TA 54 LANL MDA H

Cobrain, Dave, NMENV

From: John Hopkins [johnhopkins@lanl.gov]

Sent: Tuesday, February 07, 2006 11:22 AM

To: Cobrain, Dave, NMENV

Cc: 'Ken Kisiel'; Kieling, John, NMENV; chamberlain, kathryn, NMENV; Lynnes, Kate, NMENV; Dhawan, Neelam, NMENV; Bearzi, James, NMENV; 'Bosiljevac, Frank D.'; etl@lanl.gov; 'Dave McInroy'; 'Gregory, David R.'; 'Gabriela Lopez Escobedo'; 'Joe English'

Subject: RE: MDA H borings and subsurface air sampling

Dave
Responses to questions in your e-mail on pore-gas sampling at MDA H are attached.

Your comments suggest that NMED may want LANL to sample the Cerro Toledo beneath MDA H. We have not sampled the Cerro Toledo interval only with the dual packer system because there is insufficient depth in the borehole to sample this interval with a dual packer system. If NMED would like LANL to sample the Cerro Toledo, we would like to discuss the technical issues with you. Sampling the Cerro Toledo with a single packer may be an option for borehole 54-1023, however, due to the irregularities and instability of the Cerro Toledo encountered beneath MDA H we may not be able to ensure air sampled to be solely from the Cerro Toledo. Even if the Cerro Toledo has a higher air permeability than the tuff above it, VOC concentrations should not be very different unless the Cerro Toledo is ventilated to the atmosphere through the canyons and would then be much less.

Please advise if you would like to meet to discuss these issues.

John Hopkins, Ph. D.
Los Alamos National Laboratory
Environmental Characterization and Remediation
505-667-9551 (office)
505-699-1116 (cell)

From: Cobrain, Dave, NMENV [mailto:dave.cobrain@state.nm.us]
Sent: Friday, January 27, 2006 2:59 PM
To: johnhopkins@lanl.gov; kkisiel@seabase.com; Gregory, David R.; Gabriela Lopez Escobedo
Cc: Ken Kisiel; Kieling, John, NMENV; chamberlain, kathryn, NMENV; Lynnes, Kate, NMENV; Dhawan, Neelam, NMENV; Bearzi, James, NMENV
Subject: MDA H borings and subsurface air sampling


11909

John,

I've reviewed a couple of documents related to the borings at MDA H.

NMED's letter to DOE/UC dated December 3, 2001 acknowledges the presence of slough in the boreholes Boring 54-1023 was [rilled to 260 ft bgs, boring 54-15462 was drilled to 300 ft bgs and boring 54-15461 was drilled to 100 bgs. Based on the drilling logs, the Cerro Toledo interval extends from approximately 255 to 265 ft bgs. The letter requested removal of the slough and collection of air samples at 50 and 100 ft depths bgs in each borehole and at depths of 260 ft bgs in borings 54-1023 and 54-15462 (from the Cerro Toledo Interval).

LANL's letter dated January 29, 2002 indicated that the total depths of the borings were 258 ft bgs in 54-1023, 257 ft bgs in 54-15462 and 99 ft in 54-15461. Table 1 in the letter listed measurements of methane, CO2 and oxygen and air sample collection at depths of 250 ft in borings 54-1023 and 54-15462. Is that what you're citing as reporting that the Cerro Toledo interval was not sampled? If so, the letter doesn't specifically point that out; however, the interval sampled appears to be above the top of the Cerro Toledo. Why were the samples collected at 250 feet instead of from the intervals requested in NMED's letter to DOE/UC dated December 3, 2001?

The December 2005 Periodic Monitoring Report indicates that the boring depths were measured during the 2nd, 3rd and 4th quarter sampling events and that the total depths of 54-1023 and 54-15462 were 261 and 254 ft bgs, respectively, in the 2nd quarter and 255.5 and 260 ft bgs, respectively (possibly a typo that reversed the depths?), in the fourth quarter. Those depths are within the estimated interval of the Cerro Toledo, based on the drilling logs except for the 254 ft depth.

In our meeting on January 25, 2006, Ken Kisiel indicated that the slough in the MDA H deep borings prevented sampling of the Cerro Toledo. I'm not sure that matches with all of the information provided in the documents listed above and there also appears to be discrepancies regarding the depths of 54-1023 and 54-15462 between LANL's letter dated January 29, 2002 and the December 2005 Periodic Monitoring Report (at least one of them appears to get deeper between 2002, the 2nd quarter of 2005 and the 4th quarter of 2005).

Some clarification would be helpful.

1) Please clarify whether borings 54-1023 and 54-15462 are open to the Cerro Toledo.

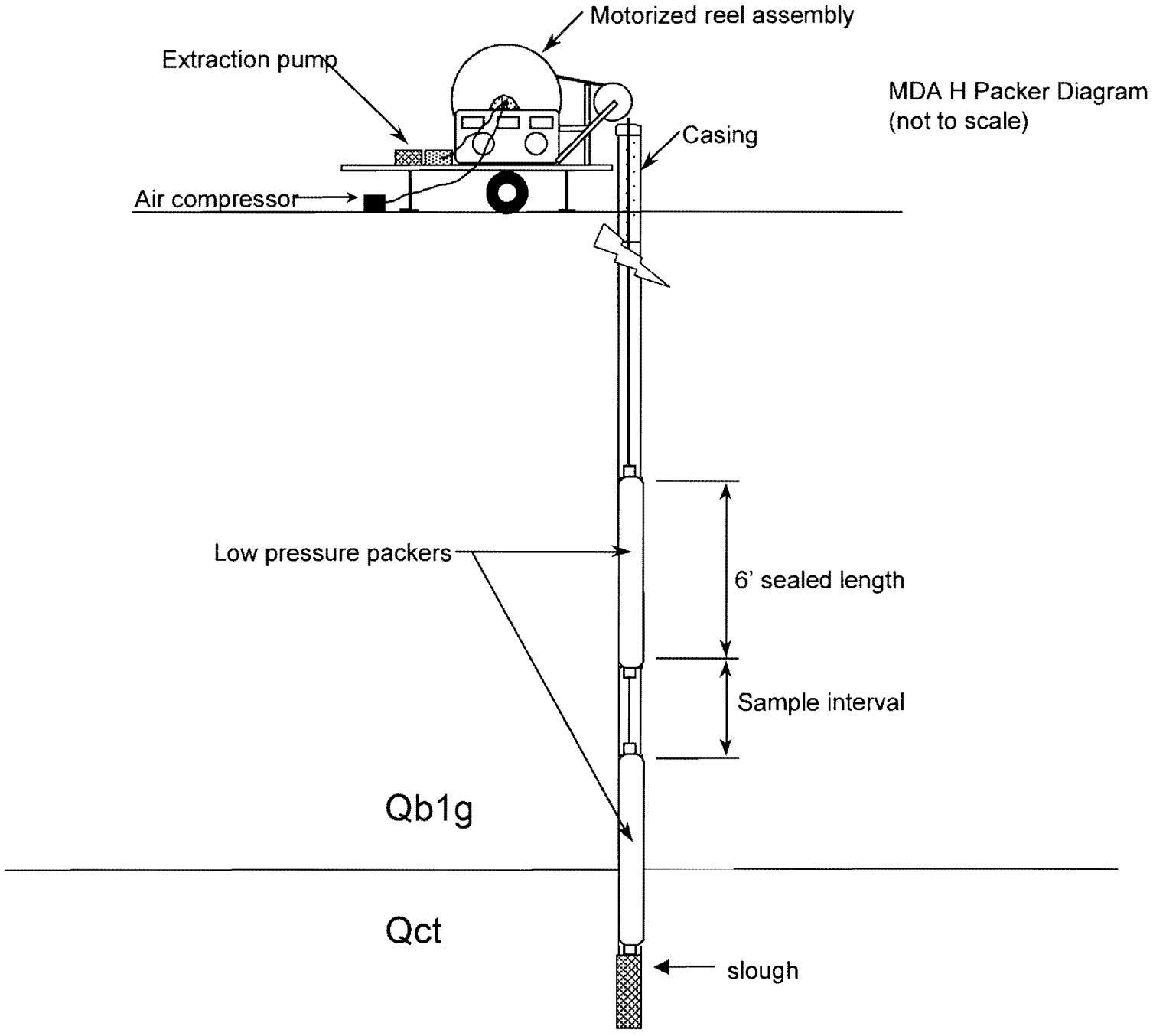
2) Please clarify whether air samples have been obtained from the Cerro Toledo interval.

3) If the Cerro Toledo Interval is not accessible in borings 54-1023 and 54-15462, please identify the depth(s) above the Cerro Toledo that have been sampled in each boring during all of the previous periodic monitoring events.

NMED will need these clarifications to help with CMS remedy selection. Thanks.

Dave

As of June 25, 2005 my email address is dave.cobrain@state.nm.us


Motorized reel assembly
Extraction pump
MDA H Packer Diagram
(not to scale)
Casing
Air compressor
Low pressure packers
6' sealed length
Sample interval
Qb1g
Qct
slough

NMED Comment 1

NMED's letter to DOE/UC dated December 3, 2001 acknowledges the presence of slough in the boreholes. Boring 54-1023 was drilled to 260 ft bgs, boring 54-15462 was drilled to 300 ft bgs and boring 54-15461 was drilled to 100 bgs. Based on the drilling logs, the Cerro Toledo interval extends from approximately 255 to 265 ft bgs. The letter requested removal of the slough and collection of air samples at 50 and 100 ft depths bgs in each borehole and at depths of 260 ft bgs in borings 54-1023 and 54-15462 (from the Cerro Toledo Interval).

LANL Response

LANL agrees that core from boreholes 54-1023 and 54-15462 indicate that the Cerro Toledo interval extends from approximately 255 to 265 ft bgs beneath MDA H. The 255 ft to 265 ft bgs approximation is derived from five foot core runs without full recovery across the Cerro Toledo interval. Missing from the recovered core was the Tsankawi Pumice Bed, a thin bed (<3 ft) of gravel-sized pumice which was an anticipated strata atop the Cerro Toledo interval. Per NMED's request, LANL attempted to remove slough from the boreholes at MDA H using an air-rotary drill-rig to blow air downhole and vacuum cuttings at the surface through a dust suppression system. The LANL letter to NMED dated January 29, 2002 provides the depths of the boreholes after removal of slough by air lift, listed on page one. The depth for borehole 54-15461 is 99 ft, borehole 54-15462 is 257 ft and borehole 54-1023 is 258 ft. Page 2 states that "Borehole 54-15462.....remains blocked below 257 ft because of the instability of the geological formation." Air samples were collected at depths of 50 and 100 ft in each borehole and at depths ranging from 247 ft to 256 ft in borehole 54-15462.

NMED Comment 2

LANL's letter dated January 29, 2002 indicated that the total depths of the borings were 258 ft bgs in 54-1023, 257 ft bgs in 54-15462 and 99 ft in 54-15461. Table 1 in the letter listed measurements of methane, CO2 and oxygen and air sample collection at depths of 250 ft in borings 54-1023 and 54-15462. Is that what you're citing as reporting that the Cerro Toledo interval was not sampled? If so, the letter doesn't specifically point that out; however, the interval sampled appears to be above the top of the Cerro Toledo. Why were the samples collected at 250 feet instead of from the intervals requested in NMED's letter to DOE/UC dated December 3, 2001?

LANL Response

LANL can not confirm that vapor from the Cerro Toledo interval has been sampled but vapor samples have been collected at or just above this stratum. It was not possible to collect vapor samples from the Cerro Toledo only. Samples were collected using a straddle packer system to ensure a discrete interval was sampled. The six foot long bottom packer, sitting on the bottom of the borehole, resulted in the sample being collected above the Cerro Toledo interval at approximately 250 ft bgs (see attached figure).

NMED Comment 3

The December 2005 Periodic Monitoring Report indicates that the boring depths were measured during the 2nd, 3rd and 4th quarter sampling events and that the total depths of 54-1023 and 54-15462 were 261 and 254 ft bgs, respectively, in the 2nd quarter and 255.5 and 260 ft bgs, respectively (possibly a typo that reversed the depths?) in the fourth quarter. Those depths are within the estimated interval of the Cerro Toledo, based on the drilling logs except for the 254 ft depth

LANL Response

You are correct. This typo was reported in the LA-UR-05-8861 quarterly report. Irregularities at the bottom of boreholes 54-1023 and 54-15462, have resulted in slight differences between sample intervals from quarter to quarter. The irregularities in borehole diameter from below 255 ft bgs in boreholes 54-1023 and 54-15462 has resulted in different depths of deployment and measurements of depth because downhole equipment is easily caught on the sides of the boreholes. Additionally, the measurement of depth is subjective and made by the operator sensing a loss of tension on the cable at the surface when the lower packer contacts the bottom of the borehole. Since the same straddle packer system has been used for each event, samples depths are comparable.

Even though the bottom of the borehole is in the Cerro Toledo, it is not possible to collect a pore gas sample exclusively from this interval because the length of the bottom packer is greater than the length of the borehole interval in the Cerro Toledo.

NMED Comment 4

In our meeting on January 25, 2006, Ken Kisiel indicated that the slough in the MDA H deep borings prevented sampling of the Cerro Toledo. I'm not sure that matches with all of the information provided in the documents listed above and there also appears to be discrepancies regarding the depths of 54-1023 and 54-15462 between LANL's letter dated January 29, 2002 and the December 2005 Periodic Monitoring Report (at least one of them appears to get deeper between 2002, the 2nd quarter of 2005 and the 4th quarter of 2005).

LANL Response

The measurement of depth in the 2nd quarter of 2005 and the 4th quarter of 2005 was made using a geophysical tool and plumb line, respectively. The smaller diameter and mass used for these measurements should not be as impacted by borehole irregularity as the straddle packer and likely represents the true depth of the open borehole. Reported sample depths for other events were based on deployment of the straddle packer system. The same straddle packer system has been deployed each quarter and therefore sample depths are comparable; however, due to borehole irregularity, subjective measurement and use of different methods sample depths recorded in the field have varied.

NMED Comment 5

Some clarification would be helpful.

1) Please clarify whether borings 54-1023 and 54-15462 are open to the Cerro Toledo.

LANL Response
54-1023 is open at the top of the Cerro Toledo, and 54-15462 is not.

NMED Comment

2) Please clarify whether air samples have been obtained from the Cerro Toledo interval.

LANL Response
Air samples have been obtained from the Cerro Toledo, Tsankawi Pumice Bed, and/or Tshirege Member just above. Uncertainty of the exact stratigraphy where vapor has been sampled is due to limited core recovery in the unconsolidated units and borehole irregularities at these depths. However, these samples are comparable between quarters since the same straddle packer system has been used. Tritium and VOC concentrations have been consistent through time in samples collected from or just above the Cerro Toledo interval.

NMED Comment

3) If the Cerro Toledo Interval is not accessible in borings 54-1023 and 54-15462, please identify the depth(s) above the Cerro Toledo that have been sampled in each boring during all of the previous periodic monitoring events.

LANL Response

Borehole 54-1023 has been sampled from 247 thru 254 ft bgs and borehole 54-15462 has been sampled from 254 thru 256 ft bgs. These intervals are approximately at or just above the top of the Cerro Toledo interval.