CLOSURE/POST-CLOSURE PLAN

ASHEVILLE DYEING AND FINISHING
SWANNANOA, NORTH CAROLINA

REVISION 3

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HAZARDOUS WASTE SECTION

MARCH 31, 1992

WESTON W.O. NO. 6208-01-01

Prepared by:

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Prepared by:

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SECTION 1

INTRODUCTION

Roy F. Weston, Inc. (WESTON) has prepared this closure plan to meet the requirements of an Administrative Order on Consent (Order) for the Asheville Dyeing & Finishing (AD&F) facility located on Warren Wilson College Road in Swannanoa, Buncombe County, North Carolina. The Order was executed on August 29, 1990 between AD&F and the North Carolina Department of Environment, Health, and Natural Resources (DEHNR).

The following passage, as contained in the August 29, 1990 Order, summarizes the historical use of hazardous materials/wastes at the site:

> "The Hazardous Waste Section alleges that prior to April 1985, as part of a dry cleaning process at the site, the prior owner/operator of the Asheville Dyeing & Finishing site utilized a raw material underground storage tank and a hazardous waste underground storage tank, both for the storage of tetrachloroethylene. In April 1985, the tanks were removed. Soil samples were collected from the bottom of the tank pits and analyzed by Environmental Testing, Inc. for the presence of solvents. Sample analysis results indicated detectable levels of 1,1,2-trichloroethylene in the soil beneath the tanks. In addition, approximately 14 years ago, an alleged spill of solvent by the previous owner/operator, consisting primarily of tetrachloroethylene occurred at Asheville Dyeing & Finishing's site and it is believed that some of the solvent entered an eight-inch drain pipe and followed this pipe to Bee Tree Creek, approximately 1,100 feet east of the plant building. Most of the solvent reportedly entered the ground. In 1988, Westinghouse Environmental Services collected soil samples from the site. The samples were analyzed by Industrial and Environmental Analysts, Inc. for volatile organics. Three hazardous constituents were reported in the results: acetone, methylene chloride, and tetrachloroethylene. From the alleged actions of the previous owner/operator, the trichloroethylene, tetrachloroethylene, and methylene chloride contamination in soils at the site constitutes either the disposal of listed hazardous wastes (F001, F003) or the presence of hazardous constituents, as defined in 40 CFR 260.10, codified at 10 NCAC 10F.0002 and 40 CFR 261, codified at 10 NCAC 10F.0029. For the purpose of this order, the Waste Management Unit (the Unit) is the hazardous waste underground storage tank described above. Asheville Dyeing & Finishing neither admits nor denies any of the allegations set out in this paragraph."

This closure plan, prepared in accordance with Title 40 of the Code of Federal Regulations (40 CFR) Part 265.112 (a), codified at Title 15A of the North Carolina Administrative Code (NCAC) Section 13A.00110, and referenced as Items 6A through 6F in the Order, addresses to the extent applicable the following items:

1. A description of how the Waste Management Unit at the facility will be closed in accordance with 40 CFR Part 265.111; and

2. A description of how final closure of the facility will be conducted in accordance with 40 CFR 265.111. The description must identify the maximum extent of the operation which will be unclosed during the active life of the facility; and

3. An estimate of the maximum inventory of hazardous wastes ever on-site over the active life of the facility specific to the Waste Management Unit and a detailed description of the methods to be used during closure, including but not limited to methods for removing, transporting, treating, storing or disposing of all hazardous waste, identification of and the type(s) of off-site hazardous waste management unit(s) to be used, if applicable; and

4. A detailed description of the steps needed to remove or decontaminate all hazardous waste residues and contaminated containment system components, equipment, structures, and soils during closure including but not limited to procedures for cleaning equipment and removing contaminated soils, methods for sampling and testing surrounding soils, and criteria for determining the extent of decontamination necessary to satisfy the closure performance standard; and

5. A detailed description of other activities necessary during the closure period to ensure that closure satisfies the closure performance standards, including but not limited to groundwater monitoring, leachate collection, and run-on and run-off control; and

6. A schedule for closure of the Waste Management Unit. The schedule must include, at a minimum, the total time required to close and the time required for intervening closure activities which will allow tracking of the progress of closure. (For example, in the case of a landfill unit, estimates of the time required to treat or dispose of all hazardous waste inventory and of the time required to place a final cover must be included).

Numerous assessment activities have been undertaken at the AD&F facility to evaluate the presence, nature, and extent of tetrachloroethylene in groundwater beneath the facility. Assessment reports and quarterly monitoring summaries submitted on behalf of AD&F by Westinghouse Environmental Services document the presence of tetrachloroethylene in groundwater located upgradient of the former hazardous waste storage tank. Accordingly, this closure plan reflects only those closure activities that relate to the subject hazardous waste management unit; however, to the extent that previous and future assessment and corrective action activities at the facility impact closure activities associated with the unit, these impacts and the resultant effects on this closure plan are described herein.

SECTION 2

CLOSURE PLAN REQUIREMENTS

2.1 GENERAL CLOSURE REQUIREMENTS

This closure plan has been prepared to meet the requirements specified in Title 40 of the Code of Federal Regulations (40 CFR), Part 265 Subparts G, H, J and N. The closure plan adheres to the format presented in the closure/post-closure checklist provided by the DEHNR. The checklist is provided as an attachment to this plan (Appendix A). The specific subsections addressing each item in the checklist are noted on the checklist.

2.1.1 Partial and/or Final Closure

Partial closure is not anticipated for the former hazardous waste underground storage tank (UST) pit. Final closure is expected to be completed within 180 days of DEHNR's final approval of this closure plan.

This closure plan addresses closure of the former waste tetrachloroethylene (commonly referred to as perchloroethylene) tank pit only (including associated piping). Subsections 2.1.1.1 through 2.1.1.5 address the requirements outlined in the checklist under General Closure Requirements.

2.1.1.1 Closure Performance Standards

As described in 40 CFR Subpart G, Part 265.111, the facility owner or operator must close the facility in a manner that:

1. Minimizes the need for further maintenance;

2. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

3. Complies with the closure requirements of this subpart including, but not limited to, the requirements of 40 CFR Parts 265.197, 265.228, 265.258, 265.280, 265.310, 265.351, 265.381 and 265.404.

This closure plan for the former tetrachloroethylene tank pit was written to comply with the applicable provisions of 40 CFR Parts 265.197 and 265.310. These sections describe closure and post-closure activities for a tank system and a landfill, respectively.

40 CFR Part 265.197(a) describes the requirements for closure of the tank system. 40 CFR Part 265.197(b) states "If the owner or operator demonstrates that not all contaminated soils

can be practically removed or decontaminated as required in Paragraph (a) of this section then the owner or operator must close the tank system and perform post-closure care in accordance with the closure and post-closure requirements that apply to landfills (Part 265.310). In addition, for the purposes of closure, post-closure and financial responsibility, such a tank system is then considered to be a landfill, and the owner or operator must meet all of the requirements for landfills specified in Subparts G and H of this Part."

Based on the results of the previous site investigations, the extent of tetrachloroethylene in the soils appears to be confined to the former waste tetrachloroethylene tank pit. Because groundwater contamination has been documented, WESTON has developed a series of site activities that will be implemented for closure of the unit as a landfill. These activities, to be conducted in accordance with 40 CFR Part 265.310 include the following:

- Excavation of existing tank system piping;
- Excavation of soils from within the confines of the former tank pit (approximately 6 x 12 x 18 feet);
- Analytical testing to determine hazardous waste classification;
- Disposal of the soil at a permitted hazardous waste landfill, if required;
- Backfilling excavated areas with clean fill;
- Collecting soil samples for confirmatory purposes;
- Placement of a non-select fill material in the pit to support the clay cap;
- Installation and compaction of a clay cap, constructed to meet or exceed a permeability of 1×10^{-7} centimeters per second (cm/sec.); and
- Installation of a topsoil cover and establishment of a vegetative stand.

Details of the closure activities are provided in Subsection 2.2 of this closure plan.

The installation of the clay cap over the former tank pit will satisfy the closure performance standards in the following ways.

1. Upon installation of the compacted clay cap, the former tank pit will be considered closed, thereby minimizing further maintenance. Minimal maintenance will be required to maintain the integrity of the clay cap.

2. Excavation of the contaminated soil and installation of the clay cap will help protect human health and the environment by minimizing exposure to any soil from the former tank pit.

3. Closure of the former tank pit will comply with 40 CFR Parts 265.197 and 265.310 for closure of tank systems and landfills, respectively.

2.1.1.2 Contents of the Plan

This closure plan addresses the requirements of 40 CFR Part 265.112 (a), as described in Subsection 1.1 of the plan.

Maximum Inventory of Wastes

In April 1985, a 2,000-gallon tank previously containing waste tetrachloroethylene was removed from the site. Accordingly, the maximum waste inventory historically contained in the tank is 2,000 gallons. For purposes of this closure plan, the maximum waste inventory remaining at the site after tank removal is estimated to be the volume of soil contained within the pit (approximately 48 cubic yards).

Removal/Decontamination Procedures

On March 23, 1985, the waste tetrachloroethylene tank was excavated and the resulting pit was backfilled. Apparently, no soil was removed for off-site disposal during these activities. Excavation and soil sampling activities were observed by Mr. J.E. Patterson, Waste Management Specialist with the North Carolina Department of Human Resources (NCDHR) as documented in a April 4, 1985 memorandum to Mr. Bill Meyer of the NCDHR. No additional removal activities were required by the NCDHR.

As part of the closure activities, soil will be excavated from two locations, including (1) areas associated with existing underground tank system piping, and (2) the former UST pit. Soils excavated from around the piping will be used for on-site backfill (upon confirmation that no contamination is present). The soil excavated from the pit and the removed piping will be transported to a hazardous waste landfill, if required based on the results of analytical testing. Detailed decontamination procedures for the soil excavations are discussed in Section 2.1.3 of this closure plan.

Other Activities During Closure Period

(Not applicable)

Closure Schedule for Each/Unit Final Closure

The closure schedule for the former waste tetrachloroethylene tank pit site is shown in Table 1. The expected year of final closure is 1992. Following preliminary approval of the closure plan, DEHNR will publish a public notice and provide a 30-day comment period for the plan.

At the conclusion of the comment period, DEHNR will either approve the plan or request modifications. DEHNR will provide AD&F with specific written comments concerning any requested modification. AD&F will make modifications or submit a new plan within 30 days after receiving written comments. DEHNR will approve or modify this plan in writing within 60 days; if DEHNR modifies the plan, this modified plan will be the approved closure plan.

TABLE 1

CLOSURE SCHEDULE

Item	Elapsed Time Following Approval of Closure Plan
Submit closure plan to DEHNR	-
Comments issued by DEHNR	-
Submit revised plan	-
Preliminary approval by DEHNR	-
End of public comment period	-
Final DEHNR approval	0
Begin contractor mobilization	14
Complete excavations and hauling	21
Complete backfill and compaction	28
Complete clay cap installation	31
Submit certification of closure and survey plat	63
Submit record of constituents closed to Buncombe County land use authority	110
Record notice in deed to property	110
Submit certification of notice in deed to property to DEHNR and EPA	110

2.1.1.3 Amendment of Closure Plan

AD&F may amend the closure plan at any time prior to the notification of final closure of the former waste tetrachloroethylene tank pit. AD&F will submit a written request to the Director of the DEHNR (the Director) to authorize a change to the approved closure plan. The written request will include a copy of the amended closure plan for approval by the Director.

AD&F will amend the closure plan whenever:

- Changes in operating plans or facility design affect the closure plan; or
- There is a change in the expected year of closure; or
- In conducting partial or final closure activities, unexpected events require a modification of the closure plan.

AD&F will amend the closure plan (if required) at least 60 days prior to the proposed change in facility design or operations or no later than 60 days after an unexpected event has occurred which has affected the closure plan.

2.1.1.4 Notification of Partial and Final Closure

AD&F will submit the closure plan to the Director at least 180 days prior to the date on which AD&F expects to begin closure of the former waste tetrachloroethylene tank pit. Upon approval of the plan, AD&F will commence closure of the unit in accordance with the schedule provided in the plan.

2.1.1.5 Closure Activities Performed Prior to Closure Plan Approval

(Not applicable)

2.1.2 Time Allowed for Closure

40 CFR Part 265.113(b) states that the "owner or operator must complete partial and final closure activities in accordance with the approved closure plan and within 180 days after receiving the final volume of hazardous wastes or the final volume of nonhazardous wastes if the owner or operator complies with all applicable requirements in paragraphs (d) and (e) of this section, at the hazardous waste management unit or facility, or 180 days after approval of the closure plan, if that is later."

AD&F will complete the closure activities within 180 days after approval of the closure plan in accordance with the schedule provided in Table 1.

2.1.2.1 Extension of Closure Timeframes

The Director may approve an extension to the closure period if AD&F demonstrates that:

1. The partial or final closure activities will, of necessity, take longer than 180 days to complete; and

2. AD&F has taken and will continue to take all steps to prevent threats to human health and the environment from the former tetrachloroethylene tank pit, including compliance with all applicable interim status requirements.

These demonstrations must be made as follows:

1. The demonstrations in Paragraph (1) must be made at least 30 days prior to the expiration of the 90-day period for commencement of closure activities; and

2. The demonstrations in Paragraph (2) must be made at least 30 days prior to the expiration of the 180-day period for completion of closure.

Extension of the closure timeframe is not anticipated for closure of this Unit.

2.1.3 Disposal or Decontamination of Equipment, Structures and Soils

Decontamination procedures employed during the field program will be designed with respect to the equipment's intended use and material construction. For sampling equipment constructed of teflon, stainless steel, or metal that will directly contact sample media, the following decontamination sequence will be adhered to:

- The equipment will be thoroughly rinsed with tap water;
- The equipment will be thoroughly rinsed with distilled water;
- The equipment will be thoroughly rinsed with methanol;
- The equipment will be thoroughly rinsed with distilled water;
- The equipment will be wrapped with aluminum foil, if appropriate, to prevent contamination if the equipment is to be stored or transported.

All decontamination fluids generated during the field program will be controlled and contained at all times. All decontamination procedures will take place on site at a controlled staging area. Decontamination procedures for small equipment will be carried out in buckets; larger equipment will be decontaminated in drums or troughs. All fluids present in the buckets, drums or troughs will be transferred into liquid waste drums and secured. Drums will be labeled and transferred to a fenced and locked holding area. The drums will be properly disposed in accordance with all local and state regulations.

2.1.4 Certification of Closure

Within 60 days of completion of closure of the former tetrachloroethylene tank pit, AD&F will submit to the Director, by registered mail, a certification that the tank pit has been closed in accordance with the specifications in the approved closure plan. The certification will be signed by AD&F and a professional engineer registered in the State of North Carolina. Documentation supporting the engineer's certification will be furnished to the Director upon request.

2.1.5 Survey Plat and Certification by Professional Land Surveyor

AD&F will submit to the appropriate Buncombe County land use authority and the Director a survey plat indicating the location and dimensions of the former tetrachloroethylene tank pit with respect to permanently surveyed benchmarks. This survey plat will be submitted no later than the submission of the certification of closure described in Subsection 2.1.4.

The survey plat will be prepared and certified by a professional land surveyor registered in the State of North Carolina and will contain a note prominently displayed which states AD&F's obligation to restrict disturbance of the site over the life of the post-closure care period.

2.1.6 Notices

Post-closure notices described in 40 CFR 265.119 are addressed in Subsection 3.6 of this closure plan.

2.1.6.1 Record of Wastes

As part of the post-closure notices, the record of wastes described in 40 CFR Part 119(a) is discussed in Subsection 3.6.1 of this closure plan.

2.1.6.2 Notice in Deed

As part of the post-closure notices, a notation in the deed to the facility property will be prepared in accordance with 40 CFR Part 265.119(b)(1). Details of the notation are provided in Subsection 3.6.2 of this closure plan.

2.1.6.3 Certification of Notice

As part of the post-closure notices, a certification that the deed notation has been prepared will be submitted in accordance with 40 CFR Part 265.119(b)(2). Details of the certification are presented in Subsection 3.6.3 of this closure plan.

2.1.7 Closure Cost Estimate

The closure cost estimate for the former tetrachloroethylene tank pit has been developed based on the following assumptions:

- All soils excavated from the tank pit will be disposed of as hazardous waste;
- All materials including clay will be hauled to the site from local suppliers;
- A closure contractor will be used for the work; and
- Delays due to weather, etc. are minimized.

A summary of the closure cost estimate is shown in Table 2. The detailed cost estimate calculations are given in Appendix B. The total estimated closure cost is $70,336.

2.1.7.1 Adjustments to Closure Cost Estimate

If necessary, AD&F will adjust the closure cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instruments used to comply with 40 CFR Part 265.143. The first adjustment will be made by multiplying the closure cost estimate by the inflation factor. Subsequent adjustments will be made by multiplying the latest adjusted closure cost estimate by the latest inflation factor.

2.1.7.2 Revisions to Closure Cost Estimates

Within 30 days of a revision to the closure plan that increased the cost of closure, AD&F will revise the closure cost estimate. If AD&F has an approved closure plan, the closure cost estimate will be revised no later than 30 days after the Director has approved the request to modify the closure plan, if the change in the closure plan increases the cost of closure. The revised cost estimate will be adjusted for inflation as specified in 40 CFR Part 265.142(b).

2.1.8 Financial Assurance for Closure

Financial assurance mechanisms for closure will be provided under separate cover.

2.2 CLOSURE OF LANDFILL

2.2.1 Contents of Plan

This closure plan addresses the requirements of (1) 40 CFR Part 265.112 (b), as described in Subsection 1.1 of this report, and (2) 40 CFR Part 265.310, as described below.

TABLE 2

CLOSURE COST SUMMARY

Item	Estimated Cost ($)
Contractor Mobilization	$940
Excavate Pit and Lines	2,220
Confirmation Sampling	2,040
Place Non-Select Backfill	2,970
Place Cap	1,470
Dispose of Contaminated Soil and Piping	24,925
Decontamination	730
Health & Safety Equipment	650
Other Direct Costs	1,000
Demobilization	540
Closure Certification	5,205
Notice in Deed to Property	1,770
Installation of Monitoring Wells	8,825
	53,285
Project Management @ 10%	5,329
Project Administration @ 10%	5,329
Sub-Total	63,942
Contingency	6,394
TOTAL CLOSURE COST	70,336

2.2.1.1 Description of How the UST Pit will be Closed

The UST pit will be closed as a landfill and will include the following activities:

- Excavation of the existing tank system piping;
- Excavation of the former UST pit (approximately 6 x 12 x 18 feet);
- Disposal of the excavated soil and piping off-site at a hazardous waste landfill, if required based on the results of analytical testing;
- Collection and analysis of tank pit and piping area soil samples to confirm the dimensions of these areas and to confirm if the affected soils have been removed;
- Backfilling the excavated areas with clean fill. A sample of the clean fill will be collected and analyzed in accordance with Toxicity Characteristic Leaching Procedure protocols for metals and organics before being placed into the excavated pit area;
- Compaction of the tank pit fill material;
- Installation of a clay cap;
- Compaction of the clay cap;
- Placement of top soil; and
- Seeding of the clay cap.

Closure of the hazardous waste unit will include excavation, removal, and disposal of all soils contained within the confines of the tank pit, including soils underlying the tank pit to the top of the shallow groundwater table. Accordingly, the depth of excavations will extend to the top of the shallow groundwater table, estimated to range from 18 to 22 feet below grade (based on groundwater elevations observed in on-site monitoring wells). A limited, compacted clay and topsoil cap is warranted for the unit, in lieu of a multi-layered RCRA cap or multi-layered clay cap comprised of a clay liner and drainage layers, for the following reasons enumerated below.

(1) The tank pit, originally containing a 2,000-gallon tank, is sufficiently small that all soils can be effectively removed for off-site disposal (if required). This includes not only the soils contained within the pit, but also the unsaturated soils underlying the pit, both of which could serve as sources that could be leached into groundwater. If the sources are removed, the impact of additional precipitation infiltrating through the area of the former tank pit is negated.

(2) The former tank pit area is sufficiently small (less than 100 square feet) that drainage considerations, such as run-on/run-off controls and a cap drainage layer, are unnecessary.

Closure of this Unit is best accomplished by constructing a compacted clay and topsoil cap. This cap will be constructed on top of crusher run backfill, to be used to bring the excavation to just within the ground surface. By compacting the clay to a higher degree of compaction than the surrounding in-situ clay horizons, and based on the flow distance across the top of the cap being less than 10 feet, infiltration through the cap will be minimized. Vegetative growth will be established as described in Section 2.2.3. Additional details concerning design and construction of the final cover are also provided in Section 2.2.3.

The location of the former tank pit will initially be delineated using corporate records and drawings and historical photographs. During the excavation process, these limits will be confirmed by visual classification of the soils by a trained geologist or engineer. Excavations will extend laterally approximately one-foot beyond the limits of the former pit, as determined by the field scientist. Vertically, excavations will extend to the first occurrence of groundwater (approximately 18 to 22 feet). One sample will be collected from each of the four walls of the pit (total of four samples) for confirmation purposes. The samples will be collected from the midway point along each side of the wall, at a location approximately one-third of the distance from the bottom of the excavation to the ground surface. The soil to be sampled will be accessed using the bucket of the backhoe. Using a stainless steel scoop, a sample will be obtained from the center of the backhoe bucket, placed in a glass jar with teflon-lined cap, and stored on ice until delivery to the analytical laboratory. The samples will be tested for volatile organics in accordance with U.S. EPA Method 8240. Sample collection methods, equipment decontamination methods, and chain-of-custody procedures will be in accordance with the Sampling and Analysis Plan, included as Appendix C to this closure plan.

Underground piping associated with the former waste tank will be located by geophysical survey (e.g., magnetometer). All piping and piping trench backfill will be excavated and disposed of as described in Section 2.2.1.6. Excavations will extend laterally and vertically a distance of one-foot into the surrounding in-situ soils. Confirmatory soil samples will be collected from the bottom of the trench at a minimum of two equidistant locations between the AD&F building and the location of the former tank pit. Soil samples will also be collected from any location in the trench that may have been affected by a leak in the piping. Samples will be collected as described previously and analyzed in accordance with EPA Method 8240.

2.2.1.2 Description of How Final Closure will be Conducted

(Not applicable)

2.2.1.3 Identification of the Maximum Extent of Operation

(Not applicable)

2.2.1.4 Estimate of the Maximum Inventory of Hazardous Wastes

An estimate of the maximum inventory of hazardous wastes is presented in Subsection 2.1.1.2.

2.2.1.5 Detailed Description of Removal of Waste Inventory

A description of the removal of the waste inventory is provided in Subsection 2.1.1.2.

2.2.1.6 Detailed Description of Removal of Waste Residues

Waste residues in the former tank pit will be excavated with an excavator or trackhoe. The excavated soil will be collected in a lined roll-off box designed for the transportation of hazardous waste. If determined to be hazardous on the basis of analytical testing, the roll-off boxes then will be transported to the Laidlaw hazardous waste disposal facility in Pinewood, South Carolina. The excavated tank system piping also will be disposed in a roll-off box and transported to Pinewood, South Carolina for final disposal.

2.2.1.7 Detailed Description of Other Necessary Activities

(Not applicable)

2.2.1.8 Schedule for Closure of Each Unit

A schedule for closure of the former UST pit is shown as Table 1.

2.2.1.9 Estimate of Expected Year of Final Closure

This closure plan addresses the requirements for closure of the former tetrachloroethylene tank pit. It is estimated that this area will be closed in 1991.

2.2.2 Decontamination Procedures

2.2.2.1 Procedures for Cleaning Equipment and Removing Contaminated Soils

Procedures for cleaning equipment and removing contaminated soils are described in Section 2.1.3 of this closure plan.

2.2.2.2 Management of Generated Wastes

Equipment used during the decontamination procedures and decontamination fluids will be containerized in a 55-gallon drum. The drum will then be transported to the Laidlaw waste disposal facility in Pinewood, South Carolina.

2.2.2.3 Methods for Sampling and Testing to Demonstrate Success of Decontamination

To demonstrate the success of the decontamination procedures following decontamination of the field equipment. The effectiveness of the equipment cleaning procedures used in the field shall be monitored by rinsing field cleaned equipment with organic free water and submitting the rinse water in standard sample containers to an approved analytical laboratory for analysis. These procedures will adhere to the *U.S. EPA Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual*, Section B.2.3, as described in the appended Sampling and Analysis Plan. The procedures will be performed once per day. Results of the laboratory analysis will be compared to other soil and water quality data to check the effectiveness of the decontamination procedures.

2.2.2.4 Criteria for Determining the Extent of Decontamination Necessary

All equipment used during the closure activities will be cleaned in accordance with the procedures described in Section 2.1.3 of this document. Every reasonable effort will be made to ensure that representative samples are collected, and that possible cross-contamination between sampling locations is minimized.

2.2.3 Final Cover Design and Construction

As described in Section 2.2.1.1, the excavated pit will be restored by backfilling first with crusher run to serve as a support base for the cap. Compaction of this subgrade material is complicated due to the depth to the bottom of the excavation and the confined limits of the excavation. Crusher run will be used in order to obtain a more effective degree of compaction, and therefore, structural support for the cap then would result from use of a silty or clayey soil.

Crusher run will be dumped directly into the pit and spread evenly in approximate two-foot layers with the bucket of the excavator. Compaction will be achieved by tamping the crusher run with the bucket of the excavator as well. upon reaching final grade (approximately 2.5 feet from the original ground surface), the excavator will be driven across the backfilled pit to gain additional compaction. Crusher run will be added, as required, and further compacted by the excavator until a stable final grade is reached.

The final cover system for the former tank pit will be constructed of a 24-inch compacted clay layer overlain by 24 inches of topsoil. Figures 1 and 2 illustrate the design of the cap. The clay will be placed in maximum eight-inch lifts using the bucket of the excavation to spread the soil and compacted to at least 90% modified Proctor density in accordance with ASTM 1557. Compaction of the clay will be achieved by passing over each lift with the tracks of the excavator followed by use of a gasoline-powered portable compactor. A relatively undisturbed soil sample will be collected after each lift is placed and compacted for laboratory determination of in-place density and permeability. The permeability of the clay cap sample will be determined in accordance with the falling-head permeability test (Soil Mechanics, Lambe, Whiteman, 1986). Each sampling location will be repaired by replacing with clay fill and hand tamping.

The cap will be installed to conform to the surrounding grade to the extent possible. The final slope will be constructed at a minimum 3% and maximum 5% grade.

Topsoil will be spread evenly over the backfilled pit and mounded as shown in Figure 2. The topsoil layer will range from 24 inches in thickness at the periphery of the pit to approximately 24.5 inches at the top of the mound to achieve the required 3 to 5% grade.

In order to blend in with the surrounding vegetative cover, the topsoil layer overlying the clay cap will be seeded using Kentucky 31 Fescue applied at a rate of 60 lbs/acre mixed with a rye grain at a rate of 25 lbs/acre as a nursery stock. The soil will be prepared by applying a dolomitic lime at a rate of two tons per acre. The area will be fertilized using 10-10-10 fertilizer, spread at a rate of 1,000 lbs/acre. Straw mulch will be spread at a rate of two tons per acre to protect the seed before it germinates.

2.2.3.1 Minimization of Liquid Migration

The clay cap is designed to minimize the migration of water at the site. The cap is sloped in such a way that the stormwater run-off flows to the existing plant road.

The compacted clay layer is designed to minimize the vertical migration of water, if any. The clay layer as designed extends beyond the limits of the former tetrachloroethylene tank pit by approximately five feet in each direction.

2.2.3.2 Function with Minimum Maintenance

The cover is designed to function with minimum maintenance. Maintenance that may be required includes:

- Quarterly inspections for evidence of damage including cracks, holes, burrows, and erosion; and

- Repair of holes, damages, or cracks in the clay cap. Damages to the final cover will be repaired by patching the affected areas with clay and/or topsoil. Grass seed will be planted as needed.

2.2.3.3 Promotion of Drainage and Minimization of Erosion or Abrasion

The clay cap will be constructed with a 3% minimum slope to promote drainage away from the site. Quarterly inspections will be performed to insure that standing water does not occur at the site or that frost damage has not occurred.

2.2.3.4 Accommodate Settling and Subsidence

The clay will be properly compacted to accommodate settling and subsidence. In addition, crusher run gravel will be installed to help minimize settlement.

2.2.3.5 Permeability Standard

The clay cap will have a permeability less than or equal to 1×10^{-7} cm/sec, as determined by the falling-head permeability test (Soil Mechanics, Lambe, Whitman, 1969).

SECTION 3

GENERAL POST-CLOSURE REQUIREMENTS

3.1 POST-CLOSURE CARE AND USE OF PROPERTY

3.1.1 Length of Post-Closure Period Specified

Post-closure care for the former tetrachloroethylene tank pit will begin after completion of closure of the unit and continue as specified in 40 CFR 265.117. It will consist of maintenance and periodic repair.

If any soil or groundwater contamination is left at the former tank pit area, monitoring and reporting as specified in 40 CFR 265.117-265.120 and 265.310(b) will be required.

3.1.2 Increasing/Decreasing Length of Post-Closure Period

Any time preceding closure of the former tetrachloroethylene tank pit, or any time during the post-closure period, the Director may:

- Shorten the post-closure care period, for the former tetrachloroethylene tank pit, if he finds that the reduced period is sufficient to protect human health and the environment (e.g., groundwater monitoring results or characteristics of any hazardous waste that indicate that the unit is secure); or

- Extend the post-closure care period applicable to the former tetrachloroethylene tank pit, if he finds that the extended period is necessary to protect human health and the environment.

3.1.3 Security Requirements

The Director may require, at final closure, continuation of any of the security requirements of 40 CFR Part 265.14 during part or all of the post-closure period when:

- Hazardous wastes may remain exposed after completion of final closure;

- Access by the public or domestic livestock may pose a hazard to human health.

Fencing will be installed around the immediate area of the former hazardous waste underground storage tank.

3.1.4 Property Use Restrictions

Post-closure uses of the former tetrachloroethylene tank pit area must never be allowed to disturb the integrity of the final cover, liner(s) or any other components of the containment system, unless the Director finds that the disturbance:

- Is necessary to the proposed use of the property and will not increase the potential hazard to human health or the environment; or
- Is necessary to reduce a threat to human health or the environment.

3.2 SUBMITTAL OF POST-CLOSURE PLAN

Section 3 of this plan comprises the post-closure plan for the former tetrachloroethylene tank pit.

3.3 AVAILABILITY OF POST-CLOSURE PLAN

A copy of the post-closure plan will be kept at the AD&F facility office. The post-closure plan will be furnished upon request to the Director, including request by mail. In addition, it will be provided during site inspection on the day of inspection, to any officer, employee, or representative of the department who is duly designated by the Director. After final closure has been certified, the approved closure plan will be maintained by the designated official at the AD&F facility throughout the post-closure period (see Subsection 3.4.3).

3.4 CONTENT OF THE POST-CLOSURE PLAN

This post-closure plan was prepared in accordance with 40 CFR Part 265.118(c). The plan identifies activities to be conducted at the AD&F facility and the frequency(ies) at which they will be conducted. Specific activities are described or referenced in the following subsections.

3.4.1 Monitoring Activities Described

Monitoring activities to be conducted are described in Subsection 3.10.6 of this report.

3.4.2 Maintenance Activities Described

Maintenance activities to be conducted on the clay cap are described in Subsection 3.10.1 of this report.

3.4.3 Post-Closure Contact Identified

The AD&F contact during post-closure of the facility is:

Name/Title:	Steve Pegg, Director of Employee Relations
Address:	Warren Wilson College Road, Swannanoa, N.C.

Telephone: 704-298-2280

3.5 AMENDMENT OF POST-CLOSURE PLAN

AD&F will submit a written request to the Director for any changes or amendments to the approved post-closure plan. The written request will be accompanied by a copy of the amended post-closure plan.

3.6 POST-CLOSURE NOTICES

3.6.1 Notice to Local Zoning Authority/Record of Wastes

Within 60 days following certification of closure, AD&F will submit to the Buncombe County land use authority, the DEHNR, and the Director, a written record of the type, location and quantity of constituents closed in the former waste tank pit site.

3.6.2 Notice in Deed

Within 60 days of certification of closure of the former tetrachloroethylene tank pit, AD&F will in accordance with State law, record on a deed to the facility property, or on some other instrument which is normally examined during title search, that will in perpetuity notify any potential purchaser of the property that:

1. The land has been used to manage hazardous wastes; and
2. Its use is restricted under 40 CFR Subpart G regulations; and
3. A survey plat and a record of the type, location and quantity of constituents closed in the former tetrachloroethylene tank pit have been filed with the Buncombe County land use authority and the Director.

3.6.3 Certification of Notice

In addition to recording a notation to the deed to the property, AD&F will submit a certification to the Director that the notation has been recorded. A copy of the document in which the notation is placed will also be submitted to the Director.

3.6.4 Removal of Wastes from a Closed Landfill

In the event that waste would be moved from the former waste tank pit, AD&F will request a modification to the post-closure plan in accordance with the requirements of 40 CFR Parts 265.118(g) and 265.119(c).

3.7 CERTIFICATION OF COMPLETION OF POST-CLOSURE CARE

Within 60 days after completion of the established post-closure care period for the former tetrachloroethylene tank pit, AD&F will submit to the Director by certified mail a

certification that the post-closure period for the tank pit was performed in accordance with the specifications in the approved post-closure plan. The certification will be signed by AD&F and an independent, professional engineer registered in the State of North Carolina. Documentation supporting the independent, professional engineer's certification will be furnished to the Director upon request until he releases the owner or operator from the financial assurance requirements for post-closure care under 40 CFR Part 265.145(h).

3.8 POST-CLOSURE CARE COST ESTIMATE

A detailed, written estimate in current dollars of the annual cost of post-closure maintenance of the former tetrachloroethylene tank pit, in accordance with the applicable post-closure regulations, is included in Appendix B. The estimated annual cost is $7,340, following a first year cost of $13,280. The post-closure cost estimate is based on the costs to AD&F of hiring a third party to conduct post-closure care activities. A third party is a party who is neither a parent nor subsidiary of AD&F.

The post-closure care cost estimate was calculated by multiplying the annual post-closure care cost estimate by the number of years of post-closure care required under 40 CFR Part 265.117. A post-closure care period of 30 years has been assumed. For this period, the total post-closure care cost is estimated at $233,480.

3.8.1 Adjustments to Post-Closure Care Cost Estimates

During the active life of the facility, AD&F will adjust the post-closure care cost estimate for inflation within 60 days prior to the anniversary date of the establishment of the financial instrument(s) used to comply with 40 CFR Part 265.145.

The post-closure care cost estimate will be updated for inflation no later than 30 days after the close of AD&F's fiscal year and before submission of updated information to the Director as specified in 40 CFR Part 265.145(d)(5). The first adjustment is made by multiplying the latest adjusted post-closure cost estimate by the inflation factor. Subsequent adjustments are made by multiplying the latest adjusted post-closure cost estimate by the latest inflation factor.

3.8.2 Revisions to Post-Closure Care Cost Estimates

AD&F will revise the post-closure cost estimate no later than 30 days after a revision to the post-closure plan which increases the cost of post-closure care. If AD&F has an approved post-closure plan, the post-closure cost estimate must be revised no later than 30 days after the Director has approved the request to modify the plan, if the change in the post-closure plan increases the cost of post-closure care. The revised post-closure cost estimate must be adjusted for inflation as specified in 40 CFR Part 265.114(b).

3.9 FINANCIAL ASSURANCE FOR POST-CLOSURE CARE

AD&F will establish financial assurances for post-closure care of the former tetrachloroethylene tank pit. Financial assurance mechanisms will be provided under separate cover.

3.10 POST-CLOSURE CARE REQUIREMENTS FOR LANDFILLS

3.10.1 Inspection and Maintenance of the Final Cover/Cap System

A representative of AD&F will inspect and maintain the integrity and effectiveness of the final cover. Inspections of the final cover and the vegetative cover over the final cover will be performed quarterly or after any unusually large rain event. Any needed repairs will be made to correct the effects of settling, subsidence, erosion, or other events. To the extent that the vegetative cover is impacted by periods of drought or abnormally low rainfall, water will be applied as required to sustain vegetative growth.

Table 3 summarizes the maintenance activity that will be conducted during the post-closure period.

3.10.2 Inspection and Maintenance of Groundwater Monitoring System

The groundwater monitoring wells identified in Section 3.10. 6 will be inspected during each sampling event for damages. Repairs will be made to the groundwater monitoring wells should any damage be detected (see Table 3).

3.10.3 Run-on and Run-off Control Structures

Run-on and run-off control structures are not required at this time. However, these items will be installed during post-closure if necessary to maintain the integrity of the final cap system.

During the excavation of the pit, a wooden frame covered with visqueen will be used to cover the pit during any rainfall events. This will be done to prevent accumulation of rainfall in the pit.

3.10.4 Maintenance of Surveyed Benchmarks

AD&F will protect and maintain surveyed benchmarks.

3.10.5 Gas Ventilation System

A gas ventilation system will not be required for closure of the former UST pit.

TABLE 3

POST-CLOSURE MAINTENANCE ACTIVITIES AND INSPECTION SCHEDULE

Item	Deficiency	Maintenance Requirements	Inspection Frequency
1) Final containment structures (cover)	Erosion; lack of vegetation; settlement/subsidence	Replace eroded soil, vegetate or riprap Sod, re-seed, add nutrients Excavate and repair final cap if damaged locally; supply additional cap material if uniform settlement	Monthly Monthly Monthly
2) Facility Monitoring	NA	NA	NA
3) Security Devices	Chain-down around site, warning signs damaged or missing; Facility fence damaged	Replace chain and/or signs Repair breaks, holes, etc.	Monthly
4) Erosion Damage	See 1) above	See 1) above; routine inspection.	Monthly
5) Vegetative Cover	See 1) above	See 1) above; routine inspections; irrigate if stressed by drought.	Monthly
6) Run-on/Run-off Control Systems	NA	NA	NA
7) Groundwater Monitoring	Well clogs, dries up or casing damaged; Outer casing seal damaged	Replace Add concrete or remove and replace with bentonite/grout below surface and concrete above surface	Quarterly
8) Fugitive Dust Control System	Lack of vegetation	Re-establish vegetation	Monthly
9) Crop Prohibitions	Undesired species	Mow; fertilize or lime	Monthly
10) pH Control	Lack of vegetation	Lime, re-seed	Monthly

3.10.6 Groundwater Monitoring System

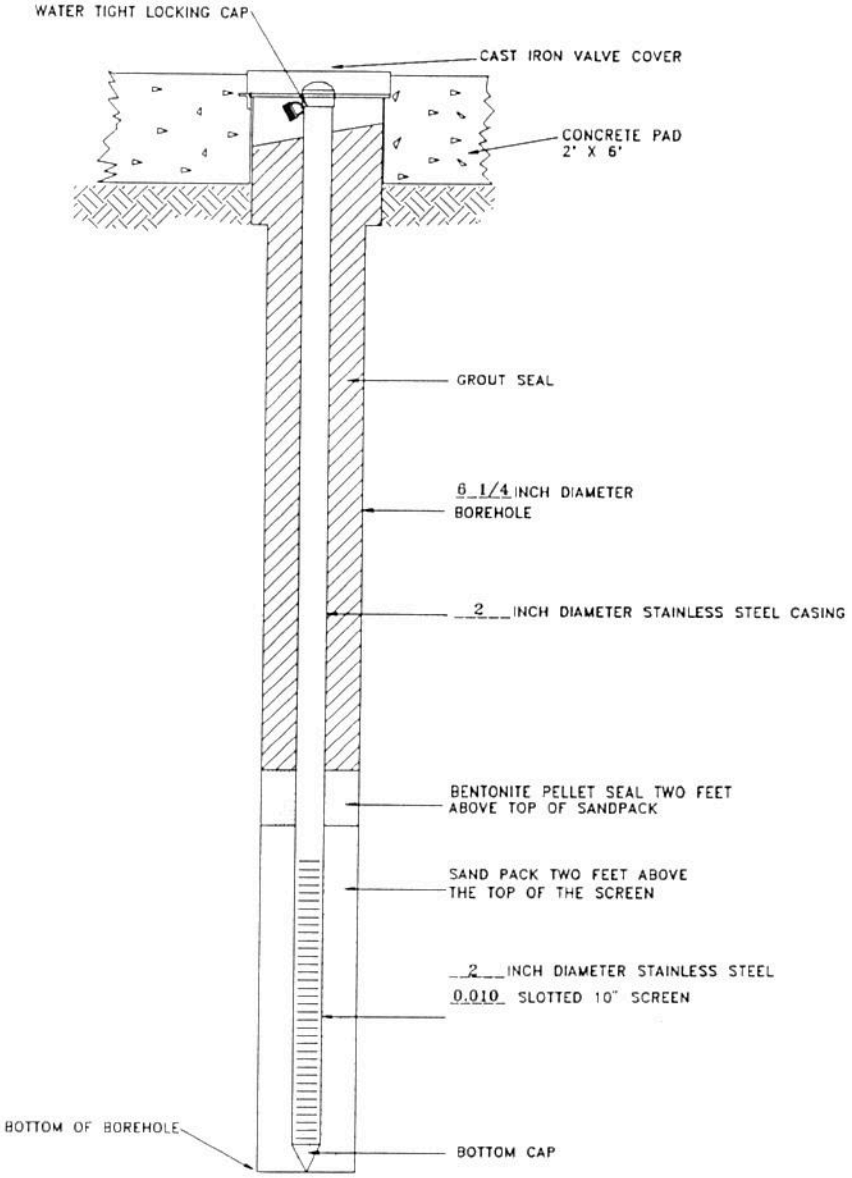
The post-closure groundwater monitoring system for the unit will consist of monitoring the quality of groundwater at one upgradient location and three downgradient locations. Existing well MW-1 will serve as the upgradient monitoring well. Three new wells, MW-12, MW-13, and MW-14, will be installed at the locations shown in Figure 3. Monitoring wells MW-12 and MW-14 will be installed 10 feet into the top of the surficial aquifer. MW-13 will be augered to refusal and then a 10-foot screen will be installed. This deeper well will serve to monitor the deep portion of the surficial aquifer. A schematic depicting construction of the proposed wells is shown in Figure 4.

All sampling activities will be conducted in accordance with the Sampling and Analysis Plan provided in Appendix C.

3.10.7 Groundwater Assessment Plan

AD&F will implement the Groundwater Assessment Plan (GWAP) as required by the AOC. To the extent possible, groundwater monitoring activities will be conducted concurrently with post-closure monitoring. Results of analyses conducted as part of this assessment may impact the monitoring activities identified in this post-closure plan. For example, the presence of tetrachloroethylene has been detected in existing MW-5 during previous monitoring events. This well represents groundwater quality upgradient of the former tank pit but downgradient of an additional apparent source of tetrachloroethylene. By using analytical results obtained from this well, AD&F should be able to evaluate the impact (if any) that the former waste tank has had on the local groundwater regime. If it can be shown that a source other than the former waste tank has impacted groundwater quality in the immediate vicinity of the unit, AD&F will request that the post-closure monitoring activities be reduced (in frequency and/or analytical parameters) or eliminated in lieu of the concurrent groundwater assessment plan activities.

WESTON
MANAGERS CONSULTANTS



NOTE:
ALL DEPTHS ARE MEASURED
FROM GROUND SURFACE
UNLESS OTHERWISE NOTED:

NOT TO SCALE

FIGURE 4
DIAGRAM OF PROPOSED MONITORING WELL
ASHEVILLE DYEING AND FINISHING

ADF-WELL

APPENDIX A

DEHNR CHECKLIST

Facility Name Asheville Dyeing & Fini
ID No.

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

I. GENERAL CLOSURE REQUIREMENTS	Provided (Y/N) or NA	Location	Comments
+A. Partial and/or Final Closure	Y	2.1	
A-1. Closure performance standards [§265.111]	Y	2.1.1	
A-2. Contents of plan [§265.112(b)]	Y	2.1.1.1	
+A-2a. Maximum inventory of wastes [§265.112(b)(3)]	Y	2.1.1.2	
A-2b. Removal/decontamination procedures [§265.112(b)(4)]	Y	2.1.1.2	
A-2c. Other activities during closure period [§265.112(b)(5)]	Y	2.1.1.2	
+A-2d. Closure schedule for each unit/final closure [§265.112(b)(6) and (7)]	Y	2.1.1.2	
+A-3. Amendment of closure plan [§265.112(c)]	Y	2.1.1.2	
A-4. Notification of partial and final closure [§265.112(d)]	Y	2.1.1.3	
A-5. Closure activities performed prior to closure plan approval [§265.112(e)]	Y	2.1.1.4	
+B. Time Allowed for Closure [§265.113]	Y	2.1.1.5	
B-1. Extension of closure timeframes [§265.113(a) and (b)]	Y	2.1.2	
B-2. Timeframes for demonstrations for extensions [§275.113(c)]	Y	2.1.2.1	
C. Disposal or Decontamination of Equipment, Structures and Soils [§265.114]	Y	2.1.2.1	
+D. Certification of Closure	Y	2.1.3	
+E. Survey Plat and Certification by Professional Land Surveyor [§265.116]	Y	2.1.4	
F. Notices [§265.119]	Y	2.1.5	
F-1. Record of wastes [§265.119(a)]	Y	2.1.6	
F-2. Notice in deed [§265.119(b)]	Y	2.1.6.1	
	Y	2.1.6.2	

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
F-3.	Certification of notice [§265.119(b)(2)]	Y	2.1.6.3	
+G.	Closure Cost Estimate [§265.142]	Y	2.1.7	
G-1.	Adjustments to closure cost estimates [§265.142(b)]	Y	2.1.7.1	
G-2.	Revisions to closure cost estimates [§265.142(c)]	Y	2.1.7.2	
H.	Financial Assurance for Closure [§265.143]	Y	2.1.8	
I.	Liability Coverage [§265.147]	Y	2.1.9	

Facility Name _____
ID No. _____

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
II.	GENERAL POST-CLOSURE REQUIREMENTS			
A.	Post-closure Care and Use of Property [§265.117]	Y	2.2	
+A-1.	Length of post-closure period specified [§265.117(a)(1)]	Y	2.2.1	
+A-2.	Increasing/decreasing length of post-closure period [§§265.117(a)(2), 265.118(g)]	Y	2.2.1.1	
A-3.	Security requirements [§265.117(b)]	Y	2.2.1.2	
A-4.	Property use restrictions [§265.117(c)]	Y	2.2.1.3	
B.	Submittal of Post-closure Plan [§265.118(a)]	Y	2.2.1.4	
C.	Availability of Post-closure Plan	Y	2.2.2	
D.	Content of Post-closure Plan [§§265.117(a)(1), 265.118(c)]	Y	2.2.3	
D-1.	Monitoring activities described [§265.118(c)(1)]	Y	2.2.4.1	
D-2.	Maintenance activities described [§265.118(c)(2)]	Y	2.2.4.2	
D-3.	Post-closure contact identified [§265.118(c)(3)]	Y	2.2.4.3	
+E.	Amendment of Post-closure Plan [§265.118(d) and (g)]	Y	2.2.5	
+F.	Post-closure Notices [§265.119]	Y	2.2.6	
F-1.	Notice to local zoning authority/record of wastes [§265.119(a)]	Y	2.2.6.1	
F-2.	Notice in deed [§265.119(b)(1)]	Y	2.2.6.2	
F-3.	Certification of notice [§265.119(b)(2)]	Y	2.2.6.3	
F-4.	Removal of wastes from a closed landfill [§265.119(c)]	Y	2.2.6.4	
+G.	Certifications of Completion of Post-closure Care [§265.120]	Y	2.2.7	

Facility Name Asheville Dyeing & Finis
ID No.

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

		Provided (Y/N) or NA	Location	Comments
+H.	Post-closure Care Cost Estimate [§265.144]	Y	2.2.8	
H-1.	Adjustments to post-closure care cost estimates [§265.144(b)]	Y	2.2.8.1	
+H-2.	Revisions to post-closure care cost estimates [§265.144(c)]	Y	2.2.8.2	
I.	Financial Assurance for Post-closure Care [§265.145]	Y	2.2.9	

Facility Name Asheville Dyeing & Finishi
ID No.

INTERIM STATUS (40 CFR PART 265) CLOSURE/POST-CLOSURE PLANS

VIII. CLOSURE OF LANDFILLS	Provided (Y/N) or NA	Location	Comments
A. Contents of Plan [§§§265.112(b), 265.310]	Y	2.3	
A-1. Description of how each unit will be closed [§265.112(b)(1)]	Y	2.3.1	
A-2. Description of how final closure will be conducted [§265.112(b)(2)]	Y	2.3.1.1	
A-3. Identification of the maximum extent of operation [§265.112(b)(2)]	Y	2.3.1.2	
A-4. Estimate of the maximum inventory of hazardous wastes [§265.112(b)(3)]	Y	2.3.1.3	
A-5. Detailed description of removal of waste inventory [§265.112(b)(3)]	Y	2.3.1.4	
A-6. Detailed description of removal of waste residues [§§265.112(b)(4), 265.114]	Y	2.3.1.5	
A-7. Detailed description of other necessary activities [§265.112(b)(5)]	Y	2.3.1.6	
A-8. Schedule for closure of each unit [§265.112(b)(6)]	Y	2.3.1.7	
A-9. Estimate of expected year of final closure [§265.112(b)(7)]	Y	2.3.1.8	
B. Decontamination Procedures [§§265.112(b)(4), 265.114, 265.310]	Y	2.3.1.9	
B-1. Procedures for cleaning equipment and removing contaminated soils [§265.112(b)(4)]	Y	2.3.2	
B-2. Management of generated wastes [§265.114]	Y	2.3.2.1	
B-3. Methods for sampling and testing to demonstrate success of decontamination [§265.112(b)(4)]	Y	2.3.2.2	
B-4. Criteria for determining the extent of decontamination necessary [§265.112(b)(4)]	Y	2.3.2.3	
	Y	2.3.2.4	

APPENDIX B

CLOSURE AND POST-CLOSURE COST ESTIMATES

APPENDIX B
CLOSURE AND POST-CLOSURE COST ESTIMATES

CLOSURE

	Unit	Number	Unit Cost	Cost
A. Closure of Tank Pit				
1. Contractor Mobilization				
Equipment/Materials	Ea	1	400	400
Labor				
-Site/Safety Manager	Hr	4	60	240
-Technician	Hr	4	30	120
-Equipment Operator	Hr	4	45	180
2. Excavate Pit and Lines (50 c.y. for pit; 60 c.y. for lines)				
Backhoe	Dy	2	250	500
Labor				
-Site/Safety Manager	Hr	12	60	720
-Technician	Hr	12	30	360
-Equipment Operator	Hr	12	45	540
Fuel/Materials	Ea	1	100	100
3. Confirmation Sampling				
Labor				
-Technician	Hr	8	30	240
Samples				
-EPA Method 8010	Ea	8	225	1,800
4. Place Non-select Backfill				
Labor				
-Site/Safety Manager	Hr	12	60	720
-Technician	Hr	12	30	360
-Equipment Operator	Hr	12	45	540
Fuel/Materials	Ea	1	100	100
Backfill (Pit only; 50% shrinkage during compaction)	CY	75	10	750
Compaction Tests	Ea	10	50	500

5.	Place Cap			
	Labor			
	–Site/Safety Manager	Hr	6	60	360
	–Technician	Hr	6	30	180
	–Equipment Operator	Hr	6	45	270
	Fuel/Materials	Ea	1	100	100
	Two–foot Compacted Clay	CY	15	8	120
	Compaction Tests	Ea	4	50	200
	Topsoil	CY	4	10	40
	Seed/Mulch	LS	1	200	200
6.	Dispose of Contaminated Soil and Piping				
	(Labor for loading contami–nated soil included above)				
	Transportation	LD	4	1,200	4,800
	Disposal (50 CY at 15% expansion, 1.4 tons/CY)	TN	80	250	20,125
7.	Decontamination				
	Labor				
	–Technician	Hr	6	30	180
	Pressure Washer	Wk	1	250	250
	Polyethylene	Ea	2	50	100
	Supplies (misc.)	Ea	1	200	200
8.	Health & Safety Equipment				
	Protective Clothing	M–Dy	2	75	150
	Vapor Monitoring	Wk	1	300	300
	Supplies (misc.)	Ea	1	200	200
9.	Other Direct Costs				
	Project Vehicle	Wk	1	250	250
	Per Diem	M–Dy	10	75	750
10.	Demobilization				
	Labor				
	–Site/Safety Manager	Hr	4	60	240
	–Technician	Hr	4	30	120
	–Equipment Operator	Hr	4	45	180

11. Closure Certification				
Labor				
–Registered Engineer	Hr	40	100	4,000
–Clerical	Hr	16	30	480
Other Direct Costs				
–Car Rental	Wk	1	250	250
–Per Diem	M–Dy	5	75	375
–Telephone, copies, etc.	Ea	1	100	100
12. Notice in Deed to Property				
Labor				
–Registered Engineer	Hr	2	100	200
–Project Engineer	Hr	8	60	480
–Clerical	Hr	8	30	240
Surveyor	Dy	1	600	600
Other Direct Costs				
–Car Rental	Dy	1	75	75
–Per Diem	M–Dy	1	75	75
–Telephone, copies, etc.	Ea	1	100	100
B. Installation of Monitoring Wells				
1. Mobilization/Demobilization	LS	1	1,000	1,000
2. Installation				
Labor				
–Field Geologist	Hr	40	50	2,000
Other Direct Costs				
–Car Rental	Wk	1	250	250
–Per Diem	M–Dy	5	75	375
–Telephone, copies, etc.	Ea	1	100	100
Drilling	LS	1	4,500	4,500
Surveyor	Dy	1	600	600

GRAND TOTALS

SUBTOTAL	53,285
PROJECT MANAGEMENT @ 10%	5,329
PROJECT ADMINISTRATION @ 10%	5,329
SUBTOTAL	63,942
CONTINGENCY @ 10%	6,394
TOTAL CLOSURE COST	70,336

POST-CLOSURE COSTS

1. Inspections				
Labor				
-Project Engineer (2 hours per quarter)	Hr	8	60	480
Other Direct Costs				
-Telephone, copies, etc.	Ea	1	50	50
2. Recordkeeping				
Labor				
-Project Engineer (2 hours per quarter)	Hr	8	60	480
-Clerical (4 hours per quarter)	Hr	16	30	480
Other Direct Costs				
-Telephone, copies, etc.	Ea	4	25	100
3. Groundwater Monitoring				
Labor				
-Geologist (30 hours per quarter)	Hr	120	45	5,400
-Technician (20 hours per quarter)	Hr	80	30	2,400
-Clerical (4 hours per quarter)	Hr	16	30	480
Laboratory				
- VOC 8240	Ea	16	180	2,880
- Chromium	Ea	16	15	240
- Cadmium (4 Samples/Qtr)	Ea	16	15	240
- SVOC 8270 (4 Samples/Yr)	Ea	4	375	1,500
-20% QA/QC Samples	Yr	1	20%	972
Other Direct Costs				
-Car Rental	Dy	8	75	600
-Per Diem	M-Dy	8	75	600
-Telephone, copies, etc.	Ea	4	100	400
-Equipment	Dy	8	60	480
-Supplies	Ea	4	300	1,200
4. Totals				
ANNUAL SUBTOTAL				18,982
30 YEAR TOTAL				569,460

APPENDIX C

GROUNDWATER SAMPLING AND ANALYSIS PLAN

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I. DESCRIPTION OF THE GROUNDWATER MONITORING SYSTEM

A. DESCRIPTION OF SITE GEOLOGY AND HYDROGEOLOGIC CONDITIONS

1) Site Geology

The AD&F facility is located in Buncombe County, North Carolina, which lies within the Blue Ridge Physiographic Province of western North Carolina. This province is characterized by elevations ranging from 1,500 to 6,400 feet above mean sea level and topography that ranges from steep sided mountains to broader, stream worn valleys (Trapp, 1970).

The dominant rock types in the Buncombe County area are meta-graywacke and muscovite-biotite schist. The geologic map of the Oteen Quadrangle, North Carolina (U.S. Geological Survey, 1972) describes the bedrock in the Bee Tree Creek Valley, located adjacent to the AD&F site, as a garnetiferous mica schist. Most of the overburden layer in Buncombe County is made up of saprolite, fluvial deposits, and topsoil, with the saprolite being the most abundant overburden material. The unconsolidated overburden ranges from less than one foot to greater than 100 feet in thickness (Westinghouse, 1989).

Borings installed at the site by Westinghouse confirm that the site geology is consistent with regional geology. Site-specific soil data indicate that the surficial sediments consist of topsoil, fluvial silts, sands and clays, fill material, and saprolite (weathered schist). These unconsolidated sediments are underlain by bedrock composed of garnetiferous mica schist. The thickness of the unconsolidated sediments ranges from 26 to 64 feet below land surface.

2) Regional Hydrogeology

The climate in Buncombe County is considered temperate. The approximate average annual precipitation is between 39 and 56 inches per year, most of which is in the form of rain (Trapp, 1970). Bee Tree Creek runs adjacent to the site and drains into the Swannanoa River, which flows westward to the French Broad River. The French Broad River lies within the Tennessee River Drainage Basin.

Hydrogeologic units have been defined on the basis of rock types (e.g., muscovite-schist and igneous intrusives) (Daniel, 1987). Many of the hydrologic units in Buncombe County owe their porosity and permeability to secondary structures such as fractures, joints, and solution cavities. Well yields in Buncombe County range from 3 to 20

gallons per minute, with some well yields reportedly as high as 60 gallons per minute (Trapp, 1970). In general, wells screened in bedrock have greater yields than those screened in the overlying unconsolidated sediments.

Groundwater temperatures in Buncombe County are usually between 50°F and 60°F. Most of the groundwater in Buncombe County is calcium-sodium-bicarbonate type water with sodium and calcium being in relatively equal proportions and magnesium the least abundant of the ions depending on the thickness, extent, and permeability of the overlying saprolite.

Beneath the AD&F site lie distinct surficial and bedrock aquifers. Water-level data indicate the surficial and bedrock aquifers are interconnected.

The shallow surficial aquifer lies within the unconsolidated sediments to a depth of approximately 50 to 64 feet below land surface. Depth to water in this unconfined aquifer ranges from approximately 5 feet at the northern edge of the property to approximately 22 feet toward the southern edge (Westinghouse, 1989).

The shallow surficial aquifer is underlain by a bedrock aquifer composed primarily of garnetiferous mica schist. Groundwater in the bedrock aquifer may occur under confined and unconfined conditions depending on the thickness, extent, and permeability of the overlying saprolite.

Groundwater movement in the surficial aquifer may be highly variable due to heterogeneties in the surficial sediments and saprolite. Groundwater movement in the bedrock aquifer occurs primarily through joints, fractures, and cleavage planes. The direction of groundwater flow in the bedrock aquifer may be controlled by the occurrence of these features.

B. WELL COMPLETION REPORTS

The well completion report for MW-1 is included as an Exhibit. Three monitoring wells (MW-12, MW-13, and MW-14) are proposed for installation as a part of this plan. Once the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) has approved installation and well construction is completed, copies of the well completion reports will be submitted.

C. FACILITY MAP

A site map showing the locations of the monitoring wells, the former waste tetrachloroethylene underground storage tank (UST) area, the drain pipe, and the French drain is provided in Figure 1. Figure 1 also indicates groundwater flow direction as a result of water-level monitoring conducted on October 29, 1991.

D. WELL CONSTRUCTION DETAILS

Construction details for the existing monitoring well No. 1 are as follows:

Total Depth:	30 feet
Elevation of Open Interval:	
Top:	2187.56
Bottom:	2177.36
Measuring Point Elevation (Top of PVC):	2199.92
Ground Surface Elevation:	2198.18

Well construction details associated with MW-12, MW-13, and MW-14 will be submitted upon approval by the DEHNR and following installation.

II. DOCUMENTATION OF SAMPLING ACTIVITIES

All information pertinent to field activities including sampling must be recorded in various forms (logbooks, sample tags, photographs, etc.). Each field worker must keep detailed records of inspections, investigations, and photographs taken, and must thoroughly review all notes before leaving the site.

With respect to field activities, all information will be entered in a bound logbook with consecutively numbered pages. Because sampling situations vary, notes should be descriptive and inclusive of relevant information. Persons reading the entries should be able to reconstruct the sampling situation from the recorded information. Signatures of the sampler(s) or the designated sampling team leader (a team leader is the field investigator assigned to be present during the collection of specific samples and to be responsible and knowledgeable of all activities directly related to collection of the samples) will be required on a daily basis. All entries by other persons will also require signature prior to any additional entries being made.

A. LOCATION OF THE SAMPLE COLLECTION LOGBOOK

The sample collection logbook shall remain on the AD&F facility at all times so as to maintain overall availability and security. Mr. Steven Pegg, Director of Employee Relations for AD&F, will serve as the document control representative for the sample collection logbook. A system of signature

release will be instituted such that the custody of the logbook will be known at all times.

B. LOGBOOK ENTRIES - GENERAL

All logbook entries shall be made in ink and include the following general information as a minimum:

1) Names of People Present

To include agency or company affiliation, purpose of presence during the sampling event (i.e., general oversight, sampler, subcontractor, etc.), site entry/exit times.

2) Date of Sampling Event

All entries to the logbook will be dated and times noted using military time. All entries will be signed at the end of the day or before someone other than the team leader writes in the logbook.

3) Environmental Conditions

As a matter of record, general environmental conditions will be noted on a daily basis. Entries shall include temperature, rainfall events, standing water, unusual site or facility activities, etc.

C. LOGBOOK ENTRIES - INDIVIDUAL WELL SPECIFIC

All aspects of sample collection and handling are to be recorded on a well specific basis in the sample collection logbook. All sample collection equipment, field analytical equipment, and equipment utilized for obtaining physical measurements shall be identified. All calculations, results, and calibration data for field instrumentation shall also be recorded. All field analyses and measurements will be traceable to the specific piece of field equipment utilized and to individual personnel collecting the sample, making the measurement, or performing the field analyses.

For purposes of this sampling and analysis plan, the following information shall be recorded at each sampling location:

1) Unusual site conditions such as damaged well casings, missing well covers, locking well caps not secured, etc.

2) Specific equipment for obtaining water-level and well depth measurements.

3) Time and dates associated with water-level measurements and well purging.

4) Initial field measurements for depth of static water level and depth of well relative to the well specific measuring point.

5) All calculations to determine the volume of water in the respective well for purposes of purging.

6) Specific equipment for purging of individual wells.

7) All field measurements (pH, specific conductance, and temperature) collected while the well is being purged.

8) Time and dates associated with sample collection.

9) Specific equipment utilized for sample collection.

10) Types and numbers of sample containers filled at each well inclusive of preservative, sample volume, and special handling procedures (i.e., storage).

In addition to the aforementioned, any problems encountered such as equipment failures, broken glassware, potential for contamination, etc. shall also be noted in the sampling logbook.

III. WATER-LEVEL MONITORING

All groundwater level measurements, as well as total depth measurements, will be referenced to an established measuring point as indicated on the well casing. The measuring point for all AD&F wells has been surveyed and referenced to a common datum (National Geodetic Vertical Datum). Measuring point elevations shall be recorded in the field logbook for easy referral. Similar procedures will be implemented for the installation of new wells MW-12, MW-13, and MW-14.

Static water levels will be measured in all on-site wells prior to any purging activities. Prior to commencing water-level measuring activities, the activities described in the following paragraphs will be implemented.

A. EFFORTS TO MINIMIZE POTENTIAL CONTAMINATION

1) A review of all historical analytical data shall be performed to establish a water-level monitoring regime that will proceed from the least contaminated well to the most contaminated. The exact sequence of water-level measurements by well number shall be recorded as a part of the field log.

2) Verify that water levels have been allowed to equilibrate for a minimum of 24 hours from the time at which any water has been removed or injected into the specific well.

3) Prepare the well area by placing a plastic apron on the ground surface around the well to minimize the potential for contamination from the ground surface.

4) Verify that the water-level indicator to be employed has been properly decontaminated (thoroughly rinsed with deionized water) prior to use.

5) Latex gloves shall be worn throughout all water-level monitoring procedure. At each well location, a change of gloves will be required.

B. STATIC WATER-LEVEL/MEASUREMENTS

During each discrete water sampling event, a static water-level measurement will be taken from each of the four wells identified in the closure/post-closure plan using an electronic water-level probe or steel tape. Water levels will be measured to an accuracy of 0.01 feet. All water-level measurements conducted to determine water-level elevations shall be recorded in the field logbook.

C. TOTAL WELL DEPTH MEASUREMENTS

During each discrete water sampling event, a determination of total well depth for the wells will be made using an electronic-water indicator or weighted tape. Actual measurements will be accomplished by lowering the tape or cable until the weighted end is detected resting on the bottom of the well. All total well depth measurements must be made to an accuracy of 0.01 feet. All measurements and calculations to determine well depth elevations shall be recorded in the field logbook.

IV. GROUNDWATER SAMPLE COLLECTION PROCEDURES

A. WELL PURGING

Prior to the collection of any groundwater samples from the AD&F wells, purging of the stagnant water must occur. Purging of appropriate well volumes and monitoring field measurements of pH, specific conductance, and temperature, will ensure that the samples collected are truly representative of the groundwater aquifer. The following equipment and/or procedures shall be employed during the well purge process:

1) Equipment and Use

Purging of the wells will involve the determination of static water levels using an electronic water-level indicator or steel tape as described previously. Once the total well volume of the water column is determined via calculation, standard operating procedures calls for the purging of three to five well volumes prior to sample collection.

Well purging will employ the use of a submersible bladder pump or teflon bailer.

a) Submersible Bladder Pump - pump will be of a Teflon bladder and lowered into the top of the standing water column to "pull" water from the formation.

b) Teflon Bailer - closed-top Teflon bailer with dedicated nylon rope (i.e., new rope for each well) lowered into top of water column, allowed to fill, and removed. Extreme care will be taken to lower the bailer into the water column at a very slow rate so as not to stir up sediments which may have collected in the well.

To avoid the potential for contamination and minimize the possibility of dermal absorption of contaminants, protective/non-reactive gloves (latex undergloves, nitrile outer gloves) will be worn during all purging operations. Additionally, new plastic sheeting shall be placed on the ground around the well to provide a clean working area and minimize ground surface contact.

2) Well Purge Volume

In order to purge wells properly, the volume of water in the well must be determined. The following method shall be used to determine well volumes for purging purposes:

a) Measure the distance from the bottom of the well to the top of the static water level. All measurements shall be to the nearest 0.01 feet. Record measurements in field logbook.

b) Measure the inside diameter of the well casing. All measurements shall be to the nearest 0.1 inch. Record measurement in field logbook.

c) Calculate well volume using the following formula:

$$V = 0.041\ d^2h$$

where: h = depth of water in feet
d = diameter of well in inches
V = volume of water in gallons

All calculations to determine well volumes shall be recorded in the field logbook.

d) Standard procedures call for a minimum of three well volumes to be purged prior to collecting any samples. If a well is pumped dry, this constitutes an adequate purge and the well can be sampled following recovery. However, if possible, monitoring wells shall not be pumped to dryness as this creates the possibility that water trapped in the sandpack may be sampled and allows for the stripping of volatile contaminants as water re-enters the well and trickles down the well screen.

3) Field Measurements

During the well purge process, pH, specific conductance, and temperature will be measured utilizing direct reading instruments. As previously indicated, a minimum of three well volumes will be purged from all wells. If after three volumes are purged, pH, specific conductance, and temperature have not stabilized; the well purging will continue until such time as stabilization has been achieved or a total of five well volumes are purged. All field measurements of pH, specific conductance, and temperature will be recorded in the field logbook. Direct reading instruments will be thoroughly rinsed with deionized water following each and every measurement.

4) Purge Water Collection

All purge water will be collected in lined 55-gallon drums. These drums will be labeled with the well numbers from which the purge water came utilizing a waterproof marker. Specific dates of purging will also be noted on the drums. Appropriate samples to classify purge waters for subsequent disposal will be collected and forwarded to the laboratory for analyses. All purge waters will be disposed of in a manner which is consistent with regulatory requirements. Arrangements for disposal of the purge waters will occur within 90 days of collection. Documentation relative to the disposal of purge waters will be maintained at the AD&F facility within a dedicated file.

5) Decontamination

All purging equipment will be decontaminated prior to use at another well location. Standard procedures for the decontamination of purging equipment (i.e., pump, bailer) is as follows:

a) Submersible Bladder Pump

Phosphate-free soap and tap water rinse (scrub to remove solid soil particles)
Tap water rinse
Deionized or distilled water rinse
Isopropyl alcohol rinse
Deionized or distilled water rinse
Air dry
Aluminum foil wrap

All rinse waters will be contained in 55-gallon drums in combination with the collection of purge water. Teflon tubing utilized in the well purge process will be decontaminated.

b) Teflon Bailer

Phosphate-free soap and tap water rinse (scrub to remove solid soil particles)
Tap water rinse
10% nitric or 10% HCl rinse
Deionized or distilled water rinse
Air dry
Aluminum foil wrap

All rinse waters will be contained in 55-gallon drums in combination with the collection of purge water.

B. WELL SAMPLING PROCEDURES

The objectives of conducting well sampling are to obtain a representative sample of the groundwater for analysis. The following summarizes the procedures which will be employed during well sampling activities at the AD&F facility:

1) Equipment

Groundwater samples will be collected using a clean Teflon bailer with a bottom fill valve. The bailer will be lowered slowly into the wells to prevent degassing of the water and the stirring of well bottom sediments. Once the bailer is filled, it will be removed from the well.

The water sample will then be carefully transferred into the appropriately preserved (if required) sample containers. In order to minimize the potential for contamination, a clean pair of latex gloves with outer nitrile gloves will be worn. As previously indicated, a plastic apron will be placed around the well to minimize direct contact of the sampling equipment with the ground surface.

2) Sample Containers, Preservatives, and Holding Times

Specific types of sample containers to be utilized for AD&F sampling events are dictated by the specific analysis to be performed. Standard container designation is based on factors such as required volume to perform the specific analysis inclusive of QA/QC (spikes, duplicates), sensitivity of the analytes to photodegradation, and overall reactivity of the sample and/or preservative.

Table 1 presents a summary of the standard sample containers, preservatives, and holding times for the parameters to be analyzed as part of the AD&F sampling and analysis plan. This information is based on the most recent revision (February 1991) of the *EPA Region IV Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual.*

3) Decontamination

All sampling equipment will be decontaminated prior to use at another well location. All rinse waters will be contained in 55-gallon drums in combination with the collection of purge water. Standard procedures for the decontamination of the Teflon bailer used for sampling are as follows:

Phosphate-free soap and tap water rinse (scrub to remove solid soil particles)
Tap water rinse
10% nitric or 10% HCl rinse
Deionized or distilled water rinse
Isopropyl alcohol rinse
Deionized or distilled water rinse
Air dry
Aluminum foil wrap

TABLE 1

SUMMARY OF STANDARD SAMPLE CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

Parameter	Container	Preservative	Holding Time
Volatile Organics	3-40 ml VOA containers with Teflon lined septum sealed caps	None	7 days
Metals	1-Liter polyethylene with polyethylene lined closure	50% Nitric Acid pH <2	6 months
Extractable Organics	1 gallon amber glass with Teflon liner	None	7 days (extraction)

4) Special Sample Collection Considerations

a) Sample containers will be filled in the following order:

1) Volatile organic analytes
2) Semi-volatile analytes
3) Metals

b) Volatile Organics - Samples collected for volatile organics shall be collected in glass bottles with a Teflon covered septum top. Samples shall have no headspace in order to prevent volatilization. Samples shall not be filtered prior to transfer to sample containers.

c) Metals - Samples collected for metals analysis shall not be filtered prior to transfer to sample containers.

V. SAMPLE IDENTIFICATION, CHAIN-OF-CUSTODY, AND SHIPMENT

A. SAMPLE LABELS

Using a waterproof marker, each sample container will be labeled (affixed) with the following information:

- Site Name
- Well Number
- Date of Sample Collection
- Time of Sample Collection
- Specific Sample Identification Number
- Parameters to be Analyzed
- Type of Preservative, if any
- Sampler's Initials

An example of the sample label to be used is included as Figure 2. The time and date of sample collection for each well will be recorded in the field logbook. Names of the sampler(s) will also be recorded.

B. SAMPLE IDENTIFICATION

Using a waterproof marker, each sample container will be identified using the following nomenclature:

ADF-WS-MW-10-01

BOTTLE LABEL FOR ALL PARAMETERS EXCEPT VOA, TC, FC

WESTON/GULF COAST LABORATORIES 2417 Bond Street University Park, IL 60466 (708) 534-5200 WESTON/GULF COAST LABORATORIES

BEND & PEEL

Sample Date: ____/____/____

Sample Time: _____ : _____ AM PM

Date Submitted: ____/____/____

Description _____

_____

_____ Sampled by: _____

WATER: ___ Other

___ Surface ___ Ground ___ Waste ___ Drinking

___ WASTE ___ SOIL ___ OTHER

___ Y ___ N : Is Sample Filtered?

___ Y ___ N : Are Sample Preservatives Added?

___ Y ___ N : Are Known Hazardous Substances Present?

SAMPLE MANAGEMENT

___ Municiple Discard ___ IEPA

___ Incinerate ___ USEPA

___ Special Handling Required

___ Return to Customer

___ Additional Analyst Information

RFW# _____

Bottle _____ of _____

ANALYSIS

___ General Inorganics ___ TOC ___ TOX

___ BNA ___ FOG ___ Phenols

___ Pesticides ___ PCB ___ Cyanide

___ Nutrients ___ Metals ___ Sulfide

___ Other _____

LIMITED SAMPLE GRID

FIGURE 2 - SAMPLE LABEL

where:	ADF:	Asheville Dyeing and Finishing
	WS:	Water Sample
	MW-10:	Monitoring Well No. 10
	01:	First Round of Sample Collection

Additional rounds of sample collection will be numbered consecutively. Specific analyses to be performed for each sample collected will be identified on the sample label as previously described in the previous section.

C. SAMPLE PACKAGING AND SHIPMENT

1) Field QA/QC samples will be collected in the field as follows:

   a) One trip blank will be included in every sample shipment that contains volatile organic analytes.

   b) One equipment blank will be collected per day that the equipment is used.

   c) If airborne contaminants are detected during a sampling event, a field blank will be collected at that location.

2) Once sample containers are filled, sealed, wiped dry and labeled, a chain-of-custody seal will be placed on each individual sample bottle. The chain-of-custody seal will be signed and dated by the sampler. All samples will be placed in watertight plastic bags to help prevent cross contamination between samples should any sample containers leak or break. All packaged samples will subsequently be placed into a plastic insulated cooler packed with ice and/or freezer packs for preservation. In addition, vermiculite and/or other packing materials will also be placed between sample jars to minimize the potential for breakage during shipment. Completed chain-of-custody forms (see Subsection D) will be enclosed within a watertight plastic bag and placed atop of the samples for easy access. Once all interior packaging has been completed, the cooler will be closed and chain-of-custody tags will be affixed to ensure sample integrity during shipment. If samples are shipped via overnight carrier for next day delivery to the laboratory, the final step in the shipment process will be the completion of the shipping document and pick-up/delivery of the samples to the courier.

The designated project leader will contact the respective laboratory the day of sample arrival to confirm delivery and to be made aware of any samples which may have been broken.

D. CHAIN-OF-CUSTODY

The primary objective of chain-of-custody documentation is to create an accurate written record which can be used to trace the possession and handling of a sample from the moment of collection through analysis (and its introduction as evidence, if applicable).

Procedures to be employed during all sampling and analysis activities at the AD&F facility to ensure the overall integrity of samples and establish formal documentation are as follows:

1) Chain-of-Custody Seals

As individual samples are collected and prepared for shipment, a chain-of-custody seal (Figure 3) will be affixed to each respective container in a manner that would distinguish any efforts at tampering and/or handling. Chain-of-custody seals will also be applied to the exterior of the shipping cooler as a means of ensuring sample integrity. Upon receipt of the samples by the lab, any broken chain-of-custody seals would be noted and reported to the project leader.

2) Chain-of-Custody Record

Each package which is prepared for shipment to the laboratory will be accompanied by a chain-of-custody record which has been designated as a controlled document (i.e., tracking number assigned).

Once all samples are collected for the day, a chain-of-custody record will be completed. The chain-of-custody record will serve as the documentation of sample travel from the field to the laboratory. Information on the chain-of-custody record will include all sample numbers in the shipment; analyses requested; date of sample collection; total number of samples; sampler's signature, date, and time of release of sample shipment to courier; volume and type of sample containers; and preservatives added (if any). An example of the chain-of-custody record is included in Figure 4.

One copy of the chain-of-custody record will be retained by the shipper (i.e., sampler) prior to release to the courier. Upon arrival of the shipment to the laboratory, the sample custodian will acknowledge arrival by signature on the remaining copies of the record. Any breakage and/or leakage of samples will be noted. Also, a laboratory number (unique to each sample container) will be assigned and noted on the record. Appropriate copies of the record will be retained by the laboratory for internal documentation purposes; however, a completed copy of the record will be returned to the project leader to verify arrival and acceptance of the samples by the laboratory.

CUSTODY SEAL

Date

Signature

WESTON

WESTON

CUSTODY SEAL

Date

Signature

CUSTODY SEAL

Date

Signature

WESTON

WESTON

CUSTODY SEAL

Date

Signature

FIGURE 3 - CHAIN-OF-CUSTODY SEAL

WESTON

Custody Transfer Record/Lab Work Request

Received By _____ Client _____ RFW Contact _____

Date _____ Client Contact _____ Date Due _____

Assigned to _____ Phone _____ Project Number _____

SAMPLE IDENTIFICATION

ANALYSES REQUESTED

Sample No.	Client ID No.	Description	Matrix	Date Collected	Container/Preservative								

Matrix:

S- Soil DS- Drum Solids

W- Water DL- Drum Liquids

O- Oil X- Other

Special Instructions:

Items/Reason	Relinquished By	Received By	Date	Time	Items/Reason	Relinquished By	Received By	Date	Time

RFW 21-21-001/A-3/86

FIGURE 4 - CHAIN-OF-CUSTODY RECORD

VI. SAMPLE METHODS

All samples that are submitted to the laboratory will be analyzed using EPA approved methods as specified by EPA SW-846 or other established EPA methods as noted. This section lists the EPA methods that will be used relative to the work being performed for AD&F.

A. FIELD ANALYTICAL PROCEDURES

Parameter	Method	Reference
pH	9040	EPA SW-846
Conductivity	120.1	EPA 600 Series
Temperature	170.1	EPA 600 Series

Note: Methods for Chemical Analysis of Water and Wastes, U.S.-EPA, Publ. No. 600-4-79-0200, 1979 (and subsequent revisions).

B. LABORATORY ANALYTICAL PROCEDURES

Parameters listed in the following subsections will be analyzed at the off-site laboratory using the EP SW-846 methods as indicated.

1) Analytical Procedures for Metals

Parameter	Method	Description
Cadmium	6010	Inductively Coupled Plasma
Chromium	6010	Inductively Coupled Plasma

2) Analytical Procedures for Volatile Organics

Samples that are analyzed for volatile organics will be done so using EPA Method 8240 (SW-846). The list of parameters is as follows:

Chloromethane	1,1 Dichloroethene
Bromomethane	1,1 Dichloroethane
Vinyl Chloride	1,2 Dichloroethene (Total)
Chloroethane	Chloroform
Methylene Chloride	1,2 Dichloroethane
Acetone	1,2 Dichloropropane

Carbon Disulfide	cis-1,3-Dichloropropene
Trichloroethene	2-Butanone
Dibromochloromethane	1,1,1-Trichloroethane
1,1,2-Trichloroethane	Carbon Tetrachloride
Benzene	Vinyl Acetate
trans-1,3-Dichloropropene	Bromodichloromethane
Bromoform	Toluene
4-Methyl-2-Pentanone	Chlorobenzene
2-Hexanone	Ethylbenzene
Tetrachlorethene	Styrene
1,1,2,2-Tetrachloroethane	Xylene (Total)

3) Analytical Procedures for Semi-Volatile Organics

Analytical procedures for semi-volatile organics will be performed using EPA Method 8270 (SW-846). The list of parameters is as follows:

Phenol	3-Nitronaniline
bis(2-chloroethyl)ether	Acenapthene
2-Chlorophenol	2,4-Dinitrophenol
1,3-Dichlorobenzene	4-Nitrophenol
1,4-Dichlorobenzene	Dibenzofuran
Benzyl Alcohol	2,4-Dinitrotoluene
1,2-Dichlorobenzene	Diethylphthalate
2-Methylphenol	4-Chlorophenylether
bis(2-Chloroisopropyl)ether	Fluorene
4-Methylphenol	4-Nitroaniline
N-Nitroso-di-n-propylamine	4-6-Dinitro-2-methylphenol
Hexachloroethane	N-Nitrosodiphenylamine
Nitrobenzene	4-Bromophenyl-phenylether
Isophorone	Hexachlorobenzene
2-Nitrophenol	Pentachlorophenol
2,4-Dimethylphenol	Phenanthrene

1,2,4-Trichlorobenzene	Anthracene
Naphthalene	Di-n-butlyphthalate
4-Chloroaniline	Fluoranthene
Hexachlorobutadiene	Pyrene
4-Chloro-3-methylphenol	Butlybenzylphthalate
2-Methylnaphthalene	3,3'-dichlorobenzidene
Hexachlorocyclopentadiene	Benzo(a)anthracene
2,4,6-Trichlorophenol	Chrysene
2,4,5-Trichlorophenol	bis(2-Ethylhexyl)phthalate
2-Chloronaphthalene	Di-n-octylphthalate
2-Nitroaniline	Benzo(b)fluoranthene
Dimethylphthalate	Benzo(a)pyrene
Acenaphthylene	Indeno(1,2,3-cd)pyrene
2,6-Dinitrotoluene	Benzo(a,h)anthracene
	Benzo(g,h,i)perylene

C. LABORATORY QA/QC

All analytical work to be performed by the laboratory will be done so in accordance with EPA protocols in accordance with an approved laboratory QA/QC plan. As required by the specific protocol or as a part of the internal laboratory procedures, a system of standards, blanks, duplicates, and spiked samples for calibration and maintaining the quality of data will be employed. Data from QC samples (i.e., blanks, spikes) are used by the laboratory as a measure of performance or as an indicator of a potential source of cross-contamination. Analytical data reported by the laboratory shall be inclusive of QA/QC data specific to AD&F samples.

The laboratory to be used will be certified in North Carolina, if applicable.

VII. SCHEDULE FOR SAMPLE REPORTING

A. SAMPLE DATES

Sampling efforts in association with post-closure activities will be performed quarterly during the first year (March, June, September, and December) and semi-annually thereafter (June and December). The first round of sampling will occur during an appropriate month within 90 days of approval of the

Closure/Post-Closure Plan by the State or in accordance with an alternate schedule to be negotiated as a part of an overall groundwater assessment program being conducted at the AD&F site.

B. WELLS TO BE SAMPLED

Sampling will be conducted on monitoring wells MW-1, MW-12, MW-13, and MW-14. The locations of MW-12, MW-13, and MW-14 are proposed and subject to approval by the DEHNR.

C. PARAMETERS FOR ANALYSIS

Specific parameters to be analyzed are detailed in Section VI. Chromium, cadmium, and volatiles will be analyzed on a quarterly basis for the first year and semi-annually thereafter; semi-volatiles will be analyzed on an annual schedule.

D. REPORTING OF ANALYTICAL DATA

Analytical results of well sampling events will be submitted to the State within 60 days of sample collection. Reports of data shall specify collection date, well number, and the corresponding well-specific analytical results.

LIST OF REFERENCES

Trapp, Henry, Jr., 1990. Geology and Groundwater Resources of the Asheville Area, North Carolina; North Carolina Department of Water and Air Resources, Groundwater Bulletin 16, 127 p.

Westinghouse Environmental Services, Inc., January 1989. Phase II Hydrological Assessment, Asheville Dyeing and Finishing Company, Swannanoa, North Carolina.

Daniel, Charles C., 1987. Statistical Analysis Relating Well Yield to Construction Practices and Siting of Wells in the Piedmont and Blue Ridge Provinces of North Carolina; U.S. Geological Survey Water Resources Investigations Report 86-4132, 54 p.

Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual, U.S.-EPA, Region IV, ESD, Athens, Georgia, February 1, 1991 (and subsequent revisions).

U.S.-EPA, *Test Methods for Evaluating Solid Waste*, SW-846, Office of Solid Wastes, Washington, DC, 1982.

U.S.-EPA, Methods for Chemical Analyses of Water and Wastes, Publ. No. 600-4-79-0200, 1979 (and subsequent revisions).

EXHIBIT

WELL COMPLETION REPORTS

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-2

DRILLING CONTRACTOR S&ME Drilling Co.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

OWNER Asheville Dyeing and Finishing

ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

DATE DRILLED 8-22-88 USE OF WELL Monitor

TOTAL DEPTH 18.5' CUTTINGS COLLECTED ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 2.12 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): N/A

CHLORINATION: Type N/A Amount _____

CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.12	To 7.92 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0.00	To 4.80 Ft.	Portland	
From	4.80	To 6.00 Ft.	Bentonite	

SCREEN:

	Depth		Diameter	Slot Size	Material
From	7.92	To 18.12 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

GRAVEL PACK:

	Depth		Size	Material
From	6.00	To 18.50 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	Depth To	Formation Description
0.0'	2.0'	TOPSOIL
2.0'	6.0'	Sandy Micaceous SILT (Alluvium)
6.0'	14.5'	Banded Silty Micaceous SAND (Residual)
14.5'	18.5'	Brown Silty Clayey Micaceous SAND
		Boring Terminated at 18.5'

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

H CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-2d

.LING CONTRACTOR S&ME Drilling Co.

LER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

'LL LOCATION: (Show sketch of the location below)

arest Town: Swannanoa

Farm School Road

oad, Community, or Subdivision and Lot No.)

County: Buncombe

.WNER Asheville Dyeing and Finishing

DDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

ATE DRILLED 8-31-88 USE OF WELL Monitor

OTAL DEPTH 69.4' CUTTINGS COLLECTED ☒ Yes ☐ No

OES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

TATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 0.85 FT. ABOVE LAND SURFACE.

IELD (gpm): _____ METHOD OF TEST _____

ATER ZONES (depth): N/A

HLORINATION: Type N/A Amount _____

DRILLING LOG

Depth From	Depth To	Formation Description
0.0'	2.0'	TOPSOIL
2.0'	6.0'	Sandy Micaceous SILT
6.0'	14.5'	Banded Silty Micaceous SAND
14.5'	64.0'	Banded Slightly Clayey Silty Micaceous SAND
64.0'	69.4'	Garnetiferous Mica SCHIST
		Boring Terminated at 69.4'

If additional space is needed use back of form.

CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	+0.85	63.66	2.0"	0.188"	PVC

GROUT:

	Depth From	Depth To	Material	Method
	0.00	58.00	Portland	
	58.00	59.00	Bentonite	

SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	63.66	68.74	2.0 in.	0.010 in.	PVC
			in.	in.	
			in.	in.	

GRAVEL PACK:

	Depth From	Depth To	Size	Material
	59.00	69.40		Sand

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

DATE

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-3

DRILLING CONTRACTOR S&ME Drilling Co.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

OWNER Asheville Dyeing and Finishing

ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

DATE DRILLED 8-23-88 USE OF WELL Monitor

TOTAL DEPTH 25.0' CUTTINGS COLLECTED ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 1.73 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): N/A

CHLORINATION: Type N/A Amount _____

CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.73	To 13.27 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0.00	To 9.00 Ft.	Portland	
From	9.00	To 10.50 Ft.	Bentonite	

SCREEN:

	Depth		Diameter	Slot Size	Material
From	13.27	To 23.47 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

GRAVEL PACK:

	Depth		Size	Material
From	10.50	To 25.00 Ft.		Sand
From		To Ft.		

Depth From	Depth To	DRILLING LOG Formation Description
0.0'	3.0'	Tan Silty CLAY
3.0'	8.0'	Gray Slightly Silty Sandy CLAY
8.0'	13.0'	Mottled Silty Micaceous SAND
13.0'	25.0'	Banded Silty Micaceous SAND
		Boring Terminated at 25.0'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-3d

DRILLING CONTRACTOR: S&ME Drilling Co.

DRILLER REGISTRATION NUMBER: 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

County: Buncombe

Farm School Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Asheville Dyeing and Finishing

ADDRESS: Farm School Road P.O. Box 337
(Street or Route No.)
Swannanoa North Carolina 28778
City or Town State Zip Code

DATE DRILLED: 9-1-88 USE OF WELL: Monitor

TOTAL DEPTH: 55.8' CUTTINGS COLLECTED: ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 1.93 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): N/A

CHLORINATION: Type N/A Amount _____

CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
+1.93	50.19		2.0"	0.188"	PVC

GROUT:

Depth From	To	Ft.	Material	Method
0.00	46.20		Portland	
46.20	47.40		Bentonite	

SCREEN:

Depth From	To	Ft.	Diameter	in.	Slot Size	in.	Material
50.19	55.27		2.0		0.010		PVC

GRAVEL PACK:

Depth From	To	Ft.	Size	Material
47.40	55.80			Sand

DRILLING LOG

Depth From	To	Formation Description
0.0'	3.0'	Tan Silty CLAY
3.0'	8.0'	Gray Slightly Silty Sandy CLAY
8.0'	13.0'	Mottled Silty Micaceous SAND
13.0'	53.5'	Banded Slightly Clayey Silty Micaceous SAND
53.5'	55.8'	Garnetiferous Mica SCHIST
		Boring Terminated at 55.8'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-4

DRILLING CONTRACTOR S&ME Drilling Co.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

2. OWNER Asheville Dyeing and Finishing

ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)
Swannanoa North Carolina 28778
City or Town State Zip Code

DATE DRILLED 8-23-88 USE OF WELL Monitor

. TOTAL DEPTH 25.0' CUTTINGS COLLECTED ☒ Yes ☐ No

. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

. STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 2.01 FT. ABOVE LAND SURFACE.

. YIELD (gpm): _____ METHOD OF TEST _____

. WATER ZONES (depth): N/A

. CHLORINATION: Type N/A Amount _____

0. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2.01	13.30 Ft.	2.0"	0.188"	PVC
		Ft.			
		Ft.			

. GROUT:

	Depth From	To	Material	Method
	0.00	9.00 Ft.	Portland	
	9.00	10.70 Ft.	Bentonite	

. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	13.30	23.50 Ft.	2.0 in.	0.010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

. GRAVEL PACK:

	Depth From	To	Size	Material
	10.70	25.00 Ft.		Sand
		Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	4.5'	Tan Sandy Silty CLAY (Alluvium)
4.5'	5.5'	Silty Garnetiferous Micaceous SAND
5.5'	13.5'	Mottled Slightly Sandy Silty CLAY
13.5'	25.5'	Banded Silty Micaceous SAND
		Boring Terminated at 25.0'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-5

DRILLING CONTRACTOR S&ME Drilling Co.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

2. OWNER Asheville Dyeing and Finishing

ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

DATE DRILLED 8-24-88 USE OF WELL Monitor

1. TOTAL DEPTH 26.0' CUTTINGS COLLECTED ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 2.01 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

. WATER ZONES (depth): N/A

CHLORINATION: Type N/A Amount _____

). CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.01	To 15.70 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

. GROUT:

	Depth		Material	Method
From	0.00	To 12.00 Ft.	Portland	
From	12.00	To 13.25 Ft.	Bentonite	

. SCREEN:

	Depth		Diameter	Slot Size	Material
From	15.70	To 25.90 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

GRAVEL PACK:

	Depth		Size	Material
From	13.25	To 26.00 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	3.5'	Red Sandy CLAY (Fill)
3.5'	5.5'	Tan Sandy Silty CLAY (Fill)
5.5'	6.0'	TOPSOIL
6.0'	18.5'	Brown Mottled Silty Clayey Micaceous SAND
18.5'	26.0'	Banded Clayey Silty Micaceous SAND
		Boring Terminated at 26.0'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-5d

DRILLING CONTRACTOR S&ME Drilling Co.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

2. OWNER Asheville Dyeing and Finishing

ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

3. DATE DRILLED 9-7-88 USE OF WELL Monitor

4. TOTAL DEPTH 38.5' CUTTINGS COLLECTED ☒ Yes ☐ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 1.77 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): _____ METHOD OF TEST _____

8. WATER ZONES (depth): N/A

9. CHLORINATION: Type N/A Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.77	To 33.07 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0.00	To 30.00 Ft.	Portland	
From	30.00	To 31.00 Ft.	Bentonite	

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	33.07	To 38.15 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

	Depth		Size	Material
From	31.00	To 38.50 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	3.5'	Red Sandy CLAY (Fill)
3.5'	5.5'	Tan Sandy Silty CLAY (Fill)
5.5'	6.0'	TOPSOIL
6.0'	18.5'	Brown Mottled Silty Clayey Micaceous SAND
18.5'	26.0'	Banded Clayey Silty Micaceous SAND
26.0'	36.0'	Banded Silty Micaceous SAND
36.0'	38.5'	Garnetiferous Mica SCHIST
		Boring Terminated at 38.5'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

14. REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

RTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-6083

WELL CONSTRUCTION RECORD

MW-6

FOR OFFICE USE ONLY

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

RILLING CONTRACTOR S&ME Drilling Co.

LLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

ELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

County: Buncombe

Farm School Road
Road, Community, or Subdivision and Lot No.)

OWNER Asheville Dyeing and Finishing

DDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

ATE DRILLED 8-24-88 USE OF WELL Monitor

OTAL DEPTH 28.8' CUTTINGS COLLECTED ☒ Yes ☐ No

OES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

TATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 1.45 FT. ABOVE LAND SURFACE.

IELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): N/A

CHLORINATION: Type N/A Amount _____

CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.45	To 18.55 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0.00	To 14.50 Ft.	Portland	
From	14.50	To 16.30 Ft.	Bentonite	

SCREEN:

	Depth		Diameter	Slot Size	Material
From	18.55	To 28.75 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

GRAVEL PACK:

	Depth		Size	Material
From	16.30	To 28.80 Ft.		Sand
From		To Ft.		

Depth From	Depth To	DRILLING LOG Formation Description
0.0'	0.5'	TOPSOIL
0.5'	7.0'	Sandy Micaceous Silty CLAY
7.0'	28.8'	Banded Silty Micaceous SAND
		Boring Terminated at 28.8'

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

4 CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-6d

.LING CONTRACTOR S&ME Drilling Co.

.ER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

L LOCATION: (Show sketch of the location below)

..rest Town: Swannanoa

County: Buncombe

Farm School Road

id. Community, or Subdivision and Lot No.)

WNER Asheville Dyeing and Finishing

'DRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

E DRILLED 8-29-88 USE OF WELL Monitor

..AL DEPTH 63.3' CUTTINGS COLLECTED ☒ Yes ☐ No

)ES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

.TIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.

TOP OF CASING IS 1.65 FT. ABOVE LAND SURFACE.

LD (gpm): _____ METHOD OF TEST _____

.TER ZONES (depth): N/A

_ORINATION: Type N/A Amount _____

ASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.65	To 57.85 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

ROUT:

	Depth		Material	Method
From	0.00	To 55.00 Ft.	Portland	
From	55.00	To 56.00 Ft.	Bentonite	

:REEN:

	Depth		Diameter	Slot Size	Material
From	57.85	To 62.94 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

IAVEL PACK:

	Depth		Size	Material
From	56.00	To 63.30 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	0.5'	TOPSOIL
0.5'	7.0'	Sandy Micaceous CLAY
7.0'	61.0'	Banded Silty Micaceous SAND
61.0'	63.3'	Garnetiferous Mica SCHIST
		Boring Terminated at 63.3'

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

MARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

WELL CONSTRUCTION RECORD

MW-7

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR S&ME Drilling Co.
DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Swannanoa
Farm School Road
(Road, Community, or Subdivision and Lot No.)
County: Buncombe

2. OWNER Asheville Dyeing and Finishing
ADDRESS Farm School Road P.O. Box 337
(Street or Route No.)
Swannanoa North Carolina 28778
City or Town State Zip Code

3. DATE DRILLED 8-24-88 USE OF WELL Monitor
4. TOTAL DEPTH 28.5' CUTTINGS COLLECTED ☒ Yes ☐ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
5. STATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING.
TOP OF CASING IS 1.90 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): _____ METHOD OF TEST _____
8. WATER ZONES (depth): N/A
9. CHLORINATION: Type N/A Amount _____
10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.90	To 18.10 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0.0	To 14.50 Ft.	Portland	
From	14.50	To 15.67 Ft.	Bentonite	

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	18.10	To 28.30 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

3. GRAVEL PACK:

	Depth		Size	Material
From	15.67	To 28.50 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	0.5'	TOPSOIL
0.5'	6.5'	Gray Sandy Silty CLAY
6.5'	9.5'	Brown Micaceous Clayey Silty SAND
9.5'	28.5'	Banded Slightly Clayey Silty Micaceous SAND
		Boring Terminated at 28.5'

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

4. REMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contaminarion.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

TH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY

Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-8

ILLING CONTRACTOR S&ME Drilling Co.

LER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0110

LL LOCATION: (Show sketch of the location below)

arest Town: Swannanoa

County: Buncombe

Farm School Road

ad. Community, or Subdivision and Lot No.)

WNER Asheville Dyeing and Finishing

DDRESS Farm School Road P.O. Box 337
(Street or Route No.)

Swannanoa North Carolina 28778
City or Town State Zip Code

TE DRILLED 8-25-88 USE OF WELL Monitor

TAL DEPTH 28.5' CUTTINGS COLLECTED ☒ Yes ☐ No

DES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

ATIC WATER LEVEL: _____ FT. ☐ above ☐ below TOP OF CASING,

TOP OF CASING IS 1.83 FT. ABOVE LAND SURFACE.

ELD (gpm): _____ METHOD OF TEST _____

TER ZONES (depth): N/A

LORINATION: Type N/A Amount _____

ASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+1.83	To 18.31 Ft.	2.0"	0.188"	PVC
From		To Ft.			
From		To Ft.			

ROUT:

	Depth		Material	Method
From	0.00	To 15.00 Ft.	Portland	
From	15.00	To 16.00 Ft.	Bentonite	

CREEN:

	Depth		Diameter	Slot Size	Material
From	18.31	To 28.50 Ft.	2.0 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

RAVEL PACK:

	Depth		Size	Material
From	16.00	To 28.50 Ft.		Sand
From		To Ft.		

DRILLING LOG

Depth From	To	Formation Description
0.0'	3.0'	Sandy Silty CLAY
3.0'	7.0'	Gray Clayey Silty Micaceous SAND
7.0'	28.5'	Banded Clayey Silty Micaceous SAND
		Boring Terminated at 28.5'

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

EMARKS: Constructed for Ground Water Incident No. 3617 - TCE Contamination.

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-8d

DRILLING CONTRACTOR S&ME, Inc.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0114

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

County: Buncombe

Farm School Road
(Road, Community, or Subdivision and Lot No.)

OWNER Anvil Knitwear(Asheville Dyeing & Finishing)

ADDRESS P.O. Box 337
(Street or Route No.)

Swannanoa, NC 28778
City or Town State Zip Code

DATE DRILLED 22 Dec. 88 USE OF WELL Monitor

TOTAL DEPTH 51' CUTTINGS COLLECTED ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: 17.27 FT. ☐ above ☒ below TOP OF CASING.

TOP OF CASING IS 0.50 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): _____

CHLORINATION: Type _____ Amount _____

Depth From	Depth To	DRILLING LOG Formation Description
0.0	0.5	Topsoil
0.5	7.0	Sandy Micaceous Silty CLAY
7.0	30.0	Banded Silty Micaceous SAND
30.0	51.0	Weathered Garnetiferous Mica SCHIST

If additional space is needed use back of form.

. CASING:

From	To	Diameter	Wall Thickness or Weight/Ft.	Material
+0.50	39.60 Ft.	2"	0.188"	PVC.
	Ft.			
	Ft.			

. GROUT:

From	To	Material	Method
0.0	33.2 Ft.	Portland	
33.2	36.5 Ft.	Bentonite	Pellets

. SCREEN:

From	To	Diameter	Slot Size	Material
39.60	49.80 Ft.	2 in.	0.010 in.	PVC
	Ft.	in.	in.	
	Ft.	in.	in.	

. GRAVEL PACK:

From	To	Size	Material
36.5	51.0 Ft.		Sand
	Ft.		

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

MW-10d

DRILLING CONTRACTOR S&ME, Inc.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WM-0114

WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

OWNER Anvil Knitwear(Asheville Dyeing & Finishing)

ADDRESS P.O. Box 337
(Street or Route No.)

Swannanoa, NC 28778
City or Town State Zip Code

DATE DRILLED 21 Dec. 88 USE OF WELL Monitor

TOTAL DEPTH 33.5' CUTTINGS COLLECTED ☒ Yes ☐ No

DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

STATIC WATER LEVEL: 10.98 FT. ☐ above ☒ below TOP OF CASING.

TOP OF CASING IS 2.55 FT. ABOVE LAND SURFACE.

YIELD (gpm): _____ METHOD OF TEST _____

WATER ZONES (depth): _____

CHLORINATION: Type _____ Amount _____

CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2.55	To 27.63 Ft.	2"	0.188"	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0.0	To 23.0 Ft.	Portland	
From	23.0	To 25.1 Ft.	Bentonite	

SCREEN:

	Depth		Diameter	Slot Size	Material
From	27.63	To 32.75 Ft.	2 in.	0.010 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

GRAVEL PACK:

	Depth		Size	Material
From	25.1	To 33.5 Ft.		Sand
From		To Ft.		

Depth From	Depth To	DRILLING LOG Formation Description
0.0	12.0	Brown Micaceous Silty Fine to Coarse SAND with Rock Fragments
12.0	22.0	Orange Silty Fine to Coarse SAND
22.0	33.5	Weathered Garnetiferous Mica SCHIST

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-5083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD RW-1

DRILLING CONTRACTOR S&ME, Inc.

DRILLER REGISTRATION NUMBER 412

STATE WELL CONSTRUCTION PERMIT NUMBER: 10-0195-WR-0116

1. WELL LOCATION: (Show sketch of the location below)

Nearest Town: Swannanoa

Farm School Road
(Road, Community, or Subdivision and Lot No.)

County: Buncombe

OWNER Anvil Knitwear (Asheville Dyeing & Finishing)

ADDRESS P.O. Box 337
(Street or Route No.)

Swannanoa N.C. 28778
City or Town State Zip Code

3. DATE DRILLED 12/14-20/88 USE OF WELL Recovery

4. TOTAL DEPTH 525.0' CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 28.57 FT. ☐ above ☒ below TOP OF CASING,
TOP OF CASING IS 1.5 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): 60 METHOD OF TEST Pump

8. WATER ZONES (depth): 62'
415'

9. CHLORINATION: Type _____ Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From +1.5	To 65.0	Ft.	6.25"		Steel
From	To	Ft.			
From	To	Ft.			

11. GROUT:

	Depth		Material	Method
From 0.0	To 64.0	Ft.	Portland	
From 64.0	To 65.0	Ft.	Bentonite	Pellets

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From N/A	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

13. GRAVEL PACK

	Depth		Size	Material
From N/A	To	Ft.		
From	To	Ft.		

14. REMARKS: 6.25" Open Hole Well Below Casing, Pump Set at 400'

Depth From	Depth To	DRILLING LOG Formation Description
0.0	62.0	Overburden
62.0	525	Garnetiferous Mica SCHIST

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT DATE