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Carmen Johnson
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Scanned ? ✓
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Close closure
Permit # 98-01
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Mr. Ed Mussler
Solid Waste Permit Engineer
NCDENR – Division of Waste Management
1646 Mail Service Center
Raleigh, NC 27699-1646

Subject: Request for NCDENR Division of Waste Management Approval
Construction and Operation of Landfill Gas System
Wilson County Landfill – Wilson, NC

SCANNED
98-01 Carmen J.
10/24/14

Dear Mr. Mussler:

On behalf of Wilson County, North Carolina (County) and MP Wilson 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 construct and operate an active landfill gas (LFG) collection and control system at the Wilson County Landfill (Landfill) located near Wilson, North Carolina.

LFG CCS

MP Wilson, LLC and Wilson County, NC have entered into a contract such that MP Wilson will recover landfill gas from the Wilson County Landfill to use for "greenpower" or other beneficial uses. **Wilson County has leased MP Wilson LLC land at the Wilson County Landfill to install and operate a landfill gas blower and flare system.** The first phase of this project will involve the installation of a landfill gas collection system and the installation of a **1,000 SCFM blower and open flare system.** CEC has submitted an application for an air permit with NCDENR DAQ for the blower and flare system.

Air Quality permit →

goal to achieve

LANDFILL BACKGROUND

The Wilson County Landfill is a closed municipal solid waste (MSW) landfill located east of the City of Wilson in Wilson County. **The facility is owned and operated by Wilson County, North Carolina.** The Landfill was operated as a sanitary landfill under Solid Waste Permit No. 98-01 from 1974 to 1997. In addition to MSW, the facility also accepted yard waste and construction and demolition (C&D) material.

msw unlined LF

The MSW landfill was closed in 1997 and the County continued operation of an onsite C&D disposal area. **The closed MSW Landfill does not have a Subtitle D liner system or a leachate collection system.** In 1998, a final cover system was installed over the MSW

closed in 1998

portions of the Landfill that consisted of a clay cap (1×10^{-6} cm/sec) with 18 inches of vegetative cover overtop. Included with the final cover was the installation of passive gas vents.

layout?

The Landfill is not 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.

why

why not?

based on what?

2.5 Mmg capacity

PROPOSED LANDFILL GAS SYSTEM

The overall objective of this project is to collect the Landfill's generated gas and use it in a beneficial use project, such as to generate heat and/or electricity for the facility or other end-users, thus providing an environmental benefit by reducing the potential for offsite migration and fugitive emissions of LFG.

As a first step, the County and MP Wilson LLC desire to connect existing passive gas vents and new gas wells to an active gas blower and route this gas to a small open flare control device for combustion. See the attached landfill gas drawings and details for additional information. The installation of the LFG system will be performed in two (or more) phases depending on construction costs. The installation and operation of gas-to-energy devices has not been decided upon at this time and will be determined based upon actual gas collection once the LFG system is installed.

Header and Lateral Piping

The header and lateral collection piping which delivers the LFG to the blower/flare station 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 300 to 750 scfm. 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 1,000 scfm.

operating goal

max.

The header piping has been designed to be 8-inch diameter SDR 17 HDPE, with the laterals being 4 and 6-inch diameter SDR 17 HDPE. While slightly oversized for this project, the 8-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.

Condensate Sumps

Condensate is formed as the temperature of LFG extracted from a landfill decreases in the collection system piping. The preliminary design provides for two sumps to be

condensate flow by grav. by to CM3, CM3 to CM2 to CM1 by vacuum.

located at low points in the LFG collection system piping; however, additional sumps may be added in the future as needed.

The sumps will be designed to meet the NCDENR regulations, which prohibit the discharge of condensate into a non-Subtitle D constructed landfill cell. The sumps will be designed as a reservoir to collect and retain liquids or to allow pumping of condensate to a central location at the blower/flare station or holding tank(s). The condensate sumps and/or holding tank(s) will be sized to handle the maximum weekly condensate collection anticipated. The sumps will be periodically evacuated by pump truck and the condensate will be disposed offsite at the Wilson County Waste Water Treatment Plant. (permit)?

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 1 percent is specified for piping located on natural soil. ok

Wellheads and Isolation Valves

The existing gas vents and any new gas wells will be fitted with gas wellheads consisting of a control valve and sampling ports. These wellheads will allow individual gas well control and analysis of the LFG at each gas well. Since this is a voluntary LFG system, the wellheads will not be monitored to meet any regulatory requirements; however, 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 will be installed in the main header piping to allow additional control over sections of the wellfield. Flanges will also be installed in the main header to allow for expansion of the wellfield as needed.

Landfill Gas Blower and Open Flare

Based upon the LandGEM modeling and the collected field data, it is assumed that an open flare and blower capable of about 1,000 scfm will be sufficient for the LFG collection system. An exact blower/flare system has not been selected at this time; however, it is anticipated that a small skid-mounted 6 to 8-inch diameter open flare with two (2) small centrifugal or fan-style blower capable of 500 scfm (each) will be used. At a minimum, the blower/flare will be equipped with a flame arrestor, shut-off valves, sample ports, a flow meter or orifice plate, and a condensate knock-out pot.

LFG SYSTEM CONSTRUCTION

As stated above, the construction of the LFG collection and control system will be completed in two (or more) phases depending on construction costs. The first stage will concentrate on completing the main header system, the condensate sumps, and the

blower/flare station. Based on these costs, as many of the existing vents as possible will be connected to the main header.

MP Wilson LLC may also install several new gas wells in areas of the waste that do not have existing gas vents. All wells will be 36-inch diameter and drilled to a depth of no deeper than 10 vertical feet above the historical groundwater elevations for the site (data provided by the County). If significant liquid is observed in the well bore during drilling, the well will be terminated at that depth. The wells will be constructed in a similar manner to typical active gas wells with solid piping extending 15 to 20 feet below the ground surface and perforated piping with stone backfill extending the remainder of the well depth.

above gw level

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. The bentonite will be used to seal around the well penetration and to match the existing clay cap thickness.

The construction will be monitored by construction quality assurance (CQA) personnel. The primary item(s) that will be observed will be the header/lateral trenching over the existing landfill final cover system and the new vertical gas well installation(s). The LFG piping will be installed in the vegetative soil cover (approximately 18 inches thick) which overlies the clay cap. All solid wall header/lateral piping will be pressure tested with air to check for leaks. These tests will be performed at various intervals during construction.

*size of
ADPG line*

The contractor will be required to take care while excavating the soil cover and installing the LFG system to prevent damage to the final cover system. For this reason, trenchers will not be allowed and a contractor who is experienced with LFG and landfill construction will be used. 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 the existing mix of grasses and foliage, liming, fertilization, and mulching the areas. The contractor will be required to take all necessary precautions, such as 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 portion of the clay cap is impacted during excavation, 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, CEC 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;
- Daily 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

Once operational, the LFG collection and control system will be maintained in accordance with 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.

While the Landfill is not subject to the requirements of the NSPS, which prescribe monthly monitoring, specific limits on wellhead pressure and oxygen, and continuous operation of the LFG system, the County and MP Wilson LLC will maintain the Landfill's LFG system similar manner to the NSPS in order to maximize available gas collection and minimize methane migration and the potential for landfill fires.

Based on recent liquid level measurements in the existing gas wells, subsurface liquid does not appear to be a problem at the Landfill; therefore, the active LFG system does not provide for the use of downwell pumps in the existing gas wells. However, if in the future, subsurface liquids do become a problem, downwell pumps can be added with

2.5MMg (only)
6" pipe in 3rd casing
+ 4" pump ok ✓

signing / location

minimal difficulty. The collected condensate from these pumps would be pumped via pipeline to a holding tank for removal from the site via pumper truck.

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 clay final cover system, ambient air infiltration into the waste mass due to the active gas system will be minimized thus reducing the potential for a landfill fire. However, 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 140 degrees F) and high oxygen content (in excess of 7.5 percent).

Should a landfill fire be suspected, the County and MP Wilson LLC will follow the existing procedures in its Solid Waste Closure Plan, which include notifying NCDENR and the local fire department. MP Wilson LLC 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. MP Wilson LLC personnel who work on the LFG system will be trained on the proper responses to a suspected landfill fire.

FINANCIAL ASSURANCE

cont ?

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

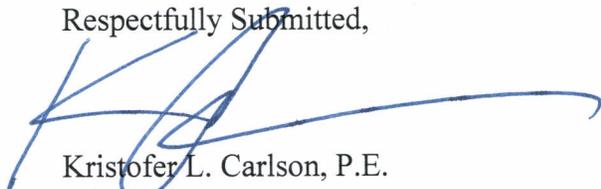
CLOSING

I appreciate your assistance on this project and look forward to your comments. The permit plans and a similar letter report have also been submitted to the Division of Air Quality for approval. The County and MP Wilson would like to begin construction on the LFG system as soon as possible.

Mr. Ed Mussler
March 27, 2009
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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



3-27-09

Attachments

cc: Ming Chao, NCDENR - DAQ
Jim Voss, MP Wilson, LLC
Richard King, PE, Applied Testing & Geosciences, LLC
Steve Clayton, Wilson County
Gary Ahlberg, PE - Blackrock Engineering
Jeff McNabb, CEC
Amy Nunes, PE, CEC

August 7, 1996

PERMITTING GUIDANCE: ACTIVE GAS COLLECTION SYSTEMS

TO: Municipal Solid Waste Landfill Owners and Operators, Consultants, and Interested Parties

FROM: Solid Waste Section, Division of Waste Management

DISCUSSION: Owners, operators and vendors have contacted the Solid Waste Section (Section) regarding clarification of rules and requirements for active gas collection systems at municipal solid waste landfills (MSWLFs). Active gas collection systems are installed at MSWLFs for a variety of reasons, including the following:

In response to an operational violation of 15A NCAC 13B .1626(4), which requires a remediation plan for methane gas releases or as a preventive measure to ensure compliance with the rule.

As an element of the closure system required by 15A NCAC 13B .1627(c)(3)(B), which requires a gas venting or collection system below the low-permeability barrier to minimize pressures exerted on the barrier.

In response to the new emissions guidelines for MSWLFs regulated under the Clean Air Act, as recently amended.

Please note that pursuant to 15A NCAC 13B .1603(a)(3), an owner and operator proposing changes to the construction, operation, closure, and post-closure plans approved in the MSWLF permit shall request prior approval from the Section in accordance with 15A NCAC 13B Rule .1617(c).

PERMIT MODIFICATION REQUIREMENTS: Submittal of the following information and Section approval is required prior to the installation of an active gas collection system:

1. Submittal of a conceptual plan for placement of gas wells, blowers, flares or other control devices, and proposed location of related infrastructure.
2. Plan for disposal of gas condensate. Pursuant to .1626(9)(a)(ii), gas condensate derived from a MSWLF unit may not be placed in the unit unless the unit is designed with a composite liner. Requests or proposals for recirculation of gas condensate in MSWLF units designed with a composite liner and leachate collection system as described in Rule .1624 must be included in the submittal.
3. A modification to the operations plan which includes a detailed emergency response plan for a landfill fire. The plan should include provisions to train landfill employees in the proper response to a fire, specifically steps to be taken concerning the gas collection system.

4. A modification to the operations plan describing how the installation and presence of the gas collection system will be coordinated with the operation of the MSWLF unit.
5. A modification to the operations plan describing the routine maintenance requirements of the gas collection system.
6. A modification to the closure plan describing how the installation and presence of the gas collection system will be coordinated with the closure of the MSWLF unit. Plan should include proposed well design, engineering details concerning penetration through the final cover system, and provisions for maintenance and repair of the closure cap system should it become damaged during the operation, installation, or repair of the gas system.
7. A plan defining the steps necessary to decommission the wells at the end of their useful life.
8. All necessary approvals and permits from the Division of Air Quality.
9. Revisions to the closure and post-closure cost estimates for financial assurance.

Following installation of the gas collection system, as-built drawings and an engineering report sealed by a Professional Engineer registered in the State of North Carolina shall be submitted to the Section in accordance with the requirements of (1) above.

FINANCIAL ASSURANCE: The installation of an active gas collection system, regardless of the reason and timing of installation has ramifications for the closure and post-closure requirements for the MSWLF facility. Please note that in accordance with Rule.1628, financial assurance for a MSWLF is the responsibility of the facility owner and operator.

CLOSURE

Systems proposed for installation at closure, or additions to an active system required by closure must be included in closure cost estimates. (i.e. additional wells or vents that may be installed when the cap system is put in place, adjustments to blowers, flares, etc.)

POST-CLOSURE

The costs for post-closure operation, maintenance, and decommissioning of the landfill gas system must be included in the post-closure cost estimates for the facility.

The closure and post-closure cost adjustments must be submitted with the permit modification application for approval by the Section and placed in the facility operating record in accordance with .1628(a)(4) and (5). Financial assurance mechanisms must be updated on the next anniversary of their filing.

If there are any questions, please contact the permitting engineers in either the Raleigh Central Office or the Winston-Salem and Fayetteville Regional Offices.

GUIDANCE DOCUMENT

Maintenance and Ongoing Support for Landfill Gas Systems

The North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management (DWM) has issued this guidance document to clarify DWM permitting and allowed maintenance activities for expansions and modifications to existing landfill gas (LFG) collection and control systems at municipal solid waste (MSW) landfills in North Carolina. Please note that additional requirements may be applicable to MSW landfills from the NCDENR Division of Air Quality, which has air permitting authority over MSW landfills subject to the New Source Performance Standards (NSPS) and other sources of air emissions that may be located at a MSW landfill.

North Carolina is home to many landfill gas (LFG) systems. These LFG systems provide environmental protection and often are part of a renewable energy or beneficial use project. To keep the systems in good working condition, the DWM recognizes that significant operations and maintenance (O&M) activities need to occur. These O&M activities may include (but are not limited to) the replacement of gas collectors, gas collection piping, gas condensate handling equipment, and other items. The DWM also recognizes that a standardized approach needs to be implemented to facilitate the approval process for LFG system O&M work to proceed expeditiously.

Facilities that have submitted plans and specifications and have received prior approval from the NCDENR DWM for the installation of active LFG collection and control systems are applicable to this guidance document. If a facility has received prior DWM approval for a LFG collection and control system and if the facility has submitted to the DWM as-built documentation, the DWM will allow the following LFG maintenance and O&M activities may occur without additional pre-permitting approval:

- The re-boring and replacement of existing vertical gas wells or other similar gas collectors;

- The DWM recognizes that MSW landfills will settle over time and LFG transmission piping will need to be re-graded or replaced. Existing piping may be regarded or replaced with no prior DWM approval as long as the piping remains in the vegetative cover layer.
- Condensate sumps, traps, and related LFG condensate handling equipment may be modified or replaced.
- Electrical, water, pneumatic, condensate forcemains, and other related LFG system piping may be installed in the vegetative cover layer of a MSW landfill.

The facility is required to submit updated as-built drawings to the NCDENR DWM within 90 days of ending construction activities.

The following item may be performed with a professional engineer's certification:

- Piping that is installed within the low permeability layer will require compaction tests to be taken no less than every 300 linear feet to meet surrounding conditions or cap specifications. A North Carolina Professional Engineer must certify that the cap has been replaced and compacted to original specifications in disturbed areas. A certification report and as-built documentation must be submitted to the DWM no later than 90 days after construction activities.
- Any expansions of existing LFG collection and control systems must be certified by a North Carolina Professional Engineer that the expanded LFG system meets or exceeds the original permitted LFG system. This certification is required to be sent to the DWM along with the as-built documentation within 90 days after construction has ended.

Please note that all MSW removed from a closed MSW landfill during LFG construction activities must be removed from the site and deposited at an active and permitted MSW facility.