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March 12, 2007

Christi Zeller
LA PLATA COUNTY ENERGY COUNCIL
P. O. Box 3833
Durango, CO 81302

SUBJECT: WORK PLAN AND COST ESTIMATE FOR INTERIM PHASE, HYDROGEOLOGIC ANALYSIS AND ENHANCED MONITORING PROGRAM FOR METHANE SEEPAGE IN THE AREA OF THE FRUITLAND FORMATION OUTCROP, NORTH SAN JUAN BASIN, LA PLATA COUNTY, COLORADO

Dear Christi:

In accordance with a request from the La Plata County Energy Council Methane Mitigation Advisory Group during our recent meeting on March 8, 2006, Errol L. Montgomery & Associates, Inc. (Montgomery & Associates) has prepared the following work plan and cost estimate to serve as an Interim Phase of hydrogeologic investigations and enhanced monitoring for methane seepage mitigation in the area of the Fruitland Formation outcrop in La Plata County, Colorado. Our overall work plan outlining three Phases of investigations was provided to the Advisory Group in a document dated September 27, 2006. This Interim Phase is intended to follow our Phase I investigation, which will be complete by the end of this month, and precede a Phase II investigation which will involve drilling monitoring wells and multi-level borehole piezometers in the areas of methane seeps.

Work Plan

The work plan for the Interim Phase is summarized below:

- Task 1: Conduct field inspections and land ownership review of seep areas to verify and obtain site access to potential monitoring locations. As many as 11 potential monitoring locations will be analyzed that have been initially identified in the Phase I work. We anticipate identifying and contacting property owners and field checking each proposed monitoring location. For this Task, we will require assistance from the Advisory Group for initiating

contacts with property owners (e.g., letter writing) and for obtaining access to field areas (e.g., Florida River, Carbon Junction, and Basin Creek). Field work will be concurrent with work for Tasks 2 and 3. Task 1 includes continuing project management for reporting project status, periodic teleconferencing with the Advisory Group, and an "in-person" meeting in Durango near completion of the Interim Phase.

- Task 2: Conduct surface geophysical studies that will include ground magnetics, shallow seismic, and electrical resistivity methods. The geophysical survey will address the objectives: 1) define the subcrop surface expected to be Fruitland Formation or younger Cretaceous sedimentary rocks; and, 2) determine the lateral variation of material properties within the Quaternary alluvial soils and at the soil/subcrop interface (weathered bedrock contact). The geophysical field program is based on performing the geophysics at two or three sites, depending on site access, as part of a pilot or test program. Because no one method will satisfy both objectives, a combination of geophysical methods is required. Each method is described briefly in the accompanying Attachment 1.

- Task 3: Measure soil methane flux using portable static chamber methods. Measuring soil methane flux (mass flux) will involve using a modified LICOR 8100 flux meter and an infrared (IR) spectrometer methane sensor. The method will use standard practices developed for soil respiration in agronomy, soil degassing in volcanic terrains, and venting of biogas at landfills. The methane flux field program is based on measuring methane flux and obtaining precision GPS coordinates of each measurement location at as many seep areas identified in a 3-day field program. We anticipate conducting as many 100 measurements per day.

Estimated Costs and Schedule

Estimated costs include costs for professional hydrogeologic services and expenses, subcontractor costs for geophysical surveys, and purchase / rental costs for the closed chamber methane flux meter and precision GPS are as follows:

INTERIM PHASE TASK[1]	ESTIMATED PROFESSIONAL FEES	ESTIMATED EXPENSES	ESTIMATED SUB-CONTRACTOR COSTS	ESTIMATED EQUIPMENT COSTS	TOTAL ESTIMATED COST
1	$ 22,500	$ 2,500	—	---	$ 25,000
2	8,500	1,500	30,000[a] 20,000[b] 20,000[c]	---	80,000
3	15,000	2,500	—	27,500	45,000
TOTAL	**$ 46,000**	**$ 6,500**	**$ 70,000**	**$ 27,500**	**$ 150,000**

[1]Task 1: Verify / Obtain Access to Potential Monitoring Locations
Task 2: Conduct Geophysical Studies (Magnetics[a], Shallow Seismic[b], and Resistivity[c])
Task 3: Measure Soil Methane Flux using Portable Static Chamber Methods

Billing for this project will be on a time and materials basis. However, the total estimated cost will not be exceeded without prior authorization. After completion of each Task, a letter report summarizing results will be prepared for the Advisory Group. Depending on potential access constraints to field areas, total time estimated to complete the Interim Phase is 3 to 4 months.

If you have questions or require more information, please contact me.

Sincerely,

ERROL L. MONTGOMERY & ASSOCIATES, INC.

Daniel S. Weber, P.G.

Attachment

cc: Dave Brown, BP America
Lisa Winn, XTO Energy
Bob Hall, Chevron
Debbie Baldwin and Karen Spray, COGCC
Walt Brown, San Juan Public Land Center

SENT VIA EMAIL

ATTACHMENT 1

Proposed Geophysical Surveys

- Aerial and Ground Magnetics (hydroGEOPHYSICS, Inc., Tucson, Arizona)

  An aerial magnetic dataset for the area is analyzed in a report titled: *Report on the Interpretation of High-Resolution Aeromagnetic Data for the Durango Survey Block, La Plata County, CO, (Feb. 2002)*. The report was completed by Ron S. Bell of ENW Services – Geophysics & GIS, based out of Denver, CO. The survey was completed for J.M. Huber Corporation, also based out of Denver, CO. We understand that assets of Huber Corp. have been acquired by XTO Energy. To use the above referenced report, the report requires a release letter from XTO Energy addressed to Montgomery & Associates for reinterpretation of the data for the seep areas by the geophysical subcontractor.

  Many structural trends – albeit deep seated – appear to have been interpreted based on the aerial magnetic results. The objective of the proposed surface geophysical method using ground magnetics would be to laterally locate subsurface structures such as shallow fault and fissure structures, as well as thickness of alluvium and characterization of alluvial material.

  The existing aerial magnetic data were processed and visualized with the objective of defining deeply buried structures. The objective for this investigation would be to revisit the aerial magnetic data in order to determine if the dataset can be processed to a level that augments near-surface anomalies. Processing steps such as completing bandpass and high pass filtering and removing longer wavelength responses in order to produce derivative datasets could possibly accentuate the shorter wavelength features that would indicate shallow structures. Since the responses are likely to be subtle, a series of extracted profiles in the areas of concern would be another way of viewing and interpreting the processed data. Providing the aerial magnetic data as an overlay with existing GIS overlays (such as topography, stressed vegetation, and geologic units) while using an appropriate scale could at the minimum determine if completing a ground magnetics survey would be appropriate. We also suggest completing a lineation interpretation using the area DEM and IKONOS satellite image and use those results as an additional map product.

  The objective of a ground magnetics survey would be to laterally locate shallow and relatively small fractures, fissures, and faults beneath the alluvium. The ground-based magnetic survey would be completed if

reprocessing the aerial magnetics data shows promising results, and if it is deemed that a survey using tighter grid spacing would enhance those results. Keeping in mind that the flight-line aerial magnetic spacing was 400 meters and that the identified seep areas are many times smaller, a closely spaced grid of ground-based magnetics data within the areas of concern can be merged with the aerial mag results and thus a refined map can be produced.

The aspect of completing a ground magnetic survey has some logistical considerations. Dense pine trees along the slopes of the canyon areas would preclude them from being geophysically surveyed due to loss of signal of the time-matched GPS data. If the areas to be surveyed contain numerous fence-lines and other man-made obstructions, this will impede data acquisition speed or limit data coverage. Legal access issues might also limit coverage.

For scoping costs, we have assumed that access to two survey areas of 10 acres each and a conservative estimate to complete the field survey is estimated to take 5 days to acquire.

- Shallow Seismics (Zonge Geosciences, Denver, CO)

The seismic investigation is proposed to assess the lateral and vertical variability of unconsolidated, unsaturated to saturated, coarse-grained soils and identify the configuration/geometry of the underlying Tertiary or Cretaceous sedimentary rocks. A "P-, S- and S" seismic survey will be conducted. This consists of P-wave refraction, S-wave refraction and Surface-wave tests. This approach is used on multiple geotechnical-type investigations by geophysicists where subsurface material properties are needed for design purposes. The need to combine the methods is due to the presence of water in the soils which will dictate the P-wave velocities obtained in the soil section (i.e., the pore-fluids transmit the compressional-wave not the soil skeleton). The refraction data will be processed using surface refraction tomography software to produce 2D velocity sections, and surface wave data will be acquired (i.e., ReMi) to produce a 1D *seismic sounding*.

The proposal is to lay out a 230-foot refraction 'spread' and acquire at 11 shot points (9 internal to the spread and 2 off-end). Shooting refraction with this field set up allows for high-resolution tomographic inversion. At each site the refraction lines will consist of two continuous lines, total of about 460 feet long, or 2 parallel lines depending on site access, geometry and accessible area. A sledge hammer for the source will be used, which will yield a depth of investigation of about 50 feet. However, if either the soils are highly attenuative or if the required the depth of investigation is greater, a larger 'accelerated weight-drop source' will be required. This larger seismic source,

called an EWG-Elastic Wave Generator, requires 4x4 pickup access for mounting on the ball hitch. The current proposal does not include the EWG, as it is a contingency. If needed for the pilot test sites, we will not charge for its use; however, if the refraction results prove successful and useful to your program (using the EWG), the cost for seismic surveys will increase for the production work.

Seismic data acquired with the P-, S- and S approach provides the ability to map bedrock, map changes in the alluvial soils, and image the soil/bedrock interface.

- Electrical Resistivity Imaging (Zonge Geosciences, Denver, CO)

A direct-current, electrical resistivity imaging (ERI) survey is proposed at each site. The resistivity measurements will be conducted with a multi-electrode resistivity system (e.g., the AGI Super Sting R8, or equivalent) capable of at least 56 channels of simultaneous data acquisition in the dipole-dipole mode using a proposed electrode spacing of 20 feet (depending on surface resistivity and access). Thus, two lines will be conducted at each site, similar to the seismic tests. We anticipate the lines can be conducted back-to-back (i.e., contiguous) for a line length of 2,200 feet or two separate but parallel lines each 1,100 feet long. This field set up will provide a 2D geo-electric cross-section of the subsurface. Geo-electric sections are confined to a limited depth of penetration, due to the processing of the field data into 'pseudo-sections'. We anticipate a depth of investigation of 100 feet for the majority of the line length, and deeper if site conditions (e.g., surface contact resistance) are conducive to acquiring quality ERI data.