

14

Johnston Co.

5/02/1995

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

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



file

December 22, 1995

Mr. Haywood Phthisic
Director of Public Utilities
Johnston County
P.O. Box 2263
Smithfield, NC 27577

Re: Permit No. 51-02, Permit to Construct the Johnston County Landfill Facility

Dear Mr. Phthisic,

Enclosed please find the original permit to construct the Johnston County Landfill Facility. Please review the permit carefully. According to 15A NCAC 13B .0203(d), by beginning construction and receiving waste at the site, the applicant shall be considered to have accepted the conditions of the permit. If there are any questions regarding the permit or the conditions contained therein, please contact us.

Please note General Conditions 1., Recordation Procedures, and the pre-operative conditions of Construction 8. In addition, Johnston County shall submit the final CQA plan and Technical Specifications, which reflect the changes of the engineer's letter of October 20, 1995, to the Section for review, prior to construction. If there are any questions either about the permit or its conditions or questions which arise during construction, please contact us. The Field Engineer for review of the construction quality assurance is Jim Barber, and the Waste Management Specialist for the facility is Mark Fry

The Solid Waste Section encourages Johnston County to take an aggressive stance to recycle, reuse and reduce the amount of solid waste disposed of. We look forward to seeing the facility in operation.

Sincerely,


Edward F. Mussler, III
Environmental Engineer
Solid Waste Section

cc. C.T. Clayton, McKim & Creed
Terry Dover

Mark Fry
Jim Barber

Files

PUBLIC NOTICE
North Carolina Department of
Environment, Health and Natural Resources
Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687
919-733-0692

Notice of public comment period and public hearing on the draft permit (Permit Number 51-02) to construct and operate the Johnston County Landfill, a municipal solid waste landfill facility (MSWLF) to be located in Johnston County, pursuant to 15A NCAC 13B .1600 of the Solid Waste Management Rules is hereby given. North Carolina Solid Waste Management Rules require that the public be given a 45-day period to comment on the draft permit prepared by the NC Division of Solid Waste Management. This 45 day period will begin November 3, 1995 and end at 5 PM on December 19, 1995. Persons wishing to comment on either this permit or the proposed permit conditions or object to the permit issuance should submit their comments in writing to the division contact listed below. All data submitted by the applicant is available as part of the administrative record and may be viewed during business hours (9 AM-4 PM, Monday-Friday, by appointment) at the Division of Solid Waste Management, 401 Oberlin Road, Suite 150, Raleigh, North Carolina.

The MSWLF facility will be owned and operated by Johnston County, P.O. Box 2263, Smithfield, North Carolina 27577. The 300-acre site is located off NCSR 1503, adjacent to the existing Johnston County landfill, approximately three miles west of Smithfield, NC. The facility is being permitted to operate a MSWLF unit to dispose of 78,000 tons per year of household, commercial and industrial solid waste.

A public hearing will be held at 1 PM, November 28, 1995, in the Johnston County Commission Chambers, Johnston County Courthouse, Johnston and Second Street, Smithfield, NC. Interested parties may submit oral or written statements and data concerning the referenced permit. Persons wishing to speak may register at the hearing. Five minutes will be allotted per speaker.

A fact sheet, copy of the draft permit, and rules for the public hearing may be obtained from the division contact. Written comments may be sent to the address listed below. The permit number must be included on all correspondence. Persons wishing notification of a final permit decision may register with the contact.

Address all comments, questions or requests to the division contact:

Mr. Edward F. Mussler, III
North Carolina Solid Waste Section
Post Office Box 27687
Raleigh, North Carolina 27611-7687
(919)733-0692 ext. 343
FAX (919) 733-4810

Invoice
for
LEGAL ADVERTISING

remit to:
**LEGAL A/R DEPT.
P.O. BOX 191
RALEIGH, NC 27602**

ACCOUNT NUMBER

ACCOUNT NAME

FOR CUSTOMER SERVICE:

73349961
DATE BILLED

NC DEPT OF EHNR

829-4586

11/03/95

BILLED TO:

NC DEPT OF EHNR
DIVISION OF SOLID WASTE MGMT.
401 OBERLIN ROAD #150
ATTN: PAT WILLIAMSON
RALEIGH NC 27605

INVOICE NR	PUBLICATION DATE	DESCRIPTION	SPACE	RATE	COST
ETY1GC01	11/03/95	COMMENT/HEARING 51-02 / PUBL	109.0L	2.59	282.31
TOTAL DUE					\$282.31

*ok to pay
Pat W.
11/13/95*

REMITTANCE
COPY
PLEASE RETURN WITH PAYMENT

APPROVED FOR
PAYMENT

Christina ASma

Please register by providing your name and mailing address. Also, please indicate whether you wish to present oral or written comments and/or be notified of a final permit decision.

NAME AND MAILING ADDRESS ORAL WRITTEN FINAL

1 _____

2 _____

3 _____

4 _____

5 _____

ATTENDEES AND SPEAKERS
 PUBLIC HEARING
 JOHNSTON COUNTY LANDFILL
 DRAFT PERMIT NO. 51-02
 NOVEMBER 28, 1995

Please register by providing your name and mailing address. Also, please indicate whether you wish to present oral or written comments and/or be notified of a final permit decision.

NAME AND MAILING ADDRESS ORAL WRITTEN FINAL

1 Mark S. Fry, Div. Solid Waste Mgt, Fayetteville
C.T. Clayton, PE McKim & Creed, Cary
Greg Eades, Div. Solid Waste, Raleigh

2 ED Müssler DSWM - Raleigh
Terry Dover DSWM Fayetteville
Warren Grimes JCPU Smithfield

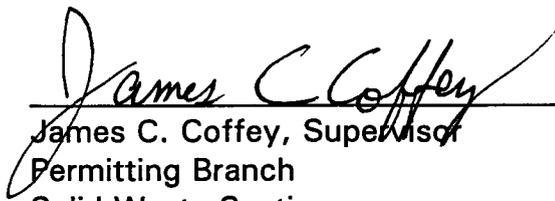
3 Rick Proctor JCPU Smithfield
Haywood M PHTHISIC ^{UTILITY} DIRECTOR JOHNSTON COUNTY
RICHARD B. SEZF, County Manager P.O. Box 1049

4 SMITHFIELD, NC 27577
TIM BROOME MCKIM & CREED ENGINEERS, CARY

5 _____

CERTIFIED COPY OF SOLID WASTE PERMIT

I do hereby certify that the attached PERMIT is an exact and true copy of Permit No. 51-02.


James C. Coffey, Supervisor
Permitting Branch
Solid Waste Section
Division of Solid Waste Management

Wake County, North Carolina

I, Sue Hodge, a Notary Public for said County and State, do hereby certify that James C. Coffey, of the Solid Waste Section, personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal,

this the twentysecond (22) day of December , 1995

OFFICIAL SEAL


NOTARY PUBLIC

My commission expires October 21, 19 ~~19~~ 2000

PERMIT DECISION FACT SHEET
PERMIT NUMBER: 51-02

FACILITY: Johnston County Landfill
COUNTY: Johnston
CITY: Smithfield, North Carolina

OWNER: Johnston County
PO Box 2263
Smithfield, NC 27577

OPERATOR: SAME

Description

A Solid Waste Permit, Part 1: Permit to Construct, has been prepared by the Division of Solid Waste Management for the construction and operation of the Johnston County Landfill, a municipal solid waste landfill facility (MSWLF). The division has determined that the proposed facility plan, engineering plan, construction quality assurance plan, operation plan, closure and post-closure plan and the water quality monitoring plan, as identified in the application, satisfy the requirements and intent of the North Carolina Solid Waste Management Rules, codified as 15A NCAC 13B .1600.

The Johnston County Landfill will be owned and operated by Johnston County. The facility is located on NCSR 1503, adjacent to the existing county landfill, west of Smithfield, Johnston County, NC. The facility encompasses a total of 300 acres, approximately 80 acres of which will ultimately have four cells. This permit approves the facility plan and construction and operation of one cell identified as Phase 5, which will cover approximately 18 acres plus related infrastructure. The projected life of Phase 5 is approximately five years. The facility is projected to be developed over 20 years. If waste receipts do not reach the permitted levels, the project could last longer.

The MSWLF unit is permitted to dispose of household, industrial and commercial solid waste. Hazardous or other banned wastes such as yard waste and white goods are not approved for disposal. The facility will accept waste from Johnston County. The facility will have a permitted capacity of approximately 3,334,000 cubic yards, which corresponds to an approximate disposal rate of 78,000 tons of waste per year, or a daily average of approximately 250 tons per day, based on 312 days per year or 6,500 tons per month. The amount of waste disposed of will increase with the population growth of the county.

Public Comment Period

North Carolina Solid Waste Management Rules require that the public be given a 45-day period to comment on the draft permit. This 45-day period began on November 3, 1995. The draft permit

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



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

October 31, 1995

Smithfield Herald
Classified/Legal Advertising Section
ATTN: Ms. Judy Dyson
PO Box 1417
Smithfield, NC 27577

FAX: 919-989-7093

Dear Judy:

faxed 1:47 pm

Please publish the following legal notice in the Friday, November 3, 1995 edition of the *Smithfield Herald*. **To ensure payment, send together the bill for the notice and a notarized copy of the notice (include date it is run) to the following address:**

**Ms. Pat P. Williamson
Solid Waste Management Division
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605**

If you have any questions about the legal notice or the billing, please call me at 919-733-4996, ext. 337. Thank you for your help.

Sincerely,

Pat Williamson

Pat P. Williamson
Public Information Officer

PPW
Attachment

October 30, 1995

TO: Pat Williamson
FROM: Ed Mussler 

RE: Public Notice of Draft Permit and Public Hearing- Johnston County

Pat,

Please have this published on November 1, 1995 in the News and Observer and the local Smithfield Paper.

Thanks

ED

PUBLIC NOTICE
North Carolina Department of Environment,
Health and Natural Resources
Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687

Raleigh, North Carolina 27611-7687
919-733-0692

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The MSWLF facility will be owned and operated by Johnston County, P.O. Box 2263, Smithfield, North Carolina 27577. The 300-acre site is located off NCSR 1603, adjacent to the existing Johnston County landfill, approximately three miles west of Smithfield, NC. The facility is being permitted to operate a MSWLF unit to dispose of 78,000 tons per year of household, commercial and industrial solid waste.

A public hearing will be held at 1 PM, November 28, 1995, in the Johnston County Commission Chambers, Johnston County Courthouse, Johnston and Second Street, Smithfield, NC. Interested parties may submit oral or written statements and data concerning the referenced permit. Persons wishing to speak may register at the hearing. Five minutes will be allotted per speaker.

A fact sheet, copy of the draft permit, and rules for the public hearing may be obtained from the division contact. Written comments may be sent to the address listed below. The permit number must be included on all correspondence. Persons wishing notification of a final permit decision may register with the contact.

Address all comments, questions or requests to the division contact:

MR. EDWARD F. MUSSLER, III
North Carolina Solid Waste Section
Post Office Box 27687
Raleigh, North Carolina 27611-7687
(919) 733-0692 ext. 343
FAX (919) 733-4810

Nov. 3

**NORTH CAROLINA
JOHNSTON COUNTY**

AFFIDAVIT OF PUBLICATION

Before the undersigned, a Notary Public of said County and State, duly commissioned, qualified, and authorized by law to administer oaths, personally appeared

Judith V. Dyson

_____, who being first duly sworn, deposes and says: that he (she) is

~~(Owner, partner, publisher, or other officer or employee authorized to make this affidavit)~~

of THE SMITHFIELD HERALD, a newspaper published, issued, and entered as second class mail in the City of Smithfield in said County and State; that he (she) is authorized to make this affidavit and sworn statement; that the notice or other legal advertisement, a true copy of which is attached hereto, was published in The Smithfield Herald on the following dates:

November 3, 1995

and that the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina.

This 3rd day of November, 1995

Judith V. Dyson
(Signature of person making affidavit)

Sworn to and subscribed before me, this 3rd

day of November, 1995.

Rebecca H. Breen

Notary Public

My Commission expires: March 6, 2000

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

James B. Hunt, Jr., Governor
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William L. Meyer, Director



October 31, 1995

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

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



October 31, 1995

The News & Observer
Classified/Legal Advertising Section
ATTN: Mr. Kim Holt
PO Box 191
Raleigh, NC 27602

FAX: 919-829-4824

Dear Kim:

faxed 1:50 pm

Please publish the following legal notice in the Friday, November 3, 1995 edition of *The News & Observer*. **To ensure payment, send together the bill for the notice and a notarized copy of the notice (include date it is run) to the following address:**

**Ms. Pat P. Williamson
Solid Waste Management Division
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605**

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Sincerely,

Pat P. Williamson
Public Information Officer

PPW
Attachment

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

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



October 31, 1995

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Classified/Legal Advertising Section
ATTN: Mr. Kim Holt
PO Box 191
Raleigh, NC 27602

FAX: 919-829-4824

Dear Kim:

faxed 1:50 pm

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Solid Waste Management Division
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605**

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Pat P. Williamson
Public Information Officer

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Attachment

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Division of Solid Waste Management
Solid Waste Section
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Raleigh, North Carolina 27611-7687
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Raleigh, North Carolina 27611-7687
(919)733-0692 ext. 343
FAX (919) 733-4810

AFFIDAVIT OF PUBLICATION

NORTH CAROLINA.
Wake County.) ss.

PUBLIC NOTICE

North Carolina Department
of Environment, Health and
Natural Resources
Division of
Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina
27611-7687
919-733-0692

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Before the undersigned, a Notary Public of said County and State, duly commissioned and authorized to administer oaths, affirmations, etc., personally appeared Robert M. Woronoff, Jr. who, being duly sworn or affirmed, according to law, doth depose and say that he is Treasurer of THE NEWS AND OBSERVER PUBLISHING COMPANY, a corporation organized and doing business under the Laws of the State of North Carolina, and publishing a newspaper known as THE NEWS AND OBSERVER, in the City of Raleigh, County and State aforesaid, the said newspaper in which such notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina, and that as such he makes this affidavit; that he is familiar with the books, files and business of said corporation and by reference to the files of said publication the attached advertisement of Public Notice was inserted in the aforesaid newspaper in space, and on dates as follows:

MONTI

The MSWLF facility will be owned and operated by Johnston County, P.O. Box 2263, Smithfield, North Carolina 27577. The 200-acre site is located off NCSR 1503, adjacent to the existing Johnston County landfill, approximately three miles west of Smithfield, NC. The facility is being permitted to operate a MSWLF unit to dispose of 78,000 tons per year of household, commercial and industrial solid waste.

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Raleigh, North Carolina
27611-7687
(919) 733-0692 ext. 343
FAX (919) 733-4810

N&O: November 3, 1995.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
			✓																												



copied from the books and files of the aforesaid Corporation and publication.

Robert M. Woronoff, Jr.
Title Treasurer

Sworn or affirmed to, and subscribed before me, this 6th day of November, A.D. 19 95.

In Testimony Whereof, I have hereunto set my hand and affixed my official seal, the day and year aforesaid.

Edmund J. Mussler III
Notary Public.

My commission expires 2nd day of July, 2000



October 26, 1995

M&C 0358-0051.OR(13)

Edward F. Mussler, III
Environmental Engineer
NCDEHNR, Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687

ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

RE: Public Hearing
Subtitle D Landfill *Draft Permit to Construct*
Johnston County, North Carolina

Dear Ed:

Pursuant to our recent correspondence please be kindly advised that the *Public Hearing* on Johnston County Subtitle D Landfill *Draft Permit to Construct* (DPTC) has been scheduled as follows:

Date and Time: Tuesday, November 28, 1995 at 1 PM

Location: County Commissioners Meeting Room
Johnston County Courthouse
Smithfield, North Carolina

Thank you for your cooperation in this matter.

Sincerely,

McKIM & CREED ENGINEERS, P.A.

C. T. Clayton / BSL

C. T. Clayton, PE
Project Manager

SUITE 117

BUILDING I

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

/cjp

cc: Haywood Phthisic, Johnston County
Warren Grimes, Johnston County
Tim Broome, McKim & Creed Engineers
M. Sanchez, McKim & Creed Engineers
C.J. Poran, Ensol Corporation



October 20, 1995

M&C 0358-0051.OR(13)

Edward F. Mussler, III
Environmental Engineer
NCDEHNR, Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687

ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

RE: Section Comments on Proposed Johnston County
Subtitle D Landfill Permit to Construct Application CQA
Johnston County, North Carolina

Dear Ed:

The following responses to the NCDEHNR, Division of Solid Waste Management, Solid Waste Section (Section) comments regarding the Construction Quality Assurance (CQA) Plan for the Johnston County Subtitle D Landfill Permit to Construct Application are ordered in the same sequence as appeared in your October 10, 1995 letter. These responses are in accordance with the conclusions reached during our meeting on October 12, 1995 with Greg Eades, Brad Atkinson, and C. J. Poran.

DRAWINGS

Drwg. E-13 *Detail 4-12 incorrectly shows the geotextile cushion being placed under the FML. Please revise.*

Detail 4-12 on Drawing E-13 has been corrected and two copies of this drawing are attached.

SUBGRADE

IV-D2, 3b. *The type of proof rolling equipment, or its size or weight should be specified. (Rule .1624(b)(7)(C)C(ii))*

The construction contract specifications (CCS) will require that a ten-ton, single-axle truck be used for proof rolling (or equivalent equipment to be approved by the Engineer).

SUITE 117

BUILDING I

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

IV-D2, 3c. *Is D698 to be used for these tests, or are other tests to be done for the moisture content?*

The CCS will indicate that any appropriate ASTM method could be used for density and moisture testing for subgrade.

IV-D3, 3c. *What particle size test is to be used?*

The CCS will indicate that ASTM D422 will be required for grain size distribution determination of subgrade fill materials.

CLAY LINER

IV-E9, 4 *While not required by the rules, many facilities also run grain size and Atterbergs on the test pad and during liner installation, when they run a perm test. There have been instances when a perm test failed or was marginal and all the other tests were within the correct window of specifications. The area of concern for repair and rechecking was able to be reduced, or a "bad" undisturbed sample was confirmed and the back-up test run.*

The CCS will indicate that ASTM D422 with hydrometer (grain size distribution) and ASTM D4318 (Atterberg limits) tests be performed for every permeability test tube.

IV-E13, d *The thickness of the "loose" lift should be stated. If the initial lift can be eight inches, will a subsequent lift be short?*

The CCS will require that loose lifts should not be more than ten inches thick. The CCS will also require that no compacted lift shall be less than four inches thick. The CCS will also indicate that the contractor may overbuild the clay liner and then cut back the final layer to achieve the required two foot thickness as long as the thickness constraints for each layer are met.

IV-E14, e *A statement that clods or particles in excess of three inches in any dimension is not allowed should be included. (Rule(b)(8)(A))*

The CCS will require that clods or particles in excess of three inches in any dimension should not be included.

IV-E14,d(~~e~~) *Is the reference to vibratory rollers meant for a specific type of equipment?*

The CCS will indicate that smooth steel drum vibratory rollers should not be used.

IV-E17, k *It is recommended that a depth of crack that may be reworked, without having to rework or remove the entire lift be included. Possibly also the repair could be tied to the corrective action paragraph on page IV-E20.*

The CCS will have an added statement "or as instructed by the ENGINEER" to allow for reworking of the dedicated or cracked depth. The same wording will be used in IV-E20.

IV-E18 *Field Quality Control- (Table E4a note; the a is missing) Would grain size tests be useful? They are commonly employed in North Carolina. Is the undisturbed permeability and natural moisture frequency correct, or should they read 1/acre/lift? If speedy tests for density and/or moisture are employed, how often are conventional tests run to help calibrate the speedy test results? I.e., every fifth or tenth measurement is confirmed with D2937 or D2216.*

The tabulated list of test frequencies should be listed as subsection (a). This will be corrected in the CCS. The CCS will require that the frequency of undisturbed permeability (ASTM D5048) will be one per two acres per lift. The CCS will also require a natural moisture content test (ASTM D2216) and grain size distribution (ASTM D422 without hydrometer) for each undisturbed permeability test. The CCS will also require that if ASTM D2922 and D3017 are to be used they will be calibrated by ASTM D2937 and D2216, every ten tests, respectively.

IV-E19, c *The original test should not be ignored, but rather the reason why it was considered faulty explained in the CQA report.*

The CCS will specify that faulty test results will be included in the CQA report with an explanation and reasoning why it was considered faulty.

- IV-E19, d *Can an area be reworked? This paragraph seems to indicate that the area must be removed. What method will be used to ensure that the specified percentage of bentonite is used during construction?*

The CCS will have an added statement "or as instructed by the ENGINEER" to allow for reworking of areas that are not properly compacted or cracked.

For soil-bentonite mix, the CCS will include requirements for quality control (QC) testing to be provided by the Contractor. Since the CQA conformance testing is based on quality control of the finished product (e.g., the undisturbed permeability of soil-bentonite liner), the CCS will not include specific requirements for bentonite contents. However, the CCS will specify that the QC will include the same procedures and frequencies as indicated in IV-E7 and E8 to be performed on the pugmill output volumes of soil-bentonite mix before placement (in addition to the required QC tests of the soil source).

HDPE LINERS AND LLDPE

- IV-F1, 2 *This paragraph states that the HDPE liner materials will have a minimum thickness of 60 mils. This is inconsistent with the material specs.*

The CCS will indicate that the HDPE liner materials thickness will be according to the Specification Table IV-F1 which allows thickness tolerances.

- IV-F5 *Suggest you add a statement that fork lifts will not be used to move rolls.*

The CCS will indicate that forklifts are not allowed to directly lift and move rolls (no direct contact is allowed).

- IV-F23-iv *Is the four psi pressure loss correct? Is there a reference on this recommendation?*

The common test pressures for double fusion seams is between 25 to 32 psi. It is common and reasonable to allow for up to ten percent drop with respect to test pressure due to equipment and test imperfections. For test pressure of 32 psi the allowed drop will be about 3.2 psi (rounded up to four psi).

IV-F25 *See comment IV-F28.*

This comment is addressed in response to comment IV-F28 below.

IV-F26,k(3) *What if a seam fails through the weld, but at a stress that exceeds the tensile stress specification of parent liner material?*

The CCS will indicate that when a seam fails through the weld at a stress that exceeds the tensile stress specification of the parent liner material, the seam is considered as passing.

IV-F28 *In reference to repairs in general it is suggested that the timing of the repair be specified, i.e., within 24 hours after an approved test, or now if it is going to rain, etc. A statement on the size of patches is recommended. For example, all patches shall extend a minimum of X inches around the hole. A statement and method of covering or protecting holes, prior to repair is suggested.*

The CCS will specify that repair work will be performed 24 hours after receipt of results of approved tests. The CCS will specify that if the forecast calls for rain on a particular day (or if it appears that it is going to rain), the repair work will be performed immediately after receipt of the approved test results. The CCS will specify that, before patching, all holes will be protected by covering them with pieces of parent material that extend a minimum of four inches around the holes and securing the protective cover with sand bags, as appropriate to their size. The CCS will also specify that all patches shall extend a minimum of four inches around the patched holes. This also applies to IV-F25.

HDPE PIPE

IV-H4, 4 *It is recommended that a statement on equipment minimizing shear movements be included.*

The CCS will include a statement on equipment minimizing shear movements.

IV-H14 *It is recommended that a size of wave that is not allowed be included, as well as the correct procedure to remove and prevent them.*

The CCS will indicate that a wave size shall not exceed 12 inches. The CCS will also recommend a procedure to prevent and remove such waves.

iv-H15, b *The Section is concerned about the provision to possibly eliminate the protective fabric entirely. It is recommended that a trial spreading of rock also be included. Most liner damage results not from the normal forces on the liner, but from the shear action of equipment. At a minimum, it is our opinion that the fabric should be included under all pipes (or a rub sheet of liner), under the haul roads that the trucks will be driving on, and in areas where a crane may be moving when laying pipe.*

The CCS will indicate that if the Engineer will decide to eliminate the cushion fabric based on test results, minimum fabric cushion will be required under the leachate collection pipes (three feet wide "rub strips"), and under haul roads that the trucks will be driving on and haul roads for the crane used for pipe laying.

OPERATIONAL COVER etc.

IV-J1 *What is the allowable permeability of the operation cover soil?*

The CCS will specify that the allowable soils for operational cover construction will be SC, SM, and ML (eliminating the CL type soil). In that way the lowest permeability expected in the operational cover is likely to about 1×10^{-5} centimeters per second (based on data from geotechnical tests of site soils in Volume 2 of 2 of the Permit to Construct Application).

IV-J4, 2a *This paragraph should be classified to indicate that the geonet must be in place prior to placing the aggregate drainage layer at the toe of the slopes, i.e., make it consistent with IV-K2(2a).*

The CCS shall clarify this paragraph to indicate that the geonet shall be in place prior to placing the aggregate drainage layer at the toe of the slopes (consistent with IV-k2(2A)).

IV-J7 *Care should be taken to avoid shear action of equipment.*

A statement will be included in the CCS to avoid shear action by construction equipment.

DRAINAGE NET

IV-K4, f *What precautions are recommended?*

The CCS will recommend precautions such as cleaning of debris, tools, and other foreign objects.

GEOTEXTILES

IV-L1, 4 *See comment IV-H15, b above.*

This comment is addressed in response to comment IV-H15, b above.

IV-L1, 1 *Is it necessary to specify that the fabric will be magnetically checked for broken needles?*

No, it is not necessary when appropriate QC procedures are followed.

IV-L4, g *You may wish to also consider allowing the fabric to be sewn, and should specify the type and color, etc. of the thread.*

The CCS will indicate that sawing of the fabric will be allowed upon appropriate submittal of shop drawings by the Contractor and Engineer's approval of the procedure, thread type and color, etc.

GENERAL COMMENTS

- *A list of tests to be performed or allowed, such as the one in Section IV-E4, 2a, is helpful and should be included in each section*

The CCS will include a list of tests in the beginning of each specification section such as IV-E4, 2a.

- *Has thought or provision been given to allowing staged activities, or multiple activities? This means that the liner could be placed while clay is being finished, or cover applied while liner is being finished. The specifications IV-E19-F and IV-F3, 2a3 seem to not allow this.*

The CCS will clarify IV-E19F and IV-F3, 2a3 so that stage or multiple activities will be permitted upon written prior approval of the Engineer.

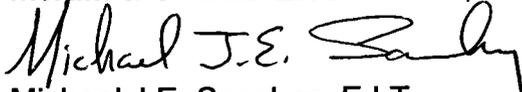
- *The HDPE liner specs are more stringent than NSF specs. If the specified tensile strength is not required by the design, then the higher spec could reduce the number of eligible vendors for the product.*

McKim & Creed is considering allowance in the CCS of tensile strength specifications of the HDPE liner according to NSF (and the corresponding peel and shear strength for the seams).

In addition, please note that the NCDEHNR, Division of Land Resources has approved the Sediment and Erosion Control Plan. A copy of the approval letter is attached. Prior to submittal to the Division of Land Resources, the plan was modified slightly from that submitted to the Section as part of the Permit to Construct Application. The approved version will be included in the CCS.

Sincerely,

McKIM & CREED ENGINEERS, P.A.



Michael J.E. Sanchez, E.I.T.
Project Engineer

/mjes

cc: Warren Grimes, Johnston County
Haywood Phthisic, Johnston County
Tim Broome, McKim & Creed Engineers
C.T. Clayton, McKim & Creed Engineers
C.J. Poran, Ensol Corporation

Enclosures

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

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary



DIVISION OF LAND RESOURCES

October 15, 1995

*Johnston County
PO Box 2263
Smithfield, NC 27577
ATTN: Richard Self, County Manager*

*RE: Letter of Approval
Project Name: Subtitle D Landfill
Location: Johnston County
Submitted by: McKim & Creed
Date Received: 10-4-95
Date Processing Initiated: 10-4-95
New Submittal (X) Revised ()*

Dear Mr. Self:

This office has reviewed the subject Erosion and Sedimentation Control Plan. We find the plan to be acceptable and hereby issue this letter of approval. If any modifications, performance reservations, or recommendations are applicable, a list is enclosed and is incorporated as a part of this letter of approval. If any modifications are not incorporated into the plan and implemented in the field, the site will be in violation of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statute, hereinafter NCGS, 113A-61.1).

The land-disturbing activity described in the plan for this site may be subject to the approval of other Local, State or Federal agencies. This could include the Division of Environmental Management under stormwater or other water quality regulations, the U.S. Army Corps of Engineers under Article 404 jurisdiction, county, city or town agencies under other local ordinances, or other approvals that may be required. The approval issued in this letter cannot supersede any other required permit or approval.

Please be advised that Title 15A, North Carolina Administrative Code, 4B .0018(a) requires that a copy of the approved plan be on file at the job site. Also, please consider this letter as notice in accordance with the requirements of NCGS

Mr. Self
October 15, 1995
page 2

113A-61.1 concerning our right to perform periodic inspections to ensure compliance with the approved plan.

North Carolina's sedimentation pollution control program is performance oriented, requiring protection of the natural resources and adjoining properties. If at any time during this project it is determined that the Erosion and Sedimentation Control Plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (NCGS 113A-51 through 66), this office may require revisions in the plan and its implementation to ensure compliance with the Act.

Please note that this approval is based in part on the accuracy of the information provided concerning financial responsibility. You are requested to file an amended Financial Responsibility Form if any changes become necessary. In addition, it would be helpful if you would notify this office of the proposed starting date for the activity at the subject site.

Your cooperation is appreciated and we look forward to working with you on this project. If there are any questions, please do not hesitate to contact this office at 919/571-4700.

Sincerely,



Wyatt Brown, CPESC
Assistant Regional Engineer
Land Quality Section
Raleigh Regional Office

WB/gb

cc: Michael J.E. Sanchez, E.I.T.

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



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

October 10, 1995

Mr. Michael Sanchez
McKim & Creed Engineers, P.A.
5625 Dillard Road, Suite 117
Cary, NC 27511

RE: Technical Review-Permit to Construct Application Revision 1, for the Proposed
Expansion of the Johnston County Landfill

Dear Mr. Sanchez,

The NC Division of Solid Waste Management, Solid Waste Section (Section) has conducted a review of the above referenced Permit to Construct application revision submitted by McKim & Creed, on behalf of Johnston County. The Section's review involved evaluating the application with respect to the North Carolina Solid Waste Management Rules (15A NCAC 13B.1600) and our technical review letter of July 28, 1995. The following issues remain to be addressed.

DRAWINGS

Drwg. E-13 Detail 4-13 incorrectly shows the geotextile cushion being placed under the FML. Please revise.

SUBGRADE

- IV-D2, 3b. The type of proof rolling equipment, or its size or weight should be specified. (Rule .1624(b)(7)(C)(ii))
- IV-D2, 3c. Is D698 to be used for these tests, or are other tests to be done for the moisture content?
- IV-D3, 3c. What particle size test is to be used?

CLAY LINER

- IV-E9, 4 While not required by the rules, many facilities also run grain size and Atterbergs on the test pad and during liner installation, when they run a perm test. There have been instances when a perm test failed or was marginal and all the other tests were within the correct window of specifications. The area of concern for repair and rechecking was able to be reduced, or a "bad" undisturbed sample was confirmed and the back-up test run.
- IV-E13,d The thickness of the "loose" lift should be stated. If the initial lift can be eight

- inches, will a subsequent lift be short?
- IV-E14,e A statement that clods or particles in excess of 3 inches in any dimension is not allowed should be included (Rule .1624(b)(8)(A))
- IV-E14,e Is the reference to vibratory rollers meant for a specific type of equipment?
Most compactors can vibrate.
- IV-E17,k It is recommended that a depth of crack that may be reworked, without having to rework or remove the entire lift be included. Possibly also the repair could be tied to the corrective action paragraph on page IV-E20.
- IV-E18 Field Quality Control- (Table E4a note; the a is missing) Would grain size tests be useful? They are commonly employed in North Carolina. Is the undisturbed permeability and natural moisture frequency correct, or should they read 1/acre/lift? If speedy tests for density and/or moisture are employed, how often are conventional tests run to help calibrate the speedy test results? i.e. every fifth or tenth measurement is confirmed with D2937 or D2216.
- IV-E19,c The original test should not be ignored, but rather the reason why it was considered faulty explained in the CQA report.
- IV-E19,d Can an area be reworked? This paragraph seems to indicate that the area must be removed.
What method will be used to ensure that the specified percentage of bentonite is used during construction?

HDPE LINERS and LLDPE

- IV-F1,2 This paragraph states that the HDPE liner materials will have a minimum thickness of 60 mils. This is inconsistent with the material specs.
- IV-F5 Suggest you add a statement that fork lifts will not be used to move rolls.
- IV-F23-iv Is the four psi pressure loss correct? Is there a reference on this recommendation?
- IV-F25 See comment IV-F28
- IV-F26,k(3) What if a seam fails through the weld, but at a stress that exceeds the tensile stress specification of parent liner material?
- IV-F28 In reference to repairs in general it is suggested that the timing of the repair be specified, ie within 24 hours after an approved test, or now if it is going to rain, etc. A statement on the size of patches is recommended. For example, all patches shall extend a minimum of X inches around the hole. A statement and method of covering or protecting holes, prior to repair is suggested.

HDPE Pipe

- IV-H4, 4 It is recommended that a statement on equipment minimizing shear movements be included.
- IV-H14, It is recommended that a size of wave that is not allowed be included, as well as

- the correct procedure to remove and prevent them.
- IV-H15,b The Section is concerned about the provision to possibly eliminate the protective fabric entirely. It is recommended that a trial spreading of rock also be included. Most liner damage results not from the normal forces on the liner, but from the shear action of equipment. At a minimum, it is our opinion that the fabric should be included under all pipes (or a rub sheet of liner), under the haul roads that the trucks will be driving on, and in areas where a crane may be moving when laying pipe.

OPERATIONAL COVER etc.

- IV-J1 What is the allowable permeability of the operation cover soil?
- IV-J4,2a This paragraph should be clarified to indicate that the geonet must be in place prior to placing the aggregate drainage layer at the toe of the slopes, ie make it consistent with IV-K2(2a).
- IV-J7 Care should be taken to avoid shear action of equipment.

DRAINAGE NET

- IV-K4, f What precautions are recommended?

GEOTEXTILES

- IV-L1, 4 See comment IV-H15,b above.
- IV-L1, 1 Is it necessary to specify that the fabric will be magnetically checked for broken needles?
- IV-L4, g You may wish to also consider allowing the fabric to be sewn, and should specify the type and color, etc. of the thread.

GENERAL COMMENTS

A list of the tests to be performed or allowed, such as the one in Section IV-E4, 2a, is helpful and should be included in each section.

Has thought or provision been given to allowing staged activities, or multiple activities. This means that the liner could be placed while clay is being finished, or cover applied while liner is being finished? The specifications IV-E19-F, and IV-F3, 2a3 seem to not allow this.

The HDPE liner specs are more stringent than NSF specs. If the specified tensile strength is not required by the design, then the higher spec could reduce the number of eligible vendors for the product.

These comments are intended to expedite the review of the referenced application, and in no

Mr. M. Sanchez
Johnston County PTC Revision Review
October 10, 1995
Page 4

way do they restrict the Section's right to request additional information following the technical review process. If you have any additional questions or need help, please feel free to call me at (919) 733-0692 Ext. 343, or email us at mussler@wastenot.ehnr.state.nc.us.

Sincerely,



~~Edward F. Mussler III~~
Environmental Engineer
Solid Waste Section

cc: Terry Dover, SWS
Jim Barber, SWS
Ben Barnes, SWS
Haywood Phistic, Johnston County

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- Booklet -

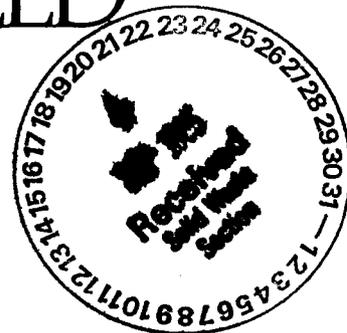
Re: NCDEHNR Comments on Permit to
CONSTRUCT Application for the
Proposed Johnston County Subtitle D
Landfill, Johnston County, NC

Sept. 25th, 1995



September 20, 1995

Greg Eades, Environmental Engineer
NCDEHNR, Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687



ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

RE: NCDEHNR Comments on Permit to Construct Application for the
Proposed Johnston County Subtitle D Landfill
Johnston County, North Carolina

Dear Greg:

The following responses to the NCDEHNR, Division of Solid Waste Management, Solid Waste Section (Section) comments regarding the Johnston County Subtitle D Landfill Permit to Construct Application are ordered in the same sequence as appeared in your July 28, 1995 letter. Text revisions and additions made to the application in response to the Section's comments are shown as underlined in this letter. Text deleted from the original submittal is shown as a ~~strikeout~~. Please note that the font used in the originally submitted Volume 1 (Sections I through VII) portion of the application has been changed for improved readability. Therefore, two copies of all sections, revised appendicies, and revised drawings are attached in their entirety. Although, the revised sections reflect the actual changes made without the underlining and ~~strikeouts~~ shown in the responses presented below, a footer (*Revision 9/95*) has been added to pages containing revisions, in accordance with the Section's request.

Section II - Facility Plan

II-15 *Waste Disposal Volumes, The discussion of the estimated variance in the waste projection needs to be included in the plan, as well as reference to the fact that waste volumes could also increase. For instance unexpected growth, a new industry, a storm, or excessive C&D waste, could be factors to cause an increase. 1619(e)(1)(B)*

The following text has been added to revised Page II-16:

SUITE 117

BUILDING I

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

Conversely, it is also possible that waste volumes received at the landfill could be considerably greater than projected. Some potential causes of unexpected waste volume increases are: 1) heavy storms and/or hurricanes that result in significant damage and produce large volumes construction and demolition (C&D) waste; 2) rapid industrial growth that produces large quantities of municipal solid waste (MSW) and C&D waste; and 3) unprecedented population growth rate that adds considerable MSW to the waste stream.

- II-20 *The use of alternative daily cover will require a demonstration, and will be included in the permit as a permit condition.*

The following statement has been added to revised Pages II-22 and V-21:

...In accordance with 15A NCAC 13B.1626(2)(b), prior to beginning use of the artificial cover, Johnston County will demonstrate its use to the appropriate Section personnel.

- II-22 *Will Phase 5 be constructed all at once, or is phased cell construction to be used?*

As stated in the original submittal near the bottom of Page II-22, "Phase 5 will be constructed all at once...". Since this statement was included in the original draft, no revision has been made in response to this comment.

- II-23 *What is the size of the Phase 5 footprint, in acres? Please also list the acreage of the other phases.*

The following statements have been added to revised Page II-24:

The Phase 5 footprint area, as defined at the outside toe of the perimeter berm slopes is approximately 29 acres, while the footprint defined at the edge of liner is approximately 18 acres.

and

The approximate footprint areas for Phases 6, 7, and 8, are approximately 25 acres each, as defined at the outside toe of the perimeter berm slopes while the footprints defined at the edge of liner for each phase is approximately 18 acres.

- II-25 *Soil balances show a lack of soil for construction of the landfill, in later years. Is sufficient soil available on-site for use as daily/weekly cover? Have off-site borrow sources been identified by the County.*

Sufficient soil is available on-site for weekly cover needed for Phase 5. However, as discussed on page II-24 of the original submittal, off-site borrow material will be needed beginning with Phase 6. This off-site borrow material will be needed for construction and weekly cover purposes. Johnston County is aware of the need for soil resources and is currently considering areas near the landfill facility that could be purchased to serve as an off-site borrow source. No revision has been made in response to this comment.

- II-26 *A statement needs to be added that a phase could fill up faster than expected. Also, the volume capacity of each phase should be listed in addition to the number of years of operation. The Solid Waste Section permits a landfill for five years or until the approved contours are reached. Ideally this will be five years. The permit is then amended for future phase construction or operation.*

The following statement has been added to revised Page II-29:

Although it is possible that a phase could be filled faster than expected, since a conservative approach was used in the conceptual design of the proposed landfill phases, it is also possible that each phase could potentially accommodate larger volumes.

In regard to the volume capacity for each phase, this information was already provided in Section II-D1. Therefore, no additional revision has been made in response to this comment.

- II-29 *There will also be a geomembrane liner in the closure cap that is not accounted for in the description.*

The following change has been made beginning at the bottom of revised Page II-31.

...iv) A 40 ml textured Linear Low Density Polyethylene (LLDPE) liner; and v) 18 inches of compacted fill material (permeability $< 1 \times 10^{-5}$ cm/sec), which will be directly in contact with the top of the waste.

- II-30 *Four groundwater samples are not required prior to obtaining the Permit to Operate. Current Section policy is to have an initial sampling event prior to opening the new MSW unit, and the other three events taken during the first six months of operation.*

The following change has been made on revised Page II-32.

...An initial sampling event will be performed prior to opening the new landfill and three additional sampling events will be completed during the first six months of operation.

- II-36 *For the leachate generation rate, please also convert the cubic feet to gallons. That number is more easily understood by the general public. Also, HELP reports annual rates while only monthly rates are reported. Please also provide the yearly leachate generation rates.*

Leachate generation rates based on gallon units have been added. In addition, annual leachate generation rates have been added, although only average monthly values are requested in 15A NCAC 13B.1619(e)(4)(B)(I). Therefore, the following edits have been made beginning at the bottom of revised Page II-38:

...Using the HELP3 model and based on the assumptions described above, the average monthly leachate generation rate was estimated to be about 615,000 gallons/month (82,000 ft³/month) and the average annual rate was estimated to be about 7.4 million gallons/year (984,000 ft³/year). The peak monthly rate was estimated to be about 10.5 million gallons/month (1.4 million ft³/month) and the peak annual rate will be approximately 126 million gallons/year (16.8 million ft³/month).

- II-36 *What volume of leachate can be handled by city emergency action?*

This comment is addressed in comment II-41 below.

- II-40 *Prior approval is required from the treatment plant prior to accepting leachate. Please obtain a letter or other documentation that leachate will be accepted. how much leachate will the County be able to accept on a daily basis? This information should also be included in the leachate management plan, found in the Operation Plan.*

Documentation verifying that leachate will be accepted at the Central Wastewater Treatment Plant (CWWTP) in Smithfield, NC is currently being obtained. This confirmation will be submitted to the Section upon receipt. As noted in what was formerly Section II-F3(6) but has been reformatted as Section II-F3f, the on-site pump station located near the leachate basin will be equipped with a 100 gpm pump that will pump the leachate to the Short Journey pump station, which is part of the Johnston County Sewage Collection System. Therefore, the following statement has been added to revised Page II-44:

The CWWTP will be able to accept the on-site pump station maximum flow capacity of 144,000 gallons per day (gpd).

In addition, revised Page V-36 has been revised as follows:

...An on-site pump station located near the leachate basin will be equipped with a 100 gpm pump that will pump the leachate to the Short Journey pump station. The Short Journey pump station will connect the leachate collection system to the Johnston County Sewage Collection System, which will convey the pretreated leachate to the Central Wastewater Treatment Plant (CWWTP) in Smithfield, NC for final treatment and disposal. The CWWTP will be able to accept the on-site pump station maximum flow capacity of 144,000 gallons per day (GPD).

- II-41 *Johnston County should identify trucks and have an alternative leachate disposal site identified by the time the Permit to Operate is issued. This information should also be included in the leachate management plan, found in the operations plan.*

Three revisions have been made beginning on revised Page II-45. Section II-F4. These revisions include: 1) correction of an error in the first sentence regarding leachate storage capacity; 2) revision of text for consistency with comment responses to comments III-15 and V-33 addressed below; and 3) addition of a description of the County's leachate hauling capabilities in case of an emergency.

The first two revisions were both made to the first paragraph in this section while the third revision is an added paragraph. This revised section will read as follows:

The leachate storage basin has been conservatively designed to have a capacity of storing up to eight days of peak leachate flow generated by both Phase 5, during the 24-hour, 25-year storm, and by the existing landfill's groundwater remediation system. In the unlikely event, that the inflow to the basin were to exceed the outflow for a prolonged period of time and thereby threaten to overflow the basin, the leachate would be pumped out of the pond by either County personnel and/or a contractor and placed on to either tank trucks or flatbed trucks equipped with containers. The leachate would then be transported to the CWWTP for final treatment and disposal. This temporary emergency leachate handling strategy would continue until the cause of the problem was identified and repaired. The appropriate personnel at CWWTP would be notified regarding the potential for insufficient leachate pretreatment.

If the County is to perform the leachate pump and haul, a 1,000-gallon tank that is welded onto a roll-off box is available. This tank can be mounted on a County truck for leachate hauling. In addition, a 3,500-gallon tank truck that is ordinarily used for transporting septic tank waste is also available for leachate hauling. Under average Phase 5 leachate and existing landfill groundwater generation conditions (i.e., 42 gpm \approx 61,000 gpd), fourteen haul trips per day would be required by both trucks. However, since the basin is sized to hold eight days of peak flow and 72 days of average flow, the need for pump and haul is unlikely to ever arise.

Section III - Engineering Plan

- III-9 *The description and diagram of the closure cap indicates 18" of 1×10^{-5} cm/sec soil directly overlaying the waste. Is this achievable? It has been the Sections experience that a "subgrade", like the foot of intermediate cover is necessary to provide a sufficient surface to run the compactor on, to build the low permeability barrier.*

As stated in Section III-B3a, "18 inches of compacted fill material (permeability of 1×10^{-5} cm/s or less), which will be directly in contact with the top of the waste". This specification is considered to be a minimum depth and therefore additional fill may be required so that the resulting layer meets this minimum requirement. It is expected that four to six inches of additional material may be needed to achieve the

18 inches of fill material compacted to the specified permeability. No revision has been made in response to this comment.

- III-9 *Section C of the Engineering Plan incorrectly refers to Appendix B-1. This should be B-2 for the stability of the composite liner.*

Section III-B2c on revised Page III-9 has been corrected as follows:

A detailed stability analysis was performed to evaluate the stability of the various components of the composite liner as shown in the design calculations in Section III, Appendix B-2.

- III-10 *What are the friction angles between the various closure cap components?*

A sentence has been removed and a new paragraph has been added to Section III-B3a beginning on revised Page III-10, as follows:

...The results show that due to the mild slopes (4H:1V), the interface friction angles between the various cap components are higher than the slope angle of 14 degrees. ~~This provides for an inherently stable cover.~~ Conservative estimate of interface friction angles between the various components of the final cover are listed below:

Interface between		Friction angle (degrees)
Bottom material	Top material	
Waste	Compacted soil cover	25
Compacted soil cover	Textured LLDPE	20 ^a
Textured LLDPE	Non-woven geotextile (bottom of geonet)	15 ^b
Non-woven geotextile (top of geonet)	Compacted common fill	20
Compacted common fill	Top soil	25

Notes to table: a) Conservative value (much lower than test results shown in Vol. II)
 b) Conservative value (based on the lower end of results in the literature and does not include apparent cohesion)

Therefore, it is concluded that:

- Overall slope stability of final cover is adequate as shown in the overall slope stability evaluation in Section III-D6.
- The final cover system of soil and geosynthetic layers is inherently stable since the conservative interface friction values (δ) are consistently larger greater than the slope angle (β) as shown in Section III. Appendix B-2.
- Settlement of the underlying waste generally tends to reduce slope angle (β) and actually improve slope stability of the final cover.
- Therefore, the stability of the final cover system is adequate.

III-10 *Is it possible to have a well compacted operational cover on the side slopes? Is it necessary, or does the operational cover just have to be laid down with no additional compaction?*

The operational cover on the side slopes will be compacted using a bulldozer and/or a compactor, as appropriate, depending on the daily conditions. No revisions have been made in response to this comment.

III-12 *Is NCDOT # 78 stone angular or round? Will the liner be safe from puncture?*

The revised construction quality assurance (CQA) plan in Volume I, Section IV, Parts I and L of the *Revised Permit to Construct Application* include detailed specifications for the drainage layer and cushion fabric. The revised Engineering Drawings also include details for the cushion fabric that has been added to eliminate the risk of HDPE geomembrane yielding due to stone pressure.

III-12 *How will the leachate lines be installed? i.e. Will protective cover be placed first or will the leachate pipe be lain and then have the cover placed on top? Also, will a rub sheet be placed under the leachate line in order to protect both the collection pipe and the FML during cover operations?*

The revised construction quality assurance (CQA) plan in Volume I, Section IV, Parts H, I and L of the *Revised Permit to Construct Application* include detailed specifications for the HDPE pipe, drainage layer and cushion fabric, respectively.

III-14 *Is a shut off valve present or needed, such that the leachate could be stored in lined cell if necessary? We did identify a valve at the leachate pond.*

Gate valves were specified in the original submittal in a profile view of the leachate collection system presented on Drawing E10. Drawing E3, which presents a plan view of the leachate collection system, will be edited to show these valves.

III-15 *What is the estimated time involved with draining a cell?*

The following text has been added beginning on revised Page III-17:

In an unlikely scenario where a 25-year 24-hour storm occurs while the entire Phase 5 area is covered with an exposed ten-foot layer of waste, most of the leachate generated in the waste will percolate through the operational cover into the drainage layer which is capable of draining these quantities without any surge delay into the perforated leachate collection pipes (as shown in the computations included in Section III, Appendix C-1). Small leachate quantities that drain through the waste to the top of the sand drains at the center and west edges of the cells will immediately drain through the sand drains into the leachate collection pipes without any delay (as shown in the computations included in Section III, Appendix C-4).

Furthermore, since the leachate collectors and headers have been sized to have a considerably greater capacity than the peak leachate flow anticipated from Phase 5, as demonstrated in the computations included in Section III, Appendix C-2 on pages 1/3 and 2/3. Leachate will flow into the drainage layer and subsequently into the collector and header pipes without buildup. Therefore, leachate will not accumulate in a cell, even during the surge caused by the 24-hour, 25-year storm.

III-15 *How will the leachate be removed from the pond if a pump and haul scenario becomes necessary?*

The following text has been added beginning on revised Page III-18:

In the unlikely event, that the inflow to the basin were to exceed the outflow for a prolonged period of time and thereby threaten to overflow the basin, the leachate would be pumped out of the pond by either County personnel and/or a contractor and placed on to either tank trucks or flatbed trucks equipped with containers. The leachate would then be transported to the CWWTP for final treatment and disposal.

If the County is to perform the leachate pump and haul, a 1,000-gallon tank that is welded onto a roll-off box is available. This tank can be mounted on a County truck for leachate hauling. In addition, a 3,500-gallon tank truck that is ordinarily used for transporting septic tank waste is also available for leachate hauling. Under average Phase 5 leachate and existing landfill groundwater generation conditions (i.e., 42 gpm \approx 61,000 gpd), fourteen haul trips per day would be required by both trucks. However, since the basin is sized to hold eight days of peak flow and 72 days of average flow, the need for pump and haul is unlikely to ever arise.

III-24 *Are soil conditions sufficiently uniform to make the differential settlement argument?*

Please note that in Section III, Appendix D-1 has been revised. This revision better demonstrates that the most critical north-south differential settlement will not change subgrade slopes significantly. Also, please note the following changes beginning on revised Page III-31 in Section III-D5b, which discusses the differential settlement:

- ...● **Effect on subgrade slopes.** Within the Phase 5 cells, subgrade slopes are designed as 2.5% in the perpendicular direction towards the leachate collection pipes (LCPs) as shown in Engineering Drawing E2. It was

conservatively evaluated that differential settlements would have a negligible effect on these subgrade slopes that may ~~change by about 0.025% (e.g., decrease or increase in the range of 2.475% to 2.525%, respectively); decrease by no more than 0.1% (e.g., decrease to no less than 2.4%) due to these settlements.~~

- III-33 *Section C incorrectly refers to Appendix B-1. This should be Appendix B-2 for stability of the composite liner.*

This comment, which is a repeat of a previous comment (III-9 above), appears to be invalid. There is no reference to either Section III, Appendix B-1 or B-2 on pages III-32, 33, or 34. The only appendix referred to on any of these three pages is Section III, Appendix D-3 (page III-33), which was correctly referenced as containing CETCO's test results. Therefore, no edits have been made in response to this comment.

- III-33 *Refers to composite sample C-12 as being representative of the on-site sandy clay. the sample should read C-2.*

The reference to "composite sample C12" on page III-33 of the original submittal has been corrected on revised Page III-41, as follows:

Original On-site Clayey Sand (SC). Based on composite sample C-2, it appears...

- * *Has the leachate lagoon bee sized adequately to handle the flow from the entire project? The plan just addresses Phase 5.*

The leachate basin has been sized to accommodate the leachate flow expected for the entire project. This is based on the following three reasonable assumptions, which have been added to revised Pages II-42 and III-19:

Furthermore, the leachate storage capacity should remain approximately the same during the operation of all four proposed landfill phases because 1) leachate flow from each previously filled phase will be nominal as the filling begins at the subsequent phase; 2) leachate generation rates will be approximately the same in each phase since leachate volume is a function of infiltration and infiltration is a function of areal extent and the areal extents of each phase are about the same size; and 3) although, one side of Phase 6 will be left without final cover as Phase 7

is filled and tied into Phase 6, the remaining portion of Phase 6 will have the final cover installed. Similarly, as Phase 8 is tied into the filled Phase 7, only one side of Phase 7 will not have the final cover placed on it. Therefore, leachate generation resulting from an inactive, previously-filled phase will be minimal. Any increases in leachate volume generated in each subsequent phase should only result in a modestly smaller amount of storage time provided by the basin.

Section III Appendices

- B-3 *The normal stress value of 0.3 ksf used for calculating the geonet transmissivity needs to be explained.*

Please see revised calculation sheets titled, *Tensar DC3205 (or equal) Geonet Transmissivity and Flow Capacity (1/6 through 6/6)* for geonet calculation in Section III, Appendix B-3.

- B-3 *Using the highest recommended factor of safety 2 for all parameters, the maximum $e_{all} = 1.16$ in/day which is less than $e_{req} = 2.77$ in/day. Does an alternate geonet need to be specified?*

Please see revised calculation sheets titled, *Tensar DC3205 (or equal) Geonet Transmissivity and Flow Capacity (1/6 through 6/6)* for geonet calculation in Section III, Appendix B-3.

- C-1 *With regard to the leachate generation rate estimate, it is stated that precipitation data came from NOAA, however the HELP model output indicates synthetic precipitation data from Raleigh, NC. Please clarify and also describe the other assumptions or model manipulations that were used. Where did the soil parameters come from?*

The following information has been added to Section III, Appendix C-1 just prior to *Leachate Generation Rate Estimates* (pages 1/9 through 9/9):

HELP 3 MODEL INPUT DESCRIPTION: LEACHATE GENERATION ESTIMATION

The input facility of the HELP3 model consists of seven modules, two of the modules are for data input and the remaining five are for execution simulation.

viewing results, printing, guidance, and quitting. The two data input modules consist of Enter/Edit Weather Data and Enter/Edit Soil and Design Data. Input to the HELP3 model included the following for the worst case leachate generation scenario:

LEACHATE GENERATION MODELING: WORST CASE SCENARIO

Weather Data Module

- The default evapotranspiration option with location specific guidance was used to provide the values for the evaporative zone depth, the maximum leaf area index, dates for the starting and ending of the growing season, the normal average annual wind speed, and the normal average quarterly relative humidity shown on pages 3/9 and 4/9 in the Section III, Appendix C-1.
- The HELP3 model allows the user to select from Default, Synthetic, or User data sets when inputting precipitation data. The Default option allows the user to select five years of historical data for any of 102 U.S. cities (Greensboro is the closest listed city to the project area). Under the User data option, NOAA tape is a selection choice, however, the model assumes that the NOAA data is in ASCII print as-on-tape format. The NOAA data we had available, however, was a printout copy. The Synthetic option generates from 1 to 100 years of daily precipitation data stochastically for any of 139 U.S. cities (Raleigh is the closest listed city to the project area) using a synthetic weather generator. If desired, the user can enter precipitation values for the specific location to improve the statistical characteristics of the resulting daily values. Consequently, this was the preferred option. We used the synthetic option and entered the adjusted NOAA data for Smithfield. As described in Section II-F2 (page II-34,35 of the original submittal), the NOAA data was adjusted, by trial and error, until the HELP3 modeling output showed a peak daily precipitation value of about 6.8 inches /day, which is the rainfall expected for Johnston County during the 24-hour, 25-year storm. The resulting precipitation data is shown on page 4/9 in Section III, Appendix C-1.
- Temperature data was entered using the synthetic option, which generates temperature data stochastically for any of 183 U.S. cities (Raleigh is the

closest listed city to the project area). Similar to the synthetic option for precipitation, the synthetic temperature option allows the user to enter temperature values for the specific location in order to improve the statistical characteristics of the resulting values. Therefore, NOAA temperature data for Smithfield, NC was used. The resulting temperature data is shown on page 4/9 in Section III, Appendix C-1.

- Solar radiation data was entered using the synthetic option, which generates daily solar radiation data stochastically for any of 183 U.S. cities (Raleigh is the closest listed city to the project area). Again, this option allows the user to enter the latitude for the specific location to improve the computation of potential solar radiation and the resulting values. According to the HELP3 guidance manual, if the project is more than 50 miles north or south of the closest city for which the model will generate the solar radiation data, then the user is recommended to enter a project-specific latitude. Since the proposed Johnston County landfill site is not more than 50 miles north or south of Raleigh, a latitude was not entered.

Soil and Design Data Module

- In order to conservatively estimate the amount of leachate generated, the percentage of landfill area where runoff is possible was assumed to be zero.
- The initial moisture storage was not manually entered but rather was program-generated. The program assumes near steady-state values and the runs the first year of the simulation to improve the initialization to steady-state. The soil water contents at the end of this year of initialization are taken as the initial values for the simulation period.
- As described in Section III, Appendix C-1 of the original submittal, a worst case scenario for leachate generation was assumed to occur under the unrealistic but conservative hypothetical conditions involving ten feet of waste across the entire bottom of the landfill with no soil cover. Therefore, the uppermost layer of the landfill profile was modeled as a vertical percolation layer consisting of ten feet of waste. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of the municipal solid waste layer, the program automatically assigned

default values of 0.6710 vol/vol, 0.2920 vol/vol, 0.0770 vol/vol, 0.001cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 2/9 in Section III, Appendix C-1.

- The next lower layer was modeled as a vertical percolation layer consisting of one foot of operational cover. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of the soil specified for the operational layer, the program automatically assigned default values of 0.4300 vol/vol, 0.3210 vol/vol, 0.2210 vol/vol, 0.000033cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 2/9 in Section III, Appendix C-1.
- The next lower layer was modeled as a lateral drainage layer consisting of one foot of gravel. The gravel layer characteristics are essentially the same as the default values. However, in order to more accurately reflect the characteristics of the 78M stone specified for this layer, a saturated hydraulic conductivity of 0.5 cm/sec was input as opposed to the default value of 0.3 cm/sec. Since the model does not allow the default values to be edited, the porosity, field capacity, and wilting point were manually entered as 0.4000 vol/vol, 0.0300 vol/vol, and 0.0120 vol/vol, respectively. These values differ by less than ten percent from the default values of 0.397 vol/vol, 0.032 vol/vol, and 0.013 vol/vol. In addition, a representative drainage length of 100 feet was assumed and a bottom slope of two percent was used in order to simulate the minimum post-settlement slope requirement for the subgrade as specified in 15A NCAC 13B.1624(b)(7).
- The next lower layer was modeled as a flexible membrane layer consisting of an HDPE liner. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of an HDPE liner, the program automatically assigned default values of 0.0000 vol/vol, 0.0000 vol/vol, 0.0000 vol/vol, 1.9999×10^{-13} cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 3/9 in Section III, Appendix C-1. Furthermore, an FML pinhole density and installation defects density of zero and an FML placement quality of poor was assumed.

- The bottom-most layer was modeled as a barrier soil consisting of two feet of compacted clay. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of this clay liner, the program automatically assigned default values of 0.4270 vol/vol, 0.4180 vol/vol, 0.3670 vol/vol, 1.0000×10^{-7} cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 3/9 in Section III, Appendix C-1.
- An SCS runoff curve number was computed by the program based on a waste surface slope of two percent, a slope length of 100 feet, a material texture value as specified above for municipal solid waste, and bare conditions (i.e., no grass cover).

The following information has been added to the beginning of Section III, Appendix B-3 just prior to the HELP 3 modeling results (Pages 1/6 through 6/6):

**HELP 3 MODEL INPUT DESCRIPTION:
FINAL COVER GEONET TRANSMISSIVITY ANALYSIS**

The input facility of the HELP3 model consists of seven modules, two of the modules are for data input and the remaining five are for execution simulation, viewing results, printing, guidance, and quitting. The two data input modules consist of Enter/Edit Weather Data and Enter/Edit Soil and Design Data. Input to the HELP3 model included the following for the worst case leachate generation scenario:

FINAL COVER MODELING: GEONET DRAINAGE EVALUATION

Weather Data Module

- The same weather data file used for the leachate generation modeling was used for modeling the final cover in order to assess the geonet drainage. An explanation of the data used in this module is given in Section III, Appendix C-1.

Soil and Design Data Module

- In order to conservatively estimate the amount of leachate generated, the percentage of landfill area where runoff is possible was assumed to be zero.
- The initial moisture storage was not manually entered but rather was program-generated. The program assumes near steady-state values and the runs the first year of the simulation to improve the initialization to steady-state. The soil water contents at the end of this year of initialization are taken as the initial values for the simulation period.
- The uppermost layer of the final cover profile was modeled as a vertical percolation layer consisting of two feet of common fill. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of an USCS SC class soil, the program automatically assigned default values of 0.3980 vol/vol, 0.2440 vol/vol, 0.1360 vol/vol, 0.0001999 cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 1/6 in Section III, Appendix B-3.
- The next lower layer was modeled as a lateral drainage layer consisting of a drainage net. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of the geonet, the program automatically assigned default values of 0.8500 vol/vol, 0.0100 vol/vol, 0.005 vol/vol, 10.0 cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 1/6 in Section III, Appendix B-3.
- The next lower layer was modeled as a flexible membrane layer consisting of a linear low density polyethylene (LLDPE) liner. Default soil/material texture values were used to describe the characteristics of this layer. By selecting from a chart within the program a soil/material texture number representative of a LLDPE liner, the program automatically assigned default values of 0.0000 vol/vol, 0.0000 vol/vol, 0.0000 vol/vol, 3.9999×10^{-13} cm/sec for porosity, field capacity, wilting point, and hydraulic conductivity, respectively, as shown on page 1/6 in Section III, Appendix B-3. Furthermore, an FML pinhole density and installation defects density of zero and an FML placement quality of poor was assumed.

- Although the bottom-most layer will consist of 18 inches of compacted fill, for the purposes of modeling the geonet drainage capacity this layer was not needed. Therefore, it was not included in this model run.
- An SCS runoff curve number was computed by the program based on a final cover surface slope of 25 percent, a slope length of 300 feet, a material texture value as specified above for the uppermost layer of the final cover, and a fair stand of grass.

C-2 *It is unclear where the value for the minimum velocity (2 fps) comes from in the leachate collector pipe design.*

Although three feet per second is typically used as the minimum velocity to achieve scour when designing sewer systems, two feet per second was selected as the minimum velocity for the leachate collection system since minimal to no solids are expected to enter the collector pipes. Furthermore, the collection system design has incorporated numerous cleanouts at various strategic locations in order to allow for periodic removal of any solids that may accumulate in the pipes. The following statement regarding the two foot per second minimum velocity has been added to the assumptions listed in Section III, Appendix C-2 page 1/3:

1. A minimum velocity of two feet per second will adequately provide sufficient scour since minimal solids are expected to enter the leachate collector and since ample cleanouts have been specified for the landfill design.

C-2 *Will <0.5% slope be adequate for the gravity fed leachate collection pipe running between Phase 5 and the leachate pond? Reaches 1,2,6,7,9 and 10 fall below 0.5% (Appendix C-3).*

As mentioned above, since the leachate entering the collector pipes will not contain significant solids, a minimum velocity of two feet per second will suffice for leachate flow to the storage basin. The slopes shown on the pipeline design worksheet provide for more than the minimum velocity to be maintained under actual conditions throughout every reach of the system. No revision has been made in response to this comment.

C-4 *In the geomembrane flap calculations, it is stated that the granular filter material must have a permeability greater than 0.1 cm/sec. Is a sand with a $K < 0.1$ cm/sec acceptable as a filter material.*

Please see revised pages 2/9 and 3/9 in Section III, Appendix C-4 the revised Engineering Plan.

D-2 *A description of the SB-Slope input parameters would be helpful in evaluating slope stability at the site.*

Please see introduction pages that have been added before the result pages in Section III, Appendix D-2.

Section IV - Construction Quality Assurance (CQA) Plan

This section will be addressed at a future date.

-Outline jobs, responsibility, qualifications etc.

-CQA vs. CQC needs to be addressed

-The pre-construction conference needs to be mentioned in the CQA plan.

-Specs will be needed for all soils and the #78 stone used on the project.

-Specs will be needed for the liner test welds, all non-destructive testing and repair procedures etc.

IV-5 *How is depth measured, how patched. Are 100' centers adequate for survey and locating patches, tests and undercut areas.*

IV-5 *Specify when subgrade and top of clay is surveyed i.e. before or after smooth role etc.*

IV-6 *Permeability tests # per acre/lift. Acceptable test methods and confining pressures.*

All comments regarding the CQA plan have been addressed in the revised CQA plan in Volume I, Section IV of the report.

Section IV Appendix A - Geosynthetic Specifications

Please provide all pertinent specs. The technical specs must, at a minimum, be equivalent to the design numbers. Specs are needed for all liners, pipes, geonets, fabrics, stone, sand, protective cover, and clay liner.

All comments regarding the CQA plan have been addressed in the revised CQA plan in Volume I, Section IV of the report.

Section V - Operation Plan

- V-4 *The detailed description of the land application of sewage sludge is not germane to the permit. It should be removed or reworded. Furthermore, in reference to the meeting it was not agreed by all parties that the "sludge could be applied to the proposed landfill area, as permitted, without adversely impacting the suitability of this site, for a new lined landfill". The Section did acknowledge that this was permitted activity under the DEM permit issued, and if it was properly done, it was likely it would not impact the site. Mr. Coffey expressed his disagreement, noting that the full hydrogeologic study should be done so that the activity would not affect the site or its characterization.*

The following edit has been made on revised Page V-5:

...On November 3, 1994, a meeting was held, in part, to discuss sludge application at the proposed Johnston County landfill site. This meeting involved Section representatives, Jim Coffey and Bill Meyer, Johnston County Director of Utilities, Haywood Phthisic, and McKim & Creed Engineers representatives, Tim Broome and C.T. Clayton. It was acknowledged by the Section that sludge application to the proposed landfill site is a permitted activity under the NC Department of Environmental Management permit issued, and if it is done properly, it not likely to impact the site. Jim Coffey expressed his disagreement by noting that the full hydrogeologic study should be done so that the activity would not affect the site or its characterization.

- V-4 *Disposal of sewage sludge will be listed in the permit as a permitted activity. All sludge must pass both the paint filter test and TCLP screening. Please include this in the application.*

The following statement has been added as the second sentence to the third paragraph in Section V-B on revised Page V-4:

...In order for sludge to be disposed of in the new landfill, it must pass both the paint filter test and the Toxicity Characteristics Leaching Procedure (TCLP) screening.

- V-8 *Hazardous waste generated from conditionally exempt small quantity generators is not allowed to be disposed of at the MSWLF. This exemption is not recognized in NC Hazardous Waste Rules. Only waste generated by households is allowed, since this waste is not hazardous by definition. Please provide a copy of the waste screening form/record of inspection form that Johnston County will use while conducting its waste screening inspections.*

The following has been removed from the second paragraph in Section V-B1d:

~~...waste that is exempt as a conditionally exempt small quantity hazardous waste and small quantities of PGB's found in items such as fluorescent ballasts and small capacitors as in consumer electric appliances~~

In addition, a copy of the Johnston County Waste Screening/Record of Inspection Form has been added to Section V-B1l on revised Page V-15.

- V-8 *The Section issued a memorandum on July 12, 1994 in reference to the "Procedure and Criteria for Waste Determination". Essentially, the memorandum indicated that the Section will no longer perform waste determinations for lined landfills. Lined landfills are allowed to accept wastes that are not hazardous, thus the County will be responsible for screening their own waste, as part of their waste screening process.*

Two references to NCDEHNR involvement in the waste determination process have been deleted. The following deletions were made on revised Page V-9 to Section V-B1d and Section V-B1e, respectively:

...The plan also does not apply to waste which has been conditionally approved for landfilling by Johnston County, or approved by NGDEHNR through the "waste determination" process as described below.

and

Some industrial and manufacturing solid waste, which may by definition, be regulated and prohibited from being landfilled, may be accepted for landfilling by Johnston County, if determined by the NGDEHNR County to be safe.

- V-12 *The NCDEHNR address needs to be added to the waste screening plan in order to promote timely reporting of attempted illegal dumping.*

The NCDEHNR address has been added to Section V-B1k on revised Page V-17:

...Within one business day, the County will confirm in writing, via certified mail to:

NCDEHNR, Division of Solid Waste Management
P.O. Box 27687
Raleigh, NC 27611-7687

and the waste hauler, the attempted illegal disposal of prohibited waste, the consequent actions of the County, and the disposition of the waste.

- V-12 *Information pertaining to the management of hazardous waste on this page is repeated word for word on V-15. Is it necessary to repeat this information?*

Beginning with the third paragraph of Section V-B1h and continuing to the end of that section, the verbiage is nearly identical to that included in Section V-B1k, with the exception that the former is slightly more thorough. However, it is not necessary for this information to be repeated. The appropriate location for the information referenced is in Section V-B1k. Therefore, the applicable paragraphs from Section V-B1h will be removed from that section and will replace, in its entirety, Section V-B1k. The response provided in the comment above will still be added to the appropriate location in Section V-B1k. The text below reflects the information removed from Section V-B1h and used to replace the text in Section V-B1k in its entirety:

If a waste load is suspected of containing the hazardous or prohibited materials covered by this plan, the waste hauler and the Johnston County Director of Public Utilities are immediately contacted by telephone and requested to send an authorized representative to the site of the waste load. The driver(s) and the truck are released as soon as they have adequately completed their sections on the waste screening form and the waste hauler has been reached. If the waste load was deposited at the working face, the waste load is not to be moved or altered. Landfill operations will be moved away from the load until a final disposition can take place. Based on the determination of the landfill supervisor and the Johnston County Director of Public Utilities, the waste will be handled as described below:

If the waste is determined not to be hazardous and is permitted for landfilling under Federal, State, and County laws, it will be transferred by landfill staff to the working face for disposal. If the waste is found to be hazardous or prohibited, the hauler will be required to immediately remove the waste and demonstrate to the County and the State that it was disposed of properly. The hauler will also be required to cover all costs associated with site clean-up and verification that the site is safe. If waste is not removed within 24 hours, as required by NCDEHNR, the County shall have the waste removed and disposed of properly and bill the waste hauler for all the costs associated with its removal, site clean-up, and repair.

Within one business day, the County will confirm in writing, via certified mail to

NCDEHNR, Division of Solid Waste Management
P.O. Box 27687
Raleigh, NC 27611-7687

and the waste hauler, the attempted illegal disposal of prohibited waste, the consequent actions of the County, and the disposition of the waste. The County may begin legal actions against the hauler. All future waste loads from a hauler found to be in violation of the Ordinance because of attempting to dispose of hazardous and prohibited materials in the Johnston County Landfill will be subject to additional waste screening. The additional screening may include screening every load of a hauler who has been previously found to be in violation.

- V-20 *As previously mentioned, a demonstration of the alternative cover will be included with the permit. The permit application should address the requirements of rule .1626(2)(b).*

The following statement has been added to Section V-C on revised Page V-21:

...In accordance with 15A NCAC 13B.1626(2)(b), prior to beginning use of the artificial cover, Johnston County will demonstrate its use to the appropriate Section personnel.

- V-21 *What actions will take place if disease vectors are detected?*

The following statement has been added to Section V-D on revised Page V-23:

...Appropriate and effective extermination measures will be implemented if disease vectors are detected.

- V-22 *What actions will be taken upon detection of methane. Also include notification requirements. More detail needs to be included with this section specifically addressing immediate actions upon detection of methane and notification and potential remediation requirements.*

Section V-E has been reformatted and the following text has been added beginning on revised Page V-24:

2. Contingency Plan for Methane Gas Above Limits in Structures

In accordance with 15A NCAC 13B.1626(4)(c), the following actions will be implemented if methane gas levels exceed 25 percent of the LEL within any structure on the landfill property:

- the building should be evacuated immediately and all smoking in and around the building should be terminated immediately;
- all windows and doors to the building should be opened to vent the building and all space heaters or similar equipment should be disconnected from their power source;

- the landfill supervisor should be notified immediately, who may then notify the County Director of Public Works, at his discretion;
- the equipment used to measure the methane level should be recalibrated and another measurement should be made; and
- methane measurements should be made within all buildings on the facility beginning with those closest to the building at which the high readings were originally obtained.

Readings should then be taken at all landfill gas monitoring wells and these readings should be recorded, in accordance with standard practice. The County's Environmental Consultant should be notified of the incident and a copy of all readings, including recalibration notes and the last three quarters of gas readings should be submitted to the consultant. The Consultant will then review the information and recommend to the County the appropriate follow-up action.

3. Contingency Plan for Methane Gas Above Limits in Gas Monitoring Wells

If methane levels exceeding the LEL are detected at the gas monitoring wells, the following actions should be implemented:

- the landfill supervisor should be notified immediately, who may then notify the County Director of Public Works, at his discretion;
- the equipment used to measure the methane level should be recalibrated and another measurement should be made;
- methane measurements should be made within all buildings on the facility beginning with those closest to the well(s) at which the high readings were obtained;
- if methane levels within the buildings are found to exceed 25 percent of the LEL, the actions specified in above should be implemented.

The County's Environmental Consultant should be notified of the incident and a copy of all readings, including recalibration notes and the last three quarters of

gas readings should be submitted to the consultant. The Consultant will then review the information and recommend to the County the appropriate follow-up action.

4. Notification and Remediation Requirements

Within seven days of detection, the methane gas levels detected and a description of the mitigation steps taken to protect human health will be placed in the operating record; and

Within 60 days of detection, a remediation plan, which describes the nature and extent of the methane gas release problems and the proposed remedy, should be implement. In addition, a copy of the plan will be placed in the operating record, and the Division will be notified.

V-22 *More detail needs to be included with respect to on-site fires. All burning at the landfill must have prior approval from the Section. Has Johnston County coordinated with the local fire department with respect to actions taken in the event of an on-site fire?*

The following sentence has been added to Section V-F on revised Page V-27:

...Prior to conducting any of these or other infrequent burning activities, approval will be obtained from the Division.

Section V-F on revised Page V-27 has also been revised as follows:

Fire extinguishers will be provided at the landfill site to control accidental fires. If a fire occurs at the Johnston County Landfill Facility, verbal notification will be given to the Division within 24 hours and written notification will be given within 15 days. In addition, arrangements will be made with the local fire protection agency to immediately provide fire-fighting services when needed. In addition, daily cover of solid waste material should help prevent foul odors from spreading into the air.

V-23 *How will dust be controlled at the site?*

Section V-G has been edited on revised Page V-28, as follows :

...Dust control measures, e.g., use of a water truck for spraying dusty roads, will be implemented, when necessary. No petroleum products will be used for dust control.

- V-26 *A description of both the procedure and apparatus necessary to conduct the paint filter test should be included.*

The following text has been to Section V-J beginning on revised Page V-31:

...The Paint Filter Liquids Test involves first placing a predetermined amount of material in a paint filter and observing the sample. If any portion of the material passes through and drops from the filter within a five minute test period, the material is deemed to contain free liquids. The apparatus used to conduct this test includes a mesh number 60 (fine meshed size) conical paint filter, a glass funnel into which is placed the filter, a ring stand to hold the funnel, and a container to catch any liquid that may pass through the filter.

- V-32 *A detailed description of the leachate sampling program (i.e., EPA sample method and frequency) is needed.*

The following text has been added to Section V-M4 on revised Page V-39:

...The leachate samples will be analyzed for Appendix I constituents using EPA Methods 8240 (Modified) for the organics analysis and either the 6000 series ICP methods or the 7000 graphite furnace methods for metals analysis, depending on which is needed to achieve the lower detection limit.

The leachate sampling frequency will be greater during startup and decrease over time as the leachate becomes better characterized. During the first month of operation, the leachate will be sampled on a weekly basis. If inconsistent results are obtained over the first month, the weekly sampling will continue for an additional month. Once the leachate analytical results remain consistent over one month of operation, the sampling frequency will be decreased to once a month for a six month period. Similarly, once the analytical results remain consistent for a six month period, then the sampling frequency will be reduced to quarterly sampling, which will be the frequency maintained over the life of the landfill.

V-A5 *Are the sediment basins equipped with emergency spillways?*

All basins were designed in accordance with the December 1993 revised North Carolina Erosion and Sediment Control Planning and Design Manual (NCESCM), except that the 25-year rather than the 10-year storm was used as the design basis. As stated on page 6.61.5 of the NCESCM, "the minimum design capacity of the emergency spillway must be the peak rate of runoff from the 10-year storm, less any reduction due to flow in the principal spillway". Since the principal spillways for all the basins, except Sediment Basin 4, will be equipped with sufficiently large riser/barrel systems to accommodate the runoff from the 25-year storm, emergency spillways will not be needed in these basins. For Sediment Basin 4, the barrel diameter would have had to exceed 36 inches in order to accommodate the 25-year storm runoff. Therefore, this basin will be equipped with a 30-inch barrel and an emergency spillway, which together will accommodate the 25-year storm runoff. No revisions have been made in response to this comment.

V-A7 *Is it necessary to scarify the operational cover prior to placing waste?*

Seeding of the operational cover was proposed in the original submittal as a means for preventing erosion and sedimentation in the areas of the landfill over which no waste had yet been placed. However, if these areas were seeded stormwater infiltration would increase into the leachate collection system. This would result in stormwater unnecessarily being pretreated in the leachate basin and discharged to the Johnston County sewage collection system. In order to minimize stormwater flow into the leachate collection system as filling operations begin in Phase 5, the operational cover on the bottom of the landfill will not be seeded. Instead, runoff will be promoted and erosion of the operational cover minimized by well compacting the cover during installation. In addition, the operational cover will be periodically inspected and repaired, as needed. Therefore, Section V Appendix A-B7 on revised Page V-A8 has been revised as follows:

7. Seeding

The operational cover placed over the entire bottom of the landfill will be seeded to prevent erosion and to minimize the need for excessive repairs to the operational cover during the time period required to place the initial ten-foot waste lift. In addition, until the final cover is installed at closure, seeding will be used to stabilize the intermediate cover placed over the outside waste slopes and the top of each ten-foot waste lift.

Also, Section V Appendix A-C1 on revised Page V-A20 has been revised, as follows:

...In the inactive areas the operational cover will be seeded maintained to minimize soil erosion (in particular on the inactive 3H:1V side slopes which may be seeded if necessary). Routine maintenance will be performed to repair erosion damage to the operational cover on the side slopes after heavy rain storms.

- Prior to initial waste placement, the geomembrane flap within the active subcell, will be cut and removed to allow leachate to enter the leachate management system. The geomembrane flap will be retained within the inactive cells and subcells, as shown in OD-1 and OD-2. In addition, the operational cover will be scarified prior to waste placement.

* *With a fence only enclosing a portion of the property, is the site properly secured?*

In order to more adequately secure the landfill site and thereby prevent uncontrolled access to the property, a fence will be installed along the southern property boundary. This fence will connect to the existing gate and extend westward to the southwest corner of the property. Middle Creek and the wooded areas surrounding the rest of the property preclude the need for fencing the entire perimeter of the landfill site. Therefore, the following sentences have been added to Section V-G beginning on revised Page V-27:

...Prior to the start of operations, a fence will be installed along the southern property boundary. This fence will connect to the existing gate and extend westward to the southwest corner of the property.

* *.1626(7) The Erosion and Sediment Control Plan should be submitted to the Land Quality Section of the Division of Land Resources for approval. Please advise the Section of approval when obtained.*

The Sediment and Erosion Control Plan will be submitted to the NCDEHNR, Land Quality Section and the Solid Waste Section will be advised upon approval of the Plan. No revisions have been made in response to this comment.

V-33 *A detailed description of the leachate sampling program (i.e., EPA sample method and frequency) should be included in the Operation Plan. The emergency leachate management plan should also address issues like the pump and haul scenario, the possibility of isolating the cell and temporarily storing the leachate in the cell, etc. More information should be supplied regarding the leachate pond. What measures are incorporated to monitor its volume and remaining storage capacity. How much leachate may be disposed of at the treatment plant? Will allowable discharge equal or exceed the inflow?*

In regard to the leachate sampling program, see response to comment listed for V-32 above.

In regard to the leachate level monitoring and the pump and haul scenario, Section V-M5 beginning on revised Page V-40 has been revised as follows:

...In order for the landfill personnel to quickly and accurately determine the leachate level in the basin, the basin will be equipped with a visual gauge that will provide a clear warning if the remaining volume in the basin is becoming critically low. A rain gauge will also be used to accumulate rainfall data for the landfill. This data in combination with leachate flow records will enable landfill personnel to project approximate leachate generation rates based on rainfall data. This information will, in turn, allow the landfill personnel to predict and prepare for potential problems that may occur after heavy and/or prolonged rain events.

Furthermore, if the need arises for storing leachate in the landfill phase, the shutoff valve just downstream of Phase 5 can be used to stop flow from proceeding to the leachate basin. Once a ten-foot layer of waste has been added to the entire bottom of Phase 5, leachate recirculation over the waste could also be implemented as a temporary leachate storage technique. Since recirculation emitters would not have been installed at this point, the leachate flow could be diverted at the shutoff valve and pump sprayed evenly over the waste.

In regard to the volume of leachate that can be conveyed to the CWWTP, text has been added on revised Page V-36, as described in response to comment II-41 above.

The Section highly recommends that the design include a visual gauge in the leachate pond so that a person could tell at a glance if it needs attention. The edge of liner should be marked, so that in the future it can be found. Posts in the anchor

trench have been used, as well as metal tapes. Provision should be made to identify where in the cell the waste must stop and berms must be built to ensure that waste or blowout does not exit over the liner system.

In regard to the comment concerning the visual gauge, see the response given to comment V-33 above.

In regard to the comments concerning the edge of liner, the following text has been added to Section V-L on revised Page V-33:

In order to prevent placement of waste outside of the edge of liner, additional posts will be added to the anchor trench between the cleanouts. The cleanouts and the added posts will serve as clear markers every 200 to 250 feet around the landfill perimeter depicting the edge of liner. Metal tape will also be placed above the edge of liner to prevent accidental damage to the liner in case of excavation on top of the perimeter berm.

In addition, prior to placing waste in a newly active area, a small berm will be constructed near the top of the side slope. This berm will clearly indicate the uppermost limit of waste placement allowed and will prevent waste from blowing outside of the landfill.

Section VI - Closure Plan

VI-4 *The monitoring wells should have covers that are vented in order to prevent the buildup of methane gas, or trapping volatiles which could affect the groundwater samples.*

As shown on the typical detail for the groundwater monitoring well on Drawing E14, the inner PVC cap is vented and the outside casing is equipped with a drainage hole, (shown on the right side), that will prevent buildup of methane gas or volatiles trapping. However, the gas monitoring well shown on the same detail shows neither a vented PVC cap nor a drain hole in the outside casing. Therefore, this detail will be edited to show a vented PVC cap and a drain hole for the outside casing.

VI-5 *If a settlement of 10-20 feet occurs, will the post-settlement slopes still be at 5%?*

The following text has been added to Section VI-B2b on revised Page VI-5:

b. **15A NCAC 13B.1627(c)(3)(A)**

Post-settlement surface slopes shall be a minimum of five percent and a maximum of 25 percent. It is difficult to predict the locations and distribution of the large cap settlements which, generally occur slowly over many years. Routine maintenance and repairs of the final cover are intended to address potential problems arising from cap settlement.

VI-8 *Does the closure cost estimate for soil take into account shrinkage factors?*

The unit cost for soil shown in the closure cost estimate is for in-place compacted soil. Therefore, shrinkage factors are accounted for in the cost estimate. No revision has been made to this comment. However, the closure cost estimate has been revised and is included in the enclosed revised Closure Plan.

Section VII - Post-Closure Plan

VII-2 *Will there be a road for maintenance of the flares and wells? What equipment will be allowed to operate on top of the final cover (i.e. maximum mower size)?*

No road will be provided for maintenance of the flares and wells. Any damage to the final cover resulting from vehicle overpass will be repaired immediately. There are no restrictions to maximum mower size or type of utility vehicles, as long as they can maneuver safely on the slopes.

No revision has been made in response to this comment.

VII-2 *Is the frequency of maintenance checks adequate especially in light of the proposed leachate recirculation? Please provide a table of closure/post-closure maintenance activities and the suggested schedule. It is likely that some activities would be more frequent early in closure and then could be reduced later in post-closure care.*

The maintenance checks specified for the post-closure period, including those for leachate recirculation, will be adequate once startup of the recirculation system is complete. Similar to the protocol specified for decreasing leachate sampling over

time, in response to comment V-32 above, maintenance checks would be gradually decreased to the minimum frequency for post-closure activities summarized below. This summary has been added to revised Page VII-6 in the Post-Closure Plan.

6. Minimum post-closure activities scheduling:

Final Cover Maintenance

- | | |
|--------------------------------------------------|-------------------|
| 1) <u>Inspection of final cover system</u> | <u>Semiannual</u> |
| 2) <u>Inspection of erosion control measures</u> | <u>Semiannual</u> |
| 3) <u>Mowing and bare spot repair</u> | <u>Annual</u> |

Leachate Collection Recirculation and Maintenance

- | | |
|---------------------------------------------------------------------------|------------------|
| 1) <u>Flow monitoring</u> | <u>Weekly</u> |
| 2) <u>Leachate sampling & analysis (during recirculation startup)</u> | <u>Weekly</u> |
| 3) <u>Leachate sampling & analysis (upon completion of startup)</u> | <u>Quarterly</u> |
| 4) <u>System inspection</u> | <u>Quarterly</u> |
| 5) <u>Leachate collection system flushing</u> | <u>Annual</u> |
| 6) <u>Aerator inspection and maintenance</u> | <u>Annual</u> |

Groundwater and Surface Water Monitoring

- | | |
|---------------------------------|-------------------|
| 1) <u>Sampling and Analysis</u> | <u>Semiannual</u> |
|---------------------------------|-------------------|

Gas Monitoring

- | | |
|----------------------------|------------------|
| 1) <u>Gas measurements</u> | <u>Quarterly</u> |
|----------------------------|------------------|

VII-3 *How will the operator know when to flush out the lateral leachate collection pipes?*

As stated in on revised Page VII-3 (and original Page VII-3), "Maintenance will involve annual flushing of the leachate collection laterals and headers in order to remove any accumulation of debris and biofilm, which may have formed on the interior pipe wall.". Aside from the table created in response to comment VII-2 above, no revision has been made to this comment.

VII-3 *What are the typical maintenance procedures required for the aerators in the leachate pond?*

As stated in Section VII-B2, "The mechanical aerators in the leachate storage basin will be removed, inspected, and oiled according to the manufacturer's specifications.". Therefore, no revision has been made to this comment.

Also, please note that a revised Post-Closure cost estimate has been prepared although no comments were received from NCDEHNR regarding these costs. These revised costs are included in the enclosed revised Post-Closure Plan.

- * *The post-closure care plan must address decommissioning the leachate lagoon. (See rule .1680(f))*

The following text has been added to the **Closure Plan** beginning on revised Page VI-8:

G. Leachate Basin Closure Plan

In accordance with 15A NCAC 13B.1680(f), the leachate storage basin will be closed upon closure of the Phase 8. Closure of the basin will involve the following actions:

- All leachate will be drained from the leachate collection lines into the basin.
- The leachate will then be pumped out of the basin and any remaining waste residue will be removed and disposed of properly.
- All connecting lines will be disconnected and securely capped.
If the groundwater surrounding the basin is found to be contaminated, a groundwater assessment and subsequent corrective actions may be needed. The basin liner, as well as, any contaminated subsoils, structures and equipment contaminated with waste will be removed and disposed of appropriately. The basin will then be backfilled and regraded to surrounding topography.
If no groundwater contamination is detected, the basin liner will be left in place, cleaned to remove all traces of leachate, and punctured so that drainage is enabled. The basin will then be backfilled and regraded to surrounding topography.

Miscellaneous

The Section needs a sealed boundary survey plat, and a property description, if available, for the permit.

A sealed survey boundary plat is being prepared and will be submitted to the Section upon completion.

Volume 2: Design Hydrogeologic Study and Water Quality Monitoring Plan

1. *Please see the attached memorandum from the section hydrogeologist.*

The responses to the hydrogeologic study comments were submitted to the Section Hydrogeologist, Brad Atkinson, under separate cover on August 17, 1995.

If you have any questions or additional comments please contact me at your earliest convenience.

Sincerely,

McKIM & CREED ENGINEERS, P.A.

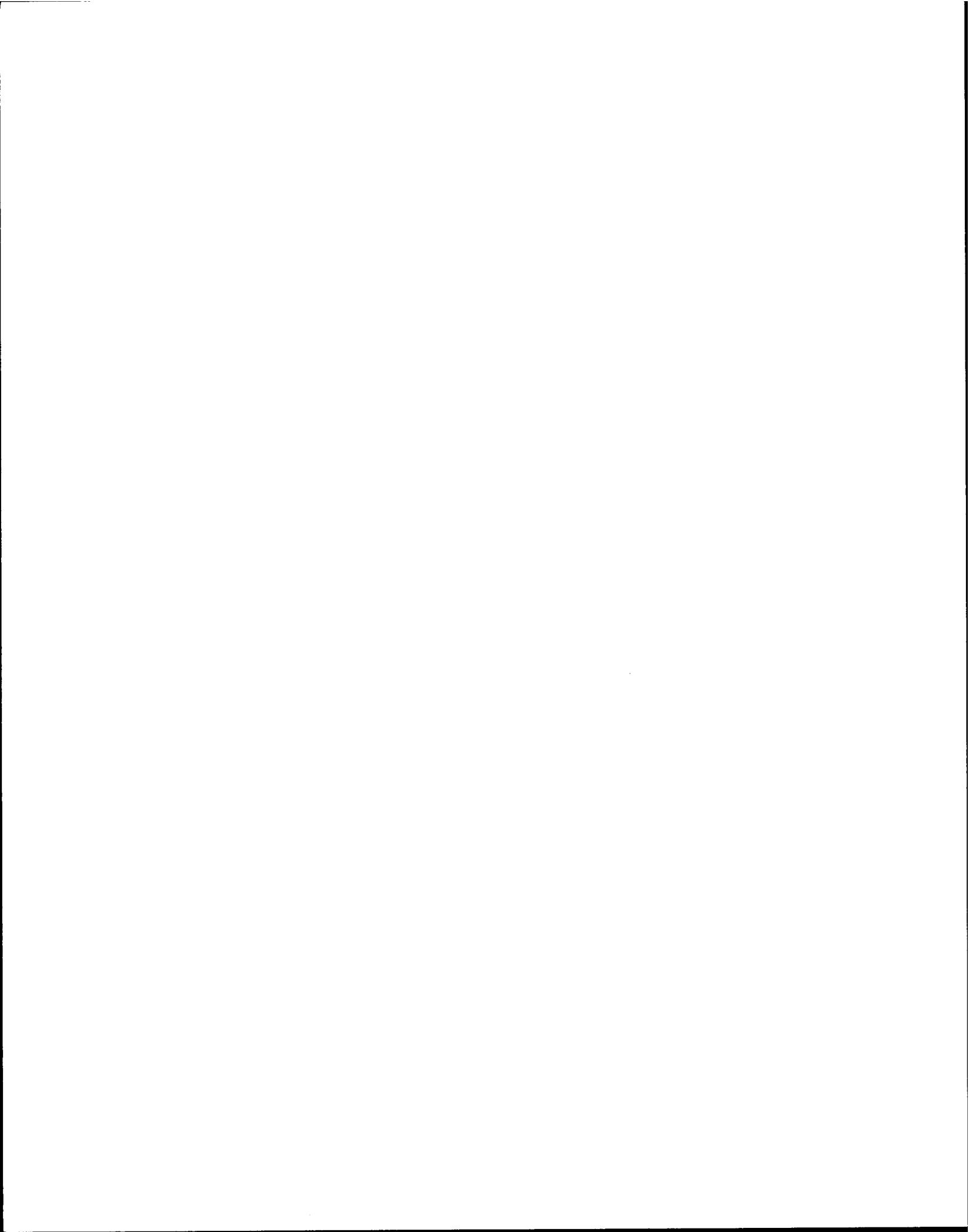


Michael J.E. Sanchez, E.I.T.
Project Engineer

/mjcs

cc: Warren Grimes, Johnston County
Haywood Phthisic, Johnston County
Tim Broome, McKim & Creed Engineers
C.T. Clayton, McKim & Creed Engineers
C.J. Poran, Ensol Corporation

Enclosures



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

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



57-C
6-?

July 28, 1995

Mr. Michael Sanchez
McKim & Creed Engineers, P.A.
5625 Dillard Road, Suite 117
Cary, NC 27511

Re: Technical Review, Permit to Construct Application
Proposed Johnston County Municipal Solid Waste Landfill

Dear Mr. Sanchez,

The NC Division of Solid Waste Management, Solid Waste Section (Section) has completed its initial technical review of the above referenced Permit to Construct application submitted by McKim & Creed, on behalf of Johnston County. The Section's review involved evaluating the application with respect to the North Carolina Solid Waste Management Rules (15A NCAC 13B.1600). Based on its preliminary review, the Section requests the following additional information.

When submitting revisions to the application, the changed pages should be clearly identified with a revision date in either the header or the footer. It is not necessary to submit five copies of the revisions. Two copies will suffice. When the application is finalized and there are no more changes, then a total of five copies will be needed. Please also note that some comments may only address a particular section of your report, while the information appears in other areas (for instance some statements made in the facility plan, also appear in the operations plan). Please proofread your resubmittal carefully, so that the entire application is consistent from section to section.

Section II Facility Plan

- II-15 Waste Disposal Volumes, The discussion of the estimated variance in the waste projection needs to be included in the plan, as well as reference to the fact that waste volumes could also increase. For instance unexpected growth, a new industry, a storm, or excessive C&D waste, could be factors to cause an increase. 1619(e)(1)(B)
- II-20 The use of alternative daily cover will require a demonstration, and will be included in the permit as a permit condition.
- II-22 Will Phase 5 be constructed all at once, or is phased cell construction to be used?
- II-23 What is the size of the Phase 5 footprint, in acres? Please also list the acreage of the other phases.

- II-25 Soil balances show a lack of soil for construction of the landfill, in later years. Is sufficient soil available on-site for use as daily/weekly cover? Have off-site borrow sources been identified by the county?
- II-26 A statement needs to be added that a phase could fill up faster than expected. Also, the volume capacity of each phase should be listed in addition to the number of years of operation. The Solid Waste Section permits a landfill for five years or until the approved contours are reached. Ideally this will be five years. The permit is then amended for future phase construction or operation.
- II-29 There will also be a geomembrane liner in the closure cap that is not accounted for in the description.
- II-30 Four groundwater samples are not required prior to obtaining the permit to operate. Current Section policy is to have an initial sampling event prior to opening the new MSW unit, and the other three events taken during the first six months of operation.
- II-36 For the leachate generation rate, please also convert the cubic feet gallons. That number is more easily understood by the general public. Also, HELP reports annual rates while only monthly rates are reported. Please also provide the yearly leachate generation rates.
- II-36 What volume of leachate can be handled by city emergency action?
- II-40 Prior approval is required from the treatment plant prior to accepting leachate. Please obtain a letter or other documentation that leachate will be accepted. How much leachate will the county be able to accept on a daily basis? This information should also be include in the leachate management plan, found in the operations plan.
- II-41 Johnston County should identify trucks and have an alternate leachate disposal site identified by the time the permit to operate is issued. This information should also be include in the leachate management plan, found in the operations plan.

Section III Engineering Plan

- III-9 The description and diagram of the closure cap indicates 18" of 1×10^{-5} cm/sec soil directly overlaying the waste. Is this achievable? It has been the Sections experience that a "subgrade", like the foot of intermediate cover is necessary to provide a sufficient surface to run the compactor on, to build the low permeability barrier.
- III-9 Section C of the Engineering Plan incorrectly refers to Appendix B-1. This should be B-2 for the stability of the composite liner.
- III-10 What are the friction angles between the various closure cap components?
- III-10 Is it possible to have a well compacted operational cover on the side slopes? Is it necessary, or does the operational cover just have to be laid down with no additional compaction?
- III-12 Is NCDOT #78 stone angular or round? Will the liner be safe from puncture?
- III-12 How will the leachate lines be installed? i.e. Will protective cover be placed first or will the leachate pipe be lain and then have the cover placed on top? Also, will a rub sheet be placed under the leachate line in order to protect both the collection pipe and the FML

during cover operations?

- III-14 Is a shut off valve present or needed, such that the leachate could be stored in the lined cell if necessary? We did identify a valve at the leachate pond.
- III-15 What is the estimated time involved with draining a cell?
- III-15 How will the leachate be removed from the pond if a pump and haul scenario becomes necessary?
- III-24 Are soil conditions sufficiently uniform to make the differential settlement argument?
- III-33 Section C incorrectly refers to Appendix B-1. This should be Appendix B-2 for stability of the composite liner.
- III-33 Refers to composite sample C-12 as being representative of the on-site sandy clay. The sample should read C-2.
- * Has the leachate lagoon been sized adequately to handle the flow from the entire project? The plan just addresses phase 5.

III Appendices

- B-3 The normal stress value of 0.3 ksf used for calculating the geonet transmissivity needs to be explained.
- B-3 Using the highest recommended factor of safety 2 for all 4 parameters, the maximum $e_{all}=1.16$ in/day which is less than $e_{req}=2.77$ in/day. Does an alternate geonet need to be specified?
- C-1 With regard to the leachate generation rate estimate, it is stated that precipitation data came from NOAA, however the HELP model output indicates synthetic precipitation data from Raleigh, NC. Please clarify and also describe the other assumptions or model manipulations that were used. Where did the soil parameters come from?
- C-2 It is unclear where the value for the minimum velocity (2 fps) comes from in the leachate collector pipe design.
- C-2 Will <0.5% slope be adequate for the gravity fed leachate collection pipe running between phase 5 and the leachate pond? Reaches 1,2,6,7,9 and 10 fall below 0.5% (Appendix C-3).
- C-4 In the geomembrane flap calculations, it is stated that the granular filter material must have a permeability greater than 0.1 cm/sec. Is a sand with a $k<0.1$ cm/sec acceptable as a filter material.
- D-2 A description of the SB-Slope input parameters would be helpful in evaluating slope stability at the site.

IV CQA Plan

- This section will be addressed at a future date.
- Outline jobs, responsibility, qualifications etc.
 - CQA vs. CQC needs to be addressed

- The pre-construction conference needs to be mentioned in the CQA plan.
- Specs will be needed for all soils and the #78 stone used on the project.
- Specs will be needed for the liner test welds, all non-destructive testing and repair procedures etc.

IV-5 How is depth measured, how patched. Are 100' centers adequate for survey and locating patches, tests and undercut areas.

IV-5 Specify when subgrade and top of clay is surveyed i.e. before or after smooth role etc.

IV-6 Permeability tests # per acre/ per lift. Acceptable test methods and confining pressures.

Appendix A Geosynthetic Specs.

Please provide all pertinent specs. The technical specs must, at a minimum, be equivalent to the design numbers. Specs are needed for all liners, pipes, geonets, fabrics, stone, sand, protective cover, and clay liner.

V Operation Plan

V-4 The detailed description of the land application of sewage sludge is not germane to the permit. It should be removed or reworded. Furthermore, in reference to the meeting it was not agreed by all parties that the "sludge could be applied to the proposed landfill area, as permitted, without adversely impacting the suitability of this site, for a new lined landfill." The Section did acknowledge that this was a permitted activity under the DEM permit issued, and if it was properly done, it was likely it would not impact the site. Mr Coffey expressed his disagreement, noting that the full hydrogeologic study should be done so that the activity would not affect the site or its characterization.

V-4 Disposal of sewage sludge will be listed in the permit as a permitted activity, All sludge must pass both the paint filter test and the TCLP screening. Please include this in the application.

V-8 Hazardous waste generated from conditionally exempt small quantity generators is not allowed to be disposed of at the MSWLF. This exemption is not recognized in NC Hazardous Waste Rules. Only waste generated by households is allowed, since this waste is not hazardous by definition. Please provide a copy of the waste screening form/record of inspection form that Johnston County will use while conducting its waste screening inspections.

V-8 The Section issued a memorandum on July 12, 1994 in reference to the "Procedure and Criteria for Waste Determination. Essentially the memorandum indicated that the Section will no longer perform waste determinations for lined landfills. Lined landfills are allowed to accept wastes that are not hazardous, thus the county will be responsible for screening their own waste, as part of their waste screening process.

V-12 The NCDEHNR address needs to be added to the waste screening plan in order to promote timely reporting of attempted illegal dumping.

Mr. M. Sanchez

July 28, 1995

Page 5

- V-12 Information pertaining to the management of hazardous waste on this page is repeated word for word on V-15. Is it necessary to repeat this information?
- V-20 As previously mentioned, a demonstration of the alternative cover will be included with the permit. The permit application should address the requirements of rule .1626(2)(b).
- V-21 What actions will take place if disease vectors are detected?
- V-22 What actions will be taken upon detection of methane. Also include notification requirements. More detail needs to be included with this section specifically addressing immediate actions upon detection of methane and notification and potential remediation requirements.
- V-22 More detail needs to be included with respect to on-site fires. All burning at the landfill must have prior approval from the Section. Has Johnston County coordinated with the local fire department with respect to actions taken in the event of an on-site fire?
- V-23 How will dust be controlled at the site?
- V-26 A description of both the procedure and apparatus necessary to conduct the paint filter test should be included.
- V-32 A detailed description of the leachate sampling program (i.e. EPA sample method and frequency) is needed.
- V-A5 Are the sediment basins equipped with emergency spillways?
- V-A7 Is it necessary to scarify the operational cover prior to placing waste?
- * With a fence only enclosing a portion of the property, is the site properly secured?
- * .1626(7) The Erosion and Sediment Control Plan should be submitted to the Land Quality Section of the Division of Land Resources for approval. Please advise the Section of approval when obtained.
- V-33 A detailed description of the leachate sampling program (i.e. EPA sample method and frequency) should be included in the operation plan. The emergency leachate management plan should also address issues like the pump and haul scenario, the possibility of isolating the cell and temporarily storing the leachate in the cell, etc. More information should be supplied regarding the leachate pond. What measures are incorporated to monitor its volume and remaining storage capacity. How much leachate may be disposed of at the treatment plant. Will allowable discharge equal or exceed the inflow?

The Section highly recommends that the design include a visual gauge in the leachate pond, so that a person could tell at a glance if it needs attention. The edge of liner should be marked, so that in the future it can be found. Posts in the anchor trench have been used, as well as metal tapes. Provision should be made to identify where in the cell the waste must stop and berms must be built to ensure that waste or blowout does not exit over the liner system.

VI. Closure Plan

- VI-4 The monitoring wells should have covers that are vented in order to prevent the buildup

Mr. M. Sanchez
July 28, 1995
Page 6

- of methane gas, or trapping volatiles which could affect the groundwater samples..
- VI-5 If a settlement of 10-20 feet occurs, will the post-settlement slopes still be at 5%?
- VI-8 Does the closure cost estimate for soil take into account shrinkage factors.

VII. Post-Closure Plan

- VII-2 Will there be a road for maintenance of the flares and wells? What equipment will be allowed to operate on top of the final cover (i.e. maximum mower size)?
- VII-2 Is the frequency of maintenance checks adequate especially in light of the proposed leachate recirculation? Please provide a table of closure/post closure maintenance activities and the suggested schedule. It is likely that some activities would be more frequent early in closure and then could be reduced later in post-closure care.
- VII-3 How will the operator know when to flush out the lateral leachate collection pipes?
- VII-3 What are the typical maintenance procedures required for the aerators in the leachate pond?
- * The post closure care plan must address decommissioning the leachate lagoon. (see rule .1680(f))

Misc.

- The Section needs a sealed boundary survey plat, and a property description, if available, for the permit.

Volume 2 Design Hydrogeologic Study and Water Quality Monitoring Plan

1. Please see the attached memorandum from the section hydrogeologist

These comments are intended to expedite the review of the referenced application, and in no way do they restrict the Section's right to request additional information following the technical review process. If you have any additional questions or need help, please feel free to call me at (919) 733-0692 Ext. 344.

Sincerely,



Edward F. Mussler III
Environmental Engineer
Solid Waste Section

cc: Terry Dover, SWS
Jim Barber, SWS
Ben Barnes, SWS
Haywood Phistic, Johnston County

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

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



July 26, 1995

Mr. C.T. Clayton
McKim and Creed Engineers, PA
5625 Dillard Road, Suite 117
Cary, NC 27511

Re: Technical Review of Design Hydrogeologic Report - Proposed Johnston Co. MSWLF

Dear Mr. Clayton:

A Technical Review of the Design Hydrogeologic Report has been completed. Further information is necessary in order to continue the review process.

The following comments are pursuant to the requirements of 15A NCAC 13B .1623 (b) and are directed to McKim and Creed and to S&ME. Portions of .1623 (b) not addressed below should, at this time, be considered as having met the Technical Review requirements of the Design Hydrogeologic Report; however, additional information may be requested at a later date.

(b)(1)(A) Provide a ground-water contour map or maps of the estimated seasonal high overlain by the Base Grading Contours for the proposed MSWLF and leachate lagoon. The estimated high water level readings should be posted adjacent each piezometer and the contour interval should be no greater than 5 foot.

(b)(3)(A) Provide a map of the proposed ground-water and surface water monitoring plan overlain by a potentiometric map and by the Initial Grading Plan. Include the proposed waste boundary and berm boundaries for Phase 8 and the proposed berm boundaries for Sediment Basin 5. The potentiometric contours should be from a specific date or dates which reflect the true ground-water flow conditions at that time. The map scale should show no less detail than 1in. = 200ft. If a 1in. = 100ft. scale is used, the monitoring plan for the MSWLF and the leachate lagoon can be shown on separate maps if needed.

Should you have any questions regarding this letter, please contact me at (919) 733-0692 ext. 267.

Sincerely,

A handwritten signature in black ink that reads "Brad Atkinson". The signature is written in a cursive style with a long, sweeping underline that extends to the right.

Brad Atkinson, Hydrogeologist
Solid Waste Section

cc: Ed Mussler, SWS
Greg Eades, SWS
Walt Beckwith, S&ME
Chaim J. Poran, Ensol

- Booklet -

Re: Sludge Disposal at Proposed
Subtitle D Landfill
Johnston County, North Carolina
March 6th, 1995



March 6, 1995

M&C358-0051.OR (13)

ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

Mr. Jim Coffey, Supervisor
Permitting Branch
NCDEHNR, Division of Solid Waste Management
P.O. Box 27687
Raleigh, North Carolina 27611-7687

RE: Sludge Disposal at Proposed Subtitle D Landfill
Johnston County, North Carolina



Dear Mr. Coffey:

The purpose of this letter is to request your comments on a municipal wastewater sludge disposal alternative being considered for the future Johnston County Subtitle D Landfill, which is expected to become operational in 1996. As discussed in your meeting on November 3, 1994, with Bill Meyer from your office, Haywood Phthisic, Director of Utilities for Johnston County, and Tim Broome and C.T. Clayton of McKim & Creed Engineers, Johnston County is currently permitted to land apply sludge throughout most of the proposed Subtitle D landfill site. Attachment 1 to this letter includes both a copy of the Residuals Land Application Permit (No. WQ0007622), which is effective until August 31, 1999, and a map of the permitted land application area.

It is our understanding that according to *15A NCAC 13B.1626(1)(b), (1)(e)(ii), and (9)*, municipal wastewater treatment sludge may be accepted at a Subtitle D landfill if the sludge is nonhazardous, the landfill facility meets all design requirements contained in *15A NCAC 13B.1624*, and the sludge is not a liquid, (as defined by the Paint Filter Liquids Test, Method 9095). Although the sludge being land applied under the permit referenced above is nonhazardous, the total solids content of the sludge is typically lower than necessary for passing the Paint Filter Liquids Test.

As part of the Permit to Construct Application for the proposed Subtitle D landfill, we are examining the possibility of incorporating the "wet cell" concept for leachate recirculation into the engineering and operational components of the landfill, as allowed under *15A NCAC 13B.1626(9)(a)(ii)*. In light of this approach, we would appreciate your comments regarding the potential for obtaining NCDEHNR permission to incorporate the wastewater

SUITE 117

BUILDING I

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

Jim Coffey
March 6, 1995
Page 2

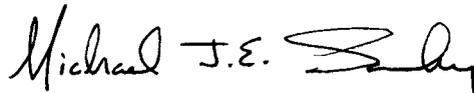
treatment sludge, which may not pass the Paint Filter Test, into the waste disposal process.

We realize that this sludge disposal strategy has not been commonly performed and therefore is unproven. However, we also feel that this innovative approach would enhance the positive aspects of accelerated biodegradation similar to leachate recirculation, resulting in a more complete waste stabilization and improvement of post-closure maintenance. Furthermore, sludge placement and leachate recirculation will accelerate methane gas production rates, which in turn will make gas recovery and reuse economically more feasible.

Since we are currently in the process of preparing the Permit to Construct Application for the Johnston County Subtitle D Landfill Facility, we would greatly appreciate your prompt consideration of this matter. If you have any questions, please call either me, C.T. Clayton, or Dr. C.J. Poran at (919) 233-8091.

Sincerely,

McKIM & CREED ENGINEERS, P.A.



Michael J.E. Sanchez
Project Engineer

cc: Edward F. Mussler, NCDEHNR
C.T. Clayton, McKim & Creed
C.J. Poran, McKim & Creed
Project File

Attachment

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

RECEIVED
OCT 06 1994
Ans'd.....



James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
A. Preston Howard, Jr., P.E., Director

September 30, 1994

Mr. Haywood M. Phthisic, III
Director of Public Utilities
Johnston County
126 South Third Street
Smithfield, North Carolina 27577



Subject: Permit No. WQ0007622
Johnston County
Land Application of Wastewater Residuals
Johnston County

Dear Mr. Phthisic:

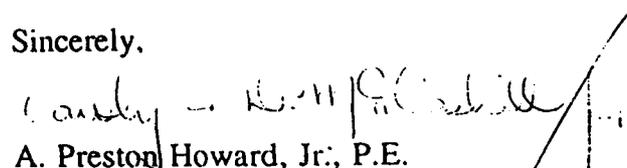
In accordance with your application for permit renewal and modification received on March 2, 1994, we are forwarding herewith Permit No. WQ0007622 dated September 30, 1994 to Johnston County for the operation of a wastewater residuals land application program. This permit renewal includes the construction of lime stabilization facilities for Johnston County Wastewater Treatment Plant and the addition of 85.6 acres of land application sites designated as phase II, located adjacent to the existing 54.2 acres of land applications sites designated as phase I. Due to the limited land available in the initial permit (Phase I) only half of the residuals total dry tons available were allowed to be land applied (535 dry tons). Issuance of this permit authorizes the land application of all the residuals dry tons listed in this permit. Please note the Town of Benson is added to this permit as a residuals source. ~~Please note the Town of Kenly is deleted from this permit as a residuals source, due to failure to show the Kenly residuals are stabilized in accordance with EPA, 40 CFR, Part 503.~~

This permit shall be effective from the date of issuance until August 31, 1999, and shall be subject to the conditions and limitations as specified therein. Please pay particular attention to the monitoring and reporting requirements contained in this permit. Failure to establish an adequate system for collecting and maintaining the required operational information will result in future compliance problems. Issuance of this permit hereby voids Permit No. WQ0007622 issued May 12, 1993.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of North Carolina General Statutes, and filed with the Office of Administrative Hearings, P.O. Drawer 27447, Raleigh, NC 27611-7447. Unless such demands are made this permit shall be final and binding.

One set of approved plans and specifications for the lime stabilization facilities is being forwarded to you. If you need additional information concerning this matter, please contact Mr. John Seymour at (919) 733-5083.

Sincerely,


A. Preston Howard, Jr., P.E.

cc: ~~Johnston County Health Department~~
~~MCKim & Creed Engineers~~
Raleigh Regional Office, Water Quality Section
Raleigh Regional Office, Groundwater Section
Jack Floyd, Groundwater Section, Central Office
Training and Certification Unit
Facilities Assessment Unit

NORTH CAROLINA
ENVIRONMENTAL MANAGEMENT COMMISSION
DEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES
RALEIGH
RESIDUALS LAND APPLICATION PERMIT

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations

PERMISSION IS HEREBY GRANTED TO

Johnston County
Johnston County

FOR THE

operation of a wastewater residuals land application program consisting of the application of approximately 1,020 dry tons total per year of residuals from the Johnston County wastewater treatment facility (660 DT/yr), the Town of Clayton (174 DT/yr), the Town of Princeton (61 DT/yr), and the Town of Benson (125 DT/yr) wastewater treatment facilities, to approximately 139.8 acres of land in Johnston County; and the construction and operation of lime stabilization facilities for the Johnston County Wastewater Treatment Plant residuals consisting of a 12-foot diameter by 14-foot side wall hopper bottom lime silo with volumetric feeder, a 10,000 pound per hour capacity blender unit, a belt conveyor, a truck loading and storage area, a 48 foot by 36 foot walled treatment/storage pad with collection drain and runoff storage tank (pad located at the Johnston County Landfill property), and all associated piping, valves, controls, pH monitoring equipment, and appurtenances; with no discharge of wastes to the surface waters, pursuant to the application received on March 2, 1994, and in conformity with the project plan, specifications, and other supporting data subsequently filed and approved by the Department of Environment, Health and Natural Resources and considered a part of this permit.

This permit shall be effective from the date of issuance until August 31, 1999, and shall be subject to the following specified conditions and limitations:

I. PERFORMANCE STANDARDS

1. The Raleigh Regional Office, telephone number 919/ 571-4700 and the appropriate local governmental official (county manager/city manager) shall be notified at least twenty-four (24) hours prior to the initial application of the residuals to a site so that an inspection can be made of the application sites and application method. Such notification to the regional supervisor shall be made during the normal office hours from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays. In addition, the Johnston County Manager's office must be notified prior to the initial application so that they will be aware that the operation has commenced.
2. This permit shall become voidable if the soils fail to adequately assimilate the wastes and may be rescinded unless the sites are maintained and operated in a manner which will protect the assigned water quality standards of the surface waters and ground waters.

3. The land application program shall be effectively maintained and operated as a non-discharge system to prevent the discharge of any wastes resulting from the operation of this program.
4. The issuance of this permit shall not relieve the Permittee of the responsibility for damages to surface or groundwaters resulting from the operation of this program.
5. In the event that the land application program is not operated satisfactorily, including the creation of nuisance conditions, the Permittee shall cease applying residuals to the sites and take any immediate corrective actions as may be required by the Division.
6. Some of the buffers specified below may not have been included in previous permits for this land application operation. However, any sites or fields that are included in this permit, but were approved with different applicable buffers shall be reflagged to comply with the below buffers. The following buffer zones shall be maintained:
 - a) 400 feet from residences or places of public assembly under separate ownership for surface application method; however, the buffer zone requirement may be reduced to a minimum of 100 feet upon written consent of the owner and approval from the appropriate DEM regional office,
 - b) 200 feet from residences or places of public assembly under separate ownership for subsurface residual injection method; however, the buffer zone requirement may be reduced to a minimum of 100 feet upon written consent of the owner and the appropriate DEM regional office.
 - c) 100 feet from any public or private water supply source, waters classified as SA or SB, and any Class I or Class II impounded reservoir used as a source of drinking water for both methods,
 - d) 100 feet from any streams classified as WS or B, any other stream, canal, marsh or coastal waters and any other lake or impoundment for surface application,
 - e) 50 feet from any streams classified as WS or B, any other stream, canal, marsh or coastal waters and any other lake or impoundment for subsurface application,
 - f) 50 feet from property lines for both surface and subsurface application methods;
 - g) 50 feet from public right of ways for both application methods,
 - h) 10 feet from upslope interceptor drains and surface water diversions for both application methods,
 - i) 25 feet from downslope interceptor drains, surface water diversions, groundwater drainage systems and surface drainage ditches for both application methods.
7. A copy of this permit shall be maintained at the land application site when residuals are being applied during the life of this permit. A spill prevention and control plan shall be maintained in all residuals transport and application vehicles.
8. Specific residual application area boundaries shall be clearly marked on each site prior to and during application.
9. No residuals at any time shall be stored at any application site, unless approval has been requested and obtained from the Division of Environmental Management.
10. Maximum slope for residual application shall be 10% for surface application and 18% for subsurface applications.
11. When wastewater residuals are applied, the Class A pathogen requirements and site restrictions in 40 CFR Part 503.32(a) or the Class B pathogen requirements and site restrictions in 40 CFR Part 503.32(b), and one of vector attraction reduction requirements in 40 CFR Part 503.33 must be met. Additionally, an evaluation must be performed which demonstrates the residuals ability to comply with this requirement. Upon request, a copy of this evaluation must be submitted including all test results and calculations.

12. ~~Johnston County shall not allow any residuals from the Town of Clayton, the Town of Princeton or the Town of Benson to be land applied at these land application sites without documented confirmation that the specific residuals are stabilized in accordance with condition No. 11 above.~~

II. OPERATION AND MAINTENANCE REQUIREMENTS

1. The facilities and application sites shall be properly maintained and operated at all times.
2. A suitable vegetative cover, as listed in condition II 4, shall be maintained in accordance with the crop management plan outlined by the local Extension Office of the Department of Agriculture, or the Soil Conservation Service, or other agronomist, and approved by this Division. It is noted that Johnston County intends to maintain Tifton 44 Coastal Bermuda Grass to take advantage of the high PAN rate allowing a higher loading rate. This special grass shall be maintained in large enough volume to insure it is handling the PAN loading placed upon it.
3. An acceptable pH must be maintained in the soil, residual and lime mixture, greater than 6.0, on all land application sites to insure optimum yield for the crop(s) specified below. The agronomist shall provide information on the pH best suited for the specified crop and the soil type.
4. The application rates shall not exceed the following for the specified crops:

<u>Crop</u>	<u>PAN (lb./acre/yr.)</u>
Alfalfa	200
Bermuda Grass (Hay, Pasture)	220
Tifton 44 Coastal Bermuda Grass	300
Blue Grass	120
Corn (Grain)	160
Corn (Silage)	200
Cotton	70
Fescue	250
Forest (Hardwood & Softwood)	75
Milo	100
Small Grain (Wheat, barley, oats)	100
Sorghum, Sudex (Pasture)	180
Sorghum, Sudex (Silage)	220
Soybeans	200
Timothy, Orchard. & Rye Grass	200

5. No residuals other than the following are hereby approved for land application in accordance with this permit:

<u>Source</u>	<u>County</u>	<u>Permit Number</u>	<u>Estimated Volume (dry tons/year)</u>
Johnston County Regional Wastewater Treatment Plant	Johnston	NC0030716	660
Town of Clayton	Johnston	NC0025453	174
Town of Princeton	Johnston	NC0026662	61
Town of Benson	Johnston	NC0020389	<u>125</u>

Total 1,020

6. The metal loading rates shall not exceed the following **Cumulative Pollutant loading rates**:

<u>Parameters</u>	<u>Kilograms per Hectare</u>	<u>Pounds per Acre</u>
Arsenic	41	36
Cadmium	39	34
Chromium	3,000	2,677
Copper	1,500	1,338
Lead	300	267
Mercury	17	15
Molybdenum	----	----
Nickel	420	374
Selenium	100	89
Zinc	2,800	2,498

7. The pollutant concentrations in the residuals which will be applied to the land shall not exceed the following **Ceiling Concentrations (Dry Weight Basis)**:

<u>Parameters</u>	<u>mg/kg</u>
Arsenic	75
Cadmium	85
Chromium	3,000
Copper	4,300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7,500

8. Upon classification of the facility by the Certification Commission, the Permittee shall employ a certified land application/residuals operator to be in responsible charge (ORC) of the land application program. The operator must hold a certificate of the type classification assigned to the land application program by the Certification Commission. The Permittee must also employ a certified back-up operator of the appropriate type to comply with the conditions of Title 15A NCAC 8A, .0202.
9. Adequate procedures shall be provided to prevent surface runoff from carrying any disposed or stored residuals into any surface waters.
10. Surface applied residuals will be plowed or disced within twenty-four (24) hours after application on lands with no cover crop established.
11. For areas that are prone to flooding or within the 100-year flood elevation, residuals may be applied only during periods of dry weather. The residuals must be incorporated into the soil within twenty-four (24) hours after application.
12. Appropriate measures must be taken to control public access to the land application sites during active site use and for the 12-month period following the last residual application event. Such controls may include the posting of signs indicating the activities being conducted at each site.
13. Adequate provisions shall be taken to prevent wind erosion and surface runoff from conveying pollutants from the residuals application area onto the adjacent property or into any surface waters.

14. Residuals shall not be applied in inclement weather or until 24 hours following a rainfall event of 1/2-inch or greater in 24 hours. Any emergency residuals disposal measures must first be approved by the Division of Environmental Management.
15. Residuals shall not be applied to any land application site that is flooded, frozen or snow-covered.
16. Residuals shall not be applied at rates greater than agronomic rates, unless authorized by the Division.
17. Animals shall not be grazed on an application site for 30 days after residuals application. Application sites that are to be used for grazing shall have fencing that will be used to prevent access after each application.
18. Food crops, feed crops and fiber crops that do not come in contact with the residuals shall not be harvested for 30 days after residuals application.
19. Food crops with harvested parts that touch the residual/soil mixture and are totally above the land surface (ex. tobacco, melons, cucumbers, squash, etc.) shall not be harvested for 14 months after residuals application.
20. Food crops with harvested parts below the surface of the land (root crops such as potatoes, carrots, radishes, etc.) shall not be harvested for 20 months after application of residuals when the residuals remain on the land surface for four (4) months or longer prior to incorporation into the soil.
21. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of residuals when the residuals remain on the land surface for less than four (4) months prior to incorporation into the soil.
22. Turf shall not be harvested for 1 year after residuals application if the turf is to be placed on land with a high potential for public exposure.

III. MONITORING AND REPORTING REQUIREMENTS

1. Any monitoring (including groundwater, surface water, residuals, soil, or plant tissue analyses) deemed necessary by the Division of Environmental Management to insure protection of the environment will be established and an acceptable sampling and reporting schedule shall be followed.
2. Proper records shall be maintained by the Permittee tracking all application activities. These records shall include, but are not necessarily limited to the following information:
 - a) source of residuals
 - b) date of residual application
 - c) location of residual application (site, field, or zone #)
 - d) method of application
 - e) weather conditions (sunny, cloudy, raining, etc.)
 - f) soil conditions
 - g) type of crop or crops to be grown on field
 - h) volume of residuals applied in gallons/acre, dry tons/acre or kilograms/hectare
 - i) annual and cumulative totals of dry tons/acre of residuals, annual and cumulative pounds/acre of each heavy metal (which shall include, but not be limited to arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium and zinc), annual pounds/acre of plant available nitrogen (PAN), and annual pounds/acre of phosphorus applied to each field.

3. A representative annual soils analysis (Standard Soil Fertility Analysis) shall be conducted of each site receiving residuals in the respective calendar year and the results maintained on file by the Permittee for a minimum of five years.

The Standard Soil Fertility Analysis shall include, but is not necessarily limited to, the following parameters:

Acidity	Manganese	Potassium
Calcium	Percent Humic Matter	Sodium
Copper	pH	Zinc
Magnesium	Phosphorus	
Base Saturation (by calculation)		
Cation Exchange Capacity		

The Standard Soil Fertility Analysis (see above) and an analysis for the following metals shall be conducted once prior to permit renewal on soils from each site which has received sludge during the permit cycle.

Arsenic	Lead	Nickel
Cadmium	Mercury	Selenium
Chromium	Molybdenum	

4. A residuals analysis will be conducted quarterly for the Johnston County residuals, from the date of permit issuance by the Permittee and the results maintained on file by the Permittee for a minimum of five years. If land application occurs at a frequency less than quarterly, a residuals analysis will be required for each instance of land application.

A residuals analysis will be conducted annually from the date of permit issuance and the results maintained on file by the Permittee for a minimum of five years for the following facilities.

Town of Clayton WWTP
 Town of Princeton WWTP
 Town of Benson WWTP

~~If land application occurs at a frequency less than annually, a residuals analysis will be required for each instance of land application.~~

The residuals analysis shall include but is not necessarily limited to the following parameters:

Arsenic	Aluminum
Cadmium	Ammonia-Nitrogen
Chromium	Calcium
Copper	Nitrate-Nitrite Nitrogen
Lead	% Total Solids
Mercury	pH
Molybdenum	Phosphorus
Nickel	Plant Available Nitrogen (by calculation)
Selenium	Potassium
Zinc	Sodium
Magnesium	TKN

After the residuals have been monitored for two years at the above frequency, the Permittee may submit a request to the Division for a permit modification for the reduction of the frequency of monitoring for pollutant concentrations and for the pathogen density requirements, but in no case shall the frequency of monitoring be less than once per year when residuals are applied to the land.

5. A Toxicity Characteristics Leaching Procedure (TCLP) analysis shall be conducted annually for the following residual sources and maintained on file by the Permittee.

Johnston County WWTP
Town of Clayton WWTP
Town of Benson WWTP

The TCLP analysis shall include the following parameters (please note the regulatory level in mg/L in parentheses):

Arsenic (5.0)	Barium (100.0)
Benzene (0.5)	Cadmium (1.0)
Carbon tetrachloride (0.5)	Chlordane (0.03)
Chlorobenzene (100.0)	Chloroform (6.0)
Chromium (5.0)	o-Cresol (200.0)
m-Cresol (200.0)	p-Cresol (200.0)
Cresol (200.0)	2,4-D (10.0)
1,4-Dichlorobenzene (7.5)	1,2-Dichloroethane (0.5)
1,1-Dichloroethylene (0.7)	2,4-Dinitrotoluene (0.13)
Endrin (0.02)	Heptachlor (and its hydroxide) (0.008)
Hexachlorobenzene (0.13)	Hexachloro-1,3-butadiene (0.5)
Hexachloroethane (3.0)	Lead (5.0)
Lindane (0.4)	Mercury (0.2)
Methoxychlor (10.0)	Methyl ethyl ketone (200.0)
Nitrobenzene (2.0)	Pentachlorophenol (100.0)
Pyridine (5.0)	Selenium (1.0)
Silver (5.0)	Tetrachloroethylene (0.7)
Toxaphene (0.5)	Trichloroethylene (0.5)
2,4,5-Trichlorophenol (400.0)	2,4,6-Trichlorophenol (2.0)
2,4,5-TP (Silvex) (1.0)	Vinyl chloride (0.2)

6. The Johnston County residuals included in this permit must be monitored quarterly from the date of permit issuance, for compliance with condition I.11 of this permit.

The following residuals included in this permit must be monitored annually from the date of permit issuance, for compliance with condition I.11 of this permit.

Town of Clayton WWTP
Town of Princeton WWTP
Town of Benson WWTP

Data to verify stabilization and vector attraction reduction of the residuals must be maintained by the Permittee. The required data is specific to the stabilization process utilized, but should be sufficient to clearly demonstrate compliance the Class A pathogen requirements in 40 CFR Part 503.32(a) or with the Class B pathogen requirements and site restrictions in 40 CFR Part 503.32(b), and one of vector attraction reduction requirements in 40 CFR Part 503.33. In addition, the EPA certification statements concerning compliance with pathogen requirements, vector attraction reduction requirements and management practices must be completed at the same frequency specified above by the proper authority or authorities if more than one is involved, either the person who prepares the residuals, the person who derives the material, or the person who applies the residuals.

After the residuals have been monitored for two years at the above frequency, the Permittee may request a permit modification for the reduction of the frequency of monitoring for pollutant concentrations and for the pathogen density requirements, but in no case shall the frequency of monitoring be less than once per year when residuals are applied to the land.

7. Three copies of all required monitoring and reporting requirements as specified in conditions III 1, III 2, III 3, III 4, III 5 and III 6 shall be submitted annually on or before March 1 of the following year to the following address:

NC Division of Environmental Management
Water Quality Section
Facility Assessment Unit
PO Box 29535
Raleigh, NC 27626-0535

8. **Noncompliance Notification:**

The Permittee shall report by telephone to the Raleigh Regional Office, telephone number 919/ 571-4700 as soon as possible, but in no case more than 24 hours or on the next working day following the occurrence or first knowledge of the occurrence of any of the following:

- a. Any occurrence with the land application program which results in the land application of significant amounts of wastes which are abnormal in quantity or characteristic.
- b. Any failure of the land application program resulting in a release of material to receiving waters.
- c. Any time that self-monitoring information indicates that the facility has gone out of compliance with the conditions and limitations of this permit or the parameters on which the system was designed.
- d. Any process unit failure, due to known or unknown reasons, that render the facility incapable of adequate residual treatment.
- e. Any spillage or discharge from a vehicle or piping system transporting residuals to the application site.

Persons reporting such occurrences by telephone shall also file a written report in letter form within 15 days following first knowledge of the occurrence. This report must outline the actions taken or proposed to be taken to ensure that the problem does not recur.

IV. GROUNDWATER REQUIREMENTS

1. The COMPLIANCE BOUNDARY for the disposal system is specified by regulations in 15A NCAC 2L, Groundwater Classifications and Standards. The Compliance Boundary is for the disposal system constructed after December 31, 1983 is established at either (1) 250 feet from the waste disposal area, or (2) 50 feet within the property boundary, whichever is closest to the waste disposal area. An exceedance of Groundwater Quality Standards at or beyond the Compliance Boundary is subject to immediate remediation action in addition to the penalty provisions applicable under General Statute 143-215.6A(a)(1).

In accordance with 15A NCAC 2L, a REVIEW BOUNDARY is established around the disposal systems midway between the Compliance Boundary and the perimeter of the waste disposal area. Any exceedance of standards at the Review Boundary shall require remediation action on the part of the permittee.

2. Any groundwater quality monitoring, as deemed necessary by the Division, shall be provided.
3. No land application of waste activities shall be undertaken when the seasonal high water table is less than three feet below land surface.

4. The Permittee shall properly abandon the two (2) water supply wells (if this has not already been done) located between Phase I and NC SR 1503 (see Figure 2 attached), as well as each of the four (4) water supply wells which are located on or immediately adjacent to Phase II (see Figure 3), in accordance with State regulations, pursuant to NCAC 15A 2C .0113.

V. INSPECTIONS

1. The Permittee or his designee shall inspect the residuals storage, transport, and application facilities to prevent malfunctions and deterioration, operator errors and discharges which may cause or lead to the release of wastes to the environment, a threat to human health, or a nuisance. The Permittee shall maintain an inspection log or summary including at least the date and time of inspection, observations made, and any maintenance, repairs, or corrective actions taken by the Permittee. This log of inspections shall be maintained by the Permittee for a period of five years from the date of the inspection and shall be made available to the Division of Environmental Management or other permitting authority, upon request.
2. Any duly authorized officer, employee, or representative of the Division of Environmental Management may, upon presentation of credentials, enter and inspect any property, premises or place on or related to the application site or facility at any reasonable time for the purpose of determining compliance with this permit; may inspect or copy any records that must be kept under the terms and conditions of this permit; and may obtain samples of groundwater, surface water, or leachate.

VI. GENERAL CONDITIONS

1. This permit shall become voidable unless the land application activities are carried out in accordance with the conditions of this permit, the supporting materials, and in the manner approved by this Division.
2. This permit is effective only with respect to the nature and volume of wastes described in the application and other supporting data.
3. This permit is not automatically transferable. In the event that there is a desire for the facilities to change ownership or a name change of the Permittee, a formal permit request must be submitted to the Division of Environmental Management accompanied by an application fee, documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request will be considered on its merits and may or may not be approved.

4. The following are approved sites for residuals application (see attached map(s)):

<u>Site No.</u>	<u>Owner/Lessee</u>	<u>Application Area [acres] (excluding buffers)</u>
Phase I	Johnston County	54.2
Phase II	Johnston County	85.6

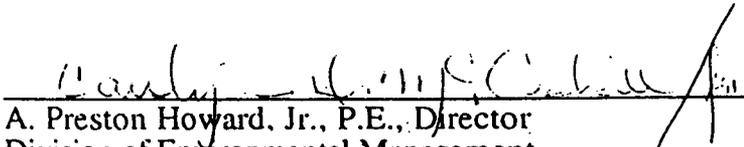
TOTAL AVAILABLE ACRES 139.8

5. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to an enforcement action by the Division of Environmental Management in accordance with North Carolina General Statute 143-215.6(a) to 143-215.6(c).
6. The annual administering and compliance fee must be paid by the Permittee within thirty (30) days after being billed by the Division. Failure to pay the fee accordingly may cause the Division to initiate action to revoke this permit as specified by 15 NCAC 2H .0205 (c)(4).

7. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances which may be imposed by other government agencies (local, state, and federal) which have jurisdiction.
8. The Permittee, at least six (6) months prior to the expiration of this permit, shall request its extension. Upon receipt of the request, the Commission will review the adequacy of the facilities described therein, and if warranted, will extend the permit for such period of time and under such conditions and limitations as it may deem appropriate.
9. This permit may be modified, or revoked and reissued to incorporate any conditions, limitations and monitoring requirements the Division of Environmental Management deems necessary in order to adequately protect the environment and public health.
10. Issuance of this permit hereby voids Permit No. WQ0007622 issued May 12, 1993.
11. In the event that the subject Johnston County lime stabilization facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective actions, including those that may be required by this Division, such as the construction of additional or replacement wastewater treatment or disposal facilities.
12. The Raleigh Regional Office, telephone number 919/ 571-4700 shall be notified at least forty-eight (48) hours in advance of operation of the installed facilities so that an in-place inspection can be made. Such notification to the regional supervisor shall be made during the normal office hours from 8:00 a.m. until 5:00 p.m. on Monday through Friday, excluding State Holidays.
13. ~~Upon completion of construction and prior to operation of this Johnston County lime stabilization facilities, a certification must be received from a professional engineer certifying that the permitted facility has been installed in accordance with the NPDES Permit, this Authorization to Construct, and the approved plans and specifications. Mail the Certification to the Water Quality Permits and Engineering Unit, P.O. Box 29535, Raleigh, NC 27626-0535.~~
14. The collected runoff from the walled treatment/storage pad shall be disposed of in the Johnston County landfill, as proposed, only with the concurrence of the North Carolina Division of Solid Waste Management. Pumping and hauling the collected runoff back to the Johnston County Wastewater Treatment Facility shall require the appropriate authorization from the Division of Environmental Management.

Permit issued this the 30th day of September, 1994

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION


 A. Preston Howard, Jr., P.E., Director
 Division of Environmental Management
 By Authority of the Environmental Management Commission

Permit No. WQ0007622

Permit No. WQ0007622

September 30, 1994

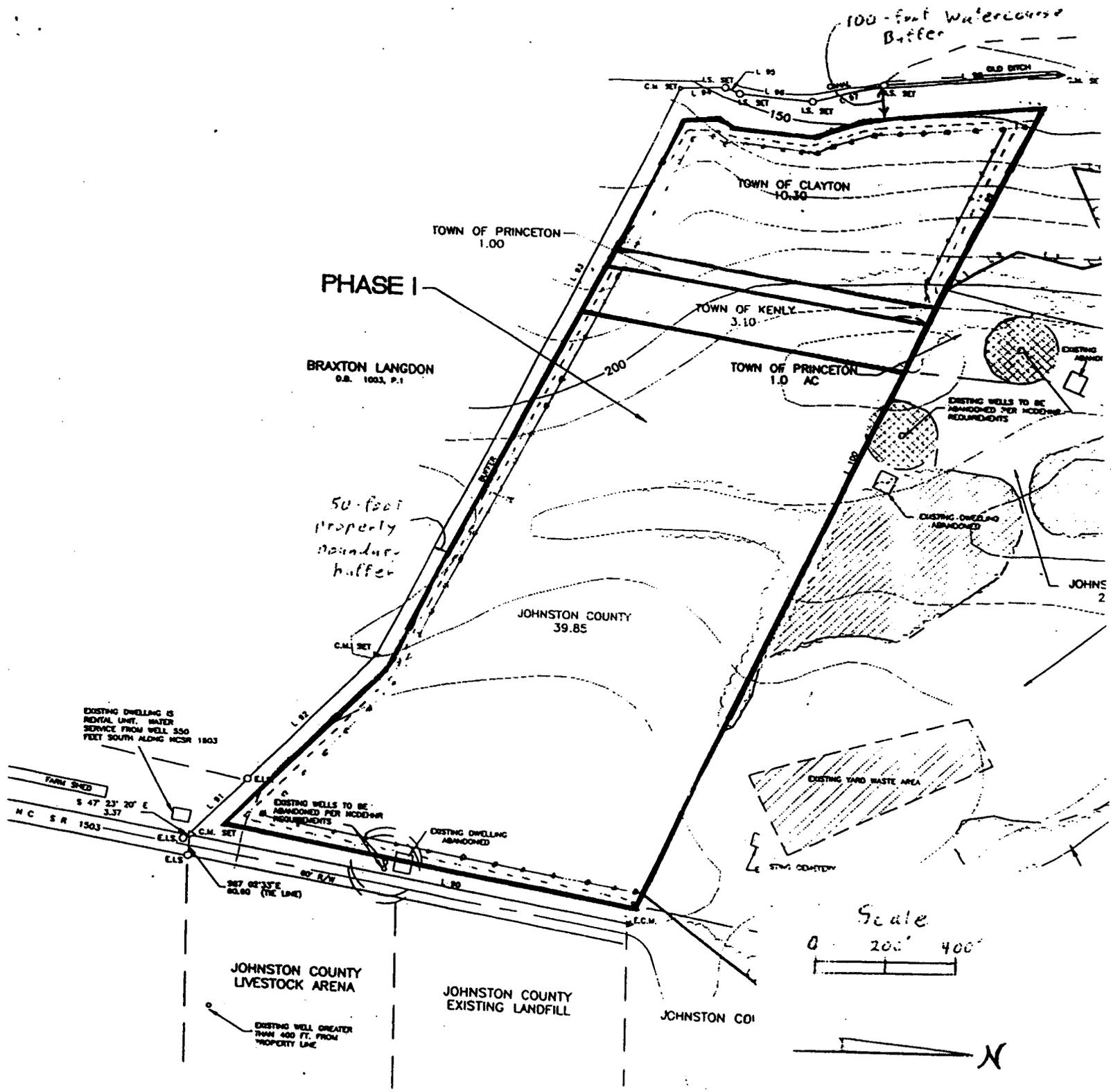
ENGINEER'S CERTIFICATION

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project, _____, _____ for the
Project Name *Location*

Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of this permit, the approved plans and specifications, and other supporting materials.

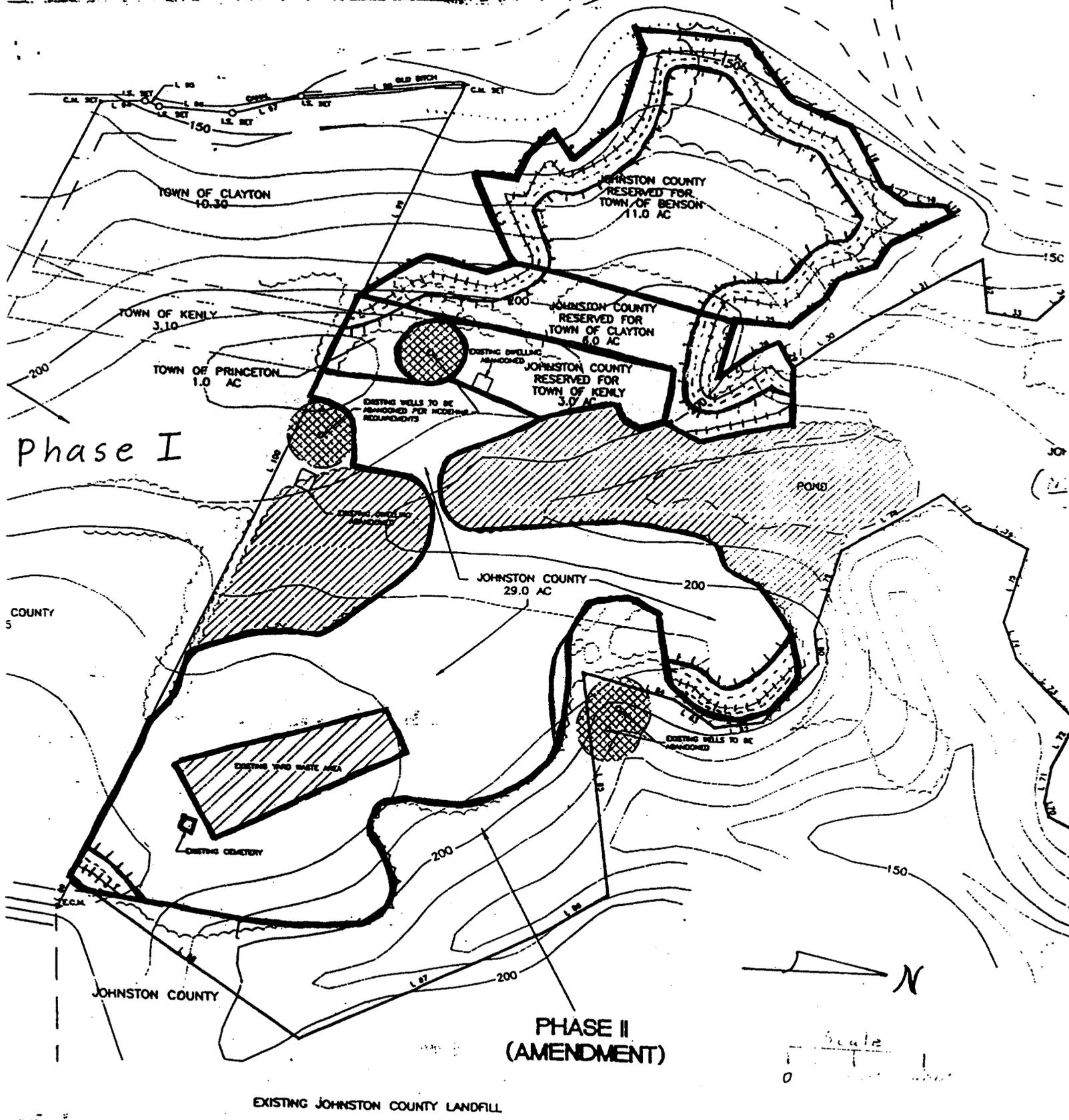
Signature _____ Registration No. _____

Date _____



- Boundary of Land Application Area
- Review Boundary
- Compliance Boundary
- Property Boundary

FIGURE 2
JOHNSTON COUNTY
SLUDGE LAND APPLICATION
JOHNSTON COUNTY
W00007622/GW94061
DETAIL OF PREVIOUSLY PERMITTED AREAS
(ALL OF PHASE I)



Phase I

PHASE II
(AMENDMENT)

COUNTY
5

EXISTING JOHNSTON COUNTY LANDFILL

- Boundary of Land Application Area
- - - Review Boundary
- + + + Compliance Boundary
- Boundary of Suitable Area

FIGURE 3
JOHNSTON COUNTY
SLUDGE LAND APPLICATION
JOHNSTON COUNTY
W0007622/GW94061
DETAIL OF AMENDED AREAS
(PORTIONS OF PHASE II)

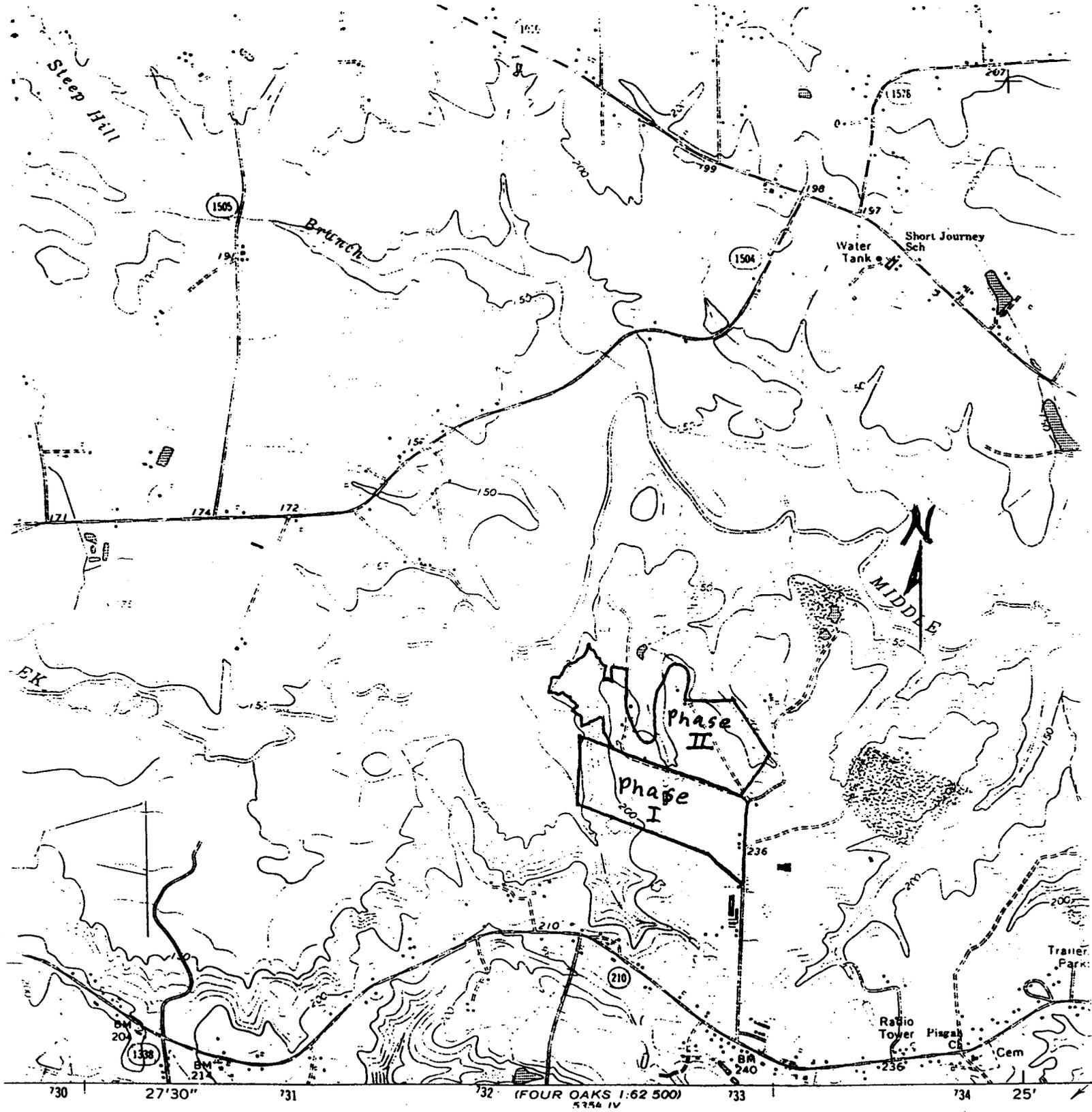
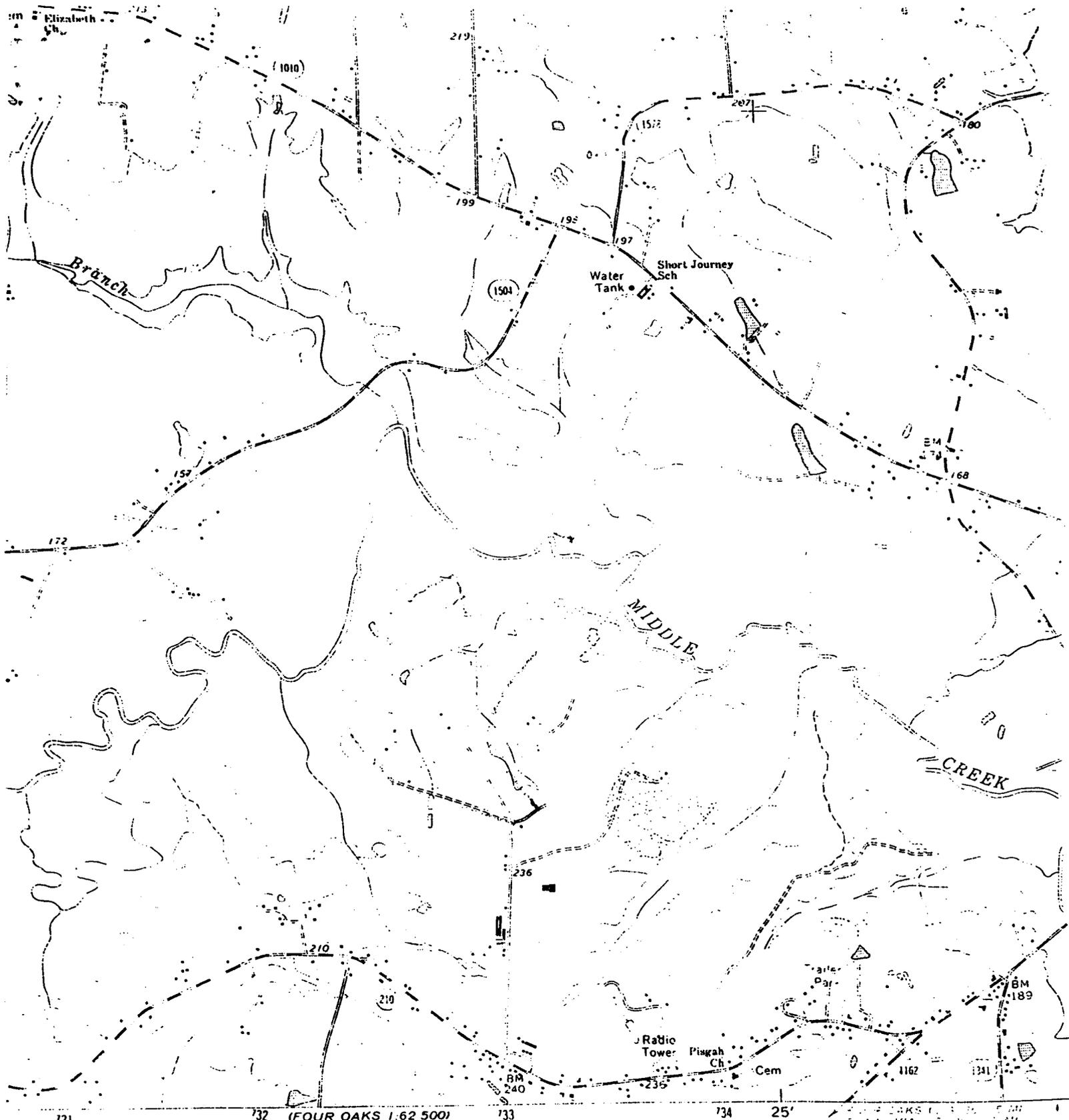
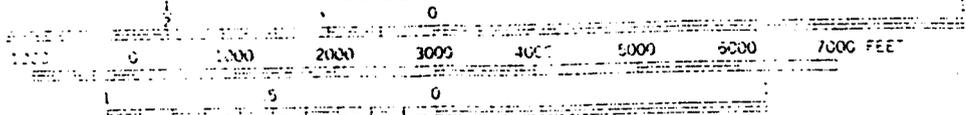


FIGURE 1
JOHNSTON COUNTY
SLUDGE LAND APPLICATION
JOHNSTON COUNTY
WQ0007622/GW94061
OUTLINED LOCATIONS OF PREVIOUSLY PERMITTED
AREAS (ALL OF PHASE I) AND AMENDED AREAS
(PHASE II AREA SHOWN) INCLUDED IN THE THE
SLUDGE LAND APPLICATION PERMIT



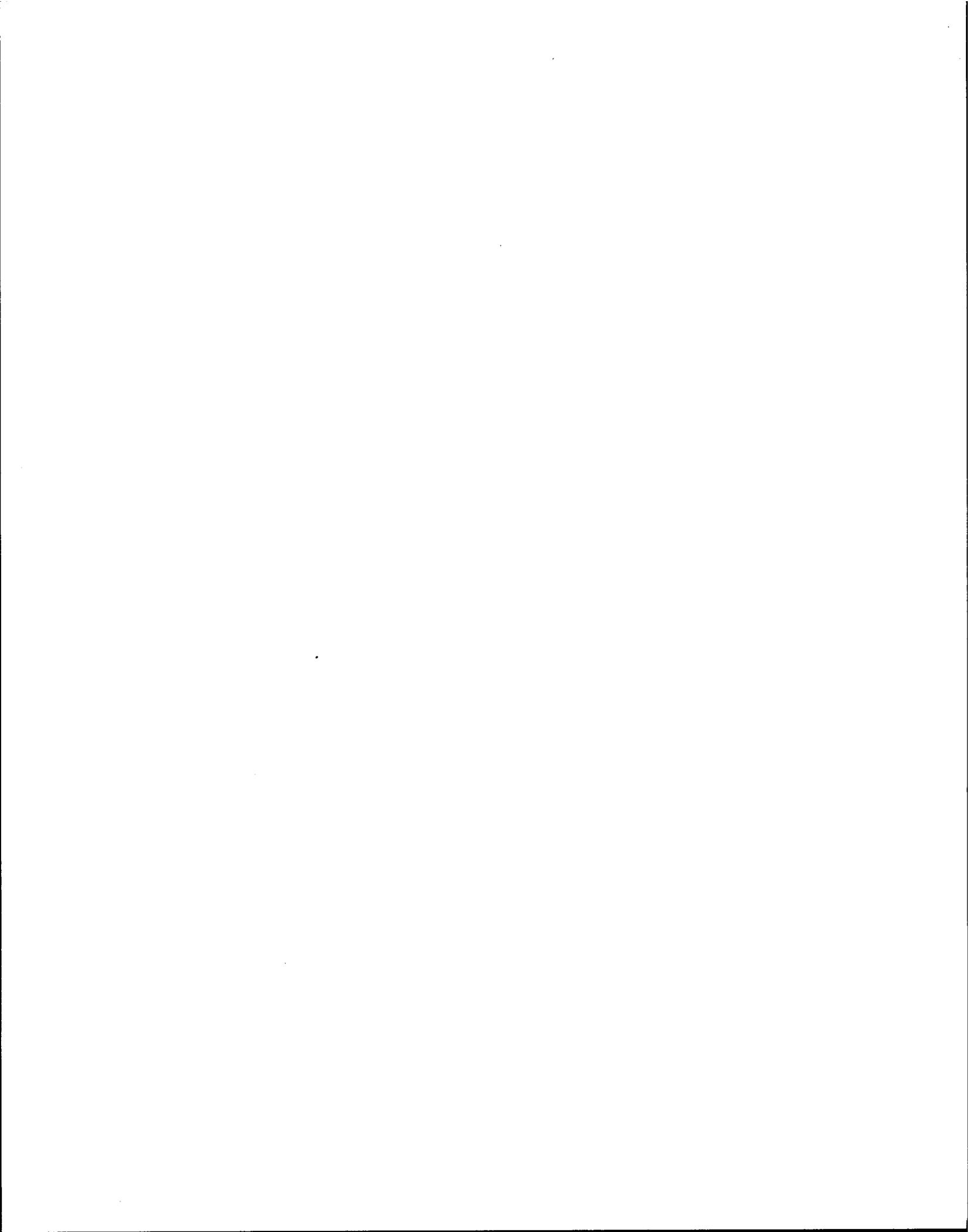
(FOUR OAKS 1:62 500)
5354 IV

SCALE 1:24 000



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

170717022



- Booklet -

Re: Johnson County Land Application
of Biosolids

JANUARY 27th, 1995



MCKIM & CREED

January 27, 1995

M&C 0358-0024.OR(40)

ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

Mr. Ken Scheuster
Raleigh Regional Office
NC DEHNR
3800 Barrett Drive
Raleigh, North Carolina 27609

RE: Johnson County Land Application of Biosolids

Dear Mr. Scheuster:

This letter concerns the Johnston County Land Application Facility. As you are aware, Johnston County notified your office to advise you of the possible permit violation regarding the excessive loading of residual solids to a portion of the Phase I permitted site. (See attached map.) Subsequent to that notification, it was suggested that a more formal meeting occur to discuss the related issues associated with the possible permit violation.

Included herein is a summary of the meeting with your office, including a list of attendees, a memo from Dr. Bob Rubin regarding future management of the Johnston County Land Application Site, and a management/monitoring plan for Johnston County.

On Friday, January 20, 1995, Mr. Jay Carter of Johnston County, Dr. Bob Rubin of NC State University (NCSU), and I met with you, Mr. Randy Jones, and Ms. Judy Garrett to discuss the associated issues regarding the recent permit violation at the Johnston County Land Application Site.

To briefly summarize, we presented a map detailing both Phase I and Phase II of the Johnston County Land Application Site. As discussed, the actual violation concerned the overloading or insult to a portion of the Phase I site dedicated for receipt of biosolids from Johnston County only.

As noted during our meeting, Dr. Bob Rubin of NCSU was invited to assist us to determine the actual impact of the insult. Dr. Rubin reviewed the site, determined sample locations, and performed field sampling and laboratory analysis of the affected soils to evaluate the impact of the insult to the Phase I site. Results of Dr. Rubin analyses were presented during the meeting and are attached herein.



SUITE 117

BUILDING I

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

Mr. Ken Scheuster
January 27, 1995
Page 2

Dr. Rubin indicated his analysis did not reveal any unusual concerns regarding metals. Whereas the nitrogen levels were high in the upper one-foot and at the four-foot depth where the sandy soil transitions to a more clayey material, Dr. Rubin felt that the nitrogen levels were not that unusual. In fact, considering how recently the site was farmed, it is inconclusive as to whether the high nitrogen levels at the four-foot depth may be attributed to previous agricultural practices or to this site overloading during land application. In summary the conclusions from the meeting were as follows:

- Proper notification of the regulatory agency had occurred
- The actual impact to the site appears insignificant
- Develop a groundwater monitoring plan for the portion of the Phase I site that was overloaded and submit to NC DEHNR for review and approval

Based upon the above, we continued our discussion with Dr. Rubin requesting assistance with the development of a groundwater monitoring plan. Further consideration was also given to assisting Johnston County with management strategies for the Land Application Facility. In response to our request, Dr. Rubin prepared the attached memo to serve as a suggested guideline to Johnston County.

Dr. Rubin's memo addresses general management of a residual solids program and provides a suggested guideline for monitoring the referenced site. It should be further noted that monitoring includes biosolids testing, soil testing, vegetation testing, and groundwater testing. And Johnston County is currently performing most of the suggested testing and analysis with the exception of the groundwater monitoring, vegetation analysis, and frequency of soil testing and analysis.

It should also be noted that Johnston County will be restricting future cumulative metal pollutant site loading to 50 percent of the permitted allowance to ensure that the constituent loadings applied to the site do not exceed the North Carolina Landfill maximum extraction levels.

The management of the Johnston County Land Application site, as outlined by Dr. Rubin's memo, together with the monitoring plan, reduces significantly the risk suggested by the possible permit violation. It should also be noted that the County now has a comprehensive record keeping program in place. When combined with the management program presented herein, it is anticipated that cumulative load rates at the site will be minimized, future insults to the soil integrity will be eliminated, and the existing soils will be suitable for continued land application or possibly as soil cover on the landfill.

Mr. Ken Scheuster
January 27, 1995
Page 3

I trust you will find the enclosed satisfactory. If I can be of further assistance, please do not hesitate to call.

Sincerely,

McKIM & CREED ENGINEERS, P.A.



Everette H. Knight, P.E.
Project Engineer

hb

Attachments

cc: Mr. Jay Carter
Mr. Timothy G. Broome, P.E.
Dr. Bob Rubin, Ph.D.
Mr. James C. Coffey

q:\0358\0024\4010\275hb1.ehk

JOHNSTON COUNTY LAND APPLICATION MANAGEMENT AND MONITORING PLAN

Background

A review of the 1994 monitoring records for the Land Application site revealed that Johnston County had overloaded a portion of the Phase I area. The effected area concerned that portion totally dedicated to Johnston County. Whereas soil testing has revealed that the result of the overloading or insult to the site is negligible, it was determined that, as a minimum, groundwater monitoring of the compromised site was necessary.

To avoid future insults, it was further determined that a comprehensive monitoring and management program be developed that considers soil testing, plant analysis, biosolids testing and calibration of application rates as well as groundwater monitoring. The primary resource for the comprehensive plan was Dr. Bob Rubin of NCSU. Dr. Rubin has been very much a part of the sampling and evaluation process regarding the site overloading at the Johnston County facility. Much of the discussion that has occurred with Dr. Rubin is summarized in the enclosed memorandum dated January 23, 1995. The memorandum is considered part of the management plan. The following information was gathered from the memorandum to provide a specific but comprehensive guideline for management of the Land Application Facilities of Johnston County.

Calibration

To ensure proper loading rates, Johnston County should consider calibration of their application methodologies. Calibration for site application can occur utilizing a tarpaulin 4.5' X 4.5' square in size. The pounds applied to the tarpaulin will approximately equal the tons per acre applied.

Biosolids Testing

Biosolids received at the land application site from Johnston County (only) should continue to be tested four times a year for both nutrients and metals as defined by the permit. If testing reveals excessive constituent levels as defined by the EPA 503 regulations, then the biosolids will not be disposed of at the Johnston County land application site.

Soil Sampling and Analysis

For the overloaded area, soil samples will be collected in one-foot increments to a maximum depth of four feet. The samples will be properly composited with depth within each field. Samples will be evaluated to determine nutrient and metal levels with respect to depth in accordance to the current site permit. Sampling and evaluation will occur four times per year. Areas designated to the Town of Clayton, the Town of Benson, and the Town of Princeton will be sampled as outlined by the current permit.

Vegetation Analysis

Vegetation will be sampled and evaluated twice during the growing season. Samples from each dedicated site shall be taken and analyzed.

Groundwater Monitoring

Groundwater monitoring will be limited to the compromised area located within Phase I. This area has received biosolids from Johnston County only. Piezometers have been installed within the Phase I site and further north into the Phase II site for the purposes of establishing background data for the future Subtitle D landfill.

Piezometers outside of the overloaded area will serve to provide the baseline data for comparison to the overloaded area.

In addition to the piezometers located in the overloaded area, additional groundwater monitoring wells will be installed both upstream and downstream of the actual overloaded site.

Groundwater samples will be taken and evaluated four times a year. Analysis and evaluation will consider nutrient as well as metal loadings. As a minimum, the following parameters shall be evaluated:

Cadmium
Copper
Lead
Zinc
Total Nitrogen

Future Loading Restrictions

Future cumulative loading rates will be restricted to 50% of the maximum load rates allowed by the permit.

MEMORANDUM

TO: Everette H. Knight, P.E.
FROM: Bob Rubin
DATE: January 23, 1995
M&C: 0358-0024.OR(10)
RE: Management of Sites on Which Biosolids Are Applied

The United States Environmental Protection Agency regulates the application of municipal biosolids to agricultural lands. These regulations are contained in 40:CFR Part 503. This comprehensive regulation establishes criteria and standards for the application of biosolids to agricultural land, for incineration facilities, and for biosolids landfills or monofills. Our primary concern presented herein for Johnston County is the agricultural utilization of biosolids.

The EPA 503 regulation is clear. The regulation establishes maximum levels of metals which can be contained in product. If a biosolid contains metal levels higher than those listed in Table 1 of the 503 regulation, then those materials cannot be applied to agricultural land. The table also lists maximum annual loading rates. These are contained in Table 2 of the 503 regulation. Table 3 of the 503 regulation contains the levels which are considered as safe for use without any cumulative loading limits. The final table of the 503 regulation contains the maximum annual pollutant loading rate. If a biosolid exceeds any of the values contained in these tables, then other activities must be developed for ultimate disposal of materials. Most municipal biosolids easily meet the levels established in the 503 regulation. A comprehensive biosolids testing program must be established to ensure that materials do meet these levels.

Once a product has been tested and found to meet the levels contained in the 503 regulation, then land application activities can begin or continue. The volume of biosolids produced dictates the frequency of sampling required. A facility producing less than one dry ton per day of biosolid must sample once per year. A facility producing between one and four tons of biosolids per day must sample twice per year. A facility producing up to 15,000 tons per year must sample every other month. And a facility producing over 15,000 dry tons per year must sample monthly. The first portion of a management program is to develop a comprehensive sampling protocol. The Johnston County utility should require biosolids to be sampled and analyzed at least quarterly. This will ensure that the materials do consistently meet levels established in the regulation and will build a database to determine the amounts applied to land. Nutrient and metal levels must be measured. The amount of biosolids applied will change according to the analysis. The nutrient loadings are dictated by the crop grown on the site and the anticipated yield for that crop. Metal loadings are dictated by the ability of the site to hold or accumulate metals. Metal levels for most sites are established as maximum cumulative levels. These levels are summarized in the tables attached.

Mr. Everette H. Knight, P.E.
January 23, 1994
Page 2

The cropping system is critical in any biosolids management program. A crop must be grown on the site capable of removing the nutrient applied to the site. The sandy soils encountered at the Johnston County landfill area are suitable for most annual crops. Generally, sites such as this grow small grains in the winter and soy beans or corn during the summer months. For this operation, a mix of small grains for winter operation (wheat, barley, or rye grass) followed by a sudan/sorghum crop would provide an excellent receiver crop. Generally, these crops can remove up to 250 pounds of nitrogen per acre per year. The maximum nitrogen loading which I would suggest is 250 pounds of nitrogen per acre per year with this double crop arrangement. Biosolids should be applied to the site early in the growing season. Biosolids can be reapplied to the site after every cutting of grassy vegetation. The grass must be removed from the site so that the nutrients contained in the vegetation do not mineralize and migrate to groundwater. The material applied to the site can be as dry cake or as a liquid biosolid. The only restriction placed on land application is to ensure that the material has been adequately stabilized prior to application to land. The 503 regulations specify several alternatives to achieve this requirement.

The operator of this or any biosolids facility must maintain comprehensive records concerning the quality of material applied and the cumulative metal loadings applied to the site. The Environmental Protection Agency has established maximum cumulative levels for regulated metals on any site. These maximum cumulative loading rates are summarized in Table 2 of the 503 regulation. If the operator of this land application system can document that the metals applied are below these levels, then theoretically the soil resources can be utilized for any land use activities. Several of the metals contained in the Table 2 chart are higher than recommended for agricultural crops in North Carolina. Levels for chromium, copper, and zinc are excessively high for most agricultural crops in North Carolina. Nonetheless, if these soil resources were mixed or blended with other soil resources, then there is no restriction on the use of these materials for agricultural purposes. There is some concern regarding the application of soils with these metal levels in landfills in North Carolina. Most metals do not leach appreciably from soil. The landfill maximums for these regulated metals are generally determined from a toxicity characterization leach procedure test. Generally, the level of pollutant extracted is at least 1/20th of that in a soil matrix. For example, the maximum cumulative pollutant loading rate for arsenic is 41 ppm, while the North Carolina landfill maximum for arsenic is .5 mg/l in a leachate. If a site did receive 41 kg of arsenic per hectare, then, I believe, that arsenic could be extracted from that soil at a level slightly above the North Carolina landfill maximum. For this reason, Johnston County is encouraged to reduce the cumulative pollutant loading rate allowable on the Johnston County site by at least 50% to ensure that none of the constituents applied to the site exceed the North Carolina landfill maximum extraction levels.

The biosolids applied to the site should be incorporated into the soil material to ensure that no runoff occurs. This incorporation will reduce the window during which these materials can be applied to land. Unfortunately, this is a necessary component of land application operations. Based upon this requirement, small areas may be kept fallow between four weeks and six weeks, wherein biosolids can be applied, and then the site can be planted immediately with appropriate

vegetation. The practice of small fallow areas and subsequent planting will ensure that materials are utilized by plants, and runoff and erosion loss is maintained at minimum levels. The crop should be harvested when appropriate. For example, sudan/sorghum grass could be harvested three or four times during a growing season. Liquid biosolids could easily be applied to the site following any cutting operation, and material would not require incorporation. If solid or cake biosolid were applied, then these materials should be lightly incorporated after a cutting operation. This could be accomplished with a simple tractor-towed aerator.

Biosolids applications should be controlled to ensure that the appropriate quantity of material is applied. This may require some equipment calibration. Once a load is determined based on either nutrient content or metal content, then a calibration should be developed. A calibration can be developed using 21.75 square foot tarpaulins (1/2,000 acre). The number of pounds of biosolids collected over this 21.75 square foot tarpaulins represents the number tons of biosolid applied. This calibration should be accomplished several times during the year to ensure that operators are applying materials appropriately. This calibration is easy to accomplish and provides valuable information concerning the accuracy of the loading calculations and the equipment operation.

Every land application site must be monitored. Monitoring must include as a minimum, periodic soil sampling. However, it is desirable to gather samples of the vegetation grown on a site and samples of groundwater. Both of these provide valuable information concerning the efficiency of the operation.

Soil Sampling

Given the sensitivity of this operation, I suggest that a soil sampling program be developed to require soil sampling to a depth of approximately 48 inches at 1-foot intervals.

The sample should be composited with depth and within each field. Once collected and composited, samples should be evaluated to determine nutrient and metal levels and their distribution with depth.

Vegetation Sampling

Vegetation sampling should be collected at least twice during the growing season. If a double crop is utilized, then the early crop should be sampled mid-spring while the later crop should be sampled approximately 30 days after germination and again near maturity.

Mr. Everette H. Knight, P.E.
January 23, 1994
Page 4

Groundwater Monitoring

It is suggested that the groundwater monitoring program be limited to the compromised site only. When agronomic application rates are utilized, groundwater monitoring is not required. The compromised area is the only portion of the total Johnston County site (both Phase I and Phase II) insulted and, therefore, is the only area suggested for groundwater monitoring.

Piezometers have been installed within the Phase I land application site for the purpose of developing background data for the Subtitle D landfill to be located on the adjacent parcel of land. In addition to the existing piezometers, additional groundwater monitoring wells should be installed to determine the up-gradient as well as the down-gradient water quality. Shallow groundwater monitoring wells (12 feet to 15 feet) are adequate for this purpose. These wells can be installed using hand augers and are reasonably inexpensive to install and monitor. These groundwater monitoring wells will provide additional data concerning the consequences of this biosolids application program. Groundwater samples should be collected at least three times per year to determine water quality. Samples of groundwater should be analyzed to determine nutrient and metal levels. Samples should be collected in March, July, and November for analysis.

Conclusion

With the comprehensive biosolids testing, soil testing, vegetation analysis, and groundwater sampling program coupled with the calibration operation presented herein, a program may be developed to utilize these sites and soils for continued land application and subsequent landfill cover. With the development of a comprehensive loading record, the biosolids applications can be maintained at rates well below the maximum cumulative rates established by the Environmental Protection Agency. A comprehensive record keeping and management program must, however, be developed in close cooperation with the solid waste management authority and the wastewater utility to ensure that no further insults to the integrity of the soil occur.

/hb

Attachments

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**TABLE 1 OF SECTION 503.13
CEILING CONCENTRATIONS**

<u>Pollutant</u>	<u>Ceiling Concentration*</u> (milligrams per kilogram)
Arsenic	75
Cadmium	85
Chromium	3,000
Copper	4,300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7,500

*Dry weight basis

**TABLE 2 OF SECTION 503.13
CUMULATIVE POLLUTANT LOADING RATES**

<u>Pollutant</u>	<u>Cumulative Pollutant Loading Rate</u> (kilograms per hectare)
Arsenic	41
Cadmium	39
Chromium	3,000
Copper	1,500
Lead	300
Mercury	17
Molybdenum	18
Nickel	420
Selenium	100
Zinc	2,800

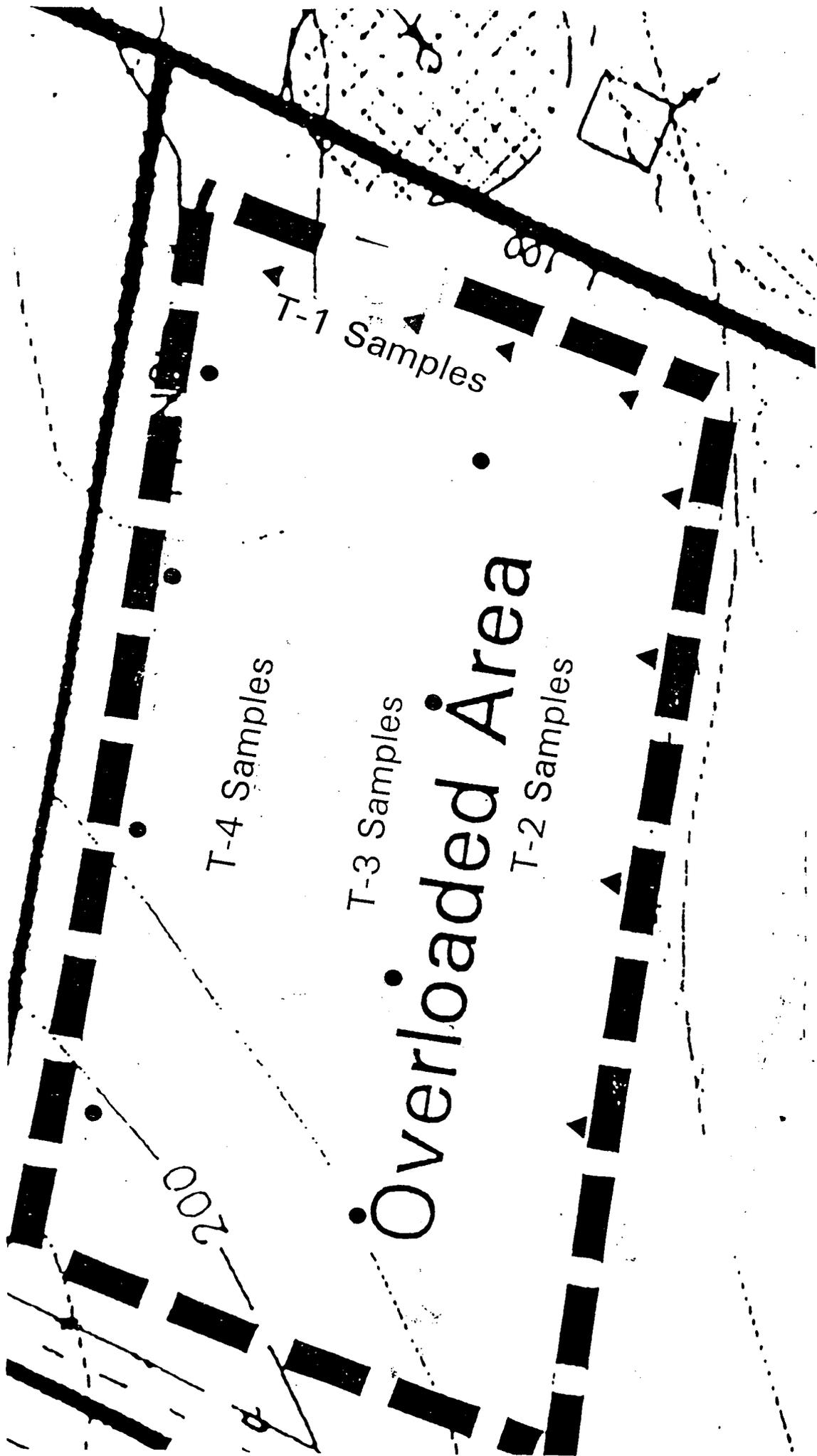
**TABLE 3 OF SECTION 503.13
POLLUTANT CONCENTRATIONS**

<u>Pollutant</u>	<u>Pollutant Concentrations*</u> (milligrams per kilogram)
Arsenic	41
Cadmium	39
Chromium	1,200
Copper	1,500
Lead	300
Mercury	17
Molybdenum	18
Nickel	420
Selenium	36
Zinc	2,800

*Dry weight basis

**TABLE 4 OF SECTION 503.13
ANNUAL POLLUTANT LOADING RATES**

<u>Pollutant</u>	<u>Annual Pollutant Loading Rate</u> (kilograms per hectare per 365-day period)
Arsenic	2.0
Cadmium	1.9
Chromium	150
Copper	75
Lead	15
Mercury	0.85
Molybdenum	0.90
Nickel	21
Selenium	5.0
Zinc	140



Overloaded Area

T-4 Samples

T-3 Samples

T-2 Samples

T-1 Samples

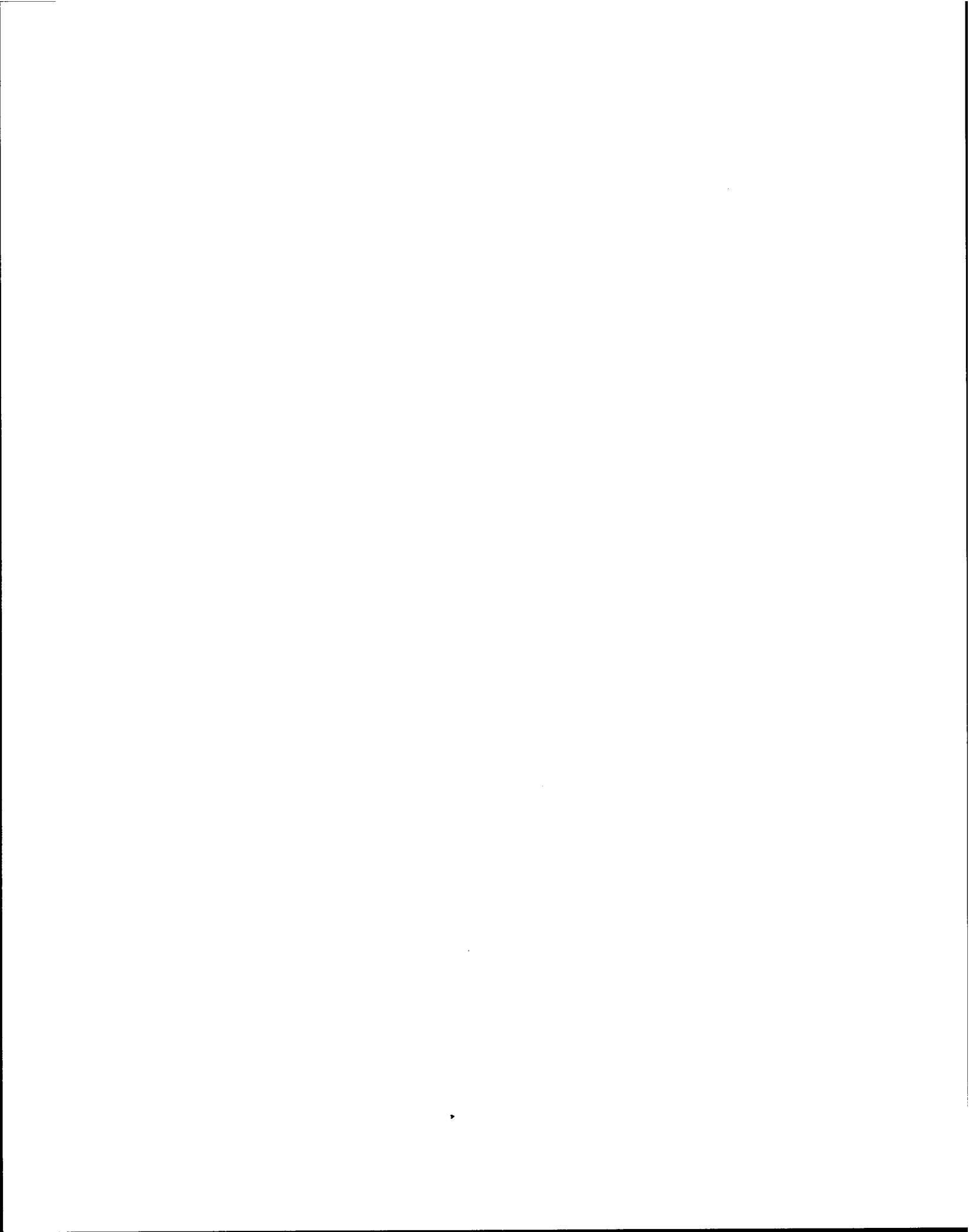
N 18th St

200

INSERT A Not to Scale
OVERLOADED AREA WITH
SOIL SAMPLE LOCATIONS

**SOIL TEST RESULTS DETERMINED AT SPECIFIC DEPTHS FROM JOHNSTON COUNTY
BIOSOLIDS RECEIVER SITES AND CONTROL AREAS**

SITE	DEPTH	OM (%)	CEC (mg/100g)	pH	P (mg/kg)	K (mg/kg) (I)	Ca (% CEC)	Mg (% CEC)	Zn (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Cd (mg/kg)	NO ³ (mg/kg)
T4	0-6	.4	3.5	4.9	147	14	34.2	6.8	4.52	6.4	7.6	1.2	23
	6-12	.2	2.8	5.0	166	16	32.1	7.9	2.12	.7	<5	<1	7
	12-24	.1	1.3	5.0	46	8	23.4	10.9	.64	.2	<5	<1	5
	24-36	.1	.8	4.9	8	10	26.7	13.3	.21	.1	<5	<1	4
	36-48	.1	1.9	4.4	10	26	15.9	13.8	.22	.2	<5	<1	33
T2	0-6	.2	3.5	4.7	166	28	37.1	13.1	11.48	4.8	9.5	1.3	45
	6-12	.2	2.1	4.6	147	14	29.3	8.8	2.71	.47	<5	<1	11
	12-24	.1	5.2	4.0	41	54	25.0	16.1	2.16	.22	<5	<1	44
	24-36	ND	6.3	3.8	12	72	27.2	16.0	1.08	-.4	<5	<1	86
	36-48	ND	7.5	4.0	8	74	27.9	14.1	.28	.05	<5	<1	82
T3	0-6	1.5	7.3	5.3	102	94	41.2	13.4	1.18	.56	<5	<1	5
	6-12	1.2	4.2	5.8	52	50	55.8	16.7	.86	.57	<5	<1	6
	12-24	.3	2.4	4.7	46	34	36.1	17.0	.42	.30	<5	<1	12
	24-36	.1	3.8	4.6	31	20	34.3	12.6	.36	.33	<5	<1	15
	36-48	.1	4.9	4.3	18	14	33.0	13.8	.39	.20	<5	<1	9
T1	0-6	.4	3.1	4.4	162	16	35.9	9.2	4.90	2.41	<5	<1	27
	6-12	.2	2.1	4.7	162	18	29.0	8.7	1.86	1.24	<5	<1	11
	12-24	.1	1.2	4.5	70	6	17.4	10.4	.22	.36	<5	<1	6
	24-36	.1	1.3	4.5	21	6	17.2	11.1	.22	.37	<5	<1	19
	36-48	.1	1.2	4.4	15	4	16.9	13.6	.14	.10	<5	<1	28



Office of
County Commissioners
(919) 989-5100
FAX (919) 989-5179

Joyce H. Ennis, Clerk

Johnston County

POST OFFICE BOX 1049
SMITHFIELD, N. C. 27577

Norman C. Denning, Chm.
John M. Booker, DVM, V-Chm.
James W. Cash
Jerry F. Wood, DDS
Eleanor N. Creech
Cecil M. Massengill
Cookie Pope

January 6, 1995

Mr. Edward F. Mussler, III, E.I.T.
Environmental Engineer
NCDEHNR Division of Solid Waste Management
P. O. Box 27687
Raleigh, North Carolina 27611-7687

RE: N.C.G.S. 130A-294(b1)(2) Public Hearing Requirement for
Johnston County Landfill Site Application

Dear Mr. Mussler:

As stated in the Johnston County Landfill Site Application, a public meeting was held on August 1, 1994 to inform the community and to invite comments from the community on the proposed landfill siting location and operation. Public notice was begun on June 24, 1994 and included the time, place, and the purpose of the meeting. The media used to advertise the meeting included a legal advertisement placed in The Smithfield Herald, and a notice to WMPM Radio Station and to Channel 35 TV for their Community News Program.

It is our understanding that the intent of N.C.G.S. 130A-294(b1)(2) is to assure that adequate opportunity has been provided for the public to participate and comment on the proposed landfill facility site and operation. Although the public meeting attracted only a few participants, mainly press personnel, ample opportunity was provided for the public to express their opinions and concerns regarding the proposed landfill. Consequently, we believe that the public meeting held on August 1, 1994 satisfactorily fulfills the requirements of N.C.G.S. 130A-294(b1)(2).

If you have any questions, please contact me or Mr. C. T. Clayton, McKim and Creed Engineers.

Sincerely,



Joyce H. Ennis, Clerk
Johnston County Board of Commissioners

cc: James C. Coffey, NCDEHNR Division of Solid Waste Management
Terry Dover, NCDEHNR Division of Solid Waste Management
Bob Harding, NCDEHNR Division of Solid Waste Management
C. T. Clayton, McKim & Creed Engineers

51-02



October 23, 1995

M&C 0358-0051.OR(13)

ENGINEERS
SURVEYORS
ARCHITECTS
PLANNERS

Brad Atkinson
Hydrogeologist
NCDEHNR, Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687

RE: Section Comments on Proposed Johnston County
Subtitle D Landfill Permit to Construct Application
Design Hydrogeologic Report
Johnston County, North Carolina

Dear Brad:

Attached, please find two copies of the revised Groundwater Monitoring Locations drawing (GW1) and two copies of the revised portions of the Groundwater Monitoring Plan report. These revisions were made in accordance with your discussions with C.J. Poran, Ensol, and Walt Beckwith, S&ME, regarding the groundwater monitoring locations. These revisions are also in response to your letter dated October 17, 1995 containing the Section's comments concerning the location of Sediment Basin 3. Also attached, are two copies of each drawing affected by these changes. These drawings include E1 through E7, E17, FO3, FO4, and FO5.

If you have any questions, please call either C.J. Poran or me at your convenience.

Sincerely,

MCKIM & CREED ENGINEERS, P.A.

Michael J.E. Sanchez
Michael J.E. Sanchez, E.I.T.
Project Engineer

/mjjes

SUITE 117
BUILDING I
5625 DILLARD ROAD
CARY, NC 27511
PHONE 919/233-8091
FAX 919/233-8031

cc: Warren Grimes, Johnston County
Haywood Phthisic, Johnston County
Tim Broome, McKim & Creed Engineers
C.T. Clayton, McKim & Creed Engineers
C.J. Poran, Ensol Corporation
Walt Beckwith, S&ME

Enclosures

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



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

October 17, 1995

Mr. Mike Sanchez
McKim and Creed Engineers, PA
5625 Dillard Road, Suite 117
Cary, NC 27511

Re: Technical Review of Design Hydrogeologic Report - Proposed Johnston Co. MSWLF

Dear Mr. Sanchez:

A Technical Review of the Design Hydrogeologic Report has been completed. Further information is necessary in order to continue the review process.

The following comments are pursuant to the requirements of 15A NCAC 13B .1623 (b) and are directed to McKim and Creed and to S&ME. Portions of .1623 (b) not addressed below should, at this time, be considered as having met the Technical Review requirements of the Design Hydrogeologic Report; however, additional information may be requested at a later date.

(b)(3)(A) The sediment basin on the northwest corner of the proposed Phase Five must be moved approximately 80-100 feet north to prevent surface water infiltration from the basin from jeopardizing the integrity of the ground-water samples collected from GW-2. Note: GW-2 must remain at the northwest corner of the landfill because it is the most critical location to be monitored.

GW-4 must be moved away from the sediment basin on the northeast corner of the Phase Five.

A revised ground-water monitoring plan should be submitted.

Should you have any questions regarding this letter, please contact me at (919) 733-0692 ext. 267 or e-mail at <atkinsonwb@wastenot.ehnr.state.nc.us>.

Sincerely,

Brad Atkinson, Hydrogeologist
Solid Waste Section

cc:

Greg Eades, SWS
Chaim J. Poran, Ensol
Walt Beckwith, S&ME

51-02



MCKIM & CREED

August 17, 1995

M&C358-0051.OR(10)

Brad Atkinson, Hydrogeologist
NCDEHNR, Division of Solid Waste Management
Solid Waste Section
P.O. Box 27687
Raleigh, North Carolina 27611-7687

ENGINEERS

SURVEYORS

ARCHITECTS

PLANNERS

RE: NCDEHNR Technical Review of Design Hydrogeologic Report
Permit to Construct Application for the
Proposed Johnston County Subtitle D Landfill
Johnston County, North Carolina

Dear Mr Atkinson:

Please find enclosed two (2) copies of the Groundwater Monitoring Locations and March 31, 1995 Groundwater Contours map to be added to the Permit to Construct Application. The map also shows subgrade elevation contours. This map addresses all comments made in the July 26, 1995 NCDEHNR letter.

If you have any questions or additional comments please contact me, Walt Beckwith of S&ME, or C.J. Poran.

Sincerely,

MCKIM & CREED ENGINEERS, P.A.

Brent Dockamy FOR

C.T. Clayton, P.E.
Project Manager

SUITE 117

BUILDING 1

5625 DILLARD ROAD

CARY, NC 27511

PHONE 919/233-8091

FAX 919/233-8031

cc: C.J. Poran, Ensol Corporation
Walter Beckwith, S&ME