

ATIP 8 1995

**Closure Plan  
Third Creek Monofill  
City of Statesville  
Statesville, North Carolina  
EPA ID Number Pending**

**August 7, 1995**

*Prepared For*

**City of Statesville  
Statesville, North Carolina**

*For Submittal To*

**North Carolina Department of Environment,  
Health, and Natural Resources  
Division of Solid Waste Management  
Hazardous Waste Section  
Raleigh, North Carolina**

*Prepared By*

**Aquaterra, Inc.  
Charlotte, North Carolina**

August 7, 1995

Mr. Dan Biur, Acting Chief  
North Carolina Department of Environment,  
Health, and Natural Resources  
Division of Solid Waste Management  
Hazardous Waste Section  
Post Office Box 27687  
Raleigh, North Carolina 27611-7687

Reference: Closure Plan Third Creek Monofill  
City of Statesville  
Statesville, North Carolina  
EPA ID Number Pending  
Aquaterra Job No. 5205800

Dear Mr. Biur:

On behalf of the City of Statesville, Aquaterra, Inc. (Aquaterra) is pleased to present the following closure plan detailing the closure activities required for the Third Creek Monofill site located southeast of the City of Statesville, North Carolina. This closure plan was prepared at the request of the City of Statesville pursuant to the Administrative Order on Consent (Docket #94-191) entered into by the City of Statesville and the North Carolina Department of Environment, Health, and Natural Resources.

This Closure Plan is based on interim status (40 CFR Part 265 and as adopted by the State of North Carolina) under *Subpart G - Closure and Post-Closure* in accordance with 40 CFR 265.110 through 265.116; *Subpart H - Financial Requirements* in accordance with 40 CFR 265.140 through 265.142 and 265.146; and *Subpart N - Landfills* in accordance with 40 CFR 265.310.

Closure Plan  
Third Creek Monofill  
City of Statesville  
Statesville, North Carolina

If you have any questions or comments concerning this plan, please contact Mr. Neal McElveen at (704) 525-8680 or Ms. Susan Kite at (910) 852-5003.

AQUATERRA, INC.

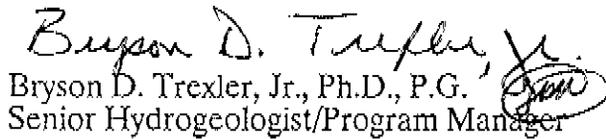


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Project Manager



Susan Kite, P.G.  
Senior Project Manager

*Senior Peer Review*



Bryson D. Trexler, Jr., Ph.D., P.G.  
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MNM/SK/rap  
52213

pc: Mr. L. F. ("Joe") Hudson, Jr. - City of Statesville  
Mr. Douglas D. Vaughn, P.E. - Pierson & Whitman  
Mr. George House - Brooks, Peirce, McLendon, Humphrey & Leonard, L.L.P.

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## **1 Introduction**

### **1.1 Background**

The City of Statesville operates a waste water treatment system at the Third Creek site located southeast of the city limits of Statesville, North Carolina (see Figure 1). The Third Creek facility is located near the City of Statesville in Iredell County, North Carolina. The site is situated on a dirt road off of Third Creek Road southeast of Statesville. The site is bordered to the north by pasture land. To the south of the facility is Third Creek. To the east of the property is residential property and to the west woodlands. The site operates under an NPDES permit (Permit No. 0020591) and a non-discharge permit (Permit No. WQ0004040). Concern from elevated concentrations of cadmium in the treatment system was raised in 1993. The non-discharge permit was modified to allow the removal and landfilling of over 20 years of accumulated solids from Aeration Basins 1 and 2 and the digester in an effort to reduce the amount of cadmium in the waste water treatment system. The sludge was placed in eight landfill trenches on property near the waste water treatment plant (see Figure 2). Subsequent sampling of the landfilled sludge identified cadmium levels in excess of the regulatory limit for cadmium according to the toxicity characteristic leaching procedure (TCLP) in seven of the trenches.

Based upon this investigation and the laboratory analytical results, the North Carolina Department of Environment, Health, and Natural Resources (NCDEHNR), Division of Solid Waste Management (DSWM), Hazardous Waste Section (HWS) issued an Administrative Order on Consent (Order) that was signed by the City of Statesville on March 8, 1995. Based upon this Order, the City of Statesville was required to submit a *Phase I Subsurface Characterization Work Plan* and a *Ground Water Sampling and Analysis Plan* to address the requirements of the Order. This work plan was submitted on April 8, 1995. The subsurface characterization was completed in mid-April 1995 and a report of *Phase I Subsurface Characterization* was submitted on May 8, 1995. *The Ground Water Sampling and Analysis Plan* was also submitted on May 8, 1995.

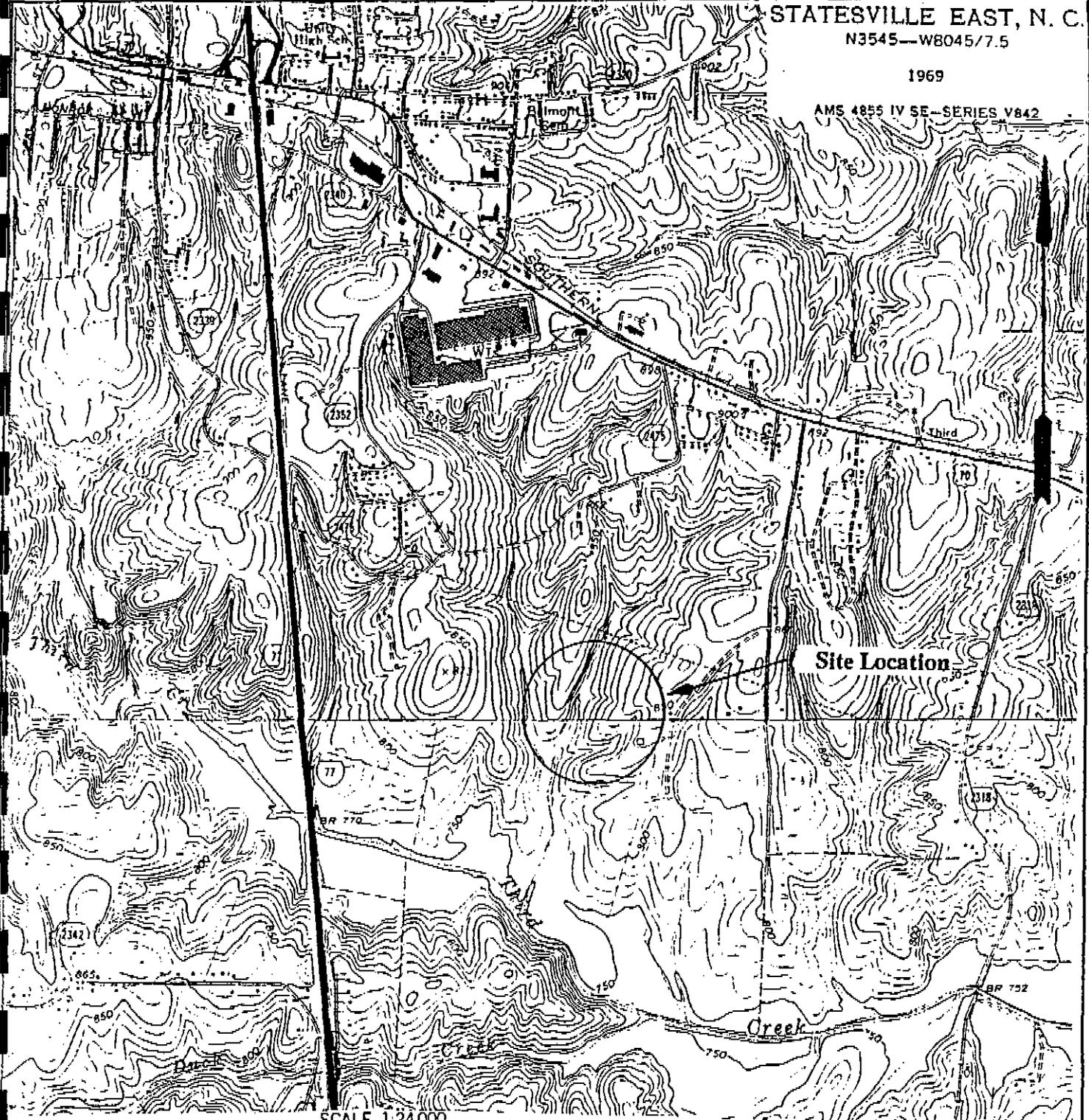
### **1.2 Closure Plan Development**

The City of Statesville has contracted Aquaterra to develop and implement the Closure Plan in accordance with 40 CFR 265.110 through 265.116. In addition, the financial requirements for closure will be developed as outlined in 40 CFR 265.140 through 265.143 and 265.146. Also, 40 CFR 265.310 (*Subpart N - Landfills*) will be used as a guideline in developing the closure care activities.

STATESVILLE EAST, N. C.  
N3545—W8045/7.5

1969

AMS 4855 IV SE—SERIES V842



SCALE 1:24,000



CONTOUR INTERVAL 10 FEET  
DATUM IS MEAN SEA LEVEL

SHEPHERDS, N. C.  
N3537.5—W8045/7.5

1969

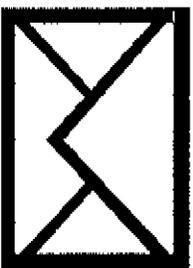
AMS 4855 III NE—SERIES V842



Author sk	Drawing	Layers	Date 4-07-95	Title Site Location Map
Job No. 5205800	Revision	Figure 1	Scale 1:24,000	Project Third Creek Monofil Statesville, North Carolina

Title Site Location Map
Project Third Creek Monofil Statesville, North Carolina

**PLEASE SEE OTHER MATERIALS  
MAPS IN THE BOOK**



5.32  
 5.15  
 7.98  
 5.70  
 1.42  
 5.00  
 5.10  
 7.04  
 7.28  
 1.73  
 1.22  
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 1.77  
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 17.60

WELL NUMBER AND LOCATION

G NUMBER AND LOCATION

DUC SURVEY FOR CITY OF  
 LE, 3rd CREEK MONOFILL.

 <b>aquaterra</b> A GREAT LAKES CHEMICAL CORPORATION COMPANY			
<h1>SITE PLAN</h1>			
<h2>3rd CREEK MONOFILL STATESVILLE, NORTH CAROLINA</h2>			
Author <b>MNM</b>	Drawing <b>5800</b>	Layers	Date <b>7/26/95</b>
Job No. <b>5205800</b>	Revision	Figure <b>2</b>	Scale <b>1" = 100'</b>

The Closure Plan for the Third Creek Monofill hazardous waste management unit (HWMU) is presented in Section 2.0.

### 1.3 Maintenance of Closure Plan

The City of Statesville will maintain an on-site copy of the approved Closure Plan and all revisions until the certificate of closure has been submitted and accepted by the NCDEHNR, HWS as outlined in 40 CFR 265.112(a). The Closure Plan copy and all revisions will be maintained at the Third Creek water treatment facility by a designated employee of the City of Statesville. The current facility designee's address and phone number are as follows:

Mr. L. F. ("Joe") Hudson, Jr., Director  
Water/Waste Water Treatment Department  
City of Statesville  
Post Office Box 1111  
Statesville, North Carolina 28687-1111  
Phone: (704) 878-3438

## 2 Closure Plan

### 2.1 Introduction

The following Closure Plan has been prepared to address the closure performance standards outlined in 40 CFR 265.111. The City of Statesville will close the Third Creek Monofill site so that:

- there is minimal need for further maintenance of the HWMU (265.111(a));
- the closure protects human health and the environment and minimizes or eliminates the post-closure escape of hazardous waste decomposition products to the ground water, surface water, and atmosphere (265.111(b)); and
- the Closure Plan complies with the requirements of Subpart G - Closure and Post-Closure and Subpart N - Landfills (40 CFR 265.310).

This plan addresses the eight trenches (Third Creek Monofill) varying in length from approximately 50 to 140 feet, width from approximately 10 to 15 feet and depth of approximately eight feet where the sludge was placed. Seven of the trenches exhibited cadmium concentrations above the TCLP regulatory level of 1.0 milligram per liter (mg/L). The site is located approximately 2,000 feet west of Third Creek Road and 5,000 feet south of Highway 70.

### 2.2 Maximum Inventory of Hazardous Waste

In 1993, concerns arose over elevated cadmium levels in the waste water treatment system. The Third Creek facility modified an existing non-discharge permit (Permit No. WQ0004040) to allow removal and landfilling of over 20 years of accumulated solids from Aeration Basins 1 and 2 and the facility digester. The solids were placed

in eight trenches near the site. According to the Third Creek facility records, approximately 1,750 cubic yards of material were placed in the trenches. Based on the February 1994 sampling data collected by IT Corporation of Knoxville, Tennessee, concentrations of cadmium using the TCLP ranged from 0.15 to 38.0 parts per million. The estimated volume of hazardous waste generated (as required by (265.111(b)(3)) at the Third Creek facility is 1,750 cubic yards of solids (cadmium contaminated) from the aeration and digester basins. There are no records of additional hazardous waste generated at the facility. The waste water treatment plant has been in operation since the early 1970's.

### *2.3 Closure of the Third Creek Monofill*

#### *2.3.1 On-Site Stabilization*

The HWMU will be closed by stabilizing the sludge and installation of a capping system. A treatment plant consisting of a concrete staging pad, power screen, and pugmill will be set on-site. The concrete pad will be used to stage materials awaiting treatment. As estimated 2 to 3 feet of overburden soil from each trench will be excavated, staged on-site, and laboratory tested for potential use as fill material. The sludge/solids will be excavated and staged on a concrete pad. The sludges/solids will be loaded into the power screen and discharged into the pugmill batch mixer. A predetermined percentage of fixation chemical (determined from bench scale tests) will be added and thoroughly mixed. The treated material will be staged on plastic, covered to prevent stormwater contact, and randomly tested for leachable cadmium using the TCLP. The treated material will then be placed back into the trenches in 12-inch lifts and compacted to a density of 90 percent using a sheeps foot roller. The treated material will be capped following the procedures in Section 2.3.2.

#### *2.3.2 Closure and Post-Closure of Landfills*

For the purposes of closure, post-closure, and financial responsibility, the Third Creek Monofill is considered to be a landfill and the City of Statesville must meet the requirements for landfills specified in Subpart G, H, and F of 40 CFR 265 as per 40 CFR 265.310. Under Subpart N - Landfills (Section 40 CFR 265.310), Closure and Post-Closure requirements include:

- (a) At final closure of the landfill, the owner or operator must cover the landfill with a final cover designed and constructed to:
  - (1) provide long-term minimization of migration of liquids through the closed landfill;
  - (2) function with minimum maintenance;
  - (3) promote drainage and minimize erosion or abrasion of the cover;
  - (4) accommodate settling and subsidence so that the cover's integrity is maintained; and
  - (5) have a hydraulic conductivity less than or equal to the hydraulic conductivity of any bottom liner system or natural subsoils present.

- (b) After final closure, the owner or operator must comply with all post-closure requirements contained in Sections 265.117 - 265.120, including maintenance and monitoring throughout the post-closure care period. The owner or operator must:
- (1) maintain the integrity and effectiveness of the final cover, including making repairs to the cover as necessary to correct the effects of settling, subsidence, erosion, or other events;
  - (2) maintain and monitor the ground water monitoring system and comply with all other applicable requirements of Subpart F of this part;
  - (3) prevent run-on and run-off from eroding or otherwise damaging the final cover; and
  - (4) protect and maintain surveyed benchmarks used in complying with Section 265.309.

The owner or operator of a landfill must maintain the following items in the operating record required in Section 265.73:

- on a map, the exact location and dimensions, including depth, of the landfill with respect to permanently survey benchmarks, and
- the contents of the landfill and the approximate location of each hazardous waste type within each landfill cell.

#### 2.3.2.1 Impermeable CAP System

Following placement of the stabilized material, closure will be completed with an impermeable cap system that will cover each of the seven trenches.

The impermeable cap will consist of a geotextile fabric followed by a compacted one to two-foot layer of clayey silty sand to sandy silt with a hydraulic conductivity less than or equal to the underlying backfill and natural soil. Overlying the compacted soil layer will be a 30 mil high density polyethylene (HDPE) liner followed by a 12-inch sand layer for drainage. A geotextile filter fabric will be placed over the sand layer followed by two to three feet of lightly compacted topsoil or fill dirt. The topsoil will be seeded to prevent erosion. If fill dirt is used, it will be paved to promote run-off and prevent erosion. A grade of one to two percent will be maintained from the compacted impermeable soil layer up to the topsoil or fill layer to promote drainage.

After the capping of the trenches has been completed, the City of Statesville will upgrade the existing facility security system in accordance with 40 CFR 265.14 (a),(b). In addition, permanent monuments will be placed at the four corners of the landfill cap(s) and surveyed with respect to a permanent benchmark.

#### 2.3.2.2 Placement of Compacted Layer

The one to two-foot layer of clayey silty sand to sandy silt shall be placed in horizontal lifts not to exceed 12-inches in uncompacted thickness. Each lift shall be compacted by a minimum of six passes of compaction equipment and to a minimum density of 90 percent of the maximum dry density as determined in accordance with

ASTM D-698. Materials shall be placed at no less than 2 percentage points below the optimum moisture content as determined in accordance with ASTM D-698 and no greater than 3 percentage points over the optimum moisture content. At no time will the minimum number of passes be reduced. The soils shall be free of trash, perishables or other deleterious materials. No cobbles, stones, or rock greater than 3-inches in diameter will be placed in the compacted layer.

Upon completion of placement, the upper surface shall be trimmed to a smooth surface and then compacted by three passes of a smooth wheel roller to provide a smooth, flat surface.

### 2.3.2.3 Placement of Topsoil Material

Topsoil material shall consist of clean off-site borrow materials. Topsoil shall be free of trash, perishable or other deleterious materials. No cobbles, stones, or rock fragments greater than 3 inches in diameter will be placed in the topsoil layer. Topsoil materials will be sufficiently compacted by placement activities; no further compaction of the topsoil will be required. No in-place density testing will be required on the topsoil materials.

### 2.3.2.4 Run-off/Run-on Control

The topsoil cover will be sloped such as to prevent drainage to the HWMU. The topsoil cover grade will be approximately one to two percent. In addition, the cover will be protected from erosion by planting vegetation such as perennial grasses. The areas around each trench will be graded so as to control run-on and pooling of run-off on the capping system.

### 2.3.2.5 Testing and Monitoring

All borrow sources for the fill soil, capping soil and topsoil will be sampled and analyzed for volatile organic compounds (VOCs) according to SW-846 Method 8240, semivolatile organic compounds (SVOCs) according to SW-846 Method 8270, and the eight RCRA metals. No contaminated borrow material will be allowed on-site.

*Method  
have more  
samples?  
One per  
1.5 ft.*

All placement activities will be continuously monitored by a qualified engineer or geologist familiar with soil placement, testing techniques, and procedures. On-site testing will consist of determining in-place density by the Sand Cone method in accordance with ASTM D-1556, the Rubber Balloon method in accordance with ASTM D-2167, or by the Nuclear method in accordance with ASTM D-2922.

Prior to placement activities, moisture/density tests will be performed on representative samples of each material to be placed. The results of these tests will be the basis for determining acceptable in-place density criteria. If there is any discrepancy between testing results using different methods, the Sand Cone method shall be the standard to which all results shall be compared. Natural subsoils on-site will be tested in-place by the Nuclear method in accordance with ASTM D-2922.

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Testing frequency shall be a minimum of one test per lift. Any in-place materials not meeting the minimum density requirements shall be recompact. Upon completion of the in-place test, the hole created for the test shall be cleaned of any remaining sand or other materials and shall be backfilled with commercially produced bentonite clay pellets, hydrated and hand compacted in a maximum of two inch lifts.

#### 2.3.2.6 Subsidence

The potential subsidence of the capping system should be negligible. The materials placed in accordance with the above procedures will exist in a compacted condition and will be over-consolidated due to the compactive effort during placement. Since there will be no surcharge load placed on the area by surface load and minimal seepage will be flowing downward through the placed material, there is no mechanism available to cause further compression of the cap, fill or subgrade materials.

#### 2.3.2.7 Closure Schedule

The closure activities outlined above will be completed within 180 days after receiving approval from the HWS. If the City of Statesville should require additional time to thoroughly complete the closure activities, the HWS will be notified immediately.

#### 2.4 Decontamination of Equipment

After closure of the HWMU, equipment will be decontaminated on-site using high pressure steam and a phosphate-free soap. A temporary decontamination pad will be constructed and lined with an impermeable plastic material to collect washdown from the decontamination process. Equipment will be positioned during decontamination so that washdown water or fluid is collected without runoff to any unlined portion of the soil. All washdown in the lined decon pad will be removed by a vacuum system and placed in drums which will be disposed of by the contractor. The impermeable plastic material used to line the decon pad will also be removed and disposed of by the contractor. The sludge and water/fluid from the washdown and the plastic will be sampled and analyzed for the hazardous waste constituents of concern and the resulting decon waste will be disposed of as in accordance with the applicable requirements of 40 CFR 262. Completion of decontamination will be determined by visual inspection to ensure all soils have been removed from the equipment.

#### 2.5 Inspection and Maintenance

The City of Statesville will ensure that the closed Third Creek Monofill is properly maintained by inspecting it regularly for the following:

- erosion damage
- vegetative cover
- run-on/run-off control system

The capping system will be sloped to provide positive site drainage away from the HWMU. The cap's slope is designed so that the maximum drainage velocity leaving the cap is less than the velocity likely to cause erosion for the selected vegetation. The cap will be visually inspected annually by a professional engineer to ensure that the positive drainage slope is maintained. Should minor subsidence or spot irregularities be discovered, new topsoil will be placed on the cap, and it will be regraded. *Comm a*

The cap will also be protected from erosion by maintaining an appropriate vegetative cap. Maintenance activities for the vegetative cap will include mowing, seeding, and fertilizing during the year. The activities will be performed on an as-needed basis due to the seasonal nature of vegetation.

#### *2.6 Closure Cost and Financial Assurance*

The closure costs and financial assurance information required under 40 CFR 265.142 and 40 CFR 265.143, respectively (Subpart H - Financial Requirements) will be submitted under separate cover by the City of Statesville.

The closure cost estimate and any revisions will be retained at the Third Creek Waste Water Treatment facility and updated on an annual basis to reflect cost changes as a result of inflation or changes in the Closure Plan activities.

As approved by the HWS, the City of Statesville will submit financial assurance information sixty days following submittal of the closure and post-closure care plans.

The City of Statesville will review six mechanisms for financial assurance including:

- Closure Trust Fund (265.143(a))
- Surety Bond (265.143(b))
- Closure Letter of Credit (265.143(c))
- Closure Insurance (265.143(d))
- Financial Test and Corporate Guarantee for Closure (265.143(e))
- Multiple Financial Mechanisms (265.143(f))

#### *2.7 Certification of Closure*

Within 60 days of completing closure, the City of Statesville will submit to the HWS a certification by both the City of Statesville and an independent professional engineer registered in the State of North Carolina that the Third Creek Monofill has been closed according to the approved Closure Plan. Documentation supporting the independent registered professional engineer's certification will be maintained until the HWS releases the City of Statesville from the financial assurance requirements for Closure under 40 CFR 265.143(h).

#### *2.8 Notice to Local Land Authority*

Within 60 days after closure is completed, the City of Statesville will submit to the Iredell County Register of Deeds and to the HWS a survey plat indicating the location and dimensions of the trenches with respect to permanently surveyed

benchmarks. This plat will be prepared and certified by a professional land surveyor registered in the State of North Carolina. The plat will contain a note, prominently displayed, which states the City of Statesville's obligation to restrict disturbances of the site in accordance with 40 CFR 264.116.

### 3 *Post-Closure Care Plan*

A Post-Closure Care Plan will be implemented after the closure is complete. This plan has been developed and submitted to the HWS under separate cover (Aquaterra report number 52214). The following items have been included in the post-closure care plan:

- Ground Water Sampling and Analysis Plan – A ground water sampling and analysis plan prepared by a qualified geologist will be submitted to the HWS within 15 days of notification (40 CFR 265.93(d)(1)) in accordance with 40 CFR 265.93(d)(2). This plan was submitted to the HWS on May 8, 1995 (Aquaterra report number GR5041).

The ground water sampling and analysis plan addresses:

- the number, location, and depth of wells;
- sampling and analytical methods for those hazardous wastes or hazardous waste constituents found present at the facility;
- evaluation procedures, including use of previously gathered ground water quality information; and
- a schedule of implementation.
- A description of the planned ground water monitoring activities and frequencies at which they will be performed.
- A description of the planned maintenance activities and frequencies at which they will be performed for the cap, security system, and monitoring wells.
- The name, address, and phone number of the person or office to contact about the hazardous waste disposal unit during the post-closure care period.
- Recordkeeping and reporting during post-closure:
  - ground water monitoring data and evaluation of data;
  - annual report;
  - updates on costs of post-closure care; and
  - maintenance of all records for the post-closure care period.

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- Copies of the Post-Closure Care Plan will be maintained at:

City of Statesville  
Water/Waste Water Treatment Department  
Post Office Box 1111  
Statesville, North Carolina 28687-1111  
Attention: Mr. L.F. ("Joe") Hudson, Jr., Director

The person responsible for updating the Post-Closure Care Plan will be the facility representative mentioned or his designee. As the Post-Closure Care Plan is updated or amended, the date and number of the revision will be placed on the lower left corner of each page revised and the revision will be noted on the plan's title page.

- A financial assurance mechanism adopted by the City of Statesville will be submitted under separate cover.