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North Carolina
Department of Environment and Natural Resources
Division of Waste Management

Michael F. Easley, Governor
William G. Ross Jr., Secretary
Dexter R. Matthews, Director

June 26, 2002

Ms. Jennifer Wendel
NC Site Management Section
US EPA Region IV Waste Division
61 Forsyth Street, 11th Floor
Atlanta, Georgia 30303

Subject: Site Re-Assessment Report
Swain County Landfill
EPA ID: NC3120000002
Bryson City, Swain County, North Carolina

Dear Ms. Wendel:

A Site Re-Assessment (SRA) was conducted for the Swain County Landfill, Bryson City, Swain County, for the purpose of determining if further action under CERCLA was needed. The SRA included a file review of previous investigations as well as on-site sampling conducted by the NC Superfund Section. The NC Superfund Section collected a total of three surface water and three sediment samples from the Tuckasegee River, a fishery, to determine if it has been adversely impacted by the landfill. Based on the file review and the sampling results from the surface water pathway, this site is recommended for no further action under CERCLA.

The Swain County Landfill is located along State Road 1311 (Buckner Branch Rd), two miles west of Bryson City, Swain County, North Carolina. The landfill occupies approximately 45 acres located entirely within the boundaries of the Nantahala National Forest (NNH). The site is bounded to the north by the Tuckasegee River, by State Road 1311 to the west and southwest, by a Southern Railroad line to the east and southeast, and by Buckner Branch to the south and east (Reference 1). The site's geographic coordinates are 35°25'31.39" north latitude and 83°28'55.90" west longitude (Ref. 2).

From the early 1970's until 1976, the Singer Company disposed of approximately 465 tons of solid and liquid wastes in the landfill. The wastes were in the form of solid finish material scrapings from spray booth walls and floors and liquid solvent wastes from cleanup operations. The majority of the wastes were containerized in 55-gallon drums and 5-gallon cans and transported to the landfill. Additionally, some solid waste from the Singer Company was placed into cardboard containers and landfilled. (Ref. 1). Prior to the 1970's, the Singer

Company disposed of an unknown quantity of lacquer spray booth sludge generated from their wood furniture finishing operations (Ref. 3).

In April 1984, the U.S. Forest Service (USFS) conducted a Preliminary Assessment (PA) at the Swain County Landfill. The USFS concluded that the wastes were not hazardous and recommended the site for no further action (Ref. 4). In May 1990, an EPA Region IV Field Investigation Team (FIT) was tasked to conduct a Screening Site Inspection (SSI) at the Swain County Landfill. Based on ownership information collected during the SSI reconnaissance, the site was deferred to the Federal Facilities Branch (Ref. 5).

In July 1991, a site visit to the NNH was conducted by an EPA representative to determine if the amended Resource Conservation and Recovery Act (RCRA) was applicable to the Swain County Landfill. It was determined that the provisions of RCRA Subtitle C would not be applicable and the USFS should proceed with a Site Inspection (SI) (Ref. 6).

In February 1994, Metcalf & Eddy, Inc. generated a Site Inspection Report for the Graham and Swain County Landfills on behalf of the USFS (Ref. 1). This report indicates the following:

1. On-site leachate and sediment pond water contained several volatile organics and inorganics, including cadmium, chromium, nickel, zinc, and PCE. Various inorganics, including lead and copper in addition to the above, were present in on-site soils at the sediment ponds.

2. One on-site monitoring well contained 1,1 DCA and TCA and several inorganics, including cadmium, chromium, lead and nickel, at levels above their MCLs or the NC 2L Drinking Water Standards. However, these contaminants were not present in the downgradient monitoring wells closest to the Tuckasegee River.

3. No significant contaminants were present in the surface water of Buckner Branch bordering the site. However, cadmium, chromium, copper, lead, and nickel were present in the sediments in the creek. The Tuckasegee River was not sampled.

The North Carolina Superfund Section collected three surface water and three sediment samples from the Tuckasegee River on April 17, 2002. The Tuckasegee River is considered a fishery and no samples were collected from the river during the 1994 SI (Ref. 7, Sample Plan Map 1). The farthest downstream samples (SCL-001-SW/SD) were collected approximately 200 feet northeast of the landfill's monitoring well SGW-03 and about 15 feet downstream of PPE#1. The second set of samples (SCL-002-SW/SD) were collected approximately 12 feet downstream of PPE#2. The background samples (SCL-004-SW/SD) were collected approximately 500 upstream of the town's water treatment plant adjacent to a horse park along Riverview Road.

This is upstream of any site influence (Ref. 7, 8). These samples were analyzed for volatiles, semi-volatiles, and inorganics. The results are summarized in Tables 1 and 2 below and included in the attached data sheets (Ref. 9). No significant levels of contaminants were present at either of the PPEs.

Table 1
Surface Water Samples, Tuckasegee River

Contaminant	Units	SCL-001-SW	SCL-002-SW	SCL-004-SW background
Barium	Mg/l	0.02	0.02	0.02
Iron	Mg/l	0.53	0.52	0.69
Manganese	Mg/l	0.03	0.03	0.05
Tetrahydrofuran	Ug/l	U	U	Trace
Toluene	Ug/l	U	U	2.2

trace=Present but below MDL

Table 2
Sediment Samples, Tuckasegee River

Contaminant	Units	SCL-001-SD	SCL-002-SD	SCL-004-SD background
Barium	Mg/kg	73	77	111.5
Chromium	Mg/kg	13	15	16.5
Copper	Mg/kg	7	8.5	11.5
Iron	Mg/kg	16,597	18,037	21,195
Lead	Mg/kg	6.5	6	10
Manganese	Mg/kg	178	190	282
Nickel	Mg/kg	97	108	128
Zinc	Mg/kg	41	52	65
Acetone	ug/kg	U	U	13.6J,C
Toluene	ug/kg	U	U	41.0J

J=Estimated value
C=Possible lab contamination or background

The surface water pathway has been impacted along Buckner Branch; however, Tuckasegee River—a fishery—has not been impacted by site contaminants. Although the groundwater pathway has been impacted, only two homes are located within ¼ mile of the landfill and no groundwater users are located downgradient of the landfill. The site has restricted access with only one worker at the landfill. Finally, the air pathway does not appear to be threatened by any significant contaminants.

The landfill was closed in December 1995. Since closure, the landfill has continued to sample on-site monitoring wells semi-annually as well as Buckner Branch along the southwest side of the landfill (Ref. 10).

Based on a review of available file information and previous investigations of the Swain County Landfill as well as additional sampling conducted by the NC Superfund Section, the North Carolina Superfund Section recommends the site for no further action under CERCLA.

Please feel free to contact me at (919) 733-2801 ext. 316 or by e-mail at melanie.bryson@ncmail.net if you have any questions or comments.

Sincerely,

Melanie Bryson
Environmental Engineer
NC Superfund Section

Jim Bateson, Head
Site Evaluation and Removal Branch
NC Superfund Section

CC: Scott Ross – File

CC: (Letter Only)
Charlotte Jesneck

Ref. 1

NANTAHALA NATIONAL FOREST
NORTH CAROLINA

DRAFT
SITE INSPECTION REPORT
GRAHAM COUNTY LANDFILL and
SWAIN COUNTY LANDFILL

February 1994

submitted to:

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
ATLANTA, GEORGIA

submitted by:

Hazardous Waste Remedial Actions Program
Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7606
Managed by MARTIN MARIETTA ENERGY SYSTEMS, INC.

prepared by:

METCALF & EDDY, INC.
ATLANTA, GEORGIA

SITE INSPECTION REPORT
for
NANTAHALA NATIONAL FOREST
NORTH CAROLINA

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ACRONYMS/ABBREVIATIONS

AA	Atomic Absorption
Ac	Acres
ARARs	Applicable or Relevant and Appropriate Requirements
BG	Background
CCWE	Constituent Concentration in Waste Extract
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLP	Contract Laboratory Program
CRQL	Contract Required Quantitation Limit
DIOF	Deionized Organic-Free
DOE	Department of Energy
DWS	Drinking Water Standard
EPA	Environmental Protection Agency
EPTOX	Extraction Procedure Toxicity Leachate
FIT	Field Investigation Team
FSP	Field Sampling Plan
FT-BGS	Feet Below Ground Surface
FT-MSL	Feet Above Mean Sea Level
FT/Mile	Feet per mile
GC/MS	Gas Chromatograph/Mass Spectrometer
GLF	Graham County Landfill
gpm	Gallons per Minute
HASP	Health and Safety Plan
HAZWRAP	Hazardous Waste Remedial Actions Program
HRS	Hazard Ranking System
IAG	Interagency Agreement
ICP	Inductively Coupled Plasma
L	Liter
LC	Leachate
M&E	Metcalf & Eddy
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
mg/L	milligrams per liter
mg/kg	milligram per kilogram
mL	Milliliter
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NC	North Carolina
NCDHS	North Carolina Department of Health Services
ND	Not Detected
NNF	Nantahala National Forest
NPL	National Priority List
PA	Preliminary Assessment

ACRONYMS/ABBREVIATIONS
(Continued)

PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SE	Sediment
SI	Site Inspection
SLF	Swain County Landfill
SVOC	Semivolatile Organic Compounds
SW	Surface Water
TAL	Target Analyte List
TB	Trip Blank
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TVA	Tennessee Valley Authority
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
USFS	U.S. Forest Service
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compounds
WQS	Water Quality Standards

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008604\SITE\TOC

EXECUTIVE SUMMARY

This report presents the results of the Site Inspection performed at the Graham County Landfill and Swain County Landfill on property owned by the U.S. Forest Service at the Nantahala National Forest, North Carolina. Field sampling activities were conducted in January 1993.

In the 1970s, the U.S. Forest Service permitted Graham and Swain Counties to use sites within the Nantahala National Forest as landfills for municipal and industrial solid waste disposal. Both are active landfills operating under North Carolina Department of Health Services permits.

Two furniture manufacturers, Burlington Industries in Graham County, and Singer Furniture in Swain County reported to the Environmental Protection Agency that during the 1970s they had disposed of industrial wastes and sludges in the landfills. Preliminary Assessments were conducted at both landfills and a Site Screening Investigation was conducted at the Graham County Landfill. Information gathered during these activities was insufficient to adequately characterize the site and data was incomplete for Hazard Ranking System scoring.

The purpose of the Site Inspection of these sites is to provide adequate information and data to support scoring each site under the Hazard Ranking System and to determine the nature and extent of contamination. During the Site Inspection, samples of soil, groundwater, surface water, leachate, and sediment were analyzed to determine the types and concentrations of contaminants present. Information on local geology and hydrogeology was derived from published literature, examination of boring logs, and groundwater level measurements. Additionally, data regarding potential receptors was gathered and evaluated.

The information obtained in this investigation will also be useful for the following:

- Assist Swain and Graham counties in determining whether their groundwater monitoring program is adequate for the landfill.

- Assist in the closure application and closure of each landfill. The North Carolina Department of Environment, Health, and Natural Resources' (NCDEHNR) "Solid Waste Management Rules" dated January 4, 1993, states that after January 1, 1998, all active sanitary landfills shall be equipped with liners, leachate collection systems and final cover systems. This requires that both Swain and Graham County landfills be either upgraded or closed by 1998.

- After a landfill is closed, further necessary water quality monitoring is necessary and is the responsibility of the owner and the operator. The existing monitoring wells and the additional proposed wells will monitor the groundwater quality after closure.

Any additional groundwater monitoring wells drilled at either landfill must conform to the NCDEHNR's monitoring well construction standards (15A NCAC2C.0105).

The analytical results indicate that hazardous constituents are migrating from the source areas via groundwater, surface water, and leachate at the Graham and Swain County landfills.

At Graham, benzene, vinyl chloride, and cadmium were detected above their respective regulatory levels in groundwater. Also, 1,1,-dichloroethane and 1,1,1-trichloroethane were detected in the background well. The groundwater data suggests the background well is not upgradient of the source area.

Surface waters do not appear to be having a direct impact on Atoah Creek; however, the presence of polynuclear aromatic hydrocarbons in the sediment indicate migration has occurred. Results of the leachate analysis indicate that benzene and cadmium were present at levels exceeding their respective regulatory levels, which may also be impacting groundwater and surface water. Lead was detected above the MCL in one surface water sample.

At Swain, inorganic constituents; barium, beryllium, cadmium, chromium, lead and nickel were above their respective regulatory levels in the background well. However, 1,1-dichloroethane and 1,1,1-trichloroethane were also detected indicating that the background well has been impacted because these analytes are not naturally occurring. The true background levels of metals in groundwater are not known. Because this is not a representative background well, the levels of metals present may or may not be above background levels. Low levels of chlorinated organics were also detected in the downgradient wells.

Surface waters appear to be affected by contamination migrating from the source area. Phenolic compounds, diethylphthalate and cadmium above their respective regulatory levels were found in the sedimentation pond and onsite creek.

Results of the leachate analysis indicate the presence of aromatic and chlorinated volatiles, polynuclear aromatic hydrocarbons, and diethylphthalate. Benzene was detected above its regulatory level.

Based upon the results of the Site Inspection it is recommended that new background wells be installed at both landfills and that an additional downgradient well be installed at the Graham County Landfill. Also, further groundwater monitoring is needed to confirm the presence of contaminants and further define the extent and magnitude of migrating contaminants from the source area.

008604\Site\Exec.Sum

SECTION 1
INTRODUCTION

This section provides general background information on the project. It also describes the content and organization of the report.

1.1 PROJECT DESCRIPTION

The Nantahala National Forest (NNF) occupies over a half million acres of mountains and valleys of western North Carolina in portions of Cherokee, Graham, Clay, Swain, Macon, and Jackson Counties. In the 1970s, the United States Forest Service (USFS) permitted Swain and Graham Counties to use sites within the NNF as landfills for municipal and industrial solid waste disposal. Both are active landfills operating under North Carolina Department of Health Services (NCDHS) permits.

Information concerning the disposal of hazardous waste and industrial waste materials at the landfills was minimal. Two furniture manufacturers, Burlington Industries in Graham County, and Singer Furniture Company in Swain County, reported to the Environmental Protection Agency (EPA) under the notice requirements of Section 103(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) that during the 1970s they had disposed of industrial wastes and sludges in the landfills. Preliminary Assessments were conducted at both sites, and a Site Screening Investigation was conducted at the Graham County Landfill. Upgradient and downgradient groundwater monitoring wells have been installed at both sites by the counties as a requirement of the State operating permits. Information from these sources was insufficient to adequately characterize the site, and data were incomplete for Hazard Ranking System (HRS) scoring.

Concerns regarding suspected environmental contamination have prompted the EPA to direct the USFS to have a Site Inspection (SI) performed at these sites. The data collected will support application of the HRS to determine if the Swain or Graham County landfills require placement on the National Priority List (NPL).

The USFS has entered into an interagency agreement (IAG) with the Department of Energy (DOE) under which DOE will provide technical support for environmental restoration activities. The Hazardous Waste Remedial Actions Program (HAZWRAP) managed by Martin Marietta Energy Systems, Inc. has been assigned the responsibility of providing the support as stated in the IAG.

Metcalf & Eddy, Inc. (M&E) has been contracted by HAZWRAP under General Order No. 12B-99791C; Work Release No. K-13, supplemental agreement Nos. 3 and 4; to provide personnel, equipment, and materials required to perform a SI at the NNF. This also included preparation of documents such as the Field Sampling Plan (FSP), Quality Assurance Project Plan (QAPP), Health and Safety Plan (HASP), and SI Report.

1.2 PURPOSE AND ORGANIZATION OF REPORT

The purpose of this report is to present the results of a SI conducted at the Graham County Landfill (GLF) and Swain County Landfill (SLF) located within the NNF.

The purpose of the SI is to provide adequate information and data on each site to support scoring each site under the HRS. Additionally, the objective of this SI is to determine the nature and extent of contamination. During the SI, samples of soil, groundwater, surface water, leachate, and sediment were analyzed to determine the types and concentrations of contaminants present. Information on local geology and hydrogeology was derived from published literature, examination of boring logs, and groundwater level measurements. The site data were evaluated to determine the source of contamination and the existing or potential routes of migration.

The information obtained in this investigation will also be useful for the following:

- Assist Swain and Graham counties in determining whether their groundwater monitoring program is adequate for the landfill.

- Assist in the closure application and closure of each landfill. The North Carolina Department of Environment, Health, and Natural Resources' (NCDEHNR) "Solid Waste Management Rules" dated January 4, 1993, states that after January 1, 1998, all active sanitary landfills shall be equipped with liners, leachate collection systems, and final cover systems. This requires that both Swain and Graham County landfills be either upgraded or closed by 1998.

- After a landfill is closed, further necessary water quality monitoring is necessary and is the responsibility of the owner and the operator. The existing monitoring wells and the additional proposed wells will monitor the groundwater quality after closure.

Any additional groundwater monitoring wells drilled at either landfill must conform to the NCDEHNR's monitoring well construction standards (15A NCAC2C.0105).

The format of this report is based on EPA guidelines supplied by HAZWRAP. The introduction and regional setting are provided in Sections 1 and 2, respectively. Evaluation, summary, and conclusions are provided in Sections 3 through 5, and are formatted to include all site-specific information in one chapter. The appendices contain SI Data Sheets and supporting technical data.

008604\Site\Sec.1

SECTION 2
REGIONAL SETTING

The following section describes the regional setting of NNF area. The purpose of the description is to relate the NNF area to environmental factors that may influence potential contaminant migration or may be impacted by potential contaminant migration.

2.1 LOCATION

NNF covers over a half million acres in southwestern North Carolina (see Figure 2.1). The NNF is located approximately 140 miles west of Charlotte, North Carolina. Most of the NNF is situated in Cherokee, Clay, Graham, Macon, and Swain counties. Site 1, GLF, and Site 2, SLF, are located in the northern portion of the NNF.

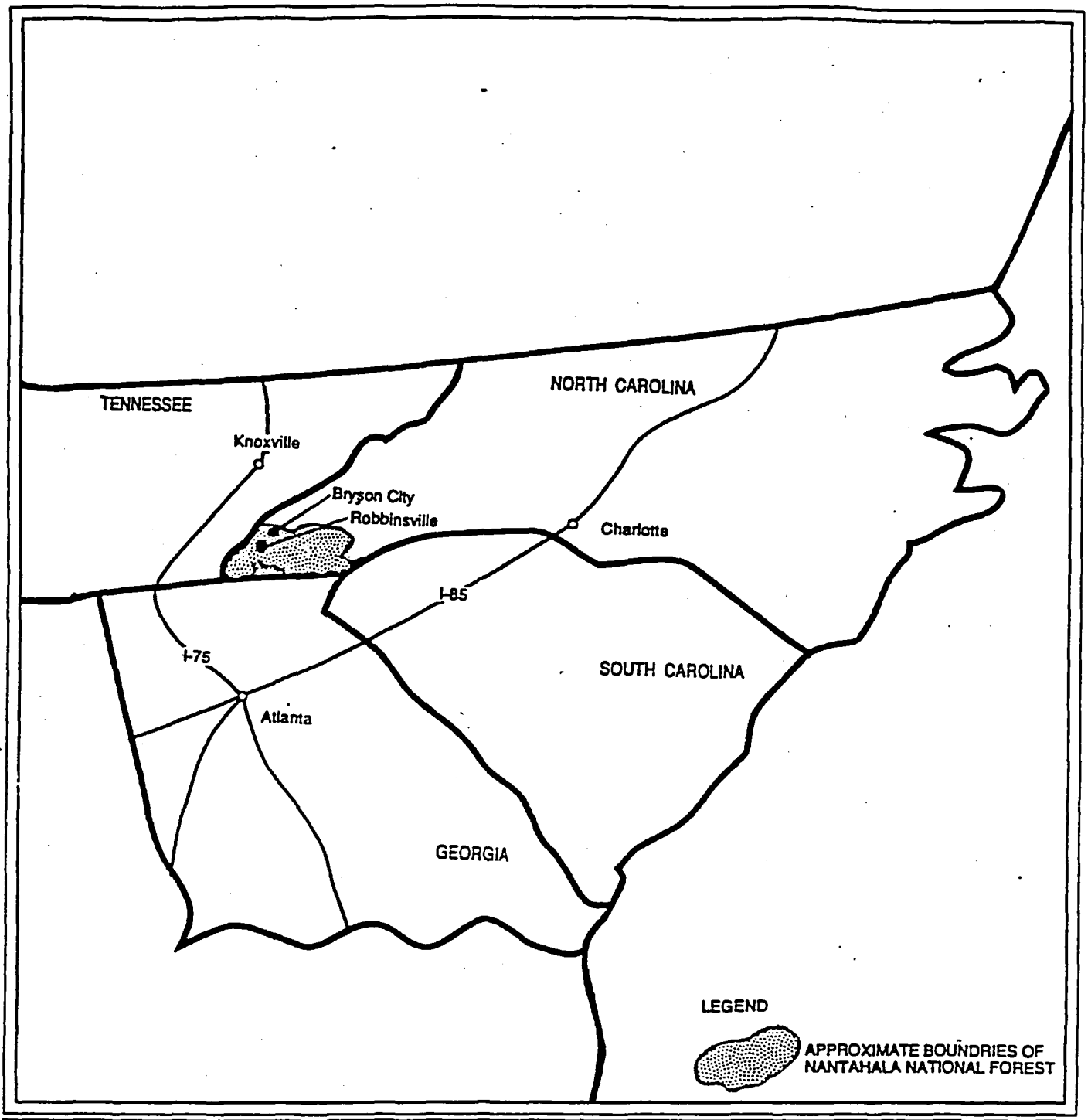
2.2 PHYSIOGRAPHY

The NNF area is located in the Blue Ridge physiographic province. This province is characterized by numerous mountains with elevations between 5,000 and 6,000 feet above mean sea level (ft-msl). Maximum relief is approximately 5,560 feet between the mountain summits and valley bottoms, with local relief of 2,000 feet common (Dodson, 1968).

The mountains are remnants of a former highland that has undergone repeated cycles of uplift and erosion. The area is characterized by deeply cut valleys with streams flowing in narrow channels. During each cycle of uplift and erosion, the valleys have been cut deeper. Alluvial deposits are commonly present at the former valley levels (Dodson, 1968).

2.3 SURFACE DRAINAGE

Most of NNF is drained by the Hiwassee and Little Tennessee Rivers, which flow westward. Secondary streams include the Nantahala and Tuckasegee Rivers, tributaries to the Little



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LOCATION MAP
NANTAHALA NATIONAL FOREST

N

Metcalf & Eddy

FIGURE 2.1

Tennessee River, and the Nottely and Valley Rivers, tributaries to the Hiwassee River. The streams form a trellis drainage pattern which indicates shallow, resistant bedrock and strong structural control. These streams have little or no floodplains.

The gradients of the streams in the area are steep. The gradient of the Hiwassee River and the Little Tennessee River are about 12 feet per mile (ft/mile) and 15 ft/mile, respectively. The secondary streams and other tributaries have steeper gradients, some approaching 50 ft/mile.

2.4 CLIMATE

The average yearly temperature in the NNF area is about 57°F. The average during the summer is about 70°F and the average during the winter is about 40°F.

Precipitation averages about 60 inches annually and is mostly in the form of rainfall. The average annual precipitation ranges from about 50 inches in the valleys to 80 inches in the mountains. December is the wettest month with October being the driest. Winter is the wettest season, followed by spring and summer. Fall is the dryest season. The overall climate is humid as a result of high rainfall and moderate temperatures. The abundant precipitation provides ample recharge for groundwater in the NNF area (Dodson, 1968).

2.5 SOILS

Soils in the vicinity of GLF consist of permeable sandy loams to sandy clay loams along the narrow ridges and side slopes. Very deep (>60 inches), well-drained sandy loams occur along the coves and narrow draws. Each of these areas is underlain by saprolite and/or fractured bedrock. Slopes range from 6 to 15 percent in the coves, 10 to 25 percent in the draws, and 25 to 50 percent along the side slopes (Young, 1972).

Soils in the vicinity of SLF consist of well-drained sandy to clayey loams. These occur on slopes and ridgetops, and are underlain by saprolite and/or fractured rock. Slopes range from 8 to 50 percent (Carter, 1976).

2.6 GEOLOGY

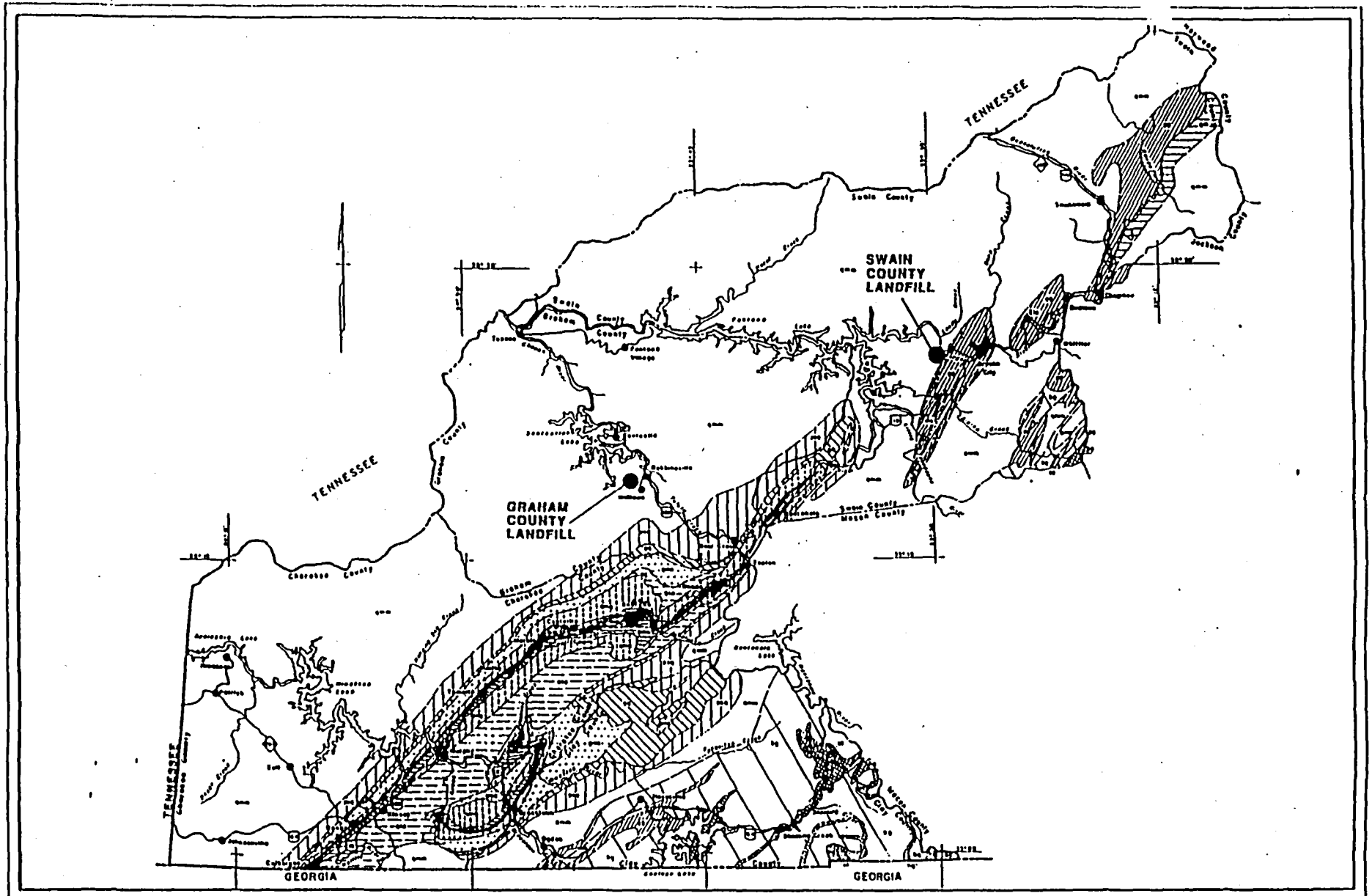
Bedrock underlying the NNF area is metamorphic, predominantly metamorphosed sedimentary rocks of Precambrian to Cambrian age, except for dikes, sills, or pegmatites. Quartzite, metaconglomerate, metagreywacke, phyllite, schist, mica gneiss, granite gneiss, and hornblende gneiss are the most common rock types. They can be placed into six general categories:

- Great Smoky Group
- Murphy Marble Belt
- Unit of mica schist and gneiss
- Unit of granite gneiss
- Unit of hornblende gneiss
- Unit of ultramafic rocks

A geologic map of the NNF area is presented as Figure 2.2 (Dodson, 1968).

The Great Smoky Group is composed of quartzite, metaconglomerate, and metagraywacke, as well as smaller amounts of phyllite, slate, schist, and gneiss. The Great Smoky Group outcrops in about 50 percent of the NNF area, mostly in Swain, Graham, and Western Clay Counties (Figure 2.2). These rocks form a complex assemblage of discontinuous, gradational, and interfingering beds (Dodson, 1968).

Contacts between the rocks within the Great Smokey Group and the Great Smoky Group and other rocks of the area cannot be drawn with certainty because of gradation and interfingering.



GEOLOGIC MAP
NANTAHALA NATIONAL FOREST
GRAHAM COUNTY LANDFILL
SWAIN COUNTY LANDFILL

Metcalf & Eddy

FIGURE 2.2

The Murphy Marble Belt is composed of a very fine to very coarsely crystalline, dolomitic marble. Actinolite, graphite, mica, quartz, and talc occur locally. This unit also contains quartzitic and schistose facies locally. Contacts of the marble unit are gradational. The marble unit occurs in two separate areas (Figure 2.2). The largest area extends southwest from near Wesser, Swain County, to Culberson, Cherokee County, and into Georgia. Marble is also found in the Peachtree-Brasstown-Martin's Creek area (Dodson, 1968).

The granite gneiss and mica schist units outcrop in separate areas in eastern Swain County and South-central Clay County (Figure 2.2). The contact of these units is gradational.

The hornblende gneiss is characteristically an epidote-hornblende gneiss. The unit comprises two types of hornblende gneiss. One type is an intrusive variety. It has been intruded into the other variety of hornblende gneiss and other rocks of the area. It is a massive, complexly folded body that does not conform to regional structure. The second type of hornblende gneiss is in layers or beds that are conformable to the regional structure. Contacts between the hornblende gneiss and other rock units is gradational. The hornblende gneiss outcrops only in eastern Clay County (Figure 2.2) (Dodson, 1968).

The ultramafic rock unit is composed of dunite, peridotite, soapstone, and serpentine bodies contain talc, chlorite, tremolite, actinolite, and corundum. The ultramafic rock unit is within the hornblende gneiss unit (Dodson, 1968).

Unconsolidated deposits overlie bedrock throughout most of the NNF area. These deposits may be composed of gravity or stream-transported sand, gravel, and boulders from deposits at old valley floors, but most of the deposits are composed of rock fragments derived from the underlying bedrock and transported only a short distance by gravity. This material ranges in size from micaceous silt or clay to boulders.

Structurally, the layers or beds of rocks in the NNF area strike northeast and dip steeply southeast. The strike is approximately N45°E, the dip ranges from 50 to 90°SE. The strike

of the foliation of the rock is about N60°E. The rocks are tightly folded and overturned to the northwest. Locally, the rocks are complexly folded at rock unit contacts (Dodson, 1968).

Fracturing is abundant in the rocks of the NNF area. Jointing and cleavage are the most common types of fractures, but minor faulting is common.

2.7 HYDROGEOLOGY

Groundwater in the NNF area occurs in unconsolidated deposits, fractures or fracture zones in metamorphic rock, solution cavities formed along fractures in marble, and contact zones between differing rock types. Aquifers that yield the largest quantities of water are impermeable rocks that contain abundant fracture zones or fractured quartz veins, pegmatites, or quartzite units.

Precipitation moves downward through unconsolidated deposits and/or fracture zones along cleavage, joints, and bedding places, from rock unit to rock unit, before discharging to springs, wells, or streams.

The occurrence of groundwater is very complex and each rock unit may contain many local aquifers. Also the degree of dip of the rock units and the amount and complexity of folding, especially near contact zones, determines the areal extent of the aquifers. The hydrologic characteristics of the rock units discussed in Section 2.6 are presented below.

Groundwater within the quartzite, metaconglomerate, and metagraywacke unit of the Great Smoky Group occurs in fractures and openings along bedding planes. Well yields are dependent on the abundance of fractures, not rock type. The complexly folded and fractured rock near the contacts, especially the contact with the granite gneiss is generally the best aquifer. Well yields average no more than 10 gallons per minute (gpm). Many springs flow from this unit. Spring yields typically range from 1 gpm to 5 gpm, with a maximum of 10 gpm possible (Dodson, 1968).

Groundwater in the marble unit occurs in solution cavities that formed along fractures. Average width of solution cavities is probably no more than 6 inches and occurs at depths ranging from less than 30 feet to more than 100 feet below land surface. Reported well yields within this unit range from 6 gpm to 60 gpm. Springs are not common within this unit (Dodson, 1968).

Groundwater in the mica schist, granite gneiss, hornblende gneiss, and ultramafic rock units occur in fractures and spaces between beds of rock. Fractures are abundant at the contacts, especially between the hornblende gneiss and ultramafic rocks. Additionally, highly fractured pegmatite and quartz veins occur in both the mica schist and granite gneiss. Well yields within the mica schist and granite gneiss range from 5 gpm to 100 gpm, with an average of 20 gpm. Well yields within the hornblende gneiss and ultramafic rocks generally average less than 10 gpm (Dodson, 1968).

In the NNF area, bedrock units can be so impermeable that little water can enter them or they cannot transmit all water available. In these situations, unconsolidated deposits overlying bedrock can be saturated. Within the unconsolidated deposits, artesian conditions can occur due to the presence of poorly sorted fill, forming localized confining beds. Generally, unconsolidated deposits are too thin or the permeability is too low to yield usable quantities of water (Dodson, 1968).

2.8 GROUNDWATER USE

In Graham County, groundwater provides approximately 90 percent of the domestic water supply. Springs provide 50 percent, and drilled and dug wells provide 20 percent each. Most of the drilled wells are less than 150 feet deep and about half are less than 100 feet deep. Most dug wells are less than 25 feet deep. Well yields rarely exceed 30 gpm. Springs are generally used for domestic supplies and occur in all areas except broad valleys (Dodson, 1968).

In Swain County, about 75 percent of the domestic water supply is groundwater. Groundwater supplies are equally divided among springs, drilled wells, and dug wells. Depths of drilled and dug wells are similar to Graham County. The principal aquifers in Swain County are fracture zones in the bedrock. Well yields exceeding 50 gpm are rare (Dodson, 1968).

Water quality in both Graham and Swain Counties is good, with the water being soft, slightly acidic, and low in dissolved solids.

2.9 SURFACE WATER USE

The only municipal water supply in Graham County is at Robbinsville. Small, privately owned water systems are maintained at Tapoco and Fontana. Robbinsville currently uses the Cheoah River as a water supply source. The intake is located upstream of the Graham County Landfill. Most industries obtain water from the Robbinsville system.

In Swain County, Bryson City obtains water from Lands Creek and Cherokee obtains water from Mingus Creek. Bryson City does have a water well as an emergency reserve.

SECTION 4
SWAIN COUNTY LANDFILL

4.1 SITE DESCRIPTION

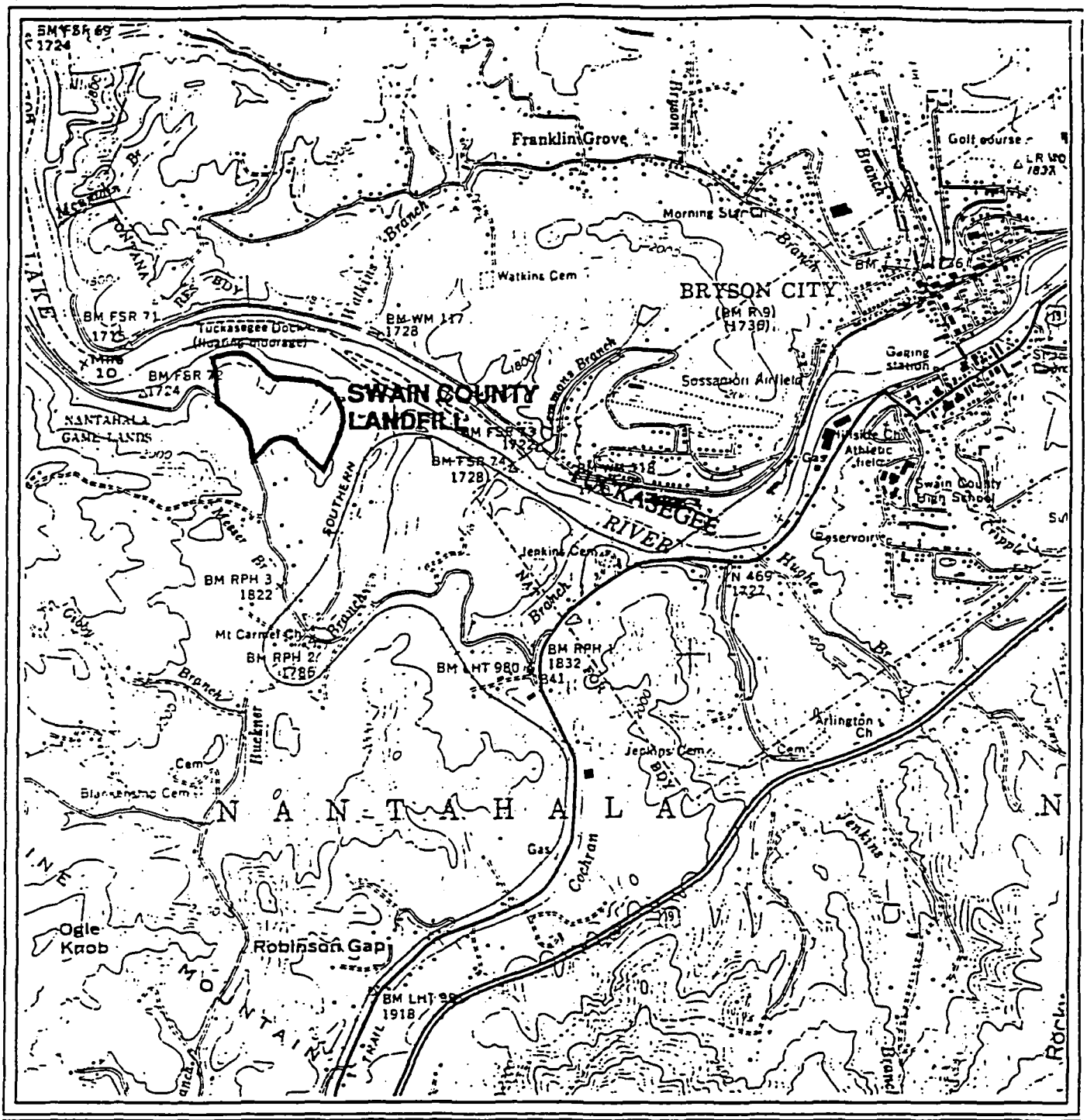
The SLF is located 2 miles west of Bryson City, North Carolina and lies within the boundaries of the NNF along the Tuckasegee River at N35°25'25" latitude and W83°30'64" longitude. The site occupies approximately 45 acres. The location of the SLF is depicted on Figure 4.1.

Access to the landfill is via a gravel road off of State Route 1311. The majority of the landfill has been cleared of trees and vegetation. Refuse is or has been placed within two draws located in the eastern portion of the landfill. Daily cover is excavated from the borrow area located in the western portion of the landfill. Two sedimentation basins have been constructed to control sediment runoff. The limits of refuse and other site features are shown on Figure 4.2.

4.2 SITE HISTORY

In the 1970s a special use permit was granted by the USFS to Swain County to operate a county landfill within the boundaries of the NNF. The site is an active sanitary landfill operating under NCDHS Permit 87-01.

The landfill has received industrial waste from Singer Furniture Company - Bryson City Plant. Singer reported to the EPA under notice requirements of Section 103(c) of CERCLA that from the early 1970s to 1976 they disposed of approximately 465 tons of solid and liquid wastes at the landfill. The wastes were in the form of solid finish material scrapings from spray booth walls and floors and liquid solvent wastes from cleanup operations. The majority of the wastes were containerized in 55-gallon drums and 5-gallon cans and transported to the landfill. Additionally, some solid waste was also placed into cardboard containers and landfilled with the box. Waste characterization data provided by Singer



SITE LOCATION MAP
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST

SOURCE: BRYSON CITY, N.C. QUADRANGLE
7.5 MINUTE SERIES, 1962 (PHOTO REVISED 1978)

N

Metcalf & Eddy

FIGURE 4.1

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DATE 03-03-92 CHECKED BY MS

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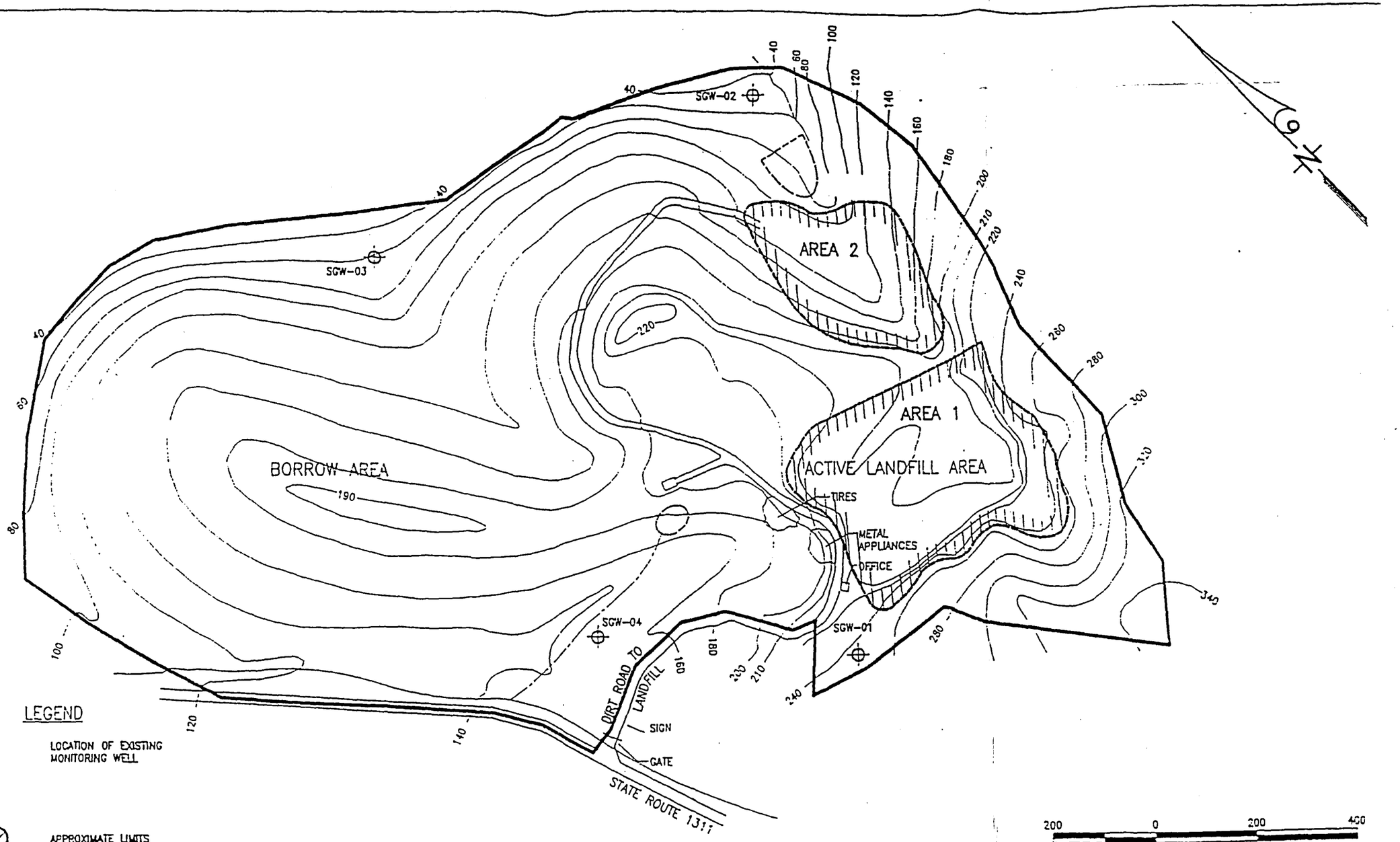


LEGEND

- LOCATION OF EXISTING MONITORING WELL
- APPROXIMATE LIMITS OF REFUSE
- SEDIMENTATION BASIN
- WET WEATHER DRAINAGE FEATURE

CONTOUR INTERVAL 20 FEET (UNLESS NOTED OTHERWISE)

NOTE:

1. TOPOGRAPHIC MAP AND REFUSE AREAS TAKEN FROM CONSTRUCTION PLAN, SOLID WASTE DISPOSAL SITE, SWAIN COUNTY, NORTH CAROLINA, TENNESSEE VALLEY AUTHORITY, W-PP-1-832K138-1, 9/4/79.

METCALF & EDDY

APPROXIMATE REFUSE LIMITS
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST

FIGURE 4.2

indicates the wastes were not hazardous by characteristic or exceeded the maximum concentration for contaminant metals. A summary of the waste identified and the analyses can be found in Table 4-1. Waste characterization data supplied by Singer is presented in Appendix A.

During April 1984, the U.S. Forest Service performed a Preliminary Assessment of the Site. Their findings indicated that waste characterization data showed the wastes were primarily not hazardous by characteristic nor exceeded the maximum concentration for contaminant metals and that no further action was needed. A copy of the preliminary assessment report is presented in Appendix B.

Singer's data for EP Tox metals including barium, cadmium, chromium, and lead do not indicate leachable metals in the samples analyzed. Since no specific data is available for volatile organics, semivolatile organics, or pesticides to "fingerprint" contaminants detected with the wastes disposed, comparable industrial uses of the contaminants detected are cited in Table 4-2, and a generic correlation to the known waste types is conducted where possible. (Pesticides, 4-methylphenol, barium, and beryllium are not delineated in Table 4-2 since their use in furniture finishing materials/wastes was not identified. Nickel is not included as a groundwater constituent since it was detected above the regulatory level in background soils. Aluminum, iron, and manganese are not included since they have been associated with bedrock conditions.)

TABLE 4-1
SINGER FURNITURE COMPANY
SUMMARY OF WASTE IDENTIFICATION ANALYSIS

Waste No.	Waste Type	Waste Description	Analysis			Results		
			EPTOX	RCRA Characteristics	Other	EPTOX	RCRA Characteristics	Other
101	Clear Lacquer Dust	Solid, crumbly, dusty, combustible, may contain nitrocellulose, low bulk density	X	Ignitability	-	NH	NH	-
102	Pigmented Lacquer Dust	Solid, crumbly, dusty, combustible, may contain nitrocellulose, low bulk density	X	Ignitability	-	NH	NH	-
103	Stain Residue	Solid, crumbly, dusty, combustible, may contain nitrocellulose, low bulk density	Not Analyzed	-	-	-	-	-
104	Filler Scrappings	Moist paste, dark color, fine solids, no free liquid	X	Ignitability	Total Phthalates Toluene Methyl Ethyl Ketone	NH	FP°30	ND ND ND
105	Lacquer Ash	Incinerator ash, dusty, dry solid	X	-	-	NH	-	-
106	Filler Ash	Incinerator ash, dusty, dry solid	Not Analyzed	-	-	NH(a)	-	-
107	Water Wash Stain	Liquid containing suspended solids and solvents. Solvents may be both soluble and insoluble in water. High water content.	X	Ignitability	-	NH	NH	-
108	U-V Filler	Solid, plastic-like material	X	-	-	NH	-	-
109	Base Coat	Solid-dust or powder	X	-	-	NH	-	-

NH = Not hazardous based on EPTOX and RCRA characteristics analysis conducted in accordance with 40CFR 261.
ND = Not detected
(a) Not hazardous based on generator knowledge of waste stream.

TABLE 4-2
CONTAMINANTS DETECTED, COMPARABLE INDUSTRIAL USES AND WASTE TYPES DISPOSED BY SINGER FURNITURE AT SLF

Contaminant Type	Constituent	Comparable Industrial Uses	Burlington Waste Type, Activity, or Material Used
Volatile Organics	Acetone	used as a paint, varnish, and lacquer solvent	furniture finishing; solvents; lacquer wastes
	Benzene	found in: oils; used as a solvent in adhesives and paint remover	solvents
	Butanone	used as a solvent for oils, resins, and waxes	furniture finishing; solvents
	Chloroethane	used as a solvent for oils, resins, and waxes	furniture finishing; solvents
	Hexanone	solvent	solvents
Semivolatile Organics	PAHs	found in oil/petroleum products	
	Phenol	found in resins; used as solvent for oils	solvents
	Diethylphthalate	found in plasticizers	plasticizer
Metals	Cadmium	found in pigment and plastics	pigmented lacquers; stain residues; washwater stain; paints (base coat)
	Chromium	found in pigment	pigmented lacquers; stain residues; washwater stain; paints (base coat)
	Lead	used as gasoline additive; found in paint	paints (base coat)

4.3 CURRENT MONITORING PROGRAM

Groundwater and surface water monitoring is required at the SLF as stated in the landfill's Solid Waste Permit No. 87-01. To satisfy that requirement, one background (SGW-01) and three downgradient groundwater monitoring wells were installed at the landfill in May and June 1990. At this time, water quality data from the first round of groundwater sampling has been received. Analytical results are summarized in Table 4-3.

TABLE 4-3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
GROUNDWATER MONITORING WELLS
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST
April 22, 1991

		Monitoring Wells			
Parameters	Units	SGW-01	SGW-02	SGW-03	SGW-04
BOD, 5 Day	mg/L	10	<1.0	20	2.0
Chloride	mg/L	1.8	3.1	65	8.3
COD	mg/L	8	5	48	10
Conductivity, Field Measurement	μmhos/cm	180	29	820	13
Fluoride	mg/L	0.11	<0.1	0.17	0.10
Nitrate-Nitrogen	mg/L	<0.05	0.15	<0.05	<0.05
pH Field Measurement	Standard Units	6.4	5.9	6.3	5.9
Total Dissolved Solids	mg/L	100	24	310	110
Sulfate	mg/L	1.0	2.8	5.5	<1
TOC	mg/L	1.0	1.3	14	1.1
TOX	mg/L	<0.004	0.018	0.024	0.010
Silver	mg/L	<0.010	<0.010	<0.010	<0.010
Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001
Barium	mg/L	0.21	0.33	0.26	<0.10
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Chromium	mg/L	<0.02	<0.02	<0.02	<0.02
Copper	mg/L	<0.010	<0.010	0.016	<0.010
Iron	mg/L	2.6	0.26	18	0.16
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Manganese	mg/L	0.45	0.064	21	0.017
Lead	mg/L	<0.05	<0.05	<0.05	<0.05
Selenium	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Zinc	mg/L	0.022	<0.010	0.020	0.040

NOTES: mg/L = milligrams per liter
μmhos/cm = micromhos per centimeter

4.4 PHYSICAL CHARACTERISTICS

Descriptions of the physical characteristics of the SLF were compiled based on observations made during the SI field activities and a review of available literature. The following sections describe the site topography/drainage, geology, and hydrogeology. These site-specific characteristics influence contaminant migration pathways.

4.4.1 Topography/Drainage

The topography of Swain County is mountainous, containing less than 1 square mile of flat valley bottoms. Maximum relief is approximately 5,560 feet. The topography in the vicinity of the SLF corresponds with the description of the Swain County topography. Elevations at the SLF range from approximately 2,000 ft-msl to approximately 1,760 ft-msl. The original topography of the SLF consisted of ridges separated by draws. As discussed earlier the draws are being or have been used to dispose of refuse. The topographic map presented in this report was taken from the Swain County Solid Waste Disposal Site Construction Plan and does not correlate with the surveyed data points. The topography was presented to illustrate topographic trends at SLF.

The Little Tennessee River and its tributaries (Tuckasegee, Oconaluftee, and Nantahala Rivers) drain Swain County. Secondary streams are the Alarka, Deep, Raven, and Hazel Creeks. Surface water runoff from the SLF flows northward to the Tuckasegee River near its entrance to Fontana Lake.

4.4.2 Geology

The geology of the SLF is characterized based upon a review of published geologic literature of the area as discussed in Section 2.6 and a review of boring logs from the installation of the existing monitoring well network.

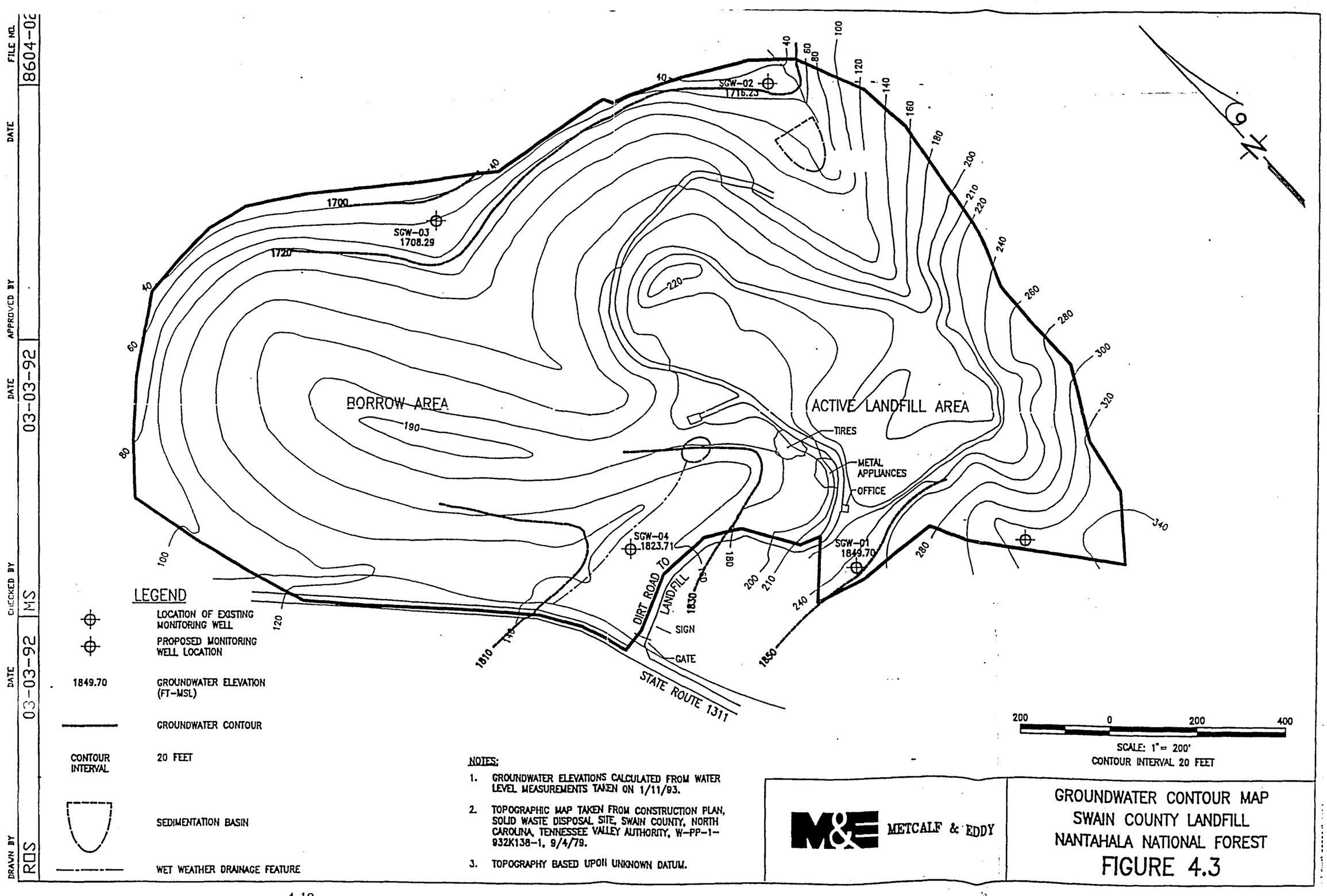
As shown in Figure 2.2, the bedrock underlying the SLF is composed of the quartzite, metaconglomerate, and metagraywacke unit of the Great Smoky Group and probably the granite gneiss and mica schist unit. The SLF is located near the contact between the two units. The exact contact between the two units cannot be drawn with certainty because of gradation and interfingering between the two units. The bedrock appears to be overlain by a thin veneer of unconsolidated deposits derived from the chemical and mechanical weathering of the bedrock.

The lithologic information included on the boring logs from the installation of the existing monitoring wells is limited. The only useful information obtained from the logs is that the thickness of the unconsolidated deposits appears to range from 5 to more than 30 feet.

4.4.3 Hydrogeology

Four monitoring wells, SGW-01 to SGW-04, were installed at the Swain County Landfill in May-June, 1990. Monitoring well SGW-01 is the background well; SGW-02, SGW-03, and SGW-04 are the downgradient wells. Lithologic descriptions from the drillers' logs are not precise, descriptions used are "dirt" and "rock." However, published literature indicates that the metamorphic bedrock consists of quartzite, metaconglomerate, granite-gneiss, and mica schists. The "dirt" is probably a weathered residuum of the bedrock, termed overburden or saprolite if less weathered. Groundwater in the area is produced primarily from fractures in the metamorphic bedrock but small quantities of water may be produced from the overburden.

Water levels from the four monitoring wells were measured by M&E personnel during the January 1993 sampling event. Water levels ranged from 8.8 to 86.1 feet below the top of the well casing and the water table elevations ranged from 1708.3 to 1849.7 ft-msl. Thus, the water table elevation change is about 141 feet. As discussed in Section 4.4.1 the topography does not correlate with the surveyed well elevations or groundwater elevations. Figure 4.3 shows the interpreted groundwater contours at the site. Groundwater flow is generally to the north towards the Tuckasegee River although some northwestern flow occurs



NOTES:

1. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVEL MEASUREMENTS TAKEN ON 1/11/93.
2. TOPOGRAPHIC MAP TAKEN FROM CONSTRUCTION PLAN, SOLID WASTE DISPOSAL SITE, SWAIN COUNTY, NORTH CAROLINA, TENNESSEE VALLEY AUTHORITY, W-PP-1-932K138-1, 9/4/79.
3. TOPOGRAPHY BASED UPON UNKNOWN DATUM.

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GROUNDWATER CONTOUR MAP
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST
FIGURE 4.3

due to a local topographic high (Borrow Area). The groundwater contours are interpreted to be influenced by the topography. The water table gradient, strongly influenced by topography, ranges from 0.087 to 0.25 ft/ft, which yields slopes from 5° to 14°.

4.5 SITE INSPECTION

The SI at the Swain County Landfill was conducted from January 10 to January 12, 1993. Samples of soil, groundwater, surface water, leachate, and sediment were collected and analyzed to evaluate the nature and extent of contamination. The numbers and types of field samples collected at the SLF are summarized in Table 4-4.

TABLE 4-4
SUMMARY OF SITE INSPECTION
AT SWAIN COUNTY LANDFILL

Sample Type	Field Samples	Duplicates	MS/MSD	Trip Blank	Equipment Rinsates
Groundwater	4	1		1	1
Sediment	5	1	1	1	
Surface Water	5		1	1	
Leachate	1	1			
Background soils	3	1			
Total	18	4	2	3	1

Information on local geology and hydrogeology was derived from published literature, examination of existing boring logs, and groundwater level measurements from existing monitoring wells.

Section 4.6 summarizes the analytical results associated with the various environmental samples collected during the SI. For reference, the locations of sampling points are shown

in Figure 4.4. Analytical methods, field procedures, details on the analytical program, and ARARs are discussed in Appendix C. The survey data is presented in Appendix H.

4.6 NATURE AND EXTENT OF CONTAMINATION

This section discusses the analytical results for the various environmental samples collected at SLF. Section 4.5, Table 4-4, summarizes the field sampling effort. All field samples were analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, total metals and cyanide.

Appendix C details the sampling procedures, the analytical program and criteria for data evaluation for the SI. Analytical data is presented in Appendix D. Sampling and equipment calibration logs and chain-of-custody documentation are presented in Appendix F and G, respectively.

4.6.1 Background Surface Soil

Background surface soil samples were collected at three topographically upgradient locations (Figure 4.2), south of SLF. These locations are located outside the boundaries of the landfill. The samples were collected to establish naturally occurring levels of constituents present at the site.

Analytical Results

Methylene chloride, acetone, and bis(2-ethylhexyl)phthalate are common laboratory contaminants and were the only organic constituents detected in BG surface soil samples collected at SLF. Acetone was present in the associated method blank, and concentrations of methylene chloride and phthalates are also attributed to laboratory contamination. These compounds were detected below the CRQL and have been qualified as estimated at very low concentrations.

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DATE 03-03-92 CHECKED BY MS

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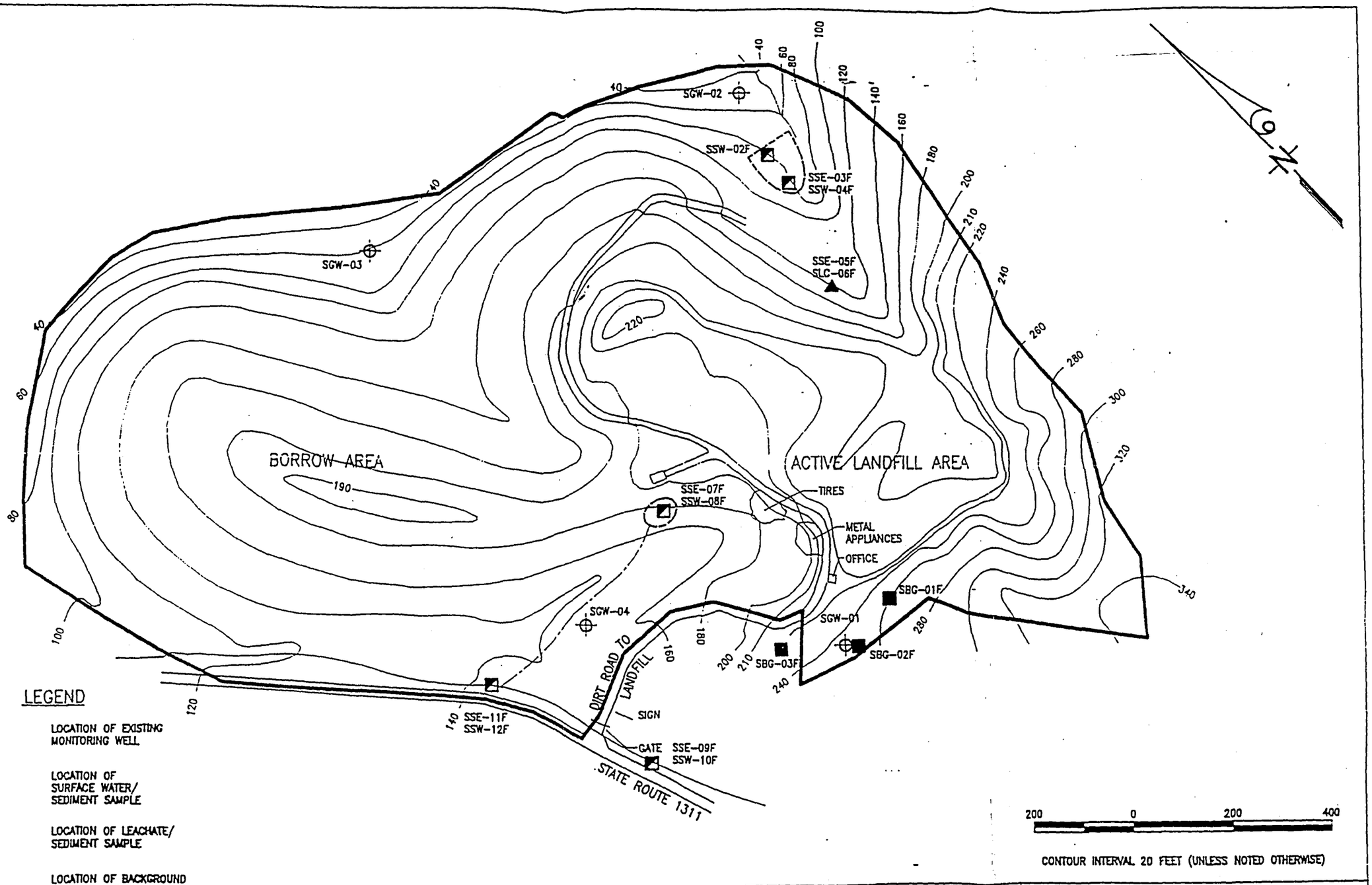


LEGEND

- LOCATION OF EXISTING MONITORING WELL
- LOCATION OF SURFACE WATER/ SEDIMENT SAMPLE
- LOCATION OF LEACHATE/ SEDIMENT SAMPLE
- LOCATION OF BACKGROUND SURFACE SOIL SAMPLE
- SEDIMENTATION BASIN
- WET WEATHER DRAINAGE FEATURE

NOTES:

1. TOPOGRAPHIC MAP TAKEN FROM CONSTRUCTION PLAN, SOLID WASTE DISPOSAL SITE, SWAIN COUNTY, NORTH CAROLINA, TENNESSEE VALLEY AUTHORITY, W-PP-1-932K138-1, 9/4/79.
2. TOPOGRAPHY BASED UPON UNKNOWN DATUM.

200 0 200 400

CONTOUR INTERVAL 20 FEET (UNLESS NOTED OTHERWISE)

METCALF & EDDY

SAMPLING LOCATIONS
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST
FIGURE 4.4

Pesticides, PCBs, herbicides, and cyanide were not detected in any background surface soil samples. With the exception of nickel, inorganic analytes of concern were all detected well below regulatory levels. The average concentrations of beryllium, cadmium, and lead are 1.1, 5.3, and 12.15 mg/kg, respectively. Nickel exceeded the regulatory level in three of the four background samples. These concentrations are consistent with the levels found in the GLF background surface soil samples.

A summary of the constituents detected in BG surface soil samples is listed in Table 4-5.

TABLE 4-5
SUMMARY OF CONSTITUENTS DETECTED IN BACKGROUND SOILS
SWAIN COUNTY LANDFILL

SAMPLE ID		SBG-01	SBG-02	SBG-53	SBG-03
SAMPLE DATE		1/10/93	1/10/93	1/10/93	1/10/93
MATRIX		SOIL	SOIL	SOIL	SOIL
		mg/kg	mg/kg	mg/kg	mg/kg
				DUP-SBG02	
COMPOUNDS DETECTED	REG. * LEVEL				
VOC					
METHYLENE CHLORIDE			0.19 J		0.16 J
ACETONE		0.56 B	2.5 J		2.1 J
SVOC					
bis(2-ETHYLHEXYL)PHTHALATE		0.044 J		0.14 J	0.11 J
PESTICIDE		U	U	U	U
PCB		U	U	U	U
HERBICIDE		U	U	U	U
METALS					
BARIUM	1000 a	66.6	28.4	134	127
BERYLLIUM				1	1.2
CADMIUM	20 a	3.3	6.3	5.6	6.1
CHROMIUM	100 a	8	13.4	25.1	31.1
COPPER		2.9	16.8	5.6	7
LEAD	100 a	13.7	10.3	9.9	14.7
NICKEL	6.4 a	5.2	11.4	16.2	17.5
CYANIDE		U	U	U	U

*-REG Level: a-CCWE 40CFR268.41 (mg/kg)
J-estimated value as a result of validation, U-undetected, B-Also present in associated method blank

4.6.2 Groundwater

Existing groundwater monitoring wells were sampled to assess hydrogeologic conditions, the nature and extent of groundwater contamination, evaluate the potential for off-site migration

of contaminants via groundwater and the suitability of the existing groundwater monitoring system. The groundwater monitoring system was installed in July 1990 as required in the SLF solid waste permit. The well completion information for each well is summarized in Table 4-6.

Based upon site topography, SGW-01 was installed as the background well and SGW-02, SGW-03, and SGW-04 were installed as downgradient wells (Figure 4.2).

TABLE 4-6
WELL COMPLETION INFORMATION SUMMARY - SLF

Well No.	Total Depth (ft-bgs)	Screened Interval (ft-bgs)	Approx. Depth to Groundwater (ft-bgs)	Well Completed In
SGW-01	94	74 - 94	84	Soil/Rock
SGW-02	20	10 - 20	8	Rock
SGW-03	30	20 - 30	7	Soil
SGW-04	28	18 - 28	7	Soil

* Based upon drillers' log

Analytical Results

The low concentration of acetone detected in SGW-03 was an estimated value and could be attributed to laboratory contamination. 1,1-Dichloroethane and 1,1,1-trichloroethane were detected at very low concentrations in the background well (SGW-01). Dichloroethene and chlorobenzene were detected in SGW-02 at concentrations well below the MCL. All VOC results were reported below the CRQL but above instrument detection limits and therefore qualified as estimated.

Diethylphthalate and 1,4-dichlorobenzene were detected in very low concentrations in SGW-

02. No other semivolatile organic contaminants were detected in the other monitoring wells. Pesticides, PCBs, herbicides, and cyanide were not detected in any groundwater sample collected at SLF.

Inorganic analytes were detected significantly above MCLs in SGW-01. Barium, beryllium, chromium, and lead were all present at approximately 3 to 10 times greater than the MCL and cadmium was present in concentrations 23 times the MCL. Nickel exceeded the MCL but was also detected above the regulatory level in background soils. In addition, unusually high levels of aluminum, iron, manganese and vanadium were present in the groundwater at SGW-01. These high concentrations may be attributed to the bedrock unit in which the well is installed. Concentrations of inorganic analytes in the other three monitoring wells at SLF did not exceed their MCLs with the exception of cadmium in SGW-02. Aluminum and iron exceed secondary drinking water standards (non-enforceable) in all three wells and manganese exceeds secondary drinking water standards in SGW-02 and SGW-04. A summary of the constituents detected in groundwater samples collected at SLF are listed in Table 4-7.

TABLE 4-7
SUMMARY OF CONSTITUENTS DETECTED IN GROUNDWATER
SWAIN COUNTY LANDFILL

SAMPLE ID		SGW-01	SGW-02	SGW-03	SGW-04	SGW-56
SAMPLE DATE		1/12/93	1/12/93	1/12/93	1/12/93	1/12/93
MATRIX		WATER	WATER	WATER	WATER	WATER
DEPTH TO WATER (FT)		86.13	9.57	9.13	8.83	8.83
pH		6.5	6.5	6.0	5.9	5.9
UNITS		ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUNDS DETECTED	REG * LEVEL ug/L					DUP-SGW04
VOC					U	U
ACETONE				4 J		
1,1-DICHLOROETHANE		1 J				
1,2-DICHLOROETHENE (cis+trans)	170		2 J			
CHLOROBENZENE	100		3 J			
1,1,1-TRICHLOROETHANE	200	2J				
SVOC		U		U	U	U
DIETHYLPHTHALATE			3 J			
1,4-DICHLOROBENZENE	75		2 J			
PESTICIDE		U	U	U	U	U
PCB		U	U	U	U	U
HERBICIDE		U	U	U	U	U
METALS						
BARIUM	2000	4880	365	37.4 B	62.8 B	63.5 B
BERYLLIUM	4	25.7				
CADMIUM	5	119	5.3			
CHROMIUM	100	285				
COPPER	1300	169				
LEAD	15	167			3	
NICKEL	100	134				
VANADIUM		798				
ALUMMINUM	50(a)	406000	1260	1640	2310	1930
IRON	300(a)	425000	18700	1770	3930	4010
MANGANESE	50(a)	5830	21900	34.7	89	91.6
ZINC	5000(a)	791	13.2	12.3	15.1	13.4
CYANIDE	200	U	U	U	U	U

* – Federal DWS/State WQS when state standard is different or more stringent
(a) Secondary drinking water standard, non-enforceable.
J-estimated value as a result of validation, U-undetected, B-Also present in associated method blank

4.6.3 Surface Water and Sediment

Surface water and sediment were collected at five locations within the SLF to evaluate the potential for offsite migration of contaminants via surface runoff (Figure 4.2). Three locations were within sediment collection ponds and two locations were along an unnamed creek, which flows along the southwestern portion of SLF. Background sampling points SSE-09/SSW-10, located southwest of SLF along the unnamed creek, are upstream of the SLF and likely unaffected by the landfill.

Surface Water Analytical Results

The highest concentrations of volatile organic contaminants detected were acetone, 2-butanone, and 2-hexanone found in surface waters from the sediment collection ponds, as well as the surface water (SSW-12) collected at the unnamed creek located just inside the landfill. (Laboratory contamination is not suspected.) Toluene was detected in surface water samples collected at both sedimentation ponds and 1,1,2,2-tetrachloroethane was detected in only one pond. VOC concentrations are qualified as estimated and are well below MCLs.

The highest concentrations of semivolatile organics were detected in SSW-08. Phenol and 4-methylphenol were detected in concentrations of 410 μg/L and 1200 μg/L, respectively. Diethylphthalate was also detected at concentration of 160 μg\L in SSW-08 as well as in three other surface water samples at much lower levels. Beta-BHC was detected in SSW-08 and heptachlor epoxide was detected in SSW-12 at concentrations below MCLs. PCBs, herbicides, and cyanides were not detected in any surface water samples collected at SLF.

Cadmium was detected in SSW-08 above the MCL at a concentration of 30.8 μg/L. Other inorganic analytes detected did not exceed MCLs or were not present above the detection limits. A summary of the constituents detected in surface water samples is listed in Table 4-8.

TABLE 4-8
SUMMARY OF CONSTITUENTS DETECTED IN SURFACE WATER
SWAIN COUNTY LANDFILL

SAMPLE ID		SSW-02	SSW-04	SSW-08	SSW-10	SSW-12
SAMPLE DATE		1/12/93	1/12/93	1/10/93	1/10/93	1/10/93
MATRIX		WATER	WATER	WATER	WATER	WATER
		ug/L	ug/L	ug/L	ug/L	ug/L
COMPOUNDS DETECTED	REG * LEVEL					
VOC 8020					U	
METHYLENE CHLORIDE				27 J		
ACETONE		42	52 J	1100		55
BROMOFORM	100/0.19		1 J			
2-BUTANONE		43 J	45 J	1300 J		72
TOLUENE	1000	1J	2 J			1 J
2-HEXANONE			8 J	390		17
1,1,2,2-TETRACHLOROETHANE			2 J			
SVOC					U	
PHENOL				410 J		9 J
4-METHYLPHENOL			16	1200		
DIETHYLPHTHALATE		3 J	6 J	160		2 J
PESTICIDE		U	R		U	
BETA-BHC				0.099		
HEPTACHLOR EPOXIDE	0.4/0.076					0.017 J
PCB		U	U	U	U	U
HERBICIDE		U	U	U	U	U
METALS						
BARIUM	2000	113	236	518	44.7	86.7
CADMIUM	4			30.8		
CHROMIUM	100			24.6		
NICKEL	100			21.1		
ZINC	5000(a)	31.3 J	43 J	2380	7.2 J	28.5 J
CYANIDE	200	U	U	U	U	U

* - Federal DWS/State WQS when state standard is different or more stringent
(a)-Secondary drinking water standard, non-enforceable
J-estimated value as a result of validation, R-data rejected, unusable, U-undetected, B-Also present in associated method blank

Sediment Analytical Results

Acetone was detected at low concentrations in SSE-07 and SSE-11 and 2-butanone was also detected in SSE-11. Butyl benzylphthalate and bis(2-ethylhexyl)phthalate were also detected in SSE-11. No other volatile or semivolatile contaminants were detected in the sediment samples collected at SLF.

PCBs, herbicides, and cyanide were not detected in any sediment samples. However, 4,4'-DDE was detected at a concentration of 0.0019 mg/kg in SSE-09, the upgradient location along the unnamed creek.

The inorganic analytes detected in the sediment samples collected at SLF are consistent with the levels detected in background surface soils. One nickel sample exceeded the recommended regulatory level which is also consistent with background soils. A summary of the constituents detected in sediment samples is listed in Table 4-9.

TABLE 4-9
SUMMARY OF CONSTITUENTS DETECTED IN SEDIMENTS
SWAIN COUNTY LANDFILL

SAMPLE ID		SSE-03	SSE-54	SSE-07	SSE-09	SSE-11
SAMPLE DATE		1/12/93	1/12/93	1/10/93	1/10/93	1/10/93
MATRIX		SOIL	SOIL	SOIL	SOIL	SOIL
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
COMPOUNDS DETECTED	REG * LEVEL		DUP-SSE03			
VOC						
ACETONE				0.005 J		4.1
2-BUTANONE						0.032
SVOC						
BUTYLBENZYLPHTHALATE						0.23 J
bis(2-ETHYLHEXYL)PHTHALATE						0.75
PESTICIDES		R	R	U		U
4,4'-DDE					0.0019 J	
PCB		U	U	U	U	U
HERBICIDES		U	U	U	U	U
METALS						
BARIUM	1000 a	144	90.4	125	64.3	91.2
BERYLLIUM		1	1.4	1.5	0.41	0.55
CADMIUM	20 a	4.9	4.2	4.8	2.3	3.6
CHROMIUM	100 a	8.5	5.5	6.5	2.9	7
COPPER		4.9	5.5	4.3	1.7	4.2
LEAD	100a	14.6	14.5	19.2	6.7	14.8
NICKEL	6.4 a	4.1	3.6	6.7	3.6	5
CYANIDE		U	U	U	U	U

*-REG Level: a-CCWE 40CFR268.41 (mg/kg)
J-estimated value as a result of validation, R-data rejected, unusable, U-undetected, B-Also present in associated method blank

4.6.4 Leachate and Sediment

Leachate and sediment were collected at one location within SLF, along the lowermost fill slope (Figure 4.2). The sample was collected to characterize the leachate and evaluate if contaminants are migrating from the landfill. Leachate and underlying sediment were sampled during a light rain and after several days of rainfall.

Analytical Results

A duplicate sample was collected of the leachate sample (SLC-06) and designated SLC-55. Chlorinated and aromatic hydrocarbons were detected in the leachate and duplicate sample collected at SLF. Benzene was below the MCL, but the estimated concentration detected slightly exceeds State drinking water quality criteria. Contaminant concentrations were detected below regulatory levels. Acetone was the only VOC detected in leachate and the underlying sediment; however, acetone in the sediment was qualified as estimated.

Dichlorobenzene, very small concentrations of PAHs (naphthalene, acenaphthalene and 2-methyl naphthalene) and diethylphthalate were detected in the leachate and duplicate sample. All results except dichlorobenzene were reported below the CRQL and therefore qualified as estimated. No other SVOCs were detected in the underlying sediment sample.

Herbicides, pesticides, PCBs, and cyanide were not detected in either the leachate or the sediment samples collected at SLF.

Inorganic analytes detected in the sediment are consistent with the levels found in the other sediments at SLF and also with background surface soils. None of the analytes exceed recommended regulatory levels. No inorganic analytes were present above the detection limit in the leachate sample and duplicate. A summary of the constituents detected in the leachate and sediment samples is listed in Table 4-10

TABLE 4–10
SUMMARY OF CONSTITUENTS DETECTED IN LEACHATE & SEDIMENT
SWAIN COUNTY LANDFILL

SAMPLE ID		SLC–06	SLC–55	SSE–05
SAMPLE DATE		1/10/93	1/10/93	1/10/93
MATRIX		WATER	WATER	SOIL
		ug/L	ug/L	mg/kg
COMPOUNDS DETECTED	REG * LEVEL		DUP–SLC06	
VOC				
CHLOROETHANE		13	14	
ACETONE		12		0.013 J
1,2–DICHLOROETHENE (cis+trans)	170		1 J	
BENZENE	5/1	2 J	2 J	
CHLOROBENZENE	100 (b)	43	48	0.004 J
ETHYLBENZENE	700/29	11	12	
XYLENES	1000/400	32	36	
SVOC				
1,4–DICHLOROBENZENE	75	17	15	0.11 J
NAPHTHALENE		3 J	4 J	
2–METHYLNAPHTHALENE		2 J	1 J	
PHENANTHRENE				0.052
ACENAPHTHALENE		2 J	1 J	
DIETHYLPHTHALATE		6 J	4 J	
PESICIDE		U	U	U
PCB		U	U	U
HERBICIDES		U	U	U
METALS		U	U	
BARIUM	1000 a			205
BERYLLIUM				0.71
CADMIUM	20 a			13.1
CHROMIUM	100 a			9.9
COPPER				4.5
LEAD	100a			12.2
NICKEL	6.4 a			5.6
CYANIDE		U	U	U

* – Leachate; Federal DWS/State WQS when state standard is different or more stringent
* – Sediment; a–CCWE 40CFR268.41 (mg/kg), b–TCLP leachate (mg/L)
J – estimated value as a result of validation, U–undetected, B–Also present in associated method blank

SECTION 5
SUMMARY AND CONCLUSIONS

5.1 SUMMARY

In January of 1993 a site inspection was performed at the GLF and SLF on property owned by the USFS at the NNF, North Carolina. This site inspection was performed under a three-volume work plan prepared by M&E (Atlanta) and reviewed and approved by personnel from HAZWRAP (Oak Ridge), USFS (Atlanta and Franklin, NC) and Region IV EPA (Atlanta). The objectives were to provide adequate information and data on each site to support scoring each site under the HRS, to determine if hazardous constituents are present at either site and if the constituents are or have migrated offsite.

Each site had one background well; there were two downgradient wells at GLF and three downgradient wells at SLF. The objective of groundwater sampling and analysis was to assess the quality of the groundwater and determine the suitability of the existing groundwater monitoring system.

Additional field sampling activities included collecting background surface soil, surface water, sediment and leachate samples at each landfill. At each site three background surface soil samples were collected to determine the naturally occurring levels of constituents present in the soil.

Surface water and sediment samples were collected from sedimentation ponds and streams at both landfills to evaluate the potential offsite migration to the streams via surface runoff. A total of six surface water and sediment samples were collected from GLF and five surface water and sediments collected from SLF. Leachates were collected at each landfill for characterization. In addition, an underlying sediment sample was also collected at SLF.

All samples were analyzed for volatiles, semivolatiles, pesticides, herbicides, PCBs, total metals, and cyanide. The analyses were performed in accordance with EPA and HAZWRAP protocols. Specific analytical methods were required to meet HAZWRAP Level C Quality Control requirements. Level C data validation was performed on all SI analytical data.

Quality Control samples were taken according to the sampling and analysis plan. These included field duplicates; matrix spike/matrix spike duplicates; trip blanks, equipment rinsates, and source water samples.

ARARs were developed for specific contaminants detected in soil, sediment, and water samples collected during the SI.

Analytical data were evaluated based on the compounds detected in each sample compared to background sampling results and regulatory action levels established to protect human health and the environment.

All field activities associated with this site inspection and the resulting data are documented in this report. This information will be used to make decisions regarding the future disposition of these sites.

5.2 CONCLUSIONS

5.2.1 Graham County Landfill

A review of the analytical results listed in the data tables in Section 3.6 and the groundwater contour map also presented in Section 3 indicate concern about the placement of the supposed existing background well and the need for the installation of an additional downgradient well at GLF.

The analytical results for well GMW-01 indicate that this well is not upgradient of the source area. As discussed previously, low concentrations of 1,1-dichloroethane and

Lead exceeded the MCL in the one leachate sample. Nickel exceeded the regulatory screening criteria in sediment samples. However, since background soils also exceeded the nickel regulatory level, it is not considered to be a site-related contaminant of concern. The sedimentation ponds currently serve as a collection area for surface runoff and may be cleaned out and monitored to determine if current conditions are contributing to the migration of contaminants or if these contaminants are present due to past operational conditions. Closure design for the landfill will consider sediment in the collection ponds and the leachate.

Based upon the analytical results, the following indicate that potential adverse environmental impact from GLF is minimal.

- Only low levels of contaminants were detected in groundwater. The volatile organics detected were vinyl chloride and benzene at concentrations above State ARARs but below limits for federal drinking water standards. Also, many of the analytical results were estimated values as a result of validation.

- The contaminant levels in the leachate are low. A properly designed landfill will collect and treat all leachate, which is assumed to contain at least some low levels of contaminants.

- No contaminants (with published ARARs) were detected in either the surface water or the sediments.

- Landfill closure will decrease the levels of contaminants in both the leachate and the groundwater by reducing surface water infiltration.

5.2.2 Swain County Landfill

A review of the analytical results listed in the data tables in Section 4.6 indicates concern about placement of the supposed existing background well at SLF. The analytical results for

well SGW-01 indicate that the well is probably not located upgradient of the source area. As discussed previously, concentrations of 1,1-dichloroethane and 1,1,1-trichloroethane were detected. Furthermore, inorganic constituents; barium, beryllium, cadmium, chromium, lead and nickel are above the groundwater MCLs or the State of North Carolina drinking water quality criteria and are significantly elevated when compared to the downgradient concentrations. These high concentrations of inorganics may be attributed to the bedrock unit in which the well is installed. It is recommended that a new background well be installed southeast of well SMW-01. A proposed location for the background well is presented in Figure 5.2. Since nickel was above the regulatory level in background soils, it is not considered to be a site-related contaminant of concern.

The presence of the inorganic analytes above ARARs in the background well and low levels of chlorinated organics in three other wells indicates the need for further groundwater monitoring. These low levels of contaminants should decrease when the landfill is closed and capped and surface water is prevented from infiltrating the landfill. Groundwater monitoring after closure should determine if any additional monitoring wells are necessary. Monitoring the groundwater along with an additional well (background) would confirm the presence or absence of these contaminants.

Surface waters appear to be affected by contaminants migrating from the source area and are apparently being carried into the unnamed creek via a surface drainage feature. Contaminants such as acetone, butanone and hexanone found in the sedimentation pond are also found at the point where the surface drainage meets the unnamed creek at much higher concentrations. These organic contaminants are also present at much lower concentrations downstream. Phenolic compounds, diethylphthalate, and cadmium were detected in the sedimentation pond and increase in concentration upon entering the stream. With the exception of cadmium, these compounds do not have assigned MCLs; however, they are not naturally occurring in the environment and are above background concentrations. The sediment samples collected at the same locations as the surface waters apparently have not been impacted by the surface migration.

FILE NO. 8604-02

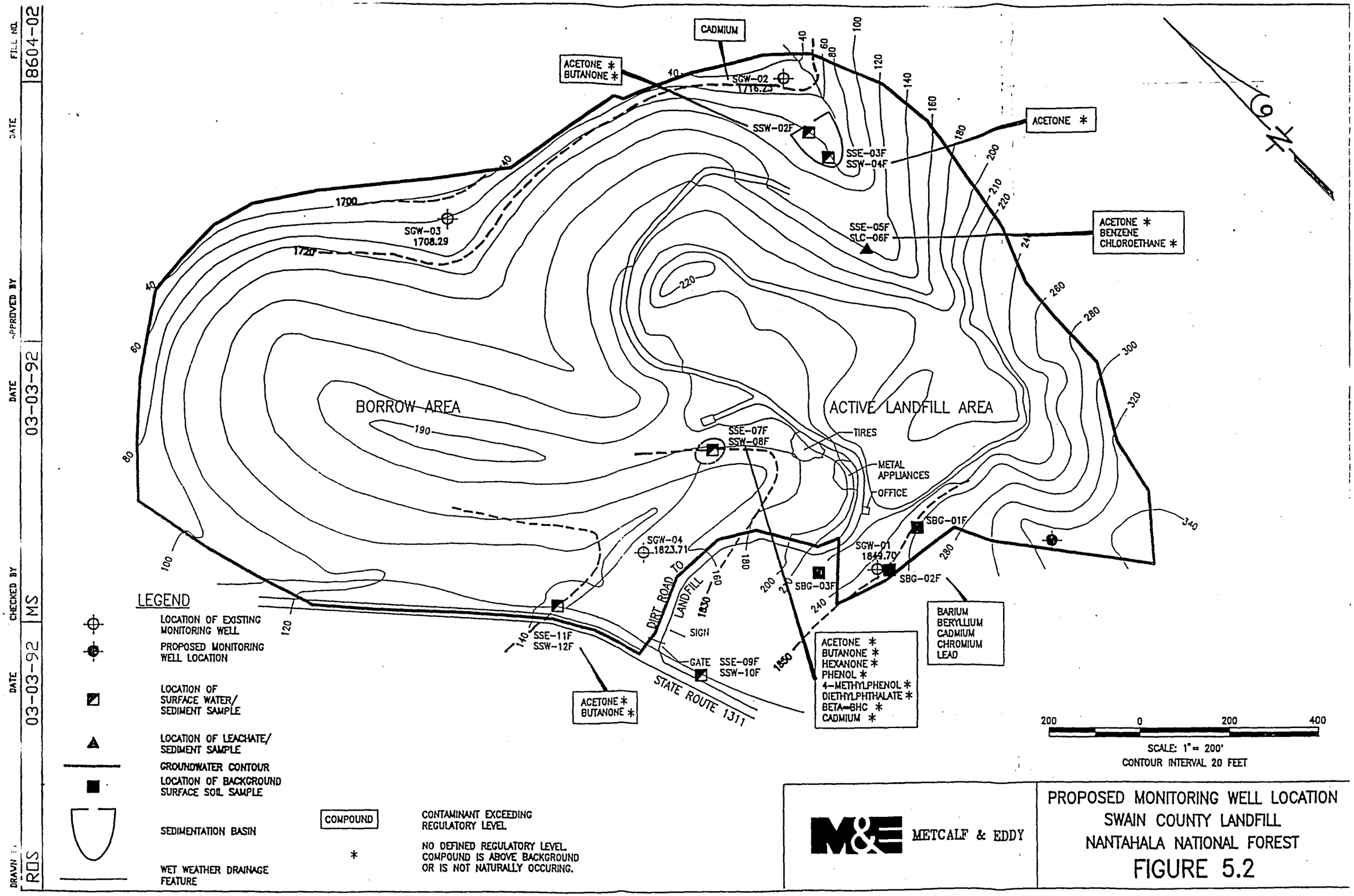
DATE 03-03-92

APPROVED BY

DATE 03-03-92

CHECKED BY MS

DRAWN BY RDS



LEGEND

- LOCATION OF EXISTING MONITORING WELL
- PROPOSED MONITORING WELL LOCATION
- LOCATION OF SURFACE WATER/ SEDIMENT SAMPLE
- LOCATION OF LEACHATE/ SEDIMENT SAMPLE
- GROUNDWATER CONTOUR
- LOCATION OF BACKGROUND SURFACE SOIL SAMPLE
- SEDIMENTATION BASIN
- WET WEATHER DRAINAGE FEATURE

COMPOUND — CONTAMINANT EXCEEDING REGULATORY LEVEL

* — NO DEFINED REGULATORY LEVEL. COMPOUND IS ABOVE BACKGROUND OR IS NOT NATURALLY OCCURING.

METCALF & EDDY

PROPOSED MONITORING WELL LOCATION
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST
FIGURE 5.2

Results of the leachate analysis indicates the presence of aromatic and chlorinated volatiles, some small quantities of PAHs and diethylphthalate. Benzene exceeds the DWQ for the State of North Carolina. Further characterization of leachate may be appropriate to confirm the presence or absence of these contaminants and to further define the extent of the impact to the surface waters and runoff. Table 5-2 summarizes the contaminants exceeding ARARs at SLF.

TABLE 5-2
SUMMARY OF SWAIN COUNTY LANDFILL SI
CONTAMINANTS EXCEEDING ARARs

	Background Soils (Conc. detected vs. ARAR, ppm)	Groundwater (Conc. detected vs. ARAR, ppb)	Surface Water (Conc. detected vs. ARAR, ppb)	Leachate (Conc. detected vs. ARAR, ppb)	Sediments
Volatile Organics	none	none	• acetone (42-1100 vs. NA) • butanone (43-1300 vs. NA) • hexanone (8-390 vs. NA)	• acetone (12 vs. NA) • benzene (2 vs. 5/1) • chloroethane (13-14 vs. NA)	none
Semivolatile Organics	none	none	• phenol (9-410 vs. NA) • 4-methylphenol (16-1200 vs. NA) •diethylphthalate (2-160 vs. NA)	none	none
Pesticides	none	none	•beta-BHC (0.099 vs. NA)	none	none
PCBs	none	none	none	none	none
Herbicides	none	none	none	none	none
Metals	nickel (5.2-17.5 vs. 6.4)	• barium (37.4-4880 vs. 2000) • beryllium (26.7 vs. 4) • cadmium (5.3-119 vs. 5) • chromium (285 vs. 100) • lead (3-167 vs. 15) • nickel (1) (134 vs. 100) • aluminum (2) (1260-406,000 vs. 50) • iron (2) (1770-425,000 vs. 300) • manganese (2) (34.7-21,900 vs. 50)	• cadmium (30.8 vs. 4)	none	none
Cyanide	none	none		none	none

• regulated compound exceeding ARARs
• regulatory level is not defined; listed as large quantity, not naturally occurring, and/or present above background. NA = Not applicable.
(1) Also detected above regulatory level in background soils.
(2) Most likely attributed to bedrock conditions.

Based upon the analytical results, the following indicate that potential adverse environmental impact from SLF is minimal:

- Only metals were detected in groundwater at levels above State ARARs and these levels were in the upgradient monitoring well.

- The contaminant levels in the leachate are low. A properly designed landfill will collect and treat all leachate, which is assumed to contain at least some low levels of contaminants.

- No contaminants (with published ARARs) were detected in either the surface water or the sediments.

- Landfill closure will decrease the levels of contaminants in both the leachate and the groundwater by reducing surface water infiltration.

5.3 SUMMARY OF RECOMMENDATIONS

5.3.1 Graham County Landfill

The following recommendations are made for further work at GLF:

- Install a background well east of GMW-01 (location presented on Figure 5.1).

- Install one additional downgradient well to monitor the eastern downgradient portion of the landfill (location presented on Figure 5.1).

- Resample all monitoring wells for volatiles, semivolatiles, pesticides, and both dissolved and total metals (providing additional data for statistical analysis) as part of the annual groundwater monitoring program.

The annual groundwater sampling program can be scheduled at different times of the year in order to provide seasonal data and can alternate yearly between a rain and non-rain event. Table 5-4 summarizes sampling locations and parameters to be analyzed at SLF.

TABLE 5-4
SUMMARY OF ANNUAL MONITORING PROGRAM AT SLF

	Media			
Analyses	Groundwater (1)	Surface Water (2)	Leachate (3)	Sediment (4)
VOCs	X	X	X	X
SVO	X	X	X	X
Pesticide	X	X	X	X
Metals"				
Total	X	X	X	X
Dissolved	X			

(1) Groundwater locations to be sampled include: new background well, SGW-01, SGW-02, SGW-03, SGW-94.
(2) Surface water locations to be sampled include: SSW-02, SSW-04, SSW-08, SSW-10, SSW-12.
(3) Leachate location to be sampled is SLC-06.
(4) Sediment locations to be sampled include: SSE-03, SSE-05, SSE-07, SSE-09, SSE-11.

VOCs = Volatile organic compounds; SVO = Semi-volatile organics.

008604\Site\Sec.5

LATITUDE AND LONGITUDE CALCULATION WORKSHEET #2

LI USING ENGINEER'S SCALE (1/60)

SITE NAME: Swain County Landfill CERCLIS #: NC3120000002

AKA: n.a. SSID: n.a.

ADDRESS: Buckner Branch Road (SR 1311)

CITY: Bryson City STATE: NC ZIP CODE: 28713

SITE REFERENCE POINT: Center of Site

USGS QUAD MAP NAME: Bryson City, NC TOWNSHIP: - N/S RANGE: - E/W

SCALE: 1 : 24,000 MAP DATE: 1978 SECTION: - 1/4 - 1/4 - 1/4

MAP DATUM [1927] 1983 (CIRCLE ONE) MERIDIAN: -

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP (attach photocopy)

LONGITUDE: 83 ° 22 ' 60.00 " LATITUDE: 35 ° 22 ' 30.00 "

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LONGITUDE: 83 ° 27 ' 30.00 " LATITUDE: 35 ° 25 ' 0.00 "

CALCULATIONS: LATITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM LATITUDE GRID LINE TO SITE REF POINT: 95

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A X 0.3304 = 31.39 "

C) EXPRESS IN MINUTES AND SECONDS (1' = 60") : 0 ' 31.39 "

D) ADD TO STARTING LATITUDE: 35 ° 25 ' 0.00 " + 0 ' 31.39 "

SITE LATITUDE:	35 ° 25 ' 31.39 "

CALCULATIONS: LONGITUDE (7.5' QUADRANGLE MAP)

A) NUMBER OF RULER GRADUATIONS FROM RIGHT LONGITUDE LINE TO SITE REF POINT: 260

B) MULTIPLY (A) BY 0.3304 TO CONVERT TO SECONDS:

A X 0.3304 = 85.90 "

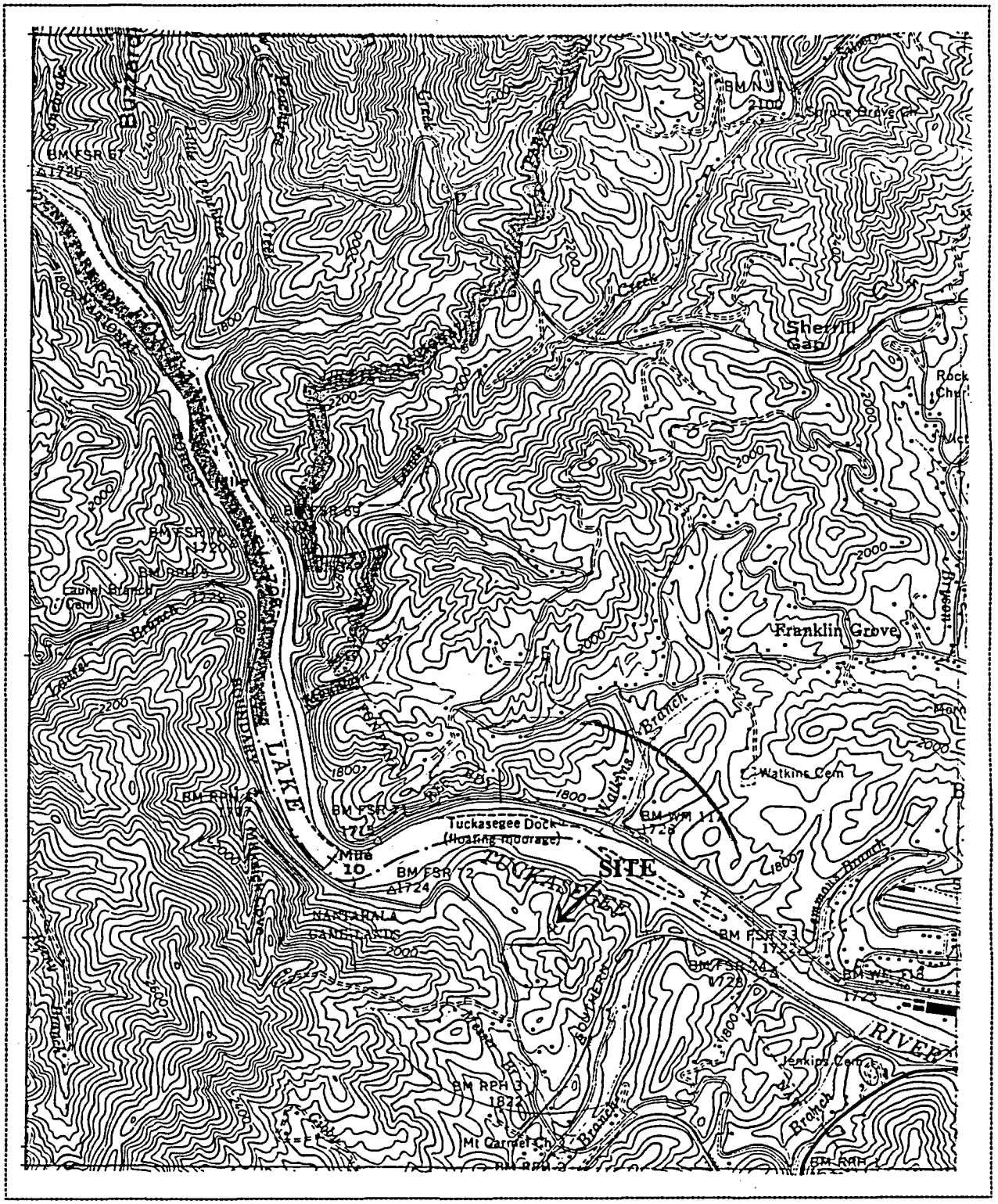
C) EXPRESS IN MINUTES AND SECONDS (1' = 60") : 1 ' 25.90 "

D) ADD TO STARTING LATITUDE: 83 ° 27 ' 30.00 " + 1 ' 25.90 "

SITE LONGITUDE:	83 ° 28 ' 55.90 "

INVESTIGATOR: Melanie Bryson DATE: 06/11/2002

SITE NAME: Swain County Landfill NUMBER: NC3120000002



TOPOGRAPHIC MAP QUADRANGLE NAME: Bryson City, NC SCALE: 1 : 24,000

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' GRID CELL:

LATITUDE: 35 ° 25 ' 0.00 " LONGITUDE: 83 ° 27 ' 30.00 "

Date: January 21, 1982

County: Swain

Notifier's name and address: William Cozart, Jr.

Singer Company, P.O. Box 1588, Lenoir, N.C.

Contact's name: Dana Crump

Site name and address: Swain County Landfill (87-01)

Buckner's Branch, Bryson City, N.C.

Site location: State Road 1311

Type of waste: spray booth sludge

What process generated the waste? applying lacquer finish to wood furniture

Volume of waste: Unknown

Method of storage or disposal: Landfill (approved by the State for the disposal of routine solid wastes)

Dates of waste activity: 1950 - 1976

Site history: Dana Crump of the Singer Company reported that an unknown volume of lacquer spraybooth sludge was disposed of in the Swain County Landfill on State Road 1311 near Bryson City from 1950-1976. Crump said Singer reported disposal of the waste in the landfill because of the possibility that the waste was ignitable. The residues of this furniture finishing material are very similar to dried fingernail polish. The residues would contain non-toxic pigments or stains, and solidified plastic-like material. They would have a slightly higher flammability than newspaper, and about the same flammability as a plastic coke bottle. The water solubility would be low. Due to the low toxicity, ignitability and water solubility of the sludge, the waste material is not hazardous.

*The preceding information is based on preliminary data supplied by the Environmental Protection Agency, and not on detailed site investigations.

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

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

1 June 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

Subject: Preliminary Assessment Report

W. F. Fancourt Company
408 Banner Avenue, Greensboro, N. C. 27420 NCD003230083

Burlington Industries/W. G. Lord Plant
Eagle Road, Cramerton, N. C. 28032 NCD067435925

Masonite Corporation/Fiberboard Division
Hwy 64 and County Route 1306, Spring Hope, N.C. NCD055359019

Masonite Corporation/Custom Component Division
200 Mason Way, Thomasville, N. C. 27360 NCD003233756

Pfizer, Inc./Coty Division
Cox Mill Road (Route 42), Sanford, N. C. 27330 NCD057037178

Lee County Landfill
State Road 1238, Sanford, N. C. 27330 NCD980503015

Swain County Landfill
State Road 1311, Bryson City, N. C. 28713 NCD980557938

One Hour Koritizing
4404 Roxboro Road, Durham, N. C. 27705 NCD980848667

Dear Mr. Jones:

Enclosed please find Preliminary Assessment Report for the subject sites.

Based on our review of available data, W. F. Fancourt Company, Burlington Industries, Masonite Corporation/Fiberboard Division, Masonite Corporation/Custom Component Division, Pfizer, Inc., and the Lee County Landfill are not hazardous waste sites and should be placed on the inactive ERRIS list.

W. F. Fancourt was included on the ERRIS list through the Hazardous Data Waste Management System. Fancourt makes textile finishes by a simple blending operation. Previously Fancourt was listed as a generator of hazardous waste because the applicant confused product streams and waste streams. Although Fancourt uses large volumns of xylene, tetrachloroethylene and alphachlorotoluene, they are all blended into a final product.

Fancourt's only waste is from rinsing the mixing tanks. Rinse water contains traces of organic solvents which are approved by the city of Greensboro for discharge. No RCRA wastes are generated and there have been no on-site spills or disposals. No further action is recommended for W. F. Fancourt Company.

Burlington Industries/W. G. Lord Plant was included on the ERRIS list because the facility submitted a part A permit in 1980. At that time Burlington planned to store hazardous wastes from other Burlington facilities before disposal. However, no hazardous wastes were ever shipped to the facility and RCRA interim status was withdrawn in January 1984.

Burlington Industries uses an alkaline solution to treat cloth before dyeing at the W. G. Lord Plant. The alkaline solutions were neutralized before 1980 and recovered after 1980. No further action is recommended for the W. G. Lord Plant.

Masonite Corporation/Fiberboard Division was included on the ERRIS list via HWDMS. Resins and urea formaldehyde glue residues are processed through a typical waste water treatment system. Sludges are landfarmed in accordance with Nash County Landfill regulations. The treatment facility was constructed when the plant was opened in 1973.

Masonite uses methyl isobutyl ketone as a cleaning solvent. Spent solvent and waste rags are transported off-site by Southeast Chemical. There have been no on-site burial or spills at Masonite Corporation. No further action is recommended.

Pfizer, Inc. in Sanford is primarily a blending operation for cosmetics. RCRA inspectors indicate that it is questionable whether or not Pfizer would be classified as a small generator. There have been no spills or unpermitted on-site disposal of waste at the facility. No further action is recommended.

Lee County Landfill was included on the ERRIS list due to a Singer Company notification for lacquer spray residues and lacquer spray sludge. Waste analysis data show that no hazardour materials were discarded in the landfill with the exception of filler scrapping. The filler scrappings are hazardous by characteristic due to ignitability. Pfizer, Inc. also discarded products with expired expiration dates at the Lee County Landfill. Although some of the cosmetics and perfumes contain alcohol, Pfizer crushed and drained the containers before disposal. The filler scrappings and cosmetics were mixed and covered with other municipal waste and are no longer ignitable.

Masonite Corporation/Custom Component Division was included on the ERRIS list via HDWMS. Spent solvents have been transported off site by M and J Solvents and M and T Drum from 1969 forward. Although the company began operations in 1955, no disposal records are available from 1955 through 1969. According to company officials there have never been any on-site burials or spills. No further action is recommended for Masonite.

Pfizer, Inc./Coty Division has landfarmed process waste on-site since 1975. From 1971 when the company began operations until 1975 process waste was discharged into the Jonesboro waste water treatment system. After 1975 the process waste was pretreated. The sludge is land applied on-site. The N. C. Division of Environmental Management permits and monitors land application at Pfizer.

The Swain County Landfill is on the ERRIS list due to the same Singer Company notification as the Lee County Landfill. Although the complete Swain County file is included the U. S. Forest Service will also evaluate the site since the Forestry Service owns the land. No further action is recommended.

One Hour Koritizing was added to the ERRIS list in May 1984. The Durham County Health Department reported that ten or more drinking water wells behind a dry cleaner showed the presence of tetrachloroethylene. Levels range from 0.036 ppm to 4.4 ppm.

City water connection should be provided to area residents immediately. A site inspection has been completed by 3012 personnel and a high priority is recommended. Toxicologist Ted Taylor and Branch Chief O. W. Strickland are evaluating the site as a public health threat.

On 23 May 1984 the Department of Human Resources, Solid and Hazardous Waste Management Branch Chief O. W. Strickland, Senior Hazardous Waste Engineer William Meyer and representatives from Natural Resources and Community Development reviewed each of the sites with 3012 personnel. Each of the subject site recommendations was approved by the committee.

If you have any questions, please contact me.

Sincerely,

Lee Crosby

Lee Crosby, Chemist

Solid and Hazardous Waste Management Branch
Environmental Health Section

LC:jj

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D980557938

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Swain County Landfill	State Road 1311				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Bryson City	NC	28713	Swain	087	11
09 COORDINATES LATITUDE	LONGITUDE				
35 25 25._	_83 30 74._				

10 DIRECTIONS TO SITE (Starting from nearest public road)

On State Road 1311, four (4) miles from intersection of SR 1311 and US 19.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)		
U. S. Forest Service	Post Office Box 2750		
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 TELEPHONE NUMBER**
Asheville	NC	28802	(704) 255-0048
07 OPERATOR (If known and different from owner)	**08 STREET** (Business, mailing, residential)		
Swain County	County Administrator Drawer A		
09 CITY	**10 STATE**	**11 ZIP CODE**	**12 TELEPHONE NUMBER**
Bryson City	NC	28713	(919) 488-9273

13 TYPE OF OWNERSHIP (Check one)

☐ A. PRIVATE ☒ B. FEDERAL: U.S. Forest Service (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

EPA NOTIS Report indicates that Singer discarded lacquer spray sludges and residues on site.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Waste characterization data shows that wastes are not hazardous by characteristic or by exceeding the maximum concentration for contaminant metals. Ignitable filler scrapping have been covered and diluted while landfilled and are no longer considered hazardous.

V. PRIORITY ASSESSMENT

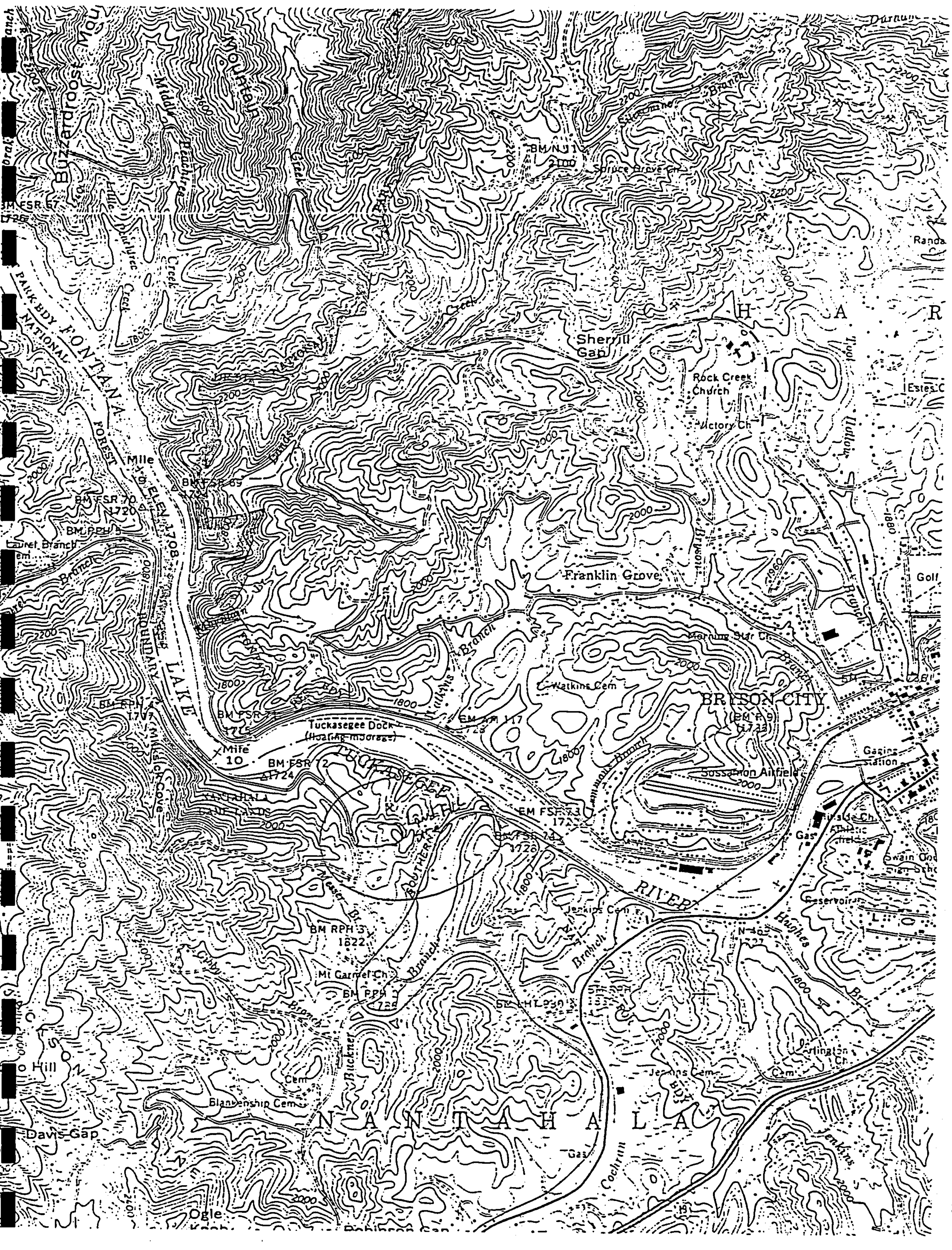
01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ 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
Dick McDonald	The Singer Company		(704) 728-6741
04 PERSON RESPONSIBLE FOR ASSESSMENT	**05 AGENCY**	**06 ORGANIZATION**	**07 TELEPHONE NUMBER**	**08 DATE**
Joe Moore Joe Moore	08	Forest Service	704 255-0048	04 05 84 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)


Middle Peachtree Creek
Sherrill Gap
Rock Creek Church
Spruce Grove Ch
PARK BDY FONTANA
NATIONAL FOREST
Mile 9 ELEV 1708
BM FSR 70 1720
Laurel Branch Cem
Franklin Grove
Morning Star Ch
Watkins Cem
BRYSON CITY
LAKE
Tuckasegee Dock
Mile 10
BM FSR 72 1724
TUCKASEGEE
Sossamon Airfield
Gaging Station
RIVER
Jenkins Cem
BM RPH 3 1822
Mt Garmel Ch
Hughes
Blankenship Cem
Davis Gap
N A N T A H A L A
Cochran
Ogle
Golf
Reservoir

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

4WD-WPB
JUL 12 1990

Ms. Pat DeRosa, Head
CERCLA Branch
Waste Management Division
North Carolina Department of Environment
Health and Natural Resources
P.O. Box 27687
Raleigh, North Carolina 27611

Dear Ms. DeRosa:

The Region IV Field Investigation Team (FIT) were tasked to conduct a Screening Site Inspection (SSI) at Swain County Landfill, NCD980557938. During the reconnaissance portion of the SSI, the FIT discovered that the site property belonged to the U.S. Forest Service. Therefore, no further action by the Superfund Site Assessment Section is planned at this time. The site has been deferred to the Federal Facilities Branch.

If you have any questions please contact me at (404) 347-5065.

Sincerely,

Deborah A. Vaughn-Wright

Deborah A. Vaughn-Wright
Project Manager

Enclosure

NUS CORPORATION
1927 LAKESIDE PARKWAY
SUITE 614
TUCKER, GEORGIA 30084
404-938-7710

C-586-7-0-54

July 5, 1990

Mr. A.R. Hanke
Site Investigation and Support Branch
Waste Management Division
Environmental Protection Agency
345 Courtland Street, N.E.
Atlanta, Georgia 30365

Subject: Swain County Landfill
Bryson City, Swain County, North Carolina
EPA ID No. NCD980557938
TDD No. F4-9001-180

Dear Mr. Hanke:

FIT 4 conducted a reconnaissance for a Screening Site Inspection at the Swain County Landfill, Bryson City, North Carolina on May 1, 1990. Discussions with Linda Cable, the Swain County Administrator's office, indicated that the county operates the municipal landfill on U.S. Forest Service property under a Memorandum of Understanding (Ref. 1).

Since this is a federal facility, there will be no further remedial action by FIT. Should you have any questions, please feel free to contact me at NUS Corporation.

Very truly yours,

Bob Donaghue

Bob Donaghue

BD/dwf

cc: Kelly Cain, EPA

NUS CORPORATION
SUPERFUND DIVISION

PROJECT NOTES

TO:

DATE: May 1, 1990

FROM: Bob Donaghue BD

COPIES:

SUBJECT: Swain County Landfill - SSI Phase I
Bryson City, Swain County, North Carolina

On May 1, 1990 I visited the Swain County tax assessors office during a reconnaissance for the Singer Company Furniture Division - Bryson (TDD F4-9001-180) and the Swain County Landfill (TDD F4-9001-179).

The tax assessor did not have information for the Swain County landfill and referred me to the County Administrator's office. I talked with Linda Cable in that office and she indicated that the Swain County Landfill is still active and is operated on U.S. Forest Service property under a Memorandum of Understanding.

I did an offsite reconnaissance of the facility and trucks could be seen entering and leaving the property. Additionally, there is no public water in the area, and residents use private wells.

Ref. 6

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

Fil Swain County Landfill

RECEIVED
AUG 30 1991
SUPERFUND SECTION

AUG 22 1991

4WD-RCRA & FFB

Mr. Jerome B. Knabel, Director of Engineering
U.S. Forest Service - Southern Region
U.S. Department of Agriculture
1720 Peachtree Road, NW
Atlanta, Georgia 30307

RE: Nantahala National Forest
North Carolina

Dear Mr. Knabel:

During a site visit to the Nantahala National Forest on July 23-24, 1991, the U.S. Environmental Protection Agency representative was requested to provide a determination on whether the Resource Conservation and Recovery Act (RCRA), as amended, would be applicable to the Graham County and Swain County Landfills on U.S. Forest Service (USFS) land. The hazardous waste provisions of RCRA Subtitle C would not be applicable, because the hazardous wastes were placed in the landfills prior to 1980, as is stated in the Preliminary Assessment report.

Therefore, the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, is the applicable jurisdiction. The USFS should, therefore, proceed with a Site Inspection (SI), as defined in the National Contingency Plan, under CERCLA. Site Inspection guidance has been provided to you earlier. We request that you provide this office with a schedule within 30 days of receipt of this letter on the submittal of an SI work plan and a draft SI report.

Also, under subtitle D of RCRA, EPA is currently revising the existing Federal Standards for Muncipal Solid Waste Landfills (MSWLF). The revised criteria are expected to be finalized in the fall of 1991. The proposed revised criteria, published in August, 1988, included location restrictions, facility design and operating requirements, groundwater monitoring, corrective action measures, closure/post-closure requirements, and financial assurance provisions. These criteria will be applicable to owners and operators of new MSWLFs, existing MSWLF units and lateral expansions. Once the criteria are final, States will be required to adopt and enforce regulations that are technically comparable to the federal criteria. States are responsible for enforcing solid waste management regulations and facility permit conditions, including MSWLFs on federal land.

If you have any questions regarding this matter, please contact Mr. J. C. Meredith, P.E., Remedial Project Manager, at (404) 347-3016. Enclosed are photographs taken by Mr. Meredith during the site visit.

Sincerely yours,

James H. Scarbrough, P.E., Chief
RCRA & Federal Facilities Branch
Waste Management Division

Enclosure

cc: Ms. Lee Crosby, Chief, Superfund
North Carolina Department of Environment,
Health and Natural Resources

Mr. William Meyer, Director
North Carolin Department of Environment,
Health and Natural Resources

Memorandum

Date: February 21, 2002

To: File

From: Melanie Bryson
Environmental Engineer
NC Superfund Section

Subject: Site Re-Assessment Sampling Event

Swain County Landfill
Bryson City, Swain County, NC
EPA ID: NC3120000002

A Site Re-Assessment (SRA) sampling event is scheduled for the week of April 15, 2002, at the Swain County Landfill, Bryson City, Swain County, NC. The purpose of the sampling event is to determine if there has been an observed release of site contaminants from the Swain County Landfill to the Tuckasegee River, a fishery. If an observed release of site contaminants is found to be present in the Tuckasegee River, further action under CERCLA may be recommended.

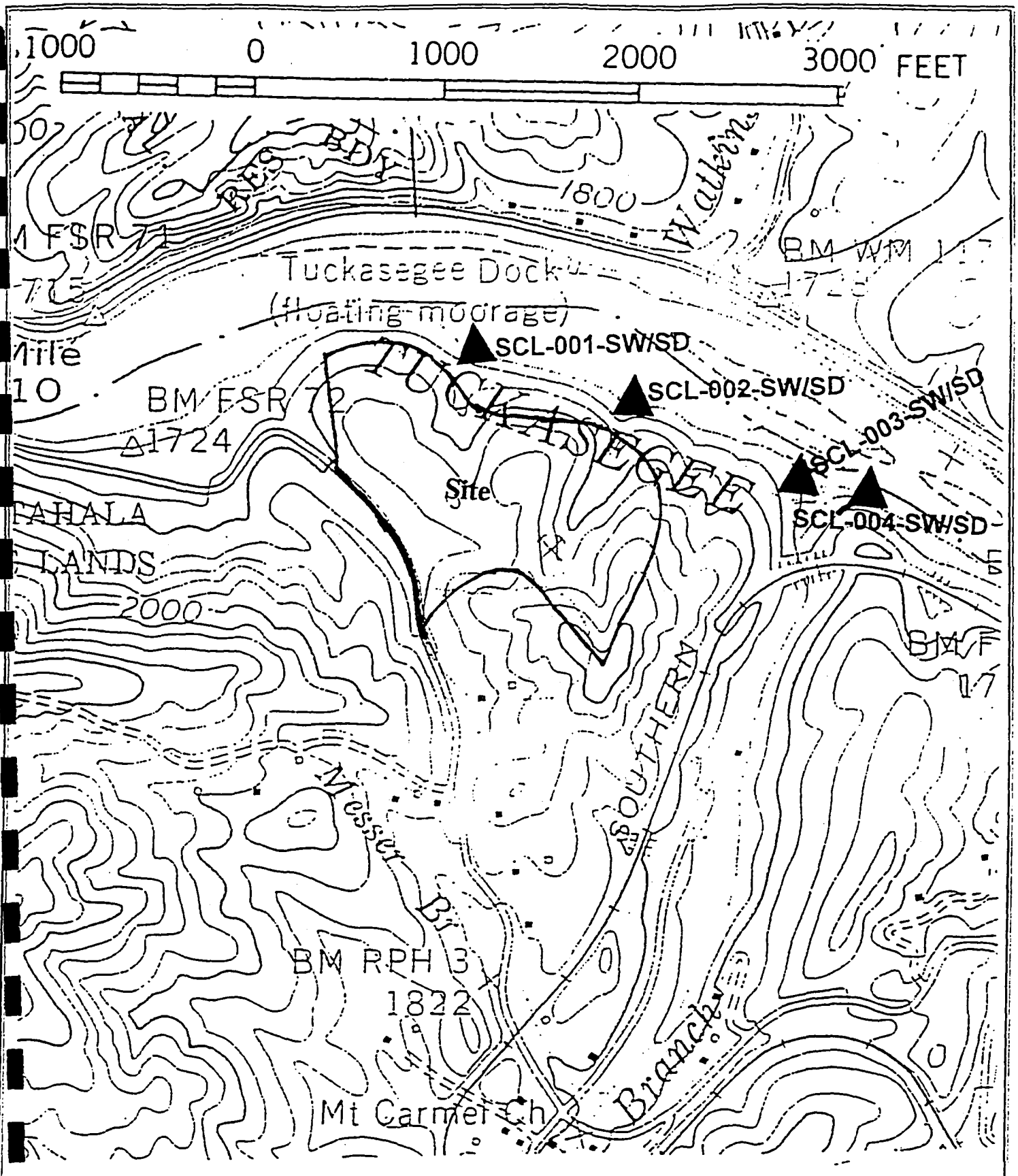
A table of the proposed samples to be collected at the Swain County Landfill is attached to this memo, along with a map of sample locations. A total of four (4) surface water and four (4) sediment samples will be collected from the Tuckasegee River. Samples SCL-001-SW/SD and SCL-002-SW/SD are both probable point of entries (PPEs) from the landfill into the Tuckasegee River. Sample SCL-003-SW/SD is a release to a fishery sample collected at the intersection with Buckner Branch. Sample SCl-004-SW/SD is a background sample from the Tuckasegee River, with sample SCL-004-SW/SD to be collected upstream of the intersection with Buckner Branch.

Attachments

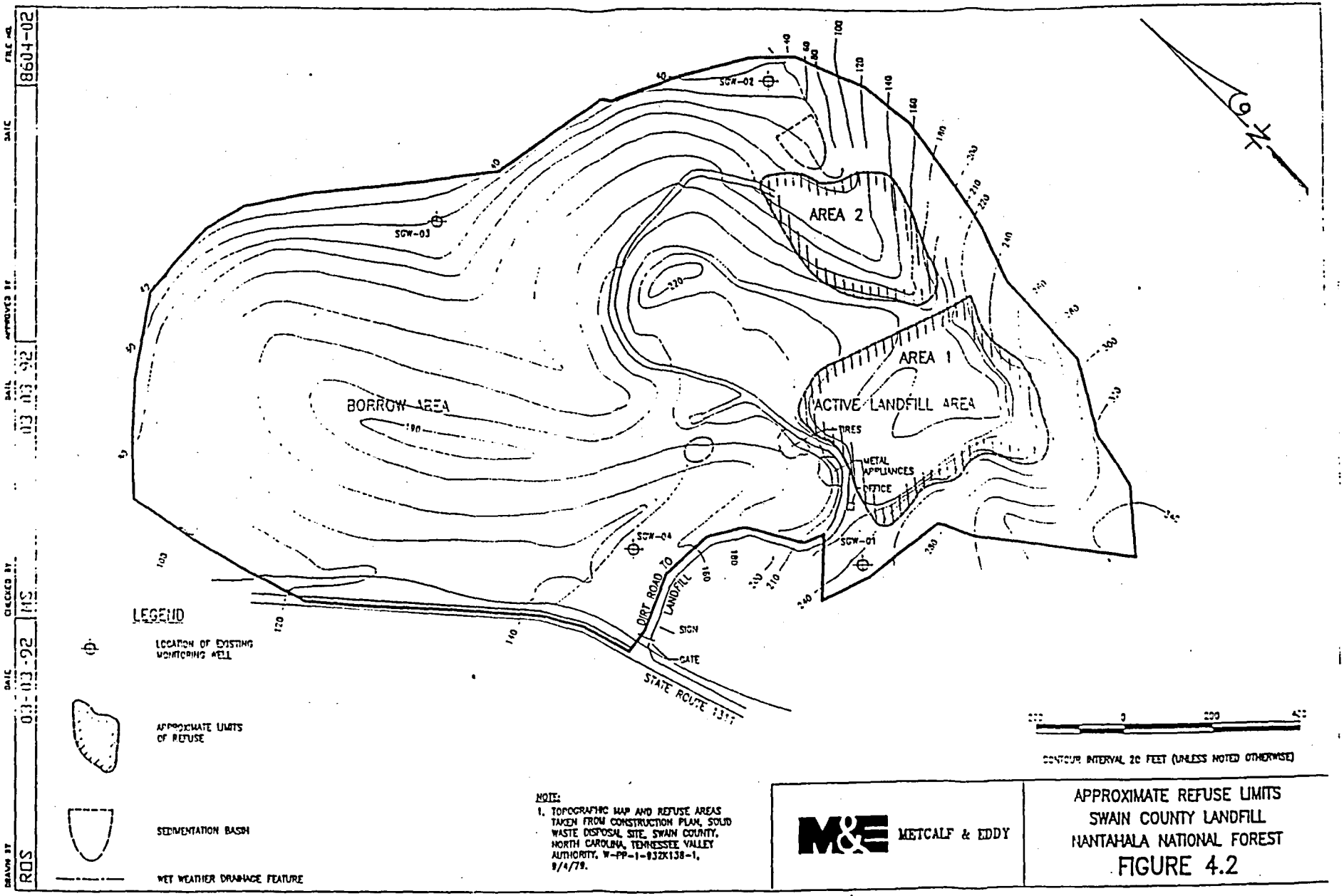
Table of Samples
Swain County Landfill SRA
NC3120000002
Bryson City, Swain County
February 21, 2002

Sample ID	Location and Rational	Analyses
SCL-001-SW/SD	Surface water and sediment sample collected from first probable point of entry (PPE1) in Tuckasegee River. Document release to fishery.	V,S,I
SCL--002-SW/SD	Surface water and sediment sample collected from second probable point of entry (PPE2) in Tuckasegee River. Document release to fishery.	V,S,I
SCL-003-SW/SD	Surface water and sediment sample collected in Tuckasegee River at intersection with Buckner Branch. Document release to fishery.	V,S,I
SCL-004-SW/SD	Surface water and sediment sample collected in Tuckasegee River upstream of intersection with Buckner Branch. Background sample.	V,S,I

V=Volatile organics; S=Semi-volatile organics; I=Inorganics



NCDENR	Site: Swain County Landfill	Sample Plan Map 1
	US EPA ID #: NC3120000002	Date: 02/21/02
	Bryson City, Swain County	Drawn By: MDB
	Approximate Scale: See Above	



NOTE:
1. TOPOGRAPHIC MAP AND REFUSE AREAS TAKEN FROM CONSTRUCTION PLAN, SOLID WASTE DISPOSAL SITE, SWAIN COUNTY, NORTH CAROLINA, TENNESSEE VALLEY AUTHORITY, W-PP-1-932X138-1, 9/4/79.

METCALF & EDDY

APPROXIMATE REFUSE LIMITS
SWAIN COUNTY LANDFILL
NANTAHALA NATIONAL FOREST
FIGURE 4.2

Memorandum

Date: April 30, 2002

To: File

From: Melanie Bryson
Environmental Engineer
NC Superfund Section

Subject: Site Re-Assessment Sampling Trip Report
Swain County Landfill
Bryson City, Swain County, NC
EPA ID: NC3120000002

On Wednesday, April 17, 2002, Melanie Bryson, Stuart Parker, Serafino Franch, Harry Zinn, and Kyle Hagen conducted sampling at the Swain County Landfill in Bryson City, Swain County, North Carolina. A total of three surface water and three sediment samples were collected from the Tuckasegee River adjacent to and upstream of the site.

The site was accessed through a dirt road off of Bucknall Branch Road. Just downstream of the site a state wildlife resources boat ramp was observed on the opposite side of the river. Several boats with fisherman were observed in the river in the area around the ramp.

Locations of the sampling points and descriptions were as follow:

1) SCL-001-SW/SD-The sample was collected approximately 200 feet northeast of the landfill's monitoring well, SGW-03. The sample location was approximately 15 feet downstream from PPE#1. Sediment collected was a medium brown sand.

2) SCL-002-SW/SD-The sample was collected approximately 12 feet downstream of PPE#2. This location was approximately 40-50 feet downstream of Level 1 rapids and 50-60 feet upstream of the island off the landfill side of the river bank. Sediment collected was a medium brown sand.

3) SCL-004-SW/SD-The sample was collected approximately 500 feet upstream of the town's water treatment plant beside a horse park along Riverview Road. Across the river a palate factory was located. Sediment collected was a micacedus brown silt with leaves.

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2} D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2} D = \frac{50 \tan \frac{1}{2} I}{T}$

$R = T \cot \frac{1}{2} I$

$R = \frac{50}{\text{Sin. } \frac{1}{2} D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$: $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574 d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3} d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	1/8	3-16	1/4	5-16	3/8	7/16	1/2	9/16	5/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Swain County Landfill 4/17/02
NC312000602

Time on-site: 08:30
Personnel: Melanie Bryson, Huey Zinn, KYLE HAGEN, Stuart Parker, Serafino Franch

Weather: Partly cloudy, temp. in the low 70s.

SCL-001-SW/SD

- Arrived at sampling point at 09:28.
- sampling point is located approx. 200 ft northeast of MW, SGW-03
- H. Zinn took sample # SCL-001-SW at 09:30
- Samples taken approx. 15' downstream from PPE1.
- H. Zinn collected SCL-001-SD at 09:35.
- Sediment is medium brown silty sand.

KHH

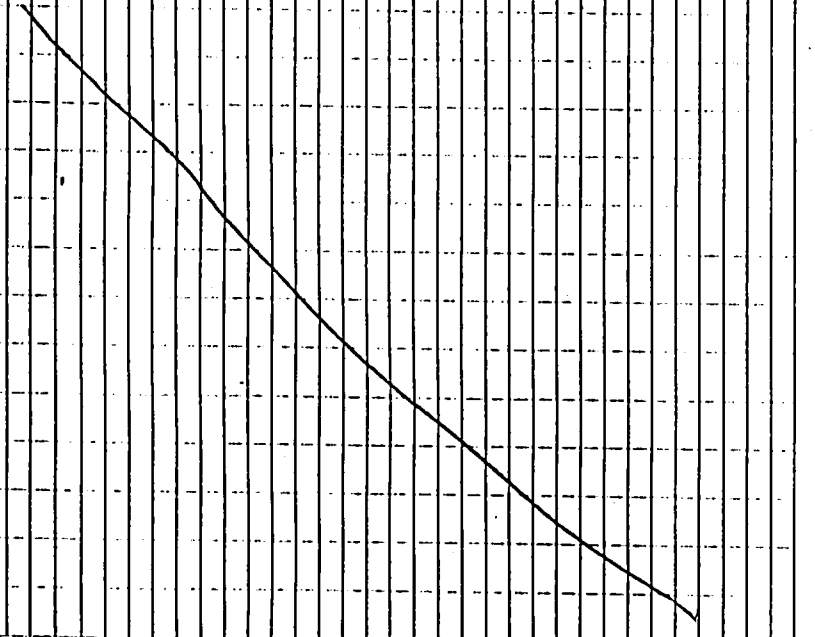
Kyle Hagen

Page 1

Swain County Landfill NC3120000002 4/17/02

Photo Log (Roll #3)

Photo #	Description
6	SCL-001-SW/SD
7	PPE1 looking upstream or Southeast along the Tuckasegee River
8	RP SCL-002-SW/SD looking downstream
9	PPE2 Unnamed ditch

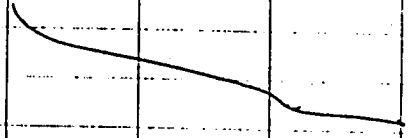


Page 2

Swain County Landfill 4/17/02
NC3120000002

SCL-002-SW/SD

- Arrived at sampling point, PPE2, at 10:10.
- H. Zinn collected SCL-002-SW at 10:16.
- H. Zinn collected sediment sample SCL-002-SD at 10:20.
- Sediment-medium brown sand.
- Sample point is approx. 12 ft downstream of PPE2
- PPE2 is approx. 40-50 ft downstream of Level IV rapids
- sampling point is located approx. 50 to 60 ft upstream of the island off the landfill side of the river bank
- off the site at 11:20.



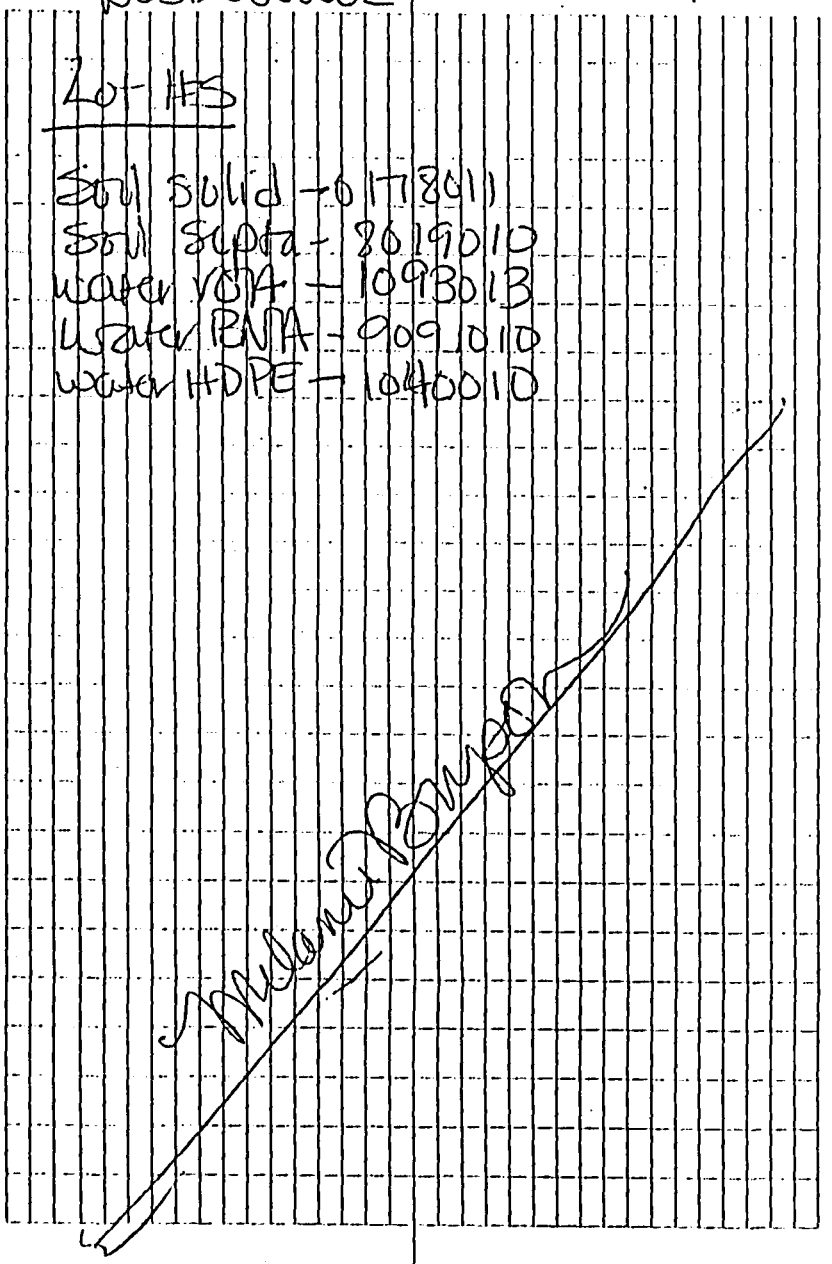
Page 3

Swain CO Landfill
NC3120000002

4/17/02

Lot #'s

Soil Solid - 01718011
Soil Septa - 86190010
Water VOA - 109B013
Water BNA - 909.0010
Water HDPE - 10400010



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3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1-16	3-32	1/8	3-16	1/4	5-16	3/8	7/16	1/2	9/16	5/8	11/16
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729	
1	2	3	4	5	6	7	8	9	10	11	
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167	

SWAIN COUNTY LANDFILL SRA SAMPLING
NC3 120 000 007 4/17/02 (SUNNY 70s)

LEFT HOTEL FOR SITE 07.45 ONSITE 08:30
PROCEED DOWN BULLDOZED ROAD TO RIVER
FLOODPLAIN. BUSHWHACKED IN ATTEMPT TO REACH
SCL 003 SW/SD. THICK THORNY BRUSH THROUGH
FLOODPLAIN PREVENTED ACCESS. EXCEPT HEINN'S
AND K. ICALEN'S ACCESS (VIA RIVER—TRESPASSED)
TO SCL 001 AND SCL 002.
1000 MET W/ MR. + ICH ON RIVER AT TOE —
OF ISLAND, BELOW RAPID/LEDGE. BUSHWACKED
BACK UP TO ENTRY POINT. BACK AT
UPSTREAM ROAD POINT @ 1045.
11:11 RECONVENED AT VEHICLES TO SECURE
SAMPLES. H.E.I.N. + ICALEN CONTINUED ON
TO NATIONAL TEXTILES SITE TO DO HH'S SAMPLING.
M. BRYSON SFP S. FRANCH TO COLLECT SCL 004 SW/SD,
TAKING GRAHAM CO AND SWAIN CO. SAMPLES W/THEM.
11:45 ARRIVED AT RIVER ACCESS — APPARENT CITY PROP.
JUST UPSTREAM (500'(N)) OF WATER TREATMENT PLANT & ACROSS
FROM HORSE PARK, ACROSS FROM PALATE FACTORY.
[PHOTOS 5-6] — (RIVERVIEW ROAD)
11:55 S. FRANCH COLLECTED SEDIMENT (BACKGROUND)
SAMPLE SCL-004-SD. MICACEOUS BROWN SILT LEAVES.
12:00 S FRANCH COLLECTED SURFACE H_2O (BACKGROUND)
SAMPLE SCL-004-SW. [NO SCL 003 SAMPLES
COLLECTED THIS TRIP]
DD Ry

[redacted] CHAIN [redacted] GUN[redacted] LA[redacted]LL [redacted] FRA[redacted]AMA[redacted] [redacted]

NC3 120 000 OUL 4/17/02 (S-PC, CAIE-SIDRMS)

12:10	ACIDIFIED METALS ANALYSIS SAMPLE
TO	PH <2. DECONNED BOOTS w/ DI RINSE.
1215	LEFT SITE FOR OFFICE. OFFICE: 1830

[signature] END FIELD NOTES

Ref. 9

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21744

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:30

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	

RECEIVED MAY 20 2002

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WC

Date Extracted _____

Date Analyzed 5-1-02 TJ

Reported By John Neal

Date Reported MAY 10 2002

Lab Number 021834

HS 3191 (Revised 12/93)

#021834-021845

9

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21745

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:16

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted _____

Date Analyzed 5-1-02 mg

Reported By _____

Date Reported _____

Lab Number 021935

DHS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21746

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 11:55

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted _____

Date Analyzed 5-1-02 mg

Reported By _____

Date Reported _____

Lab Number 021836

HS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21747

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:35

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted _____

Date Analyzed 5-1-02 mg

Reported By _____

Date Reported _____

Lab Number 021837

DHS 3191 (Revised 12/93)

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21748

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:20

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted _____

Date Analyzed 5-1-02 mg

Reported By _____

Date Reported _____

Lab Number 021838

DHS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21749

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 12:00

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
✓ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted _____

Date Analyzed 5-1-02 mg

Reported By _____

Date Reported _____

Lab Number 021839

DHS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21750

Name of Site Swain Co Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:30

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted BNA 4-24-02 KM

Date Analyzed 5-8-02 BD

Reported By

Date Reported

Lab Number 021840

HS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21751

Name of Site Swain Co Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:16

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted BN 4-24-02 KM

Date Analyzed 5-8-02 BD

Reported By

Date Reported

Lab Number 021841

HS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21752

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 11:55

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 VG

Date Extracted BN 4-24-02 KM

Date Analyzed 5-8-02 BD

Reported By _____

Date Reported _____

Lab Number 021842

HS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21753

Name of Site Swain Co Landfill Collected By Melanie Bryson ID # _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:35

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002

Date Extracted BNA 4-22-02 KM

Date Analyzed 5-8-02 BD

Reported By _____

Date Reported _____

Lab Number U02543

DHS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21754

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:20

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR-18 2002 WG

Date Extracted BNA 4-22-02 KM

Date Analyzed 5-8-02 BD

Reported By _____

Date Reported _____

Lab Number 021844

DHS 3191 (Revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 21755

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 12:00

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
✓ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
___ arsenic	
___ barium	
___ beryllium	
___ cadmium	
___ chloride	
___ chromium	
___ cobalt	
___ copper	
___ fluoride	
___ iron	
___ lead	
___ manganese	
___ mercury	
___ nickel	
___ nitrate	
___ selenium	
___ silver	
___ sulfates	
___ thallium	
___ vanadium	
___ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received APR 18 2002 WG

Date Extracted B/N 4-22-02 KM

Date Analyzed 5-8-02 BQ

Reported By _____

Date Reported _____

Lab Number 021845

DHS 3191 (Revised 12/93)

NCDEHNR
Division of Waste Management
☑ Superfund Section
☐ Hazardous Waste Section
☐ Solid Waste Section

Organics Lab: ✓
Inorganics Lab: ____

CHAIN OF CUSTODY RECORD

Project Name: Swain Co Landfill	Sampled By: Melanie Bryson
Site ID # (NCD#) NC3120000002	Sampler ID ____
Location: Bryson City, Swain Co	Telephone: (919) 733-2801 x316
Address: ____	Date Sampled: 4/17/02
	Time Sampled: ____

Sample Types: Soil ✓ Water ✓ Waste ____ Other ____

Remarks: ____

Field Sample Numbers: 21744, 21745, 21746, 21747, 21748, 21749, 21750, 21751, 21752, 21753, 21754, 21755

Relinquished By: Melanie Bryson (Signature) Date: 4/18/02 Time: 11:22

Received By: William C. Eakin Jr. (Signature) Date: 4/18/02 Time: 11:22

Relinquished By: ____ (Signature) Date: ____ Time: ____

Received By: ____ (Signature) Date: ____ Time: ____

Relinquished By: ____ (Signature) Date: ____ Time: ____

Received By: ____ (Signature) Date: ____ Time: ____

Results Reported: Olma Neal (Signature) Date: MAY 10 2002 Time: ____

#021834-021845

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(i)

STATE LABORATORY OF PUBLIC HEALTH
PO BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	021834	021835	021836	021837	021838	021839
	FIELD NO	21744	21745	21746	02747	02748	02749
COMPOUND	TYPE	(2)	(2)	(2)	(3)	(3)	(3)
	↓ MDL (ppb) ↓	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm
CHLOROMETHANE	2.0	U	U	U	U	U	U
VINYL CHLORIDE	↓	↓	↓	↓	↓	↓	↓
BROMOMETHANE							
CHLOROETHANE							
TRICHLOROFLUOROMETHANE	↓						
1,1-DICHLOROETHENE	0.5						↓
ACETONE	2.0						13.6 J,C
IODOMETHANE	0.5						U
CARBON DISULFIDE	↓						↓
METHYLENE CHLORIDE							
ACRYLONITRILE							
TRANS-1,2-DICHLOROETHENE							
METHYL-t-BUTYL-ETHER							
1,1-DICHLOROETHANE							
ISOPROPYL ETHER							
CIS-1,2-DICHLOROETHENE	↓						
2-BUTANONE	2.0			↓			
TETRAHYDROFURAN	↓			trace			
CHLOROFORM	0.5			U			
1,1,1-TRICHLOROETHANE	↓			↓			
CARBON TETRACHLORIDE							
BENZENE							
1,2-DICHLOROETHANE							
TRICHLOROETHENE							
1,2-DICHLOROPROPANE							
DIBROMOMETHANE	↓	↓	↓	↓	↓	↓	↓

C - Possible lab contamination or background
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. The number is the Minimum Detection Limit.
NA - Not analyzed.
1/ - Tentative identification.
D - SAMPLE DILUTED. MDL'S DO NOT APPLY.

trace = present but below MDL

STATE LABORATORY OF PUBLIC HEALTH
PO BOX 28047 - 306 N. WILMINGTON ST., RALEIGH, NC 27611

ORGANIC CHEMICAL ANALYSIS

PURGEABLE COMPOUNDS	LAB NO	021834	021835	021836	021837	021838	021839
	FIELD NO						
COMPOUND	TYPE	(2)	(2)	(2)	(3)	(3)	(3)
	MDL (ppb)	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm	(ppb) ppm
BROMODICHLOROMETHANE	0.5	U	U	U	U	U	U
CIS-1,3-DICHLOROPROPENE							
4-METHYL-2-PENTANONE							
TOLUENE				2.2			41.0 J
TRANS-1,3-DICHLOROPROPENE				U			U
1,1,2-TRICHLOROETHANE							
TETRACHLOROETHENE							
2-HEXANONE							
DIBROMOCHLOROMETHANE							
ETHYLENE DIBROMIDE							
CHLOROBENZENE							
1,1,1,2-TETRACHLOROETHANE							
ETHYL BENZENE							
XYLENES							
STYRENE							
BROMOFORM							
1,1,2,2-TETRACHLOROETHANE							
1,2,3-TRICHLOROPROPANE							
1,4-DICHLOROBENZENE							
1,2-DICHLOROBENZENE							
1,2,-DIBROMO-3-CHLOROPROPANE	2.0						

trace = present but below MDL

C - Possible lab contamination or background.
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. The number is the Minimum Detection Limit.
NA - Not analyzed.
1/ - Tentative identification.
D - SAMPLE DILUTED. MDL'S DO NOT APPLY.

(1)

STATE LABORATORY OF PUBLIC HEALTH

P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES COMPOUND	LAB NO	021840	021841	021842	021843	021844	021845
	FIELD #	21750	21751	21752	21753	21754	21755
	TYPE	(2)	(2)	(2)	(3)	(3)	(3)
	UNITS	µg/l ~~mg/kg~~	µg/l ~~mg/kg~~	µg/l ~~mg/kg~~	~~mg/l~~ µg/kg	~~mg/l~~ µg/kg	~~mg/l~~ µg/kg
N-nitrosodimethylamine	10/330	U	U	U	U	U	U
[illegible]s(2-chloroethyl)ether							
[illegible]-chlorophenol							
phenol							
[illegible]3-dichlorobenzene							
[illegible],4-dichlorobenzene							
1,2-dichlorobenzene							
[illegible]s(2-chloroisopropyl)ether							
[illegible]exachloroethane							
N-nitroso-di-n-propylamine							
[illegible]itrobenzene							
[illegible]sophorone							
[illegible]-nitrophenol							
2,4-dimethylphenol							
[illegible]is(2-chloroethoxy)methane							
[illegible],4-dichlorophenol							
1,2,4-trichlorobenzene							
[illegible]aphthalene							
[illegible]exachlorobutadiene							
4-chloro-m-cresol							
[illegible]exachlorocyclopentadiene							
[illegible],4,6-trichlorophenol							
2-chloronaphthalene							
acenaphthylene							
[illegible]imethyl phthalate							
[illegible],6-dinitrotoluene							
acenaphthene	↓						
[illegible],4-dinitrophenol	50/1650						
[illegible],4-dinitrotoluene	10/330						
4-nitrophenol	50/1650						
[illegible]luorene	10/330						
[illegible]-chlorophenylphenylether	↓						
diethyl phthalate	↓						
4,6-dinitro-o-cresol	50/1650						
[illegible]iphenylamine	10/330						
[illegible]azobenzene	↓						
4-bromophenylphenylether	↓						
[illegible]exachlorobenzene	↓						
[illegible]entachlorophenol	50/1650						
phenanthrene	10/330						
[illegible]nthracene	↓						
[illegible]butyl phthalate	↓	✓	✓	✓	✓	✓	✓
fluoranthene	↓						

MDL
H_2O/SOIL

[illegible] - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
[illegible] - Material was analyzed for but not detected. The number is the Minimum Detection Limit. MDL
[illegible] - Not analyzed.
[illegible] - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

(2)

STATE LABORATORY OF PUBLIC HEALTH

P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES	LAB NO	021840	021841	021842	021843	021844	021845
	FIELD #	21750	21751	21752	21753	21754	21755
COMPOUND	TYPE	(2)	(2)	(2)	(3)	(3)	(3)
	UNITS	µg/l ~~µg/kg~~	µg/l ~~µg/kg~~	µg/l ~~µg/kg~~	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg	~~µg/l~~ µg/kg
pyrene	10/330	U	U	U	U	U	U
benzidine	50/1650						
butyl benzyl phthalate	10/330						
benz(a)anthracene	↓						
chrysene	↓						
3,3-dichlorobenzidine	50/1650						
bis(2-ethylhexyl)phthalate	10/330						
di-n-octyl phthalate	10/330						
benzo(b)fluoranthene	50/1650						
benzo(k)fluoranthene	↓						
benzo(a)pyrene	↓						
indeno(1,2,3-cd)pyrene	↓						
dibenzo(a,h)anthracene	↓						
benzo(g,h,i)perylene	↓						
aniline	50/1650						
benzoic acid	↓						
benzyl alcohol	↓						
4-chloroaniline	↓						
dibenzofuran	10/330						
2-methylnaphthalene	↓						
2-methylphenol	↓						
4-methylphenol	↓						
2-nitroaniline	50/1650						
3-nitroaniline	↓						
4-nitroaniline	↓						
2,4,5-trichlorophenol	↓	↓	↓	↓	↓	↓	↓

MDL

H_2O 1/50 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. The number is the Minimum Detection Limit. MDL
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50789

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 09:30

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
____ Ground Water (1)	____ Solid (5)	SCL-001-SW
X Surface water (2)	____ Liquid (6)	
____ Soil (3)	____ Sludge (7)	
____ Other (4)	____ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP	
___ chlordane	
___ heptachlor	
___ hexachlorbenzene	
___ hexachlorbutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by DJM

Date Reported 5-23-02

Lab Number 005392

DHS 3191(revised 12/93)

Inorganic Chemistry

Parameter	Results (mg/l)(~~mg/kg~~)
___ antimony	
X arsenic	< 0.001
X barium	0.02
___ beryllium	
X cadmium	< 0.005
___ chloride	
X chromium	< 0.01
___ cobalt	
X copper	< 0.05
___ fluoride	
X iron	0.53
X lead	< 0.005
X manganese	0.03
X mercury	< 0.0005
X nickel	< 0.01
___ nitrate	
X selenium	< 0.01
X silver	< 0.01
___ sulfates	
___ thallium	
___ vanadium	
X zinc	< 0.05
___ pH	
___ conductivity	
___ TDS	
___ Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	

RECEIVED
MAY 28 2002
SUPERFUND SECTION

Organic Compounds	Results (mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1- dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4,-D	
___ 2,4,5-TP (Silvex)	

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50789

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:30

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
✓ arsenic	
✓ barium	
___ beryllium	
✓ cadmium	
___ chloride	
✓ chromium	
___ cobalt	
✓ copper	
___ fluoride	
✓ iron	
✓ lead	
✓ manganese	
✓ mercury	
✓ nickel	
___ nitrate	
✓ selenium	
✓ silver	
___ sulfates	
___ thallium	
___ vanadium	
✓ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received 04-18-2002 005302

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

HS 3191 (Revised 12/93)

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50790

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 10:16

Agency: ___ Hazardous Waste ___ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SW
X Surface water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP	
___ chlordane	
___ heptachlor	
___ hexachlorbenzene	
___ hexachlorbutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	

Inorganic Chemistry

Parameter	Results (mg/l)(~~mg/kg~~)
___ antimony	
X arsenic	< 0.001
X barium	0.02
___ beryllium	
X cadmium	< 0.005
___ chloride	
X chromium	< 0.01
___ cobalt	
X copper	< 0.05
___ fluoride	
X iron	0.52
X lead	< 0.005
X manganese	0.03
X mercury	< 0.0005
X nickel	< 0.01
___ nitrate	
X selenium	< 0.01
X silver	< 0.01
___ sulfates	
X thallium	< 0.002
X vanadium	< 0.01
X zinc	< 0.05
___ pH	
___ conductivity	
___ TDS	
___ Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	
___	
___	

Organic Compounds	Results (mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1- dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4,-D	
___ 2,4,5-TP (Silvex)	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by

Date Reported 5-23-02

Lab Number 005393

DHS 3191(revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50790

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:16

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
✓ arsenic	
✓ barium	
___ beryllium	
✓ cadmium	
___ chloride	
✓ chromium	
___ cobalt	
✓ copper	
___ fluoride	
✓ iron	
✓ lead	
✓ manganese	
✓ mercury	
✓ nickel	
___ nitrate	
✓ selenium	
✓ silver	
___ sulfates	
___ thallium	
___ vanadium	
✓ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY
04-18-2002 005393

Date Received _____

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

DHS 3191 (Revised 12/93)

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50791

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 11:55

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
____ Ground Water (1)	____ Solid (5)	SCL-004-SW
X Surface water (2)	____ Liquid (6)	
____ Soil (3)	____ Sludge (7)	
____ Other (4)	____ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
____ P&T:GC/MS	
____ Acid:B/N Ext.	
____ 2,4-D	
____ 2,4,5-TP	
____ chlordane	
____ heptachlor	
____ hexachlorbenzene	
____ hexachlorbutadiene	
____ endrin	
____ lindane	
____ methoxychlor	
____ toxaphene	
____	
____	
____	

Inorganic Chemistry

Parameter	Results (~~mg/l~~)(~~mg/kg~~)
____ antimony	
X arsenic	< 0.001
X barium	0.02
____ beryllium	
X cadmium	< 0.005
____ chloride	
X chromium	< 0.01
____ cobalt	
X copper	<0.05
____ fluoride	
X iron	0.69
X lead	< 0.005
X manganese	0.05
X mercury	< 0.0005
X nickel	< 0.01
____ nitrate	
X selenium	< 0.01
X silver	< 0.01
____ sulfates	
X thallium	< 0.002
X vanadium	< 0.01
X zinc	< 0.05
____ pH	
____ conductivity	
____ TDS	
____ Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
____ Arsenic	
____ Barium	
____ Cadmium	
____ Chromium	
____ Lead	
____ Mercury	
____ Selenium	
____ Silver	
____ ____	
____ ____	

Organic Compounds	Results (mg/l)
____ benzene	
____ carbon tetrachloride	
____ chlordane	
____ chlorobenzene	
____ chloroform	
____ o-cresol	
____ m-cresol	
____ p-cresol	
____ cresol	
____ 1,4-dichlorobenzene	
____ 1,2-dichloroethane	
____ 1,1- dichloroethylene	
____ 2,4-dinitrotoluene	
____ heptachlor	
____ hexachlorobenzene	
____ methyl ethyl ketone	
____ nitrobenzene	
____ pentachlorophenol	
____ pyridine	
____	
____ tetrachloroethylene	
____ trichloroethylene	
____ 2,4,5-trichlorophenol	
____ 2,4,6-trichlorophenol	
____ vinyl chloride	
____ endrin	
____ lindane	
____ methoxychlor	
____ toxaphene	
____ 2,4,-D	
____ 2,4,5-TP (Silvex)	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by

Date Reported 5-23-02

Lab Number 005394

DHS 3191(revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50791

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 11:55

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SW
✓ Surface Water (2)	___ Liquid (6)	
___ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
✓ arsenic	
✓ barium	
___ beryllium	
✓ cadmium	
___ chloride	
✓ chromium	
___ cobalt	
✓ copper	
___ fluoride	
✓ iron	
✓ lead	
✓ manganese	
✓ mercury	
✓ nickel	
___ nitrate	
✓ selenium	
✓ silver	
___ sulfates	
___ thallium	
___ vanadium	
✓ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY
04-18-2002 005394

Date Received _____

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

DHS 3191 (Revised 12/93)

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50792

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 09:35

Agency: _____ Hazardous Waste _____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
_____ Ground Water (1)	_____ Solid (5)	SCL-001-SD
_____ Surface water (2)	_____ Liquid (6)	
X Soil (3)	_____ Sludge (7)	
_____ Other (4)	_____ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
P&T:GC/MS	
Acid:B/N Ext.	
2,4-D	
2,4,5-TP	
chlordane	
heptachlor	
hexachlorbenzene	
hexachlorbutadiene	
endrin	
lindane	
methoxychlor	
toxaphene	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by

Date Reported 5-23-02

Lab Number 005395

DHS 3191(revised 12/93)

Inorganic Chemistry

Parameter	Results (~~mg/l~~)(mg/kg)
antimony	
X arsenic	< 1
X barium	73
beryllium	
X cadmium	< 1
chloride	
X chromium	13
cobalt	
X copper	7
fluoride	
X iron	16597
X lead	6.5
X manganese	178
X mercury	< 0.05
X nickel	97
nitrate	
X selenium	< 2.5
X silver	< 1
sulfates	
thallium	
vanadium	
X zinc	41
pH	
conductivity	
TDS	
Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Organic Compounds	Results (mg/l)
benzene	
carbon tetrachloride	
chlordane	
chlorobenzene	
chloroform	
o-cresol	
m-cresol	
p-cresol	
cresol	
1,4-dichlorobenzene	
1,2-dichloroethane	
1,1- dichloroethylene	
2,4-dinitrotoluene	
heptachlor	
hexachlorobenzene	
methyl ethyl ketone	
nitrobenzene	
pentachlorophenol	
pyridine	
tetrachloroethylene	
trichloroethylene	
2,4,5-trichlorophenol	
2,4,6-trichlorophenol	
vinyl chloride	
endrin	
lindane	
methoxychlor	
toxaphene	
2,4,-D	
2,4,5-TP (Silvex)	

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50792

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 9:35

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-001-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
✓ arsenic	
✓ barium	
___ beryllium	
✓ cadmium	
___ chloride	
✓ chromium	
___ cobalt	
✓ copper	
___ fluoride	
✓ iron	
✓ lead	
✓ manganese	
✓ mercury	
✓ nickel	
___ nitrate	
✓ selenium	
✓ silver	
___ sulfates	
___ thallium	
___ vanadium	
✓ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

FOR LAB USE ONLY

Date Received 04-18-2002 005395

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

DHS 3191 (Revised 12/93)

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50793

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 10:20

Agency: ___ Hazardous Waste ___ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SD
___ Surface water (2)	___ Liquid (6)	
X Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP	
___ chlordane	
___ heptachlor	
___ hexachlorbenzene	
___ hexachlorbutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	

Inorganic Chemistry

Parameter	Results (~~mg/l~~)(mg/kg)
___ antimony	
X arsenic	<1
X barium	77
___ beryllium	
X cadmium	<1
___ chloride	
X chromium	15
___ cobalt	
X copper	8.5
___ fluoride	
X iron	18037
X lead	6
X manganese	190
X mercury	<0.05
X nickel	108
___ nitrate	
X selenium	<2.5
X silver	<1
___ sulfates	
___ thallium	
___ vanadium	
X zinc	52
___ pH	
___ conductivity	
___ TDS	
___ Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
___ Arsenic	
___ Barium	
___ Cadmium	
___ Chromium	
___ Lead	
___ Mercury	
___ Selenium	
___ Silver	
___	
___	

Organic Compounds	Results (mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1- dichloroethylene	
___ 2,4-dinitrotoluene	
___ heptachlor	
___ hexachlorobenzene	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4,-D	
___ 2,4,5-TP (Silvex)	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by

Date Reported 5-23-02

Lab Number 005396

DHS 3191(revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50793

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 10:20

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-002-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

	Parameter	Results (mg/l)
___	P&T:GC/MS	
___	Acid:B/N Ext.	
___	2,4-D	
___	2,4,5-TP(Silvex)	
___	chlordane	
___	heptachlor	
___	hexachlorobenzene	
___	hexachlorobutadiene	
___	endrin	
___	lindane	
___	methoxychlor	
___	toxaphene	
___		
___		
___		
___		

Inorganic Chemistry

	Parameter	Results(mg/l)(mg/kg)
___	antimony	
✓	arsenic	
✓	barium	
___	beryllium	
✓	cadmium	
___	chloride	
✓	chromium	
___	cobalt	
✓	copper	
___	fluoride	
✓	iron	
✓	lead	
✓	manganese	
✓	mercury	
✓	nickel	
___	nitrate	
✓	selenium	
✓	silver	
___	sulfates	
___	thallium	
___	vanadium	
✓	zinc	
___	pH	
___	conductivity	
___	TDS	
___	flash point	
___		
___		
___		
___		
___		

TCLP Compounds

	Inorganic Compounds	Results(mg/l)
___	arsenic	
___	barium	
___	cadmium	
___	chromium	
___	lead	
___	mercury	
___	selenium	
___	silver	
___		
___		
___		
___		

	Organic Compounds	Results(mg/l)
___	benzene	
___	carbon tetrachloride	
___	chlordane	
___	chlorobenzene	
___	chloroform	
___	o-cresol	
___	m-cresol	
___	p-cresol	
___	cresol	
___	1,4-dichlorobenzene	
___	1,2-dichloroethane	
___	1,1-dichloroethylene	
___	2,4-dichloroethylene	
___	heptachlor	
___	hexachlorobenzene	
___	hexachlorobutadiene	
___	hexachloroethane	
___	methyl ethyl ketone	
___	nitrobenzene	
___	pentachlorophenol	
___	pyridine	
___	tetrachloroethylene	
___	trichloroethylene	
___	2,4,5-trichlorophenol	
___	2,4,6-trichlorophenol	
___	vinyl chloride	
___	endrin	
___	lindane	
___	methoxychlor	
___	toxaphene	
___	2,4-D	
___	2,4,5-TP (Silvex)	

FOR LAB USE ONLY

04-18-2002 005396

Date Received _____

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

DHS 3191 (Revised 12/93)

N.C. Department of Environment
& Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O Box 28047, 306 N. Wilmington Street
Raleigh, North Carolina 27611

Site Number NC3120000002 Sample ID Number /Name 50794

Name of Site Swain Co. Landfill Collected By Melanie Bryson ID#

Site Location Bryson City, Swain County Collected 04-17-02 Time 12:00

Agency: ____ Hazardous Waste ____ Solid Waste X Superfund

Sample Type

Environmental	Concentrate	Comments
____ Ground Water (1)	____ Solid (5)	SCL-004-SD
____ Surface water (2)	____ Liquid (6)	
X Soil (3)	____ Sludge (7)	
____ Other (4)	____ Other (8)	

Organic Chemistry

Parameter	Results(mg/l)
____ P&T:GC/MS	
____ Acid:B/N Ext.	
____ 2,4-D	
____ 2,4,5-TP	
____ chlordane	
____ heptachlor	
____ hexachlorbenzene	
____ hexachlorbutadiene	
____ endrin	
____ lindane	
____ methoxychlor	
____ toxaphene	
____	
____	
____	

Inorganic Chemistry

Parameter	Results (~~mg/l~~)(mg/kg)
____ antimony	
X arsenic	< 1
X barium	111.5
____ beryllium	
X cadmium	< 1
____ chloride	
X chromium	16.5
____ cobalt	
X copper	11.5
____ fluoride	
X iron	21195
X lead	10
X manganese	282
X mercury	< 0.05
X nickel	128
____ nitrate	
X selenium	< 2.5
X silver	< 1
____ sulfates	
____ thallium	
____ vanadium	
X zinc	65
____ pH	
____ conductivity	
____ TDS	
____ Flash point	

TCLP Compounds

Inorganic Compounds	Results (mg/l)
____ Arsenic	
____ Barium	
____ Cadmium	
____ Chromium	
____ Lead	
____ Mercury	
____ Selenium	
____ Silver	
____ ____	
____ ____	

Organic Compounds	Results (mg/l)
____ benzene	
____ carbon tetrachloride	
____ chlordane	
____ chlorobenzene	
____ chloroform	
____ o-cresol	
____ m-cresol	
____ p-cresol	
____ cresol	
____ 1,4-dichlorobenzene	
____ 1,2-dichloroethane	
____ 1,1- dichloroethylene	
____ 2,4-dinitrotoluene	
____ heptachlor	
____ hexachlorobenzene	
____ methyl ethyl ketone	
____ nitrobenzene	
____ pentachlorophenol	
____ pyridine	
____ tetrachloroethylene	
____ trichloroethylene	
____ 2,4,5-trichlorophenol	
____ 2,4,6-trichlorophenol	
____ vinyl chloride	
____ endrin	
____ lindane	
____ methoxychlor	
____ toxaphene	
____ 2,4,-D	
____ 2,4,5-TP (Silvex)	

Date Received 04-18-02

Date Extracted

Date Analyzed

Reported by

Date Reported 5-23-02

Lab Number 005397

DHS 3191(revised 12/93)

NC Department of Environment, Health, & Natural Resources
Solid Waste Management Division

SAMPLE ANALYSIS REQUEST

State Laboratory of Public Health
P.O. Box 28047, 306 N. Wilmington St.
Raleigh, North Carolina 27611-8047

Site Number NC3120000002 Sample ID Number/Name 50794

Name of Site Swain Co Landfill Collected By Melanie Bryson ID# _____

Site Location Bryson City, Swain Co Date Collected 4/17/02 Time 12:00

Agency: ___ Hazardous Waste ___ Solid Waste ✓ Superfund

Sample Type

Environmental	Concentrate	Comments
___ Ground Water (1)	___ Solid (5)	SCL-004-SD
___ Surface Water (2)	___ Liquid (6)	
✓ Soil (3)	___ Sludge (7)	
___ Other (4)	___ Other (8)	

Organic Chemistry

Parameter	Results (mg/l)
___ P&T:GC/MS	
___ Acid:B/N Ext.	
___ 2,4-D	
___ 2,4,5-TP(Silvex)	
___ chlordane	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___	
___	
___	
___	

FOR LAB USE ONLY

04-18-2002 005397

Date Received _____

Date Extracted _____

Date Analyzed _____

Reported By _____

Date Reported _____

Lab Number _____

DHS 3191 (Revised 12/93)

Inorganic Chemistry

Parameter	Results(mg/l)(mg/kg)
___ antimony	
✓ arsenic	
✓ barium	
___ beryllium	
✓ cadmium	
___ chloride	
✓ chromium	
___ cobalt	
✓ copper	
___ fluoride	
✓ iron	
✓ lead	
✓ manganese	
✓ mercury	
✓ nickel	
___ nitrate	
✓ selenium	
✓ silver	
___ sulfates	
___ thallium	
___ vanadium	
✓ zinc	
___ pH	
___ conductivity	
___ TDS	
___ flash point	
___	
___	
___	
___	
___	
___	

TCLP Compounds

Inorganic Compounds	Results(mg/l)
___ arsenic	
___ barium	
___ cadmium	
___ chromium	
___ lead	
___ mercury	
___ selenium	
___ silver	
___	
___	
___	
___	
___	

Organic Compounds	Results(mg/l)
___ benzene	
___ carbon tetrachloride	
___ chlordane	
___ chlorobenzene	
___ chloroform	
___ o-cresol	
___ m-cresol	
___ p-cresol	
___ cresol	
___ 1,4-dichlorobenzene	
___ 1,2-dichloroethane	
___ 1,1-dichloroethylene	
___ 2,4-dichloroethylene	
___ heptachlor	
___ hexachlorobenzene	
___ hexachlorobutadiene	
___ hexachloroethane	
___ methyl ethyl ketone	
___ nitrobenzene	
___ pentachlorophenol	
___ pyridine	
___ tetrachloroethylene	
___ trichloroethylene	
___ 2,4,5-trichlorophenol	
___ 2,4,6-trichlorophenol	
___ vinyl chloride	
___ endrin	
___ lindane	
___ methoxychlor	
___ toxaphene	
___ 2,4-D	
___ 2,4,5-TP (Silvex)	

NCDEHNR
Division of Waste Management
☑ Superfund Section
☐ Hazardous Waste Section
☐ Solid Waste Section

Organics Lab: ____
Inorganics Lab: ✓

CHAIN OF CUSTODY RECORD

Project Name: Swain Co Landfill
Site ID # (NCD#) NC3120000002
Location: Bryson City, Swain Co
Address: ____

Sampled By: Melanie Bryson
Sampler ID ____
Telephone: (919) 733-2801 x316
Date Sampled: 4/17/02
Time Sampled: ____

Sample Types: Soil ✓ Water ✓ Waste ____ Other ____

Remarks: ____

Field Sample Numbers: 50789 | 50790 | 50791 | 50792 | 50793 | 50794 | ____

Relinquished By: Melanie Bryson (Signature) Date: 4/18/02 Time: 11:35

Received By: S. C. Dean (Signature) Date: 4-18-02 Time: 11:35

Relinquished By: ____ (Signature) Date: ____ Time: ____

Received By: ____ (Signature) Date: ____ Time: ____

Relinquished By: ____ (Signature) Date: ____ Time: ____

Received By: ____ (Signature) Date: ____ Time: ____

Results Reported: [illegible] (Signature) Date: 5-23-02 Time: 3:40PM

(:\docshare\cocr.frm)

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

Ref. 10

December 21, 1995

Ms. Linda Cable, County Administrator
Swain County
P.O. Drawer A
Bryson City, NC 28713

SUBJECT: Closure of the Swain County Landfill
Permit #87-01

Dear Ms. Cable:

The Solid Waste Section (the Section) has received and reviewed documentation submitted by your consultant, McGill and Associates, on your behalf regarding the subject facility. Based on this documentation, the Section has determined that the subject facility has been closed in accordance with the applicable requirements. This determination may be rescinded should any of the documentation prove to be inaccurate.

The subject facility is considered closed subject to the attached post closure conditions. The operator of the facility, Swain County, and the owner, the U.S. Forest Service, are responsible for compliance with these conditions.

This closure shall become effective upon written notification by Swain County that the facility shall be maintained in compliance with the post closure conditions specified in this letter. Also, Rule .0510 states that when a disposal unit is closed, the permit to operate that unit is terminated and any future disposal operations will require approval by the Section.

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4996 FAX 919-715-3605

POST CLOSURE CONDITIONS

1. **MANAGEMENT OF LANDFILL GAS:** The owner and/or operator shall take the measures necessary to ensure that the closed site shall continue to meet the design standards for landfill gas found in Rule .0503(2)(a).

2. **MANAGEMENT OF SURFACE WATER:** The owner and/or operator shall take the measures necessary to ensure that the closed site shall meet the requirements of Rule .0503(2)(c). In addition, the landfill unit shall be maintained such that surface water runoff occurs in a controlled manner, and surface water shall not be impounded over waste.

3. **AIR QUALITY:** The owner and/or operator shall ensure that landfill units do not violate any applicable requirements developed under a State Implementation Plan approved or promulgated by the U.S. EPA Administrator pursuant to Section 110 of the Clean Air Act, as amended.

4. **FINAL COVER SYSTEM:** The integrity and effectiveness of the final cover system and any permanent erosion control devices must be maintained. This could include making repairs to the cover as necessary to correct the effects of settlement, subsidence, erosion, or other events.

5. **PROPOSED USES:** The owner and/or operator shall submit a proposal for the Section's review and approval addressing post closure uses of the facility. Proposed post closure uses shall not violate any post closure conditions found in this letter. In particular, plans for post closure uses shall avoid possibilities for the entrapment of methane gas. Routine landfill gas monitoring within structures and at the facility boundary may not be sufficient to detect potentially dangerous situations.

6. **ONGOING SOLID WASTE MANAGEMENT ACTIVITIES:** Continuing solid waste management activities (e.g. yard waste composting, scrap tire collection, solid waste transfer) shall not violate any post closure conditions found in this letter, and must meet any other applicable requirements.

7. **RECORDATION:** The owner and/or operator shall ensure that the recordation requirements for land disposal sites found in Rule .0204 are met.

8. WATER QUALITY MONITORING AND REPORTING REQUIREMENTS:

a. Groundwater quality at this facility is subject to the "Classifications and Water Quality Standards Applicable to the Groundwaters of North Carolina", 15A NCAC 2L. This includes, but is not limited to, the provisions for detection monitoring, assessment, and corrective action.

b. The permittee shall sample the detection monitoring wells and surface water sampling locations at a minimum on a semi-annual basis.

c. Water quality detection monitoring shall continue for a minimum of five years from the date of the Section's receipt of Swain County's notification that the facility will be maintained in compliance with the post-closure conditions specified in this letter. After five years the Section will determine if further monitoring is to be required.

d. Sampling equipment and methods shall conform to specifications in Attachment 1, "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities". The sampling parameters and methods shall be those found in Attachment 2, "Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills", or an alternate parameter list as approved by the Section.

e. The permittee shall maintain a record of all monitoring events and analytical data. Reports of the sampling events and analytical data shall be submitted to the Section in a timely manner.

f. In addition to routine semi-annual sampling of detection monitoring wells in the approved water quality monitoring system, Swain County shall sample two surface water sites in the creek along the southwest property boundary, as described in Attachment 3, Memorandum from Jim Bateson to Jan McHargue dated November 2, 1995.

If there are questions regarding this closure letter, please call Janis McHargue in the Winston-Salem Regional Office at (910) 771-4600, or the Solid Waste Section at (919) 733-0692.

Sincerely,

James C. Coffey
Permitting Branch
Solid Waste Section

cc: Julian Foscue
Jan McHargue
Bobby Lutfy
Jim Patterson
Central Files

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

LETTER

DEHNR

MEMORANDUM

To: Jan McHargue

Date: November 2, 1995

From: Jim Bateson

RE: Upgrade of Monitoring System at Swain County Sanitary Landfill
Permit #87-01

Mr. Charles Bailey telephoned today in response to my letter of October 23, 1995. The letter informed Swain County that a spring indicated on our file copy of the site map would need to be included as a sampling point for future water quality detection monitoring at the facility. Mr. Bailey told me that the spring is a wet weather seep, and not suitable for monitoring purposes. We also discussed the need to include the two surface water monitoring points in all future sampling events.

After discussing the matter with Bobby Lutfy, we decided that the the Solid Waste Section is willing to allow the continued use of the existing detection monitoring wells at the facility, and that an additional detection monitoring well in the vicinity of MW-4, or any modification or replacement of MW-4, will not be necessary as a condition of closure.

However, the sampling of the two surface water sites needs to included as a condition of closure. Both sites are located in the creek along the southwest property boundary of the site. SW-1 is near the entrance to the facility. SW-2 is located just above the confluence of the creek with the Tuckaseegee River.

I have forwarded a copy of this memorandum to Charles Bailey.

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-4996 FAX 919-715-3605