



WATAUGA COUNTY

OFFICE OF THE
COUNTY MANAGER

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Carmen Johnson
Scanned by *[Signature]* Date *6/6/12* Doc ID # *100*

January 5, 2005

95-02



Mr. Matt Gamble
Environmental Compliance Solid Waste Section
NC Department of Environment and Natural Resources
1646 Mail Service Center
Raleigh, NC 27699-1646

Dear Mr. Gamble:

This letter is in response to the notice of violation received by Watauga County on December 15, 2004, regarding Explosive Gas Concentration – Watauga County closed landfill (permit # 95-02).

In cooperation with and acting as the County's agent, Blue Ridge Resource Conservation and Development Council, Inc., (BRRC&D) has been awarded a state grant to install a methane collection system that will connect the 22 methane collection wells on the closed landfill. The methane will be collected under high pressure vacuum and anticipated in the future to be used for heat and electric generation for the County's baler and recycling center. The collection system with pump and flare apparatus should be fully functional by late spring of 2005.

Regarding the letter of violation the County instructed McGee and Associates to begin work immediately to connect a vacuum blower and flare system to the three gas recovery wells closest to the southern boundary of the property. The collection system for the three wells was completed in mid-December 2004. The County has included two agreements with McGee and Associates and a letter from BRRC&D for your review. McGee and Associates should complete installation by the end of January 2005. The County's engineer is of the opinion that this modified collection system will prevent the migration of methane gas to the test well that has been registering above limits near the County's southern property boundary. It will also prevent the potential of offsite migration.

The enclosed agreements also specify a proposed testing program to monitor the test wells on a weekly basis for three months, once the blower and flare system is in place and operative. In conjunction with the test well monitoring, the adjacent property owners, who will allow (currently 4 of 5), will have their homes tested monthly.

At the end of the three month testing period a report will be forwarded to DENR outlining progress made in remediating the potential for offsite spread of the methane gas. At this time, or at anytime, gas is encountered offsite the homeowners will be approached with the offer of installation of methane monitoring systems. The County understands should gas be detected offsite that immediate more comprehensive remediation efforts will be required.

At this time, the County is of the opinion that the installation of monitoring systems in the homes of record would be counterproductive in that 1) the gas concentration test wells have basically remained consistent since 1996; 2) the effectiveness of the current technology of detectors could lead to a false positive readings and alarms in the homes; and 3) no methane has been detected in the homes by the testing programs that have been conducted by the County.

In summation, the County is proposing to install a temporary vacuum collection and flare system and to test the homes and test wells for a three month period to determine the effectiveness of the collection system. This solution should also allow for the completion of the larger more comprehensive grant funded collection system, with permanent blower station. Please respond at your earliest convenience, if more information is needed, please do not hesitate to call me at 828-265-8000. Thank you for your consideration of this remediation proposal.

Sincerely,



Robert E. Nelson, Jr.
County Manager

RENjr/ajf

Enclosures

McGee Environmental, Inc.

6734 Knollgate Drive
Charlotte, NC 28212

December 28, 2004

Mr. Rocky Nelson
County Manager
Watauga County
842 West King Street
Boone, NC 28607

Subject: Proposal – Temporary Landfill Gas Blower System Rental
Watauga County Landfill – Boone, North Carolina

Dear Mr. Nelson:

Per your request, McGee Environmental, Inc. (MEI) is pleased to present this proposal to Watauga County (County) for a temporary landfill gas (LFG) blower system rental at the Watauga County Landfill. Carlson Environmental Consultants, PC (CEC) will be the engineering sub-consultant for professional services.

WORK SCOPE

MEI will provide the necessary LFG moving equipment and associated controls to apply vacuum to the recently completed Phase 1 LFG system at the subject site. Phase 1 involved the installation of below-grade HDPE header and lateral piping, installation of a condensate trap, and the conversion of three passive solar flare vents to active extraction wells. Extraction Well 13 (EW-13), EW-14, and EW-15 were selected for Phase 1 based on their location along the southern property boundary closest to Perimeter Gas Monitoring Probes 1 and 2. CEC has recommended a monitoring protocol addressed under a separate proposal that recommends active LFG extraction in conjunction with increased monitoring frequency.

On a month-to-month basis, MEI will provide a LFG blower with the following features:

- 1.0 HP blower, Single Phase, 230 VAC, 5.7 Amp (36 A Inrush current);
- Maximum flow rate of 100 SCFM;
- Maximum inlet vacuum of 50 inches of Water Column (in-W.C.); and
- Corrosion resistant aluminum construction.

MEI will also provide the following:

- Inlet moisture separator;
- LFG particulate filter;
- Control panel with Emergency Stop (E-stop) button; and
- Orifice Plate flow device.

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Mr. Rocky Nelson
December 28, 2004
Page 2 of 4

For the duration of the rental agreement Watauga County will provide the following:

- Use of the solar flares from EW-13, EW-14, and EW-15 for combustion of LFG;
- Single Phase electrical service for electrical power needs (e.g. 230 VAC 50A);
and
- Level concrete pad for equipment installation.

Operations, monitoring, and maintenance activities consisting of the following bulleted items will be performed in conjunction with LFG monitoring services described under a separate proposal dated December 28, 2004, at no additional cost. In the event that the LFG blower rental is to extend beyond the term of the monitoring agreement, these services would be performed for a lump sum fee of \$500 (blower rental and O&M services would be billed at \$1,000 per month for both if not combined with probe or structure monitoring services). The operations, monitoring, and maintenance services include:

- Blower/flare station (BFS) monitoring and maintenance:
 - Monitor LFG composition (methane, oxygen, carbon dioxide, and balance gas percent by-volume), pressure, and temperature at the BFS inlet and flare inlet;
 - Measure and record LFG flow rate from an orifice plate flow device and GEM-500 at the BFS;
 - Perform manufacturer recommended preventative maintenance on the blower and blower motor; and
 - Verify operation of the LFG ignition system.
- Wellhead monitoring and adjustment:
 - Monitor LFG composition of the active LFG extraction wells (methane, oxygen, carbon dioxide, and balance gas percent by-volume), static pressure, and temperature;
 - Monitor LFG flow rate and/or differential pressure (Accuflo wellhead or orifice plate flow device required).
 - Adjust and balance extraction wells to meet goals of multi-use project (aggressive approach to maximize effect on subsurface migration at first evolving into 2-fold approach for migration control and energy source);
and,
 - Prepare a letter report for the County summarizing the BFS and wellhead monitoring results.

ASSUMPTIONS AND CONDITIONS

1. Unrestricted site access will be provided to MEI and its sub-consultant CEC.

Mr. Rocky Nelson
 December 28, 2004
 Page 3 of 4

- pay for (M)
2. The County will ~~provide all~~ necessary electrical service required for the Project Work Scope. The electrical service will be provided with a service disconnect.
 3. The County will provide a level ~~concrete~~ ^{SITE (M)} pad suitable for the filtration equipment, blower, flares, and interconnect piping.
 4. The County will allow MEI to modify as needed and use the existing solar flares removed from EW-13, EW-14, and EW-15.
 5. All monitoring locations to be clearly labeled and accessible.
 6. The collection and disposal of condensate will the responsibility of the County.
 7. Tasks outside of the Work Scope presented in this proposal and identified during the monthly monitoring event will be performed on a time and materials basis.
 8. The responsibility for hazardous waste, flare gas, petroleum products, or any other regulated substance, either federal or state, will at no time pass to MEI.
 9. All applicable permits (i.e., air, solid waste, etc.) will be provided by others.
 10. Field work will be performed in OSHA Level D protection and in accordance with the SWANA Landfill Gas Division Health and Safety Task Force, "A Compilation of Landfill Gas Laboratory and Field Practices and Procedures", dated March 1992.

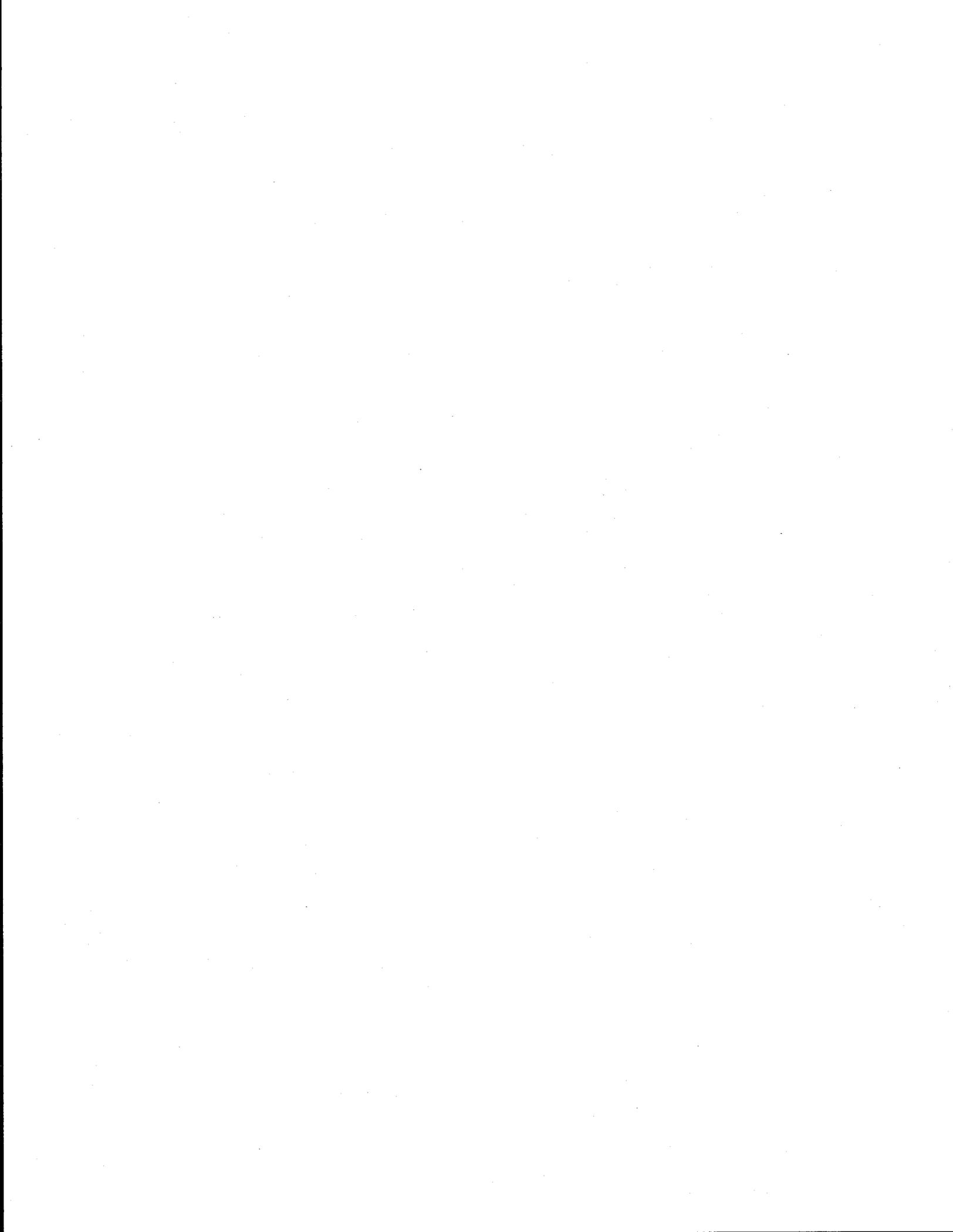
PROJECT FEE

The services detailed under the Work Scope will be provided on the following month-to-month rental basis:

- | | |
|---------------------------------------|------------------------------|
| • LFG Blower and associated equipment | \$500 per month (3 mo. Min.) |
| • LFG Blower with O&M | \$1,000 per month |

MEI will provide the operations, monitoring, and maintenance activities (O&M) as described in the Work Scope at no additional charge if the blower is rented in conjunction with probe and structure monitoring services. If probe and structure monitoring services are not required a separate mobilization would be required and would necessitate the increase in Project Fee to \$1,000 per month.

A one-time setup fee will be required to install the LFG moving equipment and flares. MEI has included costs for a 10-foot x 25-foot concrete pad built on a level site with the use of the County's backhoe at no charge (MEI can develop a Project Fee for a smaller or larger concrete pad if necessary). The setup fee will be:



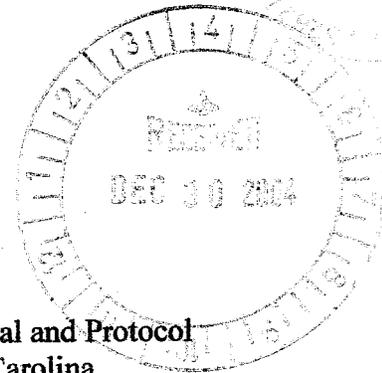
McGee Environmental, Inc.

6734 Knollgate Drive
Charlotte, NC 28212

December 28, 2004

Mr. Rocky Nelson
Public Works Director
Watauga County
842 West King Street
Boone, NC 28607

Subject: Proposal for Professional Services
Methane Gas Migration Monitoring Proposal and Protocol
Watauga County Landfill – Boone, North Carolina



Dear Mr. Nelson:

Per your request, McGee Environmental, Inc. (MEI) is presenting this proposal and monitoring protocol to Watauga County, North Carolina (County) to monitor for methane gas migration in two (2) perimeter gas probes and five (5) private residences adjacent to the Watauga County Landfill (Landfill) located in Boone, North Carolina. This proposal is based on information received from Watauga County during a meeting at the subject site on December 17, 2004.

BACKGROUND AND OBJECTIVE

The Watauga County Landfill is a closed municipal solid waste (MSW) landfill located in Watauga County adjacent to Highway 421 east of the Town of Boone. The Landfill operated as a sanitary landfill under Permit 95-01 from 1972 to 1984 and under Permit 95-02 from 1984 to 1994. A final cap was constructed on the Landfill in 1996, which included the installation of 22 landfill gas (LFG) passive vents.

According to NCDENR-approved gas management plans submitted by Draper Aden dated October 23, 1995 and July 19, 2002, the Landfill installed two (2) perimeter gas monitoring probes on the southern boundary of the Landfill in March 1996. Each of the two sample probe locations has three (3) sampling tubes in each probe at varying depths. The location of these probes was due to several homes located within 300 feet of the Landfill boundary in this area. The remainder of the Landfill facility is bounded by undeveloped land and/or is over 1,000 feet from businesses or other homes.

In accordance with Section .1626 (4)(a) – (d) of 15A NCAC 13B, the County began quarterly monitoring on the two gas probes and in all on-site facility structures in 1996. The County also monitors the five homes (as available) along the southern Landfill boundary on a semi-annual basis. The County also installed several temporary geoprobes near the new maintenance shop and transfer station buildings in July 2003. According to data provided by the County, gas monitoring in Probe 1 and in on-site structures has not

recorded methane concentrations above regulatory thresholds. Monitoring in the off-site homes has not shown any methane gas concentrations. However, gas monitoring in Probe 2 has shown consistent methane concentrations in excess of the lower explosive limit (LEL) (or 5% by volume).

MEI understands that due to the consistently high methane concentrations in Probe 2, the County has recently received a Notice of Violation (NOV) from the North Carolina Department of Environment and Natural Resources (NCDENR) that requested an updated gas monitoring plan and the installation of permanent gas monitoring in the neighboring homes.

As an immediate response to the NOV, the County requested that MEI prepare this proposal and monitoring protocol. Arguably, applying active gas extraction to a landfill is often the most effective remediative measure to reduce methane migration. Therefore, in conjunction with the Blue Ridge Resource Conservation and Development Council, Inc. (Blue Ridge), the County connected three passive gas vents along the southern boundary of the Landfill in late December 2004. The initial installation connected existing passive gas vents EW-15, EW-14, and EW-13 by buried piping to a blower and open flare (to be installed in early January 2005). Additional gas vents are planned to be connected in March 2004. The LFG collection and control system design was submitted to the NCDENR by Carlson Environmental Consultants, PC (CEC) and approved by Mr. Ed Mussler.

Active LFG collection systems will typically impact methane migration within three months; therefore, MEI recommends monitoring the two perimeter gas probes weekly for a minimum of three months. After the initial three month period, MEI will assess the data and a report will be prepared for submission to the County and NCDENR. If the methane levels in Probe 2 fall below the regulatory thresholds, MEI will recommend that the monitoring return to a quarterly basis. MEI also recommends that the five private residences on the southern boundary be monitored (with homeowner approval) on a monthly basis until the methane levels in Probe 2 fall below the regulatory thresholds.

WORK SCOPE

This work has been divided into three tasks as follows:

Task 1 – Perimeter Methane Gas Probe Monitoring

MEI will monitor the two (2) perimeter gas probes once per week at the subject site. MEI will monitor LFG composition (methane, oxygen, carbon dioxide, and balance gas percent by-volume) and static pressure in inches of water column (in-wc). MEI will use a field-calibrated CES-LandTEC GEM 500 (or equal) to perform the LFG monitoring. A dial or digital pressure gauge may be used to monitor the gas pressure in lieu of the GEM 500. MEI will log the probe measurements, atmospheric conditions, and other pertinent

data such as date, time, and personnel name(s) on monitoring forms. The test procedure will be as follows:

- Prepare the report form including the time sampling began;
- Field calibrate the LandTEC GEM 500 (or equal) using calibration gases;
- As needed, clean around the probe cap to prevent dirt and debris from entering the sample tubes;
- Unlock (as necessary) and remove the probe cap;
- Select one sample tube and note the probe number and tube depth on the report form;
- First monitor and record the static gas pressure in the sample tube using either the GEM 500 or other pressure gauge;
- After monitoring the static pressure, monitor the gas quality in the sample tube using the GEM 500. Purge ambient air from the sample tubing for at least 5 seconds per one foot of ½" or smaller diameter tubing. Allow the sampling probe to purge for 90 seconds to stabilize and record a steady state condition reading. Record the methane, carbon dioxide, oxygen, and balance gas readings. Note any significant changes (i.e., greater than 10% by volume) from any peak concentrations to a steady state condition. However, the steady state condition is typically used for official compliance readings.
- Note the time sampling ended and any unusual conditions in each probe, such as water, damage, or odors;
- Repeat this procedure for all sampling tubes and sampling probes. Ensure that the sampling equipment is purged with ambient air between readings.

Prior to leaving the site, MEI will meet with site personnel (if available) to review LFG system operations and maintenance and probe monitoring results. In the event that the work described in this proposal is performed in conjunction with LFG blower system rental (Work Scope detailed in second proposal dated December 28, 2004), MEI will perform wellfield and blower operations, monitoring, and maintenance at no additional charge while on-site. MEI will submit to the County a monthly letter report summarizing field observations, collected data, and adjustments performed during the site visits.

MEI proposes to perform Task 1 for a lump sum fee of \$500 for each weekly monitoring event.

Task 2 – Neighboring Home Monitoring

MEI recommends the County perform monthly combustible gas monitoring in the five (5) private residences on the southern property boundary of the Landfill until the methane gas concentrations in the perimeter probes reduces to below the regulatory thresholds. MEI understands the County currently performs semi-annual monitoring on these homes. MEI will utilize a portable combustible gas detector which is factory calibrated and will detect methane gas in combustible concentrations. MEI assumes that the County will notify each residence of the requested monthly access and provide MEI with contact information to schedule the inspections.

Since methane gas is heavier than air, the home monitoring will focus on lower enclosed areas such as the crawl spaces, basements, wells, etc. As available, MEI will work with the property owner to gain inside access to the homes and test suspected areas. If inside home access is unavailable, but approval is given for outside testing, MEI will monitor around the base of the home and in or around available ground penetrations, such as fence posts, swing sets, and clothes line posts. MEI will not monitor a target property without the approval of the property owner.

MEI will note any detection of combustible gases on monitoring forms and immediately notify the occupants of the homes and the County of the danger level. If methane gas concentrations in the Landfill's perimeter gas probes reduce to below regulatory thresholds during the three month initial period, the monthly home monitoring will be suspended.

MEI will perform the monthly home monitoring in conjunction with one of the weekly probe monitoring events to reduce County costs. MEI will include the results of the home monitoring in the monthly reports to the County.

MEI proposes to perform Task 2 for a lump sum amount of \$1,000 per month.

Task 3 – Monitoring Summary Report

At the conclusion of the three month monitoring period, MEI will prepare a complete report for the County to submit to the NCDENR. This report will be prepared by MEI's engineering sub-consultant, Carlson Environmental Consultants, PC, and include all the monitoring data as well as recommendations for additional monitoring and corrective measures (as needed). The report will be sealed by a North Carolina Registered Professional Engineer.

MEI proposes to perform Task 3 for a lump sum of \$1,500 (\$2,000 if additional corrective recommendations are required).

ASSUMPTIONS AND CONDITIONS

1. Unrestricted site access will be provided to MEI and its sub-consultant CEC.
2. All monitoring locations to be clearly labeled and accessible.
3. The County will contact and seek the permission of up to five residential homeowners for basement and/or crawl space monitoring. In the event that the homeowner can't be located or doesn't grant permission, MEI will monitor around the exterior of the home (w/homeowner permission and notice).
4. Names and contact number of all residential home owners will be provided to MEI.
5. The structure monitoring of up to five homes must be able to be performed in succession on the same day without any delay for access.
6. The collection and disposal of condensate will be the responsibility of Watauga County.
7. Tasks outside of the Work Scope presented in this proposal and identified during the monitoring events will be performed on a time and materials basis with prior approval by the County.
8. The responsibility for hazardous waste, flare gas, petroleum products, or any other regulated substance, either federal or state, will at no time pass to MEI or its sub-consultant CEC.
9. All applicable permits (i.e., air, solid waste, etc.) will be provided by others.
10. Field work will be performed in OSHA Level D protection and in accordance with the SWANA Landfill Gas Division Health and Safety Task Force, "A Compilation of Landfill Gas Laboratory and Field Practices and Procedures", dated March 1992.
11. This document serves as the monitoring protocol developed for the increased monitoring activities. Additional monitoring protocol documents can be developed as requested by the County for an additional fee.



Blue Ridge Resource Conservation & Development Council, Inc.

1081-2 Old US Highway 421
Sugar Grove, NC 28679
828-297-5805 Fax: 828-297-5928

Stan Steury, Exec. Director • Terry Woodruff, PBO Manager • Becky Wallace, Adm. Assistant

January 3, 2005

Mr. Larry Rose
Department of Environment and Natural Resources
Solid Waste Division
Environmental Compliance
1646 Mail Service Center
Raleigh, NC 27699-1646



Dear Mr. Rose:

It has come to our attention that Watauga County has received a "Notice of Violation" from your office in regards to the possible migration of methane from the Watauga County Landfill to the adjoining subdivision to the south. As you know, Watauga County has contracted with the Blue Ridge Resource Conservation & Development Council to install a landfill gas collection system.

Because of the methane migration issue, we have taken the following actions...

- We have consulted directly with the Watauga County Manager and County Commissioners, Watauga County Solid Waste Director and our Landfill Gas Collection Design Team to assure that our plans to install a collection system to utilize the gas also addresses the methane migration issue.
- We moved up the first phase of construction to December 2004 and January 2005 to assure that the landfill methane migration issue is addressed as soon as possible. Just before Christmas, our contractor, McGee Environmental installed gas collection lines, a condensate collection system, and well heads on the 3 gas wells along the south property line (the wells nearest the subdivision). In January, 2005 we intend to install a temporary blower/flare which will give us an active landfill gas system along this property line for the first time. This will give us a chance to monitor the impact this portion of the collection system has on the methane monitoring wells.
- We are also moving as fast as we can on installation of the rest of this collection system, which we expect to be completed in spring 2005.

We will continue to work with Watauga County on this methane migration problem as long as it takes to resolve the issue.

If you have questions, please call me at 828-297-5805 or email me at stan.steury@nc.usda.gov

Sincerely,

Stan Steury, Coordinator
Blue Ridge RC&D Council, Inc.