed by the dewatering process. After the completion of the above-described activities, further assessment activities will be undertaken and a CAP will be developed to address any remaining groundwater contamination.

The estimated cost for the above-described activities is $3.9 million, in today's dollars. Geraghty & Miller recommends, and the University concurs, that excavation should not occur until disposal avenues are identified. Because of the lack of soil contamination, the lack of drinking water wells nearby, the distance of the site from any public water supply intakes, the slowness of any contaminant migration, and the presence of a locked fence around the site, the University believes that the contamination poses minimal risk to human health. The University will work to identify appropriate disposal avenues and will work with the University of North Carolina General Administration to seek funding for the project.

based on 8 geoprobe pts. & 9 mw borings

CORRECTIVE ACTION PLAN
SOURCE REMEDIATION
THE UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL
MASON FARM LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

February 1997

Prepared for:

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road
Chapel Hill, North Carolina

Prepared by:

GERAGHTY & MILLER, INC.
and
GMCE, Inc.
Environment and Infrastructure
CrossPointe II
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Raleigh, North Carolina 27612
(919) 571-1662

CORRECTIVE ACTION PLAN
SOURCE REMEDIATION
THE UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL
MASON FARM LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

EXECUTIVE SUMMARY

This Corrective Action Plan (CAP) was prepared for the University of North Carolina at Chapel Hill (the University) Mason Farm Low-Level Radioactive Waste Disposal Site in Chapel Hill, North Carolina, in accordance with Title 15A North Carolina Administrative Code, Chapter 2L.0106. The proposed corrective action addresses remediation and/or control of primary and secondary contamination in the waste disposal area. A CAP to address groundwater will be prepared after the corrective action to address the source materials has been completed. Corrective action for the site will require the approval of the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR), Division of Water Quality (DWQ) and Division of Radiation Protection (DRP).

Between November 1963 and sometime in 1970, the University disposed of low-level radioactive waste at the site resulting from radiological research activities at the University. Material reportedly disposed of at the site consisted of laboratory disposables (rubber gloves, empty vials, paper, hypodermic needles, glass bottles, etc.), animal carcasses, animal bedding, and glass and plastic scintillation vials (containing toluene and xylene-based counting media). The primary radioactive constituents of concern associated with the site include tritium (hydrogen-3) and carbon-14.

The proposed corrective action for the site includes excavation, treatment (both on- and offsite), and disposal or interim storage of primary (buried wastes) and secondary contamination (soil) in accordance with all applicable federal, state, and local regulations. No wastes will be excavated until treatment options and the final disposition for the wastes can be established. Groundwater extracted during dewatering the excavation will be treated and discharged via either a wastewater discharge permit with a publicly owned treatment works (POTW) or via a National Pollutant Discharge Elimination System (NPDES) permit for discharge to Morgan Creek. If concentrations of radioactive constituents preclude discharge via a POTW or NPDES permit, groundwater may need to be transported offsite for treatment and disposal.

This CAP does not address groundwater contamination. It is anticipated that the most significantly contaminated groundwater will be removed by dewatering the excavation during activities to remove source materials. After the completion of source removal activities, a groundwater CAP will be developed and an evaluation will be conducted to determine the appropriate corrective action.

COMPREHENSIVE SITE ASSESSMENT REPORT
UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
MASON FARM LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

Volume I

November 1996

Prepared for:

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road
Chapel Hill, North Carolina

Prepared by:

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CONTENTS

Page

1.0 INTRODUCTION 1-1

2.0 SITE DESCRIPTION, OPERATIONS AND HISTORY 2-1

3.0 SETTING 3-1
- 3.1 ADJACENT PROPERTY USES 3-1
- 3.2 TOPOGRAPHY AND SURFACE-WATER DRAINAGE 3-1
- 3.3 POTENTIAL RECEPTORS 3-2

4.0 SITE ASSESSMENT METHODOLOGY 4-1
- 4.1 WETLANDS DELINEATION 4-1
- 4.2 SOIL BORINGS 4-2
- 4.3 MONITOR-WELL INSTALLATION AND DEVELOPMENT 4-2
- 4.4 GROUNDWATER AND SURFACE-WATER SAMPLING 4-4
- 4.5 AQUIFER TESTS 4-4
- 4.6 GEOTECHNICAL SAMPLING AND ANALYSIS 4-5
- 4.7 SURVEYING 4-5
- 4.8 WATER-LEVEL MEASUREMENTS 4-5

5.0 HYDROGEOLOGY 5-1
- 5.1 GEOLOGY 5-1
  - 5.1.1 Regional Geology 5-1
  - 5.1.2 Site-Specific Geology 5-1
- 5.2 GROUNDWATER AND SURFACE-WATER FLOW SYSTEM 5-2
  - 5.2.1 Groundwater and Surface-Water Flow Directions 5-2
  - 5.2.2 Hydraulic Conductivities 5-3

6.0 ANALYTICAL RESULTS 6-1
- 6.1 SOIL QUALITY RESULTS 6-1
  - 6.1.1 Volatile Organic and Semi-Volatile Organic Constituents 6-1
  - 6.1.2 Radionuclide Isotopes - Tritium and Carbon 14 6-2
- 6.2 GROUNDWATER AND SURFACE-WATER QUALITY RESULTS 6-3
  - 6.2.1 Volatile Organic and Semi-Volatile Organic Constituents 6-3
  - 6.2.2 Radionuclide Isotopes - Tritium and Carbon 14 6-4
- 6.3 GEOTECHNICAL ANALYTICAL RESULTS 6-5

7.0 PRINCIPAL FINDINGS AND CONCLUSIONS 7-1

8.0 REFERENCES 8-1

TABLES

4-1. Monitor-Well Construction Details.
5-1. Groundwater and Surface-Water Elevations.
5-2. Summary of Hydraulic Conductivity Data.
6-1. Summary of Radioisotope Analytical Data for Geoprobe Soil Samples.

CONTENTS (continued)

TABLES

6-2. Summary of Volatile Organic and Semi-Volatile Organic Constituents Detected in Groundwater Samples.
6-3. Summary of Volatile Organic and Semi-Volatile Organic Constituents Detected in Surface-Water Samples.
6-4. Summary of Tritium Radioisotope Analytical Data for Groundwater and Surface-Water Samples.
6-5. Summary of C-14 Radioisotope Analytical Data for Groundwater and Surface-Water Samples.

FIGURES

1-1. Site Location Map.
2-1. Site Layout.
2-2. Estimated Number and Position of Mason Farm Burial Pits.
4-1. Geoprobe™ Locations.
4-2. Groundwater and Surface-Water Sampling Locations.
5-1. Cross-Section Location Map.
5-2. Geologic Cross-Section A - A'.
5-3. Groundwater Potentiometric Surface, August 7, 1996.
5-4. Groundwater Potentiometric Surface, August 27, 1996.
6-1. Groundwater and Surface-Water Constituent Concentrations.
6-2. 1,4 Dioxane Isoconcentration Contours.

APPENDICES

A. Wetland Delineation Report Regulatory Correspondence and Nationwide Permit #14.
B. Geoprobe™ Boring Logs.
C. Well Construction Diagrams and Lithologic Logs.
D. Sampling and Slug Testing Protocols.
E. Slug Test Plots.
F. Chemical Analytical Results.
G. Geotechnical Testing Results

COMPREHENSIVE SITE ASSESSMENT REPORT
UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL
MASON FARM LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

EXECUTIVE SUMMARY

The University of North Carolina at Chapel Hill (the University) Mason Farm Low-Level Radioactive Waste Disposal Site served as a burial site for low-level radioactive material generated by the University from 1963 to 1970. During its active life, operations were performed according to regulations in place at that time. The site was developed and used prior to the creation of Jordan Lake. At the time of it's use the water table was lower than at the present time. Since the lake was created in the early 1980s, the water table has risen at the site as a result of the lake's impoundment such that the burial pits are now below the water table. In 1989 the Division of Radiation Protection (DRP) conducted limited sampling at the site. Since 1991, the site has been monitored for radioactivity under a plan approved by the DRP. No radioactivity significantly above natural background levels has been detected in groundwater outside the waste disposal area during any current or past sampling.

In early 1996, the University began exploring the possibility of removing the waste material and as part of its research sampled the groundwater at the site for chemical constituents. The sample from the monitoring well inside one of the burial pits (MW-3) contained toluene at a concentration greater than 100,000 parts per billion (ppb) in the groundwater. Because the site is adjacent to a ditch which flows into Morgan Creek, a tributary to Jordan Lake, the University immediately sampled the surface water. Both upstream and downstream samples contained no analyzed constituents above the Practical Quantitation Limit (PQL).

The University contacted the DRP and the Division of Environmental Management (DEM) and reported the above-cited findings. Additionally, the University met with the DRP, the DEM and the Division of Solid Waste Management (DSWM) to discuss further investigation of

the site. An agreement was made that the site would be investigated under the DEM guidelines for a Comprehensive Site Assessment (CSA). This report presents the results of this CSA.

Initially, soil samples were collected from eight locations immediately adjacent to the site at a depth just below the reported bottom of the burial pits. No samples were collected inside the fenced site. The purpose of these samples was to determine whether the material in the pits had leached into soils immediately adjacent to the burial pits. The samples were analyzed for volatile and semi-volatile organic compounds (SVOC), tritium and carbon-14. The soils adjacent to the fenced area have not been impacted above either State or Federal standards or State or Federal comparable remediation guidelines for chemicals in the soil. Only very low levels of tritium, below the State DRP standard and the USEPA Interim Drinking Water Maximum Contaminant Limit (MCL), were detected in interstitial waters of the soil samples. No C-14 was detected in the soil samples and the only VOC or SVOC detected was diethyl phthalate. The phthalate was only detected in one sample at a concentration well below the State remediation guideline.

The second phase of investigation involved the installation of five monitor wells to determine the nature and extent of any releases from the site. These wells and two previously existing wells were sampled and analyzed for volatile and semi-volatile organic compounds, tritium and carbon-14. The results indicate that the groundwater has been impacted by site activities, but the extent of chemical constituents is limited to the upper portion of the water-table aquifer within and near the fenced disposal area. Toluene was detected in only one well, MW-3, which monitors burial pit water within the fenced disposal area. An earlier detect of toluene in this well prompted this CSA. A SVOC, 1,4-dioxane (diethylene ether), was detected in six of the eight wells sampled with the highest concentration (21,000 ppb) in well MW-3. The lateral extent of 1,4-dioxane is generally restricted to the disposal pits area with significantly reduced concentrations in wells outside the waste disposal area.

Surface water has not been significantly impacted by activities at the site. Toluene was detected at a concentration of 1.9 ppb in sample SW-3 which was collected in a drainage ditch immediately downgradient of the disposal area. Other constituents detected in Morgan Creek may be attributed to other upstream sources.

Groundwater and surface water samples were analyzed for tritium and C-14 isotopes which are indicative of the low-level radioactive waste placed in the burial pits. Neither tritium nor C-14 were detected at concentrations exceeding the DRP for discharge to surface water. Tritium was detected above the Federal MCL of 20,000 pCi/L in well MW-3, inside the waste disposal area, but was not detected above the MCL in any other wells.

COMPREHENSIVE SITE ASSESSMENT REPORT
UNIVERSITY OF NORTH CAROLINA
AT CHAPEL HILL
MASON FARM LOW-LEVEL RADIOACTIVE
WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

1.0 INTRODUCTION

The University of North Carolina at Chapel Hill (the University) retained Geraghty & Miller, Inc., (Geraghty & Miller) to conduct an environmental investigation at the Mason Farm Low-Level Radioactive Waste Disposal Site on the University's Mason Farm property in Chapel Hill, North Carolina (Figure 1-1). The site was used between November 1963 and sometime in 1970 as a burial site for low-level radioactive waste generated at the University. During its active life, operations were performed according to regulations in place at that time. The site was developed and used prior to the creation of Jordan Lake. At the time of it's use the water table was lower than at present. Since the lake was created in the early 1980s, the water table has risen at the site as a result of the lake's impoundment such that the burial pits are now below the water table. In 1989 the Division of Radiation Protection (DRP) conducted limited sampling at the site. Since 1991, the site has been monitored for radioactivity under a plan approved by the DRP. No radioactivity significantly above natural background levels has been detected in groundwater outside the waste disposal area during any current or past sampling.

In early 1996, the University began exploring the possibility of removing the waste material and, as part of their research, sampled the groundwater at the site for chemical constituents. The University's Health and Safety Office sampled three shallow monitoring wells on January 19, 1996, and analyzed them for methylene chloride, benzene, toluene, ethylbenzene, and total xylenes. Results of analyses of samples from two wells (MW-1 and MW-2) located on the perimeter of the site were Below Quantitation Limits (BQL). The sample from the monitoring well inside one of the burial pits (MW-3) contained toluene at a concentration greater than 100,000 parts per billion (ppb) in the groundwater. Because the site is adjacent to a ditch which flows into Morgan Creek, a tributary to Jordan Lake, the University immediately sampled the

surface water. Both upstream and downstream samples contained no analyzed constituents above the Practical Quantitation Limit (PQL).

The University contacted the DRP and reported the above-cited findings. Further, the University met with the DRP, the Division of Environmental Management (DEM) and the Division of Solid Waste Management (DSWM) to discuss further investigation of the site. An agreement was made that the site would be investigated under the DEM guidelines for a Comprehensive Site Assessment (CSA). This report presents the results of this CSA.

Geraghty & Miller prepared this CSA for the University, consistent with DEM guidance (NCDEHNR, 1993). This report presents the results of soil sampling, monitor-well installation and sampling, and surface-water sampling. The field work was conducted between June and August 1996. Descriptions of the field procedures, the laboratory reports, and other information also are provided.

2.0 SITE DESCRIPTION, OPERATIONS AND HISTORY

The site is in a low-lying area of the University's Mason Farm property near Morgan Creek as shown on Figure 1-1. A small drainage ditch flows immediately adjacent to the north side of the waste disposal area. Jordan Lake lies approximately three-quarters of a mile downgradient of the site. A wetlands delineation survey, which was performed as part of this investigation, indicates that part of the site lies within a jurisdictional wetlands (Appendix A). The waste disposal area, which encompasses an area approximately 100 feet by 150 feet, was fenced prior to initial operation and remains fenced. The site layout is depicted on Figure 2-1.

The site was formerly used as a low-level radioactive waste disposal site for the University between November 1963 and sometime in 1970. Material reportedly disposed of at the site consisted of laboratory disposables (rubber gloves, empty vials, paper, hypodermic needles, glass bottles, etc.), animal carcasses, and glass and plastic scintillation vials (containing toluene and xylene-based counting media). The material was reportedly placed in boxes and/or plastic bags before being placed in the trenches.

Disposal protocols followed standards set by the State of North Carolina at that time. At the time of the burials, Jordan Lake had not been impounded and therefore the water table was lower than at present. The burials were performed in a series of pits/trenches dug by a backhoe to a depth of typically between 5 and 8 feet. Because of the shallow groundwater table at the site, the waste was at times placed into trenches below the water table. The pits were at least 6 feet apart and were covered with at least 4 feet of compacted earth. The exact number of disposal pits at the site is unknown, but approximately 52 burials are thought to have occurred in a pattern depicted in Figure 2-2.

Previous site investigations are basically limited to routine semi-annual monitoring of the site which has occurred since 1991. However, the DRP sampled the site in the late 1980's and some sampling was conducted during a master's thesis by Charles E. Maples in 1990. Results of the semi-annual sampling indicate that no radioactivity significantly above natural background levels has been detected in groundwater outside the waste disposal area. Reports from the

University's semi-annual sampling have been submitted to the DRP. Additional sampling for organic constituents was performed by University in early 1996. Analysis from this sampling event indicated that toluene was present in the groundwater above 100,000 ppb. The results of this sampling were submitted to the DRP and the DEM and prompted this CSA.

3.0 SETTING

3.1 ADJACENT PROPERTY USES

The waste disposal area is a small (100' x 150') area located in a large parcel (>100 acres) of undeveloped land owned by the University. University property surrounds the site for a distance of at least 1,500 feet in all directions. The waste disposal area is located near a biological preserve and there is no commercial or residential development within 1,500 feet of the site. One residence, owned by the University, lies approximately 1,500 feet northeast of the site in an upgradient direction. The area is provided water by the Orange Water and Sewer Authority Water (OWASA) Distribution System. No residences are downgradient of the site because the disposal area is located in the floodplain of Jordan Lake. Access to the floodplain area where the waste disposal area is located is restricted through a locked gate owned by the University. Additionally, the waste disposal area is surrounded by a locked chain-link fence.

3.2 TOPOGRAPHY AND SURFACE-WATER DRAINAGE

The site is depicted on a United States Geological Survey (USGS) 7.5-minute series Chapel Hill topographic quadrangle (Figure 1-1). Topography in the immediate Chapel Hill area consists of occasional hills and valleys. The site is situated on a low-lying, flat area on the floodplain of Morgan Creek upgradient of Jordan Lake. Jurisdictional wetlands have been identified at the site. Approximate elevation of the site is 243 feet above mean sea level (ft msl). The flood stage of Jordan Lake is approximately 241 ft msl, with normal pool being approximately 220 ft msl.

Normal surface-water drainage is southeast toward Jordan Lake. A drainage ditch is present immediately adjacent to the northern side of the waste disposal area. Water from the waste disposal area likely drains into this ditch, which discharges into Jordan Lake, approximately 1/2 mile from the site.

3.3 POTENTIAL RECEPTORS

Residents of Chapel Hill and portions of southern Orange County and southern Durham County are provided with water via the OWASA. OWASA obtains water from a surface-water intake on University Lake, approximately 3 miles southwest of the subject site. Rural areas of Orange County are supplied with water via individual water-supply wells. There are no known water-supply wells within 0.5 mile of the site, and there are no known subsurface utilities at or near the waste disposal area.

The primary receptor would be surface water flowing in a small ditch immediately adjacent to the former disposal site. Water from this ditch eventually flows into Jordan Lake, which serves as a water supply to the Towns of Cary and Apex. However, Jordan Lake encompasses over 14,000 surface acres, and any potential constituents released from the site would have little or no impact on the water quality of the reservoir. The intake for Cary and Apex water supply is on the east side of Jordan Lake at Highway 64, over 10 miles from the waste disposal area.

4.0 SITE ASSESSMENT METHODOLOGY

Geraghty & Miller conducted an environmental investigation at the site in three phases. The initial phase involved the delineation of wetlands at the site in April 1996. The initial intrusive field investigation, conducted in June 1996, involved the collection of soil samples using a Geoprobe. Based upon the results of the soil sampling phase, a third phase of work involving the installation and sampling of groundwater monitoring wells, surface-water sampling, and slug testing was performed in July 1996. The objectives of the site assessment program were to:

- perform a wetlands delineation and identify any wetlands permitting issues with the performance of the CSA and potential future remedial activities;
- gather site-specific hydrogeologic information;
- delineate the extent of any radiological isotopes, volatile and semi-volatile organic compounds in the groundwater;
- determine if surface water has been impacted by the site;
- Identify criteria for dewatering, slope stability, and other geotechnical properties required for future possible site excavation.

This section describes the field activities performed to achieve the aforementioned objectives.

4.1 WETLANDS DELINEATION

A delineation of jurisdictional wetlands boundaries at the site and immediate surrounding area was performed on April 16, 1996. The wetlands boundaries were flagged with surveyor's tape in preparation for the potential survey and/or verification by the U.S. Army Corps of

Engineers (COE). Wetlands were identified at the site with approximately one-half of the fenced site itself lying within the wetlands. The wetlands boundary is illustrated on Figure 2-1. Because the site is in a wetlands and access by drilling equipment was impossible without the construction of a temporary gravel road, the COE was notified. Nationwide Permit #14 was obtained to allow construction of a temporary road for assessment and potential remedial activity purposes. Details regarding the wetlands delineation and permit approval documentation are included in Appendix A of this report.

4.2 SOIL BORINGS

Geraghty & Miller completed eight soil borings around the perimeter of the site (Figure 4-1) on June 6, 1996, using Geoprobe™ technology. These borings were completed to obtain soil samples for C-14, tritium, volatile organic compounds (VOC), and semi-volatile organic compounds (SVOC) analysis to assess any releases to the soils around the site and to better locate the monitoring wells. Soil samples were collected continuously for lithologic description and were screened using an organic vapor analyzer (OVA). Soil samples were collected from each boring at a depth immediately below the reported depth of the disposal trenches (8 feet) and submitted for laboratory analysis. Boring logs are provided in Appendix B.

4.3 MONITOR-WELL INSTALLATION AND DEVELOPMENT

Following receipt and evaluation of the soils analytical results collected via Geoprobe, Geraghty & Miller installed four shallow monitor wells (designated GM-4, GM-5, GM-6, and GM-8) and one deep Type III monitor well (designated GM-7) on July 18 and 19, 1996. The locations of these monitor wells are shown on Figure 4-2. The drilling was performed using hollow-stem augers for the shallow wells and for installing the surface casing of the Type III well. An air hammer rig was used for drilling the final segment of the Type III well.

All of the monitor wells were installed in unconsolidated sediments. The shallow wells were constructed with 5-foot-long screens to monitor the upper portion of the water table,

including the sand layer present between approximately 8 to 10 feet below grade. The disposal pits were reportedly a maximum depth of approximately 8 feet, which would put the bottom of the pits immediately above or intersecting this sand layer. The rationale was to monitor this sandy zone which, if a major release had occurred, would be contaminated.

The Type III well, GM-7, was installed to delineate the vertical extent of any released constituents, provide vertical hydraulic gradient data, and deeper lithologic information. A 6-1/2-inch-diameter polyvinyl chloride (PVC) surface casing was grouted into place in a tight clay at a depth of 21 feet below land surface (ft bls) to seal off any potential contamination from migrating downward during drilling. After allowing the surface casing grout to set 24 hours, the borehole was advanced to 44 ft bls using an air hammer bit. The 2-inch well was then set to monitor the zone from 34 to 44 ft bls.

Well GM-6 was installed to monitor the shallow zone near Morgan Creek to determine if any released constituents were migrating toward the creek and to provide water-level data between the creek and the site.

Monitor-well construction details are listed in Table 4-1. Well construction diagrams and lithologic logs are provided in Appendix C. Monitor-well locations are depicted on Figure 4-2. The monitor wells were constructed with 2-inch-diameter, schedule 40 PVC well casing. The shallow wells were constructed with 5 feet of No. 10 slot PVC screen, while deep well GM-7 was constructed with a 10-foot screen. Monitor wells MW-1 through MW-3 were installed in 1989 or 1990 to monitor groundwater at the waste disposal area. MW-3 was reportedly installed to monitor the groundwater in a disposal pit. Well MW-4 was installed in January 1996 by hand-auger and monitors the upper few feet of the water table near the waste disposal area. No well construction logs are available for the previously existing wells. Note that well MW-1 was accidentally destroyed when it was run over by a vehicle.

Following installation, all newly-installed monitor wells were developed to remove residual clay, silt, and fine sands from the well to allow collection of representative groundwater

quality samples. Development was performed on July 24, 1996, by purging the wells using a disposable polyethylene bailer until the water was relatively clear to the unaided eye and field parameters such as pH, conductivity, and temperature had stabilized.

All drill cuttings, well development, and decontamination water/solids were placed in labeled, 55-gallon drums and placed inside the locked fence. After characterization for disposal, these investigation derived wastes were properly disposed of offsite.

4.4 GROUNDWATER AND SURFACE-WATER SAMPLING

Groundwater and surface-water samples were collected on July 25 and 26, 1996. Groundwater samples were collected from the five newly-installed monitor wells and the three previously-existing wells. Surface-water samples were collected upgradient and downgradient from the site in both Morgan Creek and the adjacent drainage ditch. Sampling locations are shown on Figure 4-2. All samples were submitted for the following analyses: C-14 (Method RICHRC5022), tritium (Method RICHRC5007), VOCs (USEPA Method 8260), and SVOCs (USEPA Method 8270). Additionally, field parameters including pH, conductivity, and temperature were collected at each sample location. Details regarding the sampling protocols are included in Appendix D.

4.5 AQUIFER TESTS

In-situ aquifer tests (slug tests) were conducted on all onsite monitor wells to allow calculation of an average hydraulic conductivity for the lithologic material underlying the site. Additionally, two temporary piezometers (TW-1 and TW-2) were installed to allow determination of the upper silty clay zone present to a depth of approximately 8 ft bls. Both slug-in and slug-out tests were conducted on the monitor wells. Only recovery tests were conducted on the two temporary piezometers. This was achieved by bailing the piezometers down and hand measuring the recovery rate. Details regarding the aquifer testing protocols and subsequent data analyses are included in Appendix D. The results of the slug testing are discussed in Section 5.2.2.

4.6 GEOTECHNICAL SAMPLING AND ANALYSIS

Geotechnical sampling and analysis were performed to determine geotechnical properties which may be useful during a possible remedial phase. Continuous split-spoon sampling was conducted in all borings drilled for well installation. Additionally, two Shelby tube samples were collected from the upper silty clay unit in borings and were analyzed for: vertical permeability, unconfined compressive strength, moisture content, grain size, Atterberg limits, and moisture-density relationship. A side slope stability analysis was also performed to assess the possibility of failure during any future excavation activity at the site. Results of the geotechnical analysis are discussed in Section 6.3.

4.7 SURVEYING

A water-level measuring point (top of casing) was established at each monitor well and at two staff gauges installed in Morgan Creek. The elevation of each measuring point was determined to within +/- 0.01 ft msl by a registered surveyor, Combined Surveying Resources of Raleigh, North Carolina. Additionally, the surface of the water in the drainage ditch at surface-water sampling locations (SW-3 and SW-4) were surveyed on August 7, which allowed incorporation of these measurements into a water-level contour map for that date. The boundary of the site's fence, the temporary gravel road, and the dirt access road were also surveyed to provide an accurate site base map.

4.8 WATER-LEVEL MEASUREMENTS

Depth-to-water measurements from the top of casing were collected from each monitor well and the two staff gauges in Morgan Creek on August 7 and August 27, 1996. The water-level measurements were converted to water-level elevations using the well survey data. Groundwater flow direction and hydraulic gradients are discussed in Section 5.2.1.

5.0 HYDROGEOLOGY

5.1 GEOLOGY

Information on the regional and site-specific geology is provided in the following paragraphs.

5.1.1 Regional Geology

Chapel Hill lies within the Eastern Piedmont Physiographic Province. The site, located in southwestern Durham County which lies within the easternmost portion of the Carolina Slate Belt. This northeast/southwest-trending geologic belt consists primarily of metamorphosed granitic rocks and volcanic rocks. Immediately east of Chapel Hill is the boundary between the Carolina Slate Belt and the northeast/southwest-trending Triassic Basins. The vicinity of Chapel Hill consists primarily of intrusive igneous rocks having a variable composition ranging from granites, quartz monzonites, granodiorites, quartz diorites, diorites, and gabbros (Allen and Wilson, 1968). Allen and Wilson (1968) also reported that north/south-trending Triassic basaltic and diabase dikes are present approximately 2 miles west and 1 mile east of Chapel Hill. The site is located close to the Triassic Basin/Carolina Slate Belt boundary. Structurally, several small faults and shear zones are found throughout the county, with the majority trending strongly northeast/southwest. Measured foliations also exhibit strong northeast/southwest orientations.

5.1.2 Site-Specific Geology

Three primary lithologic units were encountered at the site and are depicted in a cross-section. The location of the cross-section is shown in Figure 5-1, and the cross section is presented in Figure 5-2. Cross-section A to A' extends across the site from north to south and includes lithologic information from monitor wells GM-4, GM-7, and GM-6.

The upper few inches is comprised of an organic-rich topsoil, indicative of a low-lying wetlands area. A saturated, silty to sandy clay layer occurs to a depth of approximately 8 to 12 ft

bls. This upper silty to sandy clay layer typically coarsens downward, with sand concentrations increasing from approximately 10 percent land surface to nearly 90 percent at a depth of approximately 10 ft bls. The sandy unit also contains minor amounts of gravel and cobbles, which may be indicative of a stream channel deposit. A silty to sandy clay lies beneath this relatively thin sand deposit to a depth of at least 44 ft bls, the maximum depth drilled during this investigation.

5.2 GROUNDWATER AND SURFACE-WATER FLOW SYSTEM

The hydrogeologic parameters of the groundwater and surface-water flow systems are discussed in this subsection.

5.2.1 Groundwater and Surface-Water Flow Directions

The waste disposal area lies on the floodplain of Morgan Creek near the floodplain of Jordan Lake; therefore, depth to groundwater at the site is very shallow. Also, Morgan Creek has been channelized and bermed; therefore, the elevation of the water in the creek at times is higher than the site. During the investigation, groundwater occurred within a foot of land surface. At times, the entire site is flooded with several inches to a few feet of water. Because the topography is nearly flat and groundwater is shallow, the groundwater hydraulic gradients are very low. Based upon groundwater elevation data collected on August 7 and August 27, 1996, the average horizontal hydraulic gradient is approximately 0.009 feet/foot (unitless).

Water-level data measurements are presented in Table 5-1. The water-level elevation data compiled from August 7, 1996, and August 27, 1996, were used to construct water-table contour maps (Figures 5-3 and 5-4). As shown on the maps, the groundwater table surface is relatively flat. The water elevation data from August 7 include water levels in the drainage ditch adjacent to the site. When these data are used, it becomes apparent that groundwater from at least the northeastern portion of the site, which lies in the wetlands, discharges to this ditch. Based upon topography, the general groundwater flow direction for the area should be eastward, toward Jordan Lake; however, as shown on Figures 5-3 and 5-4, a slight mound of groundwater is

present in association with the higher ground in the area which may cause a radial groundwater flow pattern locally around the site.

Note that the surface-water elevations in Morgan Creek and the drainage ditch are slightly higher in downstream locations SW-1 and SW-3, respectively. One explanation is that the high surface-water levels in what should be downstream locations may be the result of wind pushing water back up into the creek and ditch from Jordan Lake. Another explanation is the water flowing into the lake is slowing down and backing up somewhat before entering the lake.

A downward vertical hydraulic gradient exists at the site, as evidenced by the difference between the water-level elevation in shallow monitor well GM-8 and the water level in the adjacent deep monitor well GM-7. The centers of the screened intervals for shallow monitor well GM-8 and deep monitor well GM-7 are separated by approximately 31 feet. A vertical gradient can therefore be calculated for the shallow/deep well pair by dividing the difference in water-level elevations for the two wells by the distance between the center points of the two screened intervals. Water-level elevation data from well pair GM-7/GM-8 indicate a downward vertical hydraulic gradient of 0.070 ft/ft (August 7, 1996) and 0.099 ft/ft (August 27, 1996).

5.2.2 Hydraulic Conductivities

In-situ aquifer tests (slug tests) were performed on the five newly-installed wells (GM-4, GM-5, GM-6, GM-7, and GM-8) and two newly-installed shallow, temporary piezometers (TW-1 and TW-2) to obtain estimates of the hydraulic conductivity (K) for the site. The K value from GM-7 provides insight into hydraulic conductivity for the lower silty clay; the K values from GM-4, GM-5, GM-6, and GM-8 yield information on the sandy layer combined with portions of the upper and lower silt clay zones; and the K values from TW-1 and TW-2 provide data only on the upper silty clay unit where the waste was buried.

Analysis of the slug test data using the AQTESOLV™ software program provided the K values for the various units as shown on Table 5-2. The shallow silty clay zone, where the waste

was buried, has a K on the order of 3×10^{-5} centimeters per second (cm/sec). The thin silty sand layer beneath the upper silty clay has an average K on the order of 2.5×10^{-3} cm/sec. The lower silty clay zone has the lowest measured K, on the order of 4.7×10^{-7} cm/sec. The K values from all of the slug tests performed ranged from 4.59×10^{-3} in the silty sand to 4.68×10^{-7} in the lower silty clay zone. Graphical plots of water-level displacement in centimeters versus time in seconds were generated for each of the slug tests, and these are included in Appendix E.

In addition to determination of K values using slug testing, three soil samples were collected using Shelby tube samplers. Two samples were collected from the upper silty clay zone where the waste is buried and one was collected from the lower silty clay zone. These three samples were submitted for geotechnical analysis including vertical permeability testing. All three of the samples had a vertical permeability on the order of 10^{-7} cm/sec indicating a very low vertical permeability for these lithologic units.

5.2.3 Groundwater Flow Velocity

Groundwater flow in the surficial aquifer at the site, as determined from the two sets of water-level elevation data, is northeasterly toward the drainage ditch. An estimated average horizontal hydraulic gradient was calculated to be approximately 0.009 ft/ft across the area of investigation. The average interstitial groundwater flow can be determined using a form of the Darcy equation as follows:

$$V = \frac{K}{Ne}\left(\frac{dh}{dl}\right)$$

where:

V = groundwater flow velocity

K = hydraulic conductivity

$\frac{dh}{dl}$ = groundwater gradient

Ne = effective porosity

Three lithologic units were encountered at the site, an upper silty clay unit, a middle silty sand unit and a lower silty clay unit. An average groundwater flow velocity has been calculated for each of these units using data determined by Geraghty & Miller.

Upper silty clay unit:

K = (0.085) ft/day

$\frac{dh}{dl} = 0.009$ ft/ft

Ne = 0.05 (An effective porosity of 5 percent was assumed for the upper silty clay zone based upon the grain-size analyses performed on Shelby tube samples collected from the lithologic unit.)

then $V = \frac{0.085 \text{ ft/day } (0.009 \text{ ft/ft})}{0.05}$

V = 0.015 ft/day = 5.48 ft/year

This value is an average horizontal groundwater flow velocity for the upper silty clay unit where the burial pits were dug. Inhomogeneities in this zone could lead to higher or lower localized rates of flow.

Middle Silty Sand Unit:

K = (7.08) ft/day

$\frac{dh}{dl} = 0.009$ ft/ft

Ne = 0.20 (assumed to be 20 percent based upon the field lithologic description of a silty sand and the corresponding effective porosity from Fetter, 1980)

6.0 ANALYTICAL RESULTS

Soil and groundwater samples were analyzed using USEPA-accepted analytical methods consistent with the NCDEHNR guidelines (NCDEHNR, 1993). Laboratory certificates and data validation notes are provided in Appendix F.

6.1 SOIL QUALITY RESULTS

Soil samples were collected in June 1996 using a Geoprobe and analyzed for VOCs, SVOCs, tritium, and C-14 to determine if soils in the immediate vicinity of the disposal area had been impacted by activities at the site. Samples typically were collected from the zone immediately below the reported bottom of the disposal pits (8 to 10 ft bls); however, one deeper sample was collected from GP-3 at 13.5 to 14.5 ft bls.

6.1.1 Volatile Organic and Semi-Volatile Organic Constituents

Only one semi-volatile compound, diethyl phthalate, detected at 0.50 ppm in the deep sample from GP-3 was detected in any of soil samples. Another SVOC (bis [2-ethylhexyl] phthalate) was detected at 0.017 ppm in the field blank associated with the soil sampling. These two phthalates are commonly found in plastics. Their presence may be related to the plastic bags in which some of the waste material was placed prior to burial. However, because the concentrations are low it is also possible their presence is related to the field sampling procedures where plastic sleeves and latex gloves were used for sample collection or their presence may be related to laboratory contamination. The soil remediation goals for diethyl phthalate and bis [2-ethylhexyl] phthalate, as outlined in the October 1996 North Carolina Inactive Hazardous Sites Program Guidelines, are 12,600 ppm and 46 ppm, respectively. Because there are no other soil remediation guidelines available through the DEM for these compounds, the Hazardous Sites Program Guidelines have been used for comparison purposes.

then $V = \frac{7.08 \text{ ft/day } (0.009 \text{ ft/ft})}{.20}$

$V = 0.319$ ft/day = 116.4 ft/year

This value is an average groundwater flow velocity for the middle silty sand unit. Inhomogeneities in this zone could lead to higher or lower localized rates of flow.

Lower silty clay unit:

$K = (0.0013)$ ft/day

$\frac{dh}{dl} = 0.009$ ft/ft

Ne = 0.05 (An effective porosity of 5 percent was assumed for the upper silty clay zone based upon the grain-size analyses performed on Shelby tube samples collected from the lithologic unit.)

then $V = \frac{0.0013 \text{ ft/day } (0.009 \text{ ft/ft})}{0.05}$

$V = 0.000234$ ft/day = 0.0854 ft/year

This value is an average horizontal groundwater flow velocity for the lower silty clay unit. Inhomogeneities in this zone could lead to higher or lower localized rates of flow.

6.1.2 Radionuclide Isotopes - Tritium and Carbon 14

All of the soil samples collected with the Geoprobe were analyzed for tritium and C-14. Because analysis of tritium in soils cannot be performed directly, the tritium analyses were performed on interstitial water found in the soil samples using soil sampling methodology. All of the soil samples were collected from below the water table. Tritium was detected above the minimum detectable activity (MDA) in six samples. The MDA is the smallest amount of sample activity that yields a net count of the isotope being sampled within the accuracy of the analytical method. The presence of tritium may be expected anytime shallow groundwater is analyzed for tritium because tritium occurs in groundwater naturally. Beginning in 1953, the occurrence of tritium has increased with the advent of large-scale atmospheric testing of nuclear weapons and the dispersion of particles released from the testing. Groundwater researchers use tritium to identify water that has entered the groundwater flow system since 1953, when weapons testing in the atmosphere was initiated (Freeze and Cherry, 1979). The tritium levels detected in the Geoprobe samples at the waste disposal area are well below the North Carolina DRP and EPA standard as shown on Table 6-1. This table presents the tritium analytical data both in picocuries/liter (pCi/L) and in microcuries/milliliter (µCi/ml) because pCi/L is used for the MDA while µCi/ml is used by the DRP as a standard (15A NCAC 11 .0117 [a][1], Appendix B, Table 2) for discharge to surface water. The EPA Interim Drinking Water Maximum Contaminant Limit (MCL) for tritium is 20,000 pCi/L and the North Carolina Standard is 0.001 µCi/ml.

None of the soil samples analyzed contained detectable levels of C-14. See Table 6-1.

6.2 GROUNDWATER AND SURFACE-WATER QUALITY RESULTS

6.2.1 Volatile Organic and Semi-Volatile Organic Constituents

Samples from the two previously-existing wells and the five newly-installed wells, as well as four surface-water samples were collected on July 25 and 26, 1996, to characterize site water quality. All of the samples were analyzed for VOCs, SVOCs, tritium and C-14. The groundwater and surface-water quality analytical results for VOCs and SVOCs are summarized in Tables 6-2 and 6-3, respectively. The analytical results for tritium and C-14 are summarized in Tables 6-4 and 6-5, respectively. Figure 6-1 illustrates on the site map the distribution of detected constituents.

Two VOCs, toluene and carbon disulfide, were detected in the groundwater at the site. Toluene was detected at a concentration of 390,000 ppb in monitor well MW-3, the previously existing well that is reportedly screened in a burial pit. (As discussed in Section 4.3, well MW-3 was installed in 1989 or 1990 and no construction details are available). The State of North Carolina 2L Groundwater Standard (2L standard) for toluene is 1000 ppb. Toluene was not detected in any of the other groundwater samples; however, it was detected at 1.9 ppb in surface-water sample SW-3 collected from the ditch immediately downgradient of the disposal area. Carbon disulfide was detected at concentrations well below the interim allowable concentration in wells GM-4 and GM-8. Based upon the data, toluene is the only Method 8260 VOC present at the site, and it has not migrated in the groundwater beyond the disposal pits area.

Two SVOCs, 1,4-dioxane (diethylene ether) and naphthalene, were detected in groundwater at concentrations exceeding the 2L standard. The 2L standards for 1,4-dioxane and napthalene are 7 ppb and 21 ppb, respectively. 1,4-Dioxane was detected in six of the eight wells sampled with concentrations ranging from an estimated concentration of 13 ppb in well GM-5 to 21,000 ppb in well MW-3. As shown on Figure 6-2, the lateral extent of 1,4-Dioxane is generally restricted to the disposal pits area with significantly reduced concentrations in wells outside the fenced waste disposal area. 1-4-Dioxane was not detected in deep monitor well GM-7 or in the

surface-water samples, suggesting the constituent is limited to the upper groundwater zone in the immediate vicinity of the disposal area. Naphthalene was detected at a concentration of 1,500 ppb in well MW-3 but was not detected in any other samples indicating that this constituent is limited to the waste disposal area and has not migrated outside the fenced area.

The surface-water samples collected from Morgan Creek, SW-1, and SW-2 contained bromodichloromethane, chloroform, and dibromochloromethane at relatively low concentrations (Table 6-3). There are no current North Carolina surface water standards. Concentrations of these constituents were greater in the upstream sample (SW-2) and therefore not considered indicative of site activities but is likely related to an upstream source.

6.2.2 Radionuclide Isotopes - Tritium and Carbon 14

Groundwater and surface-water samples were analyzed for tritium and C-14 isotopes, which are indicative of the low-level radioactive waste placed in the burial pits. Summaries of the results of the tritium and C-14 analyses are presented on Tables 6-4 and 6-5, respectively. The tables present the data both in picocuries/liter (pCi/L) and in microcuries/milliliter (µCi/ml) because pCi/L is used for the Federal MCL while µCi/ml is used by the DRP as a standard for discharge to surface water.

As shown on Tables 6-4 and 6-5, neither tritium nor C-14 was detected at concentrations exceeding the DRP standard for the respective isotope. Typically, the concentrations detected were a small percentage of the DRP standard. Tritium was detected in well MW-3 at a concentration above the MCL of 20,000 pCi/L in well MW-3; however, this was the only detect above that standard. The radionuclide analytical results indicate that these constituents are locally present within the waste disposal area groundwater at low concentrations but they have not migrated outside the fenced area.

6.3 GEOTECHNICAL ANALYTICAL RESULTS

As indicated in Section 4.6, soil samples were collected for geotechnical evaluation. These samples were analyzed for geotechnical parameters such as particle size distribution, Atterberg limits, permeability, moisture content, and shear strength. The test results were primarily used to evaluate the stability of the side slopes of a potential excavation pit. The analyses indicate that an excavation slope of 1 horizontal to 1 vertical will be feasible with a factor of safety of 1.2. Appendix G presents the geotechnical testing and the slope stability analysis results.

In addition, hydraulic conductivity values from the slug testing and laboratory vertical permeability testing were used to evaluate the potential inflow of water into the excavation (see Appendix G). The inflow of water is assumed to be highest along the Morgan Creek side face of the excavation. The majority of water is expected to inflow via the middle sand layer which lies approximately 8 to 10 feet below land surface. Based upon assumptions and calculations in Appendix G, approximately 3,500 gallons per day (gpd) of water is estimated to inflow from the creek-side face of the excavation. Additionally, water will seep into the excavation from other sides, but will be comparatively less. This water can be pumped into storage tanks from suitably located sumps along the southern side of the excavation area. Detailed estimation of dewatering needs will be discussed in the corrective action design phase.

7.0 PRINCIPAL FINDINGS AND CONCLUSIONS

The Mason Farm Low-Level Radioactive Waste Disposal Site served as a disposal site from 1963 to 1970. During its active life, operations were performed according to regulations in place at that time. The site was developed and used prior to the creation of Jordan Lake. At the time of it's use the water table was lower than at present. Since the lake was created in the early 1980s, the water table has risen at the site as a result of the lake's impoundment such that the burial pits are now below the water table. The site is fenced and has been monitored for radionuclides (tritium and C-14) since 1991. The results have been submitted to the DRP. Expanded analytical work performed by the University in early 1996 showed an elevated concentration of toluene in one well (MW-3) that is screened in a burial pit. The presence of this VOC prompted the initiation of this CSA to determine if a release has occurred from the site.

The principal findings and conclusions of the CSA are as follows:

- There are no municipal water-supply wells or residential wells within 1,500 feet of the site, and there are no surface-water intakes for public water supplies within 0.5 mile of the site. The closest known surface water supply intake is at University Lake, approximately 4 miles upgradient from the site. The waste disposal area is in the upper floodplain of Jordan Lake and both surface water and groundwater at the site flow toward the lake. Jordan Lake is the water supply for the Towns of Cary and Apex, however, the water supply intake for these towns is over 10 miles away and the disposal area would not affect this water supply.

- The site lies on a topographically flat floodplain and is underlain by a clayey-sandy silt to a depth of approximately 8 to 12 ft bls. This upper clayey-sandy silt typically coarsens downward to a depth of approximately 10 ft bls, where a relatively thin sand unit is present. This sand unit, which contains minor amounts of gravel and cobbles, is approximately 3 feet thick. Beneath the sand to a depth of at least 44 ft bls is a sandy, silty clay. Bedrock was not encountered at the site. The depth to water is typically less than 2 feet, and at times the site is flooded during periods of heavy rainfall.

- In-situ aquifer tests performed on the newly-installed wells indicated that the surficial clayey sandy silt unit (where the burial pits were dug) has an average K value of 3 x 10^{-5} cm/sec. The sandy unit that lies immediately below the base of the burial pits has an average K value of 2.5 x 10^{-3} cm/sec, and the lower silty clay zone has a K on the order of 4.7 x 10^{-7} cm/sec.

- Water-level elevation measurements indicate that groundwater in the surficial aquifer flows radially outward from the disposal area with a relatively low horizontal hydraulic gradient of 0.009 ft/ft. Overall groundwater and surface-water flow, however, is south eastward toward Jordan Lake. Using the calculated hydraulic conductivity of the sand unit and the measured hydraulic gradient, a horizontal flow velocity of approximately 116 ft/yr was calculated for the sand unit. Using K values for the upper silty clay unit and the lower silty clay unit average flow velocities of approximately 5 ft/yr and less than 1 ft/yr, respectively, were calculated.

- The soils adjacent to the fenced area have not been impacted above either State or Federal standards or State or Federal comparable remediation guidelines for chemicals in the soil. Only very low levels of tritium, below the State DRP standard and the Federal MCL, were detected in interstitial waters of the soil samples. No C-14 was detected in the soil samples and the only VOC or SVOC detected was diethyl phthalate. The phthalate was only detected in one sample at a concentration well below the State remediation guideline.

- Groundwater at the site has been impacted by waste disposal activities, but the extent of chemical constituents in the groundwater is limited to the upper portion of the water-table aquifer within and near the fenced disposal area. Toluene was detected in only one well, MW-3, which monitors burial pit water within the fenced disposal area. An earlier detect of toluene in this well prompted the CSA. A SVOC, 1,4-dioxane (diethylene ether), was detected in six of the eight wells sampled, with the highest concentration (21,000 ppb) in well MW-3. The lateral extent of 1,4-dioxane is

generally restricted to the disposal pits area with significantly reduced concentrations in wells outside the waste disposal area.

- Surface water has not been significantly impacted by activities at the site. Toluene was detected at a concentration of 1.9 ppb in sample SW-3, which was collected in a drainage ditch immediately downgradient of the disposal area. Other constituents detected in Morgan Creek may be attributed to an upstream source.

- Groundwater and surface-water samples were analyzed for tritium and C-14 radionuclides, which are indicative of the low-level radioactive waste placed in the burial pits. Neither tritium or C-14 was detected at concentrations exceeding the DRP standard for discharge to surface water. Tritium was detected above the 20,000 pCi/L EPA Interim Drinking Water Maximum Contaminant Limit in well MW-3, inside the waste disposal area but was not detected above the MCL in any other wells.

- Based upon the findings of this investigation it is recommended that an additional shallow well be installed west of existing well GM-4 plus an additional round of water quality samples and water level data will be collected. The additional well should better define the plume to the west of the waste disposal area. Results of the additional well installation and sampling will be included in the corrective action plan (CAP).

8.0 REFERENCES

Allen, Eldon P., and William F. Wilson, 1968. Geology and Mineral Resources of Orange County, North Carolina. Bulletin 81. North Carolina Geological Survey.

Fetter, C.W., 1980. Applied Hydrogeology. Charles E. Merrill Publishing Company, Columbus, OH. 488 p.

Freeze, Allan and John A. Cherry, 1979. Groundwater. Prentice-Hall, Inc., Englewood Cliffs, N.J. 604 p.

Maples, Charles, E., 1990. Survey of Tritium in Soil in an Assessment of a University Low-Level Radioactive Waste Facility. Master's Thesis, UNC-CH Department of Environmental Science and Engineering. 72 p.

North Carolina Department of Environment, Health and Natural Resources (NCDEHNR), 1993. Groundwater Section Guidelines for the Investigation and Remediation of Soils and Groundwater. Division of Environmental Management (DEM), Groundwater Section. March with June Revisions.

Table 6-2. Summary of Volatile Organic and Semi-Volatile Organic Constituents Detected in Groundwater Samples Collected at the UNC Mason Farm Low Level Radioactive Waste Disposal Site in Chapel Hill, North Carolina.

Constituents	NCAC 2L Groundwater Standard	Sample ID: Date Sampled:	MW-2 7/26/96	MW-3 7/25/96	GM-4 7/26/96	DUP-2* 7/26/96	GM-5 7/26/96	GM-6 7/26/96	GM-7 7/26/96	GM-8 7/26/96
Volatile Organics (USEPA Method 8260) ppb										
Carbon disulfide	700**		<1.0	<5,000	14J	4.0J	<1.0	<1.0	<1.0	3.7
Toluene	1,000		<1.0	390,000	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Semi-Volatile Organics (USEPA Method 8270A) ppb										
1,4-Dioxane (diethylene ether)	7		26	21,000	3,200	3,700	13J	<10	<10	37
Naphthalene	21		<10	1,500	<250	<250	<10	<10	<10	<10

ppb Micrograms per liter.
< Constituent was not detected above the reporting limit.
J Constituent concentration is qualified as estimated because the sample duplicate criteria were not met.
* Field replicate sample of groundwater sample GM-4.
NCAC 2L North Carolina Administrative Code, Title 15A, Chapter 2L, Groundwater Quality Standards, February 8, 1994.
[ ] Constituent concentration exceeds the 15A NCAC 2L Standard.
** Interim maximum allowable concentration effective May 16, 1995.
NOTE: Only detected constituents are reported on this table. Other VOC and SVOC constituents not detected are not listed.

Table 6-3. Summary of Volatile Organic and Semi-Volatile Organic Constituents Detected in Surface-Water Samples Collected at the UNC Mason Farm Low Level Radioactive Waste Disposal Site in Chapel Hill, North Carolina.

Constituents	Sample ID: Date Sampled:	SW-1 7/25/96	SW-2 7/25/96	SW-3 7/25/96	SW-4 7/25/96	DUP-1* 7/25/96
Volatile Organics (USEPA Method 8260) ppb						
Bromodichloromethane		1.9	2.1	<1.0	<1.0	<1.0
Chloroform		4.2	4.6	<1.0	<1.0	<1.0
Dibromochloromethane		<1.0	1.0	<1.0	<1.0	<1.0
Toluene		<1.0	<1.0	1.9	<1.0	<1.0

ppb Micrograms per liter.
< Constituent was not detected above the reporting limit.
* Field replicate sample of surface-water sample SW-4.
NOTE: No State of North Carolina surface water quality standards exist for the detected constituents.

Table 6-4. Summary of Tritium Radioisotope Analytical Data for Groundwater and Surface-Water Samples Collected from the UNC-CH Mason Farm Low Level Radioactive Waste Disposal Site on July 25, 1996.

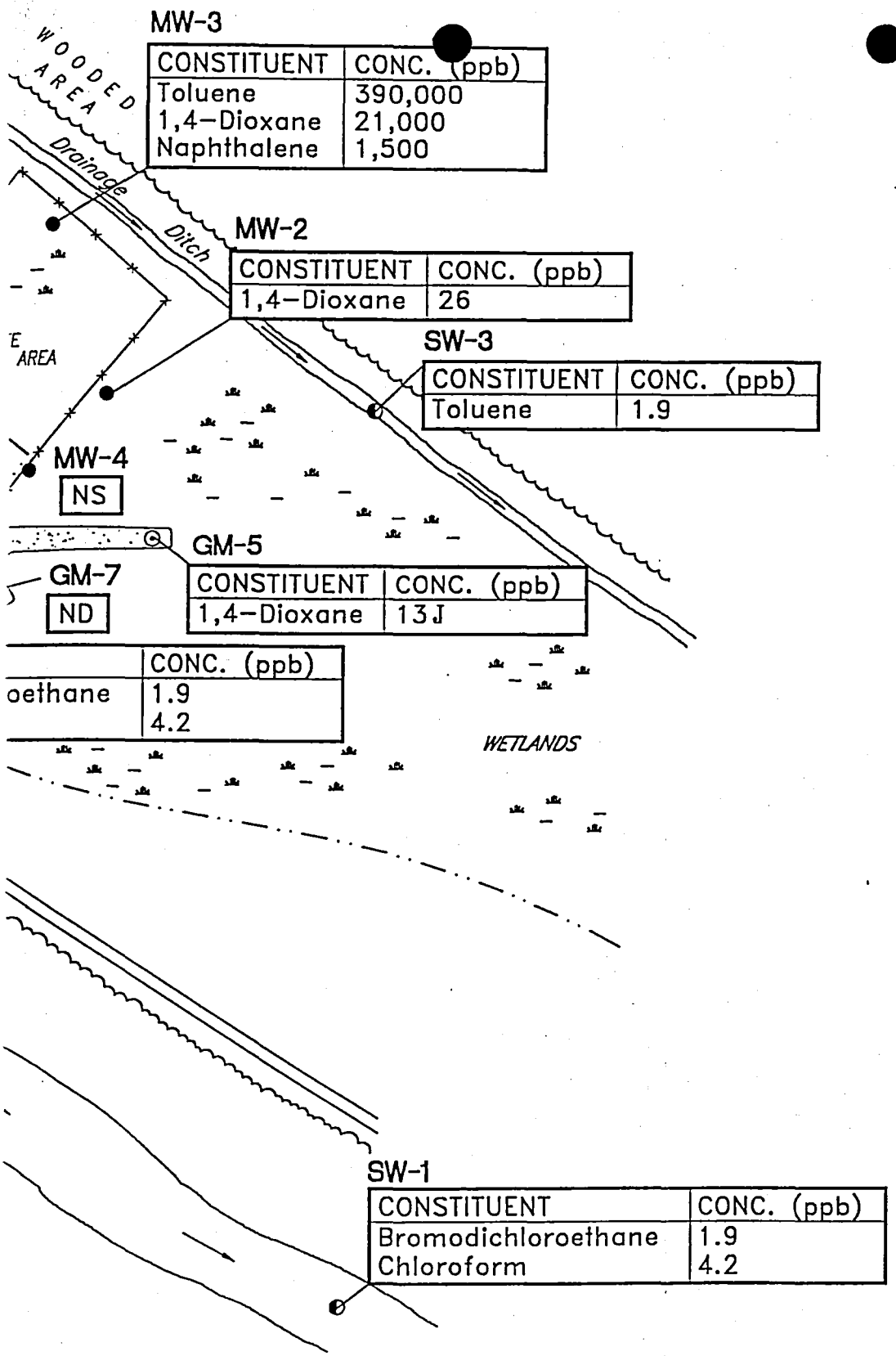
Sample ID	MDA (pCi/L)	Result (pCi/L)	NC STD (µCi/ml)	Result (µCi/ml)
MW-2	2.88E+02	1.97E+02	1.0E-03	1.97E-07
MW-3	2.88E+02	2.62E+04	1.0E-03	2.62E-05
GM-4	2.88E+02	2.45E+03	1.0E-03	2.45E-06
DUP-2	2.88E+02	2.33E+03	1.0E-03	2.33E-06
GM-5	2.88E+02	1.31E+02	1.0E-03	1.31E-07
GM-6	2.88E+02	1.64E+01	1.0E-03	1.64E-08
GM-7	2.88E+02	-5.02E+01	1.0E-03	-5.02E-08
GM-8	2.88E+02	1.77E+02	1.0E-03	1.77E-07
SW-1	2.88E+02	1.46E+02	1.0E-03	1.46E-07
SW-2	2.88E+02	4.89E+02	1.0E-03	4.89E-07
SW-3	2.88E+02	1.25E+02	1.0E-03	1.25E-07
SW-4	2.88E+02	1.57E+02	1.0E-03	1.57E-07
DUP-1	2.88E+02	7.94E+01	1.0E-03	7.94E-08

pCi/L Picocuries per liter.
µCi/ml Microcuries per milliliter.
MDA Minimum detectable activity; the smallest amount of sample activity that yields a net count of the isotope being sampled within the accuracy of the analytical method.
NC STD North Carolina Division of Radiation Protection (DRP), 15A NCAC 11 .0117 (a)(1) Appendix B, Table 2.
[ ] Constituent concentration greater than the EPA Interim Drinking Water maximum contaminant level (>MCL) of 20,000 pCi/L.
All data were validated as quantitative.
NOTE: Results are presented in pCi/L and µCi/ml for ease of comparison because the Federal MCL is in pCi/L and the North Carolina Standard is in µCi/ml. The conversion of pCi/L to µCi/ml is: pCi/L (E -09) = µCi/ml.

Table 6-5. Summary of C-14 Radioisotope Analytical Data for Groundwater and Surface-Water Samples Collected from the UNC-CH Mason Farm Low Level Radioactive Waste Disposal Site on July 25, 1996.

Sample ID	MDA (pCi/L)	Result (pCi/L)	NC STD (µCi/ml)	Result (µCi/ml)
MW-2	3.55E+00	2.39E+00	3.0E-05	2.39E-09
MW-3	3.55E+00	5.21E+02	3.0E-05	5.21E-07
GM-4	3.55E+00	7.12E+01	3.0E-05	7.12E-08
DUP-2	3.55E+00	7.17E+01	3.0E-05	7.17E-08
GM-5	3.55E+00	2.93E+00	3.0E-05	2.93E-09
GM-6	3.55E+00	6.76E-01	3.0E-05	6.76E-10
GM-7	3.55E+00	-2.48E-01	3.0E-05	-2.48E-10
GM-8	3.55E+00	1.78E+00	3.0E-05	1.78E-09
SW-1	3.55E+00	2.25E-01	3.0E-05	2.25E-10
SW-2	3.55E+00	1.71E+00	3.0E-05	1.71E-09
SW-3	3.55E+00	2.57E+00	3.0E-05	2.57E-09
SW-4	3.55E+00	1.73E+00	3.0E-05	1.73E-09
DUP-1	3.55E+00	1.46E+00	3.0E-05	1.46E-09

C-14 Carbon-14.
pCi/L Picocuries per liter.
µCi/ml Microcuries per milliliter.
MDA Minimum detectable activity; the smallest amount of sample activity that yields a net count of the isotope being sampled within the accuracy of the analytical method.
NC STD North Carolina Division of Radiation Protection (DRP), 15A NCAC 11 .0117 (a)(1) Appendix B, Table 2.
All data were validated as quantitative.
NOTE: Results are presented in pCi/L and µCi/ml for ease of comparison because the Federal MCL is in pCi/L and the North Carolina Standard is in µCi/ml. The conversion of pCi/L to µCi/ml is: pCi/L (E -09) = µCi/ml.



MW-3

CONSTITUENT	CONC. (ppb)
Toluene	390,000
1,4-Dioxane	21,000
Naphthalene	1,500

MW-2

CONSTITUENT	CONC. (ppb)
1,4-Dioxane	26

SW-3

CONSTITUENT	CONC. (ppb)
Toluene	1.9

GM-5

CONSTITUENT	CONC. (ppb)
1,4-Dioxane	13 J

	CONC. (ppb)
oethane	1.9
	4.2

SW-1

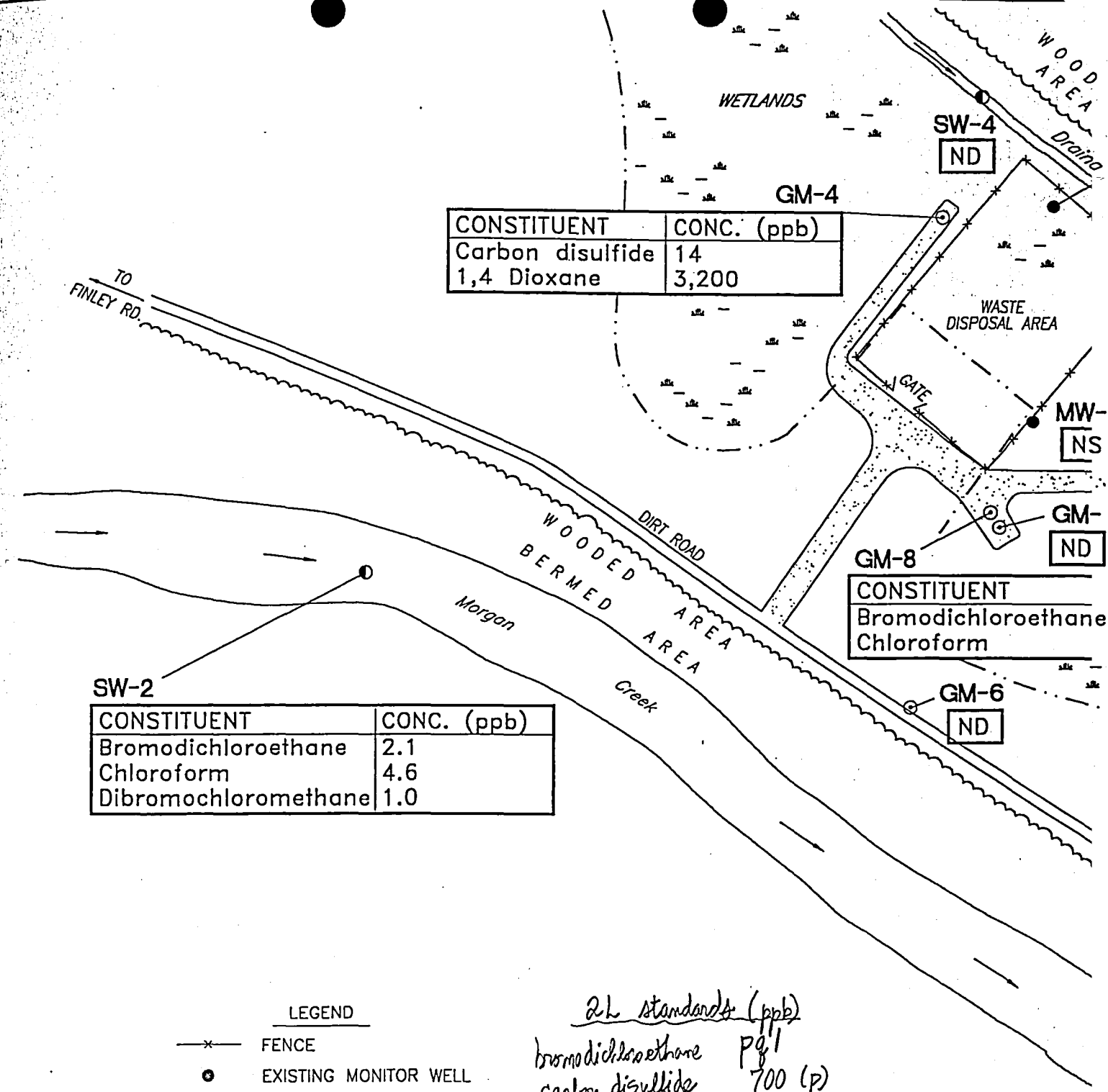
CONSTITUENT	CONC. (ppb)
Bromodichloroethane	1.9
Chloroform	4.2

GERAGHTY & MILLER, INC.
Environmental Services

GROUNDWATER AND SURFACE WATER CONSTITUENT CONCENTRATIONS

THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL
MASON FARM LOW LEVEL RADIOACTIVE WASTE DISPOSAL SITE
CHAPEL HILL, NORTH CAROLINA

FIGURE
6-1



CONSTITUENT	CONC. (ppb)
Carbon disulfide	14
1,4 Dioxane	3,200

CONSTITUENT
Bromodichloroethane
Chloroform

CONSTITUENT	CONC. (ppb)
Bromodichloroethane	2.1
Chloroform	4.6
Dibromochloromethane	1.0

LEGEND

—×—	FENCE
●	EXISTING MONITOR WELL
⊙	NEW MONITOR WELL
◐	SURFACE WATER SAMPLE
ppb	PARTS PER BILLION
ND	NOT DETECTED
J	ESTIMATED VALUE
NS	NOT SAMPLED (DRY)

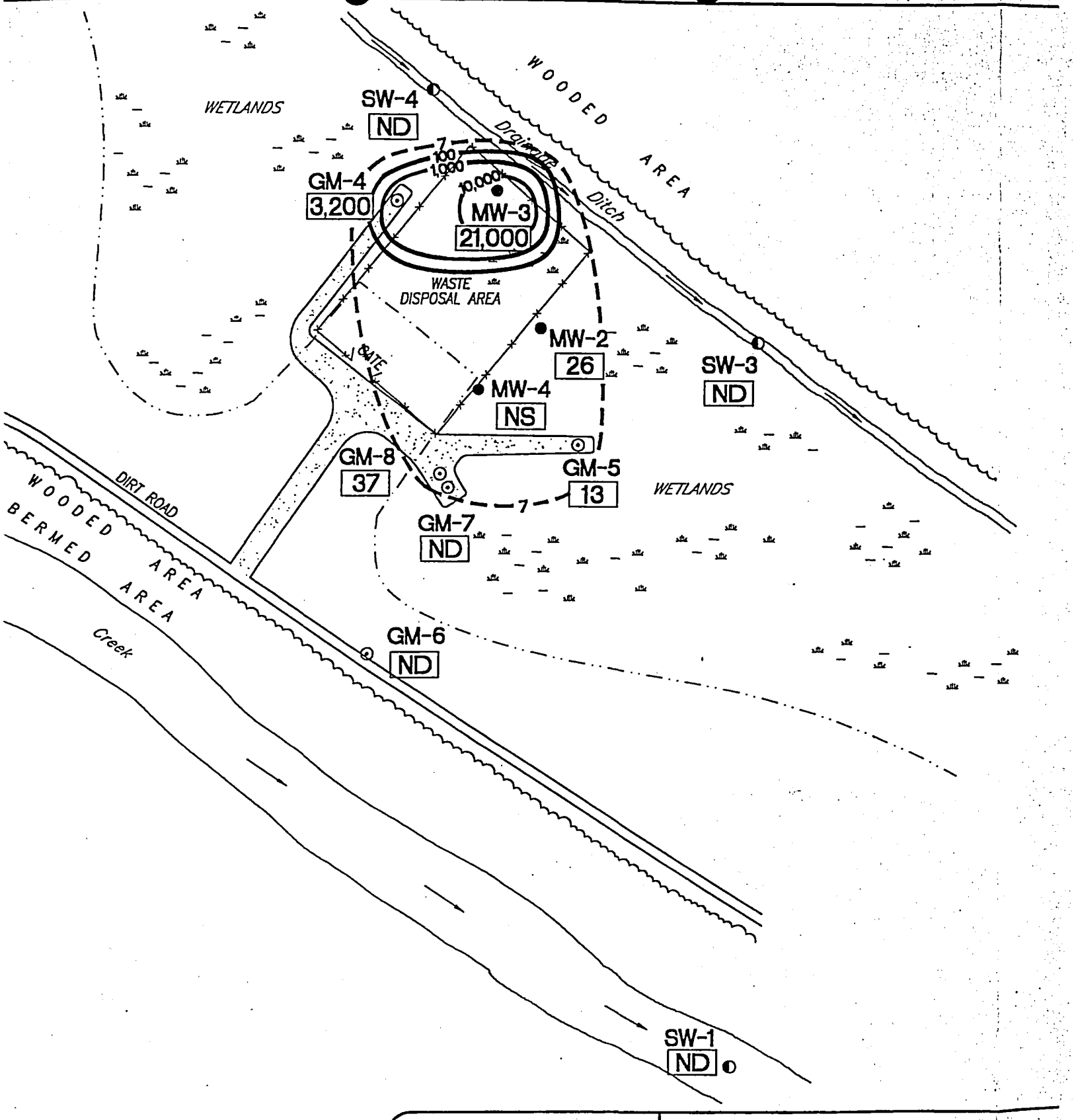
SCALE IN FEET
0 80 160

2L standards (ppb)

bromodichloroethane	pql
carbon disulfide	700 (p)
chloroform	0.19
dibromochloromethane	pql
1,4-dioxane (p-dioxane)	7.0
naphthalene	21
toluene	1,000

(p) = proposed 1/96

GERA & MILL Environmen



GERAGHTY & MILLER, INC.
Environmental Services

1,4 DIOXANE ISOCONCENTR

THE UNIVERSITY OF NORTH CAROLI
MASON FARM LOW LEVEL RADIOACTIVE
CHAPEL HILL, NORTH C

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507
FAX (919) 962-0227

The University of North Carolina at Chapel Hill
212 Finley Golf Course Road
Chapel Hill, North Carolina 27514

February 12, 1996

FEB 1 3 1996
DENR RALEIGH REGIONAL OFFICE

Mr. Jay Zimmerman, L.G.
Groundwater Supervisor
Division of Environmental Management
Raleigh Regional Office
3800 Barrett Drive Suite 101
Raleigh, North Carolina 27609

Re: Groundwater Contamination
University of North Carolina at Chapel Hill
Mason Farms Low Level Radioactive Waste Site
Chapel Hill, Durham County, N.C.

Dear Mr. Zimmerman:

On January 29, 1996 The University of North Carolina at Chapel Hill reported to Mr. Tom Arrington of your office the findings of groundwater sampling at the University's Mason Farms Low Level Radioactive Waste Site. The Site was used for the disposal of low level radioactive material from 1963 until 1970. Based on our knowledge of uses of radioactive material during that era, material placed into the site consisted of laboratory disposables (rubber gloves, empty vials, paper, hyperdermic needles, glass bottles, etc.), animal carcasses, and glass and plastic scintillation vials (containing toluene and xylene-based counting media).

Since 1991 the site has been monitored for radioactivity under a plan approved by the Division of Radiation Protection (DRP). No radioactivity significantly above natural background levels has been detected in groundwater off site. Groundwater in one monitoring well located inside one of the burial pits averages 2.3×10^{-6} microcuries/ml for tritium (H-3) and 1.0×10^{-6} microcuries/ml for carbon -14 (C-14). Identically processed background control samples (Chapel Hill tapwater), averages 8.9×10^{-7} microcuries/ml for H-3 and 7.5×10^{-7} microcuries/ml for C-14. The well concentrations are approximately 0.2 percent of the North Carolina Division of Radiation Protection (DRP) water effluent standard of 1×10^{-3} microcuries/ml for H-3, and approximately 3 percent of the 3×10^{-5} microcuries/ml water effluent standard for C-14 (15A NCAC 11 .0117 (a)(1) Appendix B, Table 2).

Recently the University has been looking into the possibility of removing the waste material. As part of our research, groundwater at the site was sampled for chemical constituents. The University's Health and Safety office sampled three monitoring wells at the site on January 19, 1996 and analyzed for methylene chloride, benzene, toluene, ethylbenzene and total xylenes. Results of analyses of samples from the two wells, located on the perimeter of the site, were Below Quantiation Limits (BQL). The sample from the monitoring well located inside one of the burial pits indicated toluene at greater than 100 ppm in the groundwater (see attached lab report).

Because the site is located next to a ditch which flows into Morgan Creek and then into Jordan Lake, the University immediately sampled the surface water. Both upstream and downstream samples showed BQL for all compounds (see attached lab report).

The University has contacted Mr. R. M. Fry, Associate Director, Division of Radiation Protection and reported the above cited findings.

The University would like to meet with the DEM and the DRP after you have reviewed this information. I will be contacting you in a few days to arrange for a meeting. If you have any questions please contact me at 962-6666.

Sincerely,

Robert O. Walton III

Robert O. Walton III, L.G.
Environmental Engineer

cc: R. M. Fry, Division of Radiation Protection
Carolyn Elfland, Associate Vice Chancellor, Business
Patricia Crawford, Associate University Counsel
Don Willhoit, Director Health and Safety

Industrial & Environmental Analysts, Inc. (IEA)
GC/MS PURGEABLES SW-846 METHOD 8240

IEA Project Number:	343-020T		
IEA Sample Number:	9601560-01	Date Received:	01/29/96
Client Name:	UNC Health and Safety Office	Date Sampled:	01/28/96
Client Project ID:	Mason Farm Site	Date Analyzed:	01/29/96
Sample Identification:	SS-1	Analysis By:	Moore
Matrix:	Water	Dilution Factor:	1.(

Number	Compound	Quantitation Limit (ug/L)	Results Concentrat: (ug/L)
1	Acetone	10	BQL
2	Benzene	5	BQL
3	Bromodichloromethane	5	BQL
4	Bromoform	5	BQL
5	Bromomethane	10	BQL
6	2-Butanone	10	BQL
7	Carbon disulfide	5	BQL
8	Carbon tetrachloride	5	BQL
9	Chlorobenzene	5	BQL
10	Dibromochloromethane	5	BQL
11	Chloroethane	10	BQL
12	2-Chloroethylvinyl ether	10	BQL
13	Chloroform	5	BQL
14	Chloromethane	10	BQL
15	1,1-Dichloroethane	5	BQL
16	1,2-Dichloroethane	5	BQL
17	1,1-Dichloroethene	5	BQL
18	1,2-Dichloroethene (total)	5	BQL
19	1,2-Dichloropropane	5	BQL
20	cis-1,3-Dichloropropene	5	BQL
21	trans-1,3-Dichloropropene	5	BQL
22	Ethylbenzene	5	BQL
23	2-Hexanone	10	BQL
24	Methylene chloride	5	BQL
25	4-Methyl-2-pentanone	10	BQL
26	Styrene	5	BQL
27	1,1,2,2-Tetrachloroethane	5	BQL
28	Tetrachloroethene	5	BQL
29	Toluene	5	BQL
30	1,1,1-Trichloroethane	5	BQL
31	1,1,2-Trichloroethane	5	BQL
32	Trichloroethene	5	BQL
33	Vinyl acetate	10	BQL
34	Vinyl chloride	10	BQL
35	Xylenes (total)	5	BQL

Comments:
Sample specific quantitation limits may be calculated by multiplying the quantitation limit by the dilution factor and/or moisture correction factor where reported.
BQL = Below Quantitation Limit

Industrial & Environmental Analysts, Inc. (IEA)
GC/MS PURGEABLES SW-846 METHOD 8240

IEA Project Number: 343-020T
IEA Sample Number: 9601560-02
Client Name: UNC Health and Safety Office
Client Project ID: Mason Farm Site
Sample Identification: SS-2
Matrix: Water

Date Received: 01/29/96
Date Sampled: 01/28/96
Date Analyzed: 01/29/96
Analysis By: Moore
Dilution Factor: 1.0

Number	Compound	Quantitation Limit (ug/L)	Results Concentration (ug/L)
1	Acetone	10	BQL
2	Benzene	5	BQL
3	Bromodichloromethane	5	BQL
4	Bromoform	5	BQL
5	Bromomethane	10	BQL
6	2-Butanone	10	BQL
7	Carbon disulfide	5	BQL
8	Carbon tetrachloride	5	BQL
9	Chlorobenzene	5	BQL
10	Dibromochloromethane	5	BQL
11	Chloroethane	10	BQL
12	2-Chloroethylvinyl ether	10	BQL
13	Chloroform	5	BQL
14	Chloromethane	10	BQL
15	1,1-Dichloroethane	5	BQL
16	1,2-Dichloroethane	5	BQL
17	1,1-Dichloroethene	5	BQL
18	1,2-Dichloroethene (total)	5	BQL
19	1,2-Dichloropropane	5	BQL
20	cis-1,3-Dichloropropene	5	BQL
21	trans-1,3-Dichloropropene	5	BQL
22	Ethylbenzene	5	BQL
23	2-Hexanone	10	BQL
24	Methylene chloride	5	BQL
25	4-Methyl-2-pentanone	10	BQL
26	Styrene	5	BQL
27	1,1,2,2-Tetrachloroethane	5	BQL
28	Tetrachloroethene	5	BQL
29	Toluene	5	BQL
30	1,1,1-Trichloroethane	5	BQL
31	1,1,2-Trichloroethane	5	BQL
32	Trichloroethene	5	BQL
33	Vinyl acetate	10	BQL
34	Vinyl chloride	10	BQL
35	Xylenes (total)	5	BQL

Comments:
Sample specific quantitation limits may be calculated by multiplying the quantitation limit by the dilution factor and/or moisture correction factor where reported.
BQL = Below Quantitation Limit

JAN 26 1996

JAN 2 1996

WEBB TECHNICAL GROUP, INC.
3909 Beryl Road
Raleigh, NC 27607
(919) 834-4984

CLIENT: UNC - CHAPEL HILL HEALTH AND SAFETY
SAMPLE ID: Groundwater
MW-2
COLLECTED: 01/19/96; 13:30
WTG LOG NUMBER: 96-01-405-01
EPA METHOD: 601/602 BTWX

RECEIVED FROM: Client Delivery
DATE RECEIVED: 01/19/96
DATE EXTRACTED: N/A
DATE ANALYZED: 01/22/96

AROMATIC VOLATILE ORGANIC COMPOUNDS

VOLATILE COMPOUNDS	QUANTITATION LIMIT ug/l	RESULTS CONCENTRATION ug/l
Benzene	0.5	BQL
Toluene	0.5	BQL
Ethylbenzene	0.5	BQL
Xylenes (Total)	0.5	BQL
Methylene Chloride	0.5	BQL

BQL = Below Quantitation Limit

Comments:

CERTIFIED BY: Terry Martin REPORT DATE: January 24, 1996

WEBB TECHNICAL GROUP, INC.
3909 Beryl Road
Raleigh, NC 27607
(919) 834-4984

CLIENT: UNC - CHAPEL HILL HEALTH AND SAFETY
SAMPLE ID: Groundwater
MW-3
COLLECTED: 01/19/96; 13:20
WTG LOG NUMBER: 96-01-405-02
EPA METHOD: 601/602 BTWX

RECEIVED FROM: Client Delivery
DATE RECEIVED: 01/19/96
DATE EXTRACTED: N/A
DATE ANALYZED: 01/22/96

AROMATIC VOLATILE ORGANIC COMPOUNDS

VOLATILE COMPOUNDS	QUANTITATION LIMIT ug/l	RESULTS CONCENTRATION ug/l
Benzene	2500*	BQL
Toluene	2500*	>100,000
Ethylbenzene	2500*	BQL
Xylenes (Total)	2500*	BQL
Methylene Chloride	100**	BQL

BQL = Below Quantitation Limit

Comments: *1:500 dilution used.
**1:200 dilution used.

CERTIFIED BY: [signature] REPORT DATE: January 24, 1996

WEBB TECHNICAL GROUP, INC.
3909 Beryl Road
Raleigh, NC 27607
(919) 834-4984

CLIENT: UNC - CHAPEL HILL HEALTH AND SAFETY
SAMPLE ID: Groundwater
MW-4
COLLECTED: 01/19/96; 13:40
WTG LOG NUMBER: 96-01-405-03
EPA METHOD: 601/602 BTWX

RECEIVED FROM: Client Delivery
DATE RECEIVED: 01/19/96
DATE EXTRACTED: N/A
DATE ANALYZED: 01/22/96

AROMATIC VOLATILE ORGANIC COMPOUNDS

VOLATILE COMPOUNDS	QUANTITATION LIMIT ug/l	RESULTS CONCENTRATION ug/l
Benzene	0.5	BQL
Toluene	0.5	BQL
Ethylbenzene	0.5	BQL
Xylenes (Total)	0.5	BQL
Methylene Chloride	0.5	BQL

BQL = Below Quantitation Limit

Comments:

CERTIFIED BY: [signature] REPORT DATE: January 24, 1996

EPA DID NOT MAIL TO FACILITY

DATE: August 22, 1995

SUBJECT: REMOVAL FROM EPA'S CERCLIS INVENTORY

FROM: Matthew J. Robbins, Brownfields Coordinator
Waste Management Division, Region IV

TO: UNIVERSITY OF NC @ CHAPEL HILL
CHYDARU
CHAPEL HILL
NC 27514

EPA has identified the Brownfields Initiative as one of the Agency's top priorities. The term "brownfields" refers to previously used properties that may lie vacant because potential contamination makes them unmarketable to the private sector. EPA has recently announced a comprehensive Brownfields strategy, including Pilot grants to municipalities, to stimulate economic revitalization.

One part of the strategy has been for EPA to review its complete inventory of Superfund sites. These sites have been screened and determined to require no remedial action under the Federal Superfund Program based on information available as well as on conditions and policies that currently exist. This is to notify you that EPA has removed your facility from EPA's computer inventory known as CERCLIS. THIS DOES NOT INDICATE THAT THE STATE HAS MADE A SIMILAR DETERMINATION.

If you have any questions, please call me at 404/347-5059 ext. 6214.

cc: State Agency

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Solid Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

DEHNR

September 19, 1995

Ms. Cynthia Gurley
NC CERCLA Project Officer
US EPA Region IV Waste Division, 6th Floor
345 Courtland Street, NE
Atlanta, Georgia 30365

Subject: Proposed Change to WASTELAN

Dear Ms. Gurley:

As we discussed earlier this week, it has come to my attention that the EPA ID. numbers for two (2) University of North Carolina at Chapel Hill sites listed in CERCLIS (and WASTELAN) are reversed in RCRIS as shown below:

Site Name Address	CERCLIS EPA ID. No.	RCRIS EPA ID. No.
University of NC @ Chapel Hill Chydaru Finley Golf Course Road Ext. Chapel Hill, NC 27514	NCD980515308	NCD003203213 (transporter)
University of NC Chapel Hill B-5 Venable Hall Chapel Hill, NC 27514	NCD003203213	NCD980515308 (LQ Gen.)

Based on the file information, it appears that the EPA ID. numbers assigned under RCRA were changed after the sites were discovered in CERCLIS. Since the sites are still active and the EPA ID. numbers are still in use under RCRA, I propose that the EPA ID. numbers in CERCLIS be changed to conform to the numbers assigned to these sites in RCRIS. I have attached copies of the State RCRIS listing and the latest CERCLIS listing I had available showing the site entries.

If you need any additional information, please contact me at (919) 733-2801 ext 290.

Sincerely,

Pat DeRosa, Head
CERCLA Branch
NC Superfund Section

attachments

cc: Scott Ross
Grover Nicholson

RCRA Notifiers List — State North Carolina Database — Run 10.37.38 08/30/95

Facility/ID / Leg. Dist		Contact - Name		- Phone	Notif.Date	Facil. Type TSD	GEN	TRNS	BBL	REC
ULTRA-MEK INC		FRED HUGHES		(704)869-4552	01/11/91	-	SQG	-	-	-
NCD982167009	Facil.: HWY 47 E		DENTON	NC	27239 DAVIDSON CO.					
	Mail: PO BOX 518		DENTON	NC	27239					
UM&M INC TRUCKING		DAVID KINGSLAND		(704)873-5221	12/06/82	-	-N-	-	-	-
NCD000645689	Facil.: RT 7		STATESVILLE	NC	28677 IREDELL CO.					
	Mail: PO BOX 8-C		STATESVILLE	NC	28677					
UNC CHAPEL HILL		RICHARD MILLER		(919)962-5718	05/07/90	-	LQG	-	-	-
[illegible]D982114928	Facil.: BRINKHOUS-BULLITT BLDG ZONE 3		CHAPEL HILL	NC	27599 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-ASHEVILLE		ROBYN GROOMS		(704)251-6564	04/30/90	-	SQG	-	-	-
NCD981932841	Facil.: ONE UNIVERSITY HEIGHTS		ASHEVILLE	NC	28804 BUNCOMBE CO.					
	Mail: ONE UNIVERSITY HEIGHTS		ASHEVILLE	NC	28804					
UNC-CHAPEL HILL		RICHARD MILLER		(919)962-5507	09/07/94	-	-N-	TRNS	-	-
NCD003203213	Facil.: 212 FINLEY RD		Chapel Hill	NC	27514 ORANGE CO.					
	Mail: 212 FINLEY RD		Chapel Hill	NC	27514					
UNC-CHAPEL HILL		DONALD WILLHOIT		(919)962-5507	08/14/90	-	LQG	-	-	-
NCD980515308	Facil.: VENABLE HALL 045A UNC CAMPUS		CHAPEL HILL	NC	27514 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-CHAPEL HILL		DONALD WILLHOIT		(919)962-5509	08/14/90	TSD	LQG	-	-	-
NCD982093783	Facil.: UNC HMF BLDG 488 ESTES DR		CHAPEL HILL	NC	27514 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-CHAPEL HILL		DONALD WILLHOIT		(919)962-5507	05/07/90	-	SQG	-	-	-
NCD982114860	Facil.: BEARD HALL ZONE 2		CHAPEL HILL	NC	27599 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-CHAPEL HILL		DONALD WILLHOIT		(919)962-5507	05/07/90	-	SQG	-	-	-
NCD982114985	Facil.: FACULTY LAB OFFICE BLDG-ZONE 1		CHAPEL HILL	NC	27599 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
[illegible]-CHAPEL HILL BUR WOMAC BLDG		DONALD WILLHOIT		(919)962-5507	10/07/93	-	SQG	-	-	-
NC0000032821	Facil.: MANNING DR		CHAPEL HILL	NC	27514 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-CHAPEL HILL SCH PUBLIC HLTH		DONALD WILLHOIT		(919)962-5507	05/03/94	-	SQG	-	-	-
NC0000268177	Facil.: PITTSBORO ST		CHAPEL HILL	NC	27514 ORANGE CO.					
	Mail: 212 FINLEY RD		CHAPEL HILL	NC	27514					
UNC-CHARLOTTE		CHARLES SEIGLER		(704)547-4291	10/26/89	-	LQG	-	-	-
NCD980600894	Facil.: HWY 49 N		CHARLOTTE	NC	28223 MECKLENBURG CO.					
	Mail: SAFETY OFFICE UNCC		CHARLOTTE	NC	282230001					
UNC-GREENSBORO		BRUCE GRIFFIN		( ) -	08/18/94	-	SQG	-	-	-
NCD077836088	Facil.: UNC		GREENSBORO	NC	27412 GUILFORD CO.					
	Mail: UNC		GREENSBORO	NC	27412					

SELECTION: ** SPECIAL **
SEQUENCE: STATE, SITE NAME

EVENTS: SITE EVAL

EPA ID NO.	SITE NAME STREET CITY COUNTY CODE AND NAME	STATE ZIP CONG DIST.	OPRBLE UNIT	EVENT TYPE	NFA FLAG	ACTUAL START DATE	ACTUAL COMPL DATE	CURRENT EVENT LEAD
NCD981744618	UNITED ORGANICS		00	DS1			08/01/88	EPA (FUND)
	1008 E. BOULEVARD			PA1	NFA	09/19/89	09/19/89	EPA (FUND)
	WILLIAMSTOWN	NC 27892						
	117 MARTIN							
NCD061795696	UNITEX CHEM		00	DS1			06/01/81	EPA (FUND)
	520 BROOME RD			PA1			08/01/82	EPA (FUND)
	GREENSBORO	NC 27406		PA2			06/20/85	STATE(FUND)
	081 GUILFORD			SI1	NFA		12/13/88	STATE(FUND)
NCD980515308	UNIVERSITY OF NC @ CHAPEL HILL		00	DS1			05/01/81	EPA (FUND)
	CHYDARU			PA1			05/01/84	STATE(FUND)
	CHAPEL HILL	NC 27514		SI1	NFA		09/01/89	EPA (FUND)
	135 ORANGE							
NCD980557615	UNIVERSITY OF NC/ARPT RD OLD SAN LDFL		00	DS1			06/01/81	EPA (FUND)
	AIRPORT RD			PA1			10/01/82	EPA (FUND)
	CHAPEL HILL	NC 27514						
	135 ORANGE							
NCD980557623	UNIVERSITY OF NC/ARPT WASTE DSPL AREA		00	DS1			06/01/81	EPA (FUND)
	AIRPORT RD			PA1			04/01/84	STATE(FUND)
	CHAPEL HILL	NC 27514		SI1			08/01/84	STATE(FUND)
	135 ORANGE							
NCD003203213	UNIVERSITY OF NORTH CAROLINA CHAPEL HILL		00	DS1			08/01/80	EPA (FUND)
	B-5 VENABLE HALL			PA1			04/01/84	STATE(FUND)
	CHAPEL HILL	NC 27514		SI1	NFA		04/17/89	EPA (FUND)
	135 ORANGE							
NC0210020541	US DOD MILITARY OCEAN TER./SUNNY POINT		00	DS1			11/30/90	FED. FAC.
	SUNNY POINT			PA1		11/28/90		FED. FAC.
	SOUTHPOINT	NC 28461-5000						
	019 BRUNSWICK							
NC6680090002	US EPA TECH CENTER		00	DS1			11/30/90	FED. FAC.
	HWY 54 & ALEXANDER DRIVE							
	RESEARCH TRIANGLE PARK	NC 27711						
	063 DURHAM							

MEMO

DATE: 2/20/90

TO: File

SUBJECT: UNC Mason Farm Site.

According to Andrew Barron, DRP, the Chydaru storage building & the Mason Farm Burial Ground are in the same general area but not adjacent. The burial ground apparently received mixed waste.

Pat DeRosa.

North Carolina Department of Environment, Health, and Natural Resources

State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Radiation Protection
P.O. Box 27687 • Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

Dayne H. Brown, Director
Telephone 919/733-4283

RECEIVED
OCT 31 1989
SUPERFUND SECTION

M E M O R A N D U M

TO: Pat DeRosa
Environmental Chemist
Superfund Section

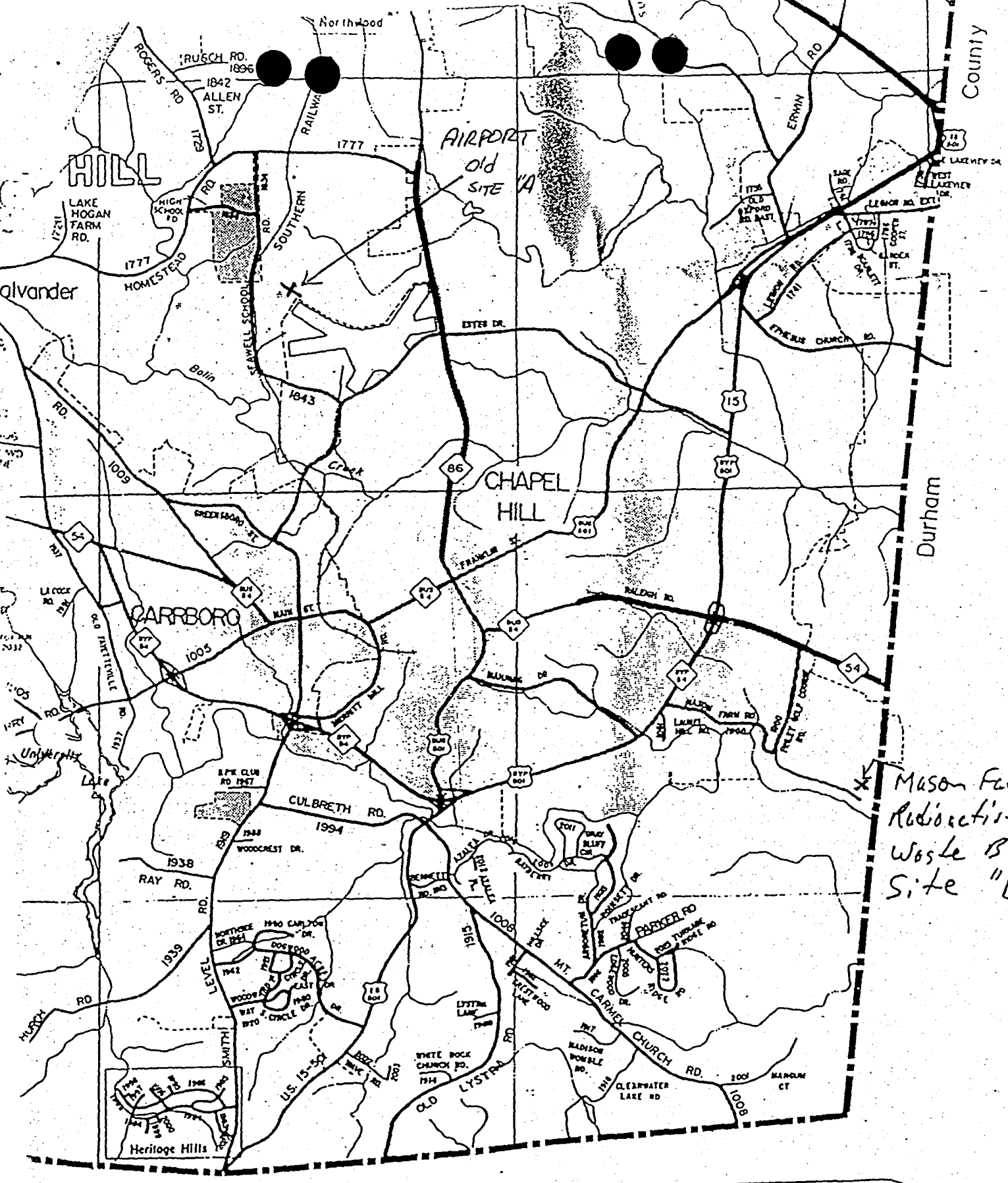
FROM: Andrew M. Barron AMB
Environmental Radiation Specialist
Nuclear Facilities and Environmental
Radiation Surveillance Section
Division of Radiation Protection

DATE: October 27, 1989

SUBJECT: Chapel Hill Burial Ground - Mason Farm Site (B)

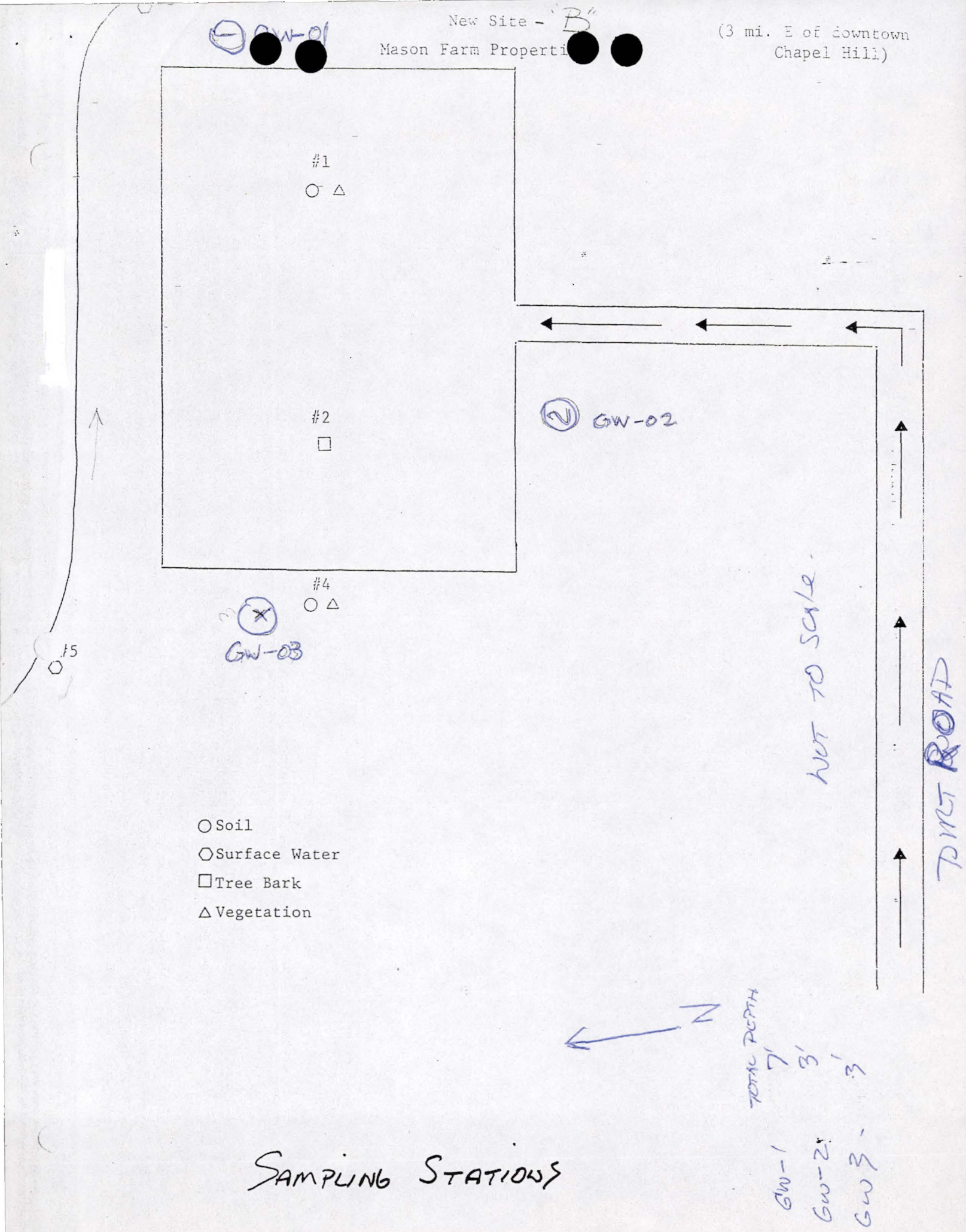
On October 4, 1989, Radiation Protection staff conducted sampling at the UNC-Chapel Hill Burial Ground (Mason Farm Site). In addition to soil, vegetation and surface water sampling, a power auger was used to drill three (3) holes (see attached maps). Groundwater samples were collected from these holes and sent to the Environmental Radiochemistry Branch of the State Laboratory for Public Health. These results indicate the presence of some compounds in the groundwater samples (attached).

AMB:sep


Northwood
RUSCH RD.
1896
1842
ALLEN ST.
ROGERS RD
1723
RAILWAY
1777
AIRPORT
Old
SITE "A"
HILL
LAKE HOGAN FARM RD.
HIGH SCHOOL RD
1777
HOMESTEAD
SOUTHERN
SEAWELL SCHOOL RD.
ERWIN RD
County
LEMON RD. EXT.
ETHERIDGE CHURCH RD.
ESTES DR.
Bolin
Creek
1843
1009
86
CHAPEL HILL
15
Durham
GREENSBORO ST.
FRANKLIN ST.
RALEIGH RD.
CARRBORO
MAIN ST.
1005
54
BOLINGBROKE DR.
MASON FARM RD
University Lake
CULBRETH RD.
1994
WOODCREST DR.
1938
RAY RD.
1939
LEVEL
SMITH
CHURCH RD
AZALEA DR.
1006
1915
PARKER RD
MT. CARMEL CHURCH RD.
LYSTRA RD
OLD LYSTRA RD
U.S. 15-501
WHITE ROCK CHURCH RD.
CLEARWATER LAKE RD
1008
Heritage Hills
Masson Farm
Radioactive
Waste Burial
Site "B"
North
SCALE:
0
4000'
8000'
BY THE ORANGE COUNTY PLANNING DEPT. NOVEMBER

New Site - "B"
Mason Farm Properti

(3 mi. E of downtown
Chapel Hill)



SAMPLING STATIONS

North Carolina Department of Human Resources
Division of Health Services
Laboratory Section
P.O. Box 28047, Raleigh, N.C. 27611

RECEIVED
OCT 25 1989
NF & ERS

Environmental Sciences Analysis Report

Name of Owner, Patient or Supply: University of NC
Address: Chapel Hill, NC
County: Orange
Report to: Dr. S.W. Fong *
Address: Division of Radiation Protection
701 Barbour Dr., Raleigh, NC 27603
Date Collected: 10/4/89
Collected By: BDD
Analysis Desired: VOC - Toluene, etc.

VOC analysis

* These are special samples, not from a public supply! Report only to Dr. Fong

Laboratory Number	Sample Number	Sample Description or Remarks	Results In
902955		CHBG(B)-GW-01	
		CHBG(B)-GW-01	
902956		CHBG(B)-GW-02	
		CHBG(B)-GW-02	
902957		CHBG(B)-GW-03	
		CHBG(B)-GW-03	
			SEE ATTACHED SHEET(S)

Date Received 10-6-89 BD
Date Extracted
Date Reported 10-19-89
Date Analyzed PT/GC/MS 10-16-89 mw VOC 10/16/89 JM
Reported By: John L. Neal

DHS Form 2364 Revised (5/89)
Laboratory

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 9D2955 PURGEABLE COMPOUNDS Date of Analysis 10/16/89

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
(Trans)1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
(Cis) 1,2-Dichloroethylene	
Chloroform	
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
Toluene	
1,1,2-Trichloroethane	
Tetrachloroethene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
Chlorobenzene	U
Ethylbenzene	
1,1,1,2-Tetrachloroethane	
p-Xylene	
m-Xylene	
o-Xylene	
Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
(Tert) Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
(Sec) Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
1,2-Dichlorobenzene	
(Bis) 2 Chloroisopropyl Ether	
1,2-Dibromo-3 Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

CHBG - GW-01

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

N.C. Division of Health Services
DHS 3068-O (1/89 Laboratory)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 902956 PURGEABLE COMPOUNDS Date of Analysis 10/16/89

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
(Trans)1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
(Cis) 1,2-Dichloroethylene	
Chloroform	
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
Toluene	trace
1,1,2-Trichloroethane	U
Tetrachloroethene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	

COMPOUND	µg/l
Chlorobenzene	U
Ethylbenzene	
1,1,1,2-Tetrachloroethane	
p-Xylene	1K
m-Xylene	
o-Xylene	trace
Styrene	U
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	trace
4-Chlorotoluene	U
(Tert) Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	trace
(Sec) Butyl Benzene	U
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
1,2-Dichlorobenzene	
(Bis) 2 Chloroisopropyl Ether	
1,2-Dibromo-3 Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

CHBG(B)-GW-02

N.C. Division of Health Services
DHS 3068-0 (1/89 Laboratory)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 902957 PURGEABLE COMPOUNDS Date of Analysis 10/16/89

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	↓
✓Vinyl Chloride	↓
Bromomethane	↓
Chloroethane	↓
Trichlorofluoromethane	↓
✓1,1-Dichloroethylene	↓
Methylene Chloride	↓
tert-Butyl Methyl Ether	↓
(Trans)1,2-Dichloroethylene	↓
Isopropyl ether	↓
1,1-Dichloroethane	↓
2,2-Dichloropropane	↓
(Cis) 1,2-Dichloroethylene	↓
Chloroform	↓
(BCM) Bromochloromethane	↓
✓1,1,1-Trichloroethane	↓
1,1-Dichloropropene	↓
✓Carbon Tetrachloride	↓
✓Benzene	trace
✓1,2-Dichloroethane	U
✓Trichloroethylene	↓
1,2-Dichloropropane	↓
Bromodichloromethane	↓
Dibromomethane	↓
Toluene	1.8
1,1,2-Trichloroethane	U
Tetrachloroethene	↓
1,3-Dichloropropane	↓
Dibromochloromethane	↓
1,2-Dibromoethane (EDB)	↓
1-Chlorohexane	↓

COMPOUND	µg/l
Chlorobenzene	U
Ethylbenzene	↓
1,1,1,2-Tetrachloroethane	↓
p-Xylene	3.1
m-Xylene	↓
o-Xylene	1.5
Styrene	U
Bromoform	↓
Isopropylbenzene	↓
1,1,2,2-Tetrachloroethane	↓
Bromobenzene	↓
n-Propylbenzene	↓
1,2,3-Trichloropropane	↓
2-Chlorotoluene	↓
1,3,5-Trimethylbenzene	1.5
4-Chlorotoluene	U
(Tert) Butyl Benzene	↓
Pentachloroethane	↓
1,2,4-Trimethylbenzene	2.8
(Sec) Butyl Benzene	U
p-Isopropyltoluene	↓
1,3-Dichlorobenzene	↓
✓1,4-Dichlorobenzene	↓
n-Butylbenzene	↓
1,2-Dichlorobenzene	↓
(Bis) 2 Chloroisopropyl Ether	↓
1,2-Dibromo-3 Chloropropane	↓
1,2,4-Trichlorobenzene	↓
Hexachlorobutadiene	↓
Naphthalene	↓
1,2,3-Trichlorobenzene	↓

1.0

400

COMMENTS: Unidentified peaks present

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

CHBG (B) - GW-03

N.C. Division of Health Services
DHS 3068-0 (1/89 Laboratory)

9 December 1988

MEMORANDUM

TO: File

FROM: Charlotte Varlashkin, Hydrogeologist CV
Superfund Branch

RE: UNC-CH Chydaru Site NCD 980515308

The NC Active Hazardous Wastes sites program has received a "Notification of an Inactive Hazardous Substance or Waste Disposal Site" for an area designated as the Mason Farm Radioactive Waste Burial site. The following information was obtained from the Notification form submitted to this office.

The site is on UNC property located about 1/2 mile east of the Finley Golf Course Clubhouse. This site appears to be in the location of the Chydaru site.

The site was used for radioactive waste disposal between 1963 and 1971. Known subsurface soil and groundwater contamination exist at the site. Surface water and vegetation are monitored annually by NC Radiation Protection Section.

CV/acr

File: Permitting
UNC-Chapel Hill
NCD003203213

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

University
Health and Safety Office
(919) 962-5507

The University of North Carolina at Chapel Hill
212 Finley Golf Course Rd.
Chapel Hill, North Carolina 27514

November 7, 1988

RECEIVED
NOV 7 1988
HAZARDOUS WASTE BRANCH

Jerome H. Rhodes, Head
Hazardous Waste Branch
Solid Waste Management Section
NC Department of Human Resources
Division of Health Services
P.O. Box 2091
Raleigh, NC 27602-2091

Dear Mr. Rhodes:

Enclosed is the closure plan for the University's Chydaru Radioactive Vial Storage Facility, EPA ID# NCD003203213. The University does not intend to submit a Part B Application for this facility, but plans to consolidate this facility with its Hazardous Materials Facility, EPA ID# NCD982093783. An amended Part A Application has been submitted to advise your agency of our plans to construct an addition to the Hazardous Materials Facility.

Sincerely,

Donald G. Willhoit

Donald G. Willhoit
Director of Health & Safety

DGW:jm

DATE: 12 April 89

TO: File

FROM: Grover Nicholson GNicholson

RE: UNC Sites

A compilation of the eight CERCLA and RCRA UNC sites is listed below:

Program	NCD Number	Site Name	RCRA Status
CERCLA	003203213	Finley Golf Course Chydarb Bldg. 303	ST, TRN, SQGEN
CERCLA	982093783	488 Estes Drive	ST
RCRA	982114860	Beard Hall	SQGEN
RCRA	982114928	Brinkhouse-Bullit Building 7	SQGEN
RCRA	982114985	Fac. Lab Office Building 7	SQGEN
CERCLA	980515308	Venable Hall	SQGEN
CERCLA	980557615	Airport Road Site	--
CERCLA	980557623	Airport Waste DS	--

GN/ds/grover.doc/p.26

Ronald H. Levine, M.D., M.P.H.
STATE HEALTH DIRECTOR

DIVISION OF HEALTH SERVICES
P.O. Box 2091
Raleigh, N.C. 27602-2091

March 28, 1984

Mr. Walton Jones
EPA 3012 Regional Project Officer
Air and Hazardous Materials Division
U. S. Environmental Protection Agency
345 Courtland Street, N. E.
Atlanta, Georgia 30365

RE: Preliminary Assessment Reports

Dear Mr. Jones:

Submitted under this cover are the Preliminary Assessment Reports for the following ERRIS List Sites in North Carolina.

UNC-CH Venable Hall Chapel Hill, N. C. 27514	NCD003203213 Orange County
UNC-CH Chydaru Chapel Hill, N. C. 27514	NCD980515308 Orange County

These two (2) University of North Carolina - Chapel Hill sites were reported as RCRA sites. The Venable Hall storage building has been closed-out and torn down and a new chemistry complex is being constructed on the site. No disposal at Venable. The Chydaru storage buildings are near the UNC Finley Golf Course and were never used to store hazardous chemicals. The buildings are used at the present time for storage of very low level radioactive materials. The facility is regulated and inspected by the N. C. Radiation Protection Section of the Department of Human Resources. This is not a RCRA 3012 Program Facility and not a hazardous waste disposal site.

Based on our review of the available date and site visits, we have concluded that the former Venable Hall storage building and the Chydaru storage buildings are not hazardous waste disposal sites, no further action is recommended and that they be placed on the inactive ERRIS List or removed completely.

UNC-CH, Old Landfill Dump
Airport Road
Chapel Hill, N. C. 27514

NCD980557615
Orange County

The University of North Carolina at Chapel Hill notified of a hazardous waste site on June 8, 1981. Between the years of 1967 and 1972 approximately 7,500 cubic feet of lab and research waste chemicals from the University were buried in trenches at the City Sanitary Landfill north of the airport on University owned property. Due to the unknows associated with the disposal and the fact that no monitoring of the site has ever been initiated, the possible long range impacts from the site are questionable. Although no known problems have been detected at the site since closure, we recommend that a low site inspection priority be given the site and that it remain on the active ERRIS list. The low priority is based on the relatively low volume of materials, burials were scattered over the area and the site is somewhat isolated with the University owning the surrounding forested areas. Future work would center on defining the areas of disposal if possible and to initiate a monitoring program for the area. Site geology/soils information should also be developed to aid in monitoring studies.

Duke Refining Corporation
2020 Jarrell Street
High Point, N. C. 27260

NCD003230836
Guilford County

This drum and solvent reclamation facility is known and alleged to have hazardous waste on site, with some spills or other releases to the environment. The main wastes are solvents from the area furniture companies. Several site inspections (with samples) have been conducted by the EPA and the State. Problems in site management and in facility operations are documented. Potential hazards for surface, soils and groundwater contamination are present as well as fire hazards. This site is considered a RCRA site and a RCRA problem. This site will be operated in compliance with RCRA or closed-out in accordance with RCRA regulations. Based on its RCRA status the State is requesting that Duke Refining be recommended for no further action under 3012 and that the site be placed on the Inactive ERRIS List. Also please note the site inspections by State and EPA and update the ERRIS files for this site.

American Enka Company
Enka Street - US 19 & 23 W
Enka, N. C. 28728

NCD052813250
Buncombe Co.

The plant manager notified, as a precaution, that American Enka had operated a landfill, for it's own use, since 1929.

Over the years the plant has produced rayon and nylon products. The facility's activities have been documented through interviews and correspondences. Based on the review of this information it appears that no hazardous wastes were disposed in the landfill. The landfill was permitted by the State in 1980 and the surface waters are routinely sampled near the landfill. American Enka is a RCRA facility and does produce small amounts of hazardous waste from work in the research department. This lab waste was reportedly "flushed" before RCRA and none is believed to have been landfilled.

Based on our review of the available data we have concluded that American Enka and it's landfill is not a hazardous waste disposal site, no further action is recommended and that it be placed on the Inactive ERRIS List.

NC State University
105A Field House
Raleigh, N. C. 27607

NCD000830737
Wake County

This is the office for the NCSU RCRA Program and is not a hazardous waste disposal site. The RCRA facility is located on Varsity Drive, Raleigh and is inspected as required under RCRA and is not a hazardous waste disposal site either. We recommend that no further action is required and the site be either removed completely or placed on the Inactive ERRIS List.

IBM Corporation RTP
3039 Cornwallis Road
Research Triangle Park, N. C. 27709

NCD041463761
Durham County

IBM notified of a spill, leak or other loss of about 8,000 gallons of 1,1,1- trichloroethane from an underground tank in 1977. IBM installed monitoring and pumping wells around the site and has had an intensive groundwater clean-up program in operation for several years. It is believed that with the remedial clean-up program and intensive site groundwater monitoring program that there are no environmental or health threats at this site.

Based on our review of the available data we have concluded that IBM RTP be given a low priority for inspection and that it remain on the Active ERRIS List. The low priority is to ensure that the site remains on the active list until it is considered cleaned-up.

Flemington Landfill
421 N - Flemington Avenue
Wilmington, N. C. 28401

NCD980503056
New Hanover County

This PA is being filed to up-date the "system" on the current status of the Flemington Landfill Site.

Several site investigations, inspections and studies have been conducted at this site by the EPA and State in the past seven (7) years. Multiple hazardous constituents are present in the groundwater on the east and southeastern boundaries of the site, apparently originating from the landfill. Several area residences and industrial groundwater users were forced into alternate sources of safe water. This site has been well documented as being a problem and is still being monitored and evaluated by the EPA and the State. A low priority site inspection is being submitted to ensure that the site remains on the Active ERRIS List as the site is beyond further consideration from the 3012 Program. The "P", pending action code, is still the appropriate designation for this site. There are no known immediate health or environmental threats that need to be addressed at this site.

New Hanover County Landfill
421 N. - Flemington Avenue
Wilmington, N. C. 28401

NCD980557797
New Hanover County

This site is an ERRIS List duplication. The State requests that the site be known as the Flemington Landfill (see above discussion) and that New Hanover County Landfill be listed as an alais. The no further action code is designated so the site will be listed as an alais and removed from the "List".

Unican Security Systems Corporation
400 Fawn Drive
Rocky Mount, N. C. 27801

NCD045646924
Nash County

Unican notified that it had used an impoundment on company property to contain, treat and/or dispose of nickel metal plating sludges. Some data is available that indicates an impact to the groundwater, in the immediate area downgradient from the impoundment, from the Ni sludges and 1,1,1-trichlorethane. More site work is being conducted by Unican and the State to ensure a good clean-up under the RCRA Program.

The State therefore requests, that no further action be recommended and that Unican be placed on the Inactive ERRIS List. The clean-up of this site will be done under State authority from the RCRA Program. No known immediate health or environmental threats at this site.

Pre-RCRA hazardous waste disposal is reported by the Company as having gone into the impoundment.

Beaufort County Landfill (07-02) NCD980557714
St. Rd. 1334 Beaufort County
Washington, N. C. 27889

This landfill was notified for by two companies as a precaution. Texasgulf, site property owner, notified just in case some unrinsed pesticide containers had been disposed of improperly in the landfill. The company had no specific knowledge that any unrinsed containers went into the landfill and sequent evaluation by 3012 was also unable to document any unauthorized disposal of unrinsed pesticide containers.

Singer Company notified as a precaution just in case cardboard containing dried lacquer spray residues from their operations were considered hazardous waste (ignitable). Based on the Company's and State's review of the chemical data on the lacquers, they were considered non-hazardous when they are dried residues on cardboard.

Based on our review of the available data we have concluded that the Beaufort County Landfill (07-02) is not a hazardous waste disposal site, no further action is recommended and that it be placed on the Inactive ERRIS List. This is a State permitted landfill with groundwater monitoring wells around the site that are routinely sampled as conditions of the permit.

Amcel Propulsion, Inc. NCD980557995
Beetree Road Buncombe County
Swannanoa, N. C. 28778

This site is an ERRIS List duplication. The State requests that the site be known as the Chemtronics site and that Amcel Propulsion be listed as an alais. The no further action code is designated so the site will be listed as an alais and removed from the "List".

Lackawanna Leather Company
Summerset Drive
Conover, N. C. 28613

NCD002388965
Catawba County

Mr. Bley, Plant Manager, notified for Lackawanna because they were storing spent solvents on site in drums. After a through investigation it was determined that no hazardous wastes had ever been disposed of on site. The facility is in compliance with RCRA as a small generator, as all hazardous waste are manifested for proper disposal.

It was, however, learned that for about two years Lackawanna contracted with a local septic hauler to dispose of some sludges that may have been hazardous? Investigation of that disposal site is still under evaluation by the State.

Based on our review of the available data we have concluded that Lackawanna Leather is not a hazardous waste disposal site, no further action is recommended and that it be placed on the Inactive ERRIS List.

Sincerely,

Frank E. Moore

Frank E. Moore, Geologist

Solid & Hazardous Waste Management Branch
Environmental Health Section

FEM:jj
cc: O. W. Strickland
Arthur Mouberry
Jay Sauber
Dennis Ramsey
W. McClelland

PRELIMINARY ASSESSMENTS SUBMITTED TO EPA

Date March 28, 1984

EPA ID NUMBER	SITE NAME	DISPOSITION			
		PRIORITY-INSPECTION			NO FURTHER ACTION
		HIGH	MEDIUM	LOW	
NCD003203213	UNC-CH Venable				X
NCD980515308	UNC-CH Chydaru				X
NCD980557615	UNC-CH Airport Lndfl			X	
NCD003230836	Duke Refining Corporation				X
NCD052813250	American Enka Company				X
NCD000830737	NCSU 105A Fieldhouse				X
NCD041463761	IBM Corp. RTP			X	
NCD980503056	Flemington Ldfl			X	
NCD980557797	New Hanover Co. Ldfl				X
NCD045646924	Unican Security Systems Corp.				X
NCD980557714	Beaufort Co. Lndfl (07-02)				X
NCD980557995	Amcel Propulsion				X
NCD002388965	Lackawanna Leather Co.				X

POTENTIAL HAZARDOUS WASTE SITE
SSESSMENT
ON AND ASSESSMENT

NCD980515308 ORANGE
UNIV OF NC @ CHAPEL HILL
CHYDARU
CHAPEL HILL NC 27514

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	NCD980515308

2 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER: Finley Golf Course Rd. Ext.

1 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
		Orange	068	04

09 COORDINATES LATITUDE	LONGITUDE
3553420	0790148 0

10 DIRECTIONS TO SITE (Starting from nearest public road)

(maps attached - in File)

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
Univ. of N. C. at Chapel Hill	~~Venable Hall~~ Error

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Chapel Hill	NC	27514	(919) 962-5507

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
			( )

13 TYPE OF OWNERSHIP (Check one)
☐ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☒ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: / / (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: / / (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☐ YES DATE / / (MONTH DAY YEAR)
☒ NO

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION
_____ BEGINNING YEAR _____ ENDING YEAR ☒ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Mr. Calvin Overcash has stated that this RCRA facility was never used to store hazardous waste under RCRA. Although he did say that it was an approved and inspected low level radioactive storage facility. Ellis Listing is error. DAM

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Assumed None, as far as 3012 Program. Does not deal w/radioactive wastes sites.

RCRA records still not clear or accurate for this site.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☒ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Donald G. Willhoit	Health & Safety Director - UNC	(919) 962-5507

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
O. W. Strickland	NC DHR	Solid & Haz. Waste Mgt. Br.	(919) 733-2178	2 27 84 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

THE UNIVERSITY OF NORTH CAROLINA 0 0 0 4 7 2
AT
CHAPEL HILL

University
Health and Safety Office

April 17, 1981

The University of North Carolina at Chapel Hill
Health and Safety Office
135 Venable Hall 045
Chapel Hill, North Carolina 27514

RECEIVED
EPA REGION IV

MAY 12 4 51 PM '81
ENFORCEMENT
DIVISION

Ms. Rita D. Ford
U. S. Environmental Protection Agency
Consolidated Permits Branch
345 Courtland Street, N.E.
Atlanta, Georgia 30365

NCD 980 515 308

Dear Ms. Ford:

Enclosed is a Notification of Hazardous Waste Activity and an application for a Hazardous Waste Permit, Part A, Forms 1 and 3, for a second storage facility (Chydaru) at the University of North Carolina. Application was submitted to EPA on March 20, 1981 for the storage facility located near Venable Hall. Included in that application were the topographic map, photographs, and facility drawing for the Chydaru facility.

Thank you for your help.

Sincerely,

Donald Willhoit

Donald G. Willhoit,
Director

DGW/mx

file

THE UNIVERSITY OF NORTH CAROLINA
AT
CHAPEL HILL

RECEIVED
MAY 20 1983
SOLID & HAZARDOUS WASTE MANAGEMENT BRANCH

University
Health and Safety Office

The University of North Carolina at Chapel Hill
Health and Safety Office
B-5 Venable Hall 045 A
Chapel Hill, North Carolina 27514

May 18, 1983

Mr. O.W. Strickland, Head
Solid and Hazardous Waste Management Branch
Division of Health Services
P.O. Box 2091
Raleigh, N.C. 27602-2091

Dear Mr. Strickland:

The University of North Carolina at Chapel Hill is currently operating with two separate EPA Hazardous Waste Facility Identification Numbers. We have not used one of the facilities and do not plan to use it in the future.

KEITH

We therefore request that the status of the Hazardous Waste Facility identified by EPA Identification Number NCD980515308, located at "Chydaru" off Finley Gold Course Road Extension, be changed to inactive.

If there are any questions, please feel free to contact me at your convenience.

Sincerely,

Calvin Overcash

Calvin Overcash
Hazardous Waste Manager

CO/mth

cc: Donald G. Willhoit, Director
Health and Safety Office

(fill–in areas are spaced for elite type, i.e., 12 characters/inch). orm pprove o.

FORM 1 GENERAL

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

GENERAL INFORMATION

Consolidated Permits Program

(Read the "General Instructions" before starting.)

I. EPA I.D. NUMBER

F N C D ~~0 0 3 2 0 3 2 1 3~~ 3 D

LABEL ITEMS

I. EPA I.D. NUMBER

III. FACILITY NAME

V. FACILITY MAILING ADDRESS

VI. FACILITY LOCATION

000470

RECEIVED
EPA/REGION IV
MAY 12 4 51 PM '81
ENFORCEMENT
DIVISION

PLEASE PLACE LABEL IN THIS SPACE

GENERAL INSTRUCTIONS

If a preprinted label has been provided, affix it in the designated space. Review the information carefully; if any of it is incorrect, cross through it and enter the correct data in the appropriate fill–in area below. Also, if any of the preprinted data is absent *(the area to the left of the label space lists the information that should appear)*, please provide it in the proper fill–in area(s) below. If the label is complete and correct, you need not complete Items I, III, V, and VI *(except VI-B which must be completed regardless)*. Complete all items if no label has been provided. Refer to the instructions for detailed item descriptions and for the legal authorizations under which this data is collected.

II. POLLUTANT CHARACTERISTICS

INSTRUCTIONS: Complete A through J to determine whether you need to submit any permit application forms to the EPA. If you answer "yes" to any questions, you must submit this form and the supplemental form listed in the parenthesis following the question. Mark "X" in the box in the third column if the supplemental form is attached. If you answer "no" to each question, you need not submit any of these forms. You may answer "no" if your activity is excluded from permit requirements; see Section C of the instructions. See also, Section D of the instructions for definitions of bold–faced terms.

SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED	SPECIFIC QUESTIONS	MARK 'X' YES	NO	FORM ATTACHED
A. Is this facility a publicly owned treatment works which results in a discharge to waters of the U.S.? (FORM 2A)		X		B. Does or will this facility *(either existing or proposed)* include a concentrated animal feeding operation or aquatic animal production facility which results in a discharge to waters of the U.S.? (FORM 2B)		X	
C. Is this a facility which currently results in discharges to waters of the U.S. other than those described in A or B above? (FORM 2C)		X		D. Is this a proposed facility *(other than those described in A or B above)* which will result in a discharge to waters of the U.S.? (FORM 2D)		X	
E. Does or will this facility treat, store, or dispose of hazardous wastes? (FORM 3)	X			F. Do you or will you inject at this facility industrial or municipal effluent below the lowermost stratum containing, within one quarter mile of the well bore, underground sources of drinking water? (FORM 4)		X	
G. Do you or will you inject at this facility any produced water or other fluids which are brought to the surface in connection with conventional oil or natural gas production, inject fluids used for enhanced recovery of oil or natural gas, or inject fluids for storage of liquid hydrocarbons? (FORM 4)		X		H. Do you or will you inject at this facility fluids for special processes such as mining of sulfur by the Frasch process, solution mining of minerals, in situ combustion of fossil fuel, or recovery of geothermal energy? (FORM 4)		X	
I. Is this facility a proposed stationary source which is one of the 28 industrial categories listed in the instructions and which will potentially emit 100 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X		J. Is this facility a proposed stationary source which is NOT one of the 28 industrial categories listed in the instructions and which will potentially emit 250 tons per year of any air pollutant regulated under the Clean Air Act and may affect or be located in an attainment area? (FORM 5)		X	

III. NAME OF FACILITY

1 SKIP UNIV OF NORTH CAROLINA AT CHAPEL HILL

IV. FACILITY CONTACT

A. NAME & TITLE *(last, first, & title)*	B. PHONE *(area code & no.)*
2 WILLHOIT, DONALD, DIR., HEALTH & SAFETY	919 933 5507

V. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX

3 B5 VENABLE HALL

B. CITY OR TOWN	C. STATE	D. ZIP CODE
4 CHAPEL HILL	NC	27514

VI. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER

5 ~~RALEIGH RD~~ / CHYDARU

B. COUNTY NAME

ORANGE

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE *(if known)*
6 CHAPEL HILL	NC	27514	

CONTINUED FROM THE FRONT

VII. SIC CODES (4-digit, in order of priority)

A. FIRST	B. SECOND
8221 (specify) University	8071 (specify) Medical laboratories

C. THIRD	D. FOURTH
8922 (specify) Research, Scientific & Educational	8072 (specify) Dental laboratories

VIII. OPERATOR INFORMATION

A. NAME: UNIVERSITY OF NORTH CAROLINA

B. Is the name listed in Item VIII-A also the owner? [X] YES [ ] NO

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)
F = FEDERAL, M = PUBLIC (other than federal or state), S = STATE, O = OTHER (specify), P = PRIVATE: S (specify)

D. PHONE (area code & no.): A 919 933 5507

E. STREET OR P.O. BOX: 35 VENABLE HALL

F. CITY OR TOWN: CHAPEL HILL

G. STATE: NC

H. ZIP CODE: 27514

IX. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

X. EXISTING ENVIRONMENTAL PERMITS

A. NPDES (Discharges to Surface Water)	N	NC0025305
B. UIC (Underground Injection of Fluids)	U	
C. RCRA (Hazardous Wastes)	R	NCD003203213
D. PSD (Air Emissions from Proposed Sources)	P	NC3069R
E. OTHER (specify)	9	NC3035 (specify) Air emissions
E. OTHER (specify)	9	NC3036 (specify) Air emissions

XI. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property bounderies. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

XII. NATURE OF BUSINESS (provide a brief description)

The University of North Carolina is a major University offering a wide range of academic disciplines. Located within the university are a large number of teaching and research laboratories. The disciplines with chemical laboratories include chemistry, biology, medical, pharmacy, public health, dental, ect.

XIII. CERTIFICATION (see instructions)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
John L. Temple Vice Chancellor for Business & Fin.	John Temple	4/21/81

COMMENTS FOR OFFICIAL USE ONLY

C

Please print or type in the unshaded areas only
(fill-in areas are spaced for elite type, i.e., 12 characters/inch).

Form Approved OMB No. 15-S8-...

FORM 3510-3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER

F N C D 0 0 3 2 0 3 2 1 3 T/A C 1

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS
		980515308

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

[X] 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C 8 | YR. 7 4 | MO. 0 7 | DAY 0 1

[ ] 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

[ ] 1. FACILITY HAS INTERIM STATUS

[ ] 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES — CODES AND DESIGN CAPACITIES

A. PROCESS CODE — Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. PROCESS DESIGN CAPACITY — For each code entered in column A enter the capacity of the process.

1. AMOUNT — Enter the amount.
2. UNIT OF MEASURE — For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE	UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G	LITERS PER DAY	V	ACRE-FEET	A
LITERS	L	TONS PER HOUR	D	HECTARE-METER	F
CUBIC YARDS	Y	METRIC TONS PER HOUR	W	ACRES	B
CUBIC METERS	C	GALLONS PER HOUR	E	HECTARES	Q
GALLONS PER DAY	U	LITERS PER HOUR	H		

ENFORCEMENT DIVISION MAY 12 4 51 PM '81 RECEIVED REGION IV 471

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

C DUP T/A C 1

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. 1. AMOUNT	B. 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S02	600	G		5				
X-2	T03	20	E		6				
1	S01	5,000	G		7				
2					8				
3					9				
4					10				

Continue form 1 e front.

III. PROCESSES *(continued)*

C. SPACE FOR ADDITIONAL PROCESS CODES O[illegible] DESCRIBING OTHER PROCESSES *(code "T[illegible]* [illegible]OR EACH PROCESS ENTERED H[illegible]RE INCLUDE DESIGN CAPACITY.

IV. DESCRIPTION OF HAZARDOUS WASTES

A. EPA HAZARDOUS WASTE NUMBER – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

B. ESTIMATED ANNUAL QUANTITY – For each listed waste entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each characteristic or toxic contaminant entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

C. UNIT OF MEASURE – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

If facility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

D. PROCESSES

1. PROCESS CODES:
   For listed hazardous waste: For each listed hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

NOTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by more than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

EXAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 100 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

LINE NO.	A. EPA HAZARD. WASTE NO (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
X-1	K 0 5 4	900	P	T 0 3 D 8 0	
X-2	D 0 0 2	400	P	T 0 3 D 8 0	
X-3	D 0 0 1	100	P	T 0 3 D 8 0	
X-4	D 0 0 2				*included with above*

CONTINUE ON PAGE 3

Continued from page 2.
NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY
W N C D 0 0 3 2 0 3 2 1 3 T/A 3 C 1	W DUP T/A 2 C DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)				2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D002	4,000	P	S01				
2	D004	100	P	S01				
3	D005	100	P	S01				
4	D006	400	P	S01				
5	D007	400	P	S01				
6	D008	1,000	P	S01				
7	D009	1,600	P	S01				
8	D010	100	P	S01				
9	D011	400	P	S01				
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								

'. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

:. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE

980515308

EPA I.D. NO. *(enter from page 1)*													
N	C	D	0	0	3	2	0	3	2	1	3	3	6

'. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

'I. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground—level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

'II. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
35 53 42	079 01 48

VIII. FACILITY OWNER

☐ A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE

IX. OWNER CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
John L. Temple Vice Chancellor for Business & Fin.	John Temple	4/21/81

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

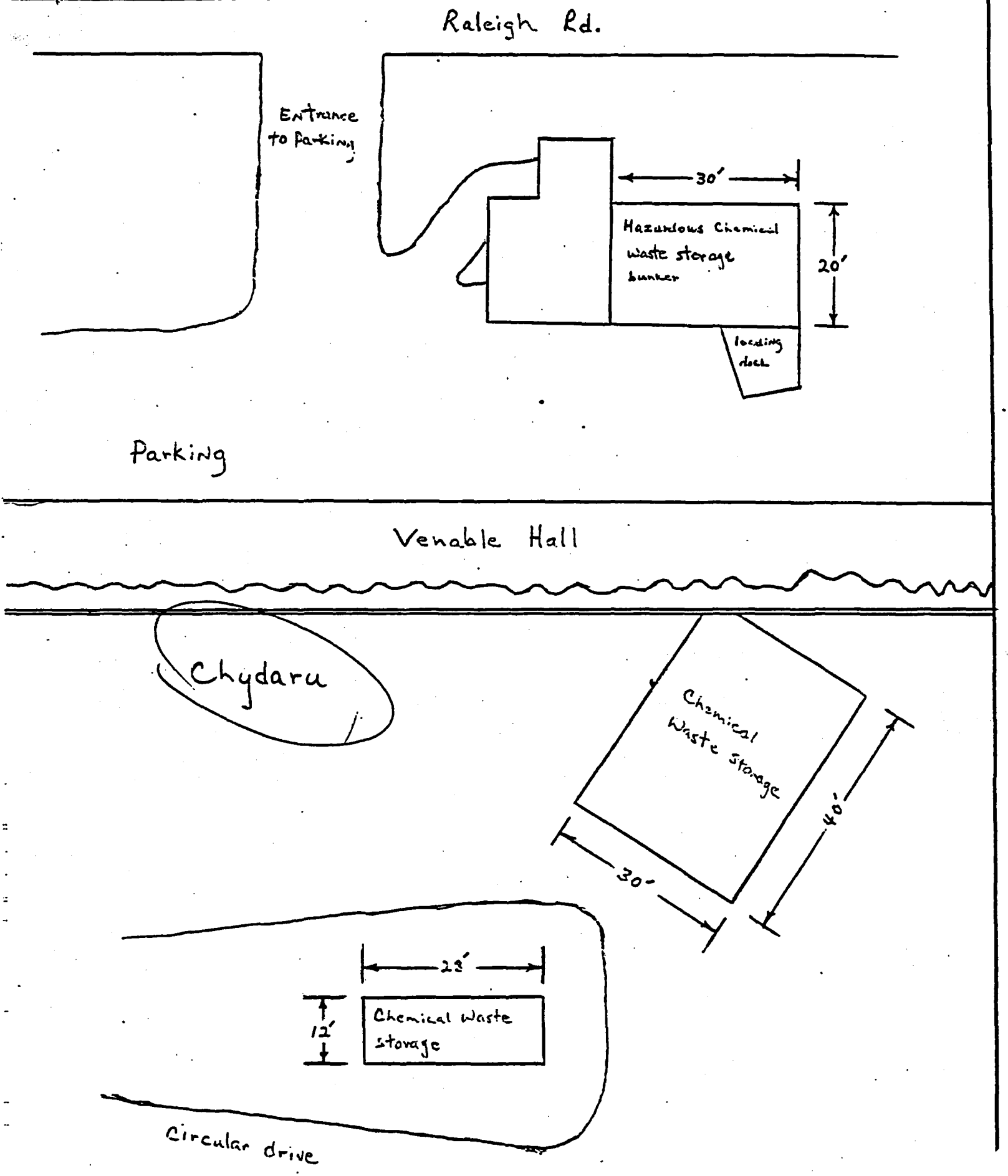
A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
John L. Temple Vice Chancellor for Business & Fin.	John Temple	4/21/81

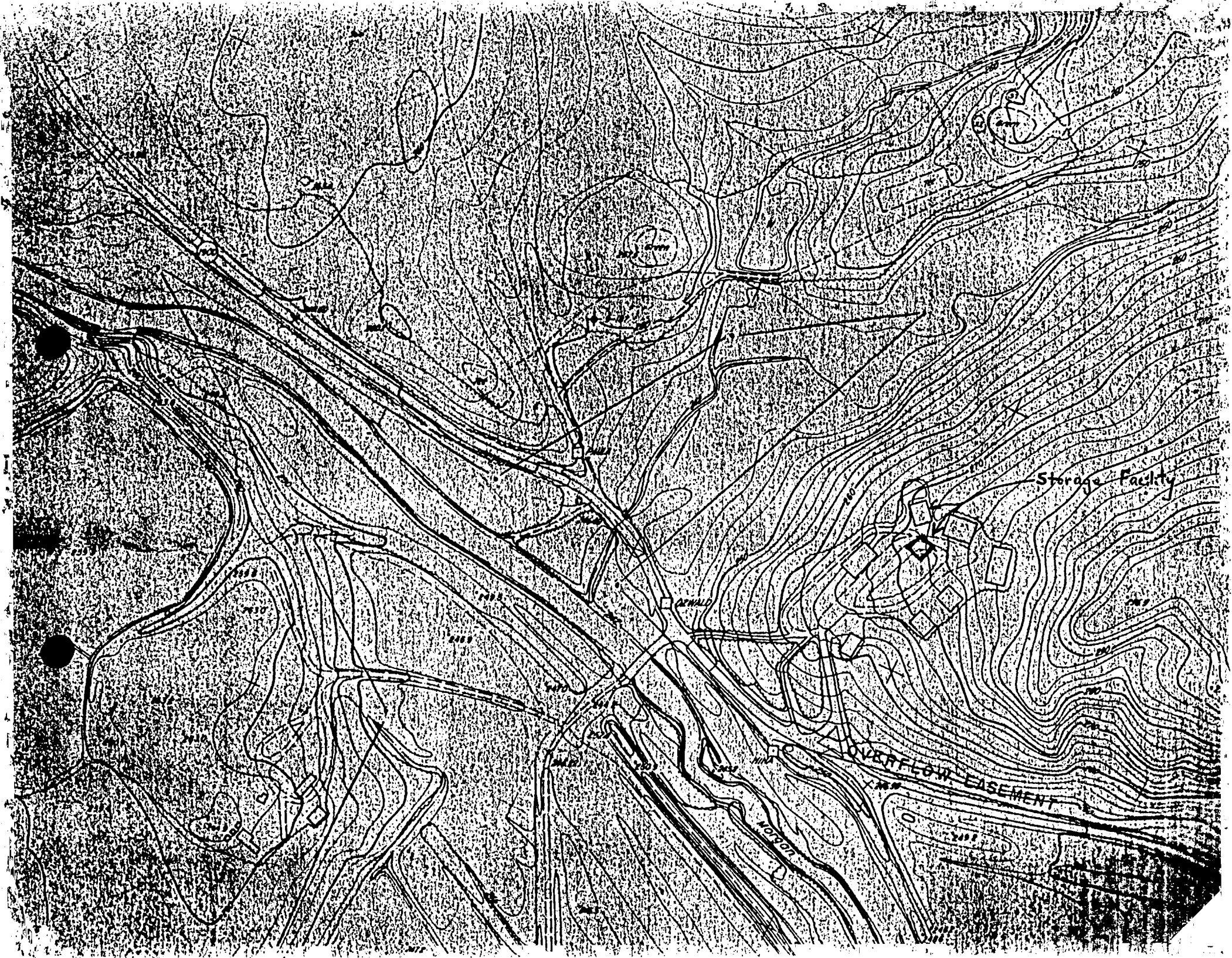
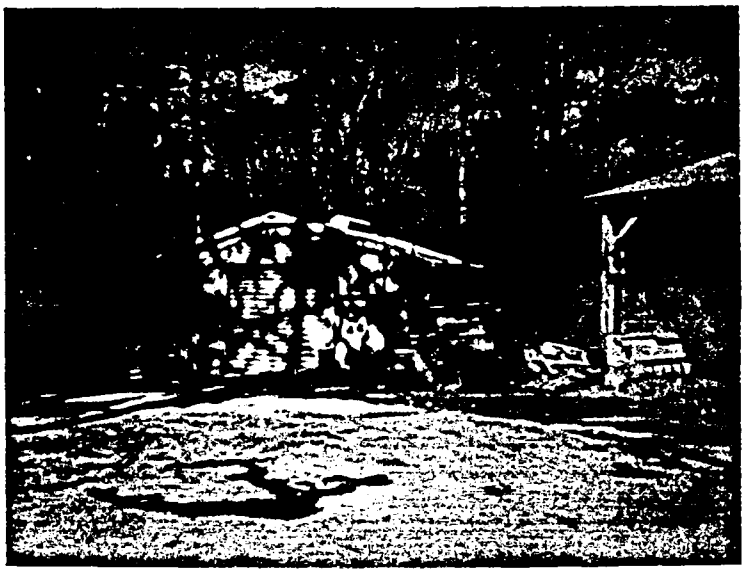
CONTINUE ON PAGE 5

Continued from page 4.

Form Approved OMB No. 158-S80004

V. FACILITY DRAWING *(see page 4)*




Storage Facility
OVERFLOW EASEMENT
Morgan