

CEC

CARLSON ENVIRONMENTAL CONSULTANTS, PC

LANDFILL GAS, AIR PERMITTING, AND REGULATORY COMPLIANCE SERVICES

October 4, 2010

Ming-Tai Chao, P.E.
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96-98 <i>J. Chao</i>	10/05/2010	DIN 11738

Subject: Request for NCDENR Division of Waste Management Approval
Expansion of Existing LFG Collection System
Construction of Landfill Gas-to-Energy Facility
Wayne County Landfill – Dudley, NC
SW Permit Nos. 96-01 and 96-06

Dear Mr. Chao:

On behalf of Wayne County, North Carolina (County) and MP Wayne LLC, Carlson Environmental Consultants, PC (CEC) is submitting this request for approval from the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management to expand the existing landfill gas (LFG) collection and control system and to construct a landfill gas-to-energy (LFGTE) facility at the Wayne County Landfill (Landfill) located in Dudley, North Carolina.

Per your email dated September 24, 2010, CEC is submitting this additional information regarding the Landfill Gas Collection and Control System (GCCS) Expansion and LFGTE projects at the Landfill. CEC is providing information concerning the current LFG projects at this time, and the remaining documentation concerning as-builts and future LFG system expansions will be provided at the conclusion of the LFG expansion project.

ROLES AND RESPONSIBILITIES

MP Wayne, LLC (MP Wayne) and Wayne County, NC have entered into a contract such that MP Wayne will recover landfill gas from the Wayne County Landfill to use for “greenpower” or other beneficial uses. Wayne County has leased MP Wayne land at the Wayne County Landfill to install and operate the LFGTE facility. The first phase of this project will involve the expansion of the landfill’s landfill gas collection system, installation of up to three (3) landfill gas (LFG) engine gensets, and the installation of a 1,600 SCFM backup open flare system. CEC has submitted an application for an air

permit with NCDENR DAQ for the 1,600 SCFM open flare system (submitted August 15, 2010 and in process at this time). The three (3) LFG engine generators have already been permitted by NCDENR DAQ under Air Quality Permit No. 10054R00 dated April 2010. This project is expected to begin construction in October 2010.

CEC will be providing consulting services to Wayne County and MP Wayne for the LFGTE and GCCS Expansion projects and will be the main point of contact for these projects with the NCDENR. Municipal Engineering Services Company, PA (MESCO) is Wayne County's primary engineer and is also providing overall coordination and permitting services for the County on these projects.

Richardson, Smith, Gardner & Associates (RSG) of Raleigh, North Carolina will be providing CQA and project management services for these projects on behalf of MP Wayne. Chandler Construction (Chandler) will be providing construction services for the LFG collection system expansion. Crowder Construction (Crowder) will be providing the construction services on the LFGTE plant and LFGTE pipeline.

LANDFILL BACKGROUND

The Wayne County Landfill is an active municipal solid waste (MSW) landfill located in the town of Dudley in Wayne County. The facility is owned and operated by Wayne County, North Carolina. The Landfill has operated as a sanitary landfill under Solid Waste Permits No. 96-01 and No. 96-06 since 1974. In addition to MSW, the facility also accepts yard waste and construction and demolition (C&D) material.

Unit 1 and Unit 2 ceased accepting MSW in 1997 and the County is in the process of overfilling Unit 1 with C&D materials. The closed Units do not have a Subtitle D liner system or a leachate collection system. In 1998, the County opened a Unit 3 to the North of Units 1 & 2 that is Subtitle D lined and is currently accepting all of the County's MSW. Unit 1, 2, and 3 have a Gas Collection and Control system that the County expands periodically in order to keep the landfill compliant with all applicable air and solid waste regulations. The County maintains a 1,100 scfm blower and open flare system for control of LFG collected by the Landfill's LFG collection system. This flare system will be used as a secondary back-up control device to MP Wayne's LFG engines and new 1,600 scfm open flare.

The Landfill is subject to the New Source Performance Standards (NSPS) as listed in 40 CFR Part 60 – Subpart WWW or the National Emission Standards for Hazardous Air Pollutants (NESHAP) as listed in 40 CFR Part 61. The Landfill has a Title V Air Operating Permit No. 08885T03.

PROPOSED LANDFILL GAS SYSTEM MODIFICATIONS

The current expansion and modification of the Landfill's existing LFG collection system will be in several stages in the Fall of 2010. The first stage will include site work and installation of new electrical power lines to the LFGTE plant. The second stage will include the expansion of the LFG collection system and installation of a LFGTE pipeline to transport gas to the new LFGTE facility. The final stage will include the installation of the three LFG engine generators and the 1,600 scfm open flare system and start-up and testing of the LFGTE plant. Additional future phases may include future expansions of the LFG collection system or the installation of additional LFG gensets or other LFG beneficial uses.

The Landfill has a NSPS Gas Collection and Control System Design Plan (GCCS Plan) that has been submitted and approved by NCDENR Division of Air Quality. An updated GCCS Plan is being prepared by CEC on behalf of the County at this time to incorporate the new LFGTE facility. The updated GCCS Plan will be submitted to NCDENR DAQ for approval.

The following design elements are standard practice for Wayne County as per its Solid Waste plans and NSPS GCCS Design Plan.

Vertical Gas Wells

All new vertical gas wells will be 36-inch diameter and drilled to a depth of no deeper than approximately 10 vertical feet above the Landfill's base liner system. If significant liquid is observed in the well bore during drilling, the well will be terminated at that depth. The wells will be constructed with 6-inch diameter PVC or HDPE solid piping extending 5 to 20 feet below the ground surface (depending on available waste depths) and perforated 6-inch diameter PVC or HDPE piping with stone backfill extending the remainder of the well depth. Bentonite clay will be used to seal the well bore at two (2) locations: one being just above the stone backfill and the second being the observed depth of the clay landfill cap or interim soil cap. The bentonite will be used to seal around the well penetration and to match the existing clay cap or interim soil cap thickness.

Header and Lateral Piping

The header and lateral collection piping which collects LFG from the Landfill waste mass and delivers the LFG to the LFG plant has been sized considering the head losses throughout the piping network to minimize the vacuum requirements of the system. Based upon the LandGEM Modeling and field testing, the Landfill is expected to generate in the range of 1,200 to 1,600 scfm (at maximum waste capacity). In the event that the Landfill generates more LFG than expected, CEC has conservatively sized the collection and control system components for a LFG recovery of up to 2,000 scfm.

The main LFGTE header piping has been designed to be 16-inch diameter SDR 17 HDPE, with the subheader and laterals being 4, 6, and 8-inch diameter SDR 17 HDPE. While slightly oversized for this project, the 16-inch diameter HDPE piping also provides more protection from landfill settlement and it allows condensate and gas to flow more easily in opposite directions. The header and lateral piping is proposed to be installed below grade to be out of the way of post closure operations or landfill activities.

Gas piping will be primarily buried in the interim soil cover or in waste (as applicable) to achieve the desired pipe slopes. Gas piping will also be buried in natural soil and may be installed above grade per the Plans. As applicable, the landfill cover will be returned to pre-construction conditions and vegetation re-established.

Condensate Sumps

Condensate is formed as the temperature of LFG extracted from a landfill decreases in the collection system piping. The existing LFG system has condensate tanks that temporarily store condensate until it is manually pumped to the Landfill's leachate lagoon. The LFG system expansion in Unit 3 will include J-Traps to be located at low points in the LFG collection system piping.

The J-Traps will be designed to meet the NCDENR regulations, which prohibit the discharge of condensate into a non-Subtitle D constructed landfill cell. The J-Traps will be designed to discharge collected condensate automatically to the Landfill's leachate collection system. The condensate collected at the LFTGE plant will be collected in a dual-contained condensate tank. The main condensate holding tank will be sized to handle the maximum weekly condensate collection anticipated. The condensate tank will discharge condensate to the Landfill's existing leachate collection and discharge system.

Condensate formed in header piping can form a blockage if it collects in a low point and is not removed from the header system. To maintain positive drainage, a 2 percent slope is specified for collection piping on the landfill surface (where possible). Differential settlement under the collection piping is less of a concern in areas off the refuse mound, therefore a minimum slope of 0.5 percent is specified for piping located on natural soil.

Wellheads and Isolation Valves

The existing gas wells (and any new gas wells) are fitted with a gas wellhead consisting of a control valve and sampling ports. These wellheads will allow individual control and analysis of each gas well. Since this is a NSPS LFG system, the wellheads will be monitored to meet NSPS regulatory requirements; in addition, the collection of LFG will be routinely monitored to maximize LFG extraction and minimize the infiltration of ambient air (for the prevention of landfill fires). Isolation valves are installed in the main header piping to allow additional control over sections of the wellfield. Flanges are also installed in the main header to allow for expansion of the wellfield as needed.

Landfill Gas Treatment Skid, Engine Gensets, and Open Flare

As noted earlier in this report, MP Wayne plans to install three (3) 1.0 MW engine gensets and an open flare capable of about 1,600 scfm at the LFGTE facility initially. Additional engine gensets may be added in the future as LFG recovery warrants. The County and MP Wayne will also install a LFG treatment skid to compress, filter, and dewater the LFG prior to combustion in the engines or 1,600 scfm open flare. The County's existing 1,100 scfm open flare will not be modified as part of this project and will be used by the County as a secondary backup in the event that the MP Wayne LFGTE facility is not operating.

LFG SYSTEM CONSTRUCTION

The LFG collection system construction will follow the Landfill's NCDENR-approved NSPS GCCS Design Plan. The construction will be monitored by construction quality assurance (CQA) personnel. The primary items that will be observed will be the gas well installation and the header/lateral trenching. The LFG piping will be installed primarily in the soil cover (approximately 6-12 inches) over wastes. If LFG system components are installed in wastes, the excavated waste materials will be moved to the Landfill's active face and the LFG system components backfilled with clean soil. All solid wall header/lateral piping will be air pressure tested with air to check for leaks. These tests will be performed at various intervals during construction.

The contractor will be required to take care in excavating the soil cover and installing the LFG system to prevent damage to the Landfill's existing cover system. The contractor will be required to minimize damage to the vegetative cover system during construction. The contractor will be required to restore all trenched and disturbed areas of the cap to the pre-construction condition. This will include reseeding with existing grasses and foliage, liming, fertilization, and mulching the areas. The contractor will be required to take all necessary precautions, such covering the trenches with plastic sheeting, to protect open trenches if precipitation occurs during daily construction activities or if trenches are left open overnight.

If any final cap is impacted during excavation in those areas, the contractor will be required to immediately make repairs to the cap. The repairs will consist of resealing the areas with bentonite clay. CQA personnel will document all areas in which the clay cap was impacted and repaired.

CONSTRUCTION DOCUMENTATION

Upon completion of the LFG collection and control system installation, RSG will provide to the NCDENR Division of Waste Management as-builts of the LFG system as well as a

Record Documentation Report. The Record Documentation Report will include (at a minimum) the following:

- A description of the construction work, parties involved, and materials and equipment used;
- Field logs from the CQA personnel as well as the contractor (as appropriate);
- Well Construction Logs;
- Header and lateral pipe leak testing forms;
- Photographs from the construction;
- Documentation on any repairs made to the clay cap (as needed);
- As-built drawings; and.
- Certification from a North Carolina Professional Engineer.

LANDFILL GAS SYSTEM OPERATIONS AND MAINTENANCE

The LFG collection and control system will be maintained in accordance with the requirements of the NSPS (40 CFR 60 Subpart WWW), the blower/flare system manufacturer's recommendations, and generally accepted practices for operating active LFG systems. These include (at a minimum) inspecting and greasing the blowers, observing the operation of the flare, checking the liquid levels in the condensate sumps, checking and recording the LFG quality, pressure, and temperature at each gas well, checking the LFG quality, pressure, and temperature of the gas at the blower/flare station, recording the gas flow at the blower/flare station, and inspecting the wellheads for damaged or loose fittings. Spare parts for the most common maintenance items such as blower grease, spare blower belts, wellhead parts, fuses, and the like will be kept at the Landfill for quick replacement or will be quickly available via third party LFG O&M services.

With the landfill subject to NSPS, the County and MP Wayne will be maintaining the Landfill's LFG system in compliance with the NSPS in order to maximize available gas collection and minimize methane migration and the potential for landfill fires.

If in the future, subsurface liquids are noted in the LFG system, downwell pumps can be added as the vertical gas wells and sumps have been designed to accommodate pumps. The collected condensate from these pumps would be pumped via pipeline to the Landfill's leachate collection system.

If in the future a well becomes unusable to the active LFG system due to poor gas quality or low gas flow, it may be temporarily decommissioned from the LFG system. This will involve closing the wellhead valve for an indeterminate period of time to allow the well to regenerate and/or to allow additional testing to be performed. A gas well may be permanently decommissioned by removing the wellhead and placing a cap on the well.

Landfill Fires

Due to the existing cover system and management of the LFG system to meet the requirements of the NSPS, ambient air infiltration into the waste mass due to the active gas system will be minimized thus reducing the potential for a landfill fire. The LFG system will be routinely monitored for temperature and oxygen content at each wellhead, and the wells will be adjusted accordingly if conditions for a landfill fire become favorable, such as high well temperatures (in excess of 145 degrees F) and high oxygen content (in excess of 5.0 percent).

Should a landfill fire be suspected, the County and MP Wayne will follow the existing procedures in its Solid Waste Plans, which include notifying NCDENR and the local fire department. The County or MP Wayne personnel will turn off all nearby active gas wells to prevent additional air infiltration and monitor the carbon monoxide levels in the nearby wells to determine the extent of the fire. The County and MP Wayne personnel who work on the LFG system are trained on the proper response to a suspected landfill fire.

FINANCIAL ASSURANCE

The installation of the expansion to LFG collection and control system and LFGTE project is being funded jointly by the County and MP Wayne. Additional upgrades, future work, and LFG O&M will be paid for by the County and MP Wayne. Wayne County, as the owner of the Landfill, and MP Wayne LLC, as the LFG system operator, understand and accept the appropriate financial responsibility for this project.

FUTURE SUBMITTALS

Based on information provided by NCDENR Solid Waste, additional information will be submitted at the conclusion of the construction project. This information will include as-builts of the existing gas collection system, an As-built Certification Report of the current LFG system expansion and LFGTE pipeline projects, required information on the future LFG system expansions, and additional items noted by NCDENR.

CLOSING

I appreciate your assistance on this project and look forward to your comments. If you have any questions or need additional information, please feel free to contact me at (704) 283-9765.

Respectfully Submitted,



Kristofer L. Carlson, P.E.
Principal
Carlson Environmental Consultants, PC

Attachments

cc: Wayne Sullivan, Municipal Engineering
Tim Rogers, Wayne County
Stevia Morton, CEC

Chao, Ming-tai

From: Chao, Ming-tai
Sent: Friday, September 24, 2010 12:00 PM
To: 'Kristofer Carlson'
Cc: Mussler, Ed; 'wsullivan@mesco.com'
Subject: Administrative review of LFGCCs/LFGTE project in Wayne County
Attachments: LFGCollectionSystemPermitting Guide96.doc; LFG Maintenance Guidance Document[1].doc

Dear Mr. Carlson:

I have conducted a review of the LFGCCs expansion project and LFGTE piping construction project and determined the submittal is incomplete. This decision was made because the letter dated September 16, 2010 was not an acceptable work plan, which did not include the briefly description of the previously completed tasks, the scopes of the new projects, estimation of the existing and future LFG gas capacity and flow rate, condensate./leachate management, asbestos waste issues, technical specifications for construction, well drilling and completion, and material, pipe leaking test, QA/QC testing requirements, construction schedule, and the format of the As-built drawings and construction completion report. For your reference and preparation of the work plan, I am attaching the Solid Waste Section Permitting Guidance Documents with this e-mail.

Because the LFGCCs/LFGTE projects encompass two active landfill units (C&DLF on top of the closed MSWLF –Unit 1, subtitle-D MSWLF- Unit 3) and a closed unlined MSWLF (Unit 2) at Wayne County Landfill Facility, and many parties (County, several consultants, and a LFG developer) are involving into the projects. Additionally, MESCO on behalf of Wayne County submits the permit applications for both active landfills – PTO for continued operation at C&DLF (permit # 96-01), PTC for Phase 3 at MSWLF (permit # 96-06). Therefore, you may want to clearly define your involvement to the overall projects especially the portions related to landfill operations and LFGCCs/LFGTE operations which shall be a part of the Operations Plan in the permit application. MESCO has agreed to update their permit application to incorporate the LFGCCs/LFGTE operations to the revised Operations Plan for the C&DLF and lined MSWLF.

By the way, please provide me the copy of as-built drawings (including the locations of extraction wells and valves, condensate traps, drip legs , flare/blower station, which are surveyed by the NC registered license surveyor) and construction completed reports (one hard copy and one electronic copy in pdf format) for previous LFGCCs projects completed in 2001/2002 and 2006.

It is your responsibility, on behalf of Wayne County, to provide the Solid Waste Section (Section) any relevant information which the Section will use to determine if causes exist for approve the proposed LFGCCs expansion projects. Therefore, within 10 business days after receiving this e-mail message please submit the revised application to the Section for a review and approval; otherwise, I will regret to return the September 16 2010 application back to you.

Best regards,

Ming-Tai Chao, P.E.
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From: Chao, Ming-tai
Sent: Monday, September 20, 2010 10:01 AM
To: 'Kristofer Carlson'
Subject: LFGCCs/LFGTE project in Wayne County

Dear Mr. Carlson: I received the package of the LFGCCs/LFGTE project for Wayne County Landfill this morning (09/20/2010). Could you please send me the electronic copy (pdf format) of this application so that I can upload the document to DWM web site. I will review this application later this week. Thank you.

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