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**OPERATIONAL AND CLOSURE PLAN
FOR
FLYASH DISPOSAL AREA**

UPDATE

<i>Carmen Johnson</i>	Doc ID#
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Submitted To:

Champion International Corporation
Roanoke Rapids, North Carolina

Submitted By:

Rust Environment & Infrastructure
Raleigh, North Carolina

August 1997

**CHAMPION INTERNATIONAL CORPORATION
OPERATIONAL AND CLOSURE PLAN FOR FLYASH DISPOSAL AREA
UPDATE**

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1.0 INTRODUCTION

Champion International Corporation (Champion) owns and operates an existing permitted solid waste disposal area (Permit No. 42-03 dated May 6, 1981). In April, 1991 Rust Environment & Infrastructure (formerly Serrine Environmental Consultants), assisted Champion with the development of an Operational and Closure Plan for the solid waste disposal area known as the Flyash Disposal Area. This plan was developed in accordance with the recommendations and guidelines established during an August 14, 1990 meeting with Mr. James Coffey and Mr. Fred Wood of the North Carolina Solid Waste Section. A complete copy of the Operational and Closure Plan that was submitted to the Solid Waste Section in April, 1991 is included in Appendix A of this update.

A revised solid waste rule [.0503(2)(d)(ii)] effective October 1, 1995 required owners of existing industrial waste landfills, receiving waste on or after January 1, 1998, to document compliance with new design standards. In response to a January 18, 1996 letter from the Solid Waste Section, Champion notified the Solid Waste Section that the Flyash Disposal Area would not receive waste after December 31, 1997 and would be closed by June 30, 1998.

On August 20, 1996 representatives from Champion, Rust and the Solid Waste Section met to discuss specific closure requirements. The purpose of this Operational and Closure Plan Update is to present additional closure plan information based on discussions during the August 20, 1996 meeting.

The following issues are discussed in the subsequent sections of this Operational and Closure Plan Update:

- Final Grading of Flyash
- Location of Asbestos and NORM Waste Materials
- Final Cover Material
- Erosion Control Plan
- Vegetative Cover
- Installation of Additional Monitoring Well
- Maintenance and Land Use After Closure
- Closure Conditions

2.0 FINAL GRADING OF FLYASH

The April 1991 Operational and Closure Plan included an Existing Site Plan (Drawing R-0009-SP-01), a Final Grading Plan (Drawing R-0009-SP-02) and a Site Development Plan (Drawing R-0009-SP-03). From May 1991 to April 1997 Champion's contractor disposed of additional flyash material in accordance with the Site Development Plan contained in the Operational and Closure Plan. On March 4, 1997 representatives from Rust, Champion and the contractor met at the site and discussed placement of final waste material and reshaping of some areas to improve the final grading. Specifically, grading improvements were intended to create more gentle side slopes where established vegetation did not exist, and to create a domed or turtle backed shape to prevent concentrated stormwater runoff. The contractor completed final waste placements and grading improvements in early May, 1997. From May 9 through 14, 1997 Burr and Associates, P.A. completed a survey to establish final contours of the flyash material. The final contours are depicted on the Erosion Control Plan For Flyash Disposal Area (Drawing EC-1) included in Appendix B.

3.0 LOCATION OF ASBESTOS AND NORM WASTE

During the active life of the Flyash Disposal Area, asbestos was disposed in a specified area as depicted on Drawing R-0009-SP-01 contained in the April 1991 Operational and Closure Plan. As stated in this plan, asbestos was disposed in accordance with an approval letter from the Solid Waste Section dated July 31, 1984. After the final cover is completed, the asbestos area will be delineated by signs.

In March 1997 Champion generated and disposed of a large headbox and lengths of pipe containing Naturally Occurring Radioactive Material (NORM) waste in the Flyash Disposal Area. Champion confirmed that this waste material was not regulated by contacting Ms. Wendy Tingle of the Radiation Protection Section and obtained a letter from William Meyer of the Solid Waste Management Division granting approval to dispose of this material in the Flyash Disposal Area.

This material was placed approximately at a location defined by coordinates S 8100 and W 1775 on the plant grid system indicated on Drawing R-0009-SP-01. A hole in existing flyash was excavated

about 12 feet wide by 20 feet long by 20 feet deep. The headbox was lowered into the hole, followed by lengths of pipe. These materials were covered with about 10 feet of flyash to the original flyash elevation. Excess flyash from the excavation was spread over a large area.

4.0 FINAL COVER MATERIAL

Champion analyzed samples of dewatered primary clarifier solids (sludge) generated at the mill and determined that, based on Toxicity Characteristic Leaching Procedure (TCLP) results (see Appendix C), this material is suitable for use as a soil conditioner in the final two feet of cover material in accordance with solid waste rule .0505(11)(e). During the August 20, 1996 meeting with representatives of the Solid Waste Section, Champion was given permission to incorporate dewatered sludge with flyash for the final cover material. Champion was instructed to contact the Division of Water Quality to inform them that the Solid Waste Section had approved the use of the sludge. On August 19, 1997 Champion contacted Judy Garrett of the Division of Water Quality and discussed Champions intention to use sludge in the final cover. Ms. Garrett stated that approval was not required from her Division as long as Champion had permission from the Solid Waste Section.

From September to December 1996 Champion experimented with different mixes of flyash and sludge and determined that the optimum mix is 50 percent flyash and 50 percent sludge (by weight). After the survey to establish final waste contours was completed in May 1997, Champion began to place the mixture of flyash and sludge. Champion's intention to begin placing the final cover material was described in Mr. Myrl Nisely's January 8, 1997 letter to Mr. James Coffey.

A minimum of 2 ½ feet of the mixture will be applied to ensure that a final cover thickness of 2 feet is achieved after any potential settling of the material. The 2 ½ feet of material will be applied in two lifts. Price Construction Company uses a CAT D5C bulldozer to mix and place the 50/50 blend of flyash and sludge. A 9-dry-ton (approximate) load of sludge is dropped by truck onto the flat surface of the site. Then, four to five smaller truck loads of flyash (approximately 2-dry-tons per load) are dropped around the sludge. A few feet away, a second set of piles are deposited. This pattern is continued until 10 to 15 piles of sludge are available. Working with one set of flyash/sludge piles, the bulldozer operator cuts across the base of the piles, crisscrossing several times to gradually mix

the components. Once reasonable uniformity is achieved, the mix is then pushed to a nearby location for placement. The repeated pushing of portions of the mix for placement further mixes the material through the rolling action of the blade. A homogeneous mixture is achieved by the time final placement is complete. Based on experience, Champion has determined that no further effort to compact the mixture is required. Rainfall after mixture placement produces a firm surface ready for seeding.

After the final cover material has been placed, the Flyash Disposal Area will again be surveyed to determine the final cover material elevations. Based on a comparison of this survey data with the survey of the final flyash elevations, as depicted on Drawing EC-1 (included in Appendix B), Rust will verify that the final cover material is at least two feet thick and provide the Solid Waste Section with a certification report prepared by a North Carolina registered professional engineer.

5.0 EROSION CONTROL PLAN

In accordance with discussions during the August 20, 1996 meeting with the Solid Waste Section and based on the final waste contours depicted on the May 1997 survey prepared by Burr & Associates, Rust prepared an Erosion Control Plan for the Flyash Disposal Area (Drawing EC-1). This plan defines the minimum cover material elevations, a proposed berm to be constructed around the top perimeter of the disposal area, pipe slope drains and associated inlet and outlet structures, and a rip rap drainage channel.

Concurrent with the submittal of this addendum to the Solid Waste Section, Champion sent a copy to Mr. John Holley, Regional Engineer for the Land Quality Section's Raleigh Regional Office, for review of the erosion control plan and proposed vegetative cover.

6.0 VEGETATIVE COVER

Champion and Metro Nursery from Wake Forest, North Carolina conducted the study between May 1993 and February 1994 to evaluate the ability of the flyash material to support various vegetative covers. A report entitled "Champion 1993 Study of Grasses to Cover Flyash" was prepared by Champion in June 1994 and submitted to the Solid Waste Section to document the study.

The primary results of the study were :

- All seven species of grass evaluated grew successfully on "weathered" flyash (i.e., flyash with a pH of 7.1 placed at least four months prior to the planting of grass).
- Bermuda grass was determined to be the most robust and propagating species.
- A mixture of Bermuda, Brown Top Millet, and Weeping Love species will produce a thick, dense growth about 6 to 10 inches tall which shades the soil. This self-shading will help keep soil temperatures in a tolerable range in times of drought. (Note: During the August 20, 1996 meeting, the Solid Waste Section expressed concern regarding the use of Weeping Love because of its tendency to grow in clumps rather than spreading uniformly. Champion agreed to find a substitute for Weeping Love.)
- The root systems can be expected to hold flyash in place and prevent erosion.
- Mowing of the grass will not be necessary. Each years' crop will die back and undergo microbiological degradation, forming a thatch and returning nutrients. Eventually a shallow topsoil will be formed.
- Naturally occurring grasses such as Johnson Grass and Crabgrass, as well as bushes and trees will compete with the planted grass mixture to further enhance erosion control.

Based on the findings from the "Champion 1993 Study of Grasses to Cover Flyash" and suggestions from representatives of the Solid Waste Section, the following mixture of grasses will be applied:

<u>Grass Species</u>	<u>Application Rate</u>
Bermuda	100 pounds per acre
Brown Top Millet	260 pounds per acre
Bahiagrass	260 pounds per acre

As discussed in Section 4.0, dewatered primary clarifier sludge will be mixed with flyash (50/50 by weight) and applied as the final cover material. The addition of the sludge is expected to improve the ability of the flyash to support the vegetative cover.

A sample of the flyash/sludge mixture was collected and analyzed by the North Carolina Department of Agriculture, Agronomic Division in May 1997. Based on a pH of 7.2, the Soil Test Report recommended that no lime be applied. The application of fertilizer, based on the test results will be 500 pounds of 16-4-8 (50% slow release) per acre.

On August 18, 1990 Champion, Rust and Solid Waste representatives agreed that it would not be appropriate to disturb heavily vegetated side slopes. Therefore, as previously discussed and documented in the April, 1991 Operational and Closure Plan, the placement of final cover material and vegetative cover does not apply to areas with existing dense vegetation.

7.0 INSTALLATION OF ADDITIONAL MONITORING WELL

On September 18, 1996 Champion received a letter from Mr. Jim Bateson, Hydrogeologist, with the Solid Waste Section stating that some amendments to the current groundwater monitoring system are needed before issuance of a closure letter for the Flyash Disposal Area. Specifically, the letter suggested that an additional monitoring well needs to be installed "on the southeast margin of the landfill (adjacent to the VEPCO powerline), with its location and construction specifications to be approved by the Section." Also, the letter stated that Champion "may drop well LG-4 from the

routine detection monitoring system, though it should not be abandoned” and that “surface water sampling will not be required for post closure monitoring.”

In accordance with the September 18, 1996 letter, Champion will install a new well at a specific location to be determined based on a future site visit by a Solid Waste Section representative. Installation of this well should occur before final closure is complete (i.e., by June 30, 1998).

8.0 MAINTENANCE AND LAND USE AFTER CLOSURE

After closure is complete, Champion will inspect the closed area regularly to ensure the adequacy of the following:

- Vegetative Cover
- Erosion Control Structures
- Groundwater Monitoring System.

As stated in Section 6.0, it is anticipated that mowing of the grass will not be necessary. Periodic seeding and fertilizing will be performed on an as-needed basis to maintain sufficient cover to prevent erosion.

The Flyash Disposal Area will be inspected on a regular basis and after significant storm events for signs of erosion, settlement and subsidence. Areas of erosion, settling or subsidence will be addressed immediately by the placement of additional fill material to restore the final grading contours and by re-establishment of the vegetative cover.

The groundwater monitoring system will be inspected during each sampling event. The wells will be checked for well head security and integrity. Repairs or replacement of protective covers and locks will be made as required.

No further use is planned for the Flyash Disposal Area after closure is complete.

Appendix A

OPERATIONAL AND CLOSURE PLAN

FOR

FLYASH DISPOSAL AREA

CHAMPION INTERNATIONAL CORPORATION

ROANOKE RAPIDS, NORTH CAROLINA

SIRRINE PROJECT NO. R-0009

SIRRINE ENVIRONMENTAL CONSULTANTS, INC.

RALEIGH, NORTH CAROLINA

OCTOBER, 1990

REVISED APRIL, 1991

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrine Project No. R-0009

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Appendix A

Appendix B

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrinc Project No. R-0009

I. BACKGROUND

Champion International Corporation owns and operates an existing permitted (Permit No. 42-03 dated May 6, 1981) sanitary landfill. The total size of the permitted area is approximately 23.5 acres. The following waste material volume and composition are disposed in the landfill. (The volumes are calculated from data supplied by Champion from May of 1990 through February of 1991.)

A. Flyash

- Approximately 71,000 cy/year
- Approximately 55% from wood and 45% from coal.

B. Sawdust and Bark

- Approximately 7,300 cy/yr

C. Wood Pallets

- Approximately 840 cy/year

D. Concrete

- Minimal amounts

E. Asbestos

- Approximately 185 cy/year

TOTAL: Approximately 79,300 cy/year

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrinc Project No. R-0009

Champion recognized that the original permit application and permit do not contain a well-defined operational or closure plan for this disposal facility. Champion contracted Sircinc Environmental Consultants to assist Champion in developing a current, site specific operational and closure plan.

This report and the accompanying drawings (see Appendix B) present a plan for the future construction, operation and completion of this disposal area. The operational and closure plan was developed in accordance with guidance provided by the North Carolina Solid Waste Management Section (see meeting history in Appendix A).

Based on the available volume in the landfill, (calculated from the Final Grading Plan, Drawing No. R-0009-SP-02) and the rate which the disposal area is currently being filled, the remaining life of the landfill is approximately 2.5 to 3.0 years. However, Champion is increasing efforts in the area of waste minimization as follows:

- Steps are being taken to improve the completeness with which bark is burned in mill boilers. If successful, the rate of flyash production would be reduced.
- Wooden pallets are now being recycled, and scrap lumber is being made available for mill employee use. These steps are expected to reduce by approximately 50% the volume of wood waste sent to the landfill.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrine Project No. R-0009

- Potting soil companies have expressed interest in obtaining weathered flyash material from Champion, to be used as a soil amendment. In the future, portions of Cell 1 (see Drawing R-0009-SP-03 in Appendix B) may be excavated for this use.

It is not possible, at this time, to predict the extent to which these efforts will extend the remaining life of the landfill.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirriner Project No. R-0009

II. OPERATION AND FINAL GRADING

A. Operation

In general, current operational procedures are appropriate and should be continued. The following is a summary of the operational considerations which will be followed until the placement of waste at the Champion facility is completed.

1. Champion will continue to maintain a groundwater monitoring system in accordance with the "North Carolina Water Quality Monitoring Guidance Document for Solid Waste Facilities".

There are five existing groundwater monitoring wells within the landfill property. The well locations are shown on Drawing No. R-0009-SP-02.

Based on previous discussions with the Solid Waste Section, Champion understands that the number and location of the wells are currently acceptable.

2. Champion's sediment and erosion control plan for the flyash disposal site was approved by the Land Quality Section of the North Carolina Department of Natural Resources and Community Development on

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrinc Project No. R-0009

May 7, 1981 (see Appendix A). Champion will continue to control erosion in accordance with this plan.

3. The landfill is being segregated into six cells for disposal of flyash, wood wastes, and asbestos as shown on Drawing No. R-0009-SP-03.
4. Cells 1, 2 and 3 will be filled concurrently. After Cells 1-3 are exhausted, Cells 4 and 5 will be filled. Cell 6 will be filled last. If weathered flyash is excavated from Cell 1 for potting soil company use, the excavated areas will be refilled concurrent with the filling of Cell 6.
5. Wood wastes and small amounts of concrete will be placed at the northeastern end of Cell 1. These materials will be covered with flyash in lifts until the final proposed contours are reached.
6. Flyash will be added to Cell 2 from south to north. Cell 2 will be accessed from the western side of the cell.
7. Asbestos will be disposed in Cells 3 and 4 "as far from the top of the landfill as possible, but in no case within ten (10) feet of the landfill surface" in accordance with the approved letter from O.W. Strickland, Head of the Solid and Hazardous Waste Management Branch, dated July 31, 1984 (see Appendix A). Drawing No. R-0009-SP-01 generally

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
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depicts the area designated for asbestos disposal. This area encompasses Cells 3 and 4.

8. The Roanoke Rapids Sanitary District has agreed with Champion's position that the flyash which encroaches on the District's sewer easement on Champion property at the south end of Cell 2 (see Drawing B&A 5-077 in Appendix B) poses no restrictions for the use of the easement, and the flyash can be left in place (see correspondence in Appendix A).
9. After Cells 1, 2, and 3 are exhausted, Cells 4 and 5 will become operational. Cell 4 will be filled with a combination of asbestos and flyash; access will occur from the west. Cell 5 will be filled with wood wastes and fly ash; access will occur from the northeast.
10. When Cells 4 and 5 are exhausted, Cell 6 will be worked. Cell 6 will primarily be filled with fly ash with access occurring from the west.

B. Final Grading

The final grading of the flyash disposal area will be as shown in Drawing R-0009-SP-02. The operator will ensure that maximum side slopes in areas not yet filled do not exceed 2:1 as indicated on Drawing No. R-0009-SP-02.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirriner Project No. R-0009

III. CLOSURE

A. Vegetative Cover

As previously discussed with the Solid Waste Section (see meeting history in Appendix A), the placement of compacted earth on the flyash piles to provide a cap would necessitate destruction of the established vegetation. Also, reshaping of the existing piles for flatter side slopes would cause increased erosion and may disturb previously placed asbestos. These activities may have more environmental impact than the alternative of not capping the landfill and establishing vegetation to completely stabilize the area.

The majority of the side slopes of the existing ash piles are well vegetated and stabilized by naturally occurring vegetation. There appears to be little to no on-site erosion of the piles and no off-site siltation from the landfill area. Upon closure, the disposal areas will be stabilized with vegetation that can be supported by the flyash alone and which will provide good coverage and erosion control characteristics. Test plots of various types of vegetation on an existing flyash pile will be established to determine the most effective species. Test plots will be set up in the spring of 1992.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrine Project No. R-0009

B. Maintenance

After establishment of the vegetative cover, Champion will ensure that the closed area is properly maintained by inspecting it regularly in the following areas:

1. Vegetative cover
2. Sediment and erosion control
3. Groundwater monitoring system

Maintenance activities for the vegetated cover will include periodic mowing, seeding and fertilizing. These activities will be performed on an as-needed basis due to the seasonal nature of vegetation.

The final grading of the flyash piles will provide positive drainage away from the disposal area. The closed piles will be inspected on a regular basis for signs of erosion, settlement and subsidence. Any signs of settling or subsidence will be addressed immediately by the placement of additional fill material to restore the final grading contours.

The groundwater monitoring system will be inspected annually. The groundwater monitoring wells will be checked for well head security and integrity. Repairs or replacement of protective covers and locks will be made as required.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirriner Project No. R-0009

C. Land Use After Closure

The flyash disposal area is estimated to have a remaining useful life of approximately 2.5 to 3.0 years. No further use is planned for the disposal area after closure is completed. However, if reclamation opportunities for weathered flyash continue to develop, Champion may excavate flyash from areas free of asbestos.

D. Closure Conditions

After the disposal area has been closed in accordance with this plan, Champion will notify the Solid Waste Section in order that a site inspection may be made by the Section to determine compliance with these closure procedures. Champion understands that after closure, future water quality monitoring requirements will be specified by the Section in the closure letter.

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirriner Project No. R-0009

APPENDIX A



HISTORY NO. 1

CHAMPION INTERNATIONAL CORPORATION
ROANOKE RAPIDS, NORTH CAROLINA

FLYASH LANDFILL OPERATING/CLOSURE PLAN PROJECT

SIRRINE PROJECT NO. R-0009

DATE: August 14, 1990

PLACE: North Carolina Solid Waste Section Office
Raleigh, NC

PRESENT FOR: CHAMPION INTERNATIONAL CORPORATION
Mr. Myrl Nisely

NC SOLID WASTE SECTION
Mr. Jim Coffey
Mr. Fred Wood

SIRRINE ENVIRONMENTAL CONSULTANTS
Ms. Francine Durso
Mr. Bob Midgette

PURPOSE OF MEETING: To review the current condition of the flyash disposal area and discuss a proposed operating and closure plan.

CORRECTIONS OR OMISSIONS: This history is the writer's interpretation of the events, discussions and transactions which took place during the meeting. If there are any additions and/or corrections to this history, please inform the writer within seven (7) days.

ITEMS OF DISCUSSION:

1. Each item of the "Meeting Agenda" (copy attached) was discussed.
2. A USGS topo map showing the area surrounding the landfill site, a topo map of the site itself, photographs of the landfill, and the existing permit were reviewed.
3. The majority of the side slopes of the existing ash piles are well vegetated and stabilized by naturally occurring vegetation. There appears to be little to no on-site erosion of the piles and no off-site siltation from the landfill.
4. Champion is performing groundwater monitoring at five (5) wells located around the landfill.
5. The current solid waste rules require a 50' buffer between the property line and the disposal area. The east side of the landfill's permitted boundary coincides with Champion's property line. East of this property line is a power line right-of-way owned by Virginia Electric Power Company (VEPCO). A 50' buffer does not exist in all locations along this property line.
6. Champion's property extends south of the landfill's permitted boundary. A water and sewer easement, located on Champion's property, is adjacent to the southern permit boundary. The toe of one of the ash piles extends a few feet south of the southern permit boundary, onto the sewer easement.
7. To create a 50' buffer along the property line described in Item 5 and to move the ash pile to within the permitted boundary described in Item 6, would necessitate disturbing well vegetated ash piles in those areas. This will cause a destruction of established vegetation, increased erosion, and may possibly disturb asbestos previously placed in compliance with the permit (see Item 8). In order to avoid this disturbance, Champion proposes to leave the ash piles as they are. The State indicated that not maintaining the 50' buffer adjacent to the VEPCO property may not be a problem since the adjacent property is a power line right-of-way. The State also indicated that Champion may want to modify the southern permit boundary to include the toe of the pile.

8. Champion currently disposes of asbestos removed from the mill in the landfill, in accordance with a letter from O.W. Strickland dated July 31, 1984. The letter states that the asbestos shall be disposed "as far from the top of the landfill as possible, but in no case within ten (10) feet of the landfill surface." The current solid waste rules require that asbestos be disposed of in virgin soil. Champion proposes to continue to place the asbestos in accordance with the July 1984 letter. The State indicated that this should be acceptable. The State indicated that the purpose of the current rule is to prevent airborne releases of asbestos and to ensure that asbestos is not disturbed in the event of a landfill fire. This situation should not be a concern at the flyash disposal area.
9. The current solid waste rules require two (2) feet of suitable compacted earth to be placed over a disposal area after final termination of disposal operations. Surrinc proposes that this requirement should not be applied to the flyash landfill based upon EP toxicity test results on the flyash which indicate no contaminant levels above the Drinking Water Standards.

Surrinc proposes that the landfill be completely stabilized with vegetation that can be supported on the flyash alone and which will provide good coverage and erosion control characteristics. Surrinc and Champion propose test plots of various types of vegetation in order to establish the most effective species. Test plots would be set up within the next year.

Placement of the compacted earth would necessitate destruction of the established vegetation, and reshaping of the piles for flatter side slopes will cause increased erosion and may disturb previously placed asbestos. Surrinc believes that these activities may have more environmental impacts than the alternative of not capping the landfill and establishing vegetation to completely stabilize the area.

The State indicated that other flyash landfills have not been required to be covered with compacted earth and have side slopes of 2:1 or greater. Since this has previously been allowed, it should be acceptable to not place the 2' of compacted earth.

History No. 1
Champion International Corporation
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August 16, 1990
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10. The State indicated that all the proposals presented above should be included in an operating/closure plan, and that they will consider all of these items. Since Champion is not required to submit a plan, the operating/closure plan can be submitted for review and if the State has any comments, they will respond.
11. Champion stated that they may wish to begin using the southwest portion of their permitted area, which to date has never been used for flyash disposal, although it is included in the permit. This would extend their remaining flyash landfill life by 5 to 6 years. The State stated that they would require a full application for a permit amendment to be submitted for the use of that portion of the property.

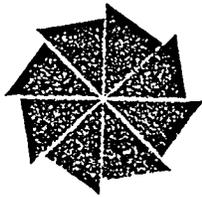
SIRRINE ENVIRONMENTAL CONSULTANTS



Francine Durso, P.E.

FD/rba

cc: All in Attendance
Project File R-0009



North Carolina Department of Natural Resources & Community Development

James B. Hunt, Jr., Governor

Howard N. Lee, Secretary

May 7, 1981



Mr. Gordon Layton
Dept. of Human Resources
Division of Health Services
225 N. McDowell St.
Raleigh, N. C. 27602

Dear Mr. Layton:

RE: Erosion Control Plan
Champion-International
Fly Ash Disposal Site

We have completed our review of the sediment and erosion control plan for the subject project. We are satisfied that it will meet the requirements of Section .0017 of the North Carolina Administrative Code, Title 15, Chapter 4, with the following conditions:

- (1) A natural or mechanical buffer must be maintained at all times, sufficient to protect the branch and the river from dispoits of disposed materials.
- (2) A copy of the ground cover specifications as we discussed must be sent to this office.

Approval is subject to satisfactory performance of the erosion control measures under field conditions. Should any of the measures fail to provide effective control, additional measures may be required.

North Carolina General Statute 113A-71(d), reserves the right of inspection of the site by our staff to determine compliance with the approved plan.

We look forward to working with you on this project.

Sincerely,

John L. Holley, Jr.
Regional Engineer
Land Quality Section

JLH/mp



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

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

July 31, 1984

Ms. Nancy C. Walker
Champion International Corp.
P.O. Box 580
Roanoke Rapids, N.C. 27870

Re: Disposal of Asbestos at Champion Landfill

Dear Ms. Walker:

The Division of Health Services has no objection to disposal of asbestos waste in permitted sanitary landfills if performed in accordance with 40 CFR Part 61. The following procedures should be followed:

1. The waste is placed wet into plastic bags and securely sealed to prevent an airborne condition during handling.
2. The operator shall be notified that the waste is to be covered immediately with sufficient amounts of dirt or other waste so as to prevent an airborne condition during final disposal.
3. The operator shall place the waste as far from the top of the landfill as possible, but in no case within ten (10) feet of the landfill surface.
4. Soil or flyash may be used for cover.

The preparation of the asbestos and delivery should comply with OSHA and DOT standards.

If you have questions concerning this matter, please advise.

Sincerely,

O.W. Strickland
O.W. Strickland, Head

Solid and Hazardous Waste Management Branch
Environmental Health Section

JGL:cew/1142A

cc: Richard Gay

*XC. Marshall Smith
et al.
Lack...
Bob...
Frank...
Richard...
Red...
D. ...*





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

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

July 31, 1984

Ms. Nancy C. Walker
Champion International Corp.
P.O. Box 580
Roanoke Rapids, N.C. 27870

Re: Disposal of Asbestos at Champion Landfill

Dear Ms. Walker:

The Division of Health Services has no objection to disposal of asbestos waste in permitted sanitary landfills if performed in accordance with 40 CFR Part 61. The following procedures should be followed:

1. The waste is placed wet into plastic bags and securely sealed to prevent an airborne condition during handling.
2. The operator shall be notified that the waste is to be covered immediately with sufficient amounts of dirt or other waste so as to prevent an airborne condition during final disposal.
3. The operator shall place the waste as far from the top of the landfill as possible, but in no case within ten (10) feet of the landfill surface.
4. Soil or flyash may be used for cover.

The preparation of the asbestos and delivery should comply with OSHA and DOT standards.

If you have questions concerning this matter, please advise.

Sincerely,

O.W. Strickland
O.W. Strickland, Head

Solid and Hazardous Waste Management Branch
Environmental Health Section

JGL:caw/1142A

cc: Richard Gay

*XC. Marshall Smith
8/1/84
Jack L...
Bob L...
Frank Cary
Richard...
Rand...
D. ...*



nw.
3/20



Roanoke Rapids Sanitary District

P.O. Box 308 635 Hamilton Street Roanoke Rapids, North Carolina 27870 (919) 537-9137

March 18, 1991

Mr. Myrl A. Nisely
Sr. Process Engineer/Environmental
Roanoke Rapids Mill
Champion International Corporation
P. O. Box 580
Roanoke Rapids, N. C. 27870

Dear Mr. Nisely:

Attached per your request is one (1) executed copy of an agreement whereby the Roanoke Rapids Sanitary District agrees that the flyash which encroaches on the District's sewer easement in the area(s) described on the drawing dated December 21, 1990, prepared by Burr & Associates, does not pose a restriction to the District's future use for operation, maintenance, or replacement of water and/or sewer systems.

If we can be of further service, please advise.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'G. Macon Reavis, Jr.'.

G. Macon Reavis, Jr.
Superintendent

Enclosure

nu.
3/20



Roanoke Rapids Sanitary District

P.O. Box 308 635 Hamilton Street Roanoke Rapids, North Carolina 27870 (919) 537-9137

March 18, 1991

Mr. Myrl A. Nisely
Sr. Process Engineer/Environmental
Roanoke Rapids Mill
Champion International Corporation
P. O. Box 580
Roanoke Rapids, N. C. 27870

Dear Mr. Nisely:

Attached per your request is one (1) executed copy of an agreement whereby the Roanoke Rapids Sanitary District agrees that the flyash which encroaches on the District's sewer easement in the area(s) described on the drawing dated December 21, 1990, prepared by Burr & Associates, does not pose a restriction to the District's future use for operation, maintenance, or replacement of water and/or sewer systems.

If we can be of further service, please advise.

Very truly yours,

A handwritten signature in cursive script, appearing to read 'G. Macon Reavis, Jr.', is written over the typed name.

G. Macon Reavis, Jr.
Superintendent

Enclosure



February 15, 1991

Mr. Macon Reavis, Superintendent
Roanoke Rapids Sanitary District
P.O. Box 308
Roanoke Rapids, N.C. 27870

Dear Mr. Reavis:

Enclosed are two drawings of a Sanitary District sewer easement where it borders Champion's flyash disposal area. The purpose of this letter is to describe an encroachment of a flyash pile onto the easement, in the hope that the District can agree with Champion that the encroachment does not inhibit use of the easement for District purposes, and is inconsequential.

The encroaching pile has existed for several years. The slope is heavily vegetated and has trees up to 9.25" in diameter near the toe. Erosion is nonexistent. As shown on the map, the pile arcs onto the easement a maximum of 4.1 feet. At that point the center line of the sewer is 6 feet from the pile.

Champion will soon be proposing operating and closure plans for this disposal site to the State. Common sense seems to suggest that it will be better to leave the pile alone, rather than excavate. No further encroachments will be tolerated. We invite you to inspect the site with us to form an opinion. If you feel that the District can still carry out its necessary activities in the space remaining, we ask you to sign a second copy of this letter and return it to me. You may keep the maps for your files.

Thank you for your consideration of this matter.

The Roanoke Rapids Sanitary Dist.
agrees that the flyash encroachment poses no
restrictions to its use of the easement, and can
be left in place.

Sincerely yours,

A handwritten signature in cursive script that reads 'Myrl A. Nisely'.

Myrl A. Nisely (Phone 535-6236)
Sr. Process Engineer/Environmental

A handwritten signature in cursive script that reads 'Macon Reavis'.

xc: Wayne Bunting
Terry Huskey
George Parrish

Chris Puryear
Scott Vickery
Sirrinc Environmental, Raleigh

Appendix - B

Drawings

"Under Seperate Cover"

Operational and Closure Plan
For Flyash Disposal Area
Champion International Corporation
Sirrine Project No. R-0009

APPENDIX B

Drawings

"Under Seperate. Cover"

Appendix - C



LABORATORIES, INC.

Certificate of Analysis

R307-051 ADDITION
12/2/96

10357 Old Keeton Road
Chen Allen, Virginia 22059
Phone 804 • 550 • 1400
Fax 804 • 550 • 5826

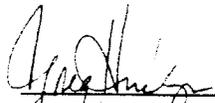
A&L Eastern Laboratories, Inc.
Attn:
7621 Whitepine Road
Richmond, VA 23237

Project No. :
Project Name :
Date Received: November 01, 1996
Date Sampled :
Date Issued : November 18, 1996

Sample ID : 45553

Parameter	Result	Units	DL	Date/Time		
				Analyzed	Method	Analyst
TCLP Organics (by 1311 leachate procedure):						
2,4,6-Trichlorophenol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Pentachlorophenol	BDL	ug/l	50.00	11-06/09:00	8270	KOD
o-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
m-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
p-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
2,4,5-Trichlorophenol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Pyridine	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachloroethane	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Nitrobenzene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachlorobutadiene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
2,4-Dinitrotoluene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachlorbenzene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Vinyl chloride	BDL	ug/l	20.00	11-06/09:00	8240	KOD
1,1-Dichloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Chloroform	BDL	ug/l	5.00	11-06/09:00	8240	KOD
1,2-Dichloroethane	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Carbon tetrachloride	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Trichloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Benzene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Tetrachloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Chlorobenzene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
1,4-Dichlorobenzene	BDL	ug/l	10.00	11-06/09:00	8240	KOD
Methyl ethyl ketone	BDL	ug/l	50.00	11-06/09:00	8240	KOD
gamma-BHC (Lindane)	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Chlordane	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Heptachlor	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Toxaphene	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Methoxychlor	BDL	ug/l	50.00	11-06/09:00	8080	SPF
Endrin	BDL	ug/l	5.00	11-06/09:00	8080	SPF
2,4-Dichlorophenoxyacetic acid	BDL	ug/l	2.00	11-06/09:00	8150	SPF
2,4,5-TP (Silvex)	BDL	ug/l	.20	11-06/09:00	8150	SPF

BDL = Below Detection Limit



Greg L. Hudson
Laboratory Director

CHAMPION INTERNATIONAL
ATTN: NEAL DAVIS
P O BOX 580-N ROANOKE AVE.
ROANOKE RAPIDS NC 27870

R6B16237-1

RE: PRIMARY CLARIFIER
PO#R80922



LABORATORIES, INC.

Certificate of Analysis

R307-051 ADDITION
12/2/96

10357 Old Keeton Road
Glen Allen, Virginia 23060
Phone 804 • 550 • 3971
Fax 804 • 550 • 3826

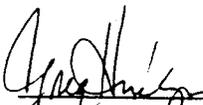
A&L Eastern Laboratories, Inc.
Attn:
7621 Whitepine Road
Richmond, VA 23237

Project No. :
Project Name :
Date Received: November 01, 1996
Date Sampled :
Date Issued : November 18, 1996

Sample ID : 45553

Parameter	Result	Units	DL	Date/Time		
				Analyzed	Method	Analyst
TCLP Organics (by 1311 leachate procedure):						
2,4,6-Trichlorophenol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Pentachlorophenol	BDL	ug/l	50.00	11-06/09:00	8270	KOD
o-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
m-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
p-Cresol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
2,4,5-Trichlorophenol	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Pyridine	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachloroethane	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Nitrobenzene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachlorobutadiene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
2,4-Dinitrotoluene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Hexachlorbenzene	BDL	ug/l	10.00	11-06/09:00	8270	KOD
Vinyl chloride	BDL	ug/l	20.00	11-06/09:00	8240	KOD
1,1-Dichloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Chloroform	BDL	ug/l	5.00	11-06/09:00	8240	KOD
1,2-Dichloroethane	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Carbon tetrachloride	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Trichloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Benzene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Tetrachloroethene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
Chlorobenzene	BDL	ug/l	5.00	11-06/09:00	8240	KOD
1,4-Dichlorobenzene	BDL	ug/l	10.00	11-06/09:00	8240	KOD
Methyl ethyl ketone	BDL	ug/l	50.00	11-06/09:00	8240	KOD
gamma-BHC (Lindane)	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Chlordane	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Heptachlor	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Toxaphene	BDL	ug/l	5.00	11-06/09:00	8080	SPF
Methoxychlor	BDL	ug/l	50.00	11-06/09:00	8080	SPF
Endrin	BDL	ug/l	5.00	11-06/09:00	8080	SPF
2,4-Dichlorophenoxyacetic acid	BDL	ug/l	2.00	11-06/09:00	8150	SPF
2,4,5-TP (Silvex)	BDL	ug/l	.20	11-06/09:00	8150	SPF

BDL = Below Detection Limit



Greg L. Hudson
Laboratory Director

CHAMPION INTERNATIONAL
ATTN: NEAL DAVIS
P O BOX 580-N ROANOKE AVE.
ROANOKE RAPIDS NC 27870

R6B16237-1

RE: PRIMARY CLARIFIER
PO#R80922

A & L EASTERN AGRICULTURAL LABORATORIES, INC.

7621 Whitepine Road • Richmond, Virginia 23237 • (804) 743-9401
 Fax No. (804) 271-6446



R307-051 ACCOUNT 45786

PAGE 1

REPORT NUMBER

CHAMPION INTERNATIONAL
 ATTN: NEAL DAVIS
 POB 580-N ROANOKE AVE
 ROANOKE RAPIDS NC 27870

PO #R80922

NEAL DAVIS
 COPY TO: SXME

LAB NUMBER = 45553
 SAMPLE ID = PRIMARY CLARIFIER

DATE SAMPLED
 DATE RECEIVED 10/30/96
 DATE REPORTED 11/05/96

SLUDGE ANALYSIS REPORT

PARAMETER	RESULT (%)	RESULT (MG/KG)	DETECTION LIMIT (MG/KG)	ANALYST	ANALYSIS DATE	METHOD REFERENCE
SOLIDS	37.97	379700	100	JCM	10/30/96	SM 2540G
NITROGEN (TKN)	0.22	2200	100	LDR	10/31/96	EPA 351.3
PHOSPHORUS	0.22	2200	100	JCM	10/31/96	EPA 365.4
POTASSIUM	0.26	2600	100	DCN	10/31/96	SW 846-6010
CALCIUM	2.18	21800	100	DCN	10/31/96	SW 846-6010
MAGNESIUM	0.43	4300	100	DCN	10/31/96	SW 846-6010
SODIUM	0.53	5300	100	DCN	10/31/96	SW 846-6010
IRON		12100	1	DCN	10/31/96	SW 846-6010
ALUMINUM		14500	10	DCN	10/31/96	SW 846-6010
MANGANESE		1830	1	DCN	10/31/96	SW 846-6010
COPPER		87	1	DCN	10/31/96	SW 846-6010
ZINC		263	1	DCN	10/31/96	SW 846-6010
AMMONIA NITROGEN	0.01	100	100	LDR	10/31/96	EPA 350.2
NO3-NO2 NITROGEN		13	10	KCS	10/31/96	EPA 353.1
CADMIUM		ND	1	DCN	10/31/96	SW 846-6010
CHROMIUM		88	5	DCN	10/31/96	SW 846-6010
NICKEL		68	5	DCN	10/31/96	SW 846-6010
LEAD		30	5	DCN	10/31/96	SW 846-6010

ALL VALUES EXCEPT SOLIDS AND TSS ARE ON A DRY WEIGHT BASIS.

Paul C. H. Chu
 PAUL C. H. CHU
 C. NORMAN JONES

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7621 Whitepine Road • Richmond, Virginia 23237 • (804) 743-9401
 Fax No. (804) 271-6446



R307-051 ACCOUNT 45786

REPORT NUMBER

PAGE 2

CHAMPION INTERNATIONAL
 ATTN: NEAL DAVIS
 POB 580 W ROANOKE AVE
 ROANOKE RAPIDS NC 27870

PO #R80922

NEAL DAVIS
 COPY TO: SAME

SLUDGE ANALYSIS REPORT

DATE SAMPLED
 DATE RECEIVED 10/30/96
 DATE REPORTED 11/05/96

LAB NUMBER - 45554
 SAMPLE ID - PRIMARY CLARIFIER

PARAMETER	RESULT (%)	RESULT (MG/KG)	DETECTION LIMIT (MG/KG)	ANALYST	ANALYSIS DATE	METHOD REFERENCE
ARSENIC		10.80	0.4	DCN	10/04/96	SM 846-7061
MERCURY		0.26	0.1	DCN	10/04/96	SM 846-7471
PH (STANDARD UNITS)	7.70			NM	10/31/96	EPA 150.1
CALCIUM CARBONATE EQ	12.85	128500	100	UCH	10/31/96	ASTM C602
VOLATILE SOLIDS	60.51	605100	100	LBR	10/31/96	SM 25405
ORGANIC NITROGEN	0.21	2100	100	KCS	10/31/96	CALCULATED
CHLORIDE		370	1	UCH	10/31/96	SM 4500 CL
SULFATE		1660	10	UCH	10/31/96	SM 846-9038

TOTAL TCLP ANALYSIS TO FOLLOW

ALL VALUES EXCEPT SOLIDS AND TSS ARE ON A DRY WEIGHT BASIS.

Signature
 FRANK C. H. CHAI
 CHIEF OF LABORATORY

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WEBB TECHNICAL REPORT
11/11/94 12:43:55

Work Order # 94-10-777

REPORT CHAMPION ROANOKE RAPIDS, NC
TO P.O. BOX 580
ROANOKE RAPIDS, NC 27870

PREPARED Webb Technical Group, Inc.
BY 4320 Delta Lake Drive
Raleigh, NC 27612

ATTEN MRYL NISLEY / NEILL DAVIS

ATTEN Client Services
PHONE (919)787-9171

CLIENT CRR SAMPLES 1
COMPANY CHAMPION INTERNATIONAL CORP.
FACILITY NORTH ROANOKE AVE.
ROANOKE RAPIDS, NC 27870

We are pleased to provide this certified report of analysis.
Samples will be retained for 30 days after report is issued.
Feel free to telephone if further explanation is required.
refer to the Work Order # in all correspondence.

WORK ID SLUDGE
TAKEN
TRANS DELIVERY, UPS
TYPE WASTEWATER
P.O. # R70999
INVOICE under separate cover

SEND REPORT TO NEAL DAVIS

TEST CODES and NAMES used on this workorder

SAMPLE IDENTIFICATION
01 SLUDGE SAMPLE GRAB 9/26

AG	SILVER BY ICP
AS	ARSENIC BY ICP
BA	BARIUM BY ICP
CD	CADMIUM BY ICP
CR	TOTAL CHROMIUM BY ICP
HG AA	MERCURY BY COLD VAPOR
PB	LEAD BY ICP
SE	SELENIUM BY ICP
TSOL S	TOTAL SOLIDS - SOIL/SLUDGE

Neil Davis
CERTIFIED BY
CONTACT ALL

RECORDED

NOV 10 1994

EOHS

SAMPLE ID		SLUDGE SAMPLE GRAB 9/26		SAMPLE # 01		FRACTIONS: A		Date & Time Collected 09/26/94		Category	
AG	<1.25	AS	10.4	BA	236	CD	2.23	CR	107	HG AA	545
MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		UG/KG DRY SOLID	
PB	5.94	SE	<1.25	TSOL S	40.4						
MG/KG DRY SOLID		MG/KG DRY SOLID		%							

July 1 used dry into bins
 Mercury not being measured mg/kg = ~~545~~ 545
 Borewin not considered for land application

Check
 Patton Redwater
 Victor Redwater
 503 Regulators EPA. SB ^{PA} PLAN ENGLISH BUI DES

Page 1,
Received: 10/19/94

WEBB TECHNICAL

REPORT

11/04/94 14:46:59

Work Order # 94-10-776

REPORT CHAMPION ROANOKE RAPIDS, NC
TO P.O. BOX 580
ROANOKE RAPIDS, NC 27870

PREPARED Webb Technical Group, Inc.
BY 4320 Delta Lake Drive
Raleigh, NC 27612

ATTEN MRYL NISLEY / NEIL DAVIS

ATTEN Client Services
PHONE (919)787-9171

CLIENT CRR
COMPANY CHAMPION INTERNATIONAL CORP.
FACILITY NORTH ROANOKE AVE.
ROANOKE RAPIDS, NC 27870

SAMPLES 1

CONTACT ALL

We are pleased to provide this certified report of analysis.
Samples will be retained for 30 days after report is issued.
Feel free to telephone if further explanation is required.
refer to the Work Order # in all correspondence.

WORK ID SLUDGE

TAKEN

TRANS DELIVERY, UPS
TYPE WASTEWATER

P.O. # R70999

INVOICE under separate cover

SEND REPORT TO NEAL DAVIS

SAMPLE IDENTIFICATION

01 SLUDGE SAMPLE GRAB 9/26

01 SLUDGE SAMPLE LEACHATE

TEST CODES and NAMES used on this workorder

TCLPIN TCLP INORGANICS

James J. Martin
CERTIFIED BY

Page 2
Received: 10/19/94

Work Order # 94-10-776

WEBB TECHNICAL REPORT
Results by Sample

SAMPLE ID SLUDGE SAMPLE LEACHATE
FRACTION 01B TEST CODE TCLPIN NAME TCLP INORGANICS
Date & Time Collected 10/24/94 Category _____

VER DCJ

EXTRACTED
DATE RUN 10/31/94

PARAMETER	RESULT	EPA LIMIT	UNITS
ARSENIC	<0.1	5.0	mg/L
BARIUM	0.649	100.0	mg/L
✓ CADMIUM	<0.005	1.0	mg/L
CHROMIUM	0.015	5.0	mg/L
✓ LEAD	<0.05	5.0	mg/L
MERCURY	<0.0002	0.2	mg/L
SELENIUM	<0.1	1.0	mg/L
SILVER	<0.01	5.0	mg/L

REPORT CHAMPION ROANOKE RAPIDS, NC
TO P.O. BOX 580
ROANOKE RAPIDS, NC 27870

PREPARED Webb Technical Group, Inc.
BY 4320 Delta Lake Drive
Raleigh, NC 27612

David Dardi
CERTIFIED BY

ATTEN MRYL NISLEY

ATTEN Client Services
PHONE (919)787-9171

CONTACT G FLYNT

CLIENT CRR
COMPANY CHAMPION ROANOKE RAPIDS, NC
FACILITY N ROANOKE AVE
ROANOKE RAPIDS, NC 27870

We are pleased to provide this certified report of analysis. Samples will be retained for 30 days after report is issued. Feel free to telephone if further explanation is required. Refer to the Work Order # in all correspondence.

WORK ID SLUDGE
TAKEN
TRANS DELIVERY, UPS
TYPE WASTEWATER
P.O. # R-70114
INV. # 47776

Previously Reported on 08/30/94.
First Reported on 08/25/94.

SAMPLE IDENTIFICATION

01 NEW SLUDGE
02 OLD SLUDGE

TEST CODES and NAMES used on this workorder

AG SILVER BY ICP
AS ARSENIC BY ICP
BA BARIUM BY ICP
CD CADMIUM BY ICP
CR TOTAL CHROMIUM BY ICP
HG_AA MERCURY BY COLD VAPOR
PB LEAD BY ICP
SE SELENIUM BY ICP

Received: 08/02/94

WEBS TECHNICAL REPORT
Results by Sample

Work Order # 94-08-090

SAMPLE ID NEW SLUDGE FRACTIONS: A,B
Date & Time Collected 07/27/94 15:00:00 Category _____

AG	<2.5	AS	<25	BA	220	CD	1.58	CR	79.5	HG AA	0.092
MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID	
PB	<12.5	SE	<25								
MG/KG DRY SOLID		MG/KG DRY SOLID									

SAMPLE ID OLD SLUDGE FRACTIONS: A,B
Date & Time Collected 07/27/94 15:00:00 Category _____

AG	<2.5	AS	<25	BA	249	CD	1.83	CR	90.5	HG AA	0.083
MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID		MG/KG DRY SOLID	
PB	16.0	SE	<25								
MG/KG DRY SOLID		MG/KG DRY SOLID									

WEBB TECHNICAL

REPORT

09/06/94 07:12:40

Work Order # 94-08-089

REPORT CHAMPION ROANOKE RAPIDS, NC
TO P.O. BOX 580
ROANOKE RAPIDS, NC 27870

PREPARED BY Webb Technical Group, Inc.
4320 Delta Lake Drive
Raleigh, NC 27612

ATTEN MRYL NISLEY

ATTEN Client Services
PHONE (919)787-9171

CLIENT CRR SAMPLES 2
COMPANY CHAMPION ROANOKE RAPIDS, NC
FACILITY N ROANOKE AVE
ROANOKE RAPIDS, NC 27870

WORK ID SLUDGE
TAKEN
TRANS DELIVERY, UPS
TYPE WASTEWATER
P.O. # R-70114
INVOICE under separate cover

Jammy D. Martin

CERTIFIED BY

CONTACT G FLYNT

We are pleased to provide this certified report of analysis.
Samples will be retained for 30 days after report is issued.
Feel free to telephone if further explanation is required.
refer to the Work Order # in all correspondence.

TEST CODES and NAMES used on this workorder

SAMPLE IDENTIFICATION
01 NEW SLUDGE
02 OLD SLUDGE

TC8150 TCCLP CHLOR. HERBICIDES
TCL608 TCCLP CHLORINATED PESTICIDE
TCLPBN TCCLP BASE NEUTRALS
TCLPIN TCCLP INORGANICS
TCLPVO TCCLP VOLATILE ORGANIC CPDS
TCLP A TCCLP ACIDIC COMPOUNDS

Page 2
Received: 08/02/94

WEBB TECHNICAL REPORT
Results by Sample

Work Order # 94-08-089

SAMPLE ID NEW SLUDGE

FRACTION O1B

TEST CODE TC8150

NAME TCLP CHLOR. HERBICIDES

Date & Time Collected 07/27/94 15:00:00

Category _____

VER DCJ

EXTRACTED
DATE RUN

PARAMETER
2,4-D
2,4,5-TP (SILVEX)

RESULT EPA LIMIT UNITS
<0.100 10.0 mg/L
<0.050 1.0 mg/L

Page 3
Received: 08/02/94
SAMPLE ID NEW SLUDGE

WEBB TECHNICAL REPORT
Results by Sample

Fraction 01B TEST CODE TCL608 NAME TCLP CHLORINATED PESTICIDE
Date & Time Collected 07/27/94 15:00:00 Category _____

Work Order # 94-08-089

EXTRACTED
DATE RUN

VER DCJ

PARAMETER	RESULT	EPA LIMIT	UNITS
CHLORDANE	<0.0025	0.030	mg/L
ENDRIN	<0.001	0.020	mg/L
HEPTACHLOR	<0.0005	0.008	mg/L
HEPTACHLOR EPOXIDE	<0.0005	0.008	mg/L
LINDANE	<0.010	0.400	mg/L
METHOXYCHLOR	<0.100	10.000	mg/L
TOXAPHENE	<0.0025	0.500	mg/L

Page 4
 Received: 08/02/94
 SAMPLE ID NEW SLUDGE
 FRACTION 01B TEST CODE TCLPBN NAME TCLP BASE NEUTRALS
 Date & Time Collected 07/27/94 15:00:00 Category _____
 Work Order # 94-08-089
 MEBB TECHNICAL REPORT
 Results by Sample

VER DCJ

EXTRACTED
 DATE RUN

PARAMETER	RESULT	EPA LIMIT	UNITS
2,4-DINITROTOLUENE	<0.010	0.13	mg/L
HEXACHLOROBENZENE	<0.010	0.13	mg/L
HEXACHLOROBUTADIENE	<0.010	0.50	mg/L
HEXACHLOROETHANE	<0.010	3.00	mg/L
NITROBENZENE	<0.010	2.00	mg/L
PYRIDINE	<0.010	5.00	mg/L

Page 5
Received: 08/02/94

WEBB TECHNICAL REPORT
Results by Sample

Work Order # 94-08-089

SAMPLE ID NEW SLUDGE FRACTION 01C TEST CODE TCLPIN NAME TCLP INORGANICS
Date & Time Collected 07/27/94 15:00:00 Category _____

EXTRACTED
DATE RUN

PARAMETER	RESULT	EPA LIMIT	UNITS
ARSENIC	<0.1	5.0	mg/L
BARIUM	0.485	100.0	mg/L
CADMIUM	<0.005	1.0	mg/L
CHROMIUM	0.052	5.0	mg/L
LEAD	<0.05	5.0	mg/L
MERCURY	<0.0002	0.2	mg/L
SELENIUM	<0.1	1.0	mg/L
SILVER	<0.01	5.0	mg/L

VER DCJ

VER DCJ

EXTRACTED
 DATE RUN 08/17/94

PARAMETER	RESULT	EPA LIMIT	UNITS
BENZENE	<0.005	0.50	mg/L
CARBON TETRACHLORIDE	<0.005	0.50	mg/L
CHLOROBENZENE	<0.005	100.00	mg/L
CHLOROFORM	<0.005	6.00	mg/L
1,4-DICHLOROBENZENE	<0.005	7.50	mg/L
1,2-DICHLOROETHANE	<0.005	0.50	mg/L
1,1-DICHLOROETHENE	<0.005	0.70	mg/L
METHYL ETHYL KETONE	<0.500	200.00	mg/L
TETRACHLOROETHENE	<0.005	0.70	mg/L
TRICHLOROETHENE	<0.005	0.50	mg/L
VINYL CHLORIDE	<0.010	0.20	mg/L

Received: 08/02/94

Results by Sample

SAMPLE ID NEW SLUDGE FRACTION 01B TEST CODE TCLP A NAME TCLP ACIDIC COMPOUNDS Category _____
Date & Time Collected 07/27/94 15:00:00

VER DCJ

EXTRACTED
DATE RUN

PARAMETER	RESULT	LIMIT	UNITS
o-CRESOL	<0.010	200.0	Mg/L
m, p-CRESOL	<0.010	200.0	Mg/L
PENTACHLOROPHENOL	<0.050	100.0	Mg/L
2,4,5-TRICHLOROPHENOL	<0.050	400.0	Mg/L
2,4,6-TRICHLOROPHENOL	<0.010	2.0	Mg/L

Received: 08/02/94

WEBB TECHNICAL

Results by Sample

REPORT

Work Order # 94-08-089

SAMPLE ID OLD SLUDGE

FRACTION 02B TEST CODE TC8150 NAME TCLP CHLOR. HERBICIDES

Date & Time Collected 07/27/94 15:00:00 Category _____

VER DCJ

EXTRACTED

DATE RUN

PARAMETER
2,4-D
2,4,5-TP (SILVEX)

RESULT	EPA LIMIT	UNITS
<0.100	10.0	mg/L
<0.050	1.0	mg/L

Received: 08/02/94

WEBB TECHNICAL

REPORT

Results by Sample

Work Order # 94-08-089

SAMPLE ID OLD SLUDGE

FRACTION 02B

TEST CODE TCL608

NAME TCLP CHLORINATED PESTICIDE

Date & Time Collected 07/27/94 15:00:00

Category _____

VER DCJ

EXTRACTED
DATE RUN

PARAMETER	RESULT	EPA LIMIT	UNITS
CHLORDANE	<0.0025	0.030	mg/L
ENDRIN	<0.001	0.020	mg/L
HEPTACHLOR	<0.0005	0.008	mg/L
HEPTACHLOR EPOXIDE	<0.0005	0.008	mg/L
LINDANE	<0.010	0.400	mg/L
METHOXYCHLOR	<0.100	10.000	mg/L
TOXAPHENE	<0.0025	0.500	mg/L

SAMPLE ID OLD SLUDGE

FRACTION 02B TEST CODE TCLPBN NAME TCLP BASE NEUTRALS
Date & Time Collected 07/27/94 15:00:00 Category _____

VER DCJ

EXTRACTED
DATE RUN

PARAMETER	RESULT	EPA LIMIT	UNITS
2,4-DINITROTOLUENE	<0.010	0.13	mg/L
HEXACHLOROBENZENE	<0.010	0.13	mg/L
HEXACHLOROBUTADIENE	<0.010	0.50	mg/L
HEXACHLOROETHANE	<0.010	3.00	mg/L
NITROBENZENE	<0.010	2.00	mg/L
PYRIDINE	<0.010	5.00	mg/L

Received: 08/02/94

WEBB TECHNICAL

REPORT

Results by Sample

Work Order # 94-08-089

SAMPLE ID OLD SLUDGE

FRACTION 02C

TEST CODE TCLPIN NAME TCLP INORGANICS

Date & Time Collected 07/27/94 15:00:00 Category _____

VER DCJ

EXTRACTED
DATE RUN

PARAMETER	RESULT	EPA LIMIT	UNITS
ARSENIC	<0.1	5.0	mg/L
BARIUM	1.10	100.0	mg/L
CADMIUM	<0.005	1.0	mg/L
CHROMIUM	<0.01	5.0	mg/L
LEAD	<0.05	5.0	mg/L
MERCURY	<0.0002	0.2	mg/L
SELENIUM	<0.1	1.0	mg/L
SILVER	<0.01	5.0	mg/L

VER DCJ

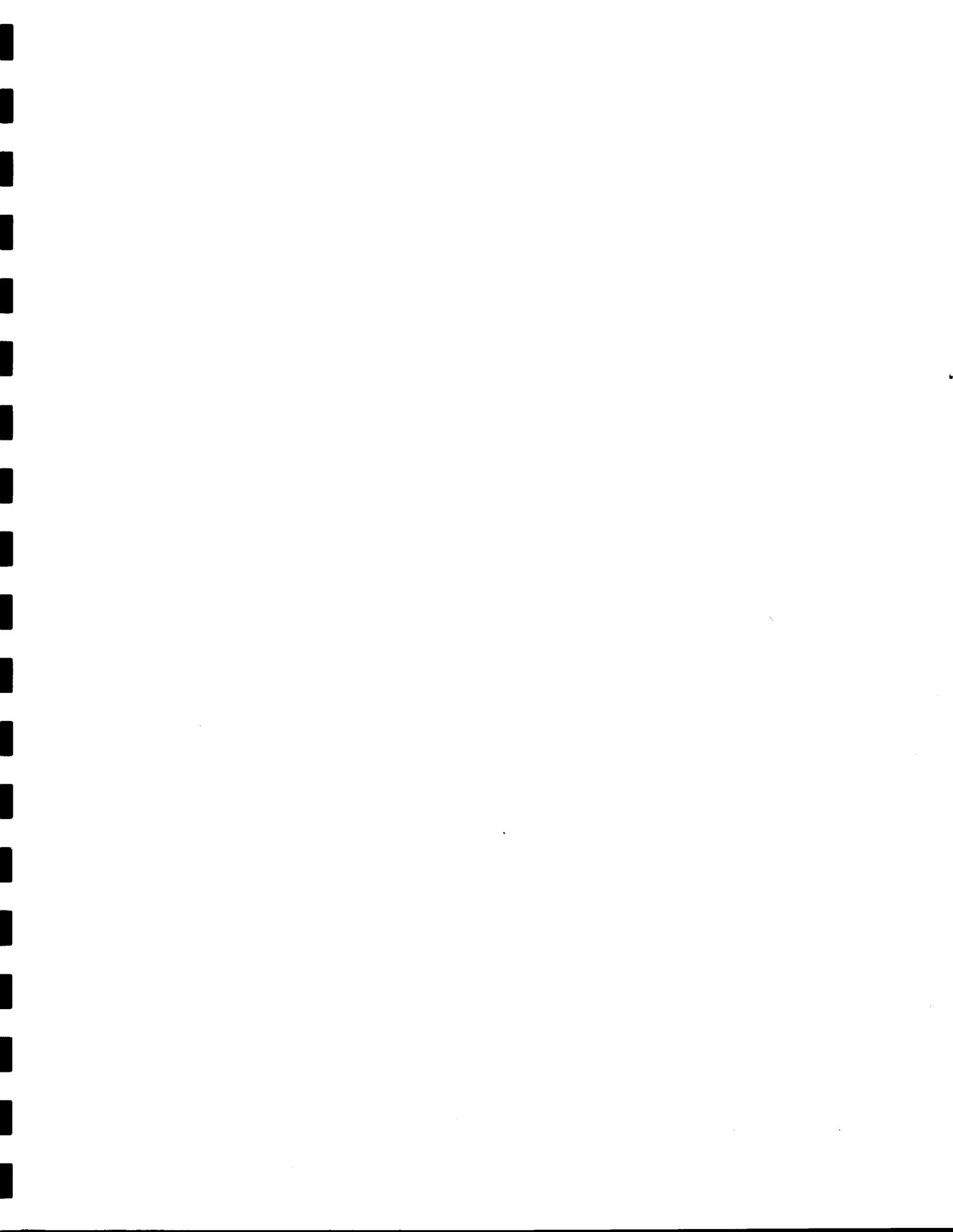
EXTRACTED
 DATE RUN 08/17/94

PARAMETER	RESULT	EPA LIMIT	UNITS
BENZENE	<0.005	0.50	mg/L
CARBON TETRACHLORIDE	<0.005	0.50	mg/L
CHLOROBENZENE	<0.005	100.00	mg/L
CHLOROFORM	<0.005	6.00	mg/L
1,4-DICHLOROBENZENE	<0.005	7.50	mg/L
1,2-DICHLOROETHANE	<0.005	0.50	mg/L
1,1-DICHLOROETHENE	<0.005	0.70	mg/L
METHYL ETHYL KETONE	<0.500	200.00	mg/L
TETRACHLOROETHENE	<0.005	0.70	mg/L
TRICHLOROETHENE	<0.005	0.50	mg/L
VINYL CHLORIDE	<0.010	0.20	mg/L

VER DCJ

EXTRACTED
DATE RUN

PARAMETER	RESULT	LIMIT	UNITS
o-CRESOL	<0.010	200.0	Mg/L
m, p-CRESOL	<0.010	200.0	Mg/L
PENTACHLOROPHENOL	<0.050	100.0	Mg/L
2, 4, 5-TRICHLOROPHENOL	<0.050	400.0	Mg/L
2, 4, 6-TRICHLOROPHENOL	<0.010	2.0	Mg/L



42-03



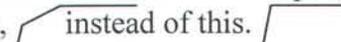
Carmen Johnson
Fac/Perm/Co ID # 42-03 Date 3/21/12 Doc ID#
LDIN

January 8, 1997

Mr. James Coffey
Division of Waste Management
P.O. Box 29603
Raleigh, NC 27611

Dear Mr. Coffey:

This letter is an update on Champion's development of a revised closure plan for the Lowground Flyash site. The activities required before we can revise the plan, and their status, are as follows:

1. Cut down the overall height of deposited material in order to fill in a valley and part of the asbestos hole. This is essentially done, and the pile is about 4-5 feet lower now. Adequate open space still remains for debris and asbestos.
2. Experiment with mixtures of flyash and sludge to use as cover. This is done. A 50/50 mix handles well.
3. From the top, reach over the sides and pull material back from the top 15 feet of the side slopes. The sides will then look like this,  instead of this.  This work will begin the week of January 13, with estimated completion by the end of February, weather permitting.
4. Exposed debris on the side slopes will be removed, and the slopes will be smoothed with new flyash. We hope to complete this by the end of March.
5. Once steps 3 and 4 are done, the projected final contours can be determined. Rust E&I will make a site visit to determine the placement of erosion control measures and engineer this phase of the site plan. We should be able to submit the revised closure plan to you when this engineering is completed. The plan will stipulate that a surveyor will take readings to establish the elevation of waste material as the baseline for final cover. Projecting all this as best we can, we hope to submit the revised plan by the end of May.
6. Gradually, throughout 1997, we will begin to cover sections of the top and adjacent sides. We expect to prepare the 50/50 mix on top as needed, and place it about 2.5 feet deep. The mix will then be rolled to compact it, fertilized and seeded right away.
7. The erosion control drains will be installed as we come to each location.

8. As the year comes to an end, most of the site should be covered, with very limited locations still receiving waste. On December 31, 1997, all deposits of debris will end.
9. Final touches will be made on the cover in the early part of 1998. When the job is considered complete, the surveyor will be brought in to establish finished elevations. These must be at least 2 feet higher than the baseline elevations in step 6. above, or material will be added until this requirement is met.
10. In the spring of 1998 a new well will be drilled somewhere on the east side of the pile. Champion does not have property outside the fence line on which to place a well. Therefore, the well will be placed within a 10 to 12 foot area between the pile and the fence.

If you have questions about any of these steps, please call me at 919-535-6236 to discuss them.

Sincerely yours,



Myrl A. Nisely
Sr. Environmental Engineer

Enclosure

xc:

Jim Cooper
Chris Puryear
Mary Lee Ransmeier
John Bengel, Stamford
Bob Midgette, Rust E & I

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

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



September 18, 1996

Mr. Myrl Nisely
Senior Environmental Engineer
Champion International Corporation
P.O. Box 580
Roanoke Rapids, NC 27870

RE: Closure of Champion Flyash Landfill, Roanoke Rapids:
Permit # 42-03

Dear Mr. Nisely,

After a review of the file data and our site visit, the hydrogeologic unit of the Solid Waste Section has determined that some amendments to the current monitoring system are needed before issuance of a closure letter for the above referenced facility.

Water levels in monitoring wells at the facility, along with topography, suggest that groundwater beneath the landfill flows to the southeast before discharging to the Roanoke River. An additional monitoring well needs to be installed on the southeast margin of the landfill (adjacent to the VEPCO powerline), with its location and construction specifications to be approved by the Section. The operators may drop well LG-4 from the routine detection monitoring system, though it should not be abandoned. Surface water sampling will not be required for post closure monitoring.

During our meeting at the Solid Waste Section on August 20, 1996, it was pointed out that any southeastward flow of groundwater from beneath the landfill could be not shown with certainty, using currently available water level data. Champion International does have the option of installing a number of additional piezometers at the facility in order to demonstrate that the existing water quality monitoring system is adequate for detection of possible releases from the landfill. However, the installation of one additional monitoring well would be less expensive than any investigation to make that determination. Since LG-4 could then be dropped from the system, long-term sampling costs would not be increased.

P.O. Box 27687,
Raleigh, North Carolina 27611-7687
Voice 919-733-4996



FAX 919-715-3605
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50% recycled/10% post-consumer paper

Mr. Myrl Nisely
Champion International
September 18, 1996
Page 2

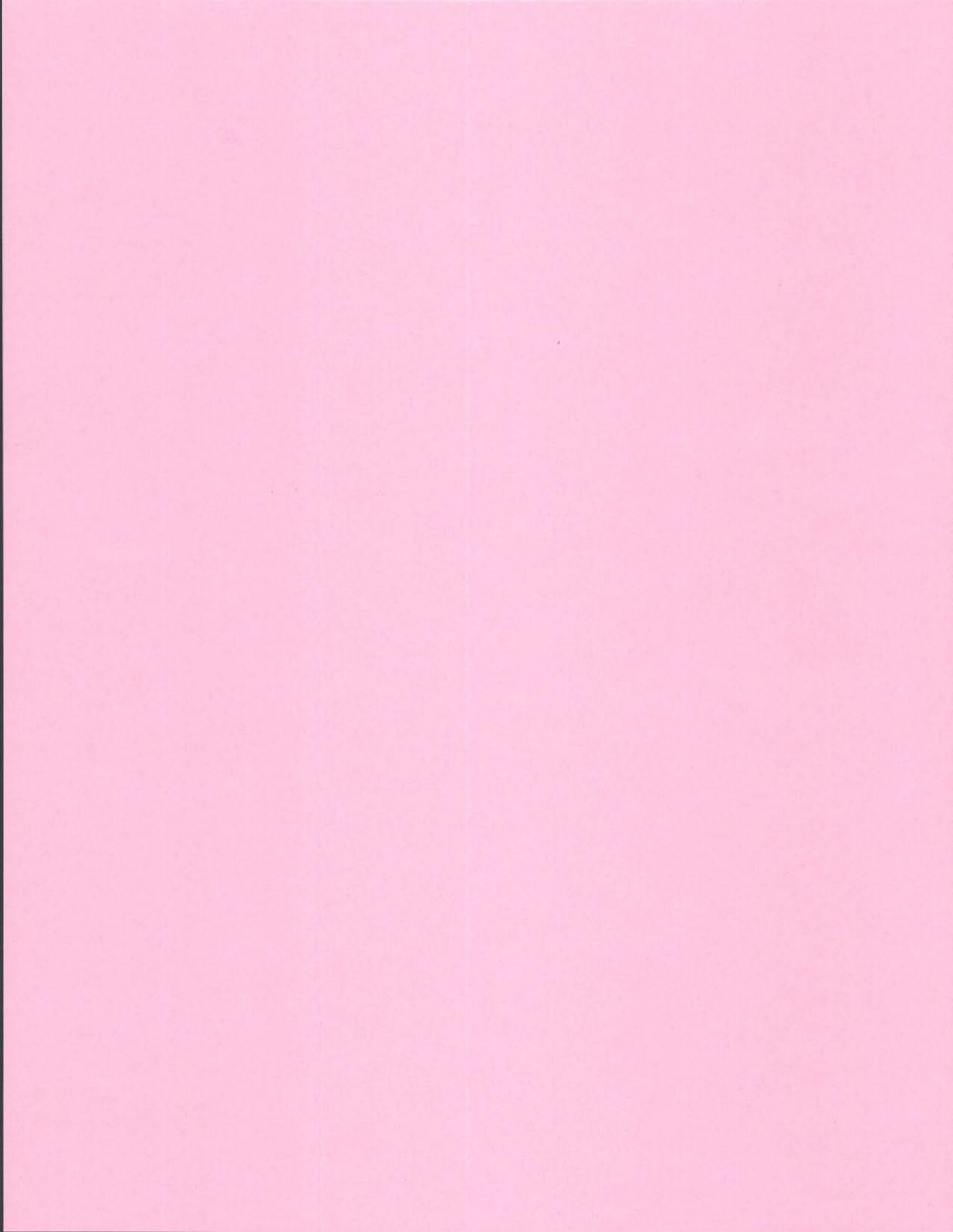
If you have any questions about this letter, please call me at the Solid Waste Section, (919) 733-0692, ext. 342..

Sincerely,



Jim Bateson
Hydrogeologist
Solid Waste Section

cc:	Bob Midgette;	Rust Environment and Infrastructure
	Bobby Lutfy;	"
	Jim Barber;	"



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

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



August 22, 1996

Mr. Myrl A. Nisely
Senior Environmental Engineer
Champion International, Roanoke Rapids Mill
P.O. Box 580
Roanoke Rapids, NC 27870

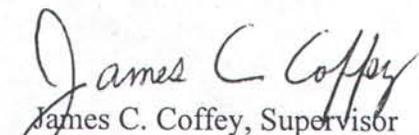
Re: Champion International Industrial Landfill, Permit Number 42-03, Halifax County

Dear Mr. Nisely:

The NC Division of Waste Management, Solid Waste Section (Section) has determined that the above referenced facility is in compliance with Rule .0503(2)(d)(ii) of the NC Solid Waste Management Rules codified at 15A NCAC 13B. Champion International has satisfied the criteria of this rule by closing their landfill before January 1, 1998. Closure should be conducted in accordance with Rule .0505, Rule .0510 and the facility permit.

If there are any questions regarding this letter, please contact Jim Barber in the Fayetteville Regional Office at (910) 486-1191 or Greg Eades in the Raleigh Central Office at (919) 733-0692, extension 344.

Sincerely,


James C. Coffey, Supervisor
Permitting Branch
Solid Waste Section

cc: Dexter Matthews, SWS
Terry Dover, SWS
Jim Barber, SWS
Ben Barnes, SWS
Central Files

CHAMPION INTERNATIONAL CORP.
ROANOKE RAPIDS, NORTH CAROLINA

Meeting Agenda - August 20, 1996

✓ 1.

Introductions

- Champion International
- Solid Waste Section
- Rust E & I

✓ 2.

History of Flyash Disposal Area

- Permitted May 6, 1981
- Materials Disposed
- 1991 Operational and Closure Plan

50% COAL FLY
50% WOOD FLY

42-03

FLY ASH, WOOD WASTE, DEMO. DEBRIS, ASBESTOS,
LOW LEVEL RAD. WASTE FROM PIPE
W/PIPE WORK. SCALE,
"WEDDY TIGGLE" - RADIATION
PROTECTION
BRANCH

✓ 3.

Additional Data

- Topographic Map
- Monitoring Well Installation Details
- Analytical Database

4. **Issues for Revised Operational and Closure Plan**

- ✓ SLUDGE Use of Primary Clarifier Solids in Final Cover Material
- ✓ Vegetative Cover Specifications
- ✓ Erosion Control Measures,
- ✓ Final Cover Thickness Documentation
- ✓ Additional Monitoring Well

① AREA FILL , NO TRENCH FILL IN PAST.

② RE-SURVEY NORTH + EAST BOUNDARY,

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



MEMORANDUM

TO: Jim Barber Date: July 16, 1996

FROM: Jim Bateson *JTB* cc: Bobby Lutfy
Mark Poindexter

RE: Closure of Champion Flyash Landfill, Roanoke Rapids:
Permit # 42-03

After a review of the file data and our site visit, the hydrogeologic unit of the Solid Waste Section has determined that some amendments to the current monitoring system are needed before issuance of a closure letter for the above referenced facility.

Water levels in monitoring wells at the facility, along with topography, suggest that groundwater beneath the landfill flows to the southeast before discharging to the Roanoke River. An additional monitoring well needs to be installed on the ~~southeast~~ margin of the landfill (adjacent to the VEPCO powerline), with its location and construction specifications to be approved by the Section. The operators may drop well LG-4 from the routine detection monitoring system, though it should not be abandoned. Surface water sampling will not be required for post closure monitoring.

During the post-closure monitoring period, water quality samples need to be analyzed for the constituents listed in the attached memorandum, *Sampling and Analysis Requirements for Construction and Demolition Landfills and Closed Sanitary Landfills*, using the methods and PQL's listed therein. The new constituent list includes the eight RCRA metals, plus a volatile organic scan. Sampling also needs to include field measurement of pH, temperature, and specific conductance.

Because past groundwater data for this facility indicates that Groundwater Quality Standards have been exceeded for some constituents (including lead), this needs to be noted in the closure letter, along with a statement that some additional water quality assessment might be needed in the future.

Champion 1993 Study of Grasses to Cover Flyash

SUMMARY

Written June, 1994

To fulfill an agreement with the NC Division of Solid Waste, six species of grass were grown on experimental plots prepared from: 1) fresh flyash with a pH of 7.9 (hereafter called "New") and 2) weathered flyash of pH about 7.1 ("Old"). A seventh type of grass was placed on an Old plot, without a corresponding New parcel. All species grew successfully on Old material, with three species especially thriving. Only one grass was able to grow well on new flyash. Two others grew rather feebly, and three failed to grow at all on New material. Hot, dry weather conditions provided a stress test for the plants.

Results show that Bermuda, Brown Top Millet, and Weeping Love grasses will make excellent cover, even in harsh drought conditions. A blend of all three will be especially effective. With experimentation, the unsupportive nature of fresh flyash can be readily transformed with fertilizer and pH adjustments.

DETAILS

Background

Under Sanitary Landfill permit No. 42-03, Champion operates a flyash disposal site at its Roanoke Rapids paper mill. A site closure plan accepted by the NC Division of Solid Waste¹ contained an agreement that Champion would study whether grasses could be successfully grown on flyash to serve as a final cover able to prevent erosion. If so, this closure would be accepted in lieu of a more expensive soil cap (which would also require seeding with grass).

Experimental Design

An equal number of 20' x 20' plots were prepared with Old and New flyash for 6 species. One extra Old plot was added when Brown Top Millet became available as a last minute addition to the study. The two soil types were sampled, then plots were seeded and covered with straw, fertilized, and monitored through a series of photographs. Regular irrigation was planned initially, but germination and growth did so well in the first two months with natural rainfall, that when hot, dry weather developed in July and August, it was decided to let the plots be drought stressed rather than kept artificially lush.

¹ Operational and Closure Plan for Flyash Disposal Area, Champion International Corporation, Roanoke Rapids, NC, October, 1990.

Species Descriptions²

Bahia (*Paspalum notatum*)

Bahiagrass is a warm-season, dense, tufted perennial bunchgrass that grows from 1 to 2½ feet tall. Its numerous leaves - generally hairy on the margins and usually flat - are less than ½ inch wide, up to 12 inches long and crowd to the base of the plant. Bahia reproduces by seed and spreads vegetatively by short, heavy runners. It forms a dense, tough sod even on droughty, sandy soils.

Brown Top Millet (*Panicum ramosum*)

An annual growing from 2 to 5 feet tall, Brown Top Millet is used mostly as a summer grazing crop. Its slender, erect stems branch at the crown. The broad, flat leaves 8 to 16 inches long, taper to a sharp point. Millet makes an abundance of seed (attractive to dove and quail), so reseeds easily. It can be grown in any area that has warm weather and sufficient rain for any other crop.

Crimson Clover (*Trifolium incarnatum*)

This familiar three-leaf clover is an annual legume used for soil improvement. It grows best on well drained soils, terraces, or hill land and will not succeed on low wet areas. Reseeds well.

Hulled Bermuda (*Cynodon dactylon*)

A warm-season, creeping perennial, sodforming turf grass which propagates by seed, runners and underground rootstocks. It grows from frost to frost and is dormant in the winter. The root system develops by sprouting new fibrous roots from the nodes of either the surface runners or underground stems. The short, flat leaves are 1 to 4 inches long. At the base of each leaf is a prominent ring or fringe of white hair. Slender, spike flowering heads, 3 to 8 in a cluster, grow from 6 to 12 inches high, depending on soil and moisture conditions. If not renovated, Bermuda grass becomes sod-bound and loses vigor in a few years. It will grow on moderately well-drained soil, whether acid or alkaline, provided moisture and plant food nutrients are adequate. Bermuda's strong root system helps prevent washing.

K. Lespedeza (*Lespedeza stipulacea Maxim.*)

An early annual, this grass comes up early and grows rapidly. The plant has a uniform growth of fine stemmed foliage and branches profusely. It is very attractive, helps prevent erosion on steep banks, and grows well under poor conditions. It is drought resistant and is well adapted to Southeastern States. Lespedeza has an enormous root system, penetrating often 4 feet into the soil, with a mat of smaller roots spreading everywhere. The large root system is loaded with nodules of nitrogen, adding to soil fertility.

² from Seeds and Planting in the South, by Pennington, Brooks

P. Orchard (*Dactylis glomerata*)

This grass is a long-lived, cool-season perennial bunchgrass that grows from 2 to 4 feet tall. It reproduces from seed and forms irregular sod of tufted shoots held together by short rhizomes. The leaves are folded in the bud, becoming long, flat, sharply pointed, and somewhat V-shaped in cross section. Leaf margins and sheaths are rough or sandpaper-like to the touch when mature. This grass flourishes on open rich soils, but also grows well on poor soils. Soil must have a pH of 6.5 or higher.

Weeping Lovegrass (*Eragrostis curvula*)

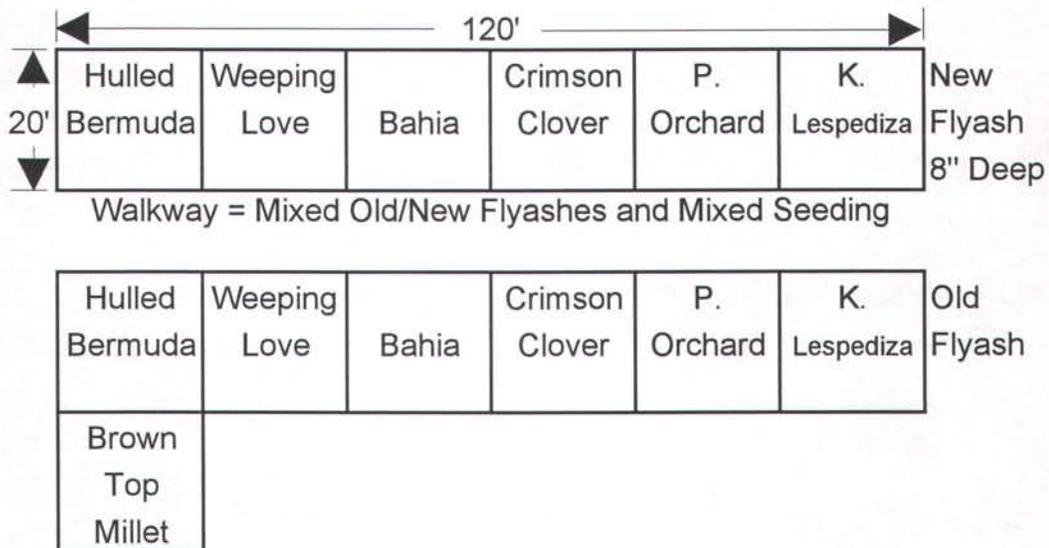
A warm-season perennial bunchgrass which grows to a height of 2 to 4 feet. It makes many basal leaves 10 to 20 inches long and 1/4 inch wide that taper to a needlelike point. These long, folding or weeping leaves suggest its name. It does well on most any type of well-drained soil, but prefers the sandy loams. It is easily established, and spreads by putting forth sprouts. A single plant may form a dense sod bunch 12 to 15 inches in diameter within two or three years.

Observations

May

On May 18, the top of the oldest flyash pile in Champion's landfill was scraped to a depth of about 6" to expose uniform Old ash. Onto this plateau loads of "New" flyash from the mill ash pond were trucked and leveled out on the strip labeled New Flyash, to a depth of 8". A walkway separated the Old and New sections. Some of the New ash spilled into the walkway and was raked in, so that the walkway was a mixture of Old and New, neither distributed nor mixed uniformly. Plots were staked out on the 19th of May.

Champion Flyash Cover Plot Plan



Following a 0.7" rain the night before, soil samples were taken on May 20, then seed was hand-sown, raked in, and covered with straw. A mixture of all the seeds was broadcast in the walkway. Soil analytical values are in Appendix A. To our surprise, no significant differences showed up in the data to explain why species struggled to grow on the New plot. Rainfall and daily maximum temperature data during the study may be found in Appendix B.

June

Significant rains occurred on the 4th, 11th, and 29th of June. On the 12th, the site was sprayed with 525 gallons of water, estimated to be equivalent to 1" of rainfall. The first pictures were taken on the last week of June.

Note scraped material is beginning to grow grasses, too.

Weeping Love in center of picture;
Bermuda in background, both on Old.



Bermuda on Old;
Brown Top Millet in foreground. No sign of Bermuda on New yet.



K. Lespedeza
showing no
emergence on New,
just beginning on
Old; Walkway
coming alive.



No sign of Crimson
Clover



July

On July 6, the second and last irrigation applied 525 gallons of water, equal to 1".

The walkway has developed well. Native weeds such as Johnson Grass are thriving. Especially note the vegetation at this time on the scraped material in the background.



The New is showing little except Bermuda and Weeping Love (and Lespedeza in the next picture).

All species show at least some growth on the Old flyash.



On July 21, after the plants had a good start, liquid 16-4-8 fertilizer was applied to the entire site at 2 lb./1000 sq. ft.

By the last week of July, Lespedeza has overcome the hindrances of New flyash (background, just in front of white sign.) The Old plot of Lespedeza (foreground) is doing even better.



To the left of Lespedeza, Orchard shows little progress on New, and is patchy on Old.



Crimson Clover is much like Orchard, nothing on New, patchy on Old.



Bahia shows nothing on New, good growth on Old.



Weeping Love is
patchy on New,
doing well on Old.



Close-up of
Weeping Love about
that same time.



Bermuda did best of all
species on both plots.

Note the natural grasses
on the scraped material
at this point.



Close-up of Bermuda
about the same time.

No picture was taken of
Brown Top Millet in late
July, but it was doing well
(was only planted on
Old.)



August

The hot, dry summer set in. See the rainfall and temperature graph.

These two pictures show that New flyash supported only Lespedeza (puny), Weeping Love (patchy), and Bermuda (well).

The walkway is flourishing.



August was hot and dry.
By the last week, species
on Old show stress.



September

The wettest period of the study occurred in September. All vegetation became greener.

Brown Top Millet shows
that it did well.



P. Orchard



Crimson Clover



Bahia and Weeping
Love



Bermuda and
Weeping Love



Thriving!



Bermuda close-up.
This grass tended to
spread beyond where it
was planted.

Weeping Love in left
foreground.



October

By late October the grasses were turning brown. The plots of Millet, Bermuda, and Weeping Love were dense carpets.



February, 1994

To wrap up the study, a final round of soil samples was taken. Thick carpets of dormant Brown Top Millet, Bermuda, and Weeping Love required effort to walk through them. These will provide resistance to erosion and moisture retention as new growth emerges for 1994, and will eventually return nutrients to the flyash through biodegradation.

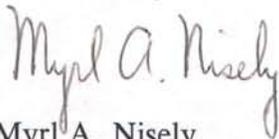
CONCLUSIONS AND RECOMMENDATIONS

- Bermuda Grass was the most robust and self propagating candidate. Weeping Love and Brown Top Millet were close seconds. A mixture of all three in equal proportions is recommended for final cover. The lush cover in the walkway was evidence that a mixture gives exceptional growth.
- These three grasses each produce a thick, dense growth about 6 to 10" tall which then shades the soil. This self-shading would help keep soil temperatures in a tolerable range in times of drought and a beating summer sun.
- The root systems can be expected to hold flyash in place and prevent erosion.
- No mowing is anticipated. Each years' crop will die back and undergo microbiological degradation, forming a thatch and returning nutrients. Eventually a shallow topsoil will be formed.
- Natural grasses such as Johnson Grass and Crabgrass, as well as small bushes and trees are expected to compete. These will further enhance the erosion control expected from this cover.
- The thick grass cover demonstrated in this study will be a cost effective means of closing this disposal site.

New, unweathered flyash must be modified before it will support these grasses. Analyses did not indicate what is in New ash which made it less suitable, but after reviewing this report, Dr. Ray Campbell of the NC Agricultural Department suggested that dissolved salts could be the problem. A few rains would leach these salts below the root system, and growth could take place. Further testing will be done to explore this concept. If pH reductions are also needed, these can be readily achieved by mixing in deteriorating bark, which is acidic, or using ammonium nitrate fertilizer, or both. Metro Nursery and Champion both feel confident that the three recommended species can be grown in new flyash the first year the cover is seeded, at minimum additional cost.

Acknowledgment

A special thank you to Mr. Roy Burrill of Metro Nursery, Wake Forest, NC, who carried out this study.



Myrl A. Nisely
Sr. Environmental Engineer
Champion International Corporation
Roanoke Rapids Mill

Appendix A.

Soil Sampling Data

SOIL TEST REPORT

AGRONOMIC DIVISION, N.C. DEPARTMENT OF AGRICULTURE
 BLUE RIDGE ROAD CENTER, RALEIGH, N.C.
 PHONE: (919) 733-2655

REPORT NO-01097

07/23/93 SAMPLED 5/20/93

COPIES SENT TO:
 X COUNTY EXTENSION DIRECTOR

TO: **METRO NURSERY**
9405 LOUISBURG RD
WAKE FOREST NC 27587-

FARM LOCATION (COUNTY): **WAKE**

SAMPLE NO OLD	PREVIOUS CROP	FIELD INFORMATION				TEST RESULTS *															
		APPLIED LIME Mo. Yr.	T/A	FERT. LAST CROP P ₂ O ₅ K ₂ O	SOIL CLASS	HM-%	W/V	CEC	BS-%	Ag	pH	P-I	K-I	Ca-%	Mg-%	Mn-I	Zn-I	Cu-I	S-I	SS-I	NO ₃ N
FAZ					DRG	0-1	0-39	5-8	100	0-0	7-1	097	94	75-5	16-5	195	089	136			
CROP TO BE GROWN		LIME				SUGGESTED TREATMENT FOR FIRST CROP (OR YEAR) **															
LAWN		0-0				(1-0 LBS NITROGEN PER 1000 SQ FT)															
CROP TO BE GROWN		LIME				SUGGESTED TREATMENT FOR SECOND CROP (OR YEAR) **															
LAWN		0-0				(1-0 LBS NITROGEN PER 1000 SQ FT)															

SAMPLE NO NEW	PREVIOUS CROP	FIELD INFORMATION				TEST RESULTS *															
		APPLIED LIME Mo. Yr.	T/A	FERT. LAST CROP P ₂ O ₅ K ₂ O	SOIL CLASS	HM-%	W/V	CEC	BS-%	Ag	pH	P-I	K-I	Ca-%	Mg-%	Mn-I	Zn-I	Cu-I	S-I	SS-I	NO ₃ N
FAI					DRG	0-1	0-38	5-7	100	0-0	7-1	097	94	75-0	16-8	198	084	134			
CROP TO BE GROWN		LIME				SUGGESTED TREATMENT FOR FIRST CROP (OR YEAR) **															
LAWN		0-0				(1-0 LBS NITROGEN PER 1000 SQ FT)															
CROP TO BE GROWN		LIME				SUGGESTED TREATMENT FOR SECOND CROP (OR YEAR) **															
LAWN		0-0				(1-0 LBS NITROGEN PER 1000 SQ FT)															

TEST RESULTS **

SAMPLE NO.	PREVIOUS CROP	FIELD INFORMATION			SOIL CLASS	HM %	W/V	CEC	BS %	AC	pH	P-I	K-I	TEST RESULTS				SS-I	NO ₃ -N	NH ₄ -N	Na	
		Mo	Vr	T/A										FERT. LAST CROP	N	Ca %	Mg %					Min-I
F1N	Old	Mo	Vr	T/A	M-0	0.1	0.49	5.7	72	1.6	5.8	0.92	90	52.9	10.9	225	0.98	116				
CROP TO BE GROWN													SUGGESTED TREATMENT FOR SECOND CROP (OR YEAR)**									
LAWN													LIME									

SAMPLE NO.	PREVIOUS CROP	FIELD INFORMATION			SOIL CLASS	HM %	W/V	CEC	BS %	AC	pH	P-I	K-I	TEST RESULTS				SS-I	NO ₃ -N	NH ₄ -N	Na	
		Mo	Vr	T/A										FERT. LAST CROP	N	Ca %	Mg %					Min-I
F20	New	Mo	Vr	T/A	MIN	0.0	0.56	6.2	81	1.2	6.4	1.28	90	56.7	16.5	219	0.99	114				
CROP TO BE GROWN													SUGGESTED TREATMENT FOR SECOND CROP (OR YEAR)**									
LAWN													LIME									

SAMPLE NO.	PREVIOUS CROP	FIELD INFORMATION			SOIL CLASS	HM %	W/V	CEC	BS %	AC	pH	P-I	K-I	TEST RESULTS				SS-I	NO ₃ -N	NH ₄ -N	Na	
		Mo	Vr	T/A										FERT. LAST CROP	N	Ca %	Mg %					Min-I
CROP TO BE GROWN													SUGGESTED TREATMENT FOR FIRST CROP (OR YEAR)**									
LAWN													LIME									

SAMPLE NO.	PREVIOUS CROP	FIELD INFORMATION			SOIL CLASS	HM %	W/V	CEC	BS %	AC	pH	P-I	K-I	TEST RESULTS				SS-I	NO ₃ -N	NH ₄ -N	Na	
		Mo	Vr	T/A										FERT. LAST CROP	N	Ca %	Mg %					Min-I
CROP TO BE GROWN													SUGGESTED TREATMENT FOR SECOND CROP (OR YEAR)**									
LAWN													LIME									

SAMPLE NO.	PREVIOUS CROP	FIELD INFORMATION			SOIL CLASS	HM %	W/V	CEC	BS %	AC	pH	P-I	K-I	TEST RESULTS				SS-I	NO ₃ -N	NH ₄ -N	Na	
		Mo	Vr	T/A										FERT. LAST CROP	N	Ca %	Mg %					Min-I
CROP TO BE GROWN													SUGGESTED TREATMENT FOR FIRST CROP (OR YEAR)**									
LAWN													LIME									

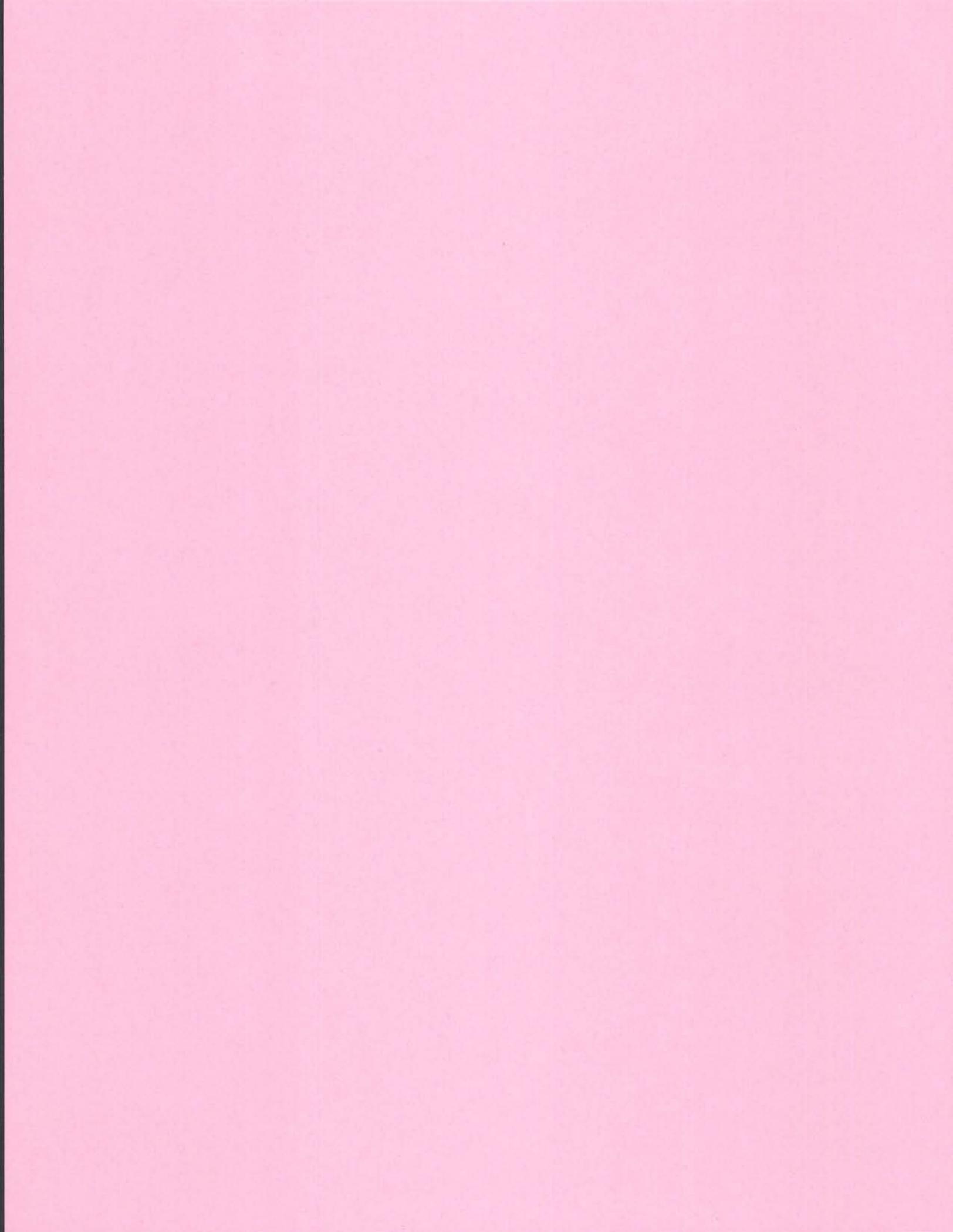
** TEST RESULTS (N.C. tests will not compare directly to numbers obtained by other methods.)
 BS % = Base Saturation, % of CEC
 M.O. = Mineral Organic
 O.H.G. = Organic
 HM % = Humic Matter, Percent by vol
 W/V = Weight per Volume, g/cm³
 CEC = Cation Exchange Capacity, meq/100 cm³
 SOI = Soil Organic Index
 Ca = Calcium, % of CEC
 Mg = Magnesium, % of CEC
 N = Nitrogen, mg/dm³
 NH₄-N = Ammonium N, mg/dm³
 NO₃-N = Nitrate N, mg/dm³
 Na = Sodium, meq/100 cm³
 Zn = Zinc Index
 Cu = Copper Index
 P-I = Phosphorus Index
 K-I = Potassium Index
 Min-I = Manganese Index
 Ca = Calcium, % of CEC
 Mg = Magnesium, % of CEC
 N = Nitrogen, M = lbs/1000 sq ft
 P₂O₅ = Phosphate, M = lbs/1000 sq ft
 K₂O = Potash, M = lbs/1000 sq ft
 Zn = Zinc
 B = Boron
 Mn = Manganese
 Cu = Copper

Appendix B.

Rain and Temperature Data

1993 Rain at Mill			Date	Soil Temperature	
			of		
5/5	0.48	Monthly	<u>Irrigation</u>		
5/6	0.03	Totals			
5/14	0.41	After			
5/18	0.06	Planting			
5/19	0.43				
5/20	0.70				
5/26	0.46				
5/29	0.80				
5/31 - 6/1	0.55	3.41			
6/4	1.80				
6/5	0.02				
6/11	0.24		6/12		
6/26	0.08				
6/29	0.60	2.74			
7/1	0.05				
7/4	0.50		7/6		
7/14	trace				
7/15	0.08			7/16	123 F
7/19	trace				
7/24	trace				On another check,
7/25	1.22	1.85			soil temperature was
8/3	0.50				128 F, but date
8/5	trace				was not recorded.
8/6	0.40				
8/13	0.08	0.98			
9/1	0.02				
9/4	1.50				
9/16	1.59				
9/17	0.90				
9/20 - 9/21	0.15				
9/27	0.90	5.06			
10/7	0.15				
10/8	0.13				
10/10	0.18				
10/11	0.18				
10/16	0.30				
10/21	0.27				
10/26	0.80				
10/27	0.12				
10/29	0.10				
10/30	1.50	3.73			

Date	Max Temp	Rainfall	Irrigated 1"	Date	Max Temp	Rainfall	Irrigated 1"	Date	Max Temp	Rainfall
				7/1	84	0.05		8/20	92	
				7/2	84			8/21	89	
5/14	66	0.41		7/3	90			8/22	86	
5/15	80			7/4	88	0.50		8/23	88	
5/16	86			7/5	91			8/24	92	
5/17	84			7/6	92		1	8/25	93	
5/18	82	0.06		7/7	92			8/26	94	
5/19	78	0.43		7/8	87			8/27	91	
5/20	68	0.70		7/9	94			8/28	95	
5/21	70			7/10	97			8/29	97	
5/22	68			7/11	96			8/30	94	
5/23	78			7/12	96			8/31	83	
5/24	82			7/13	94			9/1	96	0.02
5/25	86			7/14	92			9/2	92	
5/26	84	0.46		7/15	92	0.08		9/3	91	
5/27	78			7/16	94			9/4	90	1.50
5/28	84			7/17	94			9/5	75	
5/29	88	0.80		7/18	80			9/6	82	
5/30	78			7/19	87			9/7	85	
5/31	80			7/20	90			9/8	82	
6/1	70	0.55		7/21	90			9/9	86	
6/2	76			7/22	87			9/10	83	
6/3	84			7/23	82			9/11	75	
6/4	84	1.80		7/24	86			9/12	80	
6/5	80	0.02		7/25	87			9/13	84	
6/6	84			7/26	86			9/14	86	
6/7	84			7/27	87			9/15	88	
6/8	94			7/28	94			9/16	75	1.59
6/9	96			7/29	98			9/17	78	0.90
6/10	95			7/30	86			9/18	80	
6/11	90	0.24		7/31	82			9/19	76	
6/12	82		1	8/1	84			9/20	76	
6/13	72			8/2	90			9/21	80	0.15
6/14	80			8/3	88	0.5		9/22	77	
6/15	80			8/4	82			9/23	82	
6/16	80			8/5	82			9/24	74	
6/17	84			8/6	81	0.40		9/25		
6/18	87			8/7	72			9/26		
6/19	89			8/8	79			9/27	80	0.90
6/20	88			8/9	82			9/28	70	
6/21	81			8/10	82			9/29	73	
6/22	82			8/11	82			9/30	64	
6/23	82			8/12	85			10/1	70	
6/24	85			8/13	76	0.08		10/2	76	
6/25	84			8/14	84			10/3	74	
6/26	84	0.08		8/15	87			10/4	78	
6/27	80			8/16	90			10/5	88	
6/28	88			8/17	86			10/6	70	
6/29	90	0.60		8/18	84			10/7		0.15
6/30	89			8/19	86			10/8		0.13





June 27, 1996

Mr. James Coffey
Supervisor of Permitting
Department of Environment, Health, and Natural Resources
Division of Solid Waste
401 Oberlin Road
Raleigh, NC 27605

Re: Letter of Intent to Close Champion Flyash Site, Permit 42-03

Dear Mr. Coffey:

A letter from your office dated January 18 requests owners/operators of industrial landfills to state their closing plans by July 1, 1996. Champion intends to stop waste deposits on December 31, 1997. Final grading and cover will begin immediately and be complete by June 30, 1997.

Mr. Jim Barber, Mr. Jim Bateson, and Mr. Ben Barnes from your division have made site visits in 1996 and have given verbal indications of some elements they think will be required for closure. To follow up on this dialog, I request a meeting as soon as possible with you and those named. Champion plans to again use the services of consultant Bob Midgette, now with Rust Environment & Infrastructure, to prepare an update to the closure plan we submitted in 1991. Bob and I feel a meeting to discuss what the update should include will be helpful. Please contact me at 919-535-6236 to arrange a suitable time to sit down together.

We tentatively hope to provide the revised plan by the end of September.

Sincerely yours,

A handwritten signature in cursive script that reads 'Myrl A. Nisely'.

Myrl A. Nisely
Sr. Environmental Engineer

Roanoke Rapids Mill
P.O. Box 580
Roanoke Rapids, North Carolina 27870
919 537-6011

7/29/96 LEFT VOICE MAIL MESSAGE FOR
MR. LISBY ABOUT RTG. 8/20/96 C 10:00
C R-C-O.



June 27, 1996

Mr. James Coffey
Supervisor of Permitting
Department of Environment, Health, and Natural Resources
Division of Solid Waste
401 Oberlin Road
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Myrl A. Nisely
Sr. Environmental Engineer

xc: Jim Cooper
Chris Puryear
Mary Lee Ransmeier
John Bengel, Stamford
Bob Midgette, Rust Environment & Infrastructure
5510 Six Forks Road, Suite 700
Raleigh, NC 27609

Ben Barnes
3800 Barrett Dr., Suite 101
Raleigh, NC 27609

Jim Barber
225 Green St.
Wachovia Bldg., Suite 601
Fayetteville, NC 28301

Jim Bateson
401 Oberlin Rd., Suite 150
Raleigh, NC 27611-7687

42-03

MEMO

DATE: 5/19/97

TO: JIM B

SUBJECT: _____

MERIE NISERY NEEDS A
 LETTER APPROVING SLUDGE & FLY ASH MIXTURE
 50-50 FOR FINAL COVER / MY SIGNATURE.
 PLEASE FAX TO HIM
 QUESTIONS? CALL 535-6236

① WANTS ~~AD SLUDGE~~
~~TO SCOPE~~
 + FLY ASH FOR
FINAL COVER.

② EXISTING VEG. &
 SWALES.
 2' CLEAN FLY ASH
 31 DEC 97

THANKS
 JIM



North Carolina Department of Environment,
 Health, and Natural Resources



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