

## Supey, Eric

**From:** Rachelle King [RKing@chkenergy.com]  
**Sent:** Wednesday, November 18, 2009 11:54 AM  
**To:** Rooney, Eric; Supey, Eric; Ryder, John; Means, Jennifer  
**Cc:** Eddy Grey  
**Subject:** Robson #1 Well Site  
**Importance:** High

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For our discussion today regarding the Robson #1 Well.

Attached with this email are the following for your review

- Chronology of environmental activities
- ERM biological report
- Test America, Inc. (TAI) and Energy Laboratories, Inc. (ELI) analytical results for samples collected by ERM
- Benchmark Analytics, Inc. (BAI) test results for samples collected by Chesapeake personnel
- Test America, Inc. (TAI) analytical results for a composite sample of "fines" from a rock pile and soil sample collected adjacent to and down slope from a rock pile.
- Figure 1, aerial photograph/map of the well pad and surrounding area with approximate locations of soil/surface water samples

Attachment(s) available for download until 2014-11-20

Attachment: [Test America NSJ1632 FINAL 10 22 09 1702.pdf](#), 580.44 KBytes  
Attachment: [Energy Lab t09100072.pdf](#), 395.59 KBytes  
Attachment: [Test America-fines-soil NSK0451 FINAL 11 11 09 1700.pdf](#), 244.37 KBytes  
Attachment: [Figure 1 aerial Phot-Map with Sample Locations.pdf](#), 1.83 MBytes  
Attachment: [ERM Robson Report.pdf](#), 8.26 MBytes  
Attachment: [Benchmark Analyses-CHK.pdf](#), 254.27 KBytes

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As shown on the chronology of environmental activities, Chesapeake continues to investigate the nature and extent of elevated barium, chloride, and the presence of diesel range organics in soil extending to the northwest from the northernmost corner of the Chesapeake Robson #1 well pad.

### ERM Report

Chesapeake retained ERM to conduct a biological evaluation of the potentially impacted area. ERM personnel observed a corridor of trees along a fluvial pathway, which experienced leaf loss. However, ERM personnel were unable to conclude whether the leaf loss was due to stress or seasonal changes.

### ERM Samples

While on location, ERM personnel collected 2 soil samples from each of 4 locations (TP-1 through TP-4) and 1 surface water sample (SW-1). Because Chesapeake wanted unbiased observations from ERM personnel, analytical results for soil and water samples collected by ERM were directly sent to Chesapeake. Sample locations presented on the attached Figure 1 are only approximate due to inaccuracy in GPS units used for

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latitude/longitude readings and possible interference in satellite acquisition from the forest canopy.

ERM personnel collected soil samples from an upper and lower interval at each of 4 soil sample locations. The upper sample interval was from 0.0 to 0.5-foot below ground surface. The lower interval was soil from 0.5-foot above bedrock to the top of the bedrock surface. As shown on Figure 1, sample location TP-1 was a background location with sample location TP-2, TP-3, TP-4, and SW-1 approximately 35, 70, 140, and 175 feet down slope from the pad, respectively. Soil samples were submitted to TAI for barium and diesel range organics (DRO). The surface water sample (SW-1) was submitted to TAI for barium, chloride, and DRO analyses. Samples were also submitted to ELI for comprehensive salinity analyses.

As shown on TAI data sheets, elevated concentrations of barium and reported concentrations of DRO decreased with distance from the well pad. Chloride and barium concentrations in the surface water sample are assumed to be at background levels and DRO less than the laboratory reporting limit. Similarly, data presented on ELI data sheets indicate elevated concentrations of bicarbonate, calcium, chloride, and sodium along with conductivity (electrical conductivity (EC)) decreased with distance from the well pad.

#### Chesapeake Samples

Surface soil and surface water samples were also collected by Chesapeake personnel. Soil samples (samples ROB-S1 through ROB-S8, and ROB-Control) were submitted to BAI for analyses of gasoline, kerosene, fuel oil, diesel fuel, pH, barium, volatile organic compounds (VOC), semi-volatile compounds (SVOC), and chloride. Surface water samples (ROB-W1 and ROB-W2) were submitted to BAI for analyses of alkalinity, specific conductance, pH, total dissolved solids, barium, calcium, iron, magnesium, manganese, potassium, sodium, strontium, hardness, and chloride.

Barium concentrations in soil samples appear to be elevated in soil samples ROB-S1 and ROB-S3 with the highest concentration in the control sample. Chloride concentrations appear to be elevated in all but soil samples ROB-S2 and ROB-S7.

No SVOCs were detected in soil samples above the laboratory reporting limit. Only trace concentrations of VOCs ethylbenzene and xylenes were reported in one soil sample. A trace concentration of methylene chloride, a common laboratory contaminant, was detected in one soil sample. No other VOCs were reported above the laboratory detection limit. No concentrations of gasoline, kerosene, fuel oil, diesel fuel were reported in the soil samples.

Surface water analyses for sample ROB-W1 appears to have elevated specific conductance, barium, calcium, sodium, and chloride when compared to sample ROB-W2.

Chesapeake personnel collected a 5-aliquot composite sample of "fines" from a rock pile on the well pad. Additionally, a surface soil sample was collected from a location immediately down slope of the rock pile. Chloride concentrations in both samples were less than the laboratory reporting limit. The barium concentration in the "fines" sample was slightly above background concentrations and the barium concentration in the soil sample was elevated.

#### Arborist Report

Chesapeake retained the service of Mr. Russ Carlson, arborist, to provide a second evaluation of the trees in the vicinity of the well pad. Mr. Carlson's report should be completed in the near future. As with the ERM biological evaluation, Chesapeake wanted unbiased observations from Mr. Carlson, therefore, analytical results for soil and water samples were not provided to Mr. Carlson. Upon receipt by Chesapeake, the report will be forwarded to the DEP.

#### Current Activities

Chesapeake personnel collected a composite sample of rock from the rock pile on the well pad. The composite rock sample was submitted to a physical testing laboratory to be pulverized. The pulverized sample will be submitted to TAI for analyses of chloride and barium. Upon receipt by Chesapeake, the analytical data will be forward to the DEP.

#### Forward Plan

Chesapeake is proposing an electromagnetic (EM) terrain conductivity survey for the horizontal and vertical delineation of impact on the well pad and to the northwest of the pad. Preliminary data indicate that barium, chloride, and diesel range organics have a similar migration pathway from the well pad. Therefore, chloride impact with a resulting increase in electrical conductivity (EC) likely can be mapped with the use of a Geonics EM-