



Haywood County Solid Waste

278 Recycle Rd
Clyde, NC 28721
Telephone: (828) 627-8042
Fax: (828) 627-8137

Stephen King
Solid Waste Director

March 29, 2012

Ms. Elizabeth S. Werner
Solid Waste Section – Permitting Branch Hydrogeologist
North Carolina Department of Environment and Natural Resources
Raleigh Regional Office
1601 Mail Service Center
Raleigh, North Carolina 27699-1646

Re: Response to Methane Gas Exceedance in Bus Maintenance Facility
Haywood County Closed Landfill – Francis Farm
Permit No. 44-03

Dear Ms. Werner:

Thank you for your letter dated March 13, 2012 in response to my letter to Andrea Keller, dated December 1, 2011, regarding a potential methane gas exceedance in the School Bus Maintenance Facility at the closed Francis Farm Landfill in Haywood County, North Carolina. As I indicated to Ms. Keller, the onsite methane gas monitor alerted the Haywood County Schools staff regarding a potential elevated methane concentration in the school bus maintenance facility, and the building was immediately opened and ventilated. Subsequent monitoring of the facility by Haywood County Solid Waste Department staff two hours after the initial elevated reading showed 0% methane in the building. Methane gas monitoring the following morning also showed 0% methane gas concentrations. Although the Haywood County Solid Waste Department was unable to independently verify the elevated methane gas readings, one must assume that the onsite monitor worked properly and that the School's staff took the appropriate steps to respond to and alleviate the situation.

This event highlights the importance of ensuring that the School System's continuous onsite methane gas monitor continues to operate properly and that the School's staff has procedures in place to **a)** keep the monitors calibrated correctly, and **b)** respond appropriately in the event that elevated methane readings are detected. This event also emphasizes the importance of the Gas Collection, Combustion, and Electrical Generation System at the Francis Farm Landfill. Please see response points 4, 5, and 6 below for a discussion regarding the Gas Collection System.

The following is our response to your March 13, 2012 letter:

1. The Haywood County School System operates the continuous methane gas monitor in the School Bus Maintenance Facility. Continuous monitoring occurs at three points within the building. Proper operation and calibration of the monitoring system is the responsibility of the

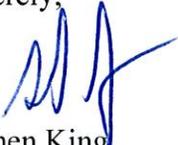
Haywood County School System. The Haywood County Solid Waste Department has provided recommendations for improving the methane gas monitoring system in the School Bus Maintenance Facility to the Haywood County Schools Superintendent, Dr. Anne Garrett, as described in the attached March 21, 2012 letter from McGill Associates to the Haywood County Manager Marty Stamey, and the attached March 22, 2012 letter from Haywood County Manager Marty Stamey to the Haywood County Schools. It will be the responsibility of the Haywood County Schools to implement the suggested recommendations. At the request of the Haywood County Schools, the Haywood County Solid Waste Department is willing to assist the Haywood County Schools with developing the proper procedures for the operation of the continuous methane gas monitoring system within the School Bus Maintenance Facility.

2. In the letter from the County's engineering consultant McGill Associates to the Haywood County Manager, it is recommended that the Haywood County Schools work with the manufacturer of the methane monitoring equipment to ensure that the monitoring positions are properly located throughout the building.
3. The School Bus Maintenance Facility includes an underslab ventilation system that runs continuously. The operation of the fan is checked periodically during monthly or quarterly LFG monitoring events and has been observed to be in operation each time it has been checked. Haywood County has requested that the Haywood County Schools include in their Standard Operating Procedures and record keeping information pertaining to the underslab ventilation system.
4. As noted in the February 22, 2012 email from Dave Pasko of McGill Associates to your office, the flare system associated with the Gas Collection, Combustion, and Electrical Generation System was started on February 15, 2012. The flare system combusts methane gas by removing the gas from the landfill under vacuum, and in the process eliminates the potential for gas to leave the site or enter onsite structures. It is the intent of the Haywood County Solid Waste Department to continue operation of the flare system as the generator comes online. The flare system by itself or the generator system by itself, are equally efficient in combusting methane gas. Since the start-up of the flare system, the initial monthly monitoring of LFG wells around the periphery of the site on February 28, 2012 showed that several of the wells experienced dramatic decreases in methane gas concentrations from previous sampling events. One sampling period does not constitute a trend; however, the results from the first sampling event are promising. Also, as noted in the email, LFG monitoring results will be forwarded to your office on a quarterly basis, beginning in March 2012.
5. A cut-off trench located just to the west of the school bus facility has been utilized in the past as a way to vent landfill gas. The effectiveness of this trench was negligible as methane gas was still detected at the nearby water valve location located just outside of the trench area. A clay plug was installed in the water line trench to cutoff the pathway for methane gas migration towards the building. As part of the gas collection and combustion system, the passive vents located within the trench were removed because these vents would have allowed a pathway for oxygen to enter the gas collection system. The gas collection system will, over time, divert the gas flow gradient away from the school bus facility and towards the extraction wells.

6. As noted in response #4 above, the Gas Collection, Combustion, and Electrical Generation System began operation on February 15, 2012 and the Haywood County Solid Waste Department has begun the one-year period of monthly monitoring. As noted in the Report of Landfill Gas Assessment prepared by McGill Associates and submitted to your office on November 15, 2011, the County will evaluate the effectiveness of the gas collection and combustion system after a one-year period of operation to determine if there are additional measures that may be taken to improve the system. An option that the County will consider at the end of the one-year period is whether additional extraction wells are necessary.

The Haywood County Solid Waste Department will continue to be proactive in addressing LFG migration at the Francis Farm Landfill. The cooperation of the Haywood County School System is an essential component of ensuring the safety of workers at the School's Bus Maintenance Facility.

Sincerely,



Stephen King
Solid Waste Director

Attachments: Letter to County Manager from McGill Associates
Letter to Dr. Anne Garrett from County Manager

cc: Marty Stamey, Haywood County Manager
Dr. Anne Garrett, Superintendent, Haywood County Schools
Tracy Hargrove, Haywood County Schools
Andrea Keller, NCDENR
Allen Gaither, NCDENR
Mark Cathey, McGill Associates

BOARD OF COMMISSIONERS

MARK S. SWANGER, CHAIRMAN
J. W. "KIRK" KIRKPATRICK, III, VICE CHAIRMAN
L. KEVIN ENSLEY
BILL L. UPTON
MICHAEL T. SORRELLS



COUNTY MANAGER
MARTY STAMEY

LEON M. KILLIAN, III
COUNTY ATTORNEY

March 23, 2012

Dr. Anne Garrett, Superintendent
Haywood County Schools
1230 North Main Street
Waynesville, North Carolina 28786

Re: Methane Gas Monitoring System
Haywood County Schools Bus Maintenance Facility
Francis Farm Landfill

Dear Dr. Garrett,

A recent event at the Haywood County Schools (HCS) Bus Maintenance Facility required the County Solid Waste Department to notify the North Carolina Department of Environment and Natural Resources, Division of Waste Management (DWM) of a potential exceedance of the allowable methane gas concentrations measured at the facility. On November 28, 2011, a reading of 8% methane was observed by the continuous methane gas monitor located within the Bus Maintenance Facility. The facility staff acted appropriately by venting the facility and contacting the Solid Waste Department. Follow up monitoring by the Solid Waste staff showed methane levels had reached 0% later that same day and the following morning.

The Haywood County Solid Waste Department properly notified the DWM of the event on December 1, 2011. We received a response letter from the DWM on March 13, 2012, which questioned the proper operation of the existing continuous monitoring system of the facility. Upon receipt of the letter from DWM, we asked our consultant (McGill Associates) to provide recommendations relative to the methane exceedance at the HCS Bus Maintenance Facility. Please see the attached letter from McGill Associates that describes recommendations for the HCS Bus Maintenance Facility.

The primary concern of Haywood County is the safety of the employees that utilize the Bus Maintenance Facility. Secondly, the DWM has the authority to stop use of the facility if they have reason to believe that occupying the facility is unsafe and could be detrimental to public health. The DWM has questioned whether methane monitoring within the building is being conducted correctly. Therefore, at the recommendation of our consultant, Haywood County respectfully requests that Haywood County Schools review and consider the recommendations described within the letter from McGill Associates, dated March 21, 2012.

Dr. Anne Garrett
March 23, 2012
Page 2

The Haywood County Solid Waste Department will continue to be proactive in addressing methane gas migration at the Francis Farm Landfill. The proper operation of the monitoring equipment is an essential component of ensuring the safety of workers at the HCS Bus Maintenance Facility, and that the valuable work performed at the facility is uninterrupted. Please provide my office with an Implementation Plan and schedule to address the above-described tasks associated with the HCS facilities located at the Francis Farm Landfill. Please do not hesitate to contact me if you wish to discuss this matter with County staff and/or our engineering consultant.

Sincerely,



Marty Stamey
Haywood County Manager

Attachments: Letter from DWM
Letter from McGill Associates

cc: Stephen King, Haywood County Solid Waste Director
Tracy Hargrove, Haywood County Schools
Mark Cathey, McGill Associates



COPY

North Carolina Department of Environment and Natural Resources

Division of Waste Management

Beverly Eaves Perdue
Governor

Dexter R. Matthews
Director

Dee Freeman
Secretary

March 13, 2012

Mr. Stephen King
Haywood County Solid Waste Director
215 North Main Street
Waynesville, NC 28786

Re: Response to Methane Exceedance in Bus Maintenance Facility on November 28, 2011
Haywood County Closed Landfill – Francis Farm
Permit No. 44-03
Doc ID No. 16067

Dear Mr. King:

The Solid Waste Section (Section) has received your December 1, 2011 methane exceedance letter where an indoor continuous monitoring alarm signaled elevated gas concentrations in the Bus Maintenance Facility on November 28, 2011. The Section recommends additional actions to be taken. With the bus maintenance facility being occupied on a daily basis, the Section requests a more detailed contingency plan including both immediate action and long term. The following points should be noted when compiling this new plan.

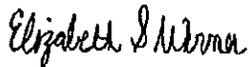
1. Determine the operational requirements of the continuous monitoring system, including calibration requirements. Calibration requirements could include annual gas checks rather than the auto-calibration and quarterly calibration by properly trained personnel in accordance with the manufacturer's instructions.
2. Examine the physical locations of the continuous monitoring system units and evaluate these locations to determine if they adequately represent the facility conditions with respect to methane intrusion.
3. How often is the ventilation system with active exhaust fan checked for proper operation?
4. What is the timetable for startup of the gas collection/combustion/electrical generation system?
5. Review the trench design and evaluate its efficiency.
6. Review the number of gas extraction wells and determine if the existing number of wells is sufficient for their intended purpose.

Additionally, the Section recommends that the County update their existing Landfill Gas Monitoring Plan. The following are potential options for the County to improve the existing plan in order to adequately protect the health and safety of the building personnel.

1. Include calibration of the school maintenance building air monitoring equipment as part of the County's Solid Waste Department activities.
2. Determine if there is a more accurate method for monitoring ambient air conditions inside the facility structures during emergency situations where the continuous monitoring system detects an exceedance.
3. Prepare a backup contingency plan that may include but not limited to opening all doors, a notification process, installation and operation of fans for positive ventilation, etc.

If you have questions or concerns, please contact me via email Elizabeth.werner@ncdenr.gov or phone at (919) 707-8253. Thank you in advance for your anticipated cooperation with this matter.

Sincerely,



Elizabeth S. Werner
Hydrogeologist
Solid Waste Section

Cc via email: Marty Stamey - Haywood County Manager
Andrew Alexander, PG - BLE, Inc.
Jeff Bishop, PE - McGill Associates
Mark Poindexter - SWS
Andrea Keller - SWS
Jason Watkins - SWS
Allen Gaither - SWS



COPY

March 21, 2012

Mr. Marty Stamey
County Manager
Haywood County
215 North Main Street
Waynesville, North Carolina 28786

RE: Haywood County Schools Maintenance
Facility, Francis Farm Landfill
Haywood County, North Carolina

Dear Mr. Stamey:

A recent event at the Haywood County Schools (HCS) Bus Maintenance Facility, which is located adjacent to the closed Francis Farm Landfill, has highlighted the need to review the policies and procedures regarding methane gas monitoring within the Bus Maintenance Facility and the appropriate response actions to take in the event that methane gas concentrations reach dangerous levels. On November 28, 2011 at approximately 5 p.m., a reading of 8% methane was observed by the continuous methane gas monitor located within the Bus Maintenance Facility. Methane gas is a component of landfill gas that is produced as a result of the decomposition of solid waste in a landfill, and is potentially explosive when the methane concentration is between 5 and 15% in air. The facility staff responded appropriately by opening the overhead doors and venting the building. The Haywood County Solid Waste Department was contacted and conducted methane gas monitoring two hours after the initial high level alarm and found that methane gas concentrations were 0%. Follow-up testing the next morning by the Solid Waste Department also showed 0% methane.

Haywood County Schools owns and operates the continuous methane gas monitoring system located in the School Bus Maintenance Facility. Continuous monitoring occurs at three points within the building. The monitoring system was installed when the building was constructed in the mid-1990's, due to the fact that the building was placed in close proximity to the closed Francis Farm Landfill. The Haywood County Solid Waste Department conducts quarterly methane gas monitoring in all on-site structures at the Francis Farm Landfill. Methane gas has never been detected in any of the structures during these monitoring events. As you know, the Haywood County Solid Waste Department is also in the process of completing the installation of the Landfill Gas Collection, Combustion, and Electrical Generation System at the Landfill. The operation of this system will help control the migration of methane gas at the site by extracting gas from the landfill under vacuum and combusting the gas.

E n g i n e e r i n g • P l a n n i n g • F i n a n c e

McGill Associates, P.A. • P.O. Box 2259, Asheville, NC 28802 • 55 Broad Street, Asheville, NC 28801

828-252-0575 • Fax: 828-252-2518

The Haywood County Solid Waste Department has been contacted by the North Carolina Department of Environment and Natural Resources (NCDENR), Solid Waste Section (SWS) regarding the November 28, 2011 response to methane exceedance. A copy of that letter is enclosed. The NCDENR has the authority to stop use of the facility if they have reason to believe that occupying the facility is unsafe and could be detrimental to public health. The SWS has questioned whether the methane monitoring system located within the building is being operated and calibrated properly. It is important for the safety of the employees and all those who use the facility that the methane gas monitors function properly and that the School Maintenance Facility Staff knows the proper procedures to take in the event that the alarm level is reached. Therefore, McGill Associates recommends that Haywood County Schools review all aspects of the methane monitoring system and response procedures for the School Bus Maintenance Facility. The following tasks are recommended, at a minimum:

1. HCS contact the manufacturer of the continuous methane gas monitoring equipment to verify that the monitoring equipment is still adequate, is operating properly, that locations of the sensors are properly located within the facility and that the sensors are properly protected. Consider adding additional monitors if recommended by the manufacturer.
2. HCS work with the monitoring equipment manufacturer to develop the correct procedures for the calibration of the equipment. A standard operating procedure for the monitoring system should be developed and implemented, including a schedule for calibration. Develop and implement a record keeping system for the calibration of the monitoring equipment.
3. HCS verify that the under-slab ventilation system at the School Bus Maintenance Facility works properly. This can be accomplished by using a smoke-testing procedure at the intake vents of this system. Once it's verified that the ventilation system works properly, regular inspection of the operating fan can be incorporated into the standard operating procedure. Verification of the proper working order of the fan should be part of the record keeping for the facility.
4. HCS develop procedures for responding to a high methane level alarm and incorporate into the standard operating procedure for the facility. Train the employees on proper response procedures to implement in the event the high level alarm is sounded, including venting the building, evacuating the building, and contacting the Haywood County Solid Waste Department.
5. HCS should also install continuous methane monitoring equipment within the other buildings located on site, just up the hill from the Bus Maintenance Facility.

Mr. Marty Stamey

March 21, 2012

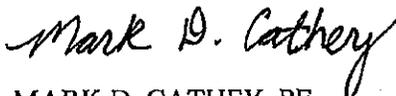
Page 3

The November 28, 2011 high methane level reading may have been a function of improperly operating or improperly calibrated monitoring equipment and therefore, it is important that HCS verify that the monitoring equipment is adequate and functioning properly. The proper operation of the monitoring equipment is an essential component of ensuring the safety of workers at the HCS Bus Maintenance Facility.

Please do not hesitate to call me if you have any questions concerning this letter.

Sincerely,

McGILL ASSOCIATES, P.A.



MARK D. CATHEY, PE

Senior Project Manager

cc: Stephen King, Haywood County Solid Waste Director
David Francis, Haywood County
Jeff Bishop, McGill Associates