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Date: October 17, 2006
Refer to: EP2006-0913

Mr. James Bearzi
NMED – Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

SUBJECT: SUBMITTAL OF THE RESPONSE TO THE NOTICE OF DISAPPROVAL FOR THE INVESTIGATION REPORT FOR THE TA-16-340 COMPLEX [CONSOLIDATED UNITS 13-003(a)-99 AND 16-003(n)-99 AND SOLID WASTE MANAGEMENT UNITS 16-003(o), 16-026(j2), AND 16-029(f)]

Dear Mr. Bearzi:

Enclosed please find two hard copies with electronic files of the "Response to the Notice of Disapproval for the Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)]."

If you have any questions, please contact John McCann at (505) 665-1091 (jmccann@lanl.gov) or Tony Trujillo at (505) 845-5987 (ltrujillo@doeal.gov).

Sincerely,

Andrew Phelps, Associate Director
Environmental Programs
Los Alamos National Laboratory

Sincerely,

David Gregory, Federal Project Director
Department of Energy
Los Alamos Site Office

AP/DG/DH/ew

Enclosure: 1) Two hard copies with electronic files of the "Response to the Notice of Disapproval for the Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99 and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)]"

Cy:(w/ enc)
D. Hickmott, EP-CAP, MS M992 (with CD)
T. Trujillo, DOE AL, MS A316 (with CD)
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IRM-RMMSO, MS A150

Response to the
Notice of Disapproval for the Investigation Report for the TA-16-340 Complex
[Consolidated Units 13-003(a)-99 and 16-003(n)-99 and
Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)]
Los Alamos National Laboratory, NM0890010515 HWB-LANL-06-005,
Dated September 14, 2006

INTRODUCTION

This submittal is the response by Los Alamos National Laboratory (LANL or the Laboratory) to the notice of disapproval regarding the "Investigation Report for the TA-16-340 Complex [Consolidated Units 13-003(a)-99 and 16-003(n)-99, and Solid Waste Management Units 16-003(o), 16-026(j2), and 16-029(f)]," issued by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on September 14, 2006. LANL submitted the investigation report (IR), referenced as LA-UR-06-0153/ ER2005-0678, to NMED in January 2006.

To facilitate review of this response, NMED comments are included verbatim. The comments are divided into general and specific categories, as presented in the notice of disapproval. LANL responses follow each NMED comment. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with U.S. Department of Energy policy.

GENERAL COMMENTS

NMED Comment

1. The Permittees depict "Not detected" and "Not analyzed" with the same symbol on their data tables. Even though this information is presented elsewhere in the Report, different symbols should be used for these designations when depicted on tables in the future.

LANL Response

1. Comment noted. LANL will attempt to use different symbols in tables in the future, although currently using distinct symbols is not possible automatically with the data-pull software being used.

NMED Comment

2. The Permittees have indicated that the ecological risk assessment will be revised following the additional investigation and removal activities for [Solid Waste Management Unit] *SWMU 16-003(o). The Permittees must also revise the human health risk assessment for SWMU 16-003(o) once the additional investigation and remediation activities are completed.*

LANL Response

2. LANL will revise both the human health risk assessment and the ecological risk assessment upon completion of the additional investigation activities.

SPECIFIC COMMENTS

NMED Comment

1. *Section 5.0 Removal of Human-made Fixtures, Structures, and Soil, pg. 21:*

   The Permittees report that "[a]s part of the D&D operations, six sumps and approximately 300 ft of interconnecting drainline were removed at former Building 16-340." According to Section 5.3 of the Report, the interconnecting drainlines between the sumps consisted of several 3-foot segments and appeared to be in good condition following excavation. However, sampling in the area of the sumps indicates that there were leaks in the sumps and/or the sump/drainline connections. The Permittees did not collect samples beneath the interconnecting drainlines as part of this investigation and must, therefore, investigate beneath the drainlines, specifically in the locations where the drainline segments were connected. The Permittees must drill a borehole between each of the sump areas and collect samples from the native material directly beneath the former drainline segment locations. The Permittees must determine the extent of any contamination detected based on laboratory analyses.

LANL Response

1. All samples from the vicinity of the building 16-340 sumps and associated drainlines were collected in accordance with the NMED-approved investigation work plan. LANL did not propose any additional sample locations at the interconnecting drainlines because there was no evidence of drainline leakage during the interim removal action. However, per a discussion with NMED personnel on September 14, 2006, LANL will sample two points in the approximate location of the former drainlines that extended between the building 16-340 sumps (see Figure 1) to determine if contaminants were released from the interconnecting drainlines between the sumps. These data will help determine the extent of contamination in the drainline areas.

NMED Comment

2. *Section 7.1.2 Confirmation and Investigation Sampling, pg. 28:*

   According to Figure 11a of the approved work plan, the Permittees proposed to collect soil samples at locations along the path between sumps 108/109 and the former fishladder structure. Instead, the Report indicates that samples were collected in the area of the drainline. The Permittees did not definitively determine the location of the drainline in the work plan, and so the Permittees must discuss this deviation from the work plan. The Permittees must also discuss the condition of the removed drainline (between Manhole MH 811 and the former fishladder structure) and provide rationale for collecting all of the samples underneath the drainline in one concentrated area.

LANL Response

2. The building 16-340 drainline, as shown in Figure 11a of the approved work plan, was originally believed to extend in a straight line between sump 108/109 and Environmental Protection Agency (EPA) Outfall 05A054 (near the top of the former fishladder). Findings from the interim removal action show that the building 16-340 drainline (as shown in Plate 1 of the investigation report) actually ran eastward, connected with manhole/structure 16-811, and ultimately extended northward to the outfall.

The vitrified clay pipe (VCP) drainline that was removed between manhole/structure 16-811 and the former fishladder structure was visually inspected for integrity and was in good condition, showing no signs of leakage. As a result of field screening (specifically, a spot test that was positive for high explosives [HE] from soil samples collected beneath the drainline coupling, approximately 6 ft west of manhole/structure 16-811), approximately 11 yd^3 of contaminated soil and tuff was removed from an excavated area measuring 6 ft long × 6 ft wide × 8 ft deep, directly beneath the drainline sections that contained residual HE product (see Photograph/Figure 5.3-4 of the investigation report).

After the pipeline was removed, screening samples were collected at 20-ft intervals along the pipeline excavation, as stated in section 7.1.1 of the investigation report, and the samples were screened using field methods described in section 7.2 of the investigation report. Selection of the locations for drainline verification samples (16-23636, 16-23637, 16-23638, and 16-23639) was based on the conditions observed during removal actions and on the field-screening results (particularly positive results for HE), in accordance with the NMED-approved work plan.

NMED Comment

3. Section 7.10 Subsurface Pore-gas Sampling, pg. 38:

In accordance with the work plan, the Permittees collected samples from each of the intermediate boreholes at the total depth of the boreholes (200 feet) during the first round of pore-gas sampling. However, this interval was not sampled during the second round of sampling. The Permittees must provide a discussion to address this deviation from the work plan.

LANL Response

3. A second round of pore-gas samples could not be collected at the total depth of both intermediate boreholes because the borehole walls collapsed in the less competent strata of the Bandelier Tuff and overlying alluvium. The collapsing occurred after the first sampling round, which was conducted during drilling and advancement of the boreholes to approximately 200 ft.

   As described in section 4.7 of the investigation report, an initial round of subsurface pore-gas samples was collected from Borehole (BH) 16-23691 using a single-packer pore-gas extraction method during drilling activities between October and November 2004. After the stabilization of pore-gas conditions, which may be affected by drilling, a second round of pore-gas sampling was conducted in April 2005 using dual-packer and single-packer vapor extraction methods.

   An initial round of subsurface pore-gas samples was collected from BH 16-23692 using a single-packer vapor extraction method during drilling activities in November 2004. A second round of pore-gas sampling at this borehole did not occur in April 2005 because the borehole had collapsed and bridged at approximately 5–15 ft below ground surface (bgs). The borehole was redrilled in November 2005, and a second round of pore-gas sampling was conducted in December 2005 using a dual-packer vapor extraction method.

NMED Comment

4. Section 7.12 Subsurface Pore-gas Laboratory Analytical Results, pg. 39:

The Permittees state that the "concentrations tended to increase with depth and increased from the first round to the second round." The Permittees must graphically present this information (and any

subsequent sampling data) to clearly show any trends for each borehole because the contamination trends with depth and time are not clear from the data presentation.

LANL Response

4. LANL has prepared graphs (Figures 2a and 2b) for the first and second pore-gas sampling events at each intermediate-depth borehole (BH 16-23691 and BH 16-23692) to illustrate the contamination trends, with depth, of selected volatile organic compounds (VOCs) (acetone, butanone[2], and toluene). Similar graphs will be generated for subsequent sampling data and will be provided in the Phase II report.

NMED Comment

5. Section 9.1 Additional Data Requirements, SWMU 16-003(o), pg. 44: "The first proposed borehole (Location 16-23591) corresponds to a tuff sample collected at approximately 4.5 ft bgs where benzo(a)pyrene was detected at a concentration that exceeded the industrial SSL."

The reported detections of benzo(a)pyrene do not exceed the industrial SSL in any of the sump samples. The Permittees must clarify this statement.

Also, Plate 7 depicts metals contamination remaining above background concentrations at SWMU 16-003(o) for various metals. In addition to the data requirements identified, the Permittees must determine the vertical extent of contamination for TAL metals at the following sump locations: 16-23607, 16-23611, and 16-23613.

LANL Response

5. Benzo(a)pyrene was detected at location 16-23591 in a field-duplicate sample. Field-duplicate results are used for quality-control purposes only; however, because the reported concentration of benzo(a)pyrene in the field-duplicate sample exceeded the industrial soil screening level (SSL), LANL proposes drilling a 15-ft borehole at this location.

Per a discussion with NMED on September 14, 2006, additional sampling at locations 16-23607, 16-23611, and 16-23613 was deemed unnecessary because (1) the concentrations of target analyte list (TAL) metals at these sump locations were slightly above 2 times the background levels; and (2) a new intermediate-depth borehole (requested in NMED comment 13), as well as the two new 15-ft boreholes (requested in NMED comment 1), would effectively define the nature and extent of metals contamination in this area.

NMED Comment

6. Section 9.4 Procedures and Reporting, pg. 46:

The Permittees propose to submit an addendum to this Report within 90 days after receipt of the data. Instead, the Permittees must submit a separate investigation report titled Phase II Investigation Report for the TA-16-340 Complex within 90 days of receipt of the data.

LANL Response

6. Per a discussion with NMED on September 14, 2006, LANL will prepare a Phase II investigation report; however, the content of this document will be abbreviated (for example, sections 1, 2, and 6 of the original investigation report would not be part of the Phase II report). A streamlined report outline will be submitted to NMED for approval.

NMED Comment

7. Section B-5.1 Inorganic Chemicals in Soil and Tuff, pg. B-6:

While studies have indicated that calcium, sodium, and potassium are relatively non-toxic, other studies have shown there to be an upper intake limit for iron. The United States Department of Agriculture Food Safety and Inspection Service and the National Academy of Science Food and Nutrition Board have developed upper intake levels (ULs), which should be applied in determining a soil screening level (SSL) that, in turn, should be used in assessing essential nutrients toxicity. If site concentrations of iron are below this SSL, then the concentrations may be eliminated from further consideration in the risk assessment. The Permittees shall revise the report accordingly.

LANL Response

7. Iron was initially omitted from the risk screening assessments. NMED guidance (NMED 2006, 92513) includes SSLs for iron. As required by the Compliance Order on Consent (hereafter, the Consent Order), iron is evaluated by comparing with NMED SSLs using the reference dose for iron from the National Center for Environmental Assessment. The maximum detected iron concentration at the 340 Complex is 25,400 mg/kg, and the corresponding NMED SSL for an industrial receptor is 100,000 mg/kg. Therefore, the maximum iron concentration is substantially less than the iron SSL, and no revision to the current risk assessment is necessary. However, iron will be evaluated as a chemical of potential concern (COPC) once the additional investigation and remediation activities have been completed (if iron exceeds background value), and it will be included in the Phase II report, if appropriate.

NMED Comment

8. Section B-5.3 Radionuclides in Soil, pg. B-8:

The Permittees report that one soil sample was inadvertently analyzed for isotopic uranium and that uranium-234, -235, and -238 were detected at levels greater than their respective background values. The Permittees state in Appendix B to the approved Work Plan that radionuclides are only potential contaminants at SWMU 13-003(a)-99. However, the 1990 SWMU Report for TA-16 reports that "radioactive wastes are also present in some of the sumps." The Permittees should analyze for isotopic uranium during all subsequent sampling at the SWMUs included in this Report.

LANL Response

8. Comment noted. Inasmuch as uranium is a possible contaminant as this site, LANL will analyze samples for isotopic uranium during the next sampling events at Consolidated Units 13-003(a)-99 and 16-003(n)-99 and at SWMUs 16-003(o), 16-026(j2), and 16-029(f).

NMED Comment

9. Section B-8.3-1 Inorganic Chemicals, pgs. B-22 and B-26:

The Permittees claim that the vertical extent of cobalt is defined within Fishladder Canyon by the two intermediate-depth boreholes (Locations 16-23691 and 16-23692). The cobalt detection at locations 16-23693 and 16-23749 (two sample locations most downgradient from the fishladder) are above background levels in tuff (84.6 ppm and 89.9 ppm, respectively). These elevated detections are approximately 1,200 feet downgradient from location 16-23692. It is not appropriate to use data collected from 1,200 feet away to determine vertical extent. The Permittees must determine vertical extent of cobalt at locations 16-23693 and 16-23749.

The Permittees also claim that vertical extent of silver is defined at SWMU 16-003(o). Silver was detected in a tuff sample collected at 2.8-3.5 feet below ground surface at location 16-23693. The concentration detected was greater than four times the background level. Because this is the deepest sample that was collected in this part of the SWMU and location 16-23692 is too far away (approximately 1,200 feet) to be used to determine vertical extent, the Permittees must collect additional samples to determine vertical extent for silver at this location.

LANL Response

9. Per a discussion with NMED on September 14, 2006, LANL will drill more deeply at location 16-23693 to determine the nature and extent of metals contamination (specifically, cobalt and silver), assuming drilling equipment can access this difficult location (see Figure 1). These data will also help to determine whether the cobalt contamination is the result of spalling from the auger used in the previous investigation.

NMED Comment

10. Section B-8.3-2 Organic Chemicals, Former Building 340 Drainline Area, pg. B-28, first paragraph:

The Permittees state that several organic compounds were detected in fill and/or tuff at several locations along the former Building 340 drainline. The Permittees also state that the vertical extent of these contaminants has been defined with the deepest interval in borehole 16-23691. The closest sampling location to borehole 16-23691 along the drainline is approximately 360 feet upgradient. It is not appropriate to use data collected from this borehole to determine vertical extent along the drainline. The Permittees must collect additional samples along the drainline to determine extent for these contaminants.

At sampling locations along the drainline from former 16-340 building, the concentrations of several constituents increase with depth. The Permittees must determine extent of these contaminants at the following locations.

- *16-24894: acenaphthene, anthracene, benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h.i)perylene, chrysene, dibenzofuran, fluoranthene.*
- *16-24896: acenaphthene, anthracene, benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h.i)perylene, chrysene, fluoranthene.*

- *16-24899: benzo(a) anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h.i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene.*
- *16-24891: benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene.*

LANL Response

10. Per a discussion with NMED on September 14, 2006, LANL will drill an intermediate-depth borehole in the vicinity of these locations as requested by NMED comment 13 to effectively determine the extent of polycyclic aromatic hydrocarbons (PAHs) in this area. Consequently, the additional sampling requested is addressed by this additional intermediate-depth borehole (see Figure 1).

NMED Comment

11. Section B-8.3-2 Organic Chemicals, Former Fishladder Structure, pg. B-28, first paragraph:

The Permittees state that several organic compounds were detected in soil and/or tuff along the upper half of the former fishladder structure. The Permittees also state that the vertical extent of these contaminants has been defined in boreholes 16-23691 and 16-23692. It is not appropriate to use these boreholes to determine vertical extent of contamination in the fishladder area because they are located approximately 70 and 250 feet downgradient, respectively. The Permittees must collect additional samples in the former fishladder structure area to determine extent for these contaminants.

LANL Response

11. During a September 14, 2006, discussion with NMED, LANL noted that the locations of the highest detected concentrations of organic chemicals in soil and/or tuff along the upper half of the former fishladder structure were going to be removed as part of the proposed Phase II excavation activities. The proposed verification sampling (11 confirmation samples collected from excavation floors and 21 surface and shallow subsurface samples bounding the excavation areas) will augment existing data and determine extent in the vicinity of the upper half of the fishladder structure. NMED agreed that no additional/new sampling will then be needed.

NMED Comment

12. Section B-8.3-2 Organic Chemicals, Former Fishladder Structure Area (Lower Half) and Downgradient, pgs. B-29-B-30:

The Permittees state that several organic compounds were detected in samples collected along the lower half of and downgradient from the former fishladder. The Permittees also state that the vertical extent of these contaminants has been defined with the deepest interval in borehole 16-23692. While it may not be appropriate to use this borehole to determine vertical extent for some of these sample locations (specifically, 16-23569, 16-23655, 16-23657, 16-23693, 16-23749, and 16-23751), the values detected are low and additional sampling is not warranted.

LANL Response

12. LANL acknowledges the comment.

NMED Comment

13. Section B-8.3-2 Organic Chemicals, pgs. B-30-B-31:

The Permittees state that the detected concentrations of VOCs in pore gas at SWMU 16-003(o) were at low levels and that further sampling for extent is not warranted. Also, the Permittees state that the "concentrations tended to increase with depth and increased from the first round to the second round" in section 7.12 of the Report. The Permittees have proposed an approach and method for evaluation of pore gas data (ER2006-0582/LA-UR-06-4107, June 15, 2006). The Permittees must calculate the concentration for each contaminant detected beyond which the pore gas concentrations must not exceed. The concentrations must be conservatively calculated to prevent partitioning into groundwater that could theoretically result in concentrations above the tap water soil screening level (as outlined in the Technical Background Document for Development of Soil Screening Levels, Revision 4.0, NMED 2006).

During the second round of pore gas sampling in borehole 16-23691, the 175-176 foot interval contained higher concentrations of acetone (285 µg/m^3), 2-butanone (76.6 µg/m^3), and toluene (339 µg/m^3) compared to the first round. The Permittees must perform an additional round of sampling to determine if the concentrations are increasing with time. NMED may require additional boreholes depending on the results of monitoring data.

Because of the lateral extent of contamination and the increasing contaminant concentrations with depth along the former drainline from building 340, the Permittees must also determine if there are VOCs in pore gas in this area. Specifically, a deep boring (total depth to be determined based on field screening) must be located near sampling locations 16-24894, 16-26896, 16-24899, and 16-24891. The Permittees must follow the pore-gas sampling procedures as described in the approved work plan.

LANL Response

13. Per a discussion with NMED on September 14, 2006, LANL will drill an intermediate-depth borehole in the vicinity of sampling locations 16-24894, 16-26896, 16-24899, and 16-24891 to determine the extent of contamination in this area. During the September 14, 2006, meeting with NMED, LANL noted that the VOC concentrations in BH 16-23691 were very low relative to (anticipated) calculated levels of concern using the approach and method for evaluating pore-gas data (LANL 2006, 93982). Additional pore-gas sampling results would not be expected to differ significantly and therefore should not exceed these screening levels. NMED agreed to this on the condition that LANL provide the calculations to support the assertion. The maximum detected concentrations of selected VOCs (acetone, butanone[2], and toluene) in pore-gas samples were evaluated to determine if concentrations of VOCs in the subsurface pore gas are of concern as a potential source of groundwater contamination. The results of that evaluation are summarized below.

Volatile Organic Compound	Max C^{air} [a] ($\mu g/m^3$)	H' [b] (Dimensionless)	H' Source*	SL ($\mu g/L$)	SI Source [c]	SV (Dimensionless)
Acetone	285	1.60E-03	NMED	5.50E+03	EPA Region 6 HHMSSL	3,24E-02
Butanone[2-]	76.6	1.10E-03	NMED	7.00E+03	EPA Region 9 PRG	9.95E-03
Toluene	339	2.72E-01	NMED	7.50E+02	NMWQCC	1.66E-03

[a] C = concentration.

[b] Sources for Henry's Law Constant (H'):

NMED = Table B of New Mexico Environment Department Technical Background Document for Development of Soil Screening Levels, Revision 4.0.

[c] Sources for SL:

NMWQCC – NMAC 20.6.2.3103, last revised 2004.

EPA MCL = EPA National Primary Drinking Water Standards, last revised 2003.

EPA Region 6 HHMSSL = Tap water values from Region 6 Human Health Medium-Specific Screening Levels 2006, last revised 2006.

EPA Region 9 PRG = Tap water values from Region 9 Preliminary Remediation Goals (PRG) table, last revised 2004.

A screening value (SV) less than 1 indicates that the concentration of a VOC in pore gas is not sufficiently high to cause the water screening level (SL) to be exceeded, even if the VOC plume were in contact with groundwater. The calculations for partitioning VOCs in tuff into groundwater will be provided in the revised risk assessment appendix in the Phase II report, upon completion of additional investigation and remediation activities. The current levels of acetone, butanone[2], and toluene in pore gas are at trace concentrations, which do not represent a potential impact on groundwater.

NMED Comment

14. *Section B-8.4-2 Organic Chemicals, pg. B-34, first paragraph: "[Acetone] was also detected in fill, sediment, and the underlying tuff near the locations of the former drainline and terminus (16-23710, 16-23722, 16-23713, 16-23712, and 16-23720)."*

    Acetone is not shown as being detected at locations 16-23713 or 16-23712 on either the figures or the tables. The Permittees must clarify this statement.

LANL Response

14. Acetone was not detected at locations 16-23713 or 16-23712. This error was made in the original investigation report.

NMED Comment

15. *Appendix C Field Methods*

    The Permittees provide a general description of the use of a photoionization detector for screening VOCs. The Permittees must provide information on the voltage of the lamp used during the field activities.

LANL Response

15. The photoionization detector used to screen for total VOCs in soil and tuff samples during investigation activities was configured with an ultraviolet lamp capable of providing an ionization energy equivalent to 10.6 eV.

NMED Comment

16. Appendix D Borehole Logs and Well Construction Methods

The Permittees do not identify any surge beds during drilling for this site investigation. Given how important surge beds are at TA-16 for contaminant migration, NMED requests the Permittees relog the core and identify changes in permeability and/or the presence of surge beds.

LANL Response

16. To obtain further lithologic information/details and identify possible changes in permeability and/or the presence of surge beds, LANL will relog the core that was collected from intermediate-depth BH 16-23691 and BH 16-23692.

NMED Comment

17. Appendix E Analytical Program

The Permittees state that "[s]ome of the analytical results were rejected for various reasons and are not usable for the purposes of this report." According to Section XI.C.14.c of the Consent Order, the Permittees must provide a summary of data quality exceptions and their effect on the acceptability of the analytical data. The reasons the data were rejected are discussed in general terms throughout the appendix, but do not provide sufficient information for determining data acceptability for each sample. The rejected data listed below for SWMU 16-003(o) are presented on Table F-2.0-5. The Permittees must resample at these locations.

- *At sampling locations 16-23636, 16-23637, 16-23638 and 16-23639 (which are all located downgradient of structure 16-811), nitrate data were rejected at all sample intervals. Several samples upgradient from these have detected concentrations of nitrate.*
- *At sampling locations 16-23609, 16-24894, 16-24896, 16-24899, and 16-24891, the HE data were rejected for all sample intervals. These sampling locations are located along a former drainline where data show increasing concentrations of SVOCs with depth (see specific comment #10). The Permittees must determine extent of explosives compound contamination if detected.*
- *At sampling locations 16-23671, 16-23674, 16-23676, 16-23678, 16-23677, 16-23678, 16-23681, 16-23682, 16-23683, 16-23684, chromium data were rejected. Most of the reported data far exceed the background values of 19.3 ppm for soil and 7.14 ppm for QBt 2,3,4. All of these sampling locations are located in the upper part of the former fishladder structure where contaminated soil/tuff has already been removed.*

LANL Response

17. Nitrate data were rejected at locations 16-23636, 16-23637, 16-23638, and 16-23639 at all sample intervals. These data are part of data package 3275S. They were rejected because the samples were analyzed after a period had elapsed that was greater than twice the holding time.

    Chromium data were rejected at locations 16-23671, 16-23672, 16-23674, 16-23676, 16-23677, 16-23678, 16-23681, 16-23682, 16-23683, and 16-23684. These data are part of data package 3521S. These data were rejected because the recovery of chromium in the associated spike sample was less than 30%.

    Reported HE results for soil samples (upper interval) collected at locations 16-24891, 16-24894, 16-24896, and 16-24899 were rejected. These data are part of data package 3533S. These data were rejected because the samples were not analyzed within the analytical holding-time requirement. However, the tuff samples collected beneath the soil samples at the same locations have valid HE results. Some of these results were initially qualified as rejected in the environmental restoration database (ERDB). After a review of the associated data package (3576S) as part of this response, it was determined that the rejected qualifiers entered into the ERDB were incorrect. The HE results for these tuff samples are presented in Table 1.

    At location 16-23609, no results for sample RE16-05-55873 were rejected. At location 16-23609, only some of the data were rejected for sample RE16-05-55874. After review of the associated data package (3126S), it was determined that the rejected qualifiers entered into the ERDB were incorrect. HE results for these two samples are presented in Table 1.

    Per a discussion with NMED on September 14, 2006, LANL proposes to resample a subset of the locations discussed above, as follows:

    - Locations 16-23636 and 16-23639 will be resampled at two depth intervals (4–4.5 ft bgs and 6–6.5 ft bgs) and analyzed for nitrate.
    - Proposed Phase II excavations will encompass locations 16-23671, 16-23672, 16-23676, 16-23677, 16-23678, 16-23681, 16-23682, 16-23683, and 16-23684. Postexcavation samples (at the excavation floor and 2 ft into tuff) have already been proposed for locations 16-23671, 16-23672, 16-23676, 16-23677, 16-23678, 16-23681, and 16-23682. These samples will be analyzed for TAL metals, including chromium.
    - Individual locations 16-24891, 16-24894, 16-24896, and 16-24899 will not be resampled; however, the new intermediate-depth borehole requested in NMED comment 13 will be drilled in the vicinity of these locations (see Figure 1). The data collected from the borehole soil and tuff samples will be used to define the extent of HE compounds at these locations. Also, no additional samples will be collected at location 16-23609. LANL is already proposing a 15-ft borehole at location 16-23597 (approximately 108 ft northwest of 16-23609) and a 15-ft borehole at the new location between sumps 105 and 106/107 (approximately 54 ft southeast of 16-23609).

NMED Comment

18. Section H-4.0 Ecological Screening Assessment:

The conclusions drawn by the ecological risk screening relied significantly upon the use of background and receptor species area use factors. The use of the background comparison is supported and suitably addresses a number of the constituents of potential ecological concern (COPEC) issues. The application of area use factors, however, is an uncertain tool with tenuous results. The spatial distribution of COPEC occurrence within and outside of viable habitat (i.e., the tuff) must be used as a line of evidence for the revised risk assessment. The results of the retained COPECs should be depicted within the Habitat Map (Figure H-1) in order to provide a context on the exposure, and potential risk setting.

LANL Response

18. The application of area use factors was applied per EPA ecological risk guidance (EPA 1999, 70086) and EPA ecological soil screening-level guidance (EPA 2005, 89448). Although uncertainties are associated with area use factors, as is the case with the entire screening assessment process, LANL contends that the assessment does not produce tenuous results. The application of area use factors (individual and population) within a screening-level ecological risk assessment provides a more realistic spatial context for the screening assessment and actually decreases the uncertainty related to overly conservative ecological screening levels. In addition, population area use factors evaluate potential ecological risk at the scale and in the manner that EPA has established as appropriate, except in the case of threatened and endangered species. The population area use factor approach has been reviewed by several prominent EPA subject matter experts (SMEs) on ecological risk assessment as well as other SMEs working as consultants and state regulators. Their acceptance of this approach indicates that it is reasonable and represents a suitable means to address the uncertainty associated with conservative screening results. Furthermore, the empirical results obtained from field studies in Cañon de Valle (LANL 2003, 77965), Los Alamos and Pueblo Canyons (LANL 2004, 87390), and Mortandad Canyon (in preparation) provide verification that the application of area use factors is appropriate. The results of these studies indicated that exposure to chemical of potential ecological concern (COPEC) concentrations similar to or greater than those reported at the 16-340 Complex has not resulted in adverse impacts on ecological populations and individuals foraging and/or residing in these watersheds. Therefore, although screening-level risk assessments generally contain uncertainties, the use of individual and population area use factors reduces the uncertainties, provides a realistic spatial context for exposure and effects, evaluates potential risk at a scale that EPA deems appropriate for protection of ecological resources, and agrees with the results of empirical studies.

    Placing COPECs and COPEC concentrations on a habitat map to depict spatial distribution within and outside of viable habitats is not a line of evidence and does not provide additional information relevant to the screening-level ecological risk assessment. Such information does not reflect an assessment endpoint and is not a measure of exposure and/or effect on receptors. The assumption behind calculating ecological screening levels and conducting a screening-level assessment is that receptors are present within the contaminated area 100% of the time, regardless of habitat. The application of area use factors, as discussed above, provides a more realistic context for that exposure but does not distinguish between viable and questionable habitat (i.e., the screening assessment still overestimates exposure). The area around the 340 Complex is industrial. Although it contains some favorable habitat, it also includes industrial facilities. No sensitive habitat exists in the vicinity of the 340 Complex. In addition, the areas of elevated COPEC concentrations are recommended for remediation. Because the goal of the remediation is to remove any COPCs/COPECs of potential risk to human and ecological receptors, the revised screening-level ecological risk assessment will show no COPECs remain that could be a potential risk. Therefore, the

habitat map (Figure H-1) will not be revised to depict locations of COPECs (COPCs and concentrations are already presented in several figures in the main text of the investigation report).

REFERENCES

EPA (U.S. Environmental Protection Agency), 1999. “Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites,” OSWER Directive 9285.7-28, U.S. Environmental Protection Agency, Washington, D.C. (EPA 1999, 70086)

EPA (U.S. Environmental Protection Agency), February 2005. “Guidance for Developing Ecological Soil Screening Levels,” OSWER Directive 9285.7-55, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 2005, 89448)

LANL (Los Alamos National Laboratory), September 2003. “Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99,” Los Alamos National Laboratory document LA-UR-03-5248, Los Alamos, New Mexico. (LANL 2003, 77965)

LANL (Los Alamos National Laboratory), April 2004. “Los Alamos and Pueblo Canyons Investigation Report,” Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 87390)

LANL (Los Alamos National Laboratory), June 15, 2006. "Pore Gas Sampling: Preliminary Approach and Recommendations for Data Evaluation," Los Alamos National Laboratory document LA-UR-06-4107, Los Alamos, New Mexico. (LANL 2006, 93982).

NMED (New Mexico Environment Department), 2006. "Technical Background Document for Development of Soil Screening Levels, Revision 4.0," New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2006, 92513)

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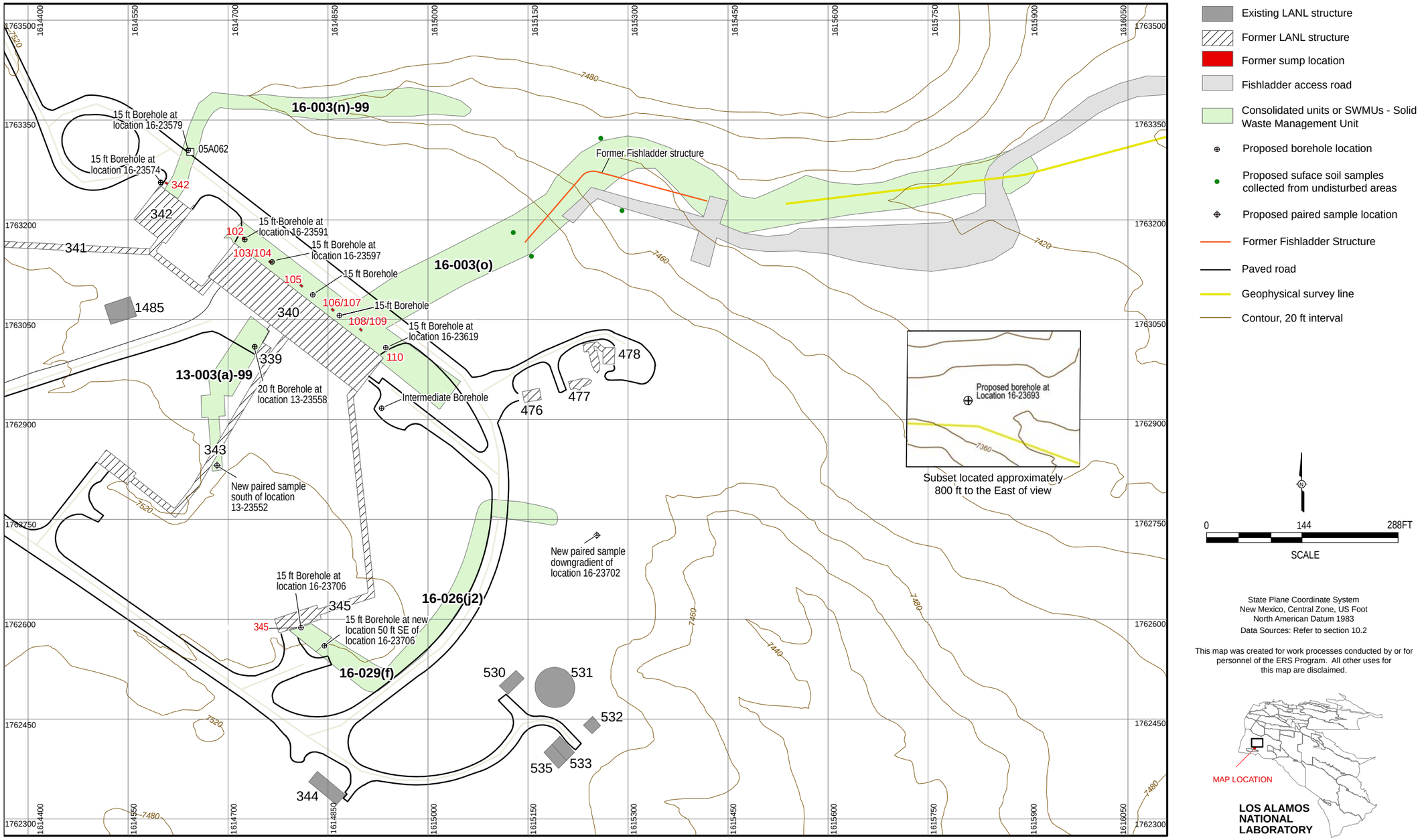

Figure 1. Additional sampling locations at the 340 Complex

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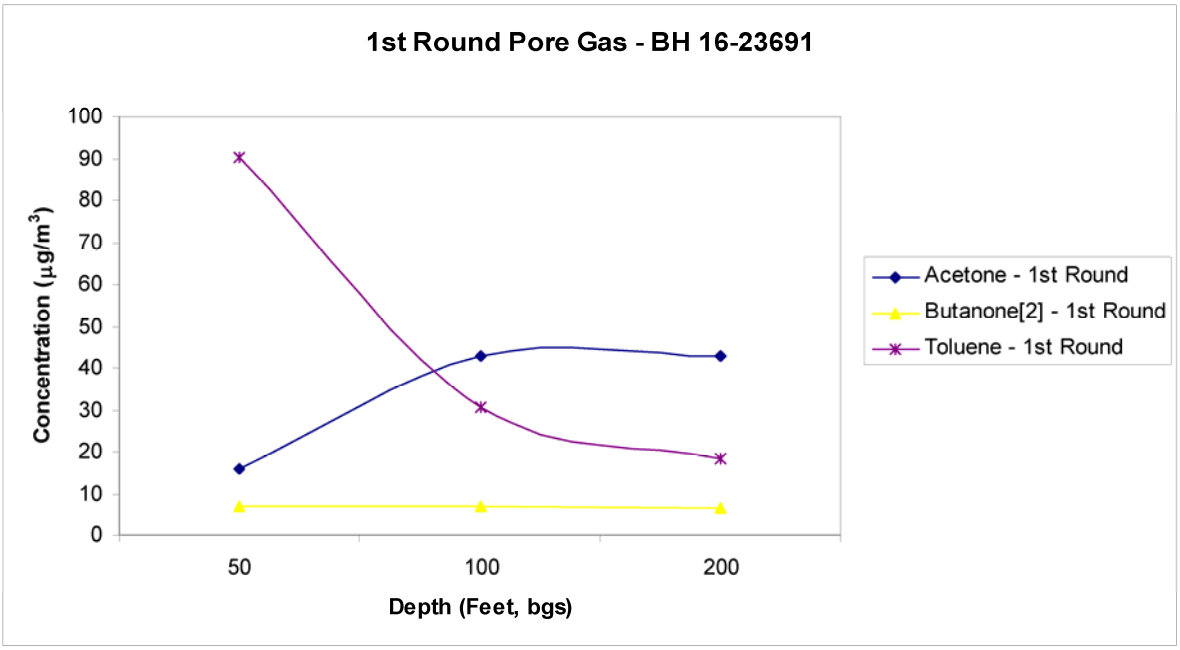


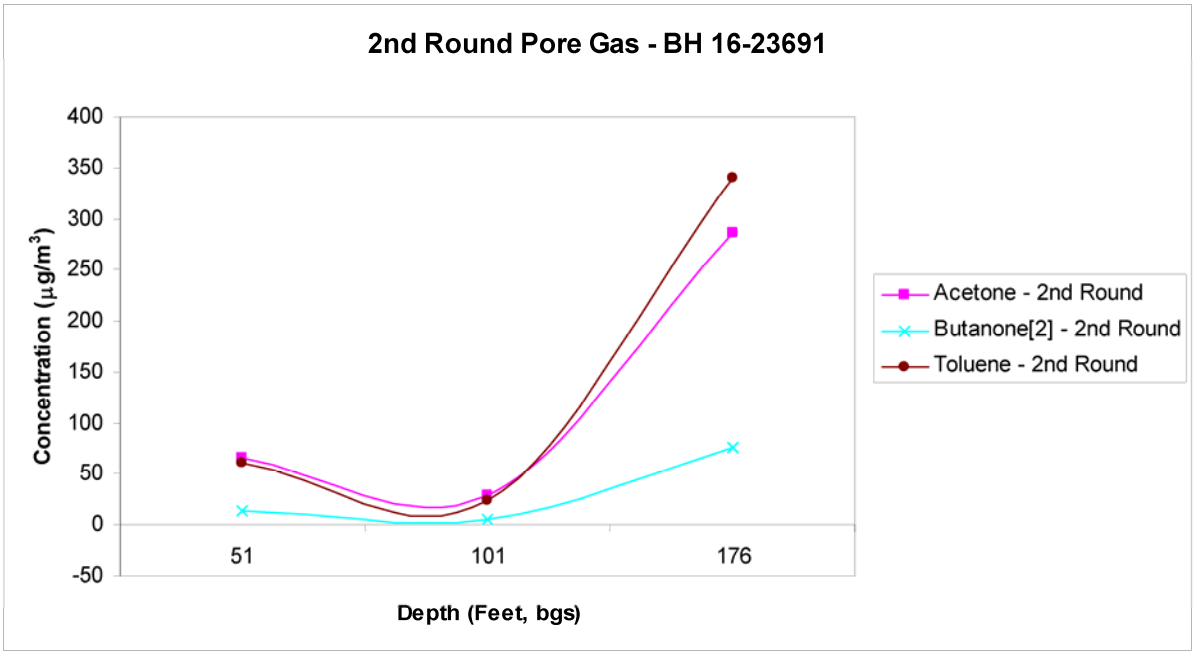
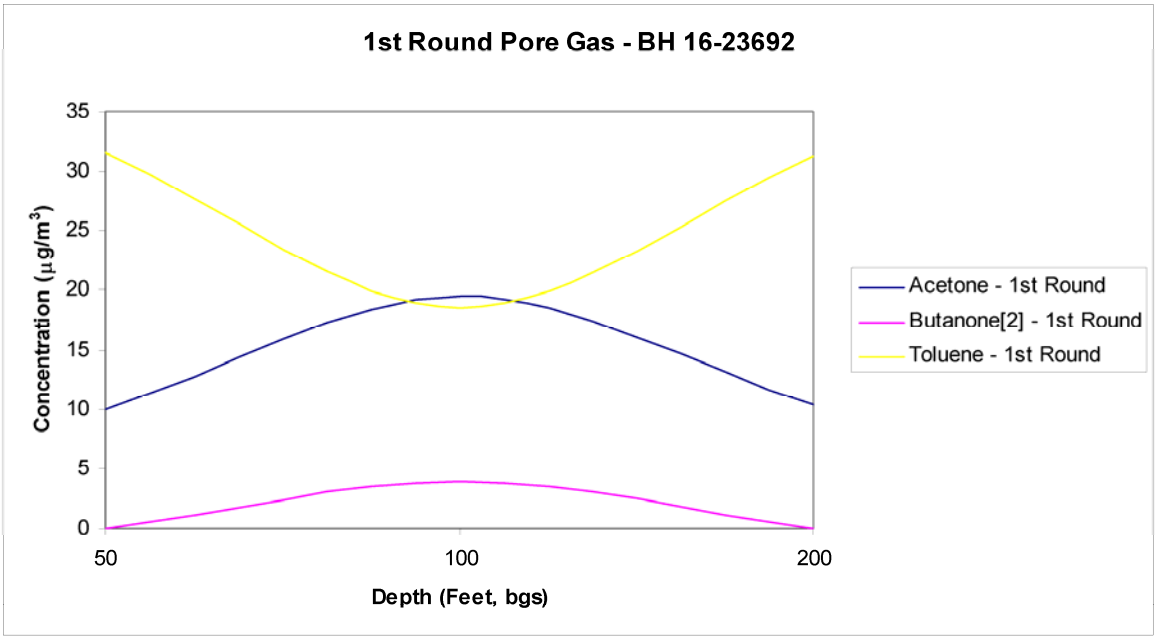


Figure 2a. VOC pore-gas results, BH 16-23691



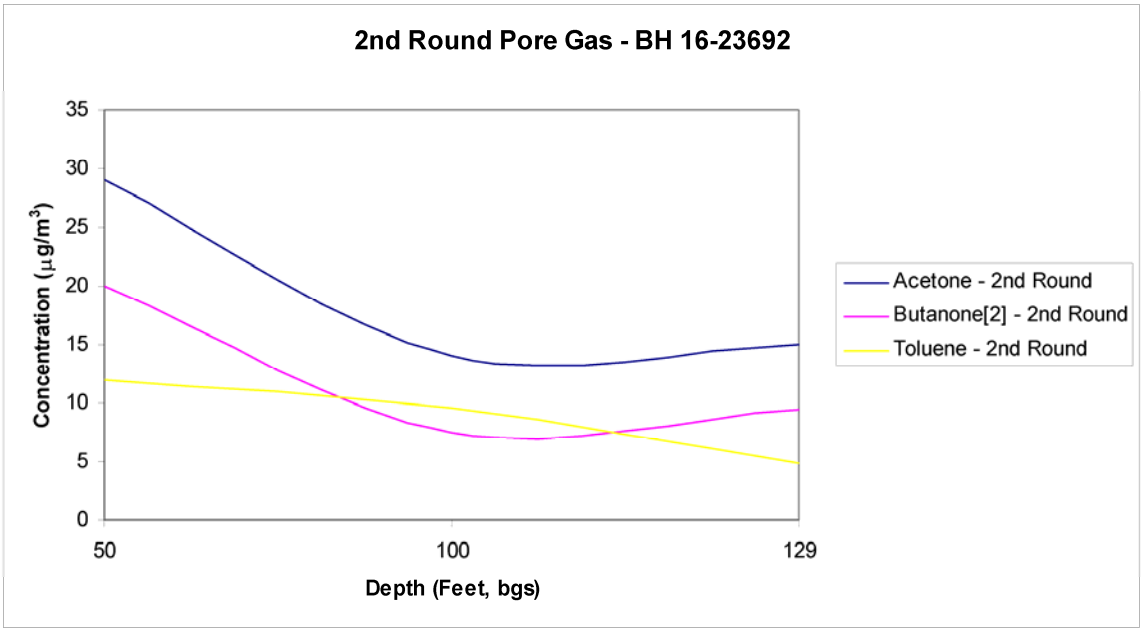


Figure 2b. VOC pore-gas results, BH 16-23692

Table 1
HE Results for Tuff Samples

Location ID	Depth (ft)	Sample ID	Request Number	2,4-Diamino-6-nitrotoluene	2,6-Diamino-4-nitrotoluene	3,5-Dinitroaniline	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Dinitrobenzene[1,3-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	HMX	Nitrobenzene	Nitrotoluene[2-]	Nitrotoluene[3-]	Nitrotoluene[4-]	PETN	RDX	TATB	Tetryl	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Tris (o-cresyl) phosphate
16-23609	4–4.5	RE16-05-55873	3126S	2 (UJ)	2 (UJ)	1 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1.65 (UJ)	1.65 (UJ)	**1.21 (J-)**	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	**0.162 (J-)**	**3.3 (J-)**	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)
16-23609	6–6.5	RE16-05-55874	3126S	2 (UJ)	2 (UJ)	1 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1.54 (UJ)	1.54 (UJ)	**0.539 (J-)**	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	0.5 (UJ)	**9.85 (J-)**	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)
16-24891	10–10.5	RE16-05-61928	3576S	2 (U)	2 (U)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.396 (U)	0.396 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	0.5 (UJ)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (U)
16-24894	10–10.5	RE16-05-61927	3576S	2 (U)	2 (U)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.401 (U)	0.401 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	0.5 (UJ)	**0.728 (J+)**	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (U)
16-24896	8–8.5	RE16-05-61926	3576S	2 (U)	2 (U)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.374 (U)	0.374 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	0.5 (UJ)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (U)
16-24899	8–8.5	RE16-05-61925	3576S	2 (U)	2 (U)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.36 (U)	0.36 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (UJ)	0.5 (UJ)	1 (U)	0.5 (UJ)	0.5 (UJ)	0.5 (UJ)	1 (U)

Notes: Values are in mg/kg; bold values are detects.

Data qualifier definitions:

U = The analyte was analyzed for but not detected.
J+ = The analyte was positively identified, and the result is likely to be biased high.
J- = The analyte was positively identified, and the result is likely to be biased low.
UJ = The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.

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