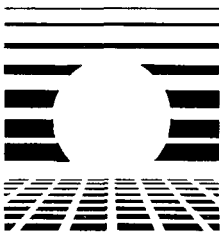
PERMIT DOCUMENTS
FOR
TRAIL RIDGE LANDFILL
FIRST RAI RESPONSE

PREPARED FOR:

TRAIL RIDGE LANDFILL, INC.

PREPARED BY:



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Certificate of Authorization Number 2584
Phone Number (904) 642-8990

DECEMBER 13, 2002

PROJECT NUMBER: E 02-025

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • GIS • LANDSCAPE ARCHITECTS

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December 13, 2002

Ms Mary C Nogas, P E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference Trail Ridge Landfill - Second Permit Renewal
FDEP Permit No 0013493-001 and 0013493-002
FDEP File Numbers 13493-010 and 13493-011
ET&M No E02-25-3

Dear Ms Nogas

We have received your letter dated October 25, 2002 regarding the referenced project On behalf of Trail Ridge Landfill, Inc , please find the following response to your request for additional information

Attachment 1, Review Memorandum, dated October 25, 2002, prepared by Julia Boesch

1 *Since you are proposing to recirculate leachate, please publish notice*

The applicant hereby withdraws the request to recirculate leachate

2 *Greg Mathis signed the application as a General Manager, however, the Florida Department of State, Division of Corporations web page does not list him as an officer/director Please provide documentation demonstrating that he is an officer or director of Trail Ridge Landfill, Inc or provide a letter from an officer/director giving him the required authorization*

Charles Campagna, Vice President of Waste Management Holdings, Inc signed the application Trail Ridge Landfill, Inc is a wholly owned subsidiary of Waste Management Holdings, Inc We recommend that the Department review the 09/16/2002 Corporate Annual Report which is a "Document Image" on the Florida Department of State, Division of Corporations web page for Trail Ridge Landfill, Inc On the second page of the report, Mr Charles J Campagna is listed as Vice President, as stated on the application

3 *If you wish to operate from 5 00 a m to 10 00 p m , as indicated in item B 15 of the application form, please address how you will illuminate the site during the non-daylight hours Please note that at least 3 candle-feet of illumination are required*

Please be advised that this application is a permit renewal application The above condition is an existing permit condition, the facility is in compliance with the existing permit condition and has on-site light plants to for use during non-daylight hours

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4 *In item B 11 of the application form you indicate there will be one spotter Please note that more than one spotter is required if you wish to accept the proposed average and maximum daily tonnages of 3900 and 5000 tons, respectively Please revise and provide*

At least one trained spotter or one trained operator will be at the working face at all times when the landfill receives waste, in accordance with Rule 62-701 500(1), FAC as stated in Section VIII A 2 (Page 15) During peak operating hours, the facility will have an additional spotter or laborer

5 *Please amend your training plan to include the initial training spotters, in addition to operators, will receive within 60 days of employment, as well as the continuing training they will receive to satisfy the requirements of FAC Chapter 62-701 Please confirm that the employees will be trained by a provider approved by the department to provide training for the particular job position Please also list the minimum number of hours of training each employee by job position will receive Please describe the training employees will receive in the interim prior to receiving the required training*

The training requirements as specified in Rule 62-701, FAC are for "trained" operators and spotters only The facility will ensure that there is an adequate number of trained operators and trained spotters at all times Trained operators and trained spotters will have attended a Department-approved training program and will attend continued training at a Department-approved training program Upon initial employment, the facility has an in-house training program wherein the employee is exposed to a wide variety of topics covering environmental and safety issues The facility may then choose to send the employee to a Department-approved provider in order for the employee to be deemed a "trained" operator or spotter

Please note that according to Rule 62-701 320(15)(f), FAC, "A trained operator may perform the duties of a trained spotter "

6 *Please propose to have the "trained" spotters inspect each load of waste as it is being discharged and spread*

In accordance with Rule 62-701 500(1), FAC, there will be at least one trained spotter at the working face at all times when the landfill receives waste to detect unauthorized wastes In addition, the spotter will be assisted by additional personnel, including trained operators, equipment operators, laborers, and trained spotters, if necessary

Further, in accordance with Rule 62-710 510(6)(a)1 , FAC, "The landfill operator shall examine at least three random loads of solid waste delivered to the landfill each week " The facility will continue to institute a load checking program wherein at least three loads are randomly selected by a trained spotter and inspected every week

7 *Please list the minimum number of trained spotters and equipment operators you will provide at the working face at all times waste is being accepted Please indicate the minimum number of trained spotters that will be stationed on the working face to observe waste from the ground as it is being discharged and spread Please also list the minimum number of equipment operators that will be present at the working face when accepting and spreading waste, and specify and list the minimum equipment by type and what its capacity is Please demonstrate the proposed minimum personnel and equipment will be adequate to manage the proposed maximum waste amount If this*

information was previously provided and you wish to include it by reference, please identify the document (by title and date) and section where it is contained and confirm that the information is still valid

As stated in Section VIII A 2 (Page 15), "On a normal basis, the personnel present during operating hours on the landfill will include a trained operator, a trained spotter, a material handler (laborer) and three equipment operators During peak operating hours, the facility will have an additional spotter or laborer and an additional equipment operator " The minimum equipment at the working face includes two compactors and one dozer During peak operating hours, an additional compactor or dozer is used for spreading and/or compaction

The equipment on site includes three compactors and two dozers According to the compactor manufacturer, each compactor can handle approximately 1000 tons per eight-hour day The dozers are estimated to handle approximately 75 tons per hour Therefore under normal conditions (with two compactors and one dozer working thirteen hours per day), the facility can handle approx 4,225 tons per day, which exceeds the average of 3,900 tons per day Further, with the additional compactor and dozer, the facility can handle approx 6,825 tons per day, which exceeds the peak day of 5,000 tons per day

This facility has been operating for over ten years in compliance with the regulations and permits We believe that the operations record demonstrates that the facility is operating with the adequate personnel and equipment

8 *Please identify the equipment you will utilize to spread the waste for spotter inspection as well as the equipment to compact the waste and specify the expected waste compaction If from the time you originally calculated the settlement analysis you have changed the compaction equipment and increased the expected compaction rate, please reevaluate the validity of the foundation analysis and conduct waste settlement analysis Please describe how the waste will be compacted, including the minimum number of passes and if the facility will compact from the top or crest down*

Both the compactors and dozers are used to spread the waste for spotter inspection as well as compact the waste The number of passes will vary based on waste type, moisture content and a host of other factors The facility compacts waste both from top down and from the bottom up

A Post Construction Settlement Evaluation was conducted by Law Engineering and Environmental Services, Inc in October of 1996 and provided to the Department in the First Permit Renewal application dated October 28, 1996 (Appendix C) This analysis was based upon a maximum landfill elevation of +350 feet with an average waste unit weight of 70 pcf (1,890 pounds per cubic foot) The average site density was determined to be 1,594 pounds per cubic yard Since the final landfill height has not changed and the current density is less that the density used in the analysis, we believe that the 1996 settlement analysis as conducted by Law Engineering and Environmental Services, Inc is still valid

9 *How will you handle unacceptable materials that are discovered at the working face after the hauler has left? Please propose a designated temporary storage area for unacceptable waste such as white goods, yard waste, waste tires, until their removal to a facility with the appropriate permit or authorization to accept the waste and show the locations on the site plan Also please propose a maximum time frame that such waste will be allowed to remain at the facility until removal Please identify the facility to where the materials will be removed and who will remove them*

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In the event unacceptable waste is identified after the hauler has left the facility, the unacceptable waste is removed from the working face and placed in close proximity to the working face At the end of the day, at a minimum, unacceptable waste is removed from the working area and stored on a paved area adjacent to the waste tire storage and processing area Tires will be placed within the tire storage areas There is an existing concrete storage area for the containment of items such as batteries, oil filters, used oil, etc The white goods are stored in a roll-off box In the 10-year history of the facility, the facility has not received yard waste of any significance The City of Jacksonville provides separate collection and disposal for yard waste and it is not received on site for disposal White goods and batteries are taken off site by various recyclers, these materials are removed off site on an as needed basis

10 *Please list the procedures that will be implemented in the event hazardous waste is discovered at the working face Please include in your plan at a minimum, that the facility will immediately notify the department of the discovery by telephone and will provide written notification and report addressing the managing of the waste within 7 days of the discovery The facility shall record the incident including the location in logs and shall physically delineate the area in the field The extent of contamination shall also be determined Also the facility shall indicate that they will follow all applicable local, state and federal regulations in managing the waste Furthermore, the facility shall commit to handling all materials contaminated by the hazardous material as hazardous waste*

Please see Section VII N 2 (Page 23) which provides the procedures for handling hazardous waste discovered at the landfill The landfill will notify the Department immediately in the event of a discovery by telephone and in addition, agrees to provide a report of the incident to the Department within seven days The report will include the date of the incident, how the materials were discovered, transferred and transported, the disposal location, and if known, the source of the material The material will be transferred and disposed off site in accordance with applicable local, state and federal regulations The clean up will include determining the extent of contamination as well as the handling of materials that are contaminated by the hazardous waste

11 *In section X C you indicate that other waste materials such as shredded waste and biological waste may be accepted for disposal on condition that they satisfy the requirements of FAC Chapter 62-701 520(2) (and) (5) Prior to accepting such waste, please list the procedures you will follow in ensuring the said requirements are satisfied Also, if you intend to apply shredded waste and not follow up with initial cover, please demonstrate that you will satisfy the requirements of FAC Chapter 62-701 520(2) Please clarify if you are you proposing to accept either new types of waste or waste such as an industrial waste at higher concentrations than you were previously permitted to accept and which may result in a leachate other than that which the leachate/liner compatibility liner test was based on If so, please evaluate if the expected resultant leachate will remain compatible with the liner system and provide your evaluation*

Regarding shredded waste, before any shredded waste was brought to the facility, the landfill would request information from the shredding facility to demonstrate that the particle sizes are in accordance with Rule 62-701 520(2)(a), FAC Then, when the shredded waste is brought to the facility for disposal, the material would be unloaded near the working face and then spread and compacted onto the working face The shredded waste will be placed in the working face with the other waste materials and will receive initial daily cover or be tarped in conjunction with the other waste materials

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Regarding biological waste, there are only two types of waste accepted, bodies of domestic animals and treated biomedical waste Before the bodies of domestic animals are brought to the facility, the landfill requests information about the waste to determine if the animals were diseased If the animals were not diseased, the bodies are disposed within the working face and then covered immediately with either additional waste or initial cover If the bodies of the domestic animal are from diseased animals, the bodies will be handled in accordance with Section 823 041(1), F S Treated biomedical waste is disposed within the working face and then covered with either additional waste or initial cover

The landfill has always been permitted to receive any non-hazardous industrial wastes There are no new types of waste including industrial wastes "at higher concentrations" proposed at this time

12 *Please provide calculations concerning the proposed downcomer pipes and terraces to be installed and constructed with the close-as-you-go closure and final closure If previously provided and you wish to incorporate it by reference, please identify the document by title and date and list the section within the document the pertinent information may be found Please also confirm that any information you intend to incorporate by reference is still valid*

The drainage areas for the terraces have been limited to a maximum of 1 25 acres and the terraces are designed with a depth of 2 5 feet and slope of 1% Please see the calculations in **Attachment A**, which demonstrate that a 25-year/24-hour event will result in a maximum depth of approx 1 15 feet (which provides more than 1 35 feet of freeboard)

The downcomers are installed within the 3 1 side slopes to bring the stormwater runoff from the terraces down to the drainage inlets With a slope of 33% and a roughness coefficient (n) of 0 012, the 30" downcomer pipe can handle a flow of 256 CFS The largest drainage area for a downcomer is 11 5 acres Based upon a 25-year intensity of 7 7 in/hr and a coefficient of runoff of 0 8, the maximum flow for a 25-year/24-hour storm event would be 71 4 CFS Therefore, the downcomer is more than adequate to handle the flow

13 *In section X B , you indicate that ash that meets the requirements of Rule 62-701 570(6) (Rule 62-702 570(6)) may be used as initial cover In other sections of your application you indicate you intend to also utilize shredded tires and tarpaulin for initial cover Prior to utilizing any of the said materials for cover, please demonstrate that each will satisfy the initial cover requirements of FAC Rule 62-701 500(7)(e) including acting as a fire barrier Additionally, please demonstrate that their use, especially where the ash and shredded tires are of concern, will not cause an impact to surface water Please also specify the tarpaulin you will use and characterize and provide a description of the ash In your response, please also list the procedures that will be followed in applying each of the proposed initial covers, i e , tarpaulin, shredded waste tires, and ash as initial cover and identify by job position the person who will apply the covers How thick of a layer of shredded tires or ash will you apply? Will you leave the materials in place or remove them? If left in place, how will the materials affect the flow of leachate? Also where will you store the materials when not being used as cover? Please list the procedures that will be followed in managing ash from the time it is received until it is used If you wish to utilize any other materials for initial cover, other than the ones listed above with the exception of clean uncontaminated dirt, please specify and demonstrate they will satisfy the above requested requirements*

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Please be advised that the facility currently has been permitted by the Department to use shredded tires and tarpaulin for initial cover Geotextile Fabrics Fabrene Type TG Product G168 and Nicholon are being used Other equivalent geotextile materials will be utilized upon written approval from the Department The equipment operators place the tarps on the working face at the end of the day in areas that will receive additional waste within 18 hours In the morning, the tarps are removed prior to additional waste placement The tarps are stored near the working face for future use the same day

Prior to receipt of ash residue from a facility, the landfill would require test results from the generator If the material is deemed acceptable for disposal, the ash residue will be placed on the working face and covered with additional waste or initial cover The material will not be stockpiled on site The landfill hereby withdraws the request to be allowed to use ash residue as daily (initial) cover

Regarding shredded waste tires, Rule 62-711 400(3), FAC states, "Waste tires that have been cut into sufficiently small parts may be disposed of or used as initial cover at a permitted landfill " The facility is proposing to cut the tires into pieces that meet the initial cover requirement of Rule 62-711 400(3)(a), FAC and use the shredded tires on the working face for initial cover The shredded tires will not be used on exterior side slope or roadways The equipment operators will place a six-inch thick layer of shredded tires for initial cover, which will remain in place and be covered with additional waste or intermediate cover within seven days The shredded tires for initial cover will be stored on top of the landfill in the vicinity of the working face We believe that no further demonstrations are necessary since it is proposed to use the shredded tires as initial cover as proposed by the regulations

The landfill proposes to use contaminated soil for initial cover See the response to #14 below

14 *How will you ensure that contaminated soils accepted at the facility are not contaminated by a hazardous waste? How will you handle acceptable and unacceptable contaminated soils? Please address the procedures that will be followed in handling soils received at the facility from the time of their receipt until they are used The department understands that you will not use them for any type of cover Please confirm or deny.*

Prior to receipt of contaminated soils at the landfill, the facility reviews pertinent analytical test results from the source If the results indicate that the material is hazardous waste, then the material is not accepted at the site In other words, soil that is unacceptable for disposal within the landfill is not received at the site Depending upon the contaminant of concern, the contaminated soil may be used for initial cover on interior side slopes and not on exterior side slopes If the constituents of concern exceed Rule 62-777, FAC, Soil Cleanup Target Levels for Direct Exposure Based Industrial/Commercial Levels, the soil will not be used for initial cover Contaminated soils that are stored on the site for future use as initial cover will be stockpiled on top of the landfill (within the lined landfill footprint) and will be surrounded by a silt fence We believe the Department should support this reuse of contaminated soil

15 *How will you delineate and mark in the field the waste limits, to prevent the inadvertent placement of waste outside of them? What measures have or will you implement to delineate and mark the liner limits in the field so that the facility will be able to find them at a future date, if necessary? Please also discuss accessibility*

The landfill liner system includes a clay anchor berm on top of the liner around the entire perimeter of the landfill as shown in the details on Drawing No 16 As you can see from the details, the anchor berm is

approximately 4 to 6 feet in height and clearly delineates the edge of the liner system Further, the as-builts of the liner system include the location of the anchor berm Therefore, the limits of waste placement are clearly delineated in the field and can be located easily in the future since the anchor berms were as-built

16 *Please specify the maximum working face dimensions*

The typical working face is 200 feet long by 300 feet wide The size of the working face may vary based upon the location of the working face and waste volume

17 *Please indicate what you mean by "bellies" in the report contained in Appendix D, concerning the inspection of the leachate collection lines Did you video all pipes associated with the leachate collection and detection systems? Please address*

In conversation with Florida Jetclean, Inc , they indicated that the "bellies" are sags or dips in the leachate collection pipe Bellies are potentially created due to shifting of the aggregate medium and not due to sub-base settlement Although these sags or dips maybe as much as 4" in depth, the leachate collection pipe is surrounded by aggregate (as shown in Detail 10 on Drawing No 18) and the leachate will flow in the aggregate

All the primary leachate collection pipes were videoed in addition to jet cleaning According to Florida Jetclean, Inc , the water used in the jetting operation was able to flow unrestricted and therefore, all the primary pipes were determined to be "in good working order"

Please note that the leak detection system is constructed entirely of geonet, except the riser pipe from the sump to vault box Please see Drawing No 18

18 *Please propose a minimum frequency for inspecting, videoing, and cleaning out the leachate collection and detection system during operations Are fines in the leachate expected to increase, especially since you are proposing to recirculate it via an aggregate or slag media? Please address*

The landfill has been in operation for over ten years and has experienced no difficulties in the leachate collection system Further, the leachate collection was designed and constructed with redundancy, in that the pipe is surrounded with an aggregate envelope If the pipe were to become clogged, the aggregate would handle the flow Therefore, we propose that the system be jet cleaned every five years prior to permit renewal

19 *In section P of the engineering report you indicate that the landfill operator will monitor the level of leachate in the collection sumps on a daily basis How about the detection sumps? Also, how will he/she monitor the levels? How is the proposed leachate recirculation event expected to affect these levels? How will you measure the rate of leachate being collected in each of the leachate collection and detection sumps? Please propose to provide and maintain meters at each sump What level of leachate in the leachate collection and detection systems will alert a problem and warrant action?*

The landfill operator monitors the level in and the flow from both the leachate collection and detention sumps on a daily basis, Monday thru Friday The levels are monitored by means of a bubbler sensor and

a manometer at the control panel for each pump station The amount of leachate pumped from each leachate collection and detection sump is measure by a flow meter within the vault box (See Drawing No 18) If the level in a sump exceeds 3 5', an audio and visual alarm would sound at the control panel for the pump station Please note that the leachate sump is recessed approx 3 5 feet below the landfill base and the sump has been double lined (See Drawing No 18)

20 *In section P you propose to compare precipitation rates with leachate generation rates? Have you made such a comparison? Please do so and provide the results of your comparison*

Please see the summary tables for 1998, 1999, 2000, 2001 and 2002 (through October) as well as the comparison table in **Attachment B** As you can see, the summary tables show the monthly rainfall as well as the leachate generation for both the primary and secondary leachate collection systems The comparison table provides the calculated leachate generation rate per operating area per day and the rainfall per day Upon review of the tables, one can see that the amount of rainfall has an impact upon the amount of leachate generated

21 *In section B you indicate that "level sensors in the riser pipe are used to control the pump which removes leachate as it accumulates " What is the level and will the pumps have the capacity to continue maintaining leachate at the specified level or lower with leachate being recirculated at the proposed maximum amount and rate? Please address Also, are the riser pipes built to final elevations, or are you proposing to construct them in increments as waste fill progresses? How will you prevent rainwater or other foreign matter from entering into the risers and cleanouts? How are gases that may collect in them being managed? Please address*

The level sensor is a bubbler sensor in conjunction with a manometer This a similar arrangement that is used in wastewater pump stations throughout the City of Jacksonville As stated above, the leachate sumps are recessed approx 3 5' below the landfill base The leachate pumps discharge a minimum of 35 gallons per minute into the leachate force main which discharges to the leachate storage tanks Based upon 35 gallons per minute, each pump is capable of pumping 50,400 gallons per day and all the pumps (eight total) are capable of pumping 403,200 gallons per day or 12,096,000 gallons per month As you can see from the tables in **Attachment B**, the facility does not generate 12 million gallons of leachate per month Please keep in mind that the figures for July thru October of 2002 reflect a worst-case scenario because the facility was in the process of placing the first lift of waste (less opportunity for absorption into the waste and for stormwater runoff to the perimeter ditch) and there was fairly significant rainfall

Please see Detail No 12 on Drawing No 17, which shows how the riser pipes were constructed to terminate at the Vault Box for each pump station Further, from Detail 12, you can see that each riser pipe as well as the clean-out are covered with an HDPE blind flange On Details 7 and 8 on Drawing No 16, you can see that the clean-out is covered on both ends with an HDPE blind flange

Regarding gas management, each leachate clean-outs is either connected to the gas collection system or will be connected as the gas collection system is expanded to include the landfill phase

22 *Have you compared the amount of leachate being collected against the amount of leachate that was projected to be generated by your design calculations previously submitted? If not, please make the comparison and provide a summary of the results to the department*

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The amount of leachate generated is provided in the summary tables in **Attachment B** The maximum and average leachate generation rates were calculated to be 734 1 and 146 9 gallons per acre per day, respectively In the original design, it was estimated that the maximum leachate generation rate would be 1,000 gallons per acre per day

23 *In light of the proposed leachate recirculation event please reevaluate the capacity of the leachate collection system, i e , pipes, pumps, to adequately handle the expected leachate amount Please provide all supporting calculations Will you have backup pumps? Also, please show all sumps, leachate lift stations, and cleanouts on the site plan view*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

24 *Please provide sizing calculations for the leachate recirculation system, including the trench, the pipes within the trench, the force main, and the pump and pump lift station? Please provide a detail of the pump lift station and also show in a plan and cross sectional view the location of the force main, pump station and flow meter and how they will connect to the existing leachate containment area Did you evaluate the potential for the pipes to clog due to fines that may be in the aggregate, or slag? Please address Also, please specify the types of aggregate you intend to use and provide a description of the slag From the help model printouts the department understands that the hydraulic conductivity of the trench slag/aggregate will be a minimum of 0 300 cm/sec How will you ensure the material provides this minimum hydraulic conductivity after installation? Please address these comments and provide all supporting calculations*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

25 *Please list the procedures that will be followed in constructing the leachate recirculation trenches including the proposed 8-inch pipe and pumping system Will the 8-inch pipe reflected on Drawing sheet number 19A be installed above grade or below grade? How will you prevent it from being damaged during operations? Please address What equipment will be used to construct the system, who will construct it, and who will supervise the construction? Who will decide where to construct the system and when? Please address the quality assurance you will provide to the project, if any*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

26 *You are proposing to use slag or aggregate in the leachate trenches How will the material, slag, be handled from the time it enters the facility, i e , storage, until it is placed in the trenches Will the trenches be immediately covered with intermediate cover?*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

27 *The following comments concern the water balance analysis conducted utilizing the Help model*

- a *A curve number of 80 is too high Please rerun the program utilizing a lower curve number and justify the number you select*
- b *It does not appear that you modeled the system in a saturated state, since you are proposing to recirculate leachate the disposal area will be wetter than normally expected and may reach saturation, please address*

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c *Please run the help model at various stages of the facility when the waste is at various elevations to determine the worst case*
d *Please use historical rainfall data that reflects wet years as opposed to the default data, which reflects dryer times*
e *Please run the model for 14 and 20 years as well as 5 years*
f *Please note you will be required to provide the earthen materials you specify in the program and the materials will be required to exhibit the hydraulic conductivities indicated therein*
g *Are the porosities, field capacities, wilting points, initial soil water content, hydraulic conductivity default values from the program? Please address*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

28 *Please provide a factor of safety regarding the leachate head above the primary liner Please note a head of 10 inches and 11 8 inches does not provide much safety Therefore, the department is not inclined to accept the proposed leachate recirculation rate Please address*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

29 *What will be the wetting front of the recirculated leachate and what will its impact be on the liner and leachate collection system? Please address*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

30 *Please calculate the expected leachate leakage rate through the primary liner Please confirm that you will maintain a recording flow meter at each of the sumps, and will monitor the amount and rate of leachate being collected in the secondary (leak detection system) Please propose to inspect and remediate the system when specific amounts are detected Please justify all assumptions*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

31 *Please also demonstrate that the proposed leachate recirculation activity will not cause the maximum hydraulic head on the secondary liner to reach one inch or greater nor cause it to be as thick or thicker than the secondary lateral drainage layers (geonet)*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

32 *Please provide a safety factor Please provide all supporting calculations and justify any assumptions*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

33 *You propose to not recirculate leachate unless there is a minimum of 55 feet of waste How will you determine in the field if waste is at this minimum height prior to implementing leachate recirculation activities?*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

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34 *From your proposal the department deduced that you will recirculate leachate at a rate no greater than 0 688 gallons per square foot of trench piping and that on a maximum day you will not recirculate more than 30,000 gallons of leachate Furthermore, the department understands that you will recirculate in only one area during a day and that the trench area will be no greater than 1 acre in size Please confirm or deny these understandings Please clarify your engineering report, section VIIB to indicate these maximum rates*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

35 *How will you control and measure the rate leachate is being recirculated? At a minimum please propose recording flow meters on the recirculation line and describe them Also, please identify the person by job role that will be responsible for recording the rates and ensuring the maximum amount is not exceeded Please propose to have the person observe the area as the leachate is being recirculated to ensure the leachate is not penetrating the intermediate cover layer or seeping elsewhere Please list the steps to be followed in conducting the leachate recirculation event and controlling leachate rate Will the system pumps be operated manually or automatically? Please address*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

36 *How will you know when an area is reaching its liquid limit, becoming saturated? Please provide a justification for not proposing to monitor pore pressures or propose to and address how you will If you will, please address the frequency at which you will monitor the pore pressure, indicate how you will monitor them, what level will warrant ceasing leachate recirculation activities, and propose a response time to cease them commencing from the time it is first discovered that cessation is warranted Please list the steps to be implemented in ceasing the recirculation activities and who will implement it*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

37 *Are you intending to monitor backpressures in light of the proposed leachate recirculation activity? Please address*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

38 *How will you know when to cease recirculating leachate in an area, when you may recommence recirculation in an area, or when to abandon an area and move to a new one? Please list the measures you will implement to abandon a recirculation area prior to moving to a new location? Are you proposing to recirculate leachate every day? Are you not going to recirculate leachate on rainy days? Please address these comments and provide all supporting calculations*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

39 *How will you know if the leachate recirculation activity is flooding the recirculation area and/or wetting the intermediate cover? What will be the minimum distances from the side slopes will you recirculate leachate? How will you minimize and inspect for leachate seeps? If a seep is discovered, what procedures will you follow in managing and eliminating it? Please address if perched leachate conditions will be a problem within the disposal considering the initial cover you*

will be and are using Please address these comments for active areas as well as areas that have received intermediate and final cover At a minimum please propose to notify the department and to cease leachate recirculation activities until evaluated and resolved

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

40 *The weight of waste and its decomposition rate are expected to increase when wet and moist Subsequently waste settlement will accelerate which in turn may allow for additional waste to be disposed thereby further increasing the waste density and weight Also, settlement may be greater in areas of the leachate recirculation activity, contributing to differential settlement Please estimate the expected waste density and weight of the waste in light of the proposed leachate recirculation activity and provide an evaluation of how the increase in these factors will affect the total, primary and secondary, waste settlement, differential settlement and ultimately the foundation settlement Please conduct and provide waste settlement calculations and if warranted, new foundation settlement calculations and justify all assumptions*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

41 *Since you are proposing to recirculate leachate, the amount of waste settlement is expected to increase which in turn may exert greater down drag forces on structures placed within the disposal area Please evaluate the expected down drag forces and effects on such structures including those associated with the gas collection system How far from the top of the bottom liner system are the bottom of the pipes? How far are they expected to be after the expected maximum amount of waste settlement and associated resultant forces? Please provide all supporting calculations and justify all assumptions Please address the procedures you will follow in maintaining and monitoring the effectiveness of this system*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

42 *Also, please address the effect the expected total waste settlement and differential waste settlement will have on the grade of the top slope and terraces as well as on structures placed within the disposal area, i e , the downcomer pipes, gas vents Will the top slope effectively promote the drainage of rainfall after the expected maximum waste settlement? Please provide all supporting calculations and justify all assumptions*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

43 *Please include in your response how the increase in waste settlement and potentially foundation settlement will impact the leachate collection system including but not limited to the integrity of the pipes, liner and grade of the liner system Please provide all supporting calculations*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

44 *Since you are proposing to recirculate leachate, which in turn will increase the wetness and weight of the waste, please provide an evaluation for the potential for deep-seated rotational or translational failures through the waste and final cover system, Pursuant to FAC Rule 62-701 600(5)(g)5*

Reference Trail Ridge Landfill - Second Permit Renewal
ET&M No E02-25-3

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

45 *Please not only indicate that erosion will be repaired within 3 days, but also indicate the measures you will implement to prevent and manage erosion Also, please propose to investigate the cause of the leachate to determine if there is an underlying problem, such as unstable slopes*

The landfill prevents erosion by directing stormwater in a controlled manner by way of temporary and permanent stormwater controls Stormwater from the top of the landfill is typically collected in swales and directed to downcomers (both temporary and permanent), which brings the water down to the existing drainage inlets and perimeter ditch When erosion occurs, it is repaired within three days and the reason for the erosion is evaluated to eliminate the source Please note that the typical reason for erosion is stormwater runoff (surface water) and not leachate Upon occasion, there may be a leachate seep on a side slope, which is typically dug out, refilled, compacted and covered To date this has always solved the problem If this did not solve the problem, the landfill would investigate further to determine the reason for the seep

46 *Have you inspected the interior of the leachate storage tanks? If not, please do so Please provide a copy of the results*

The exterior of the tanks were inspected on September 21, 2001 by Timothy Thomas of Thomas Piping and Maintenance Services (American Petroleum Institute Certification #21058) and the results are provided in **Attachment C** The current permit only required that the exterior of the tanks be inspected Since the existing tanks have no means of safe interior inspection (no access ports), we propose that the exterior of the tanks be inspected on or before September 21, 2004 (within three years)

47 *Please provide an updated agreement and/or contract with a facility to accept and treat the landfill's leachate Please include the maximum amount they are willing to accept on any one day*

Please see the attached letter (**Attachment D**) from the JEA regarding the Waste Hauler Discharge Permit, which authorizes discharge from Trail Ridge Landfill to the Buckman Wastewater Reclamation Facility As stated in the letter, there are no flow restrictions

48 *How will you prevent leachate that may travel underneath on the underside of the barrier liner or other final cover system component, from escaping into the environment? Will you connect the final cover system to the liner system? Please address*

Please see Details 4 – 6 on Drawing No 16 which show how the final cover (clay layer) is tied into the clay anchor berm at the edge of the liner system This tie-in of the final cover to the liner system prevents the escape of leachate into the environment

49 *Please provide a more detailed description of the soil/mulch mixture proposed in the top earthen layer Please propose to only utilize mulched yard trash, as defined in FAC Rule 62-701 200(143) What measures will you implement to ensure the mulch is composed of only "yard trash "? Where will you store the premixed and mixed material? Where will you mix the material? Please specify what the maximum size the mulch will be and what equipment you will use to mulch*

Reference Trail Ridge Landfill - Second Permit Renewal
ET&M No E02-25-3

The mulch material used in the soil/mulch mixture comes from the City of Jacksonville's yard trash mulching operation, which to the best of my knowledge is a Department permitted facility According to the City, the mulching facility accepts only yard waste material and the mulch material is a maximum of one inch in size after processing The mulch material and soil material is placed on top of the landfill in a layered fashion (with horizontal layers) and then as the material is removed from the pile, it is excavated in a vertical manner, which provides the mixing The excavated material is placed in trucks and hauled to the location for placement

50 *How will the proposed mulch/soil mixture to be utilized in the intermediate cover affect the stability of the final cover system? How will you compensate for degradation and settlement of the mulch material? Please note that the barrier liner of the final cover system shall be in direct contact with the mulch mixture Please propose a protective layer between the two layers*

Any mulch/soil mixture used on exterior side slopes or on the top will be removed and replaced with intermediate cover Therefore, it will not affect the stability of the final cover system When the mulch/soil mixture is used for intermediate cover, it will be 16 inches in thickness to allow for degradation and settlement, which has been approved by the Department in the past for this landfill Since the mulch/soil material will be removed from the exterior side slopes or as the final intermediate cover layer, there is no need to provide a separation/protective layer

51 *Concerning the final cover system design, please conduct and provide side slope stability calculations and analysis Please conduct your calculations based on the materials you intend to utilize in the final cover system including the intermediate cover and account for saturated conditions Please conduct laboratory interface friction angle tests (ASTM D5321) in wetted condition for each interface in the final cover system utilizing the actual components that will be utilized Please note that the system shall be designed to be stable at the weakest interface determined Finally, please provide all supporting calculations and laboratory results*

The requested information was provided and approved by the Department in the first permit renewal The design has not changed This information was provided to the Department in the Permit Documents for Operation and Construction Renewal dated October 28, 1996 and additional back-up was provided in the RAI Response dated February 27, 1997

52 *Please provide a water balance analysis on the final cover system, both top and sideslopes*

Please see the HELP Model analysis for the final cover system for both the side slopes as well as the top area in **Attachment E**, as requested Please note that an Alternate Closure Design Demonstration for Side Slope Closure was included in Appendix L of the RAI Response dated February 27, 1997 for the first permit renewal

53 *Please specify the grass and vegetation that will be provided, and address that it will not have root penetrations that may impact the barrier liner*

The proposed vegetation will be Bahia sod and Bermuda sod According to the Duval County Extension Service (Pam Mattis @ 387-8850), Bahia sod and Bermuda sod will have a maximum root depth of 12 inches The depth of the cover layers above the barrier layer is 24 inches Therefore, the roots are not expected to penetrate the barrier layer

54 *Please show any existing as well as proposed gas vent locations, flares, blowers, on the site plan Are you proposing to install gas vents in phases? If so, please reflect on the fill-phasing plan provided on drawing sheet numbers 10-15 If not, please justify why not*

The existing and gas collection wells are provided on attached Drawing No 9A, which is a new drawing for this permit application The gas collection wells will be installed during closure and therefore, the Closure Phasing Plans on Drawing Nos 14 and 15 have been revised to include the gas collection wells The Fill Phasing Plans were not modified because the gas collection wells will be installed with closure and not during operation

55 *By introducing more moisture to the waste it is expected to decompose quicker and accelerate the generation of gas Please evaluate and address the effect the proposed leachate recirculation event will have on the generation of gas and provide a copy of your evaluation Please also provide supporting calculations If you find the gas collection system is still adequate and do not wish to propose any changes to the permitted active gas collection system, you may incorporate the previously submitted information including design calculations pertaining to the system by referencing it and confirming that the information remains valid and satisfies the applicable Rule of FAC Chapter 62-701 Please identify the document by listing the title and date and identify the sections where the subject information may be found However, if you find the system will be inadequate, please provide your changes and any supporting calculations and modify your Title V permit accordingly*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

56 *The permeating of liquids that are present within the disposal area into the gas vent structures is a concern What measures will you implement to prevent recirculated leachate from reaching into the gas collection structures and how will you monitor for it?*

The applicant has withdrawn the request to recirculate leachate Therefore, a response is not necessary

57 *Please address the inspections you will conduct on the active gas collection system, leachate recirculation system, cover system components, leachate collection items, and etc Please provide a quality assurance plan that will address the maintenance and repairs of these items and system during operations and after cover is applied Please include the procedures that will be followed in maintaining and repairing them Please address the tests, if any, that will be conducted in determining the integrity of these systems*

The gas collection system is monitored and tested on a monthly basis The cover system is mowed and inspected on a regular basis and if the cover system or other closure components require repair or maintenance, the work is conducted on a timely basis The leachate collection system is monitored on a daily basis, Monday thru Friday If any system requires repair or maintenance, it is restored to its intended function

58 *Please address who and how you will select the first four feet of select waste above the liner system How will you manage the unselected waste?*

Reference Trail Ridge Landfill - Second Permit Renewal
ET&M No E02-25-3

The first four feet of waste has been placed over the entire liner system and the placement was observed by an independent monitor under the direction of a professional engineering accordance with the existing permit (Specific Condition 16)

59 *Concerning the fill phasing plan, how will field personnel know when they have reached the elevations at which the facility is to construct final cover and install the drainage devices in accordance with drawing sheet numbers 11-15? How will they know where the limits of fill are for each respective fill phase reflected on same drawing sheets?*

The landfill has surveyors stake the slopes and terraces prior to waste placement and again after waste placement to check the grades With this periodic survey work, the landfill personnel know when the final grades have been met Please note that the downcomer system is not installed during operations but as a part of closure

60 *Please clarify the waste filling sequence within in each phase For instance, will you start in the southeast corner and work your way north and west?*

Waste placement in each phase generally proceeds from east to west

61 *What material will the access roads be constructed of? How will you ensure the access road on the disposal area will be stable and not contribute to erosion?*

The roads are constructed of slag, broken concrete, rocks and bricks, which provide a stable base The roadways are graded to direct runoff to roadside swales to minimize erosion

62 *In your notes you indicate that fill phasing may change, please note that such a change will require a modification to your permit prior to initiation*

The note was included to indicate that the operations may require minor adjustments to the fill phasing, such as the waste placement from west to east (rather than east to west) on a second lift within a phase to promote better drainage Nevertheless, major revision, such as changing the order of fill phasing would (and has been in the past) be handled with a permit modification

Please note that upon further review of the Fill Phasing Plans, the landfill has decided to change the order of waste placement in Phase V, in the following order VD, VC, VA and VB Please see the revised Fill Phasing Plans as well as the Closure Phasing Plans (Drawing Nos 11 thru 15)

63 *Please address litter and dust control If you intend to incorporate information previously provided, please list the title and date of the document and the section within the document the information may be found Please also indicate if the information is still valid and satisfies the requirements of the now effective FAC Chapter 62-701*

As stated in Section VIII U (Page 31), "The problem of blowing litter will be minimized by limiting the active working face and using initial cover or tarpaulins over the active fill areas Other methods, such as the utilization of casual labor pickers and portable fencing will be employed as required to contain loose paper and other wind-blown refuse during fill operations Any loose paper or similar refuse blown outside the working area will be picked up on a regular basis "

Reference: Trail Ridge Landfill - Second Permit Renewal
ET&M No E02-25-3

As stated in Section VIII U (Page 30), "Dust originating from haul road surfaces will be controlled by periodic sweeping and/or watering of road surfaces, as required "

64 *Please address odor control and list the procedures you will follow in controlling and eliminating odors*

Odors are largely controlled by the active gas collection as well as the placement of initial cover and tarps on the active face

65 *Please list the procedures that will be followed in the event of a fire or hot load is received at the facility*

As stated in Section VIII U (Page 30), "Should a fire occur at the landfill, the application of additional compacted cover will be utilized to cut off the flow of oxygen into the burning area If this does not contain the fire, the affected area will be thoroughly wetted, excavated, and wetted again prior to reconstructing the cells "

If a hot load is received at the landfill, the landfill isolates the load and extinguishes the load with cover and/or wetting which ever is deemed appropriate

66 *The following comments concern the Quality Assurance/Quality Control Plan*

a *Please list the minimum qualification the Quality Assurance personnel will have, independent of the contractor who will be retained for the project Please confirm the QA/QC personnel will be at the site and will observe all work and associated testing related with the closure construction project*

As stated in the Quality Assurance Quality Control Plans (Appendices J and K, Pages 1 and 2), the General Quality Control Monitor shall be experienced in civil site construction and solid waste regulations, the General Quality Assurance Engineer shall be experienced in civil site construction and solid waste regulations and shall be a registered Professional Engineer, the Soils Quality Control Monitor shall be experienced in civil site construction and soil testing standards and procedures, and the Soils Quality Assurance Engineer shall be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer Further, the qualifications for the Geosynthetic Quality Assurance/Quality Control personnel are contained in Section 1 2 7 3 of the Quality Assurance Guidance Document for the Installation of Lining Systems in Appendix K

As stated in the Quality Assurance Quality Control Plans (Appendices J and K, Page 1), the General QA/QC includes full-time services to periodically observe the contractor's work to verify substantial compliance with permits, plans, specification and design concepts Further, as stated in Section 1 2 7 2 2 a of the Quality Assurance Guidance Document for the Installation of Lining Systems (Appendix K), the Geosynthetic Quality Assurance monitors, logs, photographs and/or documents all geosynthetic installation operations

b *Please specify the criteria the various components of the final cover system will be required to satisfy, i e , peel and shear strength, interface friction angles Please note that the*

synthetic and earthen materials as well as their characteristics, i e , hydraulic conductivities, thickness, friction angles, specified in the QA/QC report shall correspond with those provided in the requested water balance analysis, interface friction angle tests and other design calculations Please revise the plan accordingly

In accordance with Rule 62-701 400(3)(d)5, FAC, the HDPE geomembrane used for the top area closure will meet the specifications contained in method GRI GM13 In Table 2 of GRI GM13, all the limits for each properties, such a thickness, density, tensile properties, tear resistance, etc , are clearly defined The final cover details on Drawing No 20 show that the closure will include a 40 mil textured geomembrane liner and we do not believe that it is necessary to state that the materials will meet the regulations, which are required by law to be met

Table 2 from GRI GM13 is not included in the QA/QC Plan because if there are any modifications made to the table during the five-year permit period, the QA/QC Plan does not need to be modified with the Department The most up-to-date Table 2 information will be provided in the project specifications Further, there will be project specifications for each earthen material, which must be met per the QA/QC Plan, but they are also not stated in the plan for the reasons stated above The QA/QC Plan explains how monitoring, inspections, etc will be conducted and it is not the object of the plan to provide the standards to be met

c *Please address how you will handle gas bubbles if encountered during closure construction*

Addressing gas bubbles is not a QA/QC issue This is a construction issue First the liner must be placed in a manner that allows gases to vent during construction and soil must be placed on the liner as soon as possible after the liner has been installed, tested and approved These issues have been covered very successfully in the past in the construction documents and would be addressed in future construction documents

67 *The following comments concern the Waste tire processing plan*

a *Is the curb being maintained? Please show the storage areas for both processed and unprocessed waste tires on the site plan Please reflect the required fire lanes on the drawings Please reflect the dimensions and subbase*

The curbs both concrete and asphalt are maintained Further, the area is swept and maintained so that debris does not accumulate at the curbs

The whole waste tires are stored in the Tire Pile Areas (as shown on Exhibit A in Appendix H) until they are shredded or taken off site for beneficial reuse In the event the tires are shredded, the shredded tire wastes is either taken up to the landfill for use as alternate initial cover or transported off site to a recycling facility Typically, the facility does not store shredded tire waste on site but if necessary, it would be stored in Tire Pile Area(s)

The 50' wide lanes around each Tire Pile Area, as shown on Exhibit A, are the Fire Lanes The tire storage area dimensions and a detail of the pavement section are provided on Exhibit A Please keep in mind that this is an existing facility There is no construction associated with this permit

b *Please list the procedures that will be followed from the time a tire enters the site until it is removed or disposed after processing*

When a waste tire arrives at the site or is discovered on the landfill (and the hauler can not be identified), it is taken to the waste tire area and placed within the Tire Pile Area Currently, the tires are transported to the Wheelabrator Facility for beneficial reuse In the event the tires are to be shredded, a mobile tire shredder would be brought to the site to shred the existing tires on site After shredding, the shredded tire waste is either taken up to the landfill for disposal or transported off site to a recycling facility

c *What will be the maximum amount of tires you will store on site at any one time, both processed and unprocessed? Please demonstrate that the waste tire storage areas will have the capacity to contain the liquid residue from a potential waste tire fire when the maximum tire amount is being stored*

The maximum number of tires to be stored on the site is 10,000 tires The waste tire processing area has been bermed as required by Rule 62-711 540 (3) (e), FAC to keep liquid runoff from a potential waste tire fire from entering water bodies If necessary, due to a fire, the equipment and cover soil on site could be used to fortify the curb to contain a liquid runoff

d *Please describe the processing equipment you will utilize on site including its processing capacity, daily throughput Please provide a detail of the system Who will operate the equipment and what are there qualifications? Please demonstrate that you will provide enough personnel to process the proposed maximum amount of tires Please show on the site plan the location of the processing facility Will the equipment be maintained on site?* ***If not, what will be the minimum frequency it will be made available*** *and please provide a copy of a contract with an authorized mobile waste tire processor What will you do with tires that are unable to be processed? How long from the time a waste tire is received on site will it be processed? What will be the maximum amount of time processed tires will be allowed to remain on site? To where will you send the processed waste tires?*

In the event the tires are to be shredded, the shredding will be conducted by an independent Contractor, who will shred the tires on a regular basis The Contractor will bring the necessary equipment to the site to process the tires on the site In accordance with Rule 62-711 530 (3), FAC, at least 75 percent of the whole tire, used tires and processed tires that are delivered to or are contained on the site at the beginning of the calendar year will be processed and removed for disposal or recycling from the site during the year, or disposed of on the site The processed tires are disposed in the landfill or taken off-site for disposal or beneficial reuse

e *Please demonstrate that you will have the capacity in equipment and in personnel to adequately handle the maximum amount of tires you propose to have on site at any one time Please demonstrate that you will not exceed the storage limitation of 60 times the daily throughput of the processing equipment for the days the equipment is at the site and operating*

The facility is limited to 10,000 whole waste tires and will contract to have the tires taken off site for beneficial reuse or shredded on a regular basis so they can stay within the permitted limit This

waste tire processing facility has been operating for ten years in compliance with the regulations and this application does not propose any changes to the operations

f What measures will you implement to control and minimize the breeding of mosquitoes?

The entire tire storage area is on a paved impervious surface There is minimal potential for ponding, tires are either shredded or are removed off site for beneficial reuse on a regular basis The removal of tires at phased intervals helps to minimize any potential for the breeding of mosquitoes In the event we do have an issue with vectors, the facility will obtain the services of a pest control firm

g What measures will you implement to ensure the processed waste tires are satisfying the FAC Chapter 62-711 required sizes for disposal

The landfill contracts to have the tire shredded and checks the shredded waste material to ensure the contract requirements are met Typically, a whole waste tire is shredded into more than eight substantially equal pieces The landfill also ships the tires off site for beneficial reuse

h Please provide a contingency plan in the event the equipment breaks down

In the case of shredding, the landfill contracts to have the tires shredded on a regular basis The Contractor is required to conduct the shredding and must bring the equipment necessary to perform the shredding operation

i How will you ensure in the field that the tires are within the height and storage limits?

There are pavement markers (painted lines) on the pavement to outline the limits of the storage areas Further, on a weekly basis, the facility visually checks the height of the waste piles to ensure compliance

j Please provide a closure plan listing the measures that will be implemented in closing the facility

The following is the closure plan for the waste tire facility

When the Waste Tire Processing Facility ceases to accept waste tires, the operator will

1 Post a notice indicating that the site is closed and provide the phone number of the City of Jacksonville, Department of Solid Waste and Resource Management,
2 Notify the Department and county of the closing,
3 Remove all waste tires and residual to a waste tire processing facility, solid waste management facility authorized to accept water tires, or a legitimate user of waste tires,
4 Remove any solid waste to a permitted solid waste management facility, and
5 Notify the Department when closing is complete

At this time, the facility does not propose to close until the landfill is closed (some 14 years from now) Further, no rehabilitation of the site would be necessary because there is no

contamination or other threat to the public health or environment Proof of financial assurance is provided with the overall financial assurance for the landfill

k Please note that the cost estimates need to be for removing the maximum amount of tires, processed and unprocessed, you intend to have at the site

As stated above, the facility is limited to 10,000 whole waste tires The financial assurance closure cost estimates for the landfill have been revised to reflect the maximum 10,000 tires (or 100 tons) as shown in **Attachment F**

l Please address how you will handle fires at the facility Also, have you had fire safety surveys conducted? If so, what were the recommendations if any and have you implemented them? If not, please do so and provide a copy of the survey with any recommendations and address

Please see the Emergency Preparedness Manual, Exhibit B in Appendix H Fire safety surveys have been conducted on an annual basis Recommendations in the surveys were implemented when possible

68 Please provide a more detailed description of the Underdrain reflected on Drawing Sheet 8 and its purpose Please provide all supporting calculations

The underdrain is provided to ensure the landfill terraces and top slope do not become saturated for slope stability The underdrains are not a requirement but rather additional protection There are no calculations to provide or any demonstration to be made A detail of the Typical Terrace including the underdrain is provided on revised Drawing No 21

69 On drawing sheets 16 - 18, please list all revisions and clarify if you are proposing any changes to the items reflected in the drawings in this permit application

The liner and leachate collection system have been completely constructed Drawing Nos 16, 17 and 18 are the same drawings as presented in the first permit renewal There are no revisions

70 Please explain the plywood shown on drawing sheet 16, detail 1

During construction of the liner system, plywood was placed over the end of the liner system When the next phase was constructed and the liner was uncovered for future connection, the plywood provided protection during the uncovering operation Please note that the plywood was not placed in direct contact with the liner Further, the plywood was removed prior to tie-in of the liner system

71 Please note you will need to apply for a closure permit in accordance with the applicable rules of FAC Chapter 62-701

When the facility ceases to accept waste for disposal, the landfill will apply for a closure permit

Reference Trail Ridge Landfill - Second Permit Renewal
ET&M No E02-25-3

72 The following comments concern the cost estimates

a Concerning your cost estimates, you indicate in your application form that the disposal area is 148 acres, which equates to 716, 320 square yards, however, your estimates are for a smaller area Please address and revise your estimates as appropriate

Please note that on Page 1 of the Financial Assurance Cost Estimate Form, 119 acres is the area used in the closure estimates The reason 119 acres rather than 144 acres is used is because 25 acres have received final cover in accordance with the closure-as-you-go requirements There have been four incremental closure projects at the site and each closure project has been documented and certified to the Department Please see **Attachment G** which contains correspondence and the Closure QA/QC Plan associated with each closure project Also, please note that Appendix M of the First Permit Renewal contained the QA/QC Plan for Side Slope Closure and Appendices J and K of the Second Permit Renewal (the current application) contains the QA/QC Plans for Side Slope Closure and Top Area Closure, respectively Also, please see **Attachment H** which contains a letter from the Department accepting the Closure Construction Certification for Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20

b Please check the amount of leachate expected to be collected during the long-term care period Since you are proposing to recirculate leachate, the disposal area is expected to be wetter than normal and more leachate, therefore, may be collected after closure Please revise your costs accordingly

The leachate recirculation has been withdrawn

c Please confirm that all cost estimates are for third party costs that the department may incur if tasked with the responsibility of maintaining and monitoring the facility

The cost estimates are third party cost estimates

I sincerely hope this response will provide the Department all the necessary information I would respectfully request that any questions regarding this application be directed to me

Sincerely,

ENGLAND, THIMS & MILLER, INC.

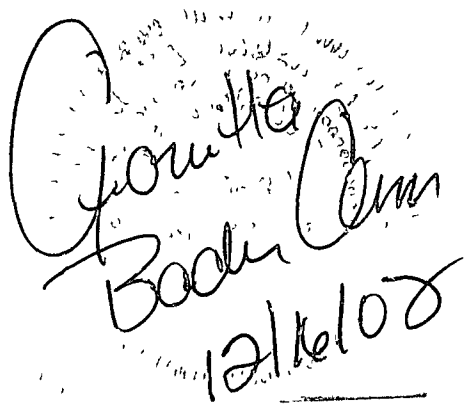
Juanita Bader Clem, P E
Vice President

Attachments

cc Greg Mathes
Achaya Kelpenda
Chris Pearson

LIST OF ATTACHMENTS

ATTACHMENT A – Stormwater Calculations for Terraces
ATTACHMENT B – Leachate/Rainfall Summary and Comparison Tables
ATTACHMENT C – Tank Inspection
ATTACHMENT D – Letter from JEA Regarding Leachate Discharge to Buckman WRF
ATTACHMENT E – HELP Model Results for Water Balance
ATTACHMENT F – Financial Assurance Closure Cost Estimates
ATTACHMENT G – Closure Documentation
ATTACHMENT H – Department Letter of Acceptance for Side Slope Closure



ATTACHMENT A

Stormwater Calculations for Terraces

TRAIL RIDGE LANDFILL
LANDFILL TERRACE SWALES

IF Flow = Q = Coefficient of Runoff (C) * Intensity (I) * Area (A)

C = 0 8

I_{25} (Intensity for 25-Year Storm) = $\frac{145}{(T_C + 20)^{0.863}}$

If T_C (Time of Concentration) = 10 min , Then I = 7 7 in /hr.

A = 1 25 ac (Maximum Terrace Size)

THEN

$$Q = 0\,8 * \frac{7.7\ \text{in.}}{\text{hr}} * \frac{\text{hr}}{3600\ \text{sec}} * \frac{\text{ft}}{12\ \text{in}} * 1\,25\ \text{ac} * \frac{43560\ \text{sf}}{\text{ac}} = 7\,8\ \text{cfs}$$

TERRACE

IF· Slope = 0 5% (allowing for settlement)

ASSUME· Depth of Flow = 1 15'

THEN·

Flow Area = FA = 3 97

Wetted Perimeter = WP = 7.27

Hydraulic Radius = HR = FA/WP = 0 546

Q = 7 95 cfs

FURTHER

Velocity = Q/A = 7.95/3.97 = 2 fps (very good)

The terrace swales have a depth of 2 5 feet and therefore, there is 1 35 feet of freeboard in the terrace swales Therefore, the terrace swales are more than adequate to handle the flow from the terraces Further, the typical terrace is approximately 1 0 acres which would result in a reduced depth of flow in the swale

ATTACHMENT B

Leachate/Rainfall Summary and Comparison Tables

Trail Ridge Landfill
Leachate/Rainfall: 1998

Month	Rainfall (inches)	Leachate Primary (gallons)	Leachate Secondary (gallons)	Total Leachate Produced (gallons)
January	4.4	239,400	800	240,200
February	13.5	350,000	2,200	352,200
March	3.4	1,653,600	30,400	1,684,000
April	0.3	300,700	32,800	333,500
May	3.2	110,100	22,200	132,300
June	2.1	173,600	9,300	182,900
July	7.0	430,800	21,600	452,400
August	8.4	1,051,000	64,700	1,115,700
September	9.2	803,700	43,100	846,800
October	0.6	733,500	17,400	750,900
November	0.1	348,200	9,800	358,000
December	0.3	169,600	2,100	171,700
TOTAL	**52.5**	**6,364,200**	**256,400**	**6,620,600**

Trail Ridge Landfill
Leachate/Rainfall: 1999

Month	Rainfall (inches)	Leachate Primary (gallons)	Leachate Secondary (gallons)	Total Leachate Produced (gallons)
January	3.6	308,000	27,000	335,000
February	0.9	228,300	-	228,300
March	1.1	239,400	-	239,400
April	1.7	447,000	4,200	451,200
May	1.2	568,700	4,400	573,100
June	7.2	709,000	200	709,200
July	3.9	306,400	200	306,600
August	6.3	202,600	3,600	206,200
September	7.0	233,600	7,590	241,190
October	5.6	190,100	7,500	197,600
November	2.2	158,900	12,100	171,000
December	0.8	131,100	13,300	144,400
TOTAL	**41.5**	**3,723,100**	**80,090**	**3,803,190**

Trail Ridge Landfill
Leachate/Rainfall: 2000

Month	Rainfall (inches)	Leachate Primary (gallons)	Leachate Secondary (gallons)	Total Leachate Produced (gallons)
January	4.2	164,600	12,900	177,500
February	2.7	124,300	8,400	132,700
March	2.2	98,100	8,300	106,400
April	1.3	149,300	2,100	151,400
May	0.1	101,800	19,200	121,000
June	4.1	64,600	22,600	87,200
July	7.4	117,500	39,300	156,800
August	5.4	368,600	11,800	380,400
September	7.5	276,800	1,400	278,200
October	0.5	179,000	7,100	186,100
November	1.5	139,100	4,500	143,600
December	1.0	182,300	2,400	184,700
TOTAL	**37.9**	**1,966,000**	**140,000**	**2,106,000**

Trail Ridge Landfill
Leachate/Rainfall: 2001

Month	Rainfall (inches)	Leachate Primary (gallons)	Leachate Secondary (gallons)	Total Leachate Produced (gallons)
January	1.0	181,400	1,100	182,500
February	0.9	151,400	-	151,400
March	7.2	524,800	2,200	527,000
April	0.6	325,000	900	325,900
May	0.8	241,600	1,200	242,800
June	8.7	312,600	2,000	314,600
July	9.2	588,900	1,100	590,000
August	8.9	604,200	600	604,800
September	13.1	626,800	1,600	628,400
October	0.1	428,300	100	428,400
November	2.8	322,400	100	322,500
December	2.9	341,600	-	341,600
TOTAL	**56.2**	**4,649,000**	**10,900**	**4,659,900**

Trail Ridge Landfill
Leachate/Rainfall: Jan-Oct 2002

Month	Rainfall (inches)	Primary (gallons)	Secondary (gallons)	Total Produced (gallons)
January	5.7	587,000	1,900	588,900
February	1.1	733,500	900	734,400
March	3.7	916,500	1,100	917,600
April	3.5	760,900	10,000	770,900
May	0.5	423,900	-	423,900
June	6.5	656,700	1,400	658,100
July	6.5	1,392,100	500	1,392,600
August	8.6	1,415,100	1,500	1,416,600
September	5.1	1,162,000	600	1,162,600
October	1.9	580,400	-	580,400
TOTAL	**43.1**	**8,628,100**	**17,900**	**8,646,000**

Trail Ridge Landfill
Leachate/Rainfall Comparison

Year	Months	Leachate Generated (gallons)	Operational Area (acres)	Generation Rate (gallons/acre/day)	Rainfall (inches)	Average Rainfall (inches/day)
1998	January	240,200	74 0	104 7	4 4	0 14
	February	352,200	74.0	170 0	13 5	0.48
	March	1,684,000	74.0	734 1	3 4	0.11
	April	333,500	74 0	150.2	0 3	0.01
	May	132,300	74.0	57.7	3.2	0.10
	June	182,900	82 5	73 9	2.1	0.07
	July	452,400	91 7	159.1	7 0	0 23
	August	1,115,700	91.7	392 5	8.4	0 27
	September	846,800	91 7	307 8	9.2	0.31
	October	750,900	91 7	264 2	0 6	0 02
	November	358,000	91 7	130 1	0 1	0.00
	December	171,700	91 7	60 4	0.3	0 01
1999	January	335,000	91.7	117.8	3.6	0.12
	February	228,300	91.7	88 9	0 9	0 03
	March	239,400	91.7	84 2	1.1	0 04
	April	451,200	91.7	164 0	1 7	0 06
	May	573,100	91.7	201 6	1 2	0 04
	June	709,200	91 7	257 8	7.2	0 24
	July	306,600	91.7	107 9	3.9	0.13
	August	206,200	91 7	72 5	6.3	0.20
	September	241,190	91 7	87 7	7 0	0 23
	October	197,600	91 7	69 5	5 6	0 18
	November	171,000	91.7	62 2	2.2	0 07
	December	144,400	91 7	50 8	0 8	0.03
2000	January	177,500	91 7	62.4	4.2	0.14
	February	132,700	91 7	51.7	2.7	0 10
	March	106,400	91 7	37 4	2 2	0 07
	April	151,400	91 7	55 0	1 3	0 04
	May	121,000	91 7	42.6	0 1	0 00

Trail Ridge Landfill
Leachate/Rainfall Comparison

Year	Months	Leachate Generated (gallons)	Operational Area (acres)	Generation Rate (gallons/acre/day)	Rainfall (inches)	Average Rainfall (inches/day)
2000	June	87,200	91 7	31 7	4 1	0 14
	July	156,800	91 7	55 2	7 4	0 24
	August	380,400	91 7	133.8	5.4	0.17
	September	278,200	91.7	101.1	7 5	0.25
	October	186,100	91 7	65 5	0 5	0 02
	November	143,600	91 7	52 2	1 5	0 05
	December	184,700	91 7	65 0	1.0	0.03
2001	January	182,500	100 2	58.8	1 0	0 03
	February	151,400	100 2	54.0	0 9	0 03
	March	527,000	109 4	155 4	7 2	0 23
	April	325,900	109 4	99 3	0 6	0 02
	May	242,800	109 4	71.6	0.8	0 03
	June	314,600	109 4	95.9	8.7	0 29
	July	590,000	109 4	174 0	9.2	0 30
	August	604,800	109 4	178 3	8.9	0.29
	September	628,400	109.4	191.5	13.1	0 44
	October	428,400	109.4	126.3	0.1	0.00
	November	322,500	109 4	98.3	2.8	0.09
	December	341,600	109.4	100.7	2.9	0 09
2002	Jan	588,900	109 4	173 6	5 7	0 18
	February	734,400	117 5	223.2	1.1	0.04
	March	917,600	117 5	251 9	3 7	0 12
	April	770,900	126 7	202.8	3.5	0 12
	May	423,900	126 7	107 9	0 5	0 02
	June	658,100	133 8	164 0	6 5	0 22
	July	1,392,600	133 8	335 7	6 5	0 21
	August	1,416,600	133 8	341.5	8 6	0.28
	September	1,162,600	144 0	269.1	5 1	0 17
	October	580,400	144.0	134.4	1.9	0.06
	Average	25,835,690	99 7	146 9	231 2	0 13

ATTACHMENT C

Tank Inspection

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 01

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 01

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: Paint is blistering due to sun damage

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? Yes

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

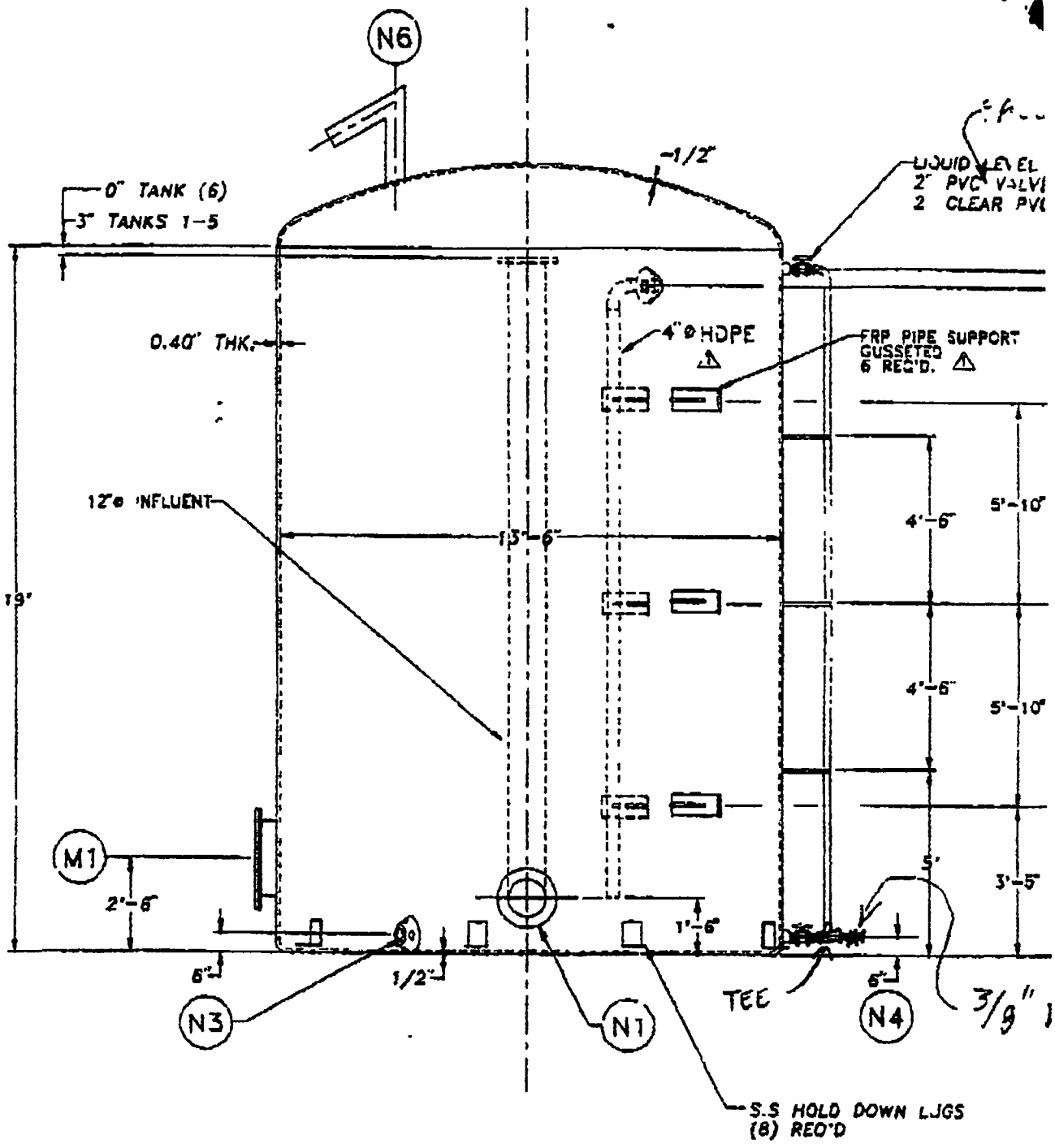
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness 100 mils

MAXIMUM FILL HIEGHT 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		4"DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

SUBMITTAL NO. [illegible]

(A)

MATCH

MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 8	SERVICE
N8	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	6"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	6"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY

NOZZLE/ FLANGE

NOZZLE SCHEDULE

OR

N5

N2

18'-6"

VALVE FOR SAMPLING

NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

☐ NO EXCEPTION TAKEN ☒ MAKE CORRECTIONS NOTED
☐ REJECTED ☐ REVISE AND RESUBMIT
☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any deviations shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Determining and confirming and correlating job site fabrication processes and techniques, coordination of his work with that of all other trades and the safety precautions and programs in connection with the work.

THIMS & MILLER, INC.

Date 2-4-92

By Douglas W. Hunt

[illegible] PLASTIC SYSTEMS, INC
[illegible]NE FIELD ROAD, P.O BOX 6280
LAKELAND, FLORIDA. 33807

DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"

DESCRIPTION: ELEVATION VIEW

PURCHASE ORDER: 58830

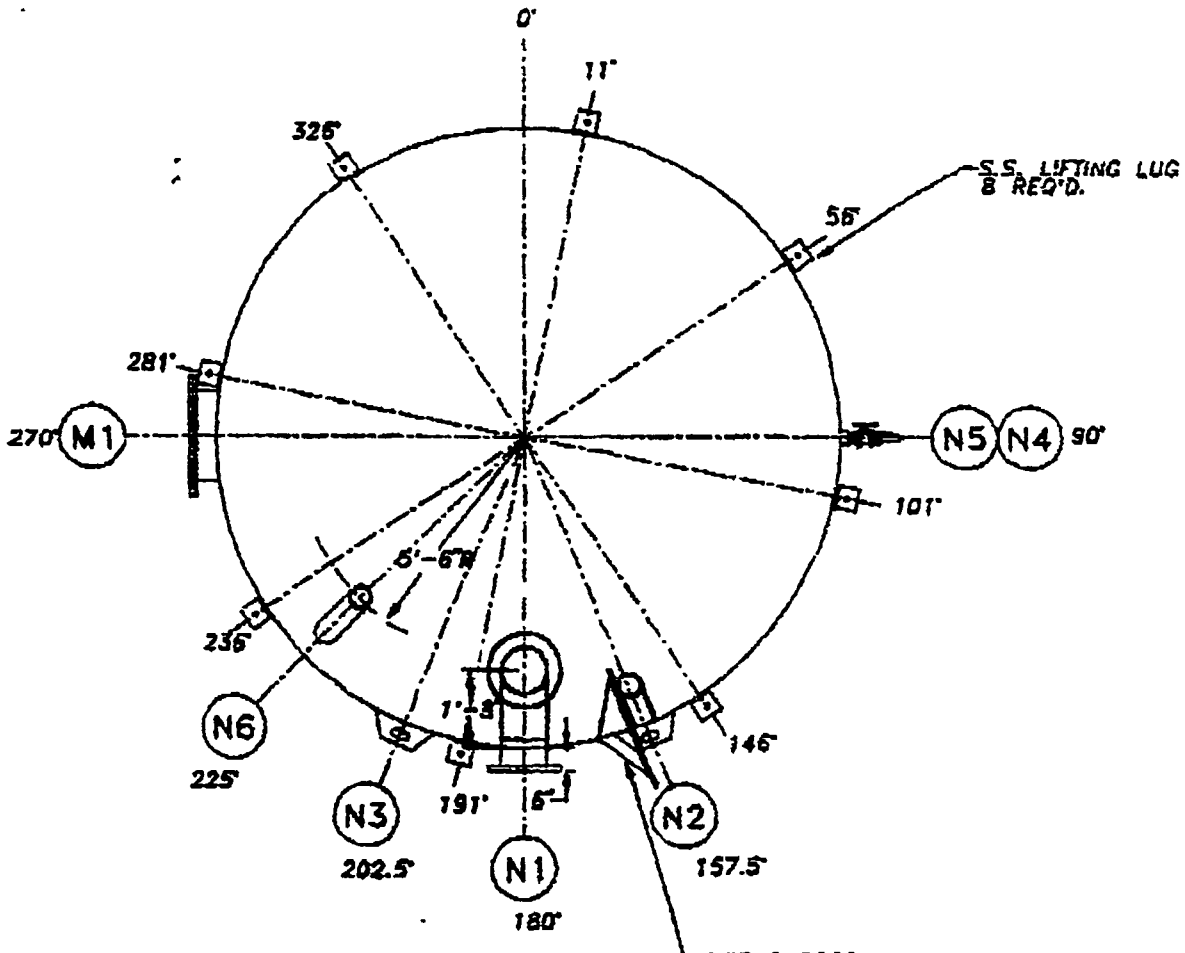
PROJECT NAME: TRAIL RIDGE LANDFILL

PREPARED FOR: JAX UTILITIES

DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve

(2) Inspect dryer/tank vent yearly

(3) The maximum interval, until the next external inspection would be three years, due to State and County regulations

(4) Based on the extent of the inspections performed on tank # 01, The test results show no substantial corrosion above and beyond That noted as of the test date (Sept.21,01) This is not to be constructed as an expressed or implied warranty of future performance

Evaluated by

Timothy N Thomas

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 02

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 02

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: Paint is blistering due to sun damage

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? NO,
Brass valves are located on sample ports.

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

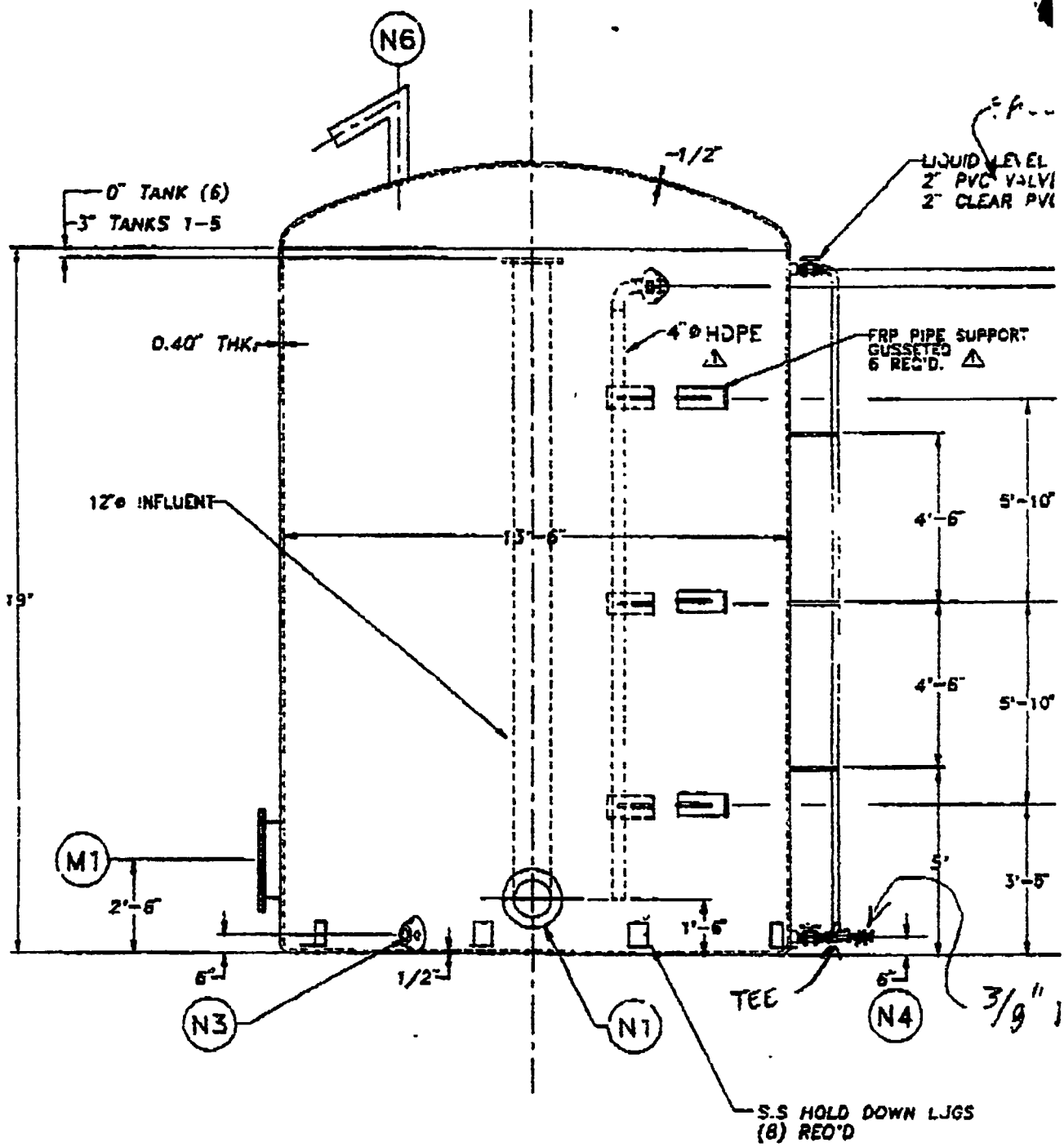
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness 100 mils

MAXIMUM FILL HIEGHT· 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		4"DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS IN

(A) SUBMITAL NO. 1102

MATCH

MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 6	SERVICE
N8	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	4"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	4"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY
NOZZLE/ FLANGE								

NOZZLE SCHEDULE

OR

N5

N2

18'-6"

NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

VALVE FOR SAMPLING

☐ NO EXCEPTION TAKEN ☒ MAKE CORRECTIONS NOTED
☐ REJECTED ☐ REVISE AND RESUBMIT
☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any deviations shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the safety precautions and programs in connection with the work.

[illegible] & MILLER, INC.

Date 2-4-92

By Douglas W. Hunt

AL PLASTIC SYSTEMS, INC
NE FIELD ROAD, P.O BOX 6280
KELAND, FLORIDA. 33807

DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"

DESCRIPTION: ELEVATION VIEW

PURCHASE ORDER: 58830

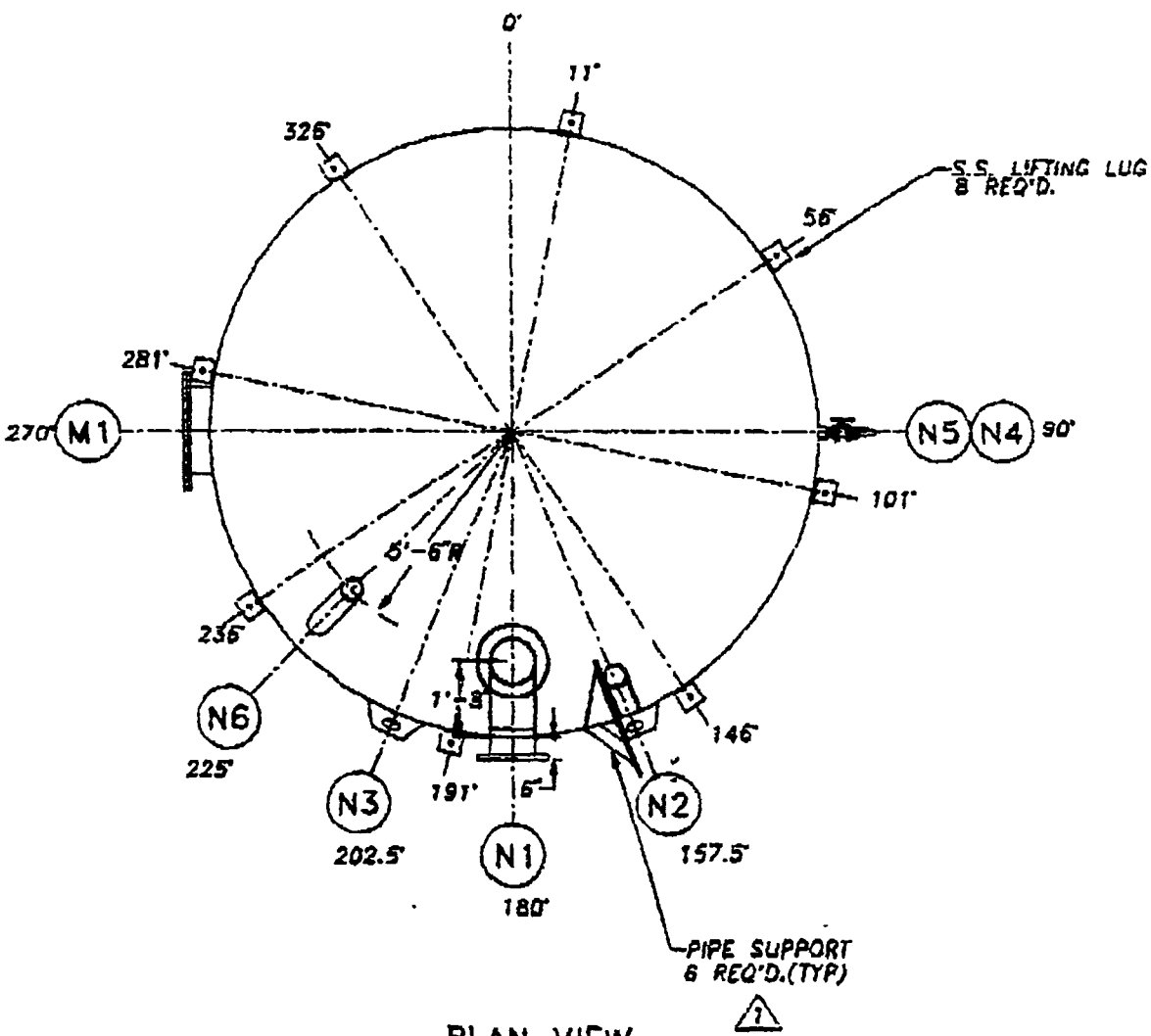
PROJECT NAME: TRAIL RIDGE LANDFILL

PREPARED FOR: JAX UTILITIES

DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve

(2) Remove and replace brass ball valve on sample port. Replacement recommended to be CPVC or 304 trough 316' grade stainless steel

(3) Inspect dryer/tank vent yearly.

(4) The maximum interval, until the next external inspection would be three years, due to State and County regulations

(5) Based on the extent of the inspections performed on tank # 02, the test results show no substantial corrosion above and beyond that was noted as of the test date (Sept,21,01). This is not to be construed as an expressed or implied warranty of future performance.

Evaluated by

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 03

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 03

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: None

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? NO,
Brass valves are located on sample ports.

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

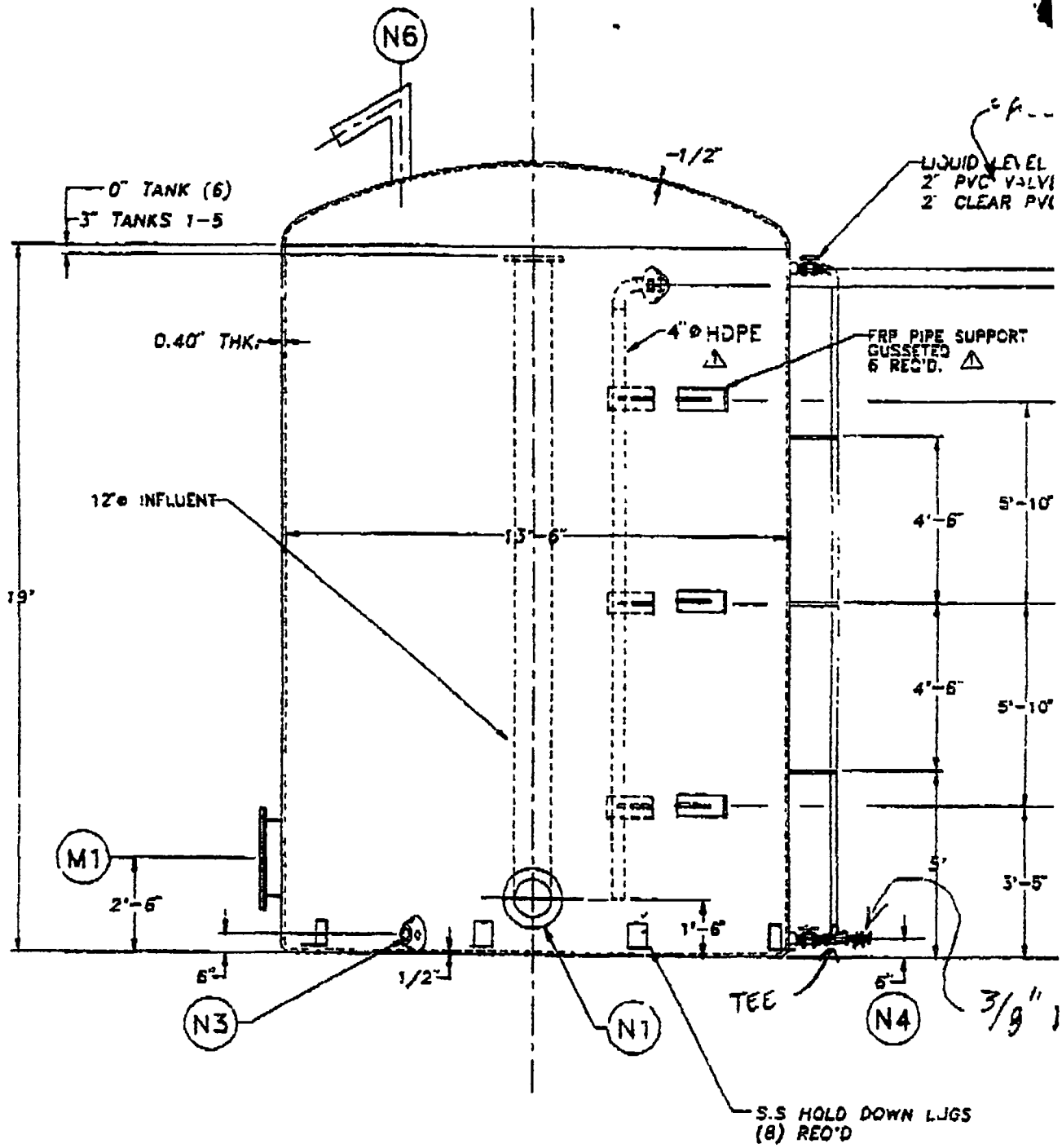
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness · 100 mils

MAXIMUM FILL HIEGHT 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		4" DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INI

SUBMITTAL NO. [illegible]

(A)

MATCH

MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 6	SERVICE
		NOZZLE/ FLANGE						
N8	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	4"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	4"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY

NOZZLE SCHEDULE

OR

N5

N2

18'-6"

NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

VALVE FOR SAMPLING

☐ NO EXCEPTION TAKEN ☒ MAKE CORRECTIONS NOTED
☐ REJECTED ☐ REVISE AND RESUBMIT
☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.

[illegible] & MILLER, INC.

Date 2-4-92

By Douglas W. Hunt

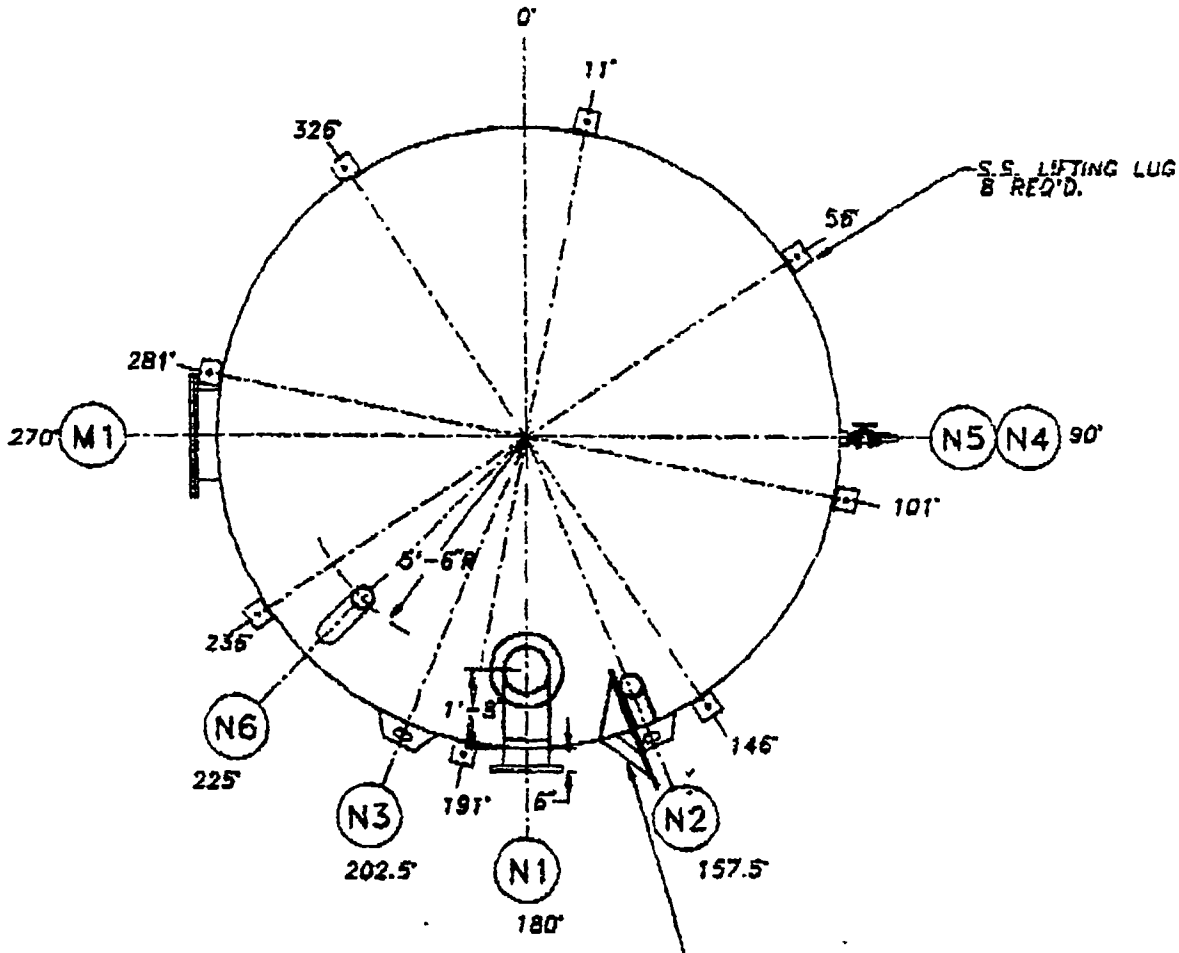
[illegible]AL PLASTIC SYSTEMS, INC
[illegible]NE FIELD ROAD, P.O BOX 6280
LAKELAND, FLORIDA. 33807

DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"
DESCRIPTION: ELEVATION VIEW
PURCHASE ORDER: 58830

PROJECT NAME: TRAIL RIDGE LANDFILL
PREPARED FOR: JAX UTILITIES
DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve.

(2) Remove and replace brass ball valve on sample port Replacement recommended to be CPVC or 304 trough 316' grade stainless steel.

(3) Inspect dryer/tank vent yearly.

(4) The maximum interval, until the next external inspection would be three years, due to State and County regulations.

(5) Based on the extent of the inspections performed on tank # 03, the test results show no substantial corrosion above and beyond that was noted as of the test date (Sept,21,01) This is not to be construed as an expressed or implied warranty of future performance.

Evaluated by

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 04

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 04

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: None

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? Yes

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

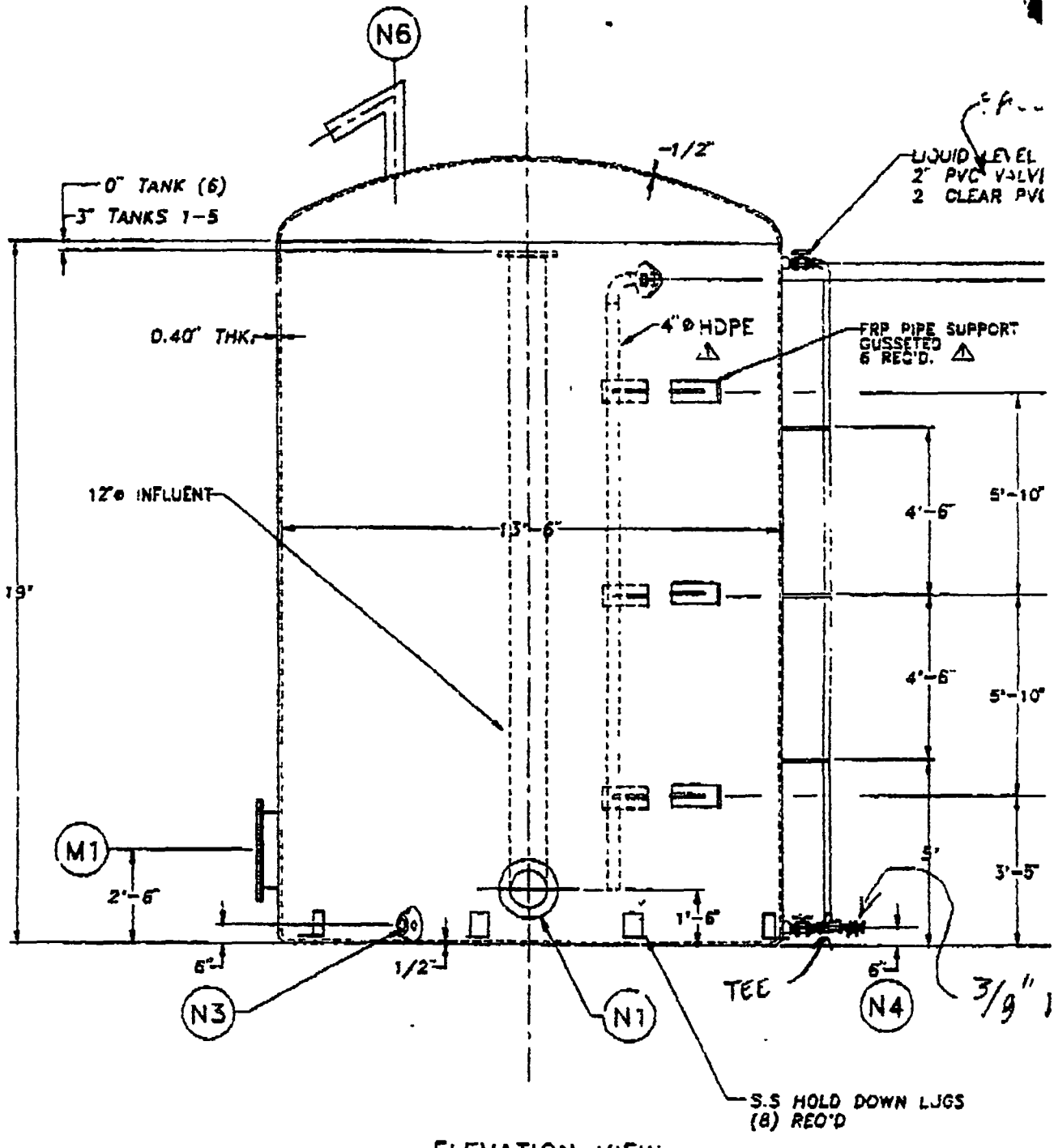
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness 100 mils

MAXIMUM FILL HIEGHT 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		4"DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INI

SUBMITTAL NO. [illegible]

(A)

MATCH

MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 8	SERVICE
N6	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	4"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	6"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY

NOZZLE/ FLANGE

NOZZLE SCHEDULE

'OR

N5

N2

18'-6"

VALVE FOR SAMPLING

NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

☐ NO EXCEPTION TAKEN ☒ MAKE CORRECTIONS NOTED

☐ REJECTED ☐ REVISE AND RESUBMIT

☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions, which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.

ENGLAND, THIMS & MILLER, INC.

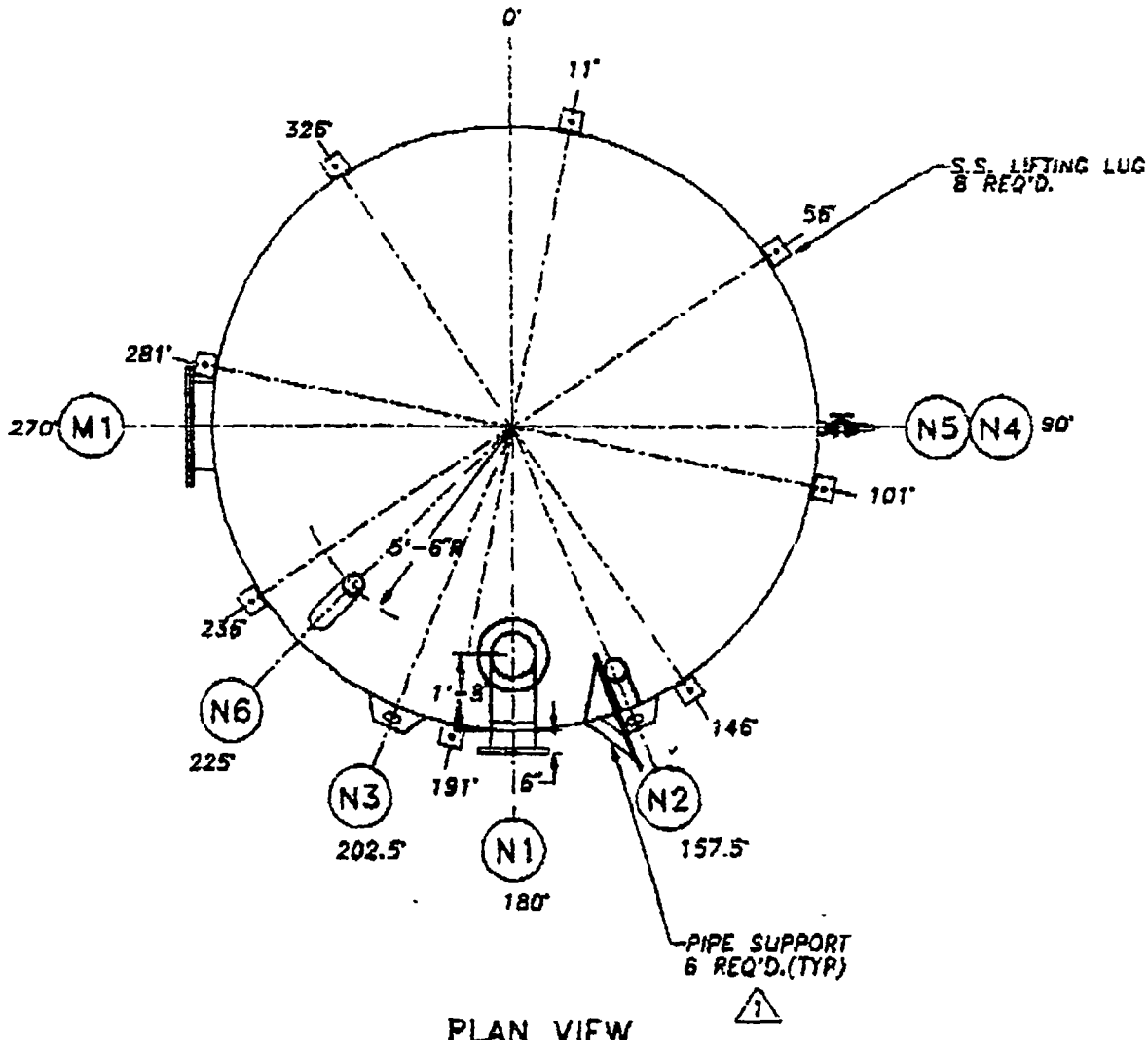
Date 2-4-92

By Douglas W. Hurst

FINAL PLASTIC SYSTEMS, INC CRANE FIELD ROAD, P.O BOX 6280 LAKELAND, FLORIDA. 33807	DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"	PROJECT NAME: TRAIL RIDGE LANDFILL
	DESCRIPTION: ELEVATION VIEW	PREPARED FOR: JAX UTILITIES
	PURCHASE ORDER: 58830	DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve.

(2) Inspect dryer/tank vent yearly

(3) Repair leak on original gauging port at roof

(4) The maximum interval, until the next external inspection would be three years, due to State and County regulations.

(5) Based on the extent of the inspections performed on tank # 04, the test results show no substantial corrosion above and beyond that was noted as of the test date (Sept,21,01) This is not to be construed as an expressed or implied warranty of future performance.

Evaluated by

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 05

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 05

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: None

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? Yes

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

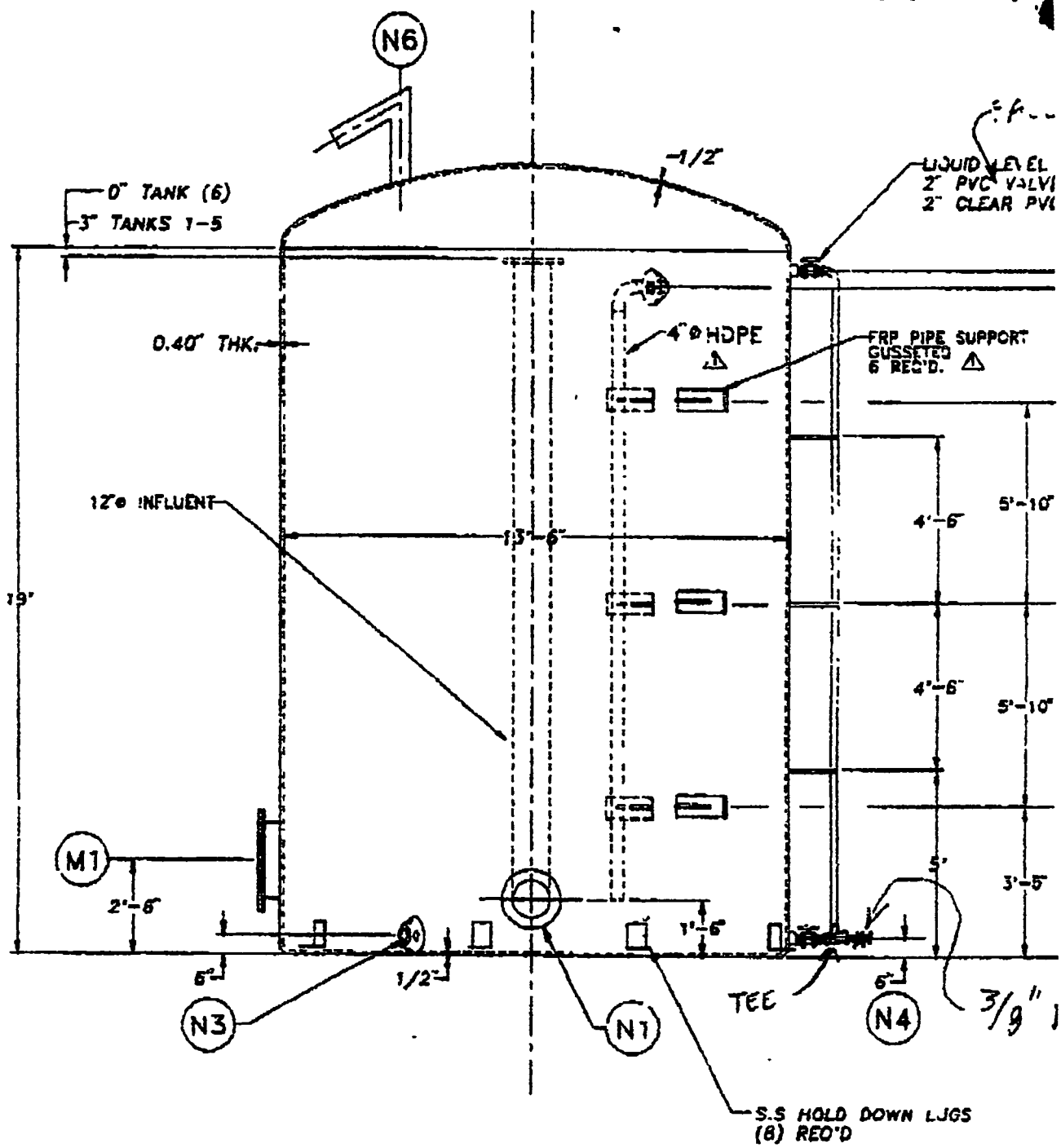
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness 100 mils

MAXIMUM FILL HIEGHT 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		4"DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

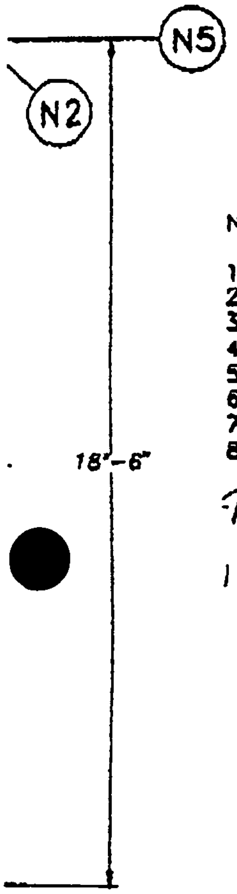
IPS IN

SUBMITTAL NO. _____

MATCH

NOZZLE SCHEDULE

NOZZLE/ FLANGE MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 6	SERVICE
N6	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	4"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	4"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY



NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

VALVE FOR SAMPLING

- [ ] NO EXCEPTION TAKEN
- [x] MAKE CORRECTIONS NOTED
- [ ] REJECTED
- [ ] REVISE AND RESUBMIT
- [ ] SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for: [illegible]

... S & MILLER, INC.

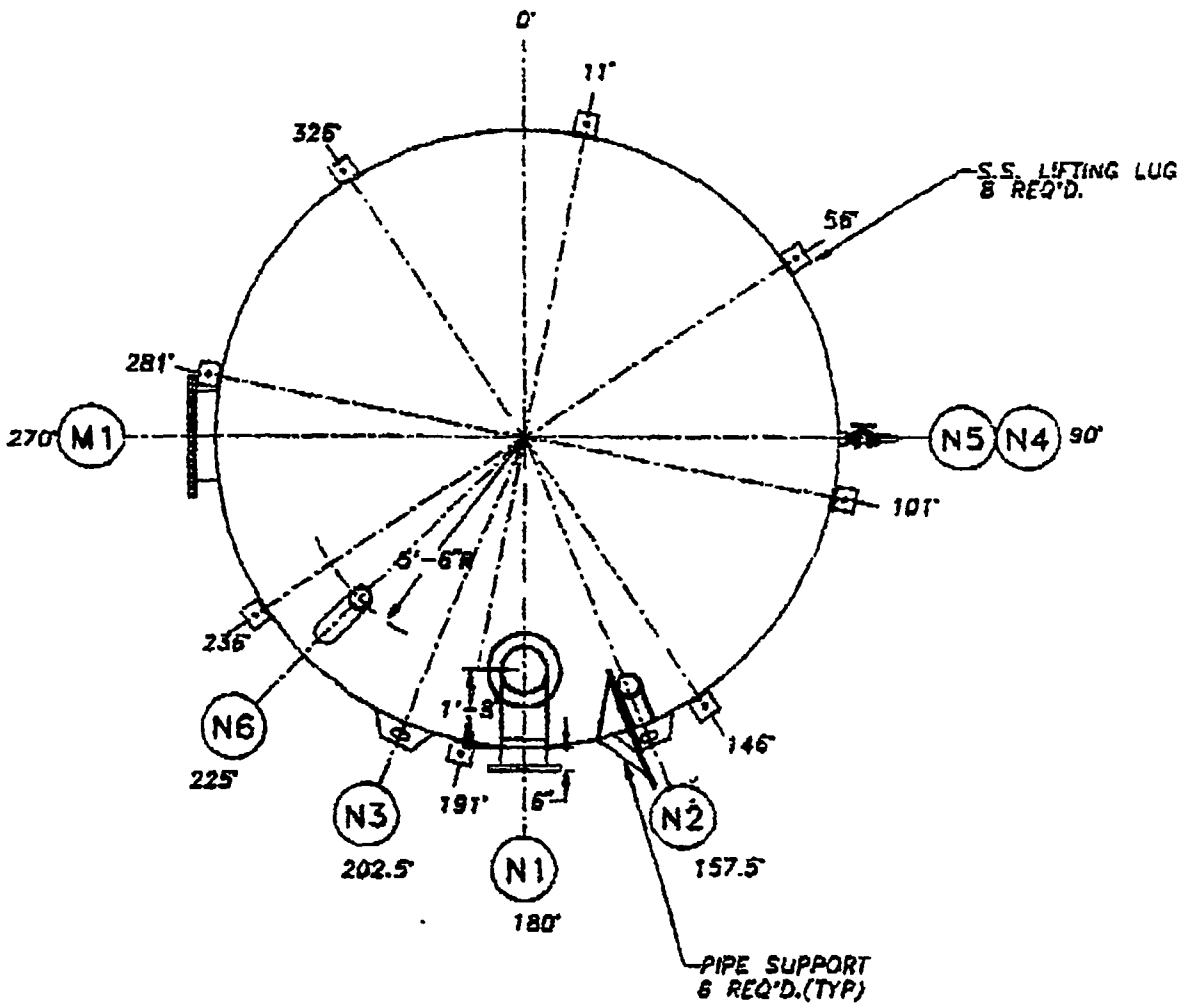
Date 2-4-92

By Douglas W. Hunt

AL PLASTIC SYSTEMS, INC ANE FIELD ROAD, P.O BOX 6280 LAKELAND, FLORIDA. 33807	DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"	PROJECT NAME: TRAIL RIDGE LANDFILL
	DESCRIPTION: ELEVATION VIEW	PREPARED FOR: JAX UTILITIES
	PURCHASE ORDER: 58830	DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve.

(2) Inspect dryer/tank vent yearly.

(3) The maximum interval, until the next external inspection would be three years, due to State and County regulations.

(4) Based on the extent of the inspections performed on tank # 05, the test results show no substantial corrosion above and beyond that was noted as of the test date (Sept,21,01). This is not to be construed as an expressed or implied warranty of future performance.

Evaluated by

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

THOMAS PIPING & MAINTENANCE

API 653 INSPECTION SERVICES

THOMAS PIPING & MAINTENANCE
EXTERNAL TANK INSPECTION
AND EVALUATION REPORT

TANK # 06

TRAIL RIDGE LANDFILL, INC.
5110 U.S. HWY 301 SOUTH
BALDWIN, FL. 32234-3608

INSPECTION DATE SEPTEMBER 21, 2001

INTRODUCTION AND DESCRIPTION

CLIENT: Trial Ridge Landfill, Inc.

DATE INSPECTED: September 24, 2001

INSPECTED BY: Timothy N. Thomas API Certified Licenses # 21058

LOCATION: Baldwin Florida

TANK NO. : 06

CAPACITY: 22,000 Gal.

PRODUCT SERVICE: Landfill Leachate.

CONSTRUCTION: Fiberglass resin hetron 922 vinyl ester.

TYPE ROOF: Dome. Self supporting.

EAVE PLATE: Unknown

TYPE BOTTOM: Flat

EXTERIOR SHELL: Coated/ Navy gray

TANK INTERIOR: Lined with C class 2 ply chopped strand.

TANK GROUNDED: Unknown

ADDITIONAL REMARKS: Tank is equipped with high level alarm (audible) gauging system is transducer style.

HISTORY

BUILT BY: Industrial Plastic Systems Inc.

YEAR BUILT: 04/92

NAME PLATE: Located above manway

LAST CLEANED BY: Unknown

DATE OF LAST CLEANING: Unknown

LAST PAINTED BY: Unknown

DATE OF LAST PAINTING: 04/92

NUMBER OF COATS: Unknown

COLOR: Navy Gray

SETTLEMENT EXPERIENCE: None

FOUNDATION: Concrete

MAJOR REPAIRS AND ALTERATIONS: None

OPERATIONAL PROBLEMS EXPERIENCED: None

ADDITIONAL REMARKS: None

SHELL

CONDITION OF SHELL PLATE: Good

VISIBLE DISTORTION OR SHELL STRESSES: None

IS THERE POSSIBLE ABNORMAL STRESSES RELATED TO EXTERNAL CONNECTED PIPING AND EQUIPMENT? IF SO, DESCRIBE: None

IS GRADE AROUND TANK SATISFACTORY TO MAINTAIN SHELL FREE OF SOIL AND MOISTURE?
Yes

CONDITION OF VALVES AND NOZZLES: Good

ARE ALL VALVES COMPATIBLE WITH PRODUCT? Yes

CONDITION OF LIQUID LEVEL GUAGE: Good, Sun protection needed on remote readout.

CONDITION OF STAIRS OR LADDER: None

CONE OR DOME ROOF

TYPE OF ROOF: DOME

CONDITIONS OF VENTS: GOOD

CONTOUR OF ROOF: CONVEX

CONDITION OF PAINT AND/OR INSULATION: GOOD

DOES ROOF DRAIN PROPERLY? YES

ADDITIONAL REMARKS: NONE

CURRENT THICKNESS EVALUATION

2 6 HDG

S E

HEIGHT = 19'

DIAMETER = 13' 6"

GRAVITY = 1 3

STRESS = 26 000

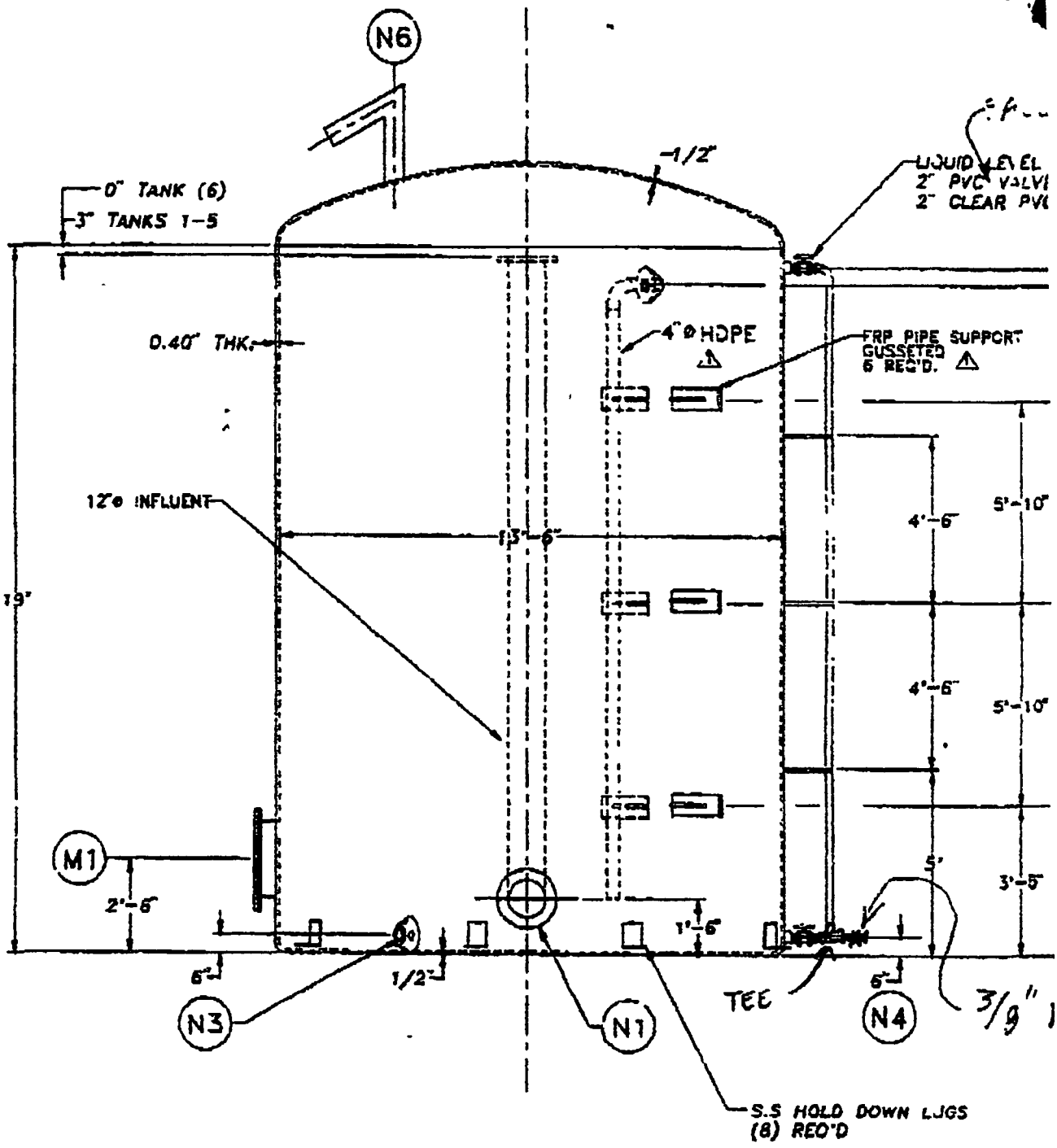
JOINT EFFIENCY = 1 0

1st COURSE T avg = Contact molded as per NBS PS 15-E9
Liner Thickness 100 mils

MAXIMUM FILL HIEGHT 18' 6"

(A)

MATCH



ELEVATION VIEW

TANKS 1 - 6

REV #	DATE	BY	COMMENTS
1	1-17-92		GUSSETED PIPE SUPPORT FOR 4" LINE OUTSIDE TANK
1	1-17-92		6"DIA INFLUENT LINE WITH PIPE SUPPORT INSIDE TANK

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS IN

SUBMITTAL NO. [illegible]

(A)

MATCH

MARK	SIZE	FACE	DRILL	PROJ.	ELEV.	ORIENT. TANKS 1 - 4	ORIENT. TANKS 5 - 8	SERVICE
		NOZZLE/ FLANGE						
N8	6"	PLAIN	—	—	TOP	225°	225°	VENT
N5	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N4	2"	FULL FACE	150#	6"	18'-6"	90°	90°	2" DIA CLPG.
N3	4"	FULL FACE	150#	6"	0'-6"	202.5°	337.5°	HDPE EFFLUENT LINE.
N2	4"	FULL FACE	150#	6"	18'-0"	157.5°	22.5°	HDPE
N1	12"	FULL FACE	150#	6"	1'-6"	180°	180°	OVERFLOW
M1	24"	FULL FACE	150#	6"	2'-6"	270°	270°	HINGED MANWAY

NOZZLE SCHEDULE

OR

N5

N2

18'-6"

VALVE FOR SAMPLING

NOTES

1. TANK TO BE FILAMENT WOUND AS PER ASTM D-3299.
2. TOP, BOTTOM AND COMPONENTS TO BE CONTACT MOLDED AS PER NBS PS 15-69.
3. RESIN: HETRON 922, VINYL ESTER.
4. LINER: "C" GLASS WITH 2 PLY CHOPPED STRAND. TOTAL LINER THICKNESS; 100 MILS.
5. BOLT HOLES TO STRADDLE NATURAL CENTERLINES.
6. COLOR: IPS STANDARD LIGHT GRAY
7. TANK TO BE SUPPORTED ON A LEVEL NON-DEFLECTING PAD.
8. LIQUID LEVEL INDICATOR: CLEAR PVC WITH 2" GRADUATED MARKINGS.
9. VENT TO BE SCREENED.
10. TANK TO BE MARKED WITH 12" HIGH NUMERALS.

☐ NO EXCEPTION TAKEN ☒ MAKE CORRECTIONS NOTED

☐ REJECTED ☐ REVISE AND RESUBMIT

☐ SUBMIT SPECIFIED ITEM

Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any deviation shown is subject to the requirements of the plans and specifications. Contractor is responsible for: Dimensions which are to be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of his work with that of all other trades and the satisfactory performance of his work.

[illegible] & MILLER, INC.

Date 2-4-92

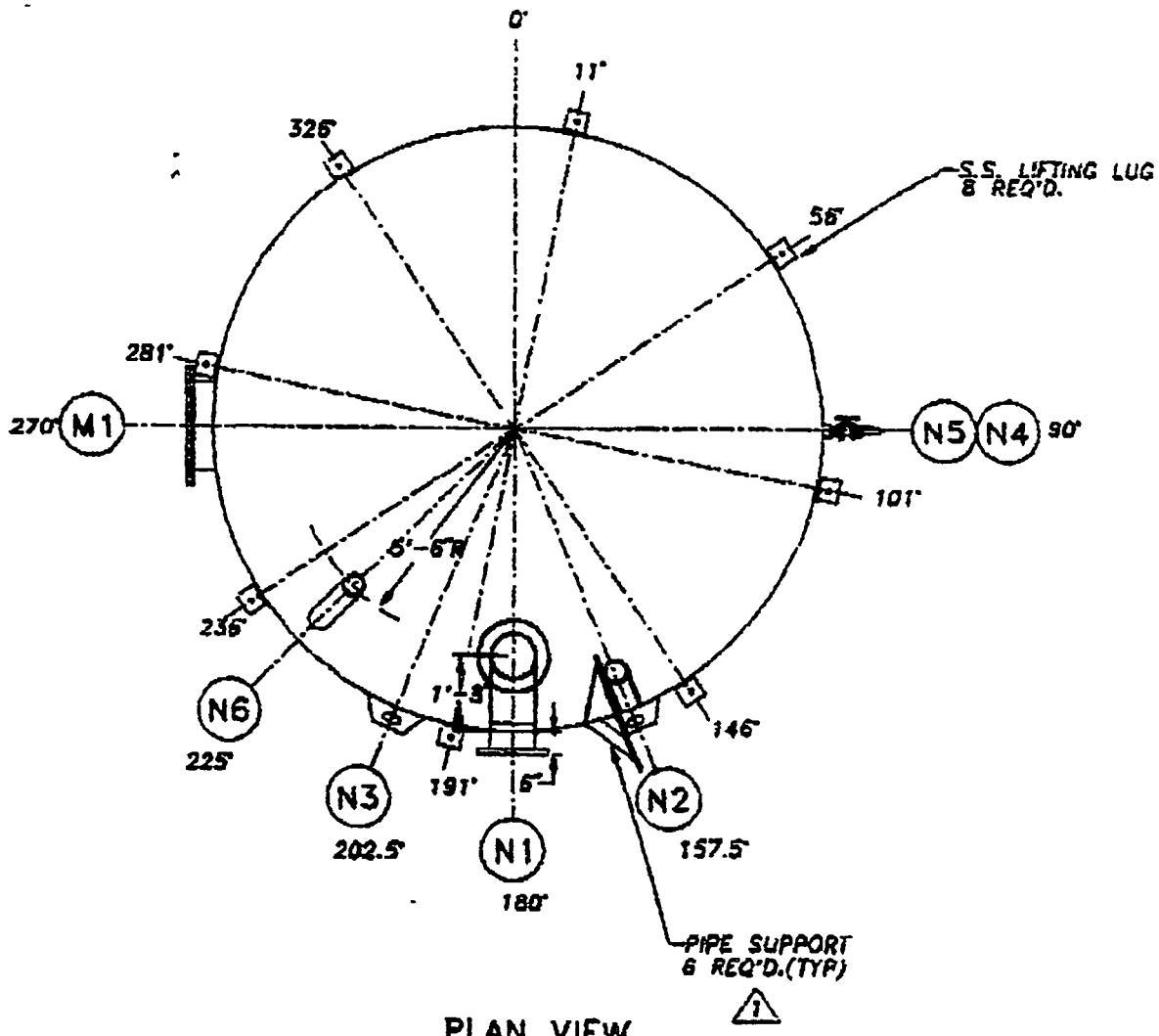
By Douglas W. Hunt

[illegible] PLASTIC SYSTEMS, INC
[illegible]ANE FIELD ROAD, P.O BOX 6280
LAKELAND, FLORIDA. 33807

DRAWING TITLE: (6) LEACHATE STORAGE TANK 14' DIA NOM. x 19'-0"	PROJECT NAME: TRAIL RIDGE LANDFILL
DESCRIPTION: ELEVATION VIEW	PREPARED FOR: JAX UTILITIES
PURCHASE ORDER: 58830	DRAWING NUMBER: 90-1074-01

(B)

MATCH



PLAN VIEW
TANKS 1-4

REV #	DATE	BY	COMMENTS
1	1-17-92		PIPE SUPPORTS ADDED (GUSSETED) FOR N2

REVISIONS

DATE: 01-15-92
DRAWN BY R.B.D.
APPROVED BY:
CHK.
SCALE: 1/4" = 1'-0"

IPS INC

RECOMMENDATIONS

(1) Install guard over sample valve.

(2) Inspect dryer/tank vent yearly.

(3) The maximum interval, until the next external inspection would be three years, due to State and County regulations.

(4) Based on the extent of the inspections performed on tank # 06, the test results show no substantial corrosion above and beyond that was noted as of the test date (Sept,21,01). This is not to be construed as an expressed or implied warranty of future performance.

Evaluated by

Timothy N Thomas, President
Thomas Piping & Maintenance
API Cert No 21058, Exp 10/02

American Petroleum Institute

Certifies That

Timothy N. Thomas

Certification Number: 21058

has successfully met the requirements to be certified as a Above Ground Storage Tank Inspector under the ANSI/API-653 Above Ground Storage Tank Inspector Certification Program.

Certification Date: October 31, 1999 *Expiration Date: October 31, 2002*

Edward R. Kelly

Quality Manager, Industry Services Department

ATTACHMENT D

Letter from JEA Regarding Leachate Discharge to Buckman Water Reclamation Facility

November 15, 2002

JEA

Zora Coleman
Solid Waste Specialist
City of Jacksonville
515 North Laura Street, 6th floor
Jacksonville, FL 32202

E L E C T R I C

W A T E R

S E W E R

RE: Waste Hauler Discharge Permit #902

Dear Ms. Coleman.

Per our telephone conversation on November 14, 2002, this letter is written to confirm conditions set forth in the City of Jacksonville's Waste Hauler Discharge Permit (WHDP) #902

WHDP #902 permits leachate from the Trail Ridge Landfill located at 5110 U S. Highway 301 to be discharged at the JEA Buckman Water Reclamation Facility This permit expires at midnight on June 27, 2007

As currently written, there are no flow restrictions in the permit.

If you have any further questions regarding this permit, please contact me at (904)665-4796.

Sincerely,

Dan Parnell
Environmental Scientist
JEA Industrial Pretreatment

ATTACHMENT E

HELP Model Results for Water Balance

Side Slope Closure

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**********************************************************************************
**********************************************************************************
**                                                                              **
**                                                                              **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**                HELP MODEL VERSION 3 07  (1 NOVEMBER 1997)                    **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                       **
**                    USAE WATERWAYS EXPERIMENT STATION                         **
**              FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                 **
**                                                                              **
**                                                                              **
**********************************************************************************
**********************************************************************************


PRECIPITATION DATA FILE.    C.\HELP3~1 07\DATA4 D4
TEMPERATURE DATA FILE:      C:\HELP3~1.07\DATA7.D7
SOLAR RADIATION DATA FILE·  C:\HELP3~1.07\DATA13.D13
EVAPOTRANSPIRATION DATA:    C:\HELP3~1.07\DATA11.D11
SOIL AND DESIGN DATA FILE·  C \HELP3~1.07\DATA10 D10
OUTPUT DATA FILE:           C:\HELP3~1.07\OPERATIO.OUT


TIME·  10.43     DATE.  11/19/2002


**********************************************************************************

     TITLE.  TRAIL RIDGE LANDFILL - SIDE SLOPE CLOSURE

**********************************************************************************


     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                     TYPE 2 - LATERAL DRAINAGE LAYER
                       MATERIAL TEXTURE NUMBER   8
          THICKNESS                     =     24.00   INCHES
          POROSITY                      =      0 4630 VOL/VOL
          FIELD CAPACITY                =      0 2320 VOL/VOL
          WILTING POINT                 =      0.1160 VOL/VOL
          INITIAL SOIL WATER CONTENT    =      0 2918 VOL/VOL
          EFFECTIVE SAT. HYD. COND.     =  0 369999994000E-03 CM/SEC
          SLOPE                         =     33.30   PERCENT
          DRAINAGE LENGTH               =     67.5    FEET
        NOTE.  SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4.63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
```

LAYER 2

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	12.00	INCHES
POROSITY	=	0 4270	VOL/VOL
FIELD CAPACITY	=	0.4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 4270	VOL/VOL
EFFECTIVE SAT. HYD. COND	=	0 100000001000E-06	CM/SEC

LAYER 3

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 7

THICKNESS	=	18.00	INCHES
POROSITY	=	0 4730	VOL/VOL
FIELD CAPACITY	=	0 2220	VOL/VOL
WILTING POINT	=	0.1040	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.2344	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0 520000001000E-03	CM/SEC

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	240 00	INCHES
POROSITY	=	0 6710	VOL/VOL
FIELD CAPACITY	=	0.2920	VOL/VOL
WILTING POINT	=	0.0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 2920	VOL/VOL
EFFECTIVE SAT HYD COND.	=	0.100000005000E-02	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0 1310	VOL/VOL
WILTING POINT	=	0 0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 1553	VOL/VOL
EFFECTIVE SAT HYD. COND	=	0 100000005000E-02	CM/SEC

LAYER 6

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0.20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0 0100	VOL/VOL
WILTING POINT	=	0.0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	33 0000000000	CM/SEC
SLOPE	=	1.93	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 7

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0 0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 0000	VOL/VOL
EFFECTIVE SAT. HYD. COND	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 8

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0 20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0 0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT HYD. COND	=	33.0000000000	CM/SEC
SLOPE	=	1.93	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 9

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0 06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0 0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0 199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1 00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 10

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	6.00	INCHES
POROSITY	=	0.4270	VOL/VOL
FIELD CAPACITY	=	0 4180	VOL/VOL
WILTING POINT	=	0 3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD COND.	=	0 100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE: SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 8 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 33.% AND A SLOPE LENGTH OF 67 FEET

SCS RUNOFF CURVE NUMBER	=	76 70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	7 003	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	11 112	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2.784	INCHES
INITIAL SNOW WATER	=	0 000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	92.720	INCHES
TOTAL INITIAL WATER	=	92 720	INCHES
TOTAL SUBSURFACE INFLOW	=	0 00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE. EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
JACKSONVILLE FLORIDA

STATION LATITUDE	=	30.50	DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50	
START OF GROWING SEASON (JULIAN DATE)	=	0	
END OF GROWING SEASON (JULIAN DATE)	=	367	
EVAPORATIVE ZONE DEPTH	=	24.0	INCHES
AVERAGE ANNUAL WIND SPEED	=	8 20	MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73 00	%
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	72 00	%
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79 00	%
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78 00	%

NOTE· PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3 07	3.48	3 72	3.32	4 91	5 37
6 54	7 15	7 26	3 41	1 94	2.59

NOTE· TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
53.20	55.10	61.30	67.70	74.10	79.00
81 30	81.00	78 20	69.50	60.80	54.80

NOTE: SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA
AND STATION LATITUDE = 30.50 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47 19	171299 687	100 00
RUNOFF	0.426	1546 539	0 90
EVAPOTRANSPIRATION	36.936	134078.906	78.27
DRAINAGE COLLECTED FROM LAYER 1	8.7221	31661.082	18.48
PERC./LEAKAGE THROUGH LAYER 2	1.103674	4006 336	2.34
AVG HEAD ON TOP OF LAYER 2	2.4949		
DRAINAGE COLLECTED FROM LAYER 6	0 3773	1369.773	0 80
PERC./LEAKAGE THROUGH LAYER 7	0.028053	101.834	0 06
AVG. HEAD ON TOP OF LAYER 7	0.0002		
DRAINAGE COLLECTED FROM LAYER 8	0.0281	101.833	0.06
PERC./LEAKAGE THROUGH LAYER 10	0 000000	0 001	0 00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	0 700	2541.543	1.48
SOIL WATER AT START OF YEAR	92.722	336581 594	
SOIL WATER AT END OF YEAR	93.422	339123.156	
SNOW WATER AT START OF YEAR	0.000	0.000	0 00
SNOW WATER AT END OF YEAR	0 000	0 000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	0.022	0 00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU FEET	PERCENT
PRECIPITATION	58 69	213044 672	100 00
RUNOFF	1 558	5654.346	2.65
EVAPOTRANSPIRATION	50 055	181698 094	85 29
DRAINAGE COLLECTED FROM LAYER 1	7.0790	25696 687	12 06
PERC /LEAKAGE THROUGH LAYER 2	0.870363	3159 417	1.48
AVG. HEAD ON TOP OF LAYER 2	1 9827		
DRAINAGE COLLECTED FROM LAYER 6	1.3041	4733 919	2.22
PERC /LEAKAGE THROUGH LAYER 7	0.073210	265.754	0.12
AVG. HEAD ON TOP OF LAYER 7	0.0006		
DRAINAGE COLLECTED FROM LAYER 8	0 0732	265.752	0 12
PERC./LEAKAGE THROUGH LAYER 10	0 000000	0.002	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-1.379	-5004 156	-2 35
SOIL WATER AT START OF YEAR	93 422	339123.156	
SOIL WATER AT END OF YEAR	92.044	334119 000	
SNOW WATER AT START OF YEAR	0.000	0 000	0.00
SNOW WATER AT END OF YEAR	0.000	0 000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	0.016	0 00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU. FEET	PERCENT
PRECIPITATION	51 32	186291 578	100 00
RUNOFF	1.109	4027 232	2.16
EVAPOTRANSPIRATION	43.046	156255 828	83.88
DRAINAGE COLLECTED FROM LAYER 1	6.8364	24816.299	13.32
PERC./LEAKAGE THROUGH LAYER 2	0.880536	3196 347	1.72
AVG. HEAD ON TOP OF LAYER 2	2.0129		
DRAINAGE COLLECTED FROM LAYER 6	0 6556	2379 972	1.28
PERC./LEAKAGE THROUGH LAYER 7	0 046168	167 591	0 09
AVG HEAD ON TOP OF LAYER 7	0.0003		
DRAINAGE COLLECTED FROM LAYER 8	0 0462	167 590	0.09
PERC /LEAKAGE THROUGH LAYER 10	0.000000	0.001	0 00
AVG HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.373	-1355 296	-0.73
SOIL WATER AT START OF YEAR	92.044	334119.000	
SOIL WATER AT END OF YEAR	91.670	332763.687	
SNOW WATER AT START OF YEAR	0.000	0 000	0 00
SNOW WATER AT END OF YEAR	0 000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	0 0000	-0.049	0 00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU FEET	PERCENT
PRECIPITATION	44 97	163241 047	100 00
RUNOFF	0 101	368 014	0.23
EVAPOTRANSPIRATION	45.279	164362.828	100.69
DRAINAGE COLLECTED FROM LAYER 1	1.3333	4839 968	2 96
PERC./LEAKAGE THROUGH LAYER 2	0 359466	1304.861	0 80
AVG. HEAD ON TOP OF LAYER 2	0.3983		
DRAINAGE COLLECTED FROM LAYER 6	0 8401	3049.486	1 87
PERC./LEAKAGE THROUGH LAYER 7	0 058016	210.598	0 13
AVG. HEAD ON TOP OF LAYER 7	0 0004		
DRAINAGE COLLECTED FROM LAYER 8	0 0580	210 596	0 13
PERC./LEAKAGE THROUGH LAYER 10	0 000000	0 002	0.00
AVG HEAD ON TOP OF LAYER 9	0 0000		
CHANGE IN WATER STORAGE	-2.642	-9589.679	-5.87
SOIL WATER AT START OF YEAR	91.670	332763.687	
SOIL WATER AT END OF YEAR	89.029	323174.031	
SNOW WATER AT START OF YEAR	0.000	0.000	0 00
SNOW WATER AT END OF YEAR	0 000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	-0.161	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU. FEET	PERCENT
PRECIPITATION	62 56	227092 766	100 00
RUNOFF	0.817	2966 716	1 31
EVAPOTRANSPIRATION	50.874	184672.156	81.32
DRAINAGE COLLECTED FROM LAYER 1	9 8474	35746 062	15.74
PERC./LEAKAGE THROUGH LAYER 2	1 234502	4481 244	1.97
AVG. HEAD ON TOP OF LAYER 2	2.7146		
DRAINAGE COLLECTED FROM LAYER 6	0 4147	1505.240	0 66
PERC./LEAKAGE THROUGH LAYER 7	0.035677	129 507	0.06
AVG. HEAD ON TOP OF LAYER 7	0 0002		
DRAINAGE COLLECTED FROM LAYER 8	0.0357	129.506	0.06
PERC /LEAKAGE THROUGH LAYER 10	0 000000	0.001	0 00
AVG HEAD ON TOP OF LAYER 9	0 0000		
CHANGE IN WATER STORAGE	0.571	2073.170	0.91
SOIL WATER AT START OF YEAR	89 029	323174 031	
SOIL WATER AT END OF YEAR	89.600	325247.187	
SNOW WATER AT START OF YEAR	0.000	0.000	0 00
SNOW WATER AT END OF YEAR	0 000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	0 0000	-0.082	0 00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU FEET	PERCENT
PRECIPITATION	59 32	215331.578	100 00
RUNOFF	0 651	2361 615	1 10
EVAPOTRANSPIRATION	47.720	173224 187	80.45
DRAINAGE COLLECTED FROM LAYER 1	6.5361	23726.225	11 02
PERC /LEAKAGE THROUGH LAYER 2	0.870017	3158 161	1 47
AVG HEAD ON TOP OF LAYER 2	1 8731		
DRAINAGE COLLECTED FROM LAYER 6	0 9504	3449.917	1.60
PERC./LEAKAGE THROUGH LAYER 7	0.059085	214.480	0.10
AVG. HEAD ON TOP OF LAYER 7	0 0004		
DRAINAGE COLLECTED FROM LAYER 8	0.0591	214.478	0.10
PERC /LEAKAGE THROUGH LAYER 10	0 000000	0 002	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	3.404	12355.271	5 74
SOIL WATER AT START OF YEAR	89.600	325247.187	
SOIL WATER AT END OF YEAR	93.003	337602.469	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0 000	0 000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	-0.108	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU FEET	PERCENT
PRECIPITATION	54 32	197181 656	100.00
RUNOFF	2.115	7676.763	3.89
EVAPOTRANSPIRATION	41 768	151619.156	76.89
DRAINAGE COLLECTED FROM LAYER 1	9.8805	35866.035	18.19
PERC./LEAKAGE THROUGH LAYER 2	0.944302	3427 818	1.74
AVG. HEAD ON TOP OF LAYER 2	2 3643		
DRAINAGE COLLECTED FROM LAYER 6	0.8488	3081 211	1 56
PERC /LEAKAGE THROUGH LAYER 7	0.052038	188.898	0.10
AVG. HEAD ON TOP OF LAYER 7	0 0004		
DRAINAGE COLLECTED FROM LAYER 8	0.0520	188.896	0 10
PERC./LEAKAGE THROUGH LAYER 10	0 000000	0 001	0.00
AVG. HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0 344	-1250.388	-0 63
SOIL WATER AT START OF YEAR	93.003	337602.469	
SOIL WATER AT END OF YEAR	92.659	336352.062	
SNOW WATER AT START OF YEAR	0.000	0.000	0 00
SNOW WATER AT END OF YEAR	0 000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	-0 024	0 00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU FEET	PERCENT
PRECIPITATION	49.29	178922.687	100.00
RUNOFF	0 282	1024.144	0 57
EVAPOTRANSPIRATION	43.393	157517.078	88 04
DRAINAGE COLLECTED FROM LAYER 1	5.2542	19072.660	10 66
PERC /LEAKAGE THROUGH LAYER 2	0 804474	2920.240	1 63
AVG. HEAD ON TOP OF LAYER 2	1 5452		
DRAINAGE COLLECTED FROM LAYER 6	0 9523	3456.914	1.93
PERC /LEAKAGE THROUGH LAYER 7	0.062855	228.165	0.13
AVG HEAD ON TOP OF LAYER 7	0 0004		
DRAINAGE COLLECTED FROM LAYER 8	0.0629	228.163	0 13
PERC./LEAKAGE THROUGH LAYER 10	0 000000	0 002	0.00
AVG. HEAD ON TOP OF LAYER 9	0 0000		
CHANGE IN WATER STORAGE	-0 655	-2376.316	-1.33
SOIL WATER AT START OF YEAR	92.659	336352.062	
SOIL WATER AT END OF YEAR	92.004	333975.750	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0.044	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55 61	201864.328	100 00
RUNOFF	0 537	1947.759	0.96
EVAPOTRANSPIRATION	49 417	179382 828	88 86
DRAINAGE COLLECTED FROM LAYER 1	6 6359	24088.371	11 93
PERC /LEAKAGE THROUGH LAYER 2	1 151440	4179 729	2 07
AVG HEAD ON TOP OF LAYER 2	1 9463		
DRAINAGE COLLECTED FROM LAYER 6	0.8737	3171.668	1 57
PERC./LEAKAGE THROUGH LAYER 7	0 054302	197.118	0 10
AVG HEAD ON TOP OF LAYER 7	0.0004		
DRAINAGE COLLECTED FROM LAYER 8	0 0543	197 116	0.10
PERC /LEAKAGE THROUGH LAYER 10	0.000000	0 001	0 00
AVG. HEAD ON TOP OF LAYER 9	0 0000		
CHANGE IN WATER STORAGE	-1 907	-6923.481	-3 43
SOIL WATER AT START OF YEAR	92.004	333975.750	
SOIL WATER AT END OF YEAR	90.097	327052 281	
SNOW WATER AT START OF YEAR	0 000	0.000	0 00
SNOW WATER AT END OF YEAR	0.000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	0 0000	0.073	0.00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.57	172679.062	100.00
RUNOFF	0 213	773 706	0.45
EVAPOTRANSPIRATION	44.929	163091.844	94 45
DRAINAGE COLLECTED FROM LAYER 1	1.6762	6084.564	3.52
PERC /LEAKAGE THROUGH LAYER 2	0.370750	1345.822	0.78
AVG HEAD ON TOP OF LAYER 2	0 4889		
DRAINAGE COLLECTED FROM LAYER 6	0.8246	2993.410	1 73
PERC./LEAKAGE THROUGH LAYER 7	0 055835	202.681	0.12
AVG. HEAD ON TOP OF LAYER 7	0.0004		
DRAINAGE COLLECTED FROM LAYER 8	0.0558	202 680	0.12
PERC /LEAKAGE THROUGH LAYER 10	0 000000	0.002	0.00
AVG HEAD ON TOP OF LAYER 9	0.0000		
CHANGE IN WATER STORAGE	-0.129	-467 182	-0 27
SOIL WATER AT START OF YEAR	90.097	327052 281	
SOIL WATER AT END OF YEAR	89.968	326585.094	
SNOW WATER AT START OF YEAR	0 000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0 000	0 00
ANNUAL WATER BUDGET BALANCE	0.0000	0 034	0.00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 10

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.03	3 37	3 01	3.71	4 10	5 78
	7 51	7.10	7 11	3 41	1 53	3 44
STD DEVIATIONS	1.25	1 37	2 16	2 31	2 70	2.21
	2.02	2 53	2.58	1.93	1 27	1.94
RUNOFF						
TOTALS	0.001	0 018	0 036	0.024	0 118	0.042
	0 050	0 218	0 214	0.008	0.000	0.053
STD. DEVIATIONS	0.003	0 053	0 074	0.036	0 318	0.076
	0.079	0 305	0 490	0 019	0.000	0 113
EVAPOTRANSPIRATION						
TOTALS	2 151	2.956	3.561	3.696	3.898	5 244
	6.119	5 568	4 822	3.733	2.007	1.584
STD DEVIATIONS	0 506	0.229	0 938	2.079	1.813	1 759
	1 086	0 996	0.460	0.344	0.523	0.424
LATERAL DRAINAGE COLLECTED FROM LAYER 1						
TOTALS	0.5771	0.6560	0.4089	0.3895	0 2626	0 2614
	0 3728	0.6233	1.1458	0.8231	0.4185	0.4411
STD. DEVIATIONS	0 5711	0 5715	0.3899	0.7962	0.7113	0 5534
	0.6350	0.7671	1.4768	0 7963	0 6893	0 6176
PERCOLATION/LEAKAGE THROUGH LAYER 2						
TOTALS	0 0850	0 1008	0 0901	0 0485	0 0276	0 0304
	0 0435	0.0748	0.1089	0 1135	0 0794	0.0564
STD. DEVIATIONS	0.0653	0 0426	0.0414	0.0597	0.0500	0 0539
	0 0611	0.0715	0.0565	0 0503	0.0605	0 0638
LATERAL DRAINAGE COLLECTED FROM LAYER 6						
TOTALS	0 0677	0.0676	0 0726	0.0589	0.0834	0 0859
	0 0946	0.0788	0 0695	0.0496	0.0327	0.0428
STD DEVIATIONS	0.0625	0.0535	0.0434	0 0438	0.0724	0 0403
	0 0500	0.0372	0 0344	0.0298	0.0264	0 0363

PERCOLATION/LEAKAGE THROUGH LAYER 7

TOTALS	0 0040	0 0042	0 0048	0 0038	0.0048	0.0053
	0.0057	0.0051	0 0049	0.0040	0.0028	0.0032
STD. DEVIATIONS	0 0031	0.0025	0 0021	0.0023	0 0028	0 0020
	0 0021	0 0019	0 0013	0 0016	0.0018	0.0022

LATERAL DRAINAGE COLLECTED FROM LAYER 8

TOTALS	0 0040	0.0042	0.0048	0 0038	0.0048	0.0053
	0.0057	0.0051	0 0049	0 0040	0.0028	0.0032
STD DEVIATIONS	0 0031	0 0025	0.0021	0 0023	0 0028	0.0020
	0.0021	0.0019	0.0013	0.0016	0.0018	0.0022

PERCOLATION/LEAKAGE THROUGH LAYER 10

TOTALS	0 0000	0 0000	0.0000	0 0000	0.0000	0 0000
	0 0000	0 0000	0 0000	0.0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0 0000	0.0000	0 0000	0 0000	0.0000
	0 0000	0.0000	0 0000	0.0000	0 0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 2

AVERAGES	1.9986	2.4499	1.4161	1.2348	0.7857	0.9353
	1.2464	2.0629	3.4317	2.8039	1.4977	1.5225
STD. DEVIATIONS	1 9777	2.0718	1.3501	2.3653	2.0743	1.9801
	2.0810	2 4991	3 3218	2.6458	2.4667	2.1275

DAILY AVERAGE HEAD ON TOP OF LAYER 7

AVERAGES	0.0003	0 0004	0 0004	0.0003	0.0004	0.0005
	0.0005	0 0004	0.0004	0 0003	0 0002	0.0002
STD DEVIATIONS	0.0003	0 0003	0 0002	0.0002	0.0004	0.0002
	0.0002	0.0002	0.0002	0.0002	0.0001	0.0002

DAILY AVERAGE HEAD ON TOP OF LAYER 9

AVERAGES	0 0000	0 0000	0 0000	0 0000	0.0000	0 0000
	0 0000	0 0000	0 0000	0 0000	0.0000	0.0000
STD. DEVIATIONS	0.0000	0 0000	0 0000	0 0000	0.0000	0.0000
	0.0000	0 0000	0.0000	0 0000	0.0000	0 0000

AVERAGE ANNUAL TOTALS & (STD. DEVIATIONS) FOR YEARS 1 THROUGH 10

	INCHES	CU FEET	PERCENT
PRECIPITATION	53 08 (5.930)	192694 9	100.00
RUNOFF	0 781 (0.6436)	2834.68	1.471
EVAPOTRANSPIRATION	45.342 (4.3172)	164590.30	85 415
LATERAL DRAINAGE COLLECTED FROM LAYER 1	6 38011 (2.97041)	23159.797	12.01889
PERCOLATION/LEAKAGE THROUGH LAYER 2	0 85895 (0.29539)	3117 998	1.61810
AVERAGE HEAD ON TOP OF LAYER 2	1.782 (0.781)		
LATERAL DRAINAGE COLLECTED FROM LAYER 6	0.80417 (0 27034)	2919.151	1 51491
PERCOLATION/LEAKAGE THROUGH LAYER 7	0 05252 (0 01310)	190.662	0 09895
AVERAGE HEAD ON TOP OF LAYER 7	0 000 (0 000)		
LATERAL DRAINAGE COLLECTED FROM LAYER 8	0 05252 (0 01310)	190.661	0.09894
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.00000 (0.00000)	0 001	0.00000
AVERAGE HEAD ON TOP OF LAYER 9	0 000 (0 000)		
CHANGE IN WATER STORAGE	-0 275 (1.6621)	-999 65	-0.519

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 10

	(INCHES)	(CU. FT)
PRECIPITATION	4 47	16226 100
RUNOFF	1.147	4164.0288
DRAINAGE COLLECTED FROM LAYER 1	0.58497	2123.44385
PERCOLATION/LEAKAGE THROUGH LAYER 2	0 009912	35 97927
AVERAGE HEAD ON TOP OF LAYER 2	22.966	
MAXIMUM HEAD ON TOP OF LAYER 2	36 292	
LOCATION OF MAXIMUM HEAD IN LAYER 1 (DISTANCE FROM DRAIN)	8.3 FEET	
DRAINAGE COLLECTED FROM LAYER 6	0 01016	36.86988
PERCOLATION/LEAKAGE THROUGH LAYER 7	0 000359	1 30213
AVERAGE HEAD ON TOP OF LAYER 7	0 002	
MAXIMUM HEAD ON TOP OF LAYER 7	0.001	
LOCATION OF MAXIMUM HEAD IN LAYER 6 (DISTANCE FROM DRAIN)	0 0 FEET	
DRAINAGE COLLECTED FROM LAYER 8	0.00036	1.30212
PERCOLATION/LEAKAGE THROUGH LAYER 10	0.000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 9	0 000	
MAXIMUM HEAD ON TOP OF LAYER 9	0.004	
LOCATION OF MAXIMUM HEAD IN LAYER 8 (DISTANCE FROM DRAIN)	0.0 FEET	
SNOW WATER	0.19	690 8433
MAXIMUM VEG SOIL WATER (VOL/VOL)	0.4630	
MINIMUM VEG SOIL WATER (VOL/VOL)	0 1160	

*** Maximum heads are computed using McEnroe's equations ***

Reference. Maximum Saturated Depth over Landfill Liner
by Bruce M McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol 119, No. 2, March 1993, pp 262-270.

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FINAL WATER STORAGE AT END OF YEAR 10

LAYER	(INCHES)	(VOL/VOL)
1	4.2269	0 1761
2	5.1240	0.4270
3	3.9960	0 2220
4	70 0800	0.2920
5	3.9735	0.1656
6	0 0020	0.0100
7	0 0000	0.0000
8	0.0020	0 0100
9	0.0000	0.0000
10	2 5620	0.4270
SNOW WATER	0 000	

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Top Area Closure

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**                                                                              **
**                                                                              **
**              HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE                   **
**                HELP MODEL VERSION 3 07  (1 NOVEMBER 1997)                    **
**                  DEVELOPED BY ENVIRONMENTAL LABORATORY                       **
**                    USAE WATERWAYS EXPERIMENT STATION                         **
**             FOR USEPA RISK REDUCTION ENGINEERING LABORATORY                  **
**                                                                              **
**                                                                              **
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PRECIPITATION DATA FILE     C.\HELP3~1.07\DATA4.D4
TEMPERATURE DATA FILE       C·\HELP3~1 07\DATA7 D7
SOLAR RADIATION DATA FILE   C.\HELP3~1.07\DATA13.D13
EVAPOTRANSPIRATION DATA.    C·\HELP3~1 07\DATA11.D11
SOIL AND DESIGN DATA FILE.  C·\HELP3~1.07\DATA11.D10
OUTPUT DATA FILE            C \HELP3~1.07\CLOSE.OUT


TIME   11 44     DATE   11/19/2002


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     TITLE:  TRAIL RIDGE LANDFILL - TOP AREA CLOSURE

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     NOTE:  INITIAL MOISTURE CONTENT OF THE LAYERS AND SNOW WATER WERE
              COMPUTED AS NEARLY STEADY-STATE VALUES BY THE PROGRAM.


                                  LAYER  1
                                  --------

                  TYPE 1 - VERTICAL PERCOLATION LAYER
                      MATERIAL TEXTURE NUMBER   8
          THICKNESS                    =     12 00   INCHES
          POROSITY                     =      0 4630 VOL/VOL
          FIELD CAPACITY               =      0.2320 VOL/VOL
          WILTING POINT                =      0 1160 VOL/VOL
          INITIAL SOIL WATER CONTENT   =      0.3793 VOL/VOL
          EFFECTIVE SAT. HYD  COND     =  0 369999994000E-03 CM/SEC
        NOTE   SATURATED HYDRAULIC CONDUCTIVITY IS MULTIPLIED BY  4 63
                 FOR ROOT CHANNELS IN TOP HALF OF EVAPORATIVE ZONE.
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LAYER 2

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	12.00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0 0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 4570	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000005000E-02	CM/SEC
SLOPE	=	4.00	PERCENT
DRAINAGE LENGTH	=	580.0	FEET

LAYER 3

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0 04	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0 0000	VOL/VOL
WILTING POINT	=	0.0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 0000	VOL/VOL
EFFECTIVE SAT HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 4

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 7

THICKNESS	=	18.00	INCHES
POROSITY	=	0 4730	VOL/VOL
FIELD CAPACITY	=	0.2220	VOL/VOL
WILTING POINT	=	0.1040	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 2278	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.520000001000E-03	CM/SEC

LAYER 5

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 18

THICKNESS	=	2160.00	INCHES
POROSITY	=	0 6710	VOL/VOL
FIELD CAPACITY	=	0 2920	VOL/VOL
WILTING POINT	=	0 0770	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 2920	VOL/VOL
EFFECTIVE SAT HYD COND.	=	0.100000005000E-02	CM/SEC

LAYER 6

TYPE 1 - VERTICAL PERCOLATION LAYER
MATERIAL TEXTURE NUMBER 5

THICKNESS	=	24 00	INCHES
POROSITY	=	0.4570	VOL/VOL
FIELD CAPACITY	=	0.1310	VOL/VOL
WILTING POINT	=	0.0580	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.1477	VOL/VOL
EFFECTIVE SAT. HYD. COND	=	0 100000005000E-02	CM/SEC

LAYER 7

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0 20	INCHES
POROSITY	=	0.8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0 0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 0100	VOL/VOL
EFFECTIVE SAT. HYD COND.	=	33.0000000000	CM/SEC
SLOPE	=	1.93	PERCENT
DRAINAGE LENGTH	=	200 0	FEET

LAYER 8

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0 0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0 0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0 0000	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 9

TYPE 2 - LATERAL DRAINAGE LAYER
MATERIAL TEXTURE NUMBER 34

THICKNESS	=	0 20	INCHES
POROSITY	=	0 8500	VOL/VOL
FIELD CAPACITY	=	0.0100	VOL/VOL
WILTING POINT	=	0 0050	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0100	VOL/VOL
EFFECTIVE SAT HYD COND	=	33.0000000000	CM/SEC
SLOPE	=	1 93	PERCENT
DRAINAGE LENGTH	=	200.0	FEET

LAYER 10

TYPE 4 - FLEXIBLE MEMBRANE LINER
MATERIAL TEXTURE NUMBER 35

THICKNESS	=	0.06	INCHES
POROSITY	=	0.0000	VOL/VOL
FIELD CAPACITY	=	0.0000	VOL/VOL
WILTING POINT	=	0 0000	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.0000	VOL/VOL
EFFECTIVE SAT. HYD. COND	=	0 199999996000E-12	CM/SEC
FML PINHOLE DENSITY	=	1.00	HOLES/ACRE
FML INSTALLATION DEFECTS	=	1.00	HOLES/ACRE
FML PLACEMENT QUALITY	=	3 - GOOD	

LAYER 11

TYPE 3 - BARRIER SOIL LINER
MATERIAL TEXTURE NUMBER 16

THICKNESS	=	6.00	INCHES
POROSITY	=	0 4270	VOL/VOL
FIELD CAPACITY	=	0 4180	VOL/VOL
WILTING POINT	=	0.3670	VOL/VOL
INITIAL SOIL WATER CONTENT	=	0.4270	VOL/VOL
EFFECTIVE SAT. HYD. COND.	=	0.100000001000E-06	CM/SEC

GENERAL DESIGN AND EVAPORATIVE ZONE DATA

NOTE SCS RUNOFF CURVE NUMBER WAS COMPUTED FROM DEFAULT SOIL DATA BASE USING SOIL TEXTURE # 8 WITH A GOOD STAND OF GRASS, A SURFACE SLOPE OF 4.% AND A SLOPE LENGTH OF 580. FEET.

SCS RUNOFF CURVE NUMBER	=	71.70	
FRACTION OF AREA ALLOWING RUNOFF	=	100.0	PERCENT
AREA PROJECTED ON HORIZONTAL PLANE	=	1.000	ACRES
EVAPORATIVE ZONE DEPTH	=	24 0	INCHES
INITIAL WATER IN EVAPORATIVE ZONE	=	10 036	INCHES
UPPER LIMIT OF EVAPORATIVE STORAGE	=	11 040	INCHES
LOWER LIMIT OF EVAPORATIVE STORAGE	=	2 088	INCHES
INITIAL SNOW WATER	=	0.000	INCHES
INITIAL WATER IN LAYER MATERIALS	=	650.967	INCHES
TOTAL INITIAL WATER	=	650.967	INCHES
TOTAL SUBSURFACE INFLOW	=	0 00	INCHES/YEAR

EVAPOTRANSPIRATION AND WEATHER DATA

NOTE EVAPOTRANSPIRATION DATA WAS OBTAINED FROM
JACKSONVILLE FLORIDA

STATION LATITUDE	=	30 50 DEGREES
MAXIMUM LEAF AREA INDEX	=	3.50
START OF GROWING SEASON (JULIAN DATE)	=	0
END OF GROWING SEASON (JULIAN DATE)	=	367
EVAPORATIVE ZONE DEPTH	=	24 0 INCHES
AVERAGE ANNUAL WIND SPEED	=	8.20 MPH
AVERAGE 1ST QUARTER RELATIVE HUMIDITY	=	73.00 %
AVERAGE 2ND QUARTER RELATIVE HUMIDITY	=	72.00 %
AVERAGE 3RD QUARTER RELATIVE HUMIDITY	=	79 00 %
AVERAGE 4TH QUARTER RELATIVE HUMIDITY	=	78 00 %

NOTE: PRECIPITATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA

NORMAL MEAN MONTHLY PRECIPITATION (INCHES)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
3 07	3.48	3 72	3 32	4.91	5.37
6 54	7 15	7 26	3 41	1.94	2.59

NOTE: TEMPERATURE DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA

NORMAL MEAN MONTHLY TEMPERATURE (DEGREES FAHRENHEIT)

JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
53.20	55.10	61.30	67 70	74.10	79 00
81.30	81 00	78 20	69.50	60.80	54.80

NOTE· SOLAR RADIATION DATA WAS SYNTHETICALLY GENERATED USING
COEFFICIENTS FOR JACKSONVILLE FLORIDA
AND STATION LATITUDE = 30 50 DEGREES

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ANNUAL TOTALS FOR YEAR 1

	INCHES	CU FEET	PERCENT
PRECIPITATION	47 19	171299.687	100 00
RUNOFF	2 744	9962.429	5 82
EVAPOTRANSPIRATION	41 770	151624.562	88 51
DRAINAGE COLLECTED FROM LAYER 2	1.9046	6913 764	4 04
PERC /LEAKAGE THROUGH LAYER 3	0.768247	2788.736	1 63
AVG HEAD ON TOP OF LAYER 3	11.3793		
DRAINAGE COLLECTED FROM LAYER 7	0 1113	404.029	0.24
PERC /LEAKAGE THROUGH LAYER 8	0.013617	49 428	0.03
AVG HEAD ON TOP OF LAYER 8	0.0001		
DRAINAGE COLLECTED FROM LAYER 9	0.0136	49.428	0 03
PERC./LEAKAGE THROUGH LAYER 11	0.000000	0.001	0.00
AVG. HEAD ON TOP OF LAYER 10	0.0000		
CHANGE IN WATER STORAGE	0.646	2345.187	1.37
SOIL WATER AT START OF YEAR	654.965	2377524.250	
SOIL WATER AT END OF YEAR	655.611	2379869.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0 00
SNOW WATER AT END OF YEAR	0 000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	0.0001	0 297	0.00

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ANNUAL TOTALS FOR YEAR 2

	INCHES	CU. FEET	PERCENT
PRECIPITATION	58.69	213044 672	100.00
RUNOFF	4.241	15393.693	7.23
EVAPOTRANSPIRATION	54.582	198132.031	93 00
DRAINAGE COLLECTED FROM LAYER 2	2.0503	7442.733	3.49
PERC /LEAKAGE THROUGH LAYER 3	0 851737	3091 804	1 45
AVG. HEAD ON TOP OF LAYER 3	12 3827		
DRAINAGE COLLECTED FROM LAYER 7	0.9301	3376.218	1 58
PERC./LEAKAGE THROUGH LAYER 8	0.063154	229.250	0.11
AVG. HEAD ON TOP OF LAYER 8	0 0004		
DRAINAGE COLLECTED FROM LAYER 9	0 0632	229 249	0 11
PERC /LEAKAGE THROUGH LAYER 11	0 000000	0 002	0 00
AVG. HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	-3.176	-11528.973	-5 41
SOIL WATER AT START OF YEAR	655.611	2379869.250	
SOIL WATER AT END OF YEAR	652.435	2368340.250	
SNOW WATER AT START OF YEAR	0 000	0 000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	-0.0001	-0.281	0 00

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ANNUAL TOTALS FOR YEAR 3

	INCHES	CU FEET	PERCENT
PRECIPITATION	51.32	186291.578	100.00
RUNOFF	0 721	2618.027	1.41
EVAPOTRANSPIRATION	48 440	175835.937	94 39
DRAINAGE COLLECTED FROM LAYER 2	1.2629	4584.222	2 46
PERC /LEAKAGE THROUGH LAYER 3	0.581543	2111.002	1.13
AVG. HEAD ON TOP OF LAYER 3	8.1698		
DRAINAGE COLLECTED FROM LAYER 7	0.5328	1933.904	1 04
PERC./LEAKAGE THROUGH LAYER 8	0.043726	158.724	0.09
AVG HEAD ON TOP OF LAYER 8	0.0002		
DRAINAGE COLLECTED FROM LAYER 9	0.0437	158 723	0 09
PERC./LEAKAGE THROUGH LAYER 11	0.000000	0.002	0.00
AVG HEAD ON TOP OF LAYER 10	0.0000		
CHANGE IN WATER STORAGE	0 320	1160.519	0.62
SOIL WATER AT START OF YEAR	652.435	2368340.250	
SOIL WATER AT END OF YEAR	652 755	2369501 000	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0 0001	0 254	0.00

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ANNUAL TOTALS FOR YEAR 4

	INCHES	CU FEET	PERCENT
PRECIPITATION	44 97	163241 047	100.00
RUNOFF	0.001	2.888	0 00
EVAPOTRANSPIRATION	48.540	176201 391	107.94
DRAINAGE COLLECTED FROM LAYER 2	0.5815	2110.983	1 29
PERC /LEAKAGE THROUGH LAYER 3	0.303294	1100.959	0.67
AVG HEAD ON TOP OF LAYER 3	4.0621		
DRAINAGE COLLECTED FROM LAYER 7	0.6330	2297.742	1 41
PERC /LEAKAGE THROUGH LAYER 8	0.052571	190.833	0 12
AVG. HEAD ON TOP OF LAYER 8	0 0003		
DRAINAGE COLLECTED FROM LAYER 9	0.0526	190.832	0 12
PERC./LEAKAGE THROUGH LAYER 11	0.000000	0.002	0 00
AVG. HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	-4.838	-17562.873	-10.76
SOIL WATER AT START OF YEAR	652 755	2369501.000	
SOIL WATER AT END OF YEAR	647 917	2351938.000	
SNOW WATER AT START OF YEAR	0.000	0 000	0 00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0 0000	0 081	0.00

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ANNUAL TOTALS FOR YEAR 5

	INCHES	CU FEET	PERCENT
PRECIPITATION	62 56	227092.766	100.00
RUNOFF	2.166	7862 175	3.46
EVAPOTRANSPIRATION	53.797	195281.500	85 99
DRAINAGE COLLECTED FROM LAYER 2	1 8383	6672 957	2 94
PERC /LEAKAGE THROUGH LAYER 3	0.787913	2860 125	1 26
AVG. HEAD ON TOP OF LAYER 3	11 3841		
DRAINAGE COLLECTED FROM LAYER 7	0 2093	759 806	0.33
PERC./LEAKAGE THROUGH LAYER 8	0.024393	88 546	0.04
AVG. HEAD ON TOP OF LAYER 8	0.0001		
DRAINAGE COLLECTED FROM LAYER 9	0 0244	88 545	0.04
PERC /LEAKAGE THROUGH LAYER 11	0.000000	0.001	0 00
AVG. HEAD ON TOP OF LAYER 10	0.0000		
CHANGE IN WATER STORAGE	4.526	16427.832	7 23
SOIL WATER AT START OF YEAR	647 917	2351938 000	
SOIL WATER AT END OF YEAR	652.442	2368365.750	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	-0.045	0.00

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ANNUAL TOTALS FOR YEAR 6

	INCHES	CU. FEET	PERCENT
PRECIPITATION	59 32	215331.578	100.00
RUNOFF	1 415	5137.567	2.39
EVAPOTRANSPIRATION	51.626	187402 937	87.03
DRAINAGE COLLECTED FROM LAYER 2	1 7523	6360.901	2.95
PERC./LEAKAGE THROUGH LAYER 3	0.743194	2697 795	1.25
AVG HEAD ON TOP OF LAYER 3	10.6952		
DRAINAGE COLLECTED FROM LAYER 7	0 8021	2911 667	1 35
PERC /LEAKAGE THROUGH LAYER 8	0 057597	209 076	0 10
AVG. HEAD ON TOP OF LAYER 8	0.0004		
DRAINAGE COLLECTED FROM LAYER 9	0.0576	209 074	0 10
PERC /LEAKAGE THROUGH LAYER 11	0 000000	0.002	0.00
AVG HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	3.667	13309.631	6.18
SOIL WATER AT START OF YEAR	652.442	2368365.750	
SOIL WATER AT END OF YEAR	656.109	2381675.500	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0 000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	-0 0001	-0 190	0.00

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ANNUAL TOTALS FOR YEAR 7

	INCHES	CU. FEET	PERCENT
PRECIPITATION	54 32	197181 656	100 00
RUNOFF	5.463	19830 861	10 06
EVAPOTRANSPIRATION	46 953	170440.828	86.44
DRAINAGE COLLECTED FROM LAYER 2	1.7423	6324 370	3 21
PERC./LEAKAGE THROUGH LAYER 3	0.683329	2480.484	1 26
AVG HEAD ON TOP OF LAYER 3	10.1786		
DRAINAGE COLLECTED FROM LAYER 7	0.6659	2417.366	1.23
PERC./LEAKAGE THROUGH LAYER 8	0.049364	179.192	0.09
AVG. HEAD ON TOP OF LAYER 8	0.0003		
DRAINAGE COLLECTED FROM LAYER 9	0 0494	179.191	0.09
PERC./LEAKAGE THROUGH LAYER 11	0 000000	0.002	0.00
AVG. HEAD ON TOP OF LAYER 10	0.0000		
CHANGE IN WATER STORAGE	-0 554	-2011.300	-1 02
SOIL WATER AT START OF YEAR	656.109	2381675.500	
SOIL WATER AT END OF YEAR	655 555	2379664.250	
SNOW WATER AT START OF YEAR	0 000	0 000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0 00
ANNUAL WATER BUDGET BALANCE	0.0001	0.338	0 00

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ANNUAL TOTALS FOR YEAR 8

	INCHES	CU FEET	PERCENT
PRECIPITATION	49.29	178922 687	100.00
RUNOFF	0.106	385 356	0.22
EVAPOTRANSPIRATION	48.174	174872.687	97.74
DRAINAGE COLLECTED FROM LAYER 2	1.2833	4658.265	2 60
PERC./LEAKAGE THROUGH LAYER 3	0.546026	1982 076	1.11
AVG. HEAD ON TOP OF LAYER 3	7.8276		
DRAINAGE COLLECTED FROM LAYER 7	0.7056	2561.477	1.43
PERC./LEAKAGE THROUGH LAYER 8	0 053103	192 764	0 11
AVG. HEAD ON TOP OF LAYER 8	0.0003		
DRAINAGE COLLECTED FROM LAYER 9	0.0531	192 762	0.11
PERC /LEAKAGE THROUGH LAYER 11	0 000000	0 002	0 00
AVG HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	-1.032	-3747.869	-2 09
SOIL WATER AT START OF YEAR	655 555	2379664.250	
SOIL WATER AT END OF YEAR	654.522	2375916.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0.000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0 011	0.00

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ANNUAL TOTALS FOR YEAR 9

	INCHES	CU. FEET	PERCENT
PRECIPITATION	55.61	201864.328	100.00
RUNOFF	2.719	9869.249	4.89
EVAPOTRANSPIRATION	53 687	194885 406	96.54
DRAINAGE COLLECTED FROM LAYER 2	1.7484	6346.744	3.14
PERC./LEAKAGE THROUGH LAYER 3	0.762409	2767 545	1.37
AVG. HEAD ON TOP OF LAYER 3	10.9933		
DRAINAGE COLLECTED FROM LAYER 7	0 5224	1896 280	0.94
PERC./LEAKAGE THROUGH LAYER 8	0.042073	152.725	0.08
AVG. HEAD ON TOP OF LAYER 8	0.0002		
DRAINAGE COLLECTED FROM LAYER 9	0 0421	152 723	0.08
PERC./LEAKAGE THROUGH LAYER 11	0.000000	0.002	0 00
AVG. HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	-3.109	-11286.145	-5.59
SOIL WATER AT START OF YEAR	654.522	2375916 250	
SOIL WATER AT END OF YEAR	651.413	2364630.250	
SNOW WATER AT START OF YEAR	0.000	0.000	0.00
SNOW WATER AT END OF YEAR	0 000	0 000	0.00
ANNUAL WATER BUDGET BALANCE	0.0000	0 074	0 00

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ANNUAL TOTALS FOR YEAR 10

	INCHES	CU. FEET	PERCENT
PRECIPITATION	47.57	172679.062	100 00
RUNOFF	0.025	90.461	0.05
EVAPOTRANSPIRATION	47.871	173772 000	100.63
DRAINAGE COLLECTED FROM LAYER 2	0 6398	2322 452	1.34
PERC./LEAKAGE THROUGH LAYER 3	0.352123	1278.206	0.74
AVG. HEAD ON TOP OF LAYER 3	4.5119		
DRAINAGE COLLECTED FROM LAYER 7	0.6057	2198.688	1.27
PERC./LEAKAGE THROUGH LAYER 8	0 051133	185.615	0.11
AVG HEAD ON TOP OF LAYER 8	0 0003		
DRAINAGE COLLECTED FROM LAYER 9	0.0511	185 613	0 11
PERC /LEAKAGE THROUGH LAYER 11	0.000000	0 002	0.00
AVG HEAD ON TOP OF LAYER 10	0 0000		
CHANGE IN WATER STORAGE	-1.623	-5889.888	-3.41
SOIL WATER AT START OF YEAR	651.413	2364630.250	
SOIL WATER AT END OF YEAR	649.791	2358740.250	
SNOW WATER AT START OF YEAR	0 000	0.000	0.00
SNOW WATER AT END OF YEAR	0.000	0 000	0 00
ANNUAL WATER BUDGET BALANCE	-0.0001	-0 272	0 00

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AVERAGE MONTHLY VALUES IN INCHES FOR YEARS 1 THROUGH 10

	JAN/JUL	FEB/AUG	MAR/SEP	APR/OCT	MAY/NOV	JUN/DEC
PRECIPITATION						
TOTALS	3.03	3.37	3 01	3.71	4.10	5 78
	7.51	7.10	7 11	3.41	1 53	3 44
STD. DEVIATIONS	1 25	1.37	2 16	2 31	2.70	2 21
	2.02	2 53	2 58	1.93	1 27	1 94
RUNOFF						
TOTALS	0.023	0.265	0 100	0.012	0.305	0 013
	0.014	0.312	0 420	0 008	0 001	0.487
STD. DEVIATIONS	0.070	0 589	0.296	0 020	0.945	0.032
	0 033	0.643	1 272	0 022	0 003	0 870
EVAPOTRANSPIRATION						
TOTALS	2.168	2 962	4.317	4.920	4.952	5.661
	6 490	5 685	4.826	3.846	2.099	1 619
STD. DEVIATIONS	0.622	0 239	0.214	1.175	2.309	1.618
	0.865	0 993	0.465	0 281	0.453	0.412
LATERAL DRAINAGE COLLECTED FROM LAYER 2						
TOTALS	0 1884	0.1940	0.1695	0.1102	0 0732	0.0534
	0.0469	0.0801	0.1277	0 1581	0.1302	0.1488
STD. DEVIATIONS	0.1114	0.0864	0.0731	0.0804	0 0844	0.0812
	0.0613	0 0923	0.0999	0 0996	0.0780	0.1198
PERCOLATION/LEAKAGE THROUGH LAYER 3						
TOTALS	0 0754	0.0768	0.0740	0.0504	0.0342	0 0249
	0.0239	0 0362	0.0546	0.0669	0.0585	0.0622
STD. DEVIATIONS	0.0356	0 0250	0.0203	0.0304	0.0334	0 0330
	0.0282	0 0367	0 0365	0.0327	0.0295	0 0387
LATERAL DRAINAGE COLLECTED FROM LAYER 7						
TOTALS	0.0333	0.0345	0.0386	0.0328	0 0564	0 0666
	0 0727	0 0686	0 0608	0.0465	0.0338	0 0273
STD. DEVIATIONS	0 0232	0.0220	0.0263	0.0202	0 0373	0 0400
	0.0311	0.0339	0 0351	0.0276	0.0235	0.0245

PERCOLATION/LEAKAGE THROUGH LAYER 8

TOTALS	0 0032	0.0031	0.0034	0 0031	0 0041	0 0045
	0.0050	0 0048	0 0043	0.0038	0 0031	0.0027
STD DEVIATIONS	0 0016	0.0016	0.0016	0.0014	0.0020	0.0021
	0.0017	0.0019	0.0019	0 0017	0.0015	0.0016

LATERAL DRAINAGE COLLECTED FROM LAYER 9

TOTALS	0.0032	0 0031	0 0034	0 0031	0 0041	0.0045
	0.0050	0.0048	0 0043	0.0038	0.0031	0.0027
STD. DEVIATIONS	0 0016	0.0016	0 0016	0.0014	0.0020	0.0021
	0.0017	0.0019	0.0019	0 0017	0 0015	0.0016

PERCOLATION/LEAKAGE THROUGH LAYER 11

TOTALS	0 0000	0.0000	0 0000	0.0000	0 0000	0.0000
	0.0000	0.0000	0.0000	0 0000	0 0000	0.0000
STD DEVIATIONS	0 0000	0.0000	0 0000	0 0000	0.0000	0 0000
	0 0000	0 0000	0.0000	0.0000	0 0000	0.0000

AVERAGES OF MONTHLY AVERAGED DAILY HEADS (INCHES)

DAILY AVERAGE HEAD ON TOP OF LAYER 3

AVERAGES	13.1261	14.7726	12 5712	8.5871	5.4904	4 1153
	3 7375	5.9290	9.5597	11 3589	10 1026	10.5511
STD. DEVIATIONS	6.7199	5.4725	4.1242	5 7597	5 9066	5 9870
	4.7614	6 4890	6.8741	6.2779	5.6120	7.3918

DAILY AVERAGE HEAD ON TOP OF LAYER 8

AVERAGES	0.0002	0 0002	0 0002	0 0002	0.0003	0.0004
	0 0004	0 0004	0.0003	0.0002	0 0002	0 0001
STD. DEVIATIONS	0 0001	0.0001	0 0001	0 0001	0.0002	0.0002
	0.0002	0.0002	0.0002	0 0001	0 0001	0 0001

DAILY AVERAGE HEAD ON TOP OF LAYER 10

AVERAGES	0 0000	0.0000	0.0000	0.0000	0 0000	0.0000
	0.0000	0.0000	0.0000	0 0000	0 0000	0.0000
STD DEVIATIONS	0.0000	0 0000	0 0000	0 0000	0.0000	0.0000
	0 0000	0.0000	0 0000	0 0000	0 0000	0 0000

AVERAGE ANNUAL TOTALS & (STD DEVIATIONS) FOR YEARS 1 THROUGH 10

	INCHES		CU FEET	PERCENT
PRECIPITATION	53 08	(5.930)	192694 9	100.00
RUNOFF	1.960	(1.8725)	7115 27	3 693
EVAPOTRANSPIRATION	49 544	(3.9302)	179844 92	93.331
LATERAL DRAINAGE COLLECTED FROM LAYER 2	1.48037	(0 52153)	5373 739	2.78873
PERCOLATION/LEAKAGE THROUGH LAYER 3	0.63798	(0.18830)	2315.873	1.20183
AVERAGE HEAD ON TOP OF LAYER 3	9 158	(2 932)		
LATERAL DRAINAGE COLLECTED FROM LAYER 7	0 57182	(0.24956)	2075.718	1 07720
PERCOLATION/LEAKAGE THROUGH LAYER 8	0.04507	(0.01523)	163 615	0 08491
AVERAGE HEAD ON TOP OF LAYER 8	0 000	(0 000)		
LATERAL DRAINAGE COLLECTED FROM LAYER 9	0 04507	(0.01523)	163.614	0.08491
PERCOLATION/LEAKAGE THROUGH LAYER 11	0 00000	(0 00000)	0.002	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000	(0.000)		
CHANGE IN WATER STORAGE	-0 517	(2 9615)	-1878.39	-0.975

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PEAK DAILY VALUES FOR YEARS 1 THROUGH 10

	(INCHES)	(CU. FT)
PRECIPITATION	4.47	16226.100
RUNOFF	2.618	9504.7012
DRAINAGE COLLECTED FROM LAYER 2	0.01271	46.14664
PERCOLATION/LEAKAGE THROUGH LAYER 3	0 004162	15 10764
AVERAGE HEAD ON TOP OF LAYER 3	24.000	
MAXIMUM HEAD ON TOP OF LAYER 3	37 409	
LOCATION OF MAXIMUM HEAD IN LAYER 2 (DISTANCE FROM DRAIN)	127.3 FEET	
DRAINAGE COLLECTED FROM LAYER 7	0 00453	16 45327
PERCOLATION/LEAKAGE THROUGH LAYER 8	0 000238	0.86528
AVERAGE HEAD ON TOP OF LAYER 8	0 001	
MAXIMUM HEAD ON TOP OF LAYER 8	0 003	
LOCATION OF MAXIMUM HEAD IN LAYER 7 (DISTANCE FROM DRAIN)	0.0 FEET	
DRAINAGE COLLECTED FROM LAYER 9	0.00024	0.86527
PERCOLATION/LEAKAGE THROUGH LAYER 11	0 000000	0.00000
AVERAGE HEAD ON TOP OF LAYER 10	0.000	
MAXIMUM HEAD ON TOP OF LAYER 10	0.000	
LOCATION OF MAXIMUM HEAD IN LAYER 9 (DISTANCE FROM DRAIN)	0 0 FEET	
SNOW WATER	0 19	690 8433
MAXIMUM VEG. SOIL WATER (VOL/VOL)	0.4600	
MINIMUM VEG SOIL WATER (VOL/VOL)	0 0870	

*** Maximum heads are computed using McEnroe's equations ***

Reference Maximum Saturated Depth over Landfill Liner
by Bruce M McEnroe, University of Kansas
ASCE Journal of Environmental Engineering
Vol. 119, No. 2, March 1993, pp 262-270.

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FINAL WATER STORAGE AT END OF YEAR 10

LAYER	(INCHES)	(VOL/VOL)
1	2.2718	0.1893
2	2 3788	0.1982
3	0.0000	0.0000
4	3.9960	0.2220
5	630 7200	0 2920
6	3.8599	0 1608
7	0 0022	0.0110
8	0 0000	0 0000
9	0.0020	0 0100
10	0.0000	0 0000
11	2.5620	0 4270
SNOW WATER	0.000	

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ATTACHMENT F

Financial Assurance Closure Cost Estimates

V. RECALCULATE ESTIMATED CLOSING COSTS

For the time period in the landfill operation when the extent and manner of its operation makes closing most expensive

**** Third Party Estimate/Quote must be provided for each item**
Costs must be for a third party providing all materials and labor

DESCRIPTION	UNIT		QUANTITY	UNIT COST		TOTAL
1 Proposed Monitoring Wells			(Do not include wells already in existence)			
The monitoring wells have been installed as part of operation	EA					$0 00
2 Slope and Fill (bedding layer between waste and barrier layer)						
Excavation	CY	NA	0	$0 00		$0 00
Placement and Spreading	SY		575,960	$0 99	(a)	$570,200 40
Compaction Included with Placement and Spreading	CY		0	$0 00		$0 00
Off-Site Material Included as part of operation	CY		0	$0 00		$0 00
Delivery Included as part of Placement and Spreading	CY		0	$0 00		$0.00
			Subtotal Monitoring Wells			$570,200 40
3 Cover Material (Barrier Layer)						
Off-Site Clay	CY		76,956	$15 00	(b)	$1,154,340 00
Synthetics - 40 mil	SY		345,092	$3 105	(c)	$1,071,510 66
Synthetics - GCL	SY	NA	0	$0.00		$0 00
Synthetics - Geonet	SY	NA	0	$0 00		$0 00
Synthetics - Other	SY	NA	0	$0 00		$0 00
			Subtotal Barrier Layer Cover			$2,225,850 66
4 Top Soil.						
Off-Site Material (sand)	CY		115,031	$6 27	(d)	$721,244 37
Off-Site Material (top soil)	CY		268,943	$12 00	(b)	$3,227,316 00
Delivery Included with material	CY		0	$0 00		$0 00
Spread Included with material	CY		0	$0 00		$0 00
			Subtotal Top Soil Cover			$3,948,560 37

a Unit price based upon Bid prices from R B Baker Construction, Inc received February 7, 1997 for Closure of Side Slope Units 1-4 and 12-20 and multiplied by an inflation factor of 1 02 for 1998, 1 01 for 1999, 1 015 for 2000 and 1 02 for 2001
b Unit price based upon Bid prices from R B Baker Construction, Inc received October 19, 2001 for Incremental Closure Construction
c Based upon Textured/Two Sides, 40 mil HDPE liner material from GSE as provided by Bob Trexler on August 19, 2002
d Unit price based upon Bid prices from R B Baker Construction, Inc received April 7, 2000 for Third Construction Increment and increased by an inflation factor of 1 02 for 2001

DESCRIPTION		UNIT		QUANTITY	UNIT COST		TOTAL
5 Vegetative Layer							
Sodding		SY		575,960	$1 87	(a)	$1,077,045 20
Hydroseeding Included with sodding		AC		0	$0 00		$0 00
Fertilizer Included with sodding		AC		0	$0 00		$0 00
Mulch		AC	N/A	0	$0 00		$0 00
Other		SY	N/A	0	$0 00		$0 00
				Subtotal Vegetative Layer			$1,077,045 20
6 Stormwater Control System							
Earthwork		CY		8,415	$5.71	(a)	$48,049 65
Grading Included with Earthwork		SY		0	$0 00		$0 00
Piping		LF		4,240	$90 48	(b)	$383,635 20
Ditches		LF	N/A	0	$0 00		$0 00
Berms		LF	N/A	0	$0 00		$0 00
Control Structures		EA	N/A	0	$0 00		$0 00
Other	Terrace Drains	EA		56	$5,500 00	(b)	$308,000 00
	Underdrain	LF		41,861	$16 00	(b)	$669,776 00
				Subtotal Stormwater Controls			$1,409,460 85
7 Gas Controls Passive							
Wells		EA	N/A	0	$0 00		$0 00
Pipe and Fittings		LF	N/A	0	$0 00		$0 00
Monitoring Probes The gas monitoring probes have been installed		EA		0	$0 00		$0 00
NSPS/Title V requirements		LS		0	$0 00		$0 00
				Subtotal Passive Gas Controls			$0 00

a Unit price based upon Bid prices from R B Baker Construction, Inc received April 7, 2000 for Third Construction Increment and increased by an inflation factor of 1 02 for 2001

b Unit price based upon Bid prices from R B Baker Construction, Inc received October 19, 2001 for Incremental Closure Construction

DESCRIPTION	UNIT	QUANTITY	UNIT COST		TOTAL
8 Gas Control· Active Extraction					
Traps	EA	5	$3,136 00	(a)	$15,680 00
Sump Installed during operation	EA	0	$0 00		$0 00
Flare Assembly	EA	1	$138,626 67	(a)	$138,626 67
Flame Arrestor Installed during operation	EA	0	$0 00		$0 00
Mist Eliminator Installed during operation	EA	0	$0 00		$0 00
Flow Meter Installed during operation	EA	0	$0 00		$0 00
Blowers Included with the Flare Assembly	EA	0	$0 00		$0 00
Collection System					
6" Pipes and Fittings	LF	7,000	$25 00	(b)	$175,000 00
8" Pipes and Fittings	LF	1,300	$30 00	(b)	$39,000 00
10" Pipes and Fittings	LF	4,700	$30 00	(b)	$141,000 00
Other (describe)					
Control Valves	EA	5	$3,000 00	(b)	$15,000 00
Wells (44 wells @ 140 FT)	FT	6,160	$100 00	(b)	$616,000 00
Well Head Assembly	EA	44	$1,000 00	(b)	$44,000 00
		Subtotal Active Gas Extraction			$1,184,306 67
9 Security System	The security system was installed as part of the operation				
Fencing	LF	0	$0 00		$0 00
Gate(s)	EA	0	$0 00		$0 00
Sign(s)	EA	0	$0 00		$0 00
Ditches	LF	0	$0 00		$0 00
		Subtotal Security System			$0 00
10 Engineering					
Closure Plan Report Including Closure Permit	LS	1	$70,000 00		$70,000 00
Certified Engineer Included in Certification of Closure	LS	0	$0 00		$0 00
NSPS/Title V Air Permit A Title V Air Permit has been issued	LS	0	$0 00		$0 00
Final Survey	LS	1	$60,000.00		$60,000 00
Certification of Closure	LS	1	$20,000 00		$20,000 00
Other (Detail)					
	LS	0	$0		$0 00
Construction Drawings	LS	1	$250,000		$250,000 00
		Subtotal Engineering			$400,000 00

a Unit price based upon Bid price from R B Baker Construction, Inc received on June 29, 1998 for construction of Phase I Gas Management system and multiplied by an inflation factor of 1 01 for 1999, 1 015 for 2000 and 1 02 for 2001

b Unit price based upon Bid prices from R B Baker Construction, Inc received October 19, 2001 for Incremental Closure Construction

11 Professional Services

	Contract Management			Quality Assurance			
	Rate/Hr	Hours	LS	Rate/Hr	Hours	LS	Total
P.E Supervisor	$125	104	$13,000	$105.00	100	$10,500	$23,500
On-Site Engineer	$0	0	$0	$65 00	1200	$78,000	$78,000
Office Engineer	$100	208	$20,800	$90 00	400	$36,000	$56,800
On-Site Technician	$75	1300	$97,500	$40 00	4800	$192,000	$289,500
Other (Explain)							
Clerical			$5,824				$5,824
Expenses			$10,000				$10,000

DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL
Quality Assurance Testing	LS	1	$65,000 00	$65,000 00
			Subtotal Professional Services	$528,624 00
			Subtotal of 1-11 Above:	$11,344,048 15
12 Contingency 15	% of Total			$1,701,607 22
			Closing Cost Subtotal:	$13,045,655 37

13 Site Specific Costs (explain)

Mobilization/Demobilization (5 0% of Construction Cost)		$520,771 21
Waste Tire Facility (100 tons at $102 per ton)	(a)	$10,200 00
Materials Recovery Facility	N/A	$0 00
Special Wastes		$50,000 00
Leachate Management System Modification	N/A	$0 00
Other - Bonds (1 0% of Construction Costs)		$104,154 24
Erosion Control (during construction)		$250,000 00
	Subtotal Site Specific Costs.	$935,125 45
	TOTAL CLOSING COSTS:	$13,980,780 82

a Based upon Trail Ridge Landfill Inc 's current cost to handle waste tire disposal

ATTACHMENT G

Closure Documentation

First Closure

Side Slope Units 5, 6, 7 (Partial) and 8 (Partial)

Certified February 3, 1994

File Copy

England-Thims & Miller, Inc.

Consulting & Design Engineers
3131 St Johns Bluff Road So. Jacksonville, FL 32246
904-642-8990

PRINCIPALS

James E. England, P.E., President
Robert E. Thims, V Pres., Sec
Douglas C Miller, P.E., V Pres
N Hugh Mathews, P.E., V Pres

September 1, 1993

Ms. Mary C. Nogas, P.E.
Waste Management Section
Northeast District
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill
Permit No. SC16-184444
ET&M No E93-143

Dear Ms. Nogas:

By this letter and on behalf of Trail Ridge Landfill, Inc., we hereby notify the Department (in accordance with Specific Condition No. 1 of the subject permit) that closure construction of Side Slope Units 5, 6, 7, 8, 9 and 10 will commence on September 7, 1993. The Contractor chosen for this closure construction is J.B. Coxwell Contracting, Inc.

Attached is the Quality Assurance/Quality Control Plan for this project. Upon completion of construction, the necessary QA/QC documentation will be submitted to the Department as a part of the certification documents.

Should you have any questions regarding this information, please do not hesitate to give me or Juanitta Clem a call.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Douglas C. Miller, P.E.
Vice President

attachment

cc: Greg Mathes
Mary Ardiff
Jim Lukens
Chris Pearson
Jim Horton

TRAIL RIDGE LANDFILL CLOSURE
PHASES I AND II
CONSTRUCTION QA/QC PLAN

This plan addresses the quality assurance and quality control (QA/QC) for the side slope unit closure construction. This plan delineates the quality procedures and standards for the construction.

In the context of this plan, quality assurance and quality control are defined as follows:

Quality Assurance - A planned and systematic pattern of all means and actions designed to provide adequate confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.

Quality Control - Those actions which provide a means to measure and regulate the characteristics of an item or service to contract and regulatory requirements.

The City of Jacksonville is the owner of Trail Ridge Landfill and Trail Ridge Landfill, Inc. is the permittee/operator of the landfill. The landfill began to receive waste in May of 1992. England, Thims & Miller, Inc. is the design engineer. The Contractor for the construction has not been chosen. The name of the Contractor will be provided to the Department of Environmental Protection, once a Contractor is chosen

The QA/QC Plan for this project includes General QA/QC and Soils QA/QC. The General QA/QC includes periodic observation of the contractor's work to verify substantial compliance with permits, plans, specifications and design concepts. These services will be conducted by England, Thims & Miller, Inc. and will include the following:

General Quality Control Monitor - shall monitor the construction for compliance with the permits, plans, specifications and design including construction to proper lines and grades, maintain weekly progress reports of the construction (including observation data sheets, problem identification and correction logs), make note of any construction deviations, and coordinate qualifying and testing of materials. This individual shall be experienced in civil site construction and solid waste regulations and shall work under the supervisor of the General Quality Assurance Engineer.

General Quality Assurance Engineer - shall supervise the construction monitoring to verify compliance with permits, plans, specification and design concepts. This individual shall be experienced in civil site construction and solid waste regulations/construction and shall be a registered Professional Engineer.

8/5/93
Rev. 8/13/93
Rev. 8/25/93

The General QA/QC includes monitoring the construction and construction sequence of the following activities:

1. General Earthwork
2. Underdrain Installation
3. Drainage Installation
4. Gas Well Installation
5. Sodding/Overseeding
6. General Construction Quality Control
7 Prepare As-Built Drawings and Surveys

The Soils QA/QC for this project includes full-time services to periodically observe the Contractor's work and conduct soil material qualifying and testing to verify substantial compliance with the material standards. This work will be conducted by Law Engineering and will include the following:

Soils Quality Control Monitor - shall pre-qualify soil materials, monitor the installation of soil materials, determine where in-place soil materials shall be tested, and test the in-place soil materials. This individual shall be responsible for assuring that all soil materials have been pre-qualified, prior to installation. This individual shall be experienced in civil site construction and soil testing standards and procedures and shall work under the supervisor of the Soils Quality Assurance Engineer.

Soils Quality Assurance Engineer - shall supervise the soil material pre-qualifying and testing of in-place soil materials to assure compliance with the test standards and testing frequency requirements, and verify compliance with the plans, specification and design. This individual shall be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer.

The QA/QC Program includes monitoring the construction of the following:

A. Final Cover Installation (Initial Cover, Compacted Clay Layer and Top Soil)

The final cover shall consist of 18" (minimum) of initial cover, 12" (minimum) of compacted clay, and 24" (minimum) of top soil. The compacted clay layer of the final cover must be tied into any existing compacted clay layers, if applicable and must be placed in two 6" (minimum) lifts. The Soils Quality Control Monitor shall observe the construction of the final cover on a full time (on-site) basis. The QA/QC for the final cover is as follows:

1. Tie-In to Existing Cover (When Applicable)

   a. Location - The edge of any existing final cover adjacent to the proposed final cover area.

   b. Standard - The compacted clay layer of any existing final cover and the proposed final cover must be tied together to form one continuous seamless layer.

   c. Frequency - The Soils Quality Control Monitor shall monitor the tie-in on a continuous basis.

2. Initial Cover (Compacted Clay Layer Subgrade)

   a. Location - Any material used to amend the existing soils shall be pre-qualified at the borrow source.

   The soil shall be tested for thickness and density in place after compaction. The location of testing shall be determined by the Soils Quality Control Monitor.

   b. Standard - Any material used to amend the existing soils shall be clean granular soil, free from organics, roots, stumps, rocks and any other deleterious materials.

   The initial cover shall be at least 18" in thickness (compacted).

   Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557).

   c. Frequency - Any soil used to amend the existing soils shall be tested once per 500 CY of material.

   Depth measurements shall be taken at the frequency of four measurements per acre for the first five acres. Thereafter, depth measurements shall be taken at the frequency of two measurements per acre.

   Density tests shall be conducted at a frequency of four tests per acre for the first five acres. Thereafter, density tests shall be conducted at a frequency of two tests per acre.

3. Compacted Clay Layer

a Borrow Source - Prior to installation of the compacted clay layer, an appropriate borrow source shall be located. Suitability of the construction materials from that source shall be determined in accordance with the following:

(1) If demonstrated field experience is available from at least three prior successful projects of five or more acres each to document that a given borrow source can meet the requirements of the project specifications, then extensive laboratory testing of the borrow source will not be required. However, the source of material shall be geologically similar to and the methods of excavating and stockpiling the material shall be consistent with those used on the prior projects. Furthermore, a minimum of three representative samples from the appropriate thickness of the in-situ stratum or from stockpiles of the borrow material proposed for compacted clay layer construction shall be submitted to an independent soil testing laboratory to document through index testing that the proposed material is consistent with the material used on prior successful projects. At a minimum, index testing shall consist of percent fines, Atterberg limits and moisture content determinations.

(2) If demonstrated field experience as defined above is not available or cannot be documented, then the following requirements shall be met.

(a) A field exploration and laboratory testing program shall be conducted by an independent soil testing laboratory to document the horizontal and vertical extent and the homogeneity of the soil strata proposed for use as compacted clay material. A sufficient number of index tests from each potential borrow stratum shall be performed to quantify the variability of the borrow materials and to document that the proposed borrow material complies with specifications At a minimum, the index tests shall consist of percent fines, Atterberg limits and moisture content determinations.

(b) Sufficient laboratory hydraulic conductivity tests shall be conducted on samples representative of the range in variability of the proposed borrow source (ASTM D 5084). For each such sample, test specimens shall be prepared and tested to cover the range of molding conditions (moisture content and dry density) required by project specifications. The hydraulic conductivity tests shall be conducted in triaxial type permeameters. The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity

calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D 5084). The borrow source will only be considered suitable if the hydraulic conductivity of the material, as documented on laboratory test specimens, can be shown to meet the requirements of the project specifications at the 98 percent confidence level.

b. Test Strip - Prior to full-scale installation of the compacted clay layer, a field test section or test strip shall be constructed at the site above a prepared subbase. The test strip shall be considered acceptable if the measured hydraulic conductivities of undisturbed samples from the test strip meet the requirements of the project specifications at the 98 percent confidence level. If the test section fails to achieve the desired results, additional test sections shall be constructed. The test strip(s) shall be constructed in accordance with the following requirements:

(1) The test section shall be of sufficient size (20' x 60' minimum) such that full-scale installation procedures can be duplicated within the test section;

(2) The test section shall be constructed using the same equipment for spreading, kneading and compaction and the same construction procedures (e.g., number of passes, moisture addition and homogenization, if needed) that are anticipated for use during full-scale installation;

(3) At a minimum, the compacted clay layer test section shall be subject to the following field and laboratory testing requirements:

(a) A minimum of five random samples of the construction material delivered to the site during test section installation shall be tested for moisture content (ASTM D 2216), percent fines (ASTM D 1140) and Atterberg limits (ASTM D 4318);

(b) At least five field density and moisture determinations shall be performed on each lift of the compacted test section;

(c) Upon completion of the test section lift, the thickness of the lift shall be measured at a minimum of five random locations to check for thickness adequacy; and

(d) A minimum of five Shelby tube or drive cylinder (ASTM D 2937) samples shall be obtained from each lift of the test section for laboratory hydraulic conductivity testing. Laboratory hydraulic conductivity testing shall be conducted in triaxial type permeameters (ASTM D 5084). The

test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D 5084).

(e) The test strip shall meet or exceed the standards established below. If the test strip fails to meet these standards, the construction methods and/or material will be rejected and the test strip shall be performed again.

c. Compacted Clay Layer Installation - Full scale compacted clay layer installation may begin only after completion of a successful test section. During construction, quality control testing shall be provided to document that the installed layer conforms to project specifications. The compacted clay layer shall be installed in two 6" (minimum) lifts for a total minimum thickness of 12" (minimum).

(1) Location - The compacted clay layer shall be tested in place. The locations of testing shall be determined by the Soils Quality Control Monitor. If there are indications of a change in product quality or construction procedures during construction, additional tests shall be performed to determine compliance.

(2) Standard -

(a) Compacted Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557).

(b) Field Density - The field density of the clay layer shall not be less than 90% of Standard Proctor Density (ASTM D 698).

(c) Thickness - Each lift (two total) shall be a minimum of 6" thick.

(d) Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 1 x 10^{-7} cm/sec (ASTM D 5084).

(3) Field Testing Frequency -

(a) Prior to the laying of the compacted clay materials, the subbase shall be compacted to the specified density. Density tests shall be conducted at a minimum rate of four tests per acre for the first five acres. Thereafter, density tests shall be conducted at a frequency of two tests per acre;

(b) A minimum of four moisture content and field density determinations shall be conducted per acre per lift of the compacted clay layer for the first five acres per lift. Thereafter, two moisture content and field density determinations shall be conducted per acre per lift of the compacted clay. The degree of compaction shall be checked using the one-point field Proctor test or other appropriate test procedures; and

(c) A minimum of eight thickness measurements shall be conducted per acre per lift of the compacted clay layer for the first five acres per lift. Thereafter, four thickness measurements shall be conducted per acre per lift of the compacted clay layer.

(4) Laboratory Testing Frequency -

(a) Percent fines (ASTM D 1140) of the liner construction material shall be determined at a minimum frequency of four tests per acre per lift of the installed compacted clay layer for the first five acres per lift. Thereafter, the percent fines shall be determined at a minimum frequency of two tests per acre per lift of the compacted clay layer;

(b) Atterberg limits determinations shall be performed on two samples per acre per lift of the installed compacted clay layer for the first five acres per lift. Thereafter, Atterberg limits determinations shall be performed on one sample per acre per lift of the compacted clay layer; and

(c) Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D 2937) samples of the compacted clay layer shall be performed at a minimum frequency of two tests per acre per lift for the first five acres per lift. Thereafter, hydraulic conductivity testing shall be performed at a minimum frequency of one test per acre per lift. Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D 5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity

calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

(5) Deficiency - If the test data from a compacted clay layer section does not meet the requirements of the project specifications, additional random samples may be tested from that section. If such additional testing demonstrates that the thickness and hydraulic conductivity meet the requirements of the project specifications at the 95 percent confidence level, that section will be considered acceptable. If not, that section shall be reworked or reconstructed so that it does meet these requirements.

4. Top Soil Layer

a. Location - The top soil shall be pre-qualified at the borrow source.

After placement, the top soil layer shall be tested in place. The location of testing shall be determined by the Soils Quality Control Monitor

b. Standard - Top soil shall have an organic content of at least 1.5 percent but not more than 10.0 percent (ASTM D 2974) and shall have a pH value between 5.0 and 7.0 (ASTM E 70). Top soil shall be suitable for plant growth and reasonably free of brush, weeds, litter, roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth. Roots greater than 3/8" diameter shall be removed.

The top soil layer shall be at least 21" in thickness (compacted).

Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557).

c. Frequency - The soil shall be monitored on a continuous basis for extraneous matter.

Organic content and pH shall be tested at the frequency of four tests per acre for the first five acres. Thereafter, the organic content and pH shall be tested at the frequency of two tests per acre.

Depth measurements shall be taken at the frequency of four measurements per acre for the first five acres. Thereafter, the depth measurements shall be taken at the frequency of two measurements per acre.

Density tests shall be conducted at a frequency of four tests per acre for the first five acres. Thereafter, the density tests shall be conducted at a frequency of two tests per acre.

B. Downcomer Pipes (Clay Encasement)

Downcomer pipes shall be installed in the final cover at the low point of the terraces, to intercept the stormwater between terraces. The downcomer pipes shall include the terrace side drains and terrace underdrain piping.

The downcomer pipes shall be encased in clay as shown on the Construction Drawings. The clay around the pipes shall be compacted into a uniform homogeneous material. Prior to placement of top soil on the downcomer pipes, the pipe shall be inspected by the General Quality Control Monitor.

(1) Location - The compacted clay layer shall be tested in place. The locations of testing shall be determined by the Soils Quality Control Monitor. If there are indications of a change in product quality or construction procedures during construction, additional tests shall be performed to determine compliance.

(2) Standard -

(a) Compacted Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557) (18" thick).

(b) Field Density - The field density of the clay layer shall not be less than 90% of Standard Proctor Density (ASTM D 698)

(c) Thickness - One foot minimum below pipe.

(d) Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 1×10^{-7} cm/sec (ASTM D 5084).

(3) Field Testing Frequency -

(a) Prior to the laying of the compacted clay materials, the subbase shall be compacted to the specified density. Density tests and thickness shall be conducted at a minimum rate of one per 60 L.F. of pipe.

(b) A minimum of one moisture content and field density determination of the compacted clay layer shall be conducted per 60 L.F. of pipe

(c) A minimum of two thickness measures of the compacted clay layer shall be conducted per 60 L.F. of pipe.

(4) Laboratory Testing Frequency -

(a) Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D 2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per 60 L.F. of pipe. Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D 5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

(5) Deficiency - If the test data from a compacted clay layer section does not meet the requirements of the project specifications, that section shall be reworked or reconstructed so that it does meet these requirements.

C. Underdrain Filter Sand

The underdrains in the terraces shall be surrounded by filter sand as shown on the Contract Drawings. The QA/QC for the filter sand is as follows:

1 Filter Sand

a. Location - The material shall be pre-qualified at the borrow source. A chain-of-custody shall be provided via truck tickets from the source to the project site.

The location of the on-site hydraulic conductivity test shall be from on-site stockpile.

b Standard - Clean, uniformly graded sand with a uniformity coefficient of 1.5 or greater and an effective grain size of 0.2 mm to 0.5 mm. The sand shall have a hydraulic conductivity no less than $1x10^{-3}$ cm/sec at a density of 100 percent Modified Proctor. The hydraulic conductivity testing shall be by Constant Head Method (ASTM D 2434).

c. Frequency - This material shall be pre-qualified at the source at a frequency of 1 test per side slope unit. The hydraulic conductivity of the sand shall be tested once per side slope unit.

D. Gas Wells

Gas wells shall be installed through the final cover at the locations shown on the Construction Drawings. The QA/QC for gas well materials shall be as follows:

1. Gravel

a Location - The gravel shall be pre-qualified at the borrow source. A chain-of-custody shall be provided via truck tickets from the source to the project site.

b. Standard - The gravel shall be clean, well-rounded gravel with no fines. The gravel shall be 1"-3" in size with an average size of 1.5", FDOT No. 2 Course Aggregate (ASTM D 448)

The gravel shall be non-calcareous (ASTM D 4373)

c. Frequency - The gravel shall be certified by the supplier. The gravel shall be tested once per gas well.

2. Backfill Material

a. Location - The soil shall be pre-qualified at the source by the Soil Quality Control Monitor.

b. Standard - The backfill material shall be a cohesionless soil.

c. Frequency - The soil shall be tested once per gas well.

3. Granular Bentonite

a. Location - The material shall be pre-qualified at the source with documentation provided to the Soils Quality Control Monitor.

b. Standard - The material shall be a homogeneous, inorganic material with at least 50 percent, by weight, passing the No. 200 sieve (ASTM D 1140)

The material shall be chemically inert to methane and carbon dioxide gasses, or any gaseous combination thereof.

c. Frequency - The material shall be certified by the supplier, one time only.

England-Thims & Miller, Inc.
Consulting & Design Engineers
3131 St. Johns Bluff Road So Jacksonville, FL 32216
904-642-8990

PRINCIPALS
James E. England, P.E., President
Robert E. Thims, V.Pres., Sec
Douglas C Miller, P.E., V. Pres
N Hugh Mathews, P.E., V Pres

November 2, 1993

Ms. Mary C. Nogas, P.E.
Waste Management Section
Northeast District
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill
Permit No. SC16-184444
Side Slope Closure Units 5, 6, 7 & 8
ET&M No. E93-143

Dear Ms Nogas:

By this letter and on behalf of Trail Ridge Landfill, Inc., we hereby notify the Department that the test strip for the referenced project has been completed and based upon the test strip results, the field density of the clay layer has been revised to "not less than 85% of Standard Proctor Density (ASTM D 698)".

Construction is continuing based on this revision. Should you have any questions regarding this revision to the QA/QC Plan for the closure of exterior side slope units, please contact me or Juanitta Clem.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Douglas C. Miller, P.E.
Vice President

attachment

cc: Greg Mathes
Jim Lukens
Chris Pearson

England-Thims & Miller, Inc.
Consulting & Design Engineers
3131 St. Johns Bluff Road So. Jacksonville, FL 32246
904-642-8990

PRINCIPALS
James E. England, P.E., President
Robert E. Thims, V.Pres., Sec.
Douglas C. Miller, P.E., V. Pres.
N. Hugh Mathews, P.E., V. Pres.

February 3, 1994

Ms. Mary C. Nogas, P.E.
Waste Management Section
Department of Environmental Regulation
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Mr. Jai P. Prasad, P.E.
Stormwater Section
Department of Environmental Regulation
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill -Side Slope Closure
Side Slope Units 5, 6, 7 (Partial) and 8 (Partial)
FDER Permit No. SC16-184444
ET&M No. E93-143-3 (Certification File)

Dear Ms. Nogas and Mr. Prasad:

Please find herewith the Certification of Construction Completion for the Trail Ridge Landfill - Side Slope Closure. The construction Quality Assurance/Quality Control documentation and As-Built drawing are attached.

Subject to your site inspection, Trail Ridge Landfill, Inc. respectfully requests your written verification that this closure is accepted by the Department.

This is the certification for the Trail Ridge Landfill closure construction of Side Slope Units 5, 6, 7 (partial) and 8 (partial) which commenced on September 7, 1993. Should you have any questions concerning this certification, please do not hesitate to contact me or Juanitta Clem.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Douglas C. Miller, P.E.
Vice President

Attachments: Certification of Construction Completion
As-Built Drawing
Quality Assurance and Quality Control Documentation

cc: Greg Mathes w/attachments
Scott McCallister w/attachments
Chris Pierson w/attachments

DEP - 4 copies
City - 2 copies
Laws Eng. - 1 copy

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION

CERTIFICATION OF CONSTRUCTION COMPLETION
OF A SOLID WASTE MANAGEMENT FACILITY

DER Construction Permit No.: SC16-184444 County: Duval

Name of Project: Trail Ridge Landfill - Side Slope Closure of Units 5, 6, 7 & 8

Name of Owner: City of Jacksonville; Trail Ridge Landfill, Inc. - Operator/Permittee

Name of Engineer: England, Thims & Miller, Inc.

Type of Project: Class I Landfill - Incremental Closure
Closure of Units 5, 6, 7 (Partial) and 8 (Partial)

Cost: Estimated $ 870,950 Actual $ 738,700+/-

Site Design: Quantity: 2,600 (Avg) ton/day Site Acreage: 5.0+/- Acres

Population: 659,000+/-(1990) Dumping Fees: $ 55 /Ton

Deviations from Plans and Application Approved by DER: Deviations are shown on the As-Built Drawing and/or outlined in the attachment. The As-Built survey was prepared by Sunshine State Surveyors, Inc. and reviewed by England, Thims and Miller, Inc.

Water Monitoring Data Submitted to DER, Date: Quarterly

Address and Telephone No. of Site: 5110 U.S. Highway 301, Baldwin, FL 32234
Phone: (904) 289-9100

Name(s) of Site Supervisor: Greg Mathes

Date Site Inspection is requested: As soon as possible

This is to certify that, with the exception of deviation noted above, the construction of the project has been completed in accordance with the plans authorized by Construction Permit No.: SC16-184444 and Modifications Dated: 12-24-91

England, Thims & Miller relied upon the information and certifications provided by Law Engineering and Sunshine State Surveyors, Inc. in this certification.

Date: 2-4-94

Signature of Professional Engineer

TRAIL RIDGE LANDFILL
SIDE SLOPE CLOSURE - UNITS 5, 6, 7 AND 8
DEVIATIONS FROM PLANS AND APPLICATION

1. Downcomer Pipe D-21 was constructed with stubouts on the uphill (southern) side only. Since the terraces were constructed with a minimum 1% slope, stubouts on the downhill (western) side were deemed unnecessary.

2. Side Slope Units 7 and 8 could not be completed because the solid waste has not been placed to complete the units. (Note: Completion of Units 7 and 8 required waste disposal in Cell C which was only recently (Nov. 5, 1993) accepted by the Department). These units were completed to Sta. 96+25 as shown on the As-Built Drawing.

3. The invert on Downcomer Pipe D-21 in Structure S-21 was raised to Elevation 117.8 +/-. It should be noted that the crown of the pipe remains below the throat of the inlet.

4. Terrace 1 at Downcomer D-19 has a depth of 2.11 feet rather than the design depth of 2.5 feet. However, based upon a 25-year storm event and the drainage area of 0.62 acres, the terrace will have over 1.0 foot of freeboard and therefore, meets the design intent.

5. For safety reasons, the gas well was install with a 24-inch borehole.

Second Closure

Side Slope Units 9, 10 and 11

Certified April 17, 1995

England-Thims & Miller, Inc.
Consulting & Design Engineers
3131 St Johns Bluff Road So Jacksonville, FL 32246
904-642-8990

PRINCIPALS
James E. England, P.E., President
Robert E. Thims, V.Pres., Sec
Douglas C. Miller, P.E., V. Pres
N Hugh Mathews, P.E., V. Pres

May 17, 1994

Ms. Mary C. Nogas, P.E.
Waste Management Section
Northeast District
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill
Permit No. SC16-184444
Side Slope Closure Units 9, 10 and 11
ET&M No. E94-17

Dear Ms. Nogas:

By this letter and on behalf of Trail Ridge Landfill, Inc., we hereby notify the Department that the closure construction of Side Slope Units 9, 10 and 11 as required by Specific Condition 34 of the referenced permit shall begin on May 23, 1994. The parties involved in the construction are as follows:

Construction Contractor - J. B. Coxwell Contracting, Inc.
General Quality Assurance Engineer - Juanitta Bader Clem, P.E.
Soils Quality Assurance Engineer - James Horton, P.E.
General/Soils Quality Control Monitor - Ken Bunnell

As in the previous closure construction, the field density of the clay layer shall be established by the Soils QA Engineer based upon test strip results and shall be determined by Standard Proctor Density (ASTM D-698). In no case shall the field density be less than 80% of Standard Proctor Density (ASTM D-698). Thus, the field density will be based upon the clay material to be used in the project.

Should you have any questions regarding this construction, please give me a call.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem

Juanitta Bader Clem, P.E.
Project Manager

cc: Greg Mathes
Scott McCallister
Neil Rushing

England-Thims & Miller, Inc.
Consulting & Design Engineers
3131 St. Johns Bluff Road S., Jacksonville, FL 32246
Tel. (904) 642-8990 Fax (904) 646-9485

Principals
James E. England, P.E., Pres
Robert E. Thims, Exec. V.P.
Douglas C. Miller, P.E. Exec. V.P.
N. Hugh Mathews, P.E., Exec. V.P.

April 17, 1995

Ms. Mary C. Nogas, P.E.
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference Trail Ridge Landfill -Side Slope Closure
Side Slope Units 9,10 and 11
FDER Permit No. SC16-184444
ET&M No. E94-17-3 (Certification File)

Dear Ms. Nogas

Please find herewith the Certification of Construction Completion for the Trail Ridge Landfill - Side Slope Closure. The Construction Quality Assurance/Quality Control documentation and As-Built drawings are attached.

We request a site inspection on May 1, 1995 at 9.00 A.M. Subject to your site inspection, Trail Ridge Landfill, Inc. respectfully requests your written verification that this closure is accepted by the Department.

This is the certification for the Trail Ridge Landfill Closure construction of Side Slope Units 9, 10 and 11 which commenced on May 23, 1994. Should you have any questions concerning this certification, please do not hesitate to contact me or Juanitta Clem.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Douglas C. Miller, P.E.
Vice President

DCM:cl

Attachments Certification of Construction Completion
As-Built Drawing
Quality Assurance and Quality Control Documentation

cc Greg Mathes w/attachments
Scott McCallister w/attachments
Chris Pierson w/attachments
DEP Stormwater Section w/attachments

Florida Department of Environmental Regulation

Twin Towers Office Bldg. 2600 Blair Stone Road Tallahassee, Florida 32399-2400

DER Form 17-701.900(2)
Form Title
Effective Date
DER Application No.
(Filled in by DER)

Certification of Construction Completion of a Solid Waste Management Facility

DER Construction Permit No: SC16-184444 County: Duval

Name of Project: Trail Ridge Landfill - Side Slope Closure of Units 9, 10 and 11

Name of Owner: City of Jacksonville; Trail Ridge Landfill, Inc. - Operator/Permittee

Name of Engineer: England, Thims & Miller, Inc.

Type of Project: Class I Landfill - Incremental Closure
Closure of Units 9, 10 and 11

Cost: Estimate $ N/A Actual $ 606,041 +/-

Site Design: Quantity: 2,600 (Avg) ton/day Site Acreage: 2.3 +/- Acres

Deviations from Plans and Application Approved by DER: Deviations are shown on the As-Built Drawing and/or outlined in the attachment. The As-Built survey was prepared by Sunshine State Surveyors, Inc. and reviewed by England, Thims & Miller, Inc.

Address and Telephone No. of Site: 5110 U.S. Highway 301, Baldwin, FL 32234
Phone (904) 289-9100

Name(s) of Site Supervisor: Greg Mathes

Date Site inspection is requested: May 1, 1995 @ 9:00 AM

This is to certify that, with the exception of any deviation noted above, the construction of the project has been completed in substantial accordance with the plans authorized by Construction Permit No.: SC16-184444 and Modifications Dated: 12-24-91

England, Thims & Miller relied upon the information and certifications provided by Law Engineering and Sunshine State Surveyors, Inc. in this certification.

Date: 4/19/95

Signature of Professional Engineer

TRAIL RIDGE LANDFILL
SIDE SLOPE CLOSURE - UNITS 9, 10 AND 11
SUBSTANTIAL DEVIATIONS FROM PLANS AND APPLICATION

1. For safety reasons, the gas well was installed with a 24-inch borehole.

2. The screened interval on the gas well extends up to the top of daily cover (6" above the top of waste). Nevertheless, gas well will function properly as a passive vent.

Third Closure

Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20

Certified December 5, 1997

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

Principals
James E England, PE , Pres
Robert E Thims, Exec VP
Douglas C Miller, PE , Exec VP
N Hugh Mathews, PE , Exec VP

January 17, 1997

Ms Mary C Nogas, P.E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256-7590

Reference Trail Ridge Landfill
Incremental Closure
Permit No SC16-184444
ET&M No E96-92-1

Dear Ms Nogas

On behalf of Trial Ridge Landfill, Inc, we hereby notify the Department that incremental closure at the referenced landfill will begin during February or March of this year This incremental closure will be conducted in accordance with the conditions set forth in the referenced permit However, since the gas system has been modified in the permit renewal to provide an active system, we plan to construct the gas wells in accordance with the new active gas well design and in the proposed locations for the active system

It is our understanding that we are required to close completed solid waste units within 180 days of final waste placement Therefore, we must proceed with this incremental closure in accordance with the existing permit, prior to issuance of the new permit

If you have any questions regarding this issue, please feel free to give me a call.

Sincerely,

ENGLAND, THIMS & MILLER, INC

Juanitta Bader Clem, P E
Vice President

cc: Greg Mathes
Scott McCallister
Chris Pearson

3131 St Johns Bluff Road S • Jacksonville FL 32246 • Tel (904) 642-8990 • Fax (904) 646-9485

England-Thims & Miller, Inc.

ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

Principals
James E England, PE , Pres
Robert E Thims, Exec VP
Douglas C Miller, PE , Exec VP
N Hugh Mathews, PE , Exec VP

April 21, 1997

Ms. Mary C Nogas, P E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference. Trail Ridge Landfill
Incremental Side Slope Closure
FDEP Permit No SC16-184444
ET&M No. E96-92-4

Dear Ms Nogas

By this letter and on behalf of Trial Ridge Landfill, Inc., we hereby notify the Department that the closure construction of Side Slope Units 1, 2-4 (partial), 7-8 (partial), 12-17 (partial), 18-19 and 20 (partial) as required by Specific Condition 34 of the referenced permit shall begin on April 21, 1997. The parties involved in the construction are as follows·

Construction Contractor - R. B. Baker Construction, Inc
General Quality Assurance Engineer - Juanitta Bader Clem, P E
Soils Quality Assurance Engineer - James Horton, P E
General/Soils Quality Control Monitor - Buckley Williams

As in the previous closure construction, the field density of the clay layer shall be established by the Soils QA Engineer based upon test strip results and shall be determined by Standard Proctor Density (ASTM D-698) In no case shall the field density be less than 80% of Stand Proctor Density. Thus, the field density will be established based upon the clay material to be used in this project

If you have any questions regarding this construction, please feel free to give me a call

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem, P E
Vice President

cc Greg Mathes
Scott McCallister
Chris Pearson
Jim Horton

3131 St Johns Bluff Road S • Jacksonville FL 32246 • Tel (904) 642-8990 • Fax (904) 646-9485

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

Principals
James E England, PE , Pres
Robert E Thims, Exec VP
Douglas C Miller PE , Exec VP
N Hugh Mathews PE , Exec VP

May 8, 1997

Ms Mary C Nogs, P E
Waste Management Section
Department of Environmental Regulation
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference Trail Ridge Landfill
Incremental Side Slope Closure
FDEP Permit No SC16-184444
ET&M No E96-92-4

Dear Ms Nogas

By this letter and on behalf of Trail Ridge Landfill, Inc , we hereby notify the Department that the Quality Assurance/Quality Control (QA/QC) Plan has been revised to correspond to the gas well details for the active gas collection system which was provided in the FDEP permit renewal (FDEP File Numbers 296641 and 296642) The specific deviations are as follows·

1. The gravel for the gas wells has been changed from FDOT No. 4 Course Aggregate (ranging in size from 3/8" to a maximum of 2 0") to FDOT No. 3 Course Aggregate (ranging in size from ½" to a maximum of 2 5").

2 The bentonite for the gas well plug shall have a hydraulic conductivity no greater than 1.0×10^{8} cm/sec, rather than requiring that at least 50 percent pass the No. 200 sieve This allows the use of bentonite pellets

These deviations only affect page 10 of the QA/QC Plan and a copy of revised Page 10 is provided herein If you have any questions regarding this deviation or the closure construction, please feel free to give me a call

Sincerely,

ENGLAND, THIMS & MILLER, INC

Juanitta Bader Clem

Juanitta Bader Clem, P E
Vice President

attachment

cc Greg Mathes
Scott McCallister
Chris Pearson
Jay McMahan

3131 St Johns Bluff Road S • Jacksonville FL 32246 • Tel (904) 642-8990 • Fax (904) 646-9485

D. Gas Wells

Gas wells shall be installed through the final cover. The QA/QC for gas well materials shall be as follows:

1. Gravel

   a. Location - The gravel shall be pre-qualified by certification by the supplier.

   b. Standard - The gravel shall be clean gravel with no fines. The gravel shall be FDOT No. 3 Course Aggregate (ASTM D 448).

      The gravel shall be non-calcareous (ASTM D 4373)

   c. Frequency - The gravel shall be certified by the supplier The gravel shall be tested once per 100 C.Y.

2. Bentonite

   a Location - The material shall be pre-qualified with documentation from the supplier.

   b. Standard - The material shall be a homogeneous, inorganic material with a hydraulic conductivity no greater than 1.0×10^{-8} cm/sec at a density of 100 percent Modified Proctor

   c. Frequency - The material shall be certified by the supplier, one time only

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

Principals
James E England, PE , Pres
Robert E Thims, Exec VP
Douglas C Miller, PE , Exec VP
N Hugh Mathews, PE , Exec VP

August 29, 1997

Ms Mary C Nogas, P.E
Waste Management Section
Department of Environmental Regulation
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference Trail Ridge Landfill
Incremental Side Slope Closure
FDEP Permit No SC16-184444
ET&M No E96-92-4

Dear Ms Nogas

By this letter and on behalf of Trail Ridge Landfill, Inc , we hereby notify the Department that the Quality Assurance/Quality Control (QA/QC) Plan has been revised to correlate the density testing of the initial cover material with the type of material (i e. sandy soil materials with a Modified Proctor and clayey soil materials with a Standard Proctor) The specific revisions are contained on Pages 2 and 5 of the attached Quality Assurance/Quality Control Plan and are double underlined for clarity purposes

If you have any questions regarding this revision, please feel free to give me a call

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem

Juanitta Bader Clem, P E
Vice President

attachment

cc Greg Mathes
Scott McCallister
Chris Pearson
Jay McMahan

3131 St Johns Bluff Road S • Jacksonville FL 32246 • Tel (904) 642-8990 • Fax (904) 646-9485

TRAIL RIDGE LANDFILL
INCREMENTAL SIDE SLOPE CLOSURE
QUALITY ASSURANCE/QUALITY CONTROL PLAN

This plan addresses the quality assurance and quality control (QA/QC) for the incremental closure (close-as-you-go) of Trail Ridge Landfill. This program delineates the quality procedures and standards for the construction. This plan includes the closure of the side slopes only. The top area will be the final closure for which a closure permit will be obtained, prior to final closure construction.

In the context of this plan, quality assurance and quality control are defined as follows:

Quality Assurance - A planned and systematic pattern of all means and actions designed to provide adequate confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service

Quality Control - Those actions which provide a means to measure and regulate the characteristics of an item or service to contract and regulatory requirements

The City of Jacksonville, Florida is the owner/permittee of Trail Ridge Landfill Trail Ridge Landfill, Inc. operates the landfill. England, Thims & Miller, Inc is the design engineer. The name of the Contractor for each incremental closure shall be provided to the Department of Environmental Protection (DEP), prior to construction

All QA/QC activities (including monitoring, sampling and testing) shall be directed and conducted by third parties, whom are independent of the Contractor.

The QA/QC Plan for this project includes General QA/QC and Soils QA/QC. The General QA/QC includes full-time services to periodically observe the contractor's work to verify substantial compliance with permits, plans, specifications and design concepts. These services will include the following.

General Quality Control Monitor - shall monitor the construction for compliance with the permits, plans, specifications and design including construction to proper lines and grades, maintain daily logs and weekly progress reports of the construction (including observation data sheets, problem identification and correction logs), make note of any construction deviations, coordinate qualifying and testing of materials, monitor any waste excavation, and monitor filling This individual shall be experienced in civil site construction and solid waste regulations

General Quality Assurance Engineer - shall supervise the construction monitoring and waste removal to verify compliance with permits, plans, specification and design concepts This individual shall be experienced in civil site construction and solid waste regulations and shall be a registered Professional Engineer

The General QA/QC Program includes monitoring the following activities:

1 General Earthwork
2 Storm Drainage Installation
3. General Construction Quality Control

The Soils QA/QC for this project includes soil material qualifying, sampling and testing to verify substantial compliance with the material standards This work will include the following:

Soils Quality Control Monitor - shall pre-qualify soil materials, monitor the installation of soil materials, determine where in-place soil materials shall be tested, and test the in-place soil materials. This individual shall be responsible for assuring that all soil materials have been pre-qualified and have a chain-of-custody from the pre-qualified source to the project site, prior to installation. This individual shall be experienced in civil site construction and soil testing standards and procedures.

Soils Quality Assurance Engineer - shall supervise the soil material pre-qualifying and testing of in-place soil materials to assure compliance with the test standards and testing frequency requirements, and verify compliance with the plans, specification and design. This individual shall be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer.

The QA/QC Plan including monitoring construction of the following:

A Final Cover (Initial Cover, Compacted Clay Layer and Vegetative Cover)

Incremental side slope closure of Trail Ridge Landfill includes a final cover consisting of 12" of initial cover, 12" of clay, and 24" of vegetative cover. The clay layer of the final cover must be placed in two 6" (minimum) lifts. The Soils Quality Control Monitor shall observe the clay layer construction on a full-time (on-site) basis. The QA/QC for the final cover is as follows·

1. Initial Cover

a Location - The fill material shall come from an off-site source. The Soils Quality Control Monitor shall visually inspect the fill material

b Standard - Soil shall be free of brush, weeds, and other litter; and free of roots, stumps, stones and any other extraneous or toxic matter

The initial cover shall be a minimum of 12" thick

Compacted to 90% of Modified Proctor maximum dry density (ASTM D-1557), unless the soil material contains 30 0% or greater passing No 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698)

c. Frequency - Depth measurements and density tests shall be conducted at the frequency of four per acre.

2. Clay Layer (referred to as Barrier Layer in Chapter 62-701, F.A.C.)

a. Borrow Source - Prior to clay layer installation, an appropriate borrow source shall be located Suitability of the clay layer construction materials from that source shall be determined in accordance with the following:

(1) If demonstrated field experience is available from at least three prior successful projects of five or more acres each to document that a given borrow source can meet the requirements of the project specifications, then extensive laboratory testing of the borrow source will not be required However, the source of material shall be geologically similar to and the methods of excavating and stockpiling the material shall be consistent with those used on the prior projects. Furthermore, a minimum of three representative samples from the appropriate thickness of the in-situ stratum or from stockpiles of the borrow material proposed for clay layer construction shall be submitted to the Owners independent soil testing laboratory to document through index testing that the proposed material is consistent with the material used on prior successful projects. At a minimum, index testing shall consist of percent fines, Atterberg limits and moisture content determinations.

(2) If demonstrated field experience as defined above is not available or cannot be documented, then the following requirements shall be met

(a) A field exploration and laboratory testing program shall be conducted by the Owners independent soil testing laboratory to document the horizontal and vertical extent and the homogeneity of the soil strata proposed for use as clay layer material A sufficient number of index tests from each potential borrow stratum shall be performed to quantify the variability of the borrow materials and to document that the proposed borrow material complies with specifications At a minimum, the index tests shall consist of percent fines, Atterberg limits and moisture content determinations

(b) Sufficient laboratory hydraulic conductivity tests shall be conducted on samples representative of the range invariability of the proposed borrow source (ASTM D-5084) For each such sample, test specimens shall be prepared and tested to cover the range of molding conditions (moisture content and dry density) required by project specifications. The hydraulic conductivity tests shall be conducted in triaxial type permeameters. The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an

adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084). The borrow source will only be considered suitable if the hydraulic conductivity of the material, as documented on laboratory test specimens, can be shown to meet the requirements of the project specifications at the 98 percent confidence level.

(3) The Soils Quality Assurance Engineer shall review the pre-qualification data and shall approve or reject the clay layer material for use.

b. Test Strip - Prior to full-scale clay layer installation, a field test section or test strip shall be constructed at the site above a prepared subbase The test strip shall be considered acceptable if the measured hydraulic conductivities of undisturbed samples from the test strip meet the requirements of the project specifications at the 98 percent confidence level. If the test section fails to achieve the desired results, additional test sections shall be constructed in accordance with the following requirements.

(1) The test section shall be of sufficient size (20' x 60' minimum) such that full-scale clay layer installation procedures can be duplicated within the test section,

(2) The test section shall be constructed using the same equipment for spreading, kneading and compaction and the same construction procedures (e g , number of passes, moisture addition and homogenization, if needed) that are anticipated for use during full-scale clay layer installation;

(3) At a minimum, the clay layer test section shall be subject to the following field and laboratory testing requirements by Soils Quality Control Monitor.

(a) A minimum of five random samples of the clay layer construction material delivered to the site during test section installation shall be tested for moisture content (ASTM D-2216), percent fines (ASTM D-1140) and Atterberg limits (ASTM D-4318);

(b) At least five field density and moisture determinations shall be performed on each lift of the compacted clay layer test section;

(c) Upon completion of the test section lift, the thickness of the lift shall be measured at a minimum of five random locations to check for thickness adequacy, and

(d) A minimum of five Shelby tube or drive cylinder (ASTM D-2937) samples shall be obtained from each lift of the test section for laboratory hydraulic conductivity testing. Laboratory hydraulic conductivity testing shall be conducted in triaxial type permeameters (ASTM D-5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084)

(e) The test strip shall meet or exceed the standards established below except the field density which shall be established by the QA Engineer, based upon the test strip results If the test strip fails to meet these standards, the construction methods and/or material will be rejected and the test strip shall be performed again

c Final Cover Installation - Full scale final cover installation may begin only after completion of a successful test section During clay layer construction, quality control testing shall be provided to document that the installed clay layer conforms to project specifications. The testing frequency for quality control testing is specified below; however, during construction of the first five acres, the frequencies shall be doubled The clay layer shall be installed in two 6" lifts for a total minimum thickness of 12"

(1) Location - The clay layer shall be tested in place. The locations of testing shall be random locations as determined by the Soils Quality Control Monitor If there are indications of a change in product quality or construction procedures during final cover construction, additional tests shall be performed to determine compliance.

(2) Standard

(a) Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D-1557), unless the soil material contains 30.0% or greater passing the No 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698). (See Initial Cover above)

(b) Field Density - The field density shall be established by the QA Engineer based upon the test strip results and shall be determined by Standard Proctor Density (ASTM D-698). In no case shall the field density be less than 80% of Standard Proctor Density (ASTM D-698)

(c) Thickness - Each lift (two total) shall be a minimum of 6" thick.

(d) Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 1.0×10^{-7} cm/sec (ASTM D-5084).

(3) Field Testing Frequency

(a) Prior to the laying of the clay layer materials, the clay layer subgrade shall be compacted to the specified density. Density tests shall be conducted at a minimum rate of two tests per acre,

(b) A minimum of two moisture content and field density determinations shall be conducted per acre per lift of the compacted clay layer. The degree of compaction shall be checked using the one-point field Proctor test or other appropriate test procedures, and

(c) A minimum of four thickness measures shall be conducted per acre per lift of the compacted clay layer.

(4) Laboratory Testing Frequency

(a) Percent fines (ASTM D-1140) of the clay layer material shall be determined at a minimum frequency of two tests per acre per lift of installed clay layer;

(b) Atterberg limits determinations shall be performed on one sample per acre per lift of installed clay layer; and

(c) Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D-2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per acre per lift. Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D-5084) The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured

(5) Deficiency - If the test data from a clay layer section does not meet the requirements of the project specifications, additional random samples shall be tested from that clay layer section. If such additional testing

demonstrates that the thickness and hydraulic conductivity meet the requirements of the project specifications at the 95 percent confidence level, that clay layer section will be considered acceptable. If not, that clay layer section shall be reworked or reconstructed so that it does meet these requirements.

3. Clay Layer Tie-In (To Existing Clay Layer, Where Applicable)

   a. Location - The edge of any existing final cover adjacent to the proposed final cover area

   b. Standard - The compacted clay layer of any existing final cover and the proposed final cover must be tied together to form one continuous seamless layer At the interface, the existing and new clay layers shall be compacted to form a seamless connection

   c. Frequency - The Soils Quality Control Monitor shall monitor the tie-in by visual inspection on a continuous basis

4 Vegetative Cover

   a. Location - The vegetative cover shall be tested in place. The location of testing shall be determined by the Soils Quality Control Monitor.

   b. Standard - Top soil which is reasonably free of brush, weeds, and other litter, and relatively free of roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth. Roots with a diameter greater than 3/8" shall be hand picked and removed.

      The vegetative cover shall be at least 24" thick.

   c Frequency - Depth measurements shall be taken at the frequency of four per acre The soil shall be monitored on a continuous basis for extraneous matter

5 Final Cover Repairs (When Applicable)

If, during construction of the final cover system, damage is sustained on the final cover system (including the initial cover, clay layer and vegetative cover), the areas of damage shall be reconstructed and retested in accordance with corresponding section described above. All repair areas shall be tested at the frequencies prescribed above, unless more frequent testing is required at the discretion of the Soils Quality Assurance Engineer.

B. Downcomer Pipes

Downcomer pipes shall be installed in the final cover at the low point of the terraces, to intercept the stormwater between terraces. The downcomer pipes shall include the terrace side drains and terrace underdrain piping.

The downcomer pipes shall be constructed as shown on the Construction Drawings. The clay around the pipes shall be compacted into a uniform homogeneous material Prior to placement of vegetative cover over the downcomer pipes, the pipe shall be inspected by the General Quality Control Monitor.

1. Location - The compacted clay layer shall be tested in place. The locations of testing shall be determined by the Soils Quality Control Monitor. If there are indications of a change in product quality or construction procedures during construction, additional tests shall be performed to determine compliance.

2 Standard -

a Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557) (12" thick minimum).

b. Field Density - The field density of the clay layer shall be as established in Section A 2.c.(2)(b) above and shall be determined by Standard Proctor Density (ASTM D 698)

c. Thickness - Twelve inches minimum below pipe.

d. Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 1 0 x 10^{-7} cm/sec (ASTM D 5084).

3. Field Testing Frequency -

a. Prior to the laying of the compacted clay materials, the subbase shall be compacted to the specified density. Density tests and thickness shall be conducted at a minimum rate of one per 75 L.F. of pipe. (Minimum of one test between terraces)

b. A minimum of one moisture content and field density determination of the compacted clay layer shall be conducted per 75 L.F. of pipe

c A minimum of two thickness measures of the compacted clay layer shall be conducted per 75 L.F of pipe

4. Laboratory Testing Frequency -

   a. Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D 2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per 75 L F of pipe (at least once between terraces) Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D 5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

5 Deficiency - If the test data from a compacted clay layer section does not meet the requirements of the project specifications, that section shall be reworked or reconstructed so that it does meet these requirements.

C Underdrain Filter Sand

The underdrains in the terraces shall be surrounded by filter sand as shown on the Contract Drawings. The QA/QC for the filter sand is as follows:

1. Filter Sand

   a. Location - The material shall be pre-qualified prior to installation

      If the testing is done at the borrow source, a chain of custody shall be provided

   b. Standard - Clean, uniformly graded sand with a uniformity coefficient of 1 5 or greater and an effective grain size of 0.2 mm to 0.5 mm Grain size distribution shall be conducted as part of pre-qualification.

      The sand shall have a hydraulic conductivity no less than 1.0×10^{-3} cm/sec at a density of 100 percent Modified Proctor The hydraulic conductivity testing shall be by Constant Head method (ASTM D2434).

   c Frequency - The hydraulic conductivity of the sand shall be tested once per 100 C Y. of sand material.

D. Gas Wells

Gas wells shall be installed through the final cover The QA/QC for gas well materials shall be as follows:

1. Gravel

   a. Location - The gravel shall be pre-qualified by certification by the supplier.

   b. Standard - The gravel shall be clean gravel with no fines. The gravel shall be FDOT No. 3 Course Aggregate (ASTM D 448).

      The gravel shall be non-calcareous (ASTM D 4373).

   c. Frequency - The gravel shall be certified by the supplier The gravel shall be tested once per 100 C.Y

2. Bentonite

   a. Location - The material shall be pre-qualified with documentation from the supplier.

   b Standard - The material shall be a homogeneous, inorganic material with a hydraulic conductivity no greater than 1.0×10^{-8} cm/sec at a density of 100 percent Modified Proctor.

   c Frequency - The material shall be certified by the supplier, one time only.

England-Thims & Miller, Inc.

ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

Principals
James E England, PE , Pres
Robert E Thims, Exec VP
Douglas C Miller, PE , Exec VP
N Hugh Mathews, PE , Exec VP

December 5, 1997

Ms Mary C Nogas, P E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Mr. David P. Apple, P E.
Stormwater Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference. Trail Ridge Landfill - Incremental Closure
Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20
FDEP Permit No. SC16-184444
ET&M No E96-92-4

Dear Ms. Nogas and Mr Apple.

Please find herewith the Certification of Construction Completion for the Trail Ridge Landfill, Incremental Closure as well as certification of the stormwater pond modification. The construction Quality Assurance/Quality Control documentation and As-Built drawings are attached

Subject to your site inspection, Trail Ridge Landfill, Inc. respectfully requests your written verification that this closure and stormwater modification are accepted by the Department.

This is the certification for the Trail Ridge Landfill closure construction of Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20 which commenced on April 21, 1997 Should you have any questions regarding these certifications, please do not hesitate to give me a call

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem, P E
Vice President

Attachments
Certification of Construction Completion of a Solid Waste Management Facility
MSSW/Stormwater Certification
Quality Assurance and Quality Control Documentation
As-Built Drawings
Pump Test and Construction Drawing for Stormwater System Modification

cc. Greg Mathes w/attachments
Scott McCallister w/attachments
Chris Pearson w/attachments

3131 St Johns Bluff Road S • Jacksonville FL 32246 • Tel (904) 642-8990 • Fax (904) 646-9485

Florida Department of Environmental Regulation

Twin Towers Office Bldg 2600 Blair Stone Road Tallahassee, Florida 32399-2400

DER Form # 17-701.900(2)
Form Title Certification of Construction Completion of a Solid Waste Management Facility
Effective Date January 1, 1993
DER Application No.
(Filled in by DER)

Certification of Construction Completion of a Solid Waste Management Facility

DER Construction Permit No: SC16-184444 County: Duval

Name of Project: Trail Ridge Landfill - Incremental Closure

Name of Owner: City of Jacksonville

Name of Engineer: England, Thims & Miller, Inc.

Type of Project: Class I Landfill - Incremental Closure

Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20

Cost: Estimate $ 1,800,000 Actual $ 1,569,240

Design: Quantity: 659,000 +/- (1990) ton/day Site Acreage: 12 +/- Acres

Deviations from Plans and Application Approved by DER:

Deviations are shown on the As-Built Drawing and/or outlined in the attachment. The As-Built Survey was prepared by Sunshine State Surveyors and reviewed by England, Thims & Miller, Inc.

Address and Telephone No. of Site: 5110 U.S. Highway 301, Baldwin, FL 32234

Phone: (904) 289-9100

Name(s) of Site Supervisor: Greg Mathes

Date Site inspection is requested: As soon as possible

This is to certify that, with the exception of any deviation noted above, the construction of the project has been completed in substantial accordance with the plans authorized by Construction Permit No.: SC16-184444 Dated: 12-24-91

England, Thims & Miller, Inc. relied upon the information and certifications provided by Law Engineering and Sunshine State Surveyors, Inc. in this certification.

Date: Dec. 3, 1997

Signature of Professional Engineer

TRAIL RIDGE LANDFILL
INCREMENTAL CLOSURE
UNITS 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20

DEVIATIONS FROM PLANS AND APPLICATION

1. The final grades were adjusted to accommodate settlement during closure construction. Adjustments are noted on the As-Built drawings

2. The gravel for the gas vents was modified from FDOT No 4 Course Aggregate (1/2" - 2.5") to FDOT No 3 Course Aggregate (3/8" - 2.0"). The bentonite for the gas well plug was modified from requiring at least 50 percent pass the No 200 sieve to a hydraulic conductivity no greater than 1.0×10^{-8} cm/sec. As explained in the May 8, 1997 letter to the Department, these modifications do not change the design intent of the gravel and the QA/QC Plan was modified to correspond to this change.

3. The density testing of the initial cover material was revised to correlate to the type of soil material - sandy soil materials with a Modified Proctor and clayey soil materials with a Standard Proctor. Please see the revised QA/QC Plan in Section I

Department of Environmental Protection

Lawton Chiles
Governor

Northeast District
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

Virginia B Wetherell
Secretary

January 28, 1998

Mr Greg Mathes, Division President
Trail Ridge Landfill, Inc
5110 U S Highway 301
Baldwin, Florida 32234

Dear Mr Mathes

Trail Ridge Landfill
Closure Construction Certification for Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20
DEP Permit Number 0013493-002-SC
Duval County - Solid Waste

The Department acknowledges receipt of the following documents submitted to comply with the requirements of the subject permit and the requirements of Florida Administrative Code Chapter 62-701.

1 "Trail Ridge Landfill Incremental Closure Quality Assurance and Quality Control Documentation for Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20," prepared by England-Thims and Miller, Inc , and LAW Engineering and Environmental Services, Inc , dated December 5, 1997,

2 "Certification of Construction Completion of a Solid Waste Management Facility," signed and scaled on December 3, 1997 by Juanitta Bader Clem, P E , received December 5, 1997, and

3 "Specific As-Built Survey of Trail Ridge Landfill Incremental Closure," prepared by Sunshine State Surveyors, Inc , signed and sealed on October 3, 1997 by Joseph Leslie Reynolds III, Registered Surveyor

In addition, Department staff conducted a closure construction completion inspection of the subject side slope units on January 26, 1998 Based on the review of the above documents and the result of the inspection, closure construction of the subject side slope units, including construction of active gas extraction well numbers W-5, W-8, W-9, W-10 W-17, W-18, W-25 and W-35, has been found acceptable The Permittee shall maintain the integrity of the side slope units, extraction wells and all associated structures as part of the facility's normal operation Please contact me at the above letterhead address or at telephone number (904) 448-4320, if you have any questions regarding this matter

Sincerely,

MC Nogas

Mary C Nogas, P. E
Solid Waste Section Supervisor

MCN fd

cc. Juanitta Bader Clem, P E
Fred Wick, DEP, Tallahassee

Forth Closure

Side Slope Units 1-4 (Complete) and 21-23

Certified July 26, 2002

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

July 26, 2002

Ms. Mary C. Nogas, P. E.
Solid Waste Section
Department of Environmental Protection
7825 Baymeadows Way, Suite B-200
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill – Incremental Closure
Side Slope Units 1-4 (Complete) and 21-23
FDEP Permit No. 0013493-002-SC
ET&M Project No. E00-117-04

Dear Ms. Nogas:

Please find herewith the Certification of Construction Completion for the Trail Ridge Landfill, Incremental Closure of Side Slope Units 1-4 (Complete) and 21-23. The Construction Quality Assurance/Quality Control documentation and As-Built Drawings are attached.

Subject to your site inspection, Trail Ridge Landfill, Inc. respectfully requests your written verification that the Department accepts this incremental closure.

This is the certification for the Trail Ridge Landfill closure construction of Side Slope Units 1-4 (complete) and 21-23, which commenced on November 12, 2001 Should you have any questions, please feel free to give me a call.

Sincerely,

ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem

Juanitta Bader Clem, P. E.
Vice President

Attachments: Certification of Construction Completion of a Solid Waste Management Facility
Quality Assurance and Quality Control Documentation
As-Built Drawings

cc: Greg Mathes, with attachments
Chris Pearson, with attachments
Jim Horton, with attachments

14775 St. Augustine Rd • Jacksonville, FL 32258 • Tel: (904) 642-8990 • Fax (904) 646-9485

Florida Department of Environmental Protection
Twin Towers Office Bldg • 2600 Blair Stone Road • Tallahassee, FL 32399-2400

Effective Date _____
DEP Application No. _____ (Filled by DEP)

Certification of Construction Completion of a Solid Waste Management Facility

DEP Construction Permit No: 0013493-002-SC County: Duval

Name of Project: Trail Ridge Landfill - Incremental Closure

Name of Owner: City of Jacksonville

Name of Engineer: England, Thims & Miller, Inc.

Type of Project: Class I Landfill - Incremental Closure
Side Slope Units 1-4 (Complete) and 21-23

Cost: Estimate $_____ Actual $ 1,140,809

Site Design: Quantity: 3,500 ton/day Site Acreage: 4± Acres

Deviations from Plans and Application Approved by DEP:
Deviations are shown on the As-Built Drawing and/or outlined in the attachment.

The As-Built Survey was prepared by Robert M. Angas Associates, Inc. and reviewed by England, Thims & Miller, Inc.

Address and Telephone No. of Site: 5110 U.S. Highway 301, Baldwin, FL 32234
Phone: (904)289-9100

Name(s) of Site Supervisor: Greg Mathes

Date Site inspection is requested: As soon as possible

This is to certify that, with the exception of any deviation noted above, the construction of the project has been completed in substantial accordance with the plans authorized by Construction

Permit No.: 0013493-002-SC Dated: 11-25-97

England, Thims & Miller, Inc. relied upon the information and certifications provided by Law Engineering and Robert M. Angas Associates, Inc.

Date 7/26/02 Yvonitta Baden (Cam)
Signature of Professional Engineer
#43245

Northwest District
160 Governmental Center
Pensacola, FL 32501-5794
850-595-8360

Northeast District
7825 Baymeadows Way, Ste. B200
Jacksonville FL 32256-7590
904-448-4300

Central District
3319 Maguire Blvd. Ste. 232
Orlando, FL 32803-3767
407-894-7555

Southwest District
3804 Coconut Palm Dr
Tampa, FL 33619
813-744-6100

South District
2295 Victoria Ave., Ste. 364
Fort Myers, FL 33901-3881
941-332-6975

Southeast District
400 North Congress Ave.
West Palm Beach, FL 33401
561-681-6600

TRAIL RIDGE LANDFILL
INCREMENTAL CLOSURE
UNITS 1-4 (COMPLETE) AND 21-23

DEVIATIONS FROM PLANS AND SPECIFICATIONS

1. Some final grades were adjusted to accommodate settlement during closure construction. Adjustments are noted on the As-Built Drawings.

2. An alternate aggregate material in lieu of the specified FDOT No. 3 coarse aggregate was used to backfill Gas Wells W-26 and W-27. As explained in the attached December 3, 2001 letter to the Department, the modification does not change the design intent of the aggregate.

3. The side slope closure areas have been sodded but the sod has not been established. Due to the field conditions at the sod farms and the field conditions at the site when the sod was placed, the sod appears stressed. If the existing sod is not established, then additional measures will be taken to establish a stand of grass (either by resodding or seeding).

the group

EMCON/OWT Solid Waste Services
999 Remington Boulevard, Suite A
Bolingbrook, IL 60440
Phone: (630) 771-9200
Fax: (630) 771-9250

December 3, 2001
Project 829385

Ms. Mary C Nogas, P E.
Solid Waste Section
Department of Environmental Protection
7825 Baymeadows Way, Suite B-200
Jacksonville, FL 322565-7590

Re: Trail Ridge Landfill
Landfill Gas System Expansion

Dear Ms Nogas·

On behalf of Trail Ridge Landfill Inc. EMCON/OWT Solid Waste Services (EMCON) respectfully requests permission to use an alternate backfill material for four (4) gas extraction wells (W-26, W-27, T-22 and T-37) for the ongoing construction of the landfill gas system expansion. The Incremental Closure Quality Assurance/Quality Control Plan and the Project Specifications require FDOT No. 3 Course Aggregate for the backfill material for the gas wells.

The gradation test result exceeds the allowable percentage of material passing a 1-inch sieve (approximately 32% actual vs. 0% to 15% allowed per FDOT No. 3). However, the percentage of finer material passing a 0.5-inch sieve is well within specification requirements (approximately 3% actual vs. 0% to 5% allowed).

The material was utilized to backfill the perforated portion of the landfill gas extraction well casings. The purpose of the stone backfill is to allow the flow of landfill gas into the well casings, while providing an isolation or "filter" medium between the well casing and the waste mass. Considering the perforations in the well casing consist of vertical slots approximately 0.375 inches wide, the alternate material gradation should perform in a manner consistent with the FDOT No. 3 course aggregate. As the design engineer for this portion of the landfill gas extraction system, I respectfully request that this material be approved for these four (4) wells as an alternate to the FDOT No. 3 course aggregate.

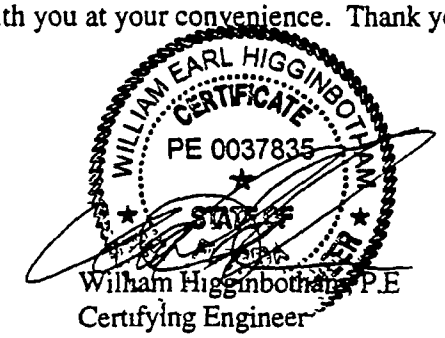
Please contact my office (630-771-9213) with any questions you may have regarding this request. I would be pleased to discuss this project with you at your convenience. Thank you.

Sincerely,

EMCON

Thomas Bilgri by AD.

Thomas A. Bilgri, P.E.
Manager – LFG Engineering Services



William Higginbotham, P.E
Certifying Engineer

cc: Greg Mathes, Trail Ridge Landfill, Inc
Juanitta Clem, England, Thims & Miller, Inc.

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

November 7, 2001

Ms Mary C Nogas, P E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill
Incremental Side Slope Closure
FDEP Permit No. 0013493-002-SC
ET&M No. E00-117-4

Dear Ms Nogas:

By this letter and on behalf of Trail Ridge Landfill, Inc., we hereby notify the Department that the closure construction of Closure Phase 2 (see Drawing No 14 of the approved Permit Drawings), as required by Specific Condition 47 a of the referenced permit, will begin on November 12, 2001 The parties involved in the construction are as follows

Construction Contractor - R. B. Baker Construction Inc.
General Quality Assurance Engineer - Juanitta Bader Clem, P E.
Soils Quality Assurance Engineer - James Horton, P.E.
General/Soils Quality Control Monitor - William Davidson

Please see the attached copy of the Quality Assurance/Quality Control (QA/QC) Plan for the project. All clarifications to the plan from the Department approved plan are in strike-out format for deletions and underlined for additions. As you will see upon review, the clarifications will simplify the implementation of the plan.

As in the previous closure construction, the field density of the clay layer will be established by the Soils QA Engineer based upon test strip results and will be determined by Standard Proctor Density (ASTM D-698). In no case will the field density be less than 80% of Standard Proctor Density. Thus, the field density will be established based upon the clay material to be used in this project.

If you have any questions regarding the construction or QA/QC Plan, please feel free to give me a call.

Sincerely,
ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem, P E.
Vice President

cc Greg Mathes
Chris Pearson
Jim Horton

14775 St Augustine Rd • Jacksonville, FL 32258 • Tel (904) 642-8990 • Fax (904) 646-9485

England-Thims & Miller, Inc.
ENGINEERS • PLANNERS • SURVEYORS • LANDSCAPE ARCHITECTS

November 7, 2001

Ms Mary C Nogas, P E
Waste Management Section
Department of Environmental Protection
7825 Baymeadows Way, Suite 200B
Jacksonville, Florida 32256

Reference: Trail Ridge Landfill
Incremental Side Slope Closure
FDEP Permit No. 0013493-002-SC
ET&M No. E00-117-4

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Sincerely,
ENGLAND, THIMS & MILLER, INC.

Juanitta Bader Clem, P.E.
Vice President

cc. Greg Mathes
Chris Pearson
Jim Horton

14775 ST AUGUSTINE RD • JACKSONVILLE FL 32258 • TEL (904) 642-8990 • FAX (904) 646-9485

TRAIL RIDGE LANDFILL
INCREMENTAL SIDE SLOPE CLOSURE
QUALITY ASSURANCE/QUALITY CONTROL PLAN

This plan addresses the quality assurance and quality control (QA/QC) for the incremental closure (close-as-you-go) of Trail Ridge Landfill. This program delineates the quality procedures and standards for the construction This plan includes the closure of the side slopes only (including the reconstruction of final cover on side slopes) The top area will be the final closure for which a closure permit will be obtained, prior to final closure construction

In the context of this plan, quality assurance and quality control are defined as follows:

Quality Assurance - A planned and systematic pattern of all means and actions designed to provide adequate confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.

Quality Control - Those actions which provide a means to measure and regulate the characteristics of an item or service to contract and regulatory requirements.

The City of Jacksonville, Florida is the owner/~~permittee~~ of Trail Ridge Landfill. Trail Ridge Landfill, Inc. is the permittee and operates the landfill. England, Thims & Miller, Inc. is the design engineer The name of the Contractor for each incremental closure shall be provided to the Department of Environmental Protection (DEP), prior to construction.

All QA/QC activities (including monitoring, sampling and testing) shall be directed and conducted by third parties, whom are independent of the Contractor.

The QA/QC Plan for this project includes General QA/QC and Soils QA/QC. The General QA/QC includes full-time services to periodically observe the contractor's work to verify substantial compliance with permits, plans, specifications and design concepts. These services will include the following:

General Quality Control Monitor - shall monitor the construction for compliance with the permits, plans, specifications and design including construction to proper lines and grades, maintain daily logs and weekly progress reports of the construction (including observation data sheets, problem identification and correction logs), make note of any construction deviations, coordinate qualifying and testing of materials, monitor any waste excavation, and monitor filling This individual shall be experienced in civil site construction and solid waste regulations

General Quality Assurance Engineer - shall supervise the construction monitoring and waste removal to verify compliance with permits, plans, specification and design concepts This individual shall be experienced in civil site construction and solid waste regulations and shall be a registered Professional Engineer.

The General QA/QC Program includes monitoring the following activities.

1. General Earthwork
2. Storm Drainage Installation
3. General Construction Quality Control

TRAIL RIDGE LANDFILL
INCREMENTAL SIDE SLOPE CLOSURE
QUALITY ASSURANCE/QUALITY CONTROL PLAN

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General Quality Assurance Engineer - shall supervise the construction monitoring and waste removal to verify compliance with permits, plans, specification and design concepts This individual shall be experienced in civil site construction and solid waste regulations and shall be a registered Professional Engineer.

The General QA/QC Program includes monitoring the following activities:

1 General Earthwork
2. Storm Drainage Installation
3. General Construction Quality Control

The Soils QA/QC for this project includes soil material qualifying, sampling and testing to verify substantial compliance with the material standards. This work will include the following:

Soils Quality Control Monitor - shall pre-qualify soil materials, monitor the installation of soil materials, determine where in-place soil materials shall be tested, and test the in-place soil materials. This individual shall be responsible for assuring that all soil materials have been pre-qualified and have a chain-of-custody from the pre-qualified source to the project site, prior to installation This individual shall be experienced in civil site construction and soil testing standards and procedures

Soils Quality Assurance Engineer - shall supervise the soil material pre-qualifying and testing of in-place soil materials to assure compliance with the test standards and testing frequency requirements, and verify compliance with the plans, specification and design. This individual shall be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer.

The QA/QC Plan including monitoring construction of the following:

A. Final Cover (~~Intermediate~~ Initial Cover, Compacted Clay Layer and Vegetative Cover)

Incremental side slope closure of Trail Ridge Landfill includes a final cover consisting of 12" of ~~intermediate~~ initial cover, 12" of clay, and 24" of vegetative cover. The clay layer of the final cover must be placed in two 6" (minimum) lifts. The Soils Quality Control Monitor shall observe the clay layer construction on a full-time (on-site) basis The QA/QC for the final cover is as follows

1. ~~Intermediate~~ Initial Cover

a. Location - The fill material shall come from an off-site source. The Soils Quality Control Monitor shall visually inspect the fill material.

b. Standard - Soil shall be free of brush, weeds, and other litter; and free of roots, stumps, stones and any other extraneous or toxic matter.

The ~~intermediate~~ initial cover shall be a minimum of 12" thick

Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557), unless the soil material contains 30 0% or greater passing the No 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698).

c. Frequency - Depth measurements and density tests shall be conducted at the frequency of four per acre.

2. Clay Layer (referred to as Barrier Layer in Chapter 62-701, F A.C.)

a. Borrow Source - Prior to clay layer installation, an appropriate borrow source shall be located Suitability of the clay layer construction materials from that source shall be determined in accordance with the following:

The Soils QA/QC for this project includes soil material qualifying, sampling and testing to verify substantial compliance with the material standards. This work will include the following:

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Soils Quality Assurance Engineer - shall supervise the soil material pre-qualifying and testing of in-place soil materials to assure compliance with the test standards and testing frequency requirements, and verify compliance with the plans, specification and design. This individual shall be experienced in civil site construction and soil testing procedures and shall be a registered Professional Engineer.

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1. ~~Intermediate~~ Initial Cover

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c. Frequency - Depth measurements and density tests shall be conducted at the frequency of four per acre.

2. Clay Layer (referred to as Barrier Layer in Chapter 62-701, F A.C.)

a. Borrow Source - Prior to clay layer installation, an appropriate borrow source shall be located. Suitability of the clay layer construction materials from that source shall be determined in accordance with the following·

(1) If demonstrated field experience is available from at least three prior successful projects of five or more acres each to document that a given borrow source can meet the requirements of the project specifications, then extensive laboratory testing of the borrow source will not be required. However, the source of material shall be geologically similar to and the methods of excavating and stockpiling the material shall be consistent with those used on the prior projects Furthermore, a minimum of three representative samples from the appropriate thickness of the in-situ stratum or from stockpiles of the borrow material proposed for clay layer construction shall be submitted to the Owner's independent soil testing laboratory to document through index testing that the proposed material is consistent with the material used on prior successful projects At a minimum, index testing shall consist of percent fines, Atterberg limits and moisture content determinations

(2) If demonstrated field experience as defined above is not available or cannot be documented, then the following requirements shall be met.

(a) A field exploration and laboratory testing program shall be conducted by the Owner's independent soil testing laboratory to document the horizontal and vertical extent and the homogeneity of the soil strata proposed for use as clay layer material A sufficient number of index tests from each potential borrow stratum shall be performed to quantify the variability of the borrow materials and to document that the proposed borrow material complies with specifications At a minimum, the index tests shall consist of percent fines, Atterberg limits and moisture content determinations

(b) Sufficient laboratory hydraulic conductivity tests shall be conducted on samples representative of the range invariability of the proposed borrow source (ASTM D-5084). For each such sample, test specimens shall be prepared and tested to cover the range of molding conditions (moisture content and dry density) required by project specifications The hydraulic conductivity tests shall be conducted in triaxial type permeameters The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084) The borrow source will only be considered suitable if the hydraulic conductivity of the material, as documented on laboratory test specimens, can be shown to meet the requirements of the project specifications at the 98 percent confidence level

(3) The Soils Quality Assurance Engineer shall review the pre-qualification data and shall approve or reject the clay layer material for use.

b Test Strip - Prior to full-scale clay layer installation, a field test section or test strip shall be constructed at the site above a prepared subbase. The test strip shall be considered acceptable if the measured hydraulic conductivities of undisturbed samples from the test

(1) If demonstrated field experience is available from at least three prior successful projects of five or more acres each to document that a given borrow source can meet the requirements of the project specifications, then extensive laboratory testing of the borrow source will not be required. However, the source of material shall be geologically similar to and the methods of excavating and stockpiling the material shall be consistent with those used on the prior projects Furthermore, a minimum of three representative samples from the appropriate thickness of the in-situ stratum or from stockpiles of the borrow material proposed for clay layer construction shall be submitted to the Owner's independent soil testing laboratory to document through index testing that the proposed material is consistent with the material used on prior successful projects. At a minimum, index testing shall consist of percent fines, Atterberg limits and moisture content determinations.

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b. Test Strip - Prior to full-scale clay layer installation, a field test section or test strip shall be constructed at the site above a prepared subbase. The test strip shall be considered acceptable if the measured hydraulic conductivities of undisturbed samples from the test

strip meet the requirements of the project specifications at the 98 percent confidence level. If the test section fails to achieve the desired results, additional test sections shall be constructed in accordance with the following requirements.

(1) The test section shall be of sufficient size (40' wide x 60' long at a minimum) such that full-scale clay layer installation procedures can be duplicated within the test section;

(2) The test section shall be constructed using the same equipment for spreading, kneading and compaction and the same construction procedures (e g , number of passes, moisture addition and homogenization, if needed) that are anticipated for use during full-scale clay layer installation;

(3) At a minimum, the clay layer test section shall be subject to the following field and laboratory testing requirements by Soils Quality Control Monitor·

(a) A minimum of five random samples of the clay layer construction material delivered to the site during test section installation shall be tested for moisture content (ASTM D-2216), percent fines (ASTM D-1140) and Atterberg limits (ASTM D-4318);

(b) At least five field density and moisture determinations shall be performed on each lift of the compacted clay layer test section;

(c) Upon completion of the test section lift, the thickness of the lift shall be measured at a minimum of five random locations to check for thickness adequacy; and

(d) A minimum of five Shelby tube or drive cylinder (ASTM D-2937) samples shall be obtained from each lift of the test section for laboratory hydraulic conductivity testing. Laboratory hydraulic conductivity testing shall be conducted in triaxial type permeameters (ASTM D-5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084)

(e) The test strip shall meet or exceed the standards established below except the field density which shall be established by the QA Engineer, based upon the test strip results If the test strip fails to meet these standards, the construction methods and/or material will be rejected and the test strip shall be performed again

strip meet the requirements of the project specifications at the 98 percent confidence level. If the test section fails to achieve the desired results, additional test sections shall be constructed in accordance with the following requirements:

(1) The test section shall be of sufficient size (40' wide x 60' long at a minimum) such that full-scale clay layer installation procedures can be duplicated within the test section;

(2) The test section shall be constructed using the same equipment for spreading, kneading and compaction and the same construction procedures (e.g., number of passes, moisture addition and homogenization, if needed) that are anticipated for use during full-scale clay layer installation;

(3) At a minimum, the clay layer test section shall be subject to the following field and laboratory testing requirements by Soils Quality Control Monitor:

(a) A minimum of five random samples of the clay layer construction material delivered to the site during test section installation shall be tested for moisture content (ASTM D-2216), percent fines (ASTM D-1140) and Atterberg limits (ASTM D-4318),

(b) At least five field density and moisture determinations shall be performed on each lift of the compacted clay layer test section;

(c) Upon completion of the test section lift, the thickness of the lift shall be measured at a minimum of five random locations to check for thickness adequacy; and

(d) A minimum of five Shelby tube or drive cylinder (ASTM D-2937) samples shall be obtained from each lift of the test section for laboratory hydraulic conductivity testing Laboratory hydraulic conductivity testing shall be conducted in triaxial type permeameters (ASTM D-5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured (ASTM D-5084).

(e) The test strip shall meet or exceed the standards established below except the field density which shall be established by the QA Engineer, based upon the test strip results If the test strip fails to meet these standards, the construction methods and/or material will be rejected and the test strip shall be performed again

c. Final Cover Installation - Full scale final cover installation may begin only after completion of a successful test section. During clay layer construction, quality control testing shall be provided to document that the installed clay layer conforms to project specifications. The testing frequency for quality control testing is specified below; however, during construction of the first five acres, the frequencies shall be doubled The clay layer shall be installed in two 6" lifts for a total minimum thickness of 12".

(1) Location - The clay layer shall be tested in place. The locations of testing shall be random locations as determined by the Soils Quality Control Monitor. If there are indications of a change in product quality or construction procedures during final cover construction, additional tests shall be performed to determine compliance.

(2) Standard

(a) Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D-1557)D 1557), unless the soil material contains 30 0% or greater passing the No 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698) (See ~~Intermediate~~ Initial Cover above).

(b) Field Density - The field density shall be established by the QA Engineer based upon the test strip results and shall be determined by Standard Proctor Density (ASTM D-698) In no case shall the field density be less than 80% of Standard Proctor Density (ASTM D-698).

(c) Thickness - Each lift (two total) shall be a minimum of 6" thick.

(d) Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 6 67 x 10^{-8} cm/sec (ASTM D-5084).

(3) Field Testing Frequency

(a) Prior to the laying of the clay layer materials, the clay layer subgrade shall be compacted to the specified density Density tests shall be conducted at a minimum rate of two tests per acre;

(b) A minimum of two moisture content and field density determinations shall be conducted per acre per lift of the compacted clay layer. The degree of compaction shall be checked using the one-point field Proctor test or other appropriate test procedures; and

(c) A minimum of four thickness measures shall be conducted per acre per lift of the compacted clay layer

(4) Laboratory Testing Frequency

(a) Percent fines (ASTM D-1140) of the clay layer material shall be determined at a minimum frequency of two tests per acre per lift of installed clay layer;

c. Final Cover Installation - Full scale final cover installation may begin only after completion of a successful test section. During clay layer construction, quality control testing shall be provided to document that the installed clay layer conforms to project specifications. The testing frequency for quality control testing is specified below; however, during construction of the first five acres, the frequencies shall be doubled The clay layer shall be installed in two 6" lifts for a total minimum thickness of 12".

(1) Location - The clay layer shall be tested in place. The locations of testing shall be random locations as determined by the Soils Quality Control Monitor If there are indications of a change in product quality or construction procedures during final cover construction, additional tests shall be performed to determine compliance

(2) Standard

(a) Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D-1557)D 1557), unless the soil material contains 30.0% or greater passing the No 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698) (See ~~Intermediate~~ Initial Cover above).

(b) Field Density - The field density shall be established by the QA Engineer based upon the test strip results and shall be determined by Standard Proctor Density (ASTM D-698). In no case shall the field density be less than 80% of Standard Proctor Density (ASTM D-698)

(c) Thickness - Each lift (two total) shall be a minimum of 6" thick.

(d) Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 6.67 x 10^{-8} cm/sec (ASTM D-5084).

(3) Field Testing Frequency

(a) Prior to the laying of the clay layer materials, the clay layer subgrade shall be compacted to the specified density. Density tests shall be conducted at a minimum rate of two tests per acre,

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(c) A minimum of four thickness measures shall be conducted per acre per lift of the compacted clay layer

(4) Laboratory Testing Frequency

(a) Percent fines (ASTM D-1140) of the clay layer material shall be determined at a minimum frequency of two tests per acre per lift of installed clay layer;

(b) Atterberg limits determinations shall be performed on one sample per acre per lift of installed clay layer; and

(c) Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D-2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per acre per lift Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D-5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

(5) Deficiency - If the test data from a clay layer section does not meet the requirements of the project specifications, additional random samples shall be tested from that clay layer section. If such additional testing demonstrates that the thickness and hydraulic conductivity meet the requirements of the project specifications at the 95 percent confidence level, that clay layer section will be considered acceptable If not, that clay layer section shall be reworked or reconstructed so that it does meet these requirements

3. Clay Layer Tie-In (To Existing Clay Layer, Where Applicable)

a. Location - The edge of any existing final cover adjacent to the proposed final cover area.

b. Standard - The compacted clay layer of any existing final cover and the proposed final cover must be tied together to form one continuous seamless layer. At the interface, the existing and new clay layers shall be compacted to form a seamless connection

c. Frequency - The Soils Quality Control Monitor shall monitor the tie-in by visual inspection on a continuous basis.

4. Vegetative Cover

a. Location - The vegetative cover shall be tested in place. The location of testing shall be determined by the Soils Quality Control Monitor

b. Standard - Top soil which is reasonably free of brush, weeds, and other litter; and relatively free of roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth. Roots with a diameter greater than 3/8" shall be hand picked and removed

The vegetative cover shall be at least 24" thick.

(b) Atterberg limits determinations shall be performed on one sample per acre per lift of installed clay layer; and

(c) Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D-2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per acre per lift Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D-5084) The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

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b Standard - Top soil which is reasonably free of brush, weeds, and other litter; and relatively free of roots, stumps, stones and any other extraneous or toxic matter harmful to plant growth. Roots with a diameter greater than 3/8" shall be hand picked and removed.

The vegetative cover shall be at least 24" thick.

c. Frequency - Depth measurements shall be taken at the frequency of four per acre. The soil shall be monitored on a continuous basis for extraneous matter.

5. Final Cover Repairs (When Applicable)

If, during construction of the final cover system, damage is sustained on the final cover system (including the ~~intermediate~~ initial cover, clay layer and vegetative cover), the areas of damage shall be reconstructed and retested in accordance with corresponding section described above. All repair areas shall be tested at the frequencies prescribed above, unless more frequent testing is required at the discretion of the Soils Quality Assurance Engineer.

B. Downcomer Pipes

Downcomer pipes shall be installed in the final cover at the low point of the terraces, to intercept the stormwater between terraces The downcomer pipes shall include the terrace side drains and terrace underdrain piping

The downcomer pipes shall be constructed as shown on the Construction Drawings. The clay around the pipes shall be compacted into a uniform homogeneous material. Prior to placement of vegetative cover over the downcomer pipes, the pipe shall be inspected by the General Quality Control Monitor.

1. Location - The compacted clay layer shall be tested in place. The locations of testing shall be determined by the Soils Quality Control Monitor. If there are indications of a change in product quality or construction procedures during construction, additional tests shall be performed to determine compliance.

2. Standard -

a. Clay Layer Subgrade - Compacted to 90% of Modified Proctor maximum dry density (ASTM D 1557)D 1557), unless the soil material contains 30.0% or greater passing the No. 200 sieve, then compacted to 90% of Standard Proctor maximum dry density (ASTM D-698) (12" thick minimum)

b. Field Density - The field density of the clay layer shall be as established in Section A.2.c.(2)(b) above and shall be determined by Standard Proctor Density (ASTM D 698).

c. Thickness - Twelve inches minimum below pipe.

d. Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 6 67 x 10^{-8} cm/sec (ASTM D 5084).

3. Field Testing Frequency -

a. Prior to the laying of the compacted clay materials, the subbase shall be compacted to the specified density. Density tests and thickness shall be conducted at a minimum rate of one per 75 L.F. of pipe (Minimum of one test between terraces).

c. Frequency - Depth measurements shall be taken at the frequency of four per acre. The soil shall be monitored on a continuous basis for extraneous matter.

5. Final Cover Repairs (When Applicable)

If, during construction of the final cover system, damage is sustained on the final cover system (including the ~~intermediate~~ initial cover, clay layer and vegetative cover), the areas of damage shall be reconstructed and retested in accordance with corresponding section described above. All repair areas shall be tested at the frequencies prescribed above, unless more frequent testing is required at the discretion of the Soils Quality Assurance Engineer

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b. Field Density - The field density of the clay layer shall be as established in Section A.2.c.(2)(b) above and shall be determined by Standard Proctor Density (ASTM D 698).

c. Thickness - Twelve inches minimum below pipe.

d. Hydraulic Conductivity - The compacted clay layer shall have an in-place hydraulic conductivity no greater than 6.67×10^{-8} cm/sec (ASTM D 5084).

3. Field Testing Frequency -

a. Prior to the laying of the compacted clay materials, the subbase shall be compacted to the specified density. Density tests and thickness shall be conducted at a minimum rate of one per 75 L.F of pipe (Minimum of one test between terraces).

b A minimum of one moisture content and field density determination of the compacted clay layer shall be conducted per 75 L.F. of pipe

c. A minimum of two thickness measures of the compacted clay layer shall be conducted per 75 L F of pipe.

4. Laboratory Testing Frequency -

a. Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D 2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per 75 L.F. of pipe (at least once between terraces). Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D 5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

5. Deficiency - If the test data from a compacted clay layer section does not meet the requirements of the project specifications, that section shall be reworked or reconstructed so that it does meet these requirements.

C. Underdrain Filter Sand

The underdrains in the terraces shall be surrounded by filter sand as shown on the Contract Drawings. The QA/QC for the filter sand is as follows·

1. Filter Sand

a. Location - The material shall be pre-qualified prior to installation.

If the testing is done at the borrow source, a chain of custody shall be provided

b Standard - Clean, uniformly graded sand with a uniformity coefficient of 1.5 or greater and an effective grain size of 0.2 mm to 0.5 mm. Grain size distribution shall be conducted as part of pre-qualification.

The sand shall have a hydraulic conductivity no less than 1.0×10^{-3} cm/sec at a density of 100 percent Modified Proctor. The hydraulic conductivity testing shall be by Constant Head method (ASTM D2434).

c. Frequency - The hydraulic conductivity of the sand shall be tested once per 100 C.Y. of sand material

b. A minimum of one moisture content and field density determination of the compacted clay layer shall be conducted per 75 L.F. of pipe

c. A minimum of two thickness measures of the compacted clay layer shall be conducted per 75 L F. of pipe

4 Laboratory Testing Frequency -

a. Hydraulic conductivity testing of Shelby tube or drive cylinder (ASTM D 2937) samples of the compacted clay layer shall be performed at a minimum frequency of one test per 75 L.F. of pipe (at least once between terraces). Laboratory hydraulic conductivity tests shall be conducted in triaxial type permeameters (ASTM D 5084). The test specimens shall be consolidated under an isotropic consolidation stress no greater than 10 pounds per square inch and permeated with water under an adequate backpressure to achieve saturation of the test specimens. The inflow to and outflow from the specimens shall be monitored with time and the hydraulic conductivity calculated for each recorded flow increment. The test shall continue until steady state flow is achieved and relatively constant values of hydraulic conductivity are measured.

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D. Gas Wells ~~Vents~~

Gas wells (temporary and permanent) ~~vents~~ shall be installed through the final cover. The QA/QC for gas vent materials shall be as follows

1 Gravel

a. Location - The gravel shall be pre-qualified by certification by the supplier.

b. Standard - The gravel shall be clean gravel with no fines. The gravel shall be FDOT No. ~~4~~ 3 Course Aggregate (ASTM D 448).

The gravel shall be non-calcareous (ASTM D 4373).

c. Frequency - The gravel shall be certified by the supplier. The gravel shall be tested once per 100 C.Y.

2. Bentonite

a. Location - The material shall be pre-qualified with documentation from the supplier.

b Standard - The material shall have a hydraulic conductivity no greater than 1.0×10^{-8} cm/sec (ASTM D 5084). ~~be a homogeneous, inorganic material with at least 50 percent, by weight, passing the No. 200 sieve (ASTM D 1140)~~

c. Frequency - The material shall be certified by the supplier, one time only.

D. Gas Wells ~~Vents~~

Gas wells (temporary and permanent) ~~vents~~ shall be installed through the final cover. The QA/QC for gas vent materials shall be as follows:

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      The gravel shall be non-calcareous (ASTM D 4373).

   c. Frequency - The gravel shall be certified by the supplier The gravel shall be tested once per 100 C.Y.

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   a Location - The material shall be pre-qualified with documentation from the supplier

   b. Standard - The material shall have a hydraulic conductivity no greater than 1.0×10^{-8} cm/sec (ASTM D 5084). ~~be a homogeneous, inorganic material with at least 50 percent, by weight, passing the No. 200 sieve (ASTM D 1140)~~

   c. Frequency - The material shall be certified by the supplier, one time only.

ATTACHMENT H

Department Letter of Acceptance for Side Slope Closure

Department of Environmental Protection

Lawton Chiles
Governor

Northeast District
7825 Baymeadows Way, Suite B200
Jacksonville, Florida 32256-7590

Virginia B Wetherell
Secretary

January 28, 1998

Mr Greg Mathes, Division President
Trail Ridge Landfill, Inc
5110 U S Highway 301
Baldwin, Florida 32234

Dear Mr Mathes

Trail Ridge Landfill
Closure Construction Certification for Side Slope Units 1-4 (Partial), 7-8 (Partial), 12-17 (Partial) and 18-20
DEP Permit Number 0013493-002-SC
Duval County - Solid Waste

The Department acknowledges receipt of the following documents submitted to comply with the requirements of the subject permit and the requirements of Florida Administrative Code Chapter 62-701

1. "Trail Ridge Landfill Incremental Closure Quality Assurance and Quality Control Documentation for Units 1-4 (Partial). 7-8 (Partial), 12-17 (Partial) and 18-20," prepared by England-Thims and Miller, Inc , and LAW Engineering and Environmental Services, Inc , dated December 5, 1997,

2. "Certification of Construction Completion of a Solid Waste Management Facility," signed and scaled on December 3, 1997 by Juanitta Bader Clem, P E , received December 5, 1997, and

3. "Specific As-Built Survey of Trail Ridge Landfill Incremental Closure," prepared by Sunshine State Surveyors, Inc , signed and sealed on October 3, 1997 by Joseph Leslie Reynolds III, Registered Surveyor

In addition, Department staff conducted a closure construction completion inspection of the subject side slope units on January 26, 1998 Based on the review of the above documents and the result of the inspection, closure construction of the subject side slope units, including construction of active gas extraction well numbers W-5, W-8, W-9, W-10 W-17, W-18, W-25 and W-35, has been found acceptable The Permittee shall maintain the integrity of the side slope units, extraction wells and all associated structures as part of the facility's normal operation Please contact me at the above letterhead address or at telephone number (904) 448-4320, if you have any questions regarding this matter

Sincerely,

Mary C Nogas, P E
Solid Waste Section Supervisor

MCN fd
cc Juanitta Bader Clem, P E.
Fred Wick, DEP, Tallahassee

MAPS

AND

CD'S

SCANNED

SEPARATELY