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SCS ENGINEERS

October 13, 2010
File No. 09207049.04

Mr. Steven Morgan
Florida Department of Environmental Protection
Southwest District
13051 North Telecom Parkway
Temple Terrace, Florida 33637

Subject: Response to Request for Additional Information (RAI) No. 1
Citrus County Central Class I Landfill, Phase 1/1A and 2
Landfill Gas Collection and Control System Construction Certification
Permit No. 21375-017-SC/08; WACS No. SWD/09/39859

Dear Mr. Morgan:

On behalf of the Citrus County Solid Waste Division, SCS Engineers (SCS) submits the following responses to your request for additional information in a letter directed to Mr. Casey Stephens, dated September 27, 2010. For ease of review, Florida Department of Environmental Protection (FDEP) comments are reiterated in bold type, followed by our response in normal type.

Report of Construction

1. **Based on the Department's review of the information provided and a telephone discussion with Dan Cooper of SCS Engineers, Inc. on September 23, 2010, it appears that the interim gas collection and control system, permitted under Permit Modification #21375-016-SO/MM on April 30, 2009, was not constructed at the facility. Instead, construction of the components of the interim system that were to remain and become part of the Phase 1/1A & 2 GCCS was incorporated into the permitted construction of the Phase 1/1A & 2 GCCS. Where indicated below, please revise this construction certification report to refer to the design, permitting, and construction of components of the permitted interim system.**

2. **Project Summary: Please revise this section, as appropriate, to clarify that parts of the project were permitted under Permit Modification #21375-016-SO/MM.**

   Response: Attachment 1 contains a revised Report of Construction in which the project summary section has been modified to appropriately describe the construction of the components of the interim system that were permitted under permit modification 21375-016-SO/MM. It should be noted that only the main text of the report is provided in Attachment 1 of this letter since none of the appendices were modified. NOTE: For ease of review, additions made to the Report of Construction are underlined (e.g., added) and any deletions have been struck through e.g., ~~deleted~~).

3. **Site Background: Please revise the narrative discussing additional background information to also reference the information provided as part of Permit Modification #21375-016-SO/MM.**

Response: Attachment 1 contains a revised Report of Construction in which the additional background information paragraph of the Site Background section has been updated to include appropriate references for information provided as part of permit modification 21375-016-SO/MM.

4. **Contract Documents: Please revise the narrative in this section to clarify that Sheets 17-27 of the referenced August 25, 2009 construction drawings were prepared based on the permit drawings approved as part of Permit No. 21375-017-SC/08 and the applicable design details included in the permit drawings approved as part of Permit Modification No. 21375-016-SO/MM.**

Response: Attachment 1 contains a revised Report of Construction in which the Contract Documents section has been revised to indicated that the drawings were prepared based on the permit drawings approved as part of Permit No. 21375-017-SC/08 and the applicable design details included in the permit drawings approved as part of Permit Modification No. 21375-016-SO/MM.

5. **Construction Records:**

a. **Record Drawings:**

1) **Please revise this section, as appropriate, to clarify that permitted project work was also permitted under Permit Modification #21375-016-SO/MM.**

Response: Attachment 1 contains a revised Report of Construction in which the Record Drawings section of the Construction Records has been revised to indicated the work was permitted under both operations Permit Modification No. 21375-016-SO/MM and construction Permit No. 21375-017-SC/08.

2) **It appears that the changes noted in the table in this section reflect changes made from the August 25, 2009 construction drawings and not "permitted plans". Please verify and revise the table heading, as appropriate.**

Response: Attachment 1 contains a revised Report of Construction in which the Record Drawings section of the Construction Records has been revised to indicate the appropriate reference to the construction drawings dated August 25, 2009 in the table heading.

3) **Upon completion of installation of the lateral from W-1 to risers 1, 2 & 3 at later date, supplemental documentation of the installation shall be submitted to the Department. This comment is for informational purposes only and does not require a response or submittal of information other than acknowledgement of the comment.**

Response: Comment Noted.

As requested, we are providing you with two copies of all requested information. An electronic copy has also been provided for your use.

Sincerely,

Daniel R. Cooper, P.E.
Project Manager
SCS ENGINEERS

C. Ed Hilton, Jr., P.E.
Vice President
SCS ENGINEERS

DRC/CEH:drc

cc: Susan Pelz, P.E., FDEP Tampa
Casey Stephens., Citrus County, P.O. Box 340, Lecanto, FL 34460-0340

Attachment 1

Revised Report of Construction

SCS ENGINEERS

Report of Construction
November 23, 2009 – July 6, 2010

Citrus County Central Class I Landfill Phase 1/1A & 2 Gas Collection and Control System Construction Permit No. 21375-017-SC/08

Citrus County Board of

County Commissioners

P.O. Box 340
Lecanto, Florida 34460

Prepared by:

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Florida Board of Professional Engineers
Certification No. 00004892

Revised October 13~~August 24~~, 2010
File No. 09207049.04

Report of Construction
November 23, 2009 – July 6, 2010

Citrus County Central Class I Landfill Phase 1/1A & 2 Gas Collection and Control System Construction
Permit No. 21375-017-SC/08

Prepared for:

Citrus County Board of County Commissioners
P.O. Box 340
Lecanto, Florida 34460

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Florida Board of Professional Engineers
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Daniel R. Cooper, P.E.
Florida P.E. No. 66440

Revised October 13~~August 24~~, 2010
File No. 09207049.04

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PROJECT SUMMARY

This report provides certification of construction for the Citrus County Central Class I Landfill, Citrus County, Phase 1/1A & 2 Gas Collection and Control System (GCCS) constructed from November 23, 2009 through July 6, 2010. The construction included components from the interim GCCS permitted under permit modification 21375-016-SO/MM as well as the those components ~~This project is~~ permitted under Construction Permit No. 21375-017-SC/08, issued by the Florida Department of Environmental Protection (FDEP). In order to more efficiently get all gas system components installed the interim GCCS was not constructed separately prior to the final GCCS construction, but was incorporated into the final GCCS construction. All work permitted under permit modification 21375-016-SO/MM was constructed as part of this project with the exception of the flare, which was not temporarily located on the east side of the landfill near R-16, but was constructed in its final location as shown on the plans included in the Record Drawings in Appendix E.

SITE BACKGROUND

Citrus County Central Class I Landfill is an active municipal solid waste landfill that is owned by the Citrus County Board of County Commissioners and is operated by the Citrus County Division of Solid Waste Management (DSWM). It is located on S.R. 44, 3 miles east of Lecanto, Citrus County, Florida.

The landfill gas (LFG) system was an initial installation and included the following: 11 vertical extraction wells, 9 remote extraction wells, installation of 8" and 10" HDPE pipe for header, 6" and 4" HDPE solid pipe for laterals and risers and 2" HDPE pipe for air supply and condensate forcemain. The construction included two new condensate traps, a small three sided metal structure, and one blower skid system with all the appurtenances including a 35' flare on a new rock foundation with fencing around the perimeter.

Additional background information for the landfill is included in the two permit applications that were submitted to FDEP as follows:

- Application for Solid Waste Operations Permit Minor Modification for Interim Gas Collection and Control System that was prepared by SCS Engineers (SCS) dated December 9, 2008.

- Application for Solid Waste Construction Permit – Landfill Gas Collection and Control System – Citrus County Central Landfill" that was prepared by SCS Engineers (SCS) dated April 22, 2009.

It should be noted that the construction of this project was conducted in conjunction with the Re-closure of the 7-acre closed area onsite. A separate certification report will be submitted for that permit (No. 21375-014-SF/01), however only one set of Record Drawings containing both projects was produced.

CONTRACT DOCUMENTS

The following documents defined the design and technical aspects of the project and governed the construction:

- "7-Acre Closed Area Re-Closure and Landfill Gas System Construction Drawings", prepared by SCS dated August 25, 2009 (Sheets 17-27). These drawings were prepared based upon the permit drawings approved as part of Permit No. 21375-017SC/08 and the applicable design details from the permit drawings approved as part of Permit Modification No. 21375-016-SO/MM.
- "Bid Documents for 7-Acre Closed Area Re-Closure and Landfill Gas System, Bid No. 070-09", prepared by SCS Engineers for the Citrus County Board of County Commissioners, dated August 16, 2009.
- Construction Permit No. 21375-017-SC/08 issued by FDEP on November 4, 2009.

CONTACT LIST

The parties involved in this project are listed below:

Design Engineer, Construction Inspection:	Construction Contractor:	Drilling Subcontractor:
SCS Engineers 4041 Park Oaks Blvd., Suite 100 Tampa, FL 33610 (813) 621-0080	Belair Builders, Inc. 6220 Taylor Road, Suite 106 Naples, FL 34109 (239) 438-5942	Shaw Environmental & Infrastructure, Inc. 16406 S.R. 224 East Findlay, OH 45840 (225) 987-6803
Surveyor, Record Documenter:	Pipe Supplier:	Electrical Subcontractor:
BBLS Surveyors & Mappers, Inc. 1502-A Railhead Blvd. Naples, FL 34110 (239) 597-1315	Ferguson Enterprises, Inc. (FL) 17323 Jean Street Fort Myers, FL 33912 (239) 433-0555	Coastal Electrical Contractors 8515 N. Trask Street Tampa, FL 33624 (813) 876-9362 x 213
Sod & Seeding:		
North Lake Sod 974 Hawk Landing Fruitland Park, FL 34731 (352) 267-1609		

SUMMARY OF CONSTRUCTION

On November 23, 2009, the DSWM issued Belair Contractors (Belair) the notice to proceed with construction. Substantial completion of the project, as outlined in the Contract Documents and Application for Construction Permit, was achieved on May 5, 2010, and final completion was accepted on July 6, 2010.

The project consisted of constructing/installing the following approximate quantities:

- 11 vertical LFG extraction wells with a total drilling depth of 820 feet (ft)
- 9 remote LFG extraction wells for leachate tie-ins
- 181 ft of 10-inch diameter HDPE SDR 17 LFG header pipe
- 2,674 ft of 8-inch diameter HDPE SDR 17 LFG header pipe
- 894 ft of 6-inch diameter HDPE SDR 17 LFG lateral pipe
- 1,030 ft of 4-inch diameter HDPE SDR 17 LFG lateral pipe and risers above and below grade
- 110 ft of 2-inch diameter HDPE SDR 11 condensate/dewatering forcemain
- 1,454 ft of 2-inch diameter HDPE SDR 9 air supply pipe
- Twelve leachate collection riser tie-ins for gas extraction
- Two self-draining condensate traps
- Two condensate sumps fitted with pneumatic dewatering pumps
- One metal building for storage and housing the air compressor
- Blower skid with one blower and all appurtenances including control panel and air compressor/dryer
- New flare on concrete foundation with chain link fencing around perimeter

Vertical Extraction Wells

Vertical extraction wells were constructed with 6-inch diameter schedule 80 polyvinyl chloride (PVC) pipe in a 36-inch diameter borehole. The boreholes were terminated at no less than 15 feet above the estimated bottom of the cell. The PVC pipe was slotted, as specified in the design drawings, to within no less than 20 feet of the ground surface. FDOT No. 4 non-calcareous stone was used as backfill around the slotted pipe in all wells. A geocomposite was placed over the stone prior to placing clean soil backfill around the solid-wall pipe. A 24-inch thick hydrated bentonite plug was installed at each well 16-40 feet below the existing grade depending on the length of solid pipe. Vertical extraction wells are connected to the vacuum in the header line utilizing an adjustable wellhead. The wellhead is connected to a vacuum riser on the header line and to the vertical well directly or via remote wellhead.

During construction, the depths of seven wells were adjusted based upon drillers ability to drill once waste was severely decomposed or saturated. The as-built well locations, well schedule, and construction details are shown on the site plans included in the Record Drawings in Appendix E.

Remote Extraction Wells

Remote extraction wells were constructed with 4-inch diameter HDPE SDR 17 pipe tied in to select leachate cleanout risers. Each of the connections to the leachate cleanout risers is valved so any or all cleanout connections can be turned off should no LFG be present in the cleanout. In some cases multiple cleanout connections are run to a single wellhead connected to the vacuum in the header line. The Record Drawings in Appendix E indicate where all leachate cleanouts are connected.

LFG Header and Laterals

The LFG header and laterals were constructed using HDPE SDR 17 pipe. Lateral pipes generally were installed with a minimum 3 percent slope to allow condensate in the pipes to drain into the header. The header was installed with a slope varying from 3 percent to greater than 20 percent. The header is designed to drain condensate to engineered low spots at the condensate traps.

The base of the LFG lateral and header trench had a minimum of 6-inches of sand bedding and both the bedding and sand backfill were compacted using a vibrating compactor. Pipes were then covered with a clean soil backfill free of excavated refuse. Caution tape with print stating "gas line buried below" was buried in the backfill approximately 1 foot above top of pipes.

Pipe Slope

The header, laterals, horizontal collectors and air/condensate lines were installed with a minimum slope of 3 percent, which is the standard for LFG pipes installed within an active landfill. Pipes located outside of the landfill footprint were installed with a 1 percent minimum slope.

To confirm pipe slope, the contractor checked the pipe slope at 10-foot intervals along the entire pipeline. Also per the Contract Documents, the pipe coordinates and elevations were surveyed at the intervals required by Section 31 20 00 - 8 and 31 20 00 - 9 of the Contract Documents, which includes 50-foot intervals and at each change in pipe direction, grade break, fitting, connection, and tie-in. Complete as-built survey data tables are included within this construction certification in Appendix F.

Condensate Traps and Sumps

Two self-draining condensate traps, CT-1 and CT-2, were installed in Phases 1/1A & 2 to collect condensate from the header. These sumps will drain condensate from the gas system back into the landfill. These sumps are also equipped for the installation of a pneumatic pump should draining into the landfill become problematic or if additional liquids removal is required in the future. No pumps were installed in traps at this time.

Two condensate sumps, CS-1 and CS-2, fitted with pneumatic dewatering pumps, were installed to collect and remove condensate from the gas collection system. To operate the pumps, air supply and condensate forcemain stub-ups were installed and connected appropriately to each of

the sumps. Condensate discharged from the sumps is routed into the existing leachate collection system via the 2-inch condensate discharge line as shown on Drawing 18 of the Record Drawings in Appendix E.

CONSTRUCTION RECORDS

The following construction documentation is provided as appendices:

- Appendix A As-Built LFG Extraction Well Schedule
- Appendix B Daily Field Reports
- Appendix C As-Built Construction Well Logs
- Appendix D Construction Photographs
- Appendix E Record Drawings (24"x36" Drawing Set included along with this Submittal)
- Appendix F As-Built Survey Data Table

Landfill Gas Extraction Well Schedule

A summary of the as-built well depths, length of slotted and solid-wall pipe, and thickness of stone backfill layers is provided on the as-built well schedule included in Appendix A, as well as on Sheet 22 of the Record Drawings. Additional information including removal waste composition and temperatures can be found in the as-built construction well logs in Appendix C.

Daily Field Reports

During the construction quality assurance (CQA) inspection activities, SCS maintained daily field reports detailing the construction progress and various issues that were addressed throughout the project. The reports included in Appendix B were used to prepare this certification report and the Record Drawings.

Construction Photographs

Photographs were taken by SCS on a regular basis in order to document each phase of the construction. The photographs included in Appendix D provide a general representation of the construction activities and methods.

Record Drawings

As mentioned in the Site Background section the GCCS work constructed ~~permitted~~ under this project was permitted under both operations Permit Modification No. 21375-016-SO/MM and construction Permit No. 21375-017-SC/08 and constructed in conjunction with another solid waste project that performed the 7-Acre Closed Area Re-closure work permitted under Permit

No. 21375-014-SF/01. Rather than produce two separate sets of Record Drawings one set has been produced that includes the work for the GCCS and the 7 Acre Closed Area Re-closure.~~both projects~~. Appendix E contains the entire record drawing set, however only Sheets 17 though 27 plus E-1 through E-3 apply for the two ~~is~~ permits that approved the GCCS work. Each of the sheets that apply to the GCCS construction ~~and are~~is discussed below.

Other than those deviation noted above in this report, the project was completed in general conformance with the Contract Documents. Due to contractor product choices and field conditions there are additional minor deviations that are indicated in the record drawings that are outlined below on a sheet by sheet basis for those sheet that are applicable the work permitted under this construction permit.

Sheet #	Changes made from Construction Drawings Dated August 25, 2009~~permitted plans~~ and reason for the change
Cover	Added additional sheet information for Surveyor sheets added to legend as well as Record Drawing Stamp
17	Changes to header and lateral pipe routes and high points occurred due to topographic and field operating conditions during construction. Changes to piping interconnecting risers 1, 2 & 3. Also note that 4-inch lateral from W-1 to risers 1, 2 & 3 was not installed as there is currently a low point between W-1 and the risers that must be filled in before appropriate slope for drainage can be achieved. Once achieved this pipe from W-1 to the interconnect will be installed at 3% slope. Interconnecting piping for risers 5, 7, & 8 as well as 12 and 12A was also changed to conserve pipe and keep all connections outside of waste rather than inside footprint as shown on permitted drawings. Above grade piping from W-7 to 8-inch header was relocated to avoid penetrating liner with stakes used in pipe supports. Tie-in of the above grade header now enters 8-inch header rather than connecting with pipe near W-8.
18	Changes to pipe routes due to topographic and field operating conditions during construction. New underground electrical connections and new electrical panel where added. Compressor shed appropriately sized based upon installed enclosure. Protective fencing around entire blower/flare and compressor is shown.
19	Detail 3 shows revisions required by field conditions where an electrofusion coupling and a fernco cap were used instead of cutting back the pipe further and butt welding. (A concrete support was preserved to support the pipe). Detail 4 Applicability was corrected since this configuration was used not only on risers 3 and 5, but on 3,5,15 and 16. Detail 6 was corrected to show shortened distance between connections, with above grade piping moved further into the landfill. Electro-fusion couplings that were used in place of butt weld is also shown. Detail 7 applicability was modified to remove risers 6, 7, 8, & 9 which did not receive this lid

	modification. These lids on those risers were preserved and sealed with a silicone seal and additional bolts rather than be replaced.
20	Contractor notes were revised or removed. Product numbers and suppliers were modified based on installed equipment on details 5 & 8. Detail 7 was modified to show electro-fusion coupling and modified lid rather than quick cap.
21	Detail 1 and 2 were modified to show the actual installed connections which included electro-fusion couplings instead of butt welds and modified flange caps versus quick cap. Orifice plate note was added to both details.
22	Changes in Well depths and subsequently other pipe lengths were made based upon field elevations and ability to drill in the waste in each area. New well schedule indicates as-built well conditions. Contractor notes were revised or removed
23	Details 1 through 4 notes and descriptions either edited or removed. Detail 6 Modified to show actual compressor configuration that was installed based on manufacturer provided configuration.
24	Detail 2 was modified to show the actual installed connection which include electro-fusion couplings instead of butt weld due to concrete support and modified flange caps versus quick cap. Orifice plate note was added to both details.
25	Detail notes were edited or removed to reflect actual installation.
26	Detail notes were edited or removed to reflect actual installation.
27	Detail 1 and Section A- Revised to reflect actual installed blower/flare components based upon contractor constructed flare whose configuration varied slightly from flare shown on permitting documents, but met all performance criteria. Contractor notes were revised or removed.
E-1	Power Plan – Revised to show CP on blower skid and additional panel M required based on manufacturer power configuration and County codes.
E-2	Riser Diagram Revised to show CP on blower skid and additional panel M required based on manufacturer power configuration and County codes.
E-3	No Change

Record Drawing Summary

The Record Drawings showing the as-built conditions were prepared by SCS and signed and sealed by Daniel R. Cooper, P.E., who is a Professional Engineer registered in Florida. The electrical record drawings were signed and sealed by the sub-consultant to SCS.

- Sheet 1 Cover Sheet
- Sheet 2 7-Acre Closed Area Reclosure – Existing Site Plan
- Sheet 3 7-Acre Closed Area Reclosure – Proposed Final Closure Site Plan
- Sheet 4 7-Acre Closed Area Reclosure – Sections – 1

- Sheet 5 — 7-Acre Closed Area Reclosure – Sections – 2
- Sheet 6 — 7-Acre Closed Area Reclosure – Sections – 3
- Sheet 7 — 7-Acre Closed Area Reclosure – Sections – 4
- Sheet 8 — 7-Acre Closed Area Reclosure – Sections – 5
- Sheet 9 — 7-Acre Closed Area Reclosure – Proposed Dry Retention Area Improvements
- Sheet 10 — 7-Acre Closed Area Reclosure – Detail
- Sheet 11 — (Not Used)
- Sheet 12 — 80-Acre Area – Existing Site Plan
- Sheet 13 — 80-Acre Area – Erosion Control Improvements Site Plan
- Sheet 14 — 80-Acre Area – Erosion Control Improvements Details – 1
- Sheet 15 — 80-Acre Area – Erosion Control Improvements Details – 2
- Sheet 16 — 80-Acre Area – Erosion Control Improvements Details – 3
- Sheet 17 — Landfill Gas System – Proposed Site Plan
- Sheet 18 — Landfill Gas System – Proposed Blower/Flare Station Grading Plan
- Sheet 19 — Landfill Gas System – Details – 1
- Sheet 20 — Landfill Gas System – Details – 2
- Sheet 21 — Landfill Gas System – Details – 3
- Sheet 22 — Landfill Gas System – Details – 4
- Sheet 23 — Landfill Gas System – Details – 5
- Sheet 24 — Landfill Gas System – Details – 6
- Sheet 25 — Landfill Gas System – Details – 7
- Sheet 26 — Landfill Gas System – Details – 8
- Sheet 27 — Landfill Gas System – Details – 9
- Sheet E-1 — Electrical Power Plan
- Sheet E-2 — Riser Diagram and Panel Schedules
- Sheet E-3 — Electrical Line Diagram
- Survey — BBLS – As-Built Survey Dated May 10, 2010.

VENDOR LIST

The following vendors supplied Belair Builders, Inc. with the materials used for the project:

Pipe Supplier	**Ferguson Enterprises, Inc. (FL)** 17323 Jean Street Fort Myers, FL 33912 (239) 433-0555
Silt Fencing	**Southeastern Silt & Erosion, Inc** 903 E. 17th Avenue Tampa, FL 33605 (800) 248-2099
Air Compressor and Dryer	**Grainger, Inc.** 100 Grainger Pkwy Lake Forest, IL 60045 (847) 753-5353
Aggregate Base	**Sean M. Gerrits, Inc.** P.O. Box 581

	Crystal River, FL 34423 (352) 795-7170
Precast Concrete Structures	**Oldcastle Precast, Inc.** 2140 Pondella Road Cape Coral, FL 33909 (239) 574-8896
Pneumatic Leachate Pumps **Well Caps**	**QED Environmental Systems** P.O. Box 3726 Ann Arbor, MI 48106 (800) 624-2026
Blower/Flare Station and **Control Panel**	**LFG Specialties, LLC** Shaw Environmental & Infrastructure Group 16406 US Route 224 E Findlay, OH 45840 (419) 424-4915