ATTACHMENT 1 NMED COMMENTS ITEM 1 MODIFICATIONS TO THE WIPP PANEL CLOSURE

1-1: PMR Overview, Section 1, "Revision to the PCS Design"

This section needs to explicitly explain which Attachment G1 Appendices are being deleted and which new appendices contain relevant information from old appendices. For example, Appendix B appears to include consolidated relevant information from the previous Appendices B through F; the new Appendix A replaces the old Appendix A. NMED believes that appendices not included in the permit should not be listed in the Attachment G1 Table of Contents. An alternative would be to list non-included appendices as references to Attachment G1.

Response:

In response to Comment 1-2, the redline/strikeout of the proposed Permit text for Permit Attachment G1 has been revised. This revision included changes to address this comment. Only the appendices included in the revised proposed Permit text are identified in Attachment G1, Table of Contents.

The Attachment G1 appendices in the current Permit are being deleted as a result of the Permit Modification Request (**PMR**). This consists of Appendix G of Attachment G1 (Appendix G1-G), Technical Specifications and Appendix H of Attachment G1 (Appendix G1-H), Drawings, that pertain to the Option D panel closure design. The new version of the redline/strikeout of the Permit text adds two new appendices to Attachment G1. These new appendices that pertain to the new WIPP Panel Closure (**WPC**) design consist of Appendix G1-A, Technical Specifications and Appendix G1-B, Drawings. A copy of the revised redline/strikeout of the applicable Permit text is included as Appendix 1-A.

1-2: PMR Item 1 Attachment G1

Please review Attachment G1 for applicable requirements and revise to remove extraneous and non-enforceable language other than what is necessary for clarification. The remaining requirements should be clearly identified with appropriate methods of compliance demonstration identified. Specifically, monitoring, recordkeeping and reporting should be associated with each requirement. The complete detailed design report will be included in the record as a reference.

Response:

The redline/strikeout of the proposed Permit text for Permit Attachment G1 and associated two appendices was revised to address the comment. The title of Attachment G1 was changed to WIPP Panel Closure (WPC) Description and Specifications. The redline/strikeout of the Permit text in the PMR was revised to include information in Attachment G1 and associated appendices that is limited to the design description, applicable specifications, and requirements for the proposed panel closure design. As described in the response to Item 1-1 above, only two appendices are proposed for inclusion into Attachment G1, Appendix G1-A, Technical Specifications and Appendix G1-B, Drawings. Monitoring, recordkeeping, and reporting have been identified in the revised Attachment G1 redline/strikeout of the proposed Permit text. Minor changes were also made to the redline/strikeout of the Permit text in Attachment G associated with the title change of Attachment G1. A change in the Permit text for Permit Part 7, Section 7.2.3.1, General Monitoring, Inspection, and Maintenance Requirements, was identified. Specifically, the Permit text for this section was modified to clarify that maintenance of the panel

closures will be performed for the accessible bulkheads. A copy of the revised redline/strikeout of the applicable Permit text is included as Appendix 1-A.

1-3: PMR Item 1 Section 1 of Overview, Revision to the PCS Design

The modification request provides the following rationale for proposing 100 feet of run-of-mine salt. "A minimum length of 100 feet for the run-of-mine salt was selected based on engineering judgment that a backfill length that is 7 to 10 times the panel entry height would provide adequate flow resistance. The panel entry height is nominally 13 feet; therefore, 7 to 10 times this height corresponds to approximately 90 to 130 feet. A nominal distance of 100 feet was chosen to meet this guideline." Please provide further justification for the selection of the 100 feet.

Response:

There are three factors that were considered in selecting the length of the run-of-mine (**ROM**) salt. The first factor was based on engineering judgment (i.e., industry practice of choosing a factor between 7 to 10 times the entry height) and the fill material (ROM salt) for backfilling underground openings to impede flow as described in the PMR.

The second factor was the linear footage available in the entries for installation. The total length of each entry is about 200 feet. One goal is to fill as much of the entries as possible, while leaving enough room on the outside to maintain the bulkhead, including the possibility of replacing it. The slopes require about 50 feet of the entry, based on the Design Report, Appendix D, Drawing No. 262-002 and assuming a nominal 2:1 slope (horizontal to vertical) at each end of the ROM salt to avoid impacting the in-bye bulkheads and a 13-foot entry height. This leaves about 150 feet for the salt and the construction of the bulkheads. The design allows a clearance of 4 feet for each of the steel bulkheads on the in-bye and out-bye sides of the ROM salt. Finally, the design allows a minimum of 20 feet on the out-bye side to allow for future bulkhead construction if the out-bye bulkhead needs to be replaced. This means that in panels such as Panel 6 and beyond, where the in-bye bulkhead is against the waste face, there may be as much as 120 feet of tunnel for the ROM salt, not including the slopes. However, in Panels 3 and 4, where a substantial barrier exists and a new in-bye bulkhead may need to be constructed, there may only be around 100 feet available. Therefore, this minimum distance of 100 feet was modeled.

The third factor used in establishing 100 feet as the minimum length is that the air flow modeling from the design report (PMR, Item 1, Appendix C) shows that, once the air gap closes, a length of 100 feet of ROM salt provides adequate flow resistance to limit volatile organic compound (**VOC**) releases.

1-4: PMR Item 1 Appendix B, Attachment G, Section G-1e Closure Activities, 6th Bullet

It is NMED's understanding that maintenance of the bulkhead will be conducted whenever periodic visual inspections warrant and/or when an investigation of increasing monitored VOC concentrations suggests that the bulkhead is not providing the proper airflow resistance. Please include a discussion of this with examples of potential triggers for bulkhead maintenance as well as a discussion of the association between maintenance required for compliance with

performance standards and how the maintenance is minimized with this WIPP Panel Closure (WPC) design as required by 40 CFR 264.111. Also, please provide a copy of the Panel Closure Bulkhead Maintenance Procedure.

Response:

The performance of accessible WPC bulkheads will be monitored using a two component approach as follows:

- Inspection of accessible WPC bulkheads for integrity and deterioration as required in Permit Attachment E. Corrective actions will be taken in accordance with associated operational procedures to repair observed deterioration as needed. Deterioration may include separation of the flexible membrane from the steel frame of the salt, separation of the bulkhead panels from the steel frame, corrosion weakening of the bulkhead members to the point where they can no longer function as intended, or excessive buckling or bending of bulkhead components. General inspection requirements pertaining to WPC bulkhead inspections (e.g., schedule, frequency, log forms, records, etc.) are as specified in Permit Part 2, Section 2.7.
- Monitoring closed panel emissions of VOCs through a system wide approach utilizing the running annual averages for VOCs derived from the Repository VOC Monitoring Program (Permit Attachment N) at Station VOC-A. Running annual average trends will be used to initiate corrective actions that may include additional VOC monitoring activities around specific panels to better locate the source of the increased emissions, corrective actions to limit VOC emissions from the active panel, and/or repair/replacement of accessible WPC bulkheads. Associated repository VOC monitoring requirements (e.g., reporting, notification, remedial action, etc.) are as specified in Permit Part 4, Section 4.6.2.

Text describing this monitoring and inspection approach has been incorporated into the revised, proposed Permit text for Attachment G1, Section G1-1b(1). A copy of the revised redline/strikeout of the applicable Permit text is included as Appendix 1-A. A copy of the Panel Closure Bulkhead Maintenance procedure is included as Appendix 1-B.

The WPC minimizes maintenance by limiting maintenance activities for the closure system to the accessible bulkheads over a limited time period (i.e., the time period that a gap exists above the ROM salt fill). After this time period, bulkhead maintenance ceases as a gap no longer exists and the bulkheads no longer play a significant role in limiting air flow through closed panels. In fact, the 100 feet of ROM salt is the primary flow resistance after the air gap closes and becomes more impermeable with time as closure of the panel entries further compresses and consolidates the ROM salt backfill.

1-5: PMR Item 1 Appendix B, Attachment G1, Section 6, 3rd Bullet

The PMR states "Out-bye bulkheads must be maintained to provide 2,200 Practical Units (PU) resistance for 23 years after installation". If VOC levels are rising, an investigation could reveal that bulkhead maintenance is becoming necessary. Please relate bulkhead maintenance

monitoring, recordkeeping, and reporting to the bulkhead airflow resistance standard in a statement within Attachment G1. This statement should tie rising VOC levels to an out-bye bulkhead inspection. Since this is a proposed permit performance standard, please provide a discussion on how compliance will be demonstrated. It is NMED's understanding that the bulkhead airflow resistance performance standard of 2,200 PU will be demonstrated through monitoring at VOC-A but the Permit Modification Request (PMR) does not appear to explicitly state this. Please provide a technical justification for the assumption that a standard bulkhead of the type proposed for the panel closure would provide an air flow resistance of 2,200 PU. Also, please provide appropriate permit language including associated monitoring, recordkeeping and reporting. Please revise the PMR to consistently state that the bulkheads will be maintained to achieve the required standard.

Response:

Refer to the response to Comment 1-4 with respect to recommended permit language to address the first part of this comment. Permit Attachment E requires that bulkheads in filled panels be inspected monthly for integrity and deterioration of accessible areas. This requirement is not affected by the PMR, and accessible bulkheads in filled panels will still require monthly inspection. VOC emissions from panels will be monitored on a system-wide basis at VOC Station A. Text describing this monitoring and inspection approach has been incorporated into the revised, proposed Permit text for Attachment G1, Section G1-1b(1). A copy of the revised redline/strikeout of the applicable Permit text is included as Appendix 1-A in this response.

The second part of this comment (i.e., the last three sentences) relates to air flow resistance of standard bulkheads. The air flow model (PMR, Item 1, Appendix A of Appendix C) assumes a bulkhead resistance of 2,200 PUs because it is a reasonable input value for the air flow model, as demonstrated later in this response. In practice, it will be difficult to measure the flow resistance of bulkheads adjacent to panel closures because of the low air flow rate across these bulkheads and because of inaccessibility behind the bulkheads. Given this situation, the Permittees have evaluated the impact of bulkhead resistance on VOC emissions in order to respond to this comment. This reevaluation involved two steps: (1) a sensitivity analysis of VOC emissions to bulkhead resistance by Golder Associates and by the Permittees, and (2) a review of data for bulkhead resistance from the test and balance of the WIPP underground ventilation system in 2008, 2009, 2010, 2012, and 2013.

The sensitivity analysis for the VOC model demonstrates that VOC emissions from closed panels with an air gap above the ROM salt are insensitive to the flow resistance of the bulkheads. When an air gap exists, the predicted VOC emissions from a closed panel are controlled by the VOC source term for head space gas concentrations emanating through filters on waste containers, not by ventilation-induced air flow through the bulkheads and air gap (see top of page 3 of Golder 2013, a copy of which is included as Appendix 1-C). In addition, VOC releases through the filters are added directly to the air flowing in the exhaust mains, bypassing the bulkheads entirely (PMR, Item 1, Appendix C, Section 3.3.1, last paragraph on page C-37). This is a conservative approach because it ignores the potential for the flow resistance of the bulkheads to reduce the rate of release of the VOC source term.

After the air gap closes, the VOC emissions model evaluates the ventilation-induced air flow through a closed panel with bulkheads, as described in the response to Item 1-12. During this time, the flow resistance through the ROM salt is much higher than that of the steel bulkheads once the air gap closes (PMR, Item 1, Appendix C, last paragraph on page C-43). In other words, bulkhead resistance is not the limiting flow parameter after the air gap closes - the limiting parameter is the resistance through the ROM salt. It follows that VOC concentrations at Station A will be insensitive to bulkhead resistance after the air gap closes. Since the same conclusion is valid when the air gap is open (see above paragraph), it follows that the predictions of the VOC emissions model are insensitive to bulkhead resistance at all times after panel closure.

The Permittees also evaluated the resistance of as-installed standard bulkheads, based on data from the test and balance of the WIPP underground ventilation system in 2008, 2009, 2010, 2012, and 2013. During these test and balances, pressure drop and flow rate are measured for individual branches of the ventilation system, and the bulkhead resistance in a branch is calculated from the basic air flow equation (see Equation (2) in the response to Item 1-12). Note that this simple approach cannot be easily performed for the out-bye bulkheads in a closed panel because it is very difficult to measure resistance when air flow rates are very low and because of inaccessibility to the back side of the bulkheads.

The data from the test and balances demonstrate that (1) some bulkheads have flow resistance equal to or significantly greater than 2,200 PU, confirming the assumed resistance of a well-maintained bulkhead in the air flow modeling, and (2) there is wide variability in the resistance of the as-installed bulkheads. The wide variability reflects the facts that leakage is sensitive to the size of the gap between the edge of a bulkhead and the surrounding rock, and that ground conditions around individual bulkheads are highly variable. Given the observed variability, the Permittees are proposing to maintain the monthly schedule for inspection of bulkheads in filled panels.

Reference

Golder Associates Inc. (Golder), 2013. WIPP Panel Closure System- Influence of Steel Bulkhead Resistance to Operational Flow Rates and VOC Concentration, Memorandum from Gordan Gjerapic to Bill Thompson dated 31 July 2013.

1-6: PMR Overview

A description of the remedial actions that would be taken if VOC emissions exceed the regulatory limits was not found in Item 1 of the PMR. Please present descriptions of proposed Action Levels and of the remedial actions that would be taken at each level to identify and mitigate the source(s) of elevated VOC releases for panel closures constructed using the proposed run of mine (ROM) salt WPC design. The response to this item could be combined with the response to item 3-6.

Response:

The remedial actions in Permit Part 4, Section 4.6.2 apply to emissions from closed and open panels. Proposed changes to these remedial actions are addressed in PMR Item 3. Panel closures are designed to protect individuals beyond the WIPP site boundary. The environmental performance standard for the nearest resident, as defined in the Permit Attachment G1, Section 1.3.2, is 10^{-6} . Panel closures also play a role in protecting the surface worker as required by Permit Part 4, Sections 4.4.1 from a risk in excess of 10^{-5} . This allowable total risk to the worker on the surface was established by the NMED in 1999 to be more stringent than the risk to any member of the public. This is confirmed by the air emission modeling calculation provided in support of PMR Item 3. Therefore, remedial action will be based on the allowable total risk to the worker on the surface. The concentrations of the VOCs that provide this dose are monitored at VOC Station A and the total risk is calculated by summing the individual risk associated with each of the VOCs emitted from the underground. There is no VOC concentration limit for individual waste panels.

The Permittees have control over the occupancy of all portions of the Land Withdrawal Area. No activities are allowed within the Land Withdrawal Area that would result in higher exposures than those received by the hypothetical resident at the boundary. Specifically, someone would have to reside within the boundary and this is not allowed. Even the most common non-employee user, the cowboy, does not spend enough time within the area for exposure to be consequential. The risk calculations used for the WPC design assumed a resident at the WIPP site boundary, even though the boundary scenario does not represent an actual member of the public. This ensures a conservative design. From the standpoint of protection of human health and the environment, the maximally exposed resident is the Mills Ranch, where the risk is clearly bounded by the risk for the non-waste surface worker in the Training Building (see Table 4 in Appendix C of the PMR). Thus, remedial action is taken before the public exposure limit of 10^{-6} is exceeded at the location of a receptor.

Remedial action is triggered when releases reach a point where Action Levels are exceeded. For the WIPP facility, remedial action is taken before the public exposure limit of 10^{-6} is exceeded at the location of a receptor (because it is bounded by the surface worker scenario). Timely remediation prevents long-term chronic exposures to all receptors. In addition, in Item 3 of the PMR, the Permittees' propose alternative actions, other than closing unfilled disposal rooms, to mitigate exposure upon reaching action levels. For example, the Permittees can repair/replace the outer bulkhead portion of the closure if necessary to reduce emissions from closed panels. In addition, the Permittees have used methods such as managing waste emplacement activities such as embargoing high VOC waste until a room or a panel is filled, or overpacking waste into larger containers with fewer filters left open to successfully control VOC emissions.

1-7: PMR Item 1 Appendix B, Attachment G1, Section 3.3.3, Page 58

The PMR states: "The air conductivities were then calculated based upon the intrinsic permeability relationship that accounts for both the relative density and the average particle size of the ROM salt backfill..."This relationship ...is based upon the investigations made by Shor, et al. (1981) ... for a particle size of 0.13 inches (0.34 cm)." The data of Shor et al. (1981), shown in Figure G1-13 (Appendix B, Attachment G1, Page B-60), demonstrate that permeability

increases with increasing particle size. However, Section 04100 of the specifications for the ROM salt to be used for the WPC (PMR Appendix B, Attachment G1, Appendix C, Section 04100, Part 2.1, Page B-121) states that the salt requires no grading and therefore its average particle size will be unknown. If the WIPP ROM salt has a higher average particle size and thus a higher intrinsic permeability than was assumed in the air flow calculations, those calculations could underestimate VOC releases. Please justify that the particle size used in the calculation is representative of the ungraded WIPP ROM salt to be used for the WPC. If a measured particle size distribution for "as-mined salt" is available, please include.

Response:

The air flow analysis uses a <u>bounding</u> porosity-permeability relationship to define the permeability of ROM salt from the WIPP mine:

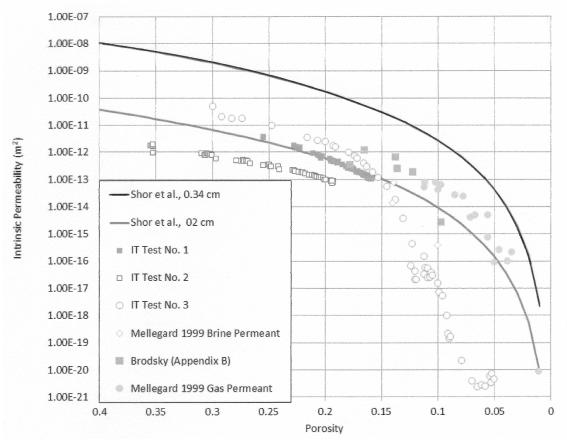
- (1) The bounding relationship (see black (top) curve in Figure **1-7.**1 below) is generally a factor of 30 to 100 times greater than the permeability measurements for WIPP crushed salt. This provides a significant degree of conservatism for estimating gas flow and VOC releases through the ROM salt; and
- (2) Permeability tests on WIPP crushed salt used grain sizes that are representative of the measured grain sizes for WIPP ROM salt. The cores for laboratory testing are representative of conditions in a panel closure because a significant fraction of the ROM salt is within the size range of the grains of crushed salt in the test cores.

Each of these statements is demonstrated by the following discussion.

(1) Bounding Relationship for Permeability

Figure 1-7.1 presents data from permeability measurements on cores of crushed WIPP salt performed by Case et al. (1987), by Brodsky et al. (1996) and by Mellegard et al. (1999). Figure 1-7.1 also plots the permeability-porosity relationship from Shor et al. (1981) for mean particle sizes of 0.34 cm and 0.02 cm. The data from Case et al. (1987) are identified as IT Tests 1, 2, and 3 in Figure 1-7.1.

Figure 1-7.1 demonstrates that the black (top) curve (relationship from Shor et al. (1981) for a mean particle size of 0.34 cm) provides an upper bound to the experimental permeability measurements on WIPP crushed salt. The black curve is approximately a factor of 30 to 100 times greater than the measured permeability with either a gas or brine permeant, with the exception of two gas permeability measurements by Mellegard (1999), which are a factor of 10 less than the black curve at porosities of 0.055 and 0.035.



Source: PMR Item 1, Appendix C, Figure 3-9, on p. C-41

Figure 1-7.1. Bounding Relationship Compared to Permeability Data for Crushed Salt (Ignore the grey curve – it is not used for the VOC analysis)

(2a) Grain Size Distribution for WIPP ROM Salt

The laboratory measurements on precompacted cores of WIPP crushed salt are representative of conditions in a panel closure because the majority of the ROM salt mass is within the size range of the crushed salt used in the test cores. This is explained in the next paragraphs.

Grain size distributions for four samples of WIPP ROM salt were measured using a sieve analysis of fine and coarse grain aggregate (ASTM: C 136) (Zimmerly et al., 2012, Appendix A, pages 6-9). Table 1-7.1 presents results from the sieve analysis that are relevant to NMED's question regarding the applicability of results from test cores in the laboratory to the behavior of WIPP ROM salt in a panel closure. Table 1-7.2 in Section (2c), presents the complete results from the sieve analysis for each sample.

Table 1-7.1. Results of Sieve Analysis for Four Samples of WIPP ROM Salt

| | % Passing by Weight | | | | | |
|---------------------|-------------------------------------------------|-----|-----|------|--|--|
| Sieve Size | Sample SA-1 Sample SA-2 Sample SA-3 Sample SA-4 | | | | | |
| 1.18 mm sieve (#16) | 21% | 6% | 29% | N/A | | |
| 2.36 mm sieve (#8) | 35% | 13% | 45% | 32%* | | |

| 4.75 mm sieve (#4) | 53% | 29% | 67% | 52% |
|-------------------------|-----|-----|-----|-----|
| 9.5 mm sieve (3/8 inch) | 68% | 57% | 85% | 67% |
| 12.5 mm sieve (½ inch) | 71% | 68% | 90% | 71% |
| 19.0 mm sieve (¾ inch) | 77% | 78% | 95% | 74% |

^{*} For a 2.0 mm (#10) sieve.

Source: Zimmerly et al., 2012, Appendix A, pages 6-9.

(2b) Comparison of Maximum Grain Size for Laboratory Testing to the Grain Size Distribution for WIPP ROM Salt

The maximum grain sizes for the crushed salt cores for laboratory testing can be compared to the data in Table 1-7.1 for the grain size distributions of ROM salt at WIPP. The relevant lines in Table 1-7.1 are color coded to simplify this comparison.

- IT Test 1 has a maximum grain size of 10 mm, which corresponds to the 57th to 85th percentile of grain sizes in ROM salt samples (see fourth line in Table **1-7.1**). In other words, 57% to 85% of the grain sizes in ROM salt samples are within the size limit of 10 mm for IT Test 1;
- IT Test 2 has a maximum grain size of 0.9 mm, which corresponds to the 6th to 29th percentile of grain sizes in ROM salt samples (see data in the first line in Table **1-7.1**). In other words, 6% to 29% of the grain sizes in ROM salt samples are within the size limit of 0.9 mm for IT Test 2;
- IT Test 3 has a maximum grain size of 20 mm, which corresponds to the 74th to 95th percentile of grain sizes in ROM salt samples (see data in the last line in Table **1-7.1**). For this case, 74% to 95% of the grain sizes in ROM salt samples are within the size limit of 20 mm for IT Test 3;
- Brodsky has a maximum grain size of 9.5 mm, which corresponds to the 57th to 85th percentile of grain sizes in ROM salt samples (see data in the fourth line in Table **1-7.1**). Therefore, 57% to 85% of the grain sizes in ROM salt samples are within the size limit of 9.5 mm for the Brodsky test cores; and
- Mellegard et al. (1999) did not report maximum grain size.

This comparison shows that the maximum grain sizes in the laboratory test cores span a significant range in the distribution of grain sizes in the ROM salt. The results in Table **1-7.**1 also show that the grain size for more than 50% of the ROM salt mass is less than 4.75 mm for 3 of the 4 samples and less than 9.5 mm for the fourth sample.

The presence of a high mass of fine and very fine grain sizes in WIPP ROM salt allows any chunks of salt greater than 2.5 cm (1 inch) or 5 cm (2 inches) to be surrounded by fine grained material that will determine the overall permeability of the panel closure. The permeability of this fine grained material will be similar to the permeability of the test cores, which also consist of fine grained material. The permeability of the test cores is therefore expected to be representative of the permeability of WIPP ROM salt in a consolidating panel closure.

(2c) Measured Particle Size Distributions for As-Mined Salt at WIPP

Table 1-7.2 provides data on measured particle size distributions for ROM salt from WIPP (Zimmerly et al. 2012*, Appendix A.2), as requested by Item 1-7. Large chunks of salt greater than 2 inches were removed from samples SA-1, SA-2, and SA-3 before performing the sieve analysis. Samples SA-1 and SA-2 had 0.1% moisture by weight and samples SA-3 and SA-4 had 0% moisture by weight. (*Ben Zimmerly, Tami Moffatt, and John Zavicar *Construction Methods Assessment for Compacted Salt Panel Closures*, NWP, December 2012).

Table 1-7.2 Measured Grain Size Distributions for Four Samples of WIPP ROM Salt

| | Percent Passing by Weight | | | | |
|-------------------|---------------------------|-----------------------|----------------------|--------------|--|
| Screen Size | Sample SA-1 | Sample SA-2 | Sample SA-3 | Sample SA-4 | |
| 75.0 mm (3 in) | Chunks larger tha | n 2 inches were remov | ed prior to analysis | 91 | |
| 63.0 mm (2.5 in) | | | | 85 | |
| 50.0 mm (2 in) | 100 | 100 | 100 | 82 | |
| 37.5 mm (1.5 in) | | Not measured | | 80 | |
| 31.5 mm (1.25 in) | | | | 78 | |
| 25.0 mm (1 in) | 80 | 82 | 98 | 76 | |
| 19.0 mm (0.75 in) | 77 | 78 | 95 | 74 | |
| 12.5 mm (0.5 in) | 71 | 68 | 90 | 71 | |
| 9.5 mm (0.375 in) | 68 | 57 | 85 | 67 | |
| 4.75 mm (#4) | 53 | 29 | 67 | 52 | |
| 2.36 mm (#8) | 35 | 13 | 45 | Not measured | |
| 2.0 mm (#10) | 31 | 11 | 41 | 32 | |
| 1.18 mm (#16) | 21 | 6 | 29 | Not measured | |
| 600 mm (#30) | 12 | 4 | 18 | Not measured | |
| 425 mm (#40) | 10 | 3 | 14 | 13 | |
| 300 mm (#50) | 7 | 3 | 11 | Not measured | |
| 180 mm (#80) | 4 | 2 | 7 | 7 | |
| 150 mm (#100) | 3 | 2 | 5 | Not measured | |
| 75 mm (#200) | 1.2 | 0.7 | 2 | 3.1 | |

Summary

Based on these considerations, the bounding relationship in Figure 1-7.1 (black curve from Shor et al. (1991)) provides a valid upper bound for the permeability-porosity relationship for WIPP ROM salt in a panel closure, including the effects of grain size. The use of an upper bound for the permeability of WIPP ROM salt will overestimate air flows and VOC releases after the air gap above the ROM salt closes.

1-8: PMR Item 1 Overview, Section 3, Page 9 "Deletion of Hydrogen and Methane Monitoring"

The PMR references data in Annual Transuranic Waste Inventory report (**ATWIR**) (2012), including Table 4-1 and Appendices A, B and C and concludes that gas generation rates in future

filled panels will not differ significantly from rates measured in Panels 3 and 4 because descriptions of these waste streams indicate they are generated by the same processes as waste already shipped to the WIPP facility. The PMR addresses some key factors likely to affect hydrogen and methane gas generation rates but does not adequately review issues such as the inventories of iron-based metals, organic matrices, and cellulosics, plastics and rubbers in the stored and projected waste streams. Please compare the inventories of these materials in Panel 3, Panel 4 and to the extent possible in the stored and projected waste streams to demonstrate that gas generation from future waste is adequately represented by the waste emplaced in Panels 3 and 4.

Response:

The justification was previously provided in the PMR that was submitted. Specifically, the following text was added to the PMR:

Another factor to consider in terminating the hydrogen/methane monitoring program is whether or not the waste disposed in Panels 3 and 4 is representative of waste that will be disposed elsewhere in the facility with regard to the potential for hydrogen/methane gas generation. With regard to future waste streams, the Permittees examined the 2012 Annual Transuranic Waste Inventory Report (ATWIR) which was issued in October, 2012. In this version of the ATWIR there is approximately 68,000 cubic meters of WIPPbound waste streams only (ATWIR Table 3-1) that do not include data for emplaced or potential waste streams. The characterization information for most of these waste streams is well known. Based on information in Table 4-1 and Appendices A, B, and C of the ATWIR, it is possible to identify about 60 waste streams. This inventory represents about 9,800 cubic meters of transuranic (**TRU**) waste where the characterization information is not well known. However, because the descriptions of these waste streams indicate they are generated by processes that generated waste already shipped to the WIPP facility, the Permittees have no reason to anticipate that gas generation rates will be significantly different in the future. The conclusions drawn from the hydrogen/methane monitoring in Panels 3 and 4 are expected to hold for future waste streams.

In addition, the following is provided in response to the comment:

Hydrogen and methane gas generation of TRU waste and packaging material may result from three general sources:

- Radiolysis
- Corrosion
- Microbial degradation

Radiolysis of hydrogenous material (cellulose, plastic, rubber, water) yields hydrogen. Corrosion of iron based materials (e.g., steel) produces hydrogen in an anaerobic (anoxic), wet environment. Microbial degradation of organic material (cellulose, plastic, rubber) in an

anaerobic environment conducive to microbial growth may produce methane. Therefore, the material types important to hydrogen and methane gas generation in filled panels are cellulose, plastic, and rubber (**CPR**), water, and iron based metals/alloys. Only under anaerobic conditions may hydrogen and/or methane be generated by corrosion and microbial degradation. Because anaerobic conditions are required to generate hydrogen and/or methane from corrosion and microbial degradation, radiolysis of hydrogenous material is the dominant hydrogen generation source over the short term. ²

The inventory of waste emplaced as of December 31, 2011, by waste material parameter (**WMP**) and panel was obtained from the Waste Data System (**WDS**). The inventory for WIPP bound waste WMPs was obtained from Table 3-4 of DOE/TRU-12-3425, <u>Annual Transuranic Waste Inventory Report – 2012 (Data Cutoff Date 12/31/2011)</u> (**ATWIR**). Additionally, the inventory for potential waste (waste that may potentially come to WIPP as identified in Appendix B of the ATWIR) was obtained from the ATWIR database. The summation of the ATWIR WIPP bound inventory and the ATWIR potential inventory will be referred to as the ATWIR inventory. This information is summarized in Table 1-8.1.

Table 1-8.1. Distribution of Emplaced and Projected Waste as of December 31, 2011

| | | | Emplaced | |
|------------------------------------|----------|----------|-------------|------------|
| | | | Total as of | ATWIR |
| | Panel 3 | Panel 4 | 12/31/2011 | Inventory* |
| Waste Material Parameter | (kg) | (kg) | (kg) | (kg) |
| Iron Base Metal/Alloys | 9.55E+05 | 1.63E+06 | 7.02E+06 | 3.46E+06 |
| Aluminum Base Metal/Alloys | 9.86E+03 | 9.44E+03 | 5.05E+04 | 2.25E+05 |
| Other Metal/Alloys | 8.94E+04 | 2.61E+04 | 3.27E+05 | 9.13E+05 |
| Other Inorganic Materials | 2.87E+05 | 2.70E+05 | 1.66E+06 | 3.93E+06 |
| Cellulosics | 4.84E+05 | 8.03E+05 | 2.28E+06 | 1.02E+06 |
| Rubber | 9.52E+04 | 1.00E+05 | 3.41E+05 | 5.79E+05 |
| Plastics | 5.70E+05 | 8.08E+05 | 2.66E+06 | 1.84E+06 |
| Solidified Inorganic Material | 2.41E+06 | 1.18E+06 | 7.28E+06 | 7.16E+06 |
| Solidified Organic Material | 1.39E+05 | 4.90E+05 | 2.38E+06 | 1.61E+06 |
| Soils | 1.97E+02 | 1.27E+05 | 6.11E+05 | 2.55E+06 |
| Steel Container Materials | 1.41E+06 | 1.49E+06 | 1.05E+07 | 1.69E+07 |
| Plastic/Liners Container Materials | 2.55E+05 | 1.61E+05 | 1.21E+06 | 1.07E+06 |
| Celluolosics Packaging Materials | 3.78E+04 | 9.27E+03 | 8.99E+05 | 2.85E+04 |
| Steel Liner Materials | 0.00E+00 | 0.00E+00 | 1.98E+04 | 0.00E+00 |
| Total | 6.74E+06 | 7.11E+06 | 3.72E+07 | 4.13E+07 |

^{*} Consists of the summation of the WIPP Bound and the Potential waste streams.

¹ Molecke, Martin A., SAND79-1245, Gas Generation From Transuranic Waste Degradation: Data Summary and Interpretation, December 1979

² Gross, Michael B.; Letter to Rick Chavez, Gas Generation from WIPP Waste during the Preclosure Period; March 7, 2011

From the information presented in the last two columns of Table 1-8.1, slightly less than half of the waste identified in Table 1-8.1 has already been emplaced as of December 31, 2011.

The materials that are of interest with respect to hydrogen and methane gas generation are as follows:

- Organic materials that may form hydrogen by radiolysis or methane through anaerobic microbial degradation. These materials are represented by the following categories and associated WMPs:
 - o CPR, consisting of the following WMPs
 - Cellulosics
 - Rubber
 - Plastics
 - Plastic/liners container materials
 - Cellulosics packaging materials
 - Solidified Organic Material
- Waste containing absorbed water that may form hydrogen by radiolysis. The WMP of primary concern here is solidified inorganic material that typically consists of solidified aqueous sludges.
- Iron based metals that may corrode under anaerobic, wet conditions to form hydrogen. Iron based metals encompass the following WMPs:
 - o Iron based metals/alloys
 - o Steel container materials
 - Steel liner materials

The inventories for CPR, solidified organic material, solidified inorganic material and iron based metals are presented in Table 1-8.2. This table summarizes the distribution of potential hydrogen and methane gas generation materials currently emplaced and projected from the ATWIR.

Table 1-8.2. Distribution of Potential Hydrogen and Methane Gas Generation Materials

| | | | | ATWIR |
|-----------------------------|----------|----------|------------------|-----------|
| | Panel 3 | Panel 4 | Emplace d | Inventory |
| | (kg) | (kg) | Total (kg) | (kg) |
| CPR | 1.44E+06 | 1.88E+06 | 7.39E+06 | 4.53E+06 |
| Solidified Inorganic Solids | 2.41E+06 | 1.18E+06 | 7.28E+06 | 7.16E+06 |
| Solidified Organic Solids | 1.39E+05 | 4.90E+05 | 2.38E+06 | 1.61E+06 |
| Iron Based Metals | 2.36E+06 | 3.12E+06 | 1.75E+07 | 2.04E+07 |

The percentage distribution (based on the values in Table 1-8.1) for the potential hydrogen and methane gas generation materials is presented in Table 1-8.3.

Table 1-8.3. Percentage Distribution (Based on the Values in Table 1-8.1) of Potential Hydrogen and Methane Gas Generation Materials

| | | | Emplaced | ATWIR |
|-----------------------------|---------|---------|----------|-----------|
| | Panel 3 | Panel 4 | Total | Inventory |
| CPR | 21.4% | 26.5% | 19.9% | 11.0% |
| Solidified Inorganic Solids | 35.8% | 16.6% | 19.6% | 17.3% |
| Solidified Organic Solids | 2.1% | 6.9% | 6.4% | 3.9% |
| Iron Based Metals | 35.1% | 44.0% | 47.1% | 49.4% |

The information presented in Table 1-8.3 is presented graphically in Figure 1-8.1.

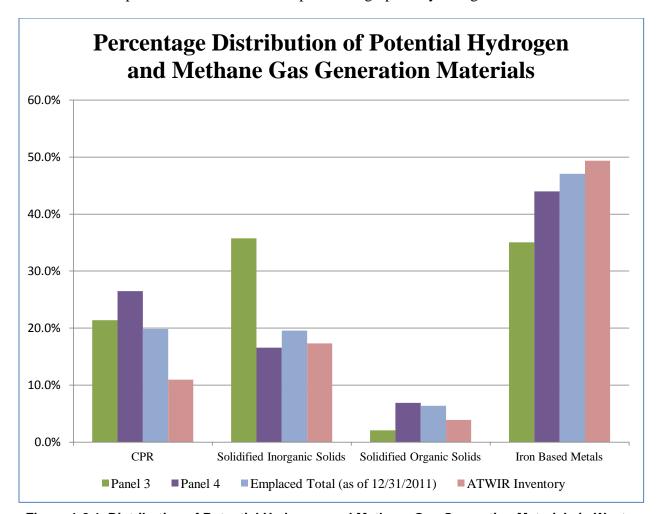


Figure 1-8.1. Distribution of Potential Hydrogen and Methane Gas Generation Materials in Waste

From Figure 1-8.1, the following observations can be made:

• Panel 4 contains the greatest percentage of CPR and solidified organic solids. The percentage of CPR in Panel 4 is over twice as high as the percentage in the ATWIR inventory, while the percentage of solidified organic solids is approximately 1.75 times higher than the percentage in the ATWIR inventory. Therefore, Panel 4 bounds the other inventories with respect to the percentage of CPR and solidified organic solids.

- Panel 3 contains the greatest percentage of solidified inorganic solids. The percentage of solidified inorganic solids in Panel 3 is slightly greater than twice as high as the percentage in the ATWIR inventory. Therefore, Panel 3 bounds the other inventories with respect to the percentage of solidified inorganic solids.
- The ATWIR inventory has the highest percentage of iron based metals/materials; however, this category is dominant in all the inventories and ranges from approximately 35% (Panel 3) to 49% (ATWIR inventory). The percentage of iron based metals/materials in Panel 4 (44%) is similar to the percentage in the ATWIR inventory (49%) (i.e., the percentage of iron based metals/materials in the ATWIR inventory is approximately 1.1 times greater than the percentage in the Panel 4 inventory). Therefore, Panel 4 reasonably represents the ATWIR inventory with respect to the percentage of iron based metals/materials.

Based on the information presented above, the inventory of potential hydrogen and methane materials emplaced in Panels 3 and 4 appear to reasonably represent, or bound, the waste projected for disposal at the WIPP facility (as identified in the 2012 ATWIR).

1-9: PMR Appendix D, Section V.E, Pages D-23 through D-29

URS (2013) provides regression plots of median, mean, and maximum hydrogen concentrations versus the months since room closure for Panels 3 and 4. However, using the median, mean, and maximum values in the regression analyses may not indicate whether the hydrogen concentration at a specific location could increase to levels greater than Action Level 1 or the Lower Explosive Limit during the time the repository will remain open. Please provide regression analyses for individual monitoring locations, particularly the locations with the highest hydrogen concentrations in Panel 4.

Response:

The requested regression analysis has been conducted and included in Revision 2 of the Statistical Analysis to Evaluate Methane and Hydrogen Concentrations in Filled Panels at the Waste Isolation Pilot Plant (August 2013). See Appendix 1-D for a copy of the August 2013 Revision 2 report.

The following information is taken and summarized from the Revision 2 report as it pertains to the comment:

Individual predictions are shown in Table 1-9.1 below (individual plots are presented in Appendices G and H of the statistical report). The soonest time to exceedance prediction within Panel 3 is more than 2,300 years for Rooms 1e and 2e to exceed Action Level 1 (10% of the lower explosive limit (**LEL**)). The corresponding time to LEL is more than 23,000 years. Within Panel 4, excluding the three rooms with static information due to plugged sample lines, the soonest time to exceedance prediction is 85 years for Room 1e to exceed Action Level 1. The corresponding time to LEL is more than 890 years.

Table 1-9.1: Predicted Time to Exceedance of Hydrogen Regulatory Thresholds in Individual Locations of Panels 3 and 4

| | WIPP - Hydrogen Levels | | | | |
|-------|--------------------------------------------|----------------|------------------------------|--|--|
| Panal | Location | | Exceedance (Years) | | |
| Panel | Location | Action Level 1 | Lower Explosive Limit | | |
| | 2e | 2300+ | 23000+ | | |
| | 2 i | 6900+ | 69000+ | | |
| 3 | 1e | 2300+ | 23000+ | | |
| 3 | EBW | 2600+ | 26000+ | | |
| | IBW | 5700+ | 57000+ | | |
| | Others | Never | Never | | |
| | 7e | 110 | 1200 | | |
| | *6e | *16 | *150 | | |
| | *5e | *31 | *320 | | |
| | *4e | *13 | *120 | | |
| | 4i | 230+ | 2400+ | | |
| | 3e | 130+ | 1400+ | | |
| 4 | 3i | 140+ | 1500+ | | |
| 7 | 2e | 99 | 1000+ | | |
| | 2 i | 170+ | 1800+ | | |
| | 1e | 85 | 890+ | | |
| | 1i | 110+ | 1100+ | | |
| | EBW | 160+ | 1600+ | | |
| | IBW | 140+ | 1500+ | | |
| | Others | Never | Never | | |
| | * Sample line is plugged; data are static. | | | | |

Because individual locations with sufficient data produced arch shaped plots indicating a reduction of hydrogen concentration accumulation, it is more appropriate to conduct the linear regressions on data in and after the peak regions for extrapolating to the future. Such later data were plotted for the locations within each panel (Figures 34 to 63 of the statistical report) and resulting regression slopes are captured in Table 1-9.2 below. Slopes are significantly negative, indicating that these data are trending downward. Based on the current trend, **no exceedance is predicted to ever occur at any of these locations**.

Table 1-9.2: Linear Regression Slopes for Individual Locations of Panel 3 and 4

| WIPP - Hydrogen Decline (ppmv/mo) | | | | |
|-----------------------------------|----------|----------|-------------|--|
| Panel | Location | Slope fr | e from Peak | |
| ranci | Location | Exhaust | Intake | |
| | 7 | -7.6 | na | |
| | 6 | -0.95 | -1.9 | |
| | 5 | -1.2 | -1.0 | |
| 3 | 4 | -0.40 | -0.35 | |
| J | 3 | -1.9 | -0.62 | |
| | 2 | -1.1 | -0.44 | |
| | 1 | -0.96 | na | |
| | BW | -1.2 | -0.14 | |
| | 7 | -23 | -21 | |
| | 6 | -22 | -19 | |
| | 5 | -13 | -15 | |
| 4 | 4 | -17 | -13 | |
| - | 3 | -13 | -14 | |
| | 2 | -8.6 | -9.1 | |
| | 1 | -4.9 | -6.5 | |
| | BW | -1.5 | -6.8 | |

From Table 1-9.1, the three shortest estimated time periods to reach Action Level 1 was 13 years, 31 years and 16 years at locations 4e, 5e, and 6e in Panel 4, respectively. The sample lines at each of these locations were lost due to plugging and so no data have been collected from these locations recently. Consequently, data at these locations are limited with respect to showing a downtrend that may have occurred as observed at other locations. However, when a sample line fails, the Permit requires the prior concentrations measured in an adjacent line, if it is still functioning, to be evaluated to determine if it is statistically similar to the prior measurements from the failed line. If the prior sampling results are statistically similar, then the lines can be grouped and the trends over longer time periods seen on adjacent lines can be applied to the failed lines. The results of the statistical evaluations for sample lines 4e, 5e, and 6e in Panel 4 are provided in Table 1-9.3.

Table 1-9.3 – Results of Failed Panel 4 Sample Lines 4e, 5e and 6e Statistical Evaluations

| Failed Sample Line Location | Date Determined as Failed | Statistical Evaluation Results ^a |
|--------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Panel 4 Room 4e | 4/7/2011 | Sample Results for hydrogen determined to be statistically similar to Panel 4 Room 3e. |
| Panel 4 Room 6e | 12/13/2011 | Sample results for hydrogen determined to be statistically similar to Panel 4 Room 7e and Panel 4 Room 5e. |
| Panel 4 Room 5e | 8/14/2012 | The statistical analysis performed indicated that the failed line is not statistically similar with adjacent working line Panel 4 Room 5i for hydrogen. No action necessary since most recent sample was below the first action level for hydrogen. Note: The results of Panel 4 Room 6e above indicate Panel 4 Room 5e is statistically similar based on the results up to the point of the loss of Panel 4 Room 6e. |

^a Statistical evaluation could not be performed for methane because methane was not detected.

Therefore, the downward trends seen in the adjacent areas can be applied for two of the three failed lines.

1-10: PMR Appendix D, Figures 12 and 13, Pages D-17 and D-18

Hydrogen concentrations in Panel 4, Room 7 (7e and 7i) and possibly in other rooms appear to decrease from mid-2011 through August 2012. However, increased hydrogen concentrations are observed in samples obtained from August 2012 through December 2012. Please provide hydrogen monitoring data for first two quarters of calendar year (CY) 2013 and evaluate any increasing concentration trends at individual monitoring locations, including whether these trends could result in hydrogen concentrations that exceed Action Level 1 or the Lower Explosive Limit (LEL) before repository closure.

Response:

Data from the first two quarters of calendar year (**CY**) 2013 have been included in Revision 2 of the <u>Statistical Analysis to Evaluate Methane and Hydrogen Concentrations in Filled Panels at the Waste Isolation Pilot Plant</u> (August 2013). See Appendix 1-D for a copy of the August 2013 Revision 2 report.

The revised plots with the added data are presented in Appendices A and B of the Revision 2 report. In general, the new data continue to indicate that accumulation rates for hydrogen are declining, and will likely continue to decline as source material (hydrogenous material) is depleted.

1-11: PMR Appendix B, Attachment G-1, Section 3.3.1 Page B-32

The PMR states: "The WPC VOC flow analyses are considered bounding because: (1) the pressure drop of 170 milli-inches (4 mm) of water gage is considered a maximum value...". The seven years of pressure drop data presented in the PMR (Page 327 of pdf; Appendix C, Tables B-1 and B-2) showed that in two of those years (2005 and 2009) the annual average pressure drops across closed waste panels (299 and 177 milli-inches, respectively) were greater than the proposed maximum value of 170 milli-inches. These higher average pressure drops would result in higher average air flow through the closed panels and therefore higher VOC releases than were calculated using a pressure drop of 170 milli-inches. Please justify the assertions that the proposed value of 170 milli-inches is a maximum and that the VOC flow analyses are therefore bounding.

Response:

Over the past few years, ventilation and maintenance activities in the WIPP underground facility have reduced the resistance to air flow in the E-300 drift:

• The overcast structures in the E-300 exhaust drift were removed by December 2010, thereby decreasing the resistance to air flow in the E-300 drift. Lower resistance to air flow reduces the pressure drop between adjacent panel entries.

- During the 2010 Long Maintenance Break (December 2010 through January 2011), the floor was trimmed in the E-300 exhaust drift to restore the height to at least the original height of 13 feet. Trimming the floor increases the cross sectional area of the drift which in turn reduces the resistance to air flow of the drift and reduces the pressure drop between adjacent panel entries.
- The reduction in pressure drop from removing the overcasts and increasing the cross sectional area of the E-300 exhaust drift is exhibited in Table 1-11.1 (below). Table 1-11.1 presents data from the March 2012 test and balance of the ventilation system. During the March 2012 test and balance, the average pressure drop measured across the entries to waste-filled Panels 1, 2, and 3 is 84 milli-inches water gage and the maximum pressure drop is 87 milli-inches water gage (see right-hand column of Table 1-11.1). These pressure differentials are approximately a factor of 2 less than the 170 milli-inches water gage used in the air flow calculations for VOC releases, which makes the airflow calculations conservative.

Panel* Panel Status (milli-inches water gage)

1 Filled 87
2 Filled 87
3 Filled 79

Table 1-11.1. Pressure Drop Data

1-12: PMR Page C-63

The PMR states: "This appendix presents the derivation of the air-flow model used to determine the performance of the WIPP Panel Closure (WPC). These derivations were used in the analyses in Section 3 to determine air flow from a single panel." This Appendix entitled Appendix A-Derivation of Relationships for the Air-Flow Models provides a discussion of the derivation of the Airflow Models used to calculate the airflow parameters of the WPC. Although Equations A-1 through A-28 provided in the appendix are presented in a straightforward manner, the input parameter values used in these equations are not consistently specified or justified. Please provide the appropriate input parameter values to allow further evaluation of the Permittees' calculations and analyses. In addition to the initial conditions used in the equations, please provide changes to conditions such as air flow gradient, air viscosity, air conductivity, and intrinsic permeability as a function of changing panel conditions (salt creep, inner bulkhead deterioration, VOC rates) that were considered.

Response:

The following provides additional information on the input parameters used in the air flow model used to determine the performance of the WPC, as presented in Sections 3.3.3 and 3.3.4 of Appendix C of the PMR (see pages C-38 through C-46) and in Appendices A and B of Appendix

^{*}Only waste-filled Panels 1, 2, and 3 are presented since they were the only ones where ventilation was not being diverted around the panel entries when the test and balance was performed in March 2012.

C (see pages C-62 through C-81). The following discussion addresses the calculation of air flow rates in Figure 3-12 of the PMR (Item 1, Appendix C, p. C-44).

Initial and Boundary Conditions

The pressure boundary condition is a pressure drop across the WPC of 170 milli-inches of water gage as determined by the data analysis presented in the design report (PMR, Item 1, Appendix B of Appendix C, p. C-78).

Air Resistances and Cross Sectional Areas

The initial air flow resistance occurs through two ventilation bulkheads out-bye of the intake and exhaust drifts and 200 feet of ROM salt (100 feet in each drift) and through the surrounding disturbed rock zone consisting of dilated salt, fractured salt, clay seams, and Marker Bed 139. Table 1-12.1 summarizes the input values for the air conductivity and cross-sectional flow areas of the four components of the surrounding disturbed rock zone (DOE, 1996, Table 2-2). The dimensions of the drifts are obtained from Design Drawing 262-002 in the PMR (Item 1, Appendix D of Appendix C, p. C-114). The cross-sectional flow areas, flow lengths, and air resistances are assumed constant for all components except for the ROM salt.

| Disturbed Rock Zone Component | Air Conductivity (m/s) | Total Cross Sectional Area* (m²) |
|-------------------------------|-------------------------|----------------------------------|
| Dilated Salt | 6.2 × 10 ⁻¹⁴ | 170 |
| Fractured Salt | 6.2×10^{-10} | 16 |

Table 1-12.1. Input Parameters for Disturbed Rock Zone Components

 6.2×10^{-12}

 6.2×10^{-11}

Source: DOE, 1996, Table 2-2.

Clay Seams

Marker Bed 139

Compacted Salt Permeability Relationship

For the ROM salt backfill, the permeability is a function of the porosity which equals one minus the fractional density. The fractional density versus time is obtained from the FLAC3D analysis (PMR, Item 1, Appendix C, Figure 3-6, p. C-33). The relationship of intrinsic permeability to the porosity of the ROM salt is determined from Kelsall et al. (1983, Eq. A-4):

$$k(Z,\phi) = Z^{2}(0.0178) \exp(21 + 6 \cdot \ln(\phi))$$
 (1)

.09

where k is permeability (darcies),

Z is the average particle diameter (here 0.34 cm), and ϕ is the porosity of the ROM salt.

The intrinsic permeability from Equation (1) is in darcies, which can be converted to the units of $[m^2]$ based on 1 darcy = 10^{-12} m² (Freeze and Cherry, 1979, p. 29).

^{*}Total area is the sum of the areas in the intake and exhaust drifts; the individual areas for the intake drift or exhaust drift are shown subsequently in Table 1-12.2.

Equation (1) is the same as the relationship from Shor et al. (1981) that is used in the VOC analysis. For a mean particle size of 0.34 cm (i.e., Z = 0.34), Equation (1) provides an upper bound on the measured permeability values for crushed salt core from the WIPP repository horizon, as shown by the black (top) curve in Figure 1-7.1. Air conductivity is calculated from intrinsic permeability using Equation (A-2) of the PMR (Item 1, Appendix A of Appendix C, p. C-64). The values of air density and air viscosity were obtained from Lindberg (1986, p. 3-41): air density is 0.0735 lbf/ft^3 and air viscosity is $3.85 \times 10^{-7} \text{ lbf·sec/ (ft}^2$). Units shown here are as reported by the source and were converted to metric units for calculating the air conductivities presented in Tables 1-12.1 and 1-12.2.

Ventilation-Induced Flow through the WPC from 5 to 28 years (with an Air Gap)

After placement of ROM salt³, there is a short period when the air gap above the ROM salt is small. However, the ROM salt begins to consolidate, resulting in an air gap above the salt that forms after several months (see PMR, Item 1, Appendix C, Figure 3-7, p. C-34 and Figure 3-8, p. C-35). The FLAC3D models indicate that the air gap closes 23 years after emplacing ROM salt, which is 28 years after room excavation. Based on the sensitivity analysis described in the response to Item 1-5, the predictions of the VOC emissions model are insensitive to bulkhead resistance at all times after panel closure. The following discussion of the VOC air flow model is provided for completeness.

Until the air gap closes, air flow resistance is dominated by the resistance of the ventilation bulkheads with an assumed air flow resistance of 2,200 practical units for each bulkhead (PMR, Item 1, Appendix C, p. C-37). This value for bulkhead resistance is consistent with well-maintained bulkheads in the WIPP underground, as demonstrated by the response to Item 1-5. The air flow rate through the WPC is then calculated from the Square Law:

$$h_L = R_{Bulk} \cdot Q^2 \tag{2}$$

where h_L is the head loss (milli-inches of water gage),

 R_{bulk} is the air flow resistance of a bulkhead(s) (Practical Units), and Q is the air flow rate in thousands of cubic feet per minute (kcfm).

A panel with a ventilation bulkhead in the intake and exhaust drifts has a combined air flow resistance of 4,400 practical units. With a pressure drop across the WPC of 170 milli-inches, the air flow rate through the WPC, with an air gap above the ROM salt, is calculated as:

$$Q = \sqrt{\frac{h_L}{R_{Bulk}}} = \sqrt{\frac{170}{4400}} = 0.196 \cdot kcfm = 196 \cdot cfm$$
 (3)

³The FLAC3D calculations assume a room is excavated at 0 years and filled with ROM salt after 5 years. The air gap closes 23 years after emplacement, or a total of 28 years since the room is excavated.

Flow Parameters for ROM Salt after 28 Years (No Air Gap)

Twenty eight years after the disposal panel was excavated, the FLAC3D results indicate that the air gap has closed and the fractional density of the consolidated ROM salt in the intake drift is about 0.88 (PMR, Item 1, Appendix C, Figure 3-6, p. C-33), with a porosity of (1 - 0.88) = 0.12. The intrinsic permeability of consolidated ROM salt in the intake drift is about 1×10^{-11} m², based on the black (top) curve in Figure 1-7.1. The air conductivity is calculated to be 6.4×10^{-6} m/s, using Equation (A-2) (Item 1, Appendix A of Appendix C, p. C-64) of the PMR to convert from intrinsic permeability to air conductivity. The air conductivity of the ROM consolidated salt in the exhaust drift is slightly lower, 2.7×10^{-6} m/s, because the fractional density of the exhaust drift is slightly higher, almost 0.90 (PMR, Appendix C, Figure 3-6, p. C-33), after 28 years.

Sample Calculation for Ventilation-Induced Air Flow after 28 Years (No Air Gap)

Twenty eight years after the disposal panel was excavated, there are two parallel flow paths: (1) through the disturbed rock zone, and (2) through the ROM salt. The air conductance through the four components of the disturbed rock zone is given by Equation (A-4) of the PMR for n = 4 (PMR, Item 1, Appendix A of Appendix C, p. C-65):

$$\sum_{i=1}^{4} \frac{K_i \cdot A_i}{L_i} \tag{4}$$

where K_i is the air conductivity (m/s) of the i^{th} component (Table 1-12.1), A_i is the cross-sectional flow area (m²) of the i^{th} component (Table 1-12.1), and

 L_i is the length of the flow path (m) of the i^{th} component. Table 1-12.2 shows a sample flow calculation for the intake and exhaust drifts after closure of the air gap. Air conductance through the disturbed rock zone surrounding the intake drift is 2.12×10^{-10} m²/s, based on Equation (4), the data in Table 1-12.1, and flow lengths of 100 feet (30.5 m). This value is identified by the first yellow highlight in Table 1-12.2.

Table 1-12.2. Sample Flow Calculation after the Air Gap Closes at 28 Years after the Disposal Panel was Excavated

| Property | Value | Units |
|---------------------|--------|-------|
| Water Density | 62.2 | pcf |
| Air Density | 0.0735 | pcf |
| Length of Component | 100 | ft |

Air Conductance Through Other System Components Intake Drift

| Component | Air Conductivity (m/s) | Estimated Cross Section Area (m ²) | Conductance (m ² /s) |
|----------------|------------------------|------------------------------------------------|---------------------------------|
| Dilated Salt | 6.20E-14 | 103.3 | 2.10E-13 |
| Fractured Salt | 6.20E-10 | 9.72 | 1.98E-10 |
| Clay Seams | 6.20E-12 | 0.055 | 1.12E-14 |
| Marker Bed 139 | 6.20E-11 | 6.682 | 1.36E-11 |

| Sum of Other Components Intake Drift (Equation A-4) | 2.12E-10 | m ² /s |
|----------------------------------------------------------|----------|-------------------|
| Estimated Consolidated ROM Air Conductivity Intake Drift | 6.40E-06 | m/s |
| Cross Sectional Area of Intake Drift | 22.555 | m ² |
| Conductance of the ROM Consolidated Salt Intake Drift | 4.74E-06 | m ² /s |

Air Conductance Through Other System Components Exhaust Drift

| Component | Air Conductivity (m/s) | Estimated Cross Section Area (m ²) | Conductance (m²/s) |
|----------------|------------------------|------------------------------------------------|--------------------|
| Dilated Salt | 6.20E-14 | 66.7 | 1.36E-13 |
| Fractured Salt | 6.20E-10 | 6.28 | 1.28E-10 |
| Clay Seams | 6.20E-12 | 0.035 | 7.12E-15 |
| Marker Bed 139 | 6.20E-11 | 4.318 | 8.78E-12 |

| Sum of Other Components Exhaust (Equation A-4) | 2.12E-10 | m ² /s |
|--------------------------------------------------------|----------|-------------------|
| Estimated Air Conductivity Exhaust Drift | 6.40E-06 | m/s |
| Cross Sectional Area of Exhaust Drift | 22.555 | m ² |
| Conductance of the ROM Consolidated Salt Exhaust Drift | 4.74E-06 | m ² /s |

| A(t) Intake Drift (Equation A-12) | 4.74E-06 | m²/s |
|------------------------------------|----------|------|
| B(t) Exhaust Drift (Equation A-13) | 1.16E-06 | m²/s |

| Head 1 | 170 | milli inches Water Gage |
|------------------------|--------|-------------------------|
| Head 4 | 0 | milli inches Water Gage |
| Head 2 (Equation A-15) | 136.51 | milli inches Water Gage |

| Flow Rates | Intake Drift (Left Side of Equation A-11) | 3.41E-06 | m ³ /s |
|------------|---------------------------------------------|----------|-------------------|
| | Exhaust Drift (Right Side of Equation A-11) | 3.41E-06 | m ³ /s |
| | Intake Drift (Left Side of Equation A-11) | 0.0072 | cfm |
| | Exhaust Drift (Right Side of Equation A-11) | 0.0072 | cfm |

| Gas Generation | 0.1 | mol/drum/yr |
|------------------------------------------|--------|--------------------|
| Volume One Mole Gas | 0.0245 | m³/mol |
| No. of Drums per Panel | 41140 | drums per panel |
| Volumetric Flow Rate Gas Generation | 100.8 | m ³ /yr |
| Volumetric Flow Rate Panel Creep Closure | 812 | m ³ /yr |
| Total Source Term Volumetric Flow Rates | 912.8 | m ³ /yr |
| | 0.061 | cfm |
| Total Flow Rate | 0.069 | cfm |

The ROM salt is the second flow path. After the air gap closes, the air conductivity of the ROM salt in the intake drift, K_{air} , is 6.4×10^{-6} m/s based on the calculation in the previous section. The cross-sectional flow area through the consolidated ROM salt, $A_{ROM\ salt}$, in the intake drift is estimated to be 22.5 m². The air conductance through 100 feet (30.5 m) of consolidated ROM salt in the intake drift is then calculated as:

$$\frac{K_{air}A_{ROM\ salt}}{L_{ROM\ salt}} = \frac{6.4 \cdot 10^{-6} \cdot 22.5}{30.479} = 4.74 \cdot 10^{-6} \cdot \frac{m^2}{s}$$
 (5)

This numerical result is shown by the second yellow highlight in Table 1-12.2. The conductance of the ROM salt in Equation (5) is more than 4 orders of magnitude greater than the conductance of the disturbed rock zone, which is 2.12×10^{-10} m²/s. This result demonstrates that the ventilation-induced flow through the WPC is predominantly through the consolidated ROM salt after closure of the air gap, with only very small flow through the surrounding disturbed rock zone.

Summary of Ventilation-Induced Air Flow through the WPC after 28 Years (No Air Gap)

The air flow through the WPC after 28 years is calculated using the relationships in PMR, Item 1, Appendix A of Appendix C, and neglects air flow resistance through the waste-filled panels. The pressure drop across the intake and exhaust drifts is 170 milli-inches of water gage. The time-dependent air conductance for the intake and exhaust drifts, denoted as A(t) and B(t), are defined by Equations (A-12) and (A-13) of the PMR (Item 1, Appendix A of Appendix C, p. C-69), respectively. The flow analysis evaluates the air conductance through the ROM salt and the surrounding disturbed rock zone for both the intake and exhaust drifts. The head at the intermediate point, node h_2 , is calculated from Equation (A-15) of the PMR (Item 1, Appendix A of Appendix C, p. C-69), and equals 136.5 milli-inches water gage (see third yellow highlight in Table 1-12.2). Equation (A-11) of the PMR (Item 1, Appendix A of Appendix C, p. C-68) is then used to calculate the air flow rates induced by ventilation (see block of four yellow highlights at the bottom of Table 1-12.2). The calculated air flow rate due to ventilation is 0.0072 cfm after 28 years.

Flow from Gas Generation and Panel Creep Closure

The VOC air flow model also includes source terms for gas generation and for panel creep closure, as shown at the bottom of Table 1-12.2. The average number of drums in a panel is estimated to be 41,140 drums (Kehrman, 2012). The estimated gas generation rate is 0.1 mols per drum per year. One mole of air occupies 24.5 liters (0.0245 m³) at ambient repository temperature and pressure. Assuming any gas generated is immediately expelled from the panel, the resulting flow rate from gas generation in a panel is:

$$Q_g = g_r \cdot N \cdot V_{atm} \tag{6}$$

where Q_g is the volumetric flow rate (m³/yr) from gas generation, g_r is the gas generation rate (0.1 mols per drum per year), N is the average number of drums in a panel (41,140 drums per panel), and V_{atm} is the volume of one mole of gas at repository conditions (0.0245 m³/mole).

Then
$$Q_g = (0.1)(41140)(0.0245) = 100.8 \cdot \frac{m^3}{vr} = .0066 \cdot cfm$$
 (7)

Panel creep closure also displaces air out of each panel. DOE (1996, p. B-5) estimates this air flow rate as 812 m^3 per year (0.055 cfm). The combined flow rate from gas generation and creep closure, $0.0066 \text{ cfm} + 0.055 \text{ cfm} \sim 0.061 \text{ cfm}$, is large compared to the flow rate induced by ventilation through the ROM salt after 28 years, 0.0072 cfm, when the air gap is closed.

1-13: Page C-65

The PMR states: "Air conductance is defined as the product of the air conductivity and cross sectional area divided by the flow path length. The effective flow conductance for a parallel system consisting of flow components can be obtained in terms of the conductances of its flow components...". Equations A3 and A4 are used to calculate the air flow permeability. The equations use a number of air flow components that are summed to calculate the air flow conductance at a given set of panel conditions. Please provide additional information regarding the nature of these components including the total number of components, distance interval of each component, and how these components may change as a function of time and distance given the impact of salt creep on these calculations as used in the modeling. Item 1-13.

Response:

Input parameters, governing relationships, and sample calculations are provided in the response to Comment No. 1-12. This analysis includes the various flow sources (ventilation, gas generation, and room closure) and the various flow components (ventilation bulkheads, ROM salt, and the surrounding disturbed rock zone). The calculations are based on the relationships in Appendix A of Appendix C of Item 1 of the PMR. During the first 23 years after emplacement of ROM salt backfill, there is an air gap above the ROM salt and air flow through the panel closure is dominated by flow through this gap. After this air gap closes, the majority of the flow rate from a waste filled panel comes from gas generation and creep closure. Source terms for creep closure and gas generation are the dominant flow generation mechanisms, and the dominant air flow resistance is provided by the consolidated ROM salt backfill. See response to Comment No. 1-12 above for additional information.

1-14: PMR (General)

The PMR did not discuss the potential impact of the Klinkenberg Effect on air permeability of the ROM salt after closure of the gap. If applicable, the Klinkenberg Effect will have a tendency to increase air permeability due to decreased viscosity on pore surfaces. Please provide this information. Item 1-16.

Response:

The correction for the Klinkenberg effect is minor compared to the conservatism in the Permittees' use of an upper bound for the permeability of ROM salt, as discussed in the response to Comment No. 1-7 above. In other words, the permeability of ROM salt is an upper bound that encompasses the magnitude of the Klinkenberg effect for ROM salt.

The correction for the Klinkenberg effect in the ROM salt is also minor compared to the change in intrinsic (liquid) permeability as the ROM salt consolidates.

Table 1-14.1 provides an estimate of the magnitude of the Klinkenberg correction as a function of the intrinsic permeability of the ROM salt. The correction is estimated using a Klinkenberg factor, b, from the American Petroleum Institute. The value of b is a function of permeability. It is also medium and gas dependent, hence Table 1-14.1 is an estimate. The mean flowing gas pressure, \overline{P} , is assumed to be 1 atmosphere, which is reasonable for a waste-filled panel with slow flow of ventilation air.

Table 1-14.1. Variation of Klinkenberg Correction Factor as a Function of Permeability

| | | Klinkenberg Correction |
|-----------------------------------------------------|------|------------------------------------------------|
| ROM Salt Intrinsic (Liquid) Permeability | b | $\frac{k_g}{k_l} = 1 + \frac{b}{\overline{P}}$ |
| 100 millidarcy (10 ⁻¹³ m ²) | 0.12 | 1.12 |
| 10 millidarcy (10 ⁻¹⁴ m ²) | 0.3 | 1.3 |
| 1 millidarcy (10 ⁻¹⁵ m ²) | 0.75 | 1.75 |
| 0.1 millidarcy (10 ⁻¹⁶ m ²) | 2 | 3 |
| 0.01 millidarcy (10 ⁻¹⁷ m ²) | 5 | 6 |

Source: Values of b from American Petroleum Institute (Amyx et al, 1960, Figure 2-43 on p. 93).

Table 1-14.1 shows that the Klinkenberg correction increases by a factor of approximately 6 as the ROM salt permeability changes over 5 orders of magnitude, from 10^{-13} m² to 10^{-17} m². Clearly, the Klinkenberg correction is relatively minor compared to the total change in intrinsic permeability as ROM salt consolidates. The Klinkenberg correction is also minor compared to the major conservatisms in the VOC air flow model:

- 1. The permeability relationship for crushed salt (Shor et al. 1981) overestimates measured values of crushed salt permeability by a factor of 30 to 100 (see black (top) curve versus data in Figure 1-7.1 and the discussion for Item 1-7). Higher values of permeability increase the air flow through the panel closure by a factor of 30 to 100 once the air gap closes above the ROM salt.
- 2. The pressure drop between the intake and exhaust drifts of a closed panel is assumed to be 170 milli-inches water gage for the air flow model, while maintenance activities in 2012 have reduced the typical pressure drop to 79 and 87 milli-inches water gage, as shown in Table 1-11.1. The assumed pressure drop of 170 milli-inches will increase the air flow through the panel closure by a factor of approximately 2 at all times relative to the data from 2012.

Given these considerations, the Permittees have not included a Klinkenberg correction in the VOC air flow model.

1-15: PMR Appendix D, Tables 1 and 2, Pages D-10 and D-11

Mean hydrogen concentrations are generally higher in Panel 4 than in Panel 3. Please compare the waste inventories in Panels 3 and 4 (including iron-based metals, organic matrices, and

cellulosics, plastics and rubbers) to determined potential causes of these different gas concentrations.

Response:

The requested comparison is in the response to Comment No. 1-8.

Additionally, a comparison of the gas generation potential between the inventory of emplaced waste in Panels 3 and 4 was performed based upon waste types used in transportation of the waste to the WIPP facility. This comparison is as follows:

Radiolytic gas generation can be quantified by G value. The G value equals the number of molecules of hydrogen generated per 100 electron volts of energy absorbed. The higher the G value of a material, then, the higher the gas generation potential for that material. The G value is determined by the chemical form of the waste and, in general, all contact-handled transuranic (**CH-TRU**) waste can be classified into four general waste types, based on gas generation potential. These four waste types are as follows:

- Waste Type I Solidified aqueous or homogenous inorganic solids
 - Examples are absorbed, adsorbed, or solidified inorganic liquid; soils, solidified particulates, or sludges formed from precipitates; and concreted inorganic particulate waste
- Waste Type II Solid inorganics
 - o Examples are glass, metal, crucibles, and other solid inorganics
- Waste Type III Solid organics
 - o Examples are plastics, cellulose, cemented organic solids, and other solid organics
- Waste Type IV Solidified organics (i.e., cemented or immobilized organic solvents)

Except for Waste Type IV, these waste types have been assigned a G value. A specific G value for Waste Type IV is currently not assigned, but this should not be interpreted that Waste Type IV does not generate gas. Waste Type IV is known to have the potential to generate significant quantities of hydrogen at high temperature through gas generation testing, but a consistent G value has not been determined for this waste type yet. Testing is required to determine the hydrogen gas generation rate for this waste type.

Another category of waste is called "Quick to WIPP." This category consists of high-wattage (i.e., high decay heat) payload containers that contain Waste Type III materials that are very likely to generate hydrogen at a high rate due to the higher decay heat. Decay heat is important because the greater the decay heat, the more energy is absorbed by the waste material and the greater the gas generation rate. Therefore, the "Quick to WIPP" typically represents the waste category with the greatest radiolytic gas generation potential, except for possibly Waste Type IV, which does not have an assigned G value at this time.

Table 1-15.1 summarizes information for waste emplaced in Panels 3 and 4 broken down by waste type and the "Quick to WIPP" category.

Table 1-15.1. Summarized Information for CH TRU Waste Emplaced in Panels 3 and 4

| Wa | ste Type | Panel 3 | Panel 4 | Max. G Value |
|----------------|-------------------|----------------------------------------------------|----------------|--------------|
| Waste Type I | | Solidified aqueous or homogeneous inorganic solids | | 1.6 |
| | 55-gal Drums | 13100 | 6290 | |
| | SWBs | 0 | 0 | |
| | Subtotal | 13100 | 6290 | |
| Waste Type II | | Solid in | organics | 1.7 |
| | 55-gal Drums/POCs | 1093 | 426 | |
| | SWBs | 33 | 49 | |
| | Subtotal | 1126 | 475 | |
| Waste Type III | | Solid organics | | 3.4 |
| | 100-gal Drums | 5409 | 11052 | |
| | 55-gal Drums/POCs | 20467 | 16398 | |
| | SWBs | 107 | 188 | |
| | Subtotal | 25983 | 27638 | |
| Waste Type IV | | Solidified | dorganics | Unknown |
| | 55-gal Drums | 726 | 3056 | |
| | SWBs | 0 | 23 | |
| | Subtotal | 726 | 3079 | |
| Quick to WIPP | | High-wattage | Waste Type III | 3.4 |
| | 55-gal Drums | 1065 | 1309 | |
| | TOTAL | 42000 | 38791 | |

For Waste Type III, 100-gallon (100-gal) drums are used to package supercompacted waste. Approximately three to five 55-gallon (55-gal) drums of supercompacted waste are placed into one 100-gal drum. Thus one 100-gal drum roughly equates to 4 55-gal drums by weight. Therefore, one can roughly convert one 100-gal drum to a 55-gal drum equivalent by multiplying by 4. One can also roughly convert one standard waste box (**SWB**) to a 55-gal drum equivalent by multiplying by 4. If this is done for the waste identified as Waste Type III in Table 1-15.1 one calculates the following 55-gal drum equivalents:

- Panel 3: 42,531 55-gal drum equivalents
- Panel 4: 61,358 55-gal drum equivalents

Upon conversion to 55-gal drum equivalents, it is apparent that Panel 4 contains the greater quantity of Waste Type III. Waste in Panel 4 has a greater radiolytic gas generation potential because it contains more Waste Type III (maximum G value of 3.4), Waste Type IV (G value not assigned) and "Quick to WIPP" waste (maximum G value of 3.4) than Panel 3. This conclusion is supported by the data from the room based hydrogen and methane monitoring program, specifically, higher hydrogen concentrations have been observed from Panel 4 than Panel 3.

Appendix 1-A

Revised Redline/Strikeout of Permit Text for Permit Part 7, Section 7.3.2.1, and Attachments G and G1

Changes to the redline/strikeout of the Permit text as presented in the submitted PMR are identified in yellow.

7.3.2 Post-Closure Care and Monitoring

7.3.2.1 General Monitoring, Inspection, and Maintenance Requirements

The Permittees shall monitor and perform inspections of the Underground HWDU closures, and perform maintenance of the <u>accessible bulkheads of the closures</u>, as <u>necessary</u>elosed <u>Underground HWDU access drifts after construction of each HWDU closure system</u>, as specified in Permit Attachment A2 (Geologic Repository). The Permittees shall monitor and maintain the components, structures and equipment of the waste containment systems at the facility as specified in Permit Attachments H and H1, and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.117(a)(1)(ii)).

Appendix 1-A 1-A-2 of 100 Panel Closure

ATTACHMENT G

CLOSURE PLAN

Introduction

This plan was submitted to the New Mexico Environment Department (**NMED**) and the U.S. Environmental Protection Agency (**EPA**) in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.14(b)(13)). Closure at the panel level will include the construction of barriers to limit the emission of hazardous waste constituents from the panel into the mine ventilation air stream below levels that meet environmental performance standards¹ and to mitigate the impacts of methane buildup and deflagration that may be postulated for some closed panels. The Post-Closure Plan (Permit Attachment H) includes the implementation of institutional controls to limit access and groundwater monitoring to assess disposal system performance. Until final closure is complete and has been certified in accordance with 20.4.1.500 NMAC (incorporating 40 CFR §264.115), a copy of the approved Closure Plan and all approved revisions will be on file at the WIPP facility and will be available to the Secretary of the NMED or the EPA Region VI Administrator upon request.

G-1a(2) Miscellaneous Unit

Post-closure migration of hazardous waste or hazardous waste constituents to ground or surface waters or to the atmosphere, above levels that will harm human health or the environment, will not occur due to facility engineering and the geological isolation of the unit. The engineering aspects of closure are centered on the use of panel closures on each of the underground HWDUs and final facility seals placed in the shafts. The design of the panel closure system is based on the criteria that the closure system for closed underground HWDUs will prevent migration of hazardous waste constituents in the air pathway in concentrations above health-based levels beyond the WIPP land withdrawal boundary during the 35 year operational and facility closure period and to withstand any flammable gas deflagration that may occur prior to final facility closure.

G-1d(1) Schedule for Panel Closure

The anticipated schedule for the closure of the underground HWDUs known as Panels 3 through 8 is shown in Figure G-2. This schedule assumes there will be little contamination within the exhaust drift of the panel. Underground HWDUs should be ready for closure according to the schedule in Table G-1. These dates are estimates for planning and permitting purposes. Actual dates may vary depending on the availability of waste from the generator sites.

Appendix 1-A 1-A-3 of 100 Panel Closure

¹ The mechanism for air emissions prior to closure is different than the mechanism after closure. Prior to closure, volatile organic compounds (VOC) will diffuse through drum filters based on the concentration gradient between the disposal room and the drum headspace. These VOCs are swept away by the ventilation system, thereby maintaining a concentration gradient that is assumed to be constant. Hence, the VOCs in the ventilation stream are a function of the number of containers only. After closure, the panel air will reach an equilibrium concentration with the drum headspace and no more diffusion will occur. The only mechanism for release into the mine ventilation system is due to pressure that builds up in the closed panel. This pressure arises from the creep closure mechanism that is reducing the volume of the rooms and from the postulated generation of gas as the result of microbial degradation of organic matter in the waste. Consequently, the emissions after panel closure are a direct function of pressurization processes and rates within the panel.

In the schedule in Figure G-2, notification of intent to close occurs 30 days before placing the final waste in a panel. Once a panel is full, the Permittees will initially block ventilation through the panel as described in Permit Attachment A2. Section A2-2a(3) "Subsurface Structures." and then will assess the closure area for ground conditions and contamination so that a definitive schedule and closure design can be determined. If as the result of this assessment the Permittees determine that a panel closure cannot be emplaced in accordance with the schedule in this Closure Plan, a modification will be submitted requesting an extension to the time for closure.

The Permittees will initially block ventilation through Panel 5 as described in Permit Attachment A2, Section A2-2a(3), "Subsurface Structures," once Panel 5 is full. The Permittees will then install the explosion-isolation wall portion of the panel closure system that is described in Permit Attachment G1, Section 3.3.2, "Explosion- and Construction-Isolation Walls." Construction of the explosion-isolation wall shall be completed within 180 days after the last receipt of waste in Panel 5. Final closure of Panels 1, 2, and 5 will be completed as specified in this Permit no later than January 31, 2016.

To ensure continued protection of human health and the environment, the Permittees will initially block ventilation through Panels 3 through 7 as described in Permit Attachment A2, Section A2-2a(3), after waste disposal in each panel has been completed. The Permittees shall continue VOC monitoring in such panels until final panel closure. If the measured concentration, as confirmed by a second sample, of any VOC in a panel exceeds the "95% Action Level" in Permit Part 4, Table 4.6.3.2, the Permittees will initiate closure of that panel by installing the 12-foot explosion-isolation wall as described in Section G-1e(1) and submit a Class 1* permit modification request to extend closure of that panel, if necessary. Regardless of the outcome of disposal room VOC monitoring, final closure of Panels 3 through 7 will be completed as specified in this Permit no later than January 31, 2016.

G-1e Closure Activities

Closure activities include those instituted for panel closure (i.e., closure of filled underground HWDUs), contingency closure (i.e., closure of surface HWMUs and decontamination of other waste handling areas), and final facility closure (i.e., closure of surface HWMUs, D&D of surface facilities and the areas surrounding the WHB, and placement of repository shaft seals). Panel closure systems will be emplaced to separate areas of the facility and to isolate panels. Permit Attachments G1 and G2 provide panel closure system and shaft seal designs descriptions.

respectively. All closure activities will meet the applicable quality assurance (QA)/quality control (QC) program standards in place at the WIPP facility. Facility monitoring procedures in place during operations will remain in place through final closure, as applicable.

G-1e(1) Panel Closure

Following completion of waste emplacement in each underground HWDU, disposal-side ventilation will be established in the next panel to be used, and the panel containing the waste will be closed. A panel closure system will be emplaced in the panel access drifts, in accordance with the design_description and specification in Permit Attachment G1 and the schedule in Figure G-2 and Table G-1. The panel closure system is designed to meet the following requirements that were established by the DOE for the design to comply with 20.4.1.500 NMAC (incorporating 40 CFR §264.601(a)):

Appendix 1-A 1-A-4 of 100 Panel Closure

- the panel closure system shall <u>contribute to meeting the environmental performance</u> <u>standards in Permit Part 4, Section 4.6.2 by mitigating the migration of VOCs from</u> <u>closed panels</u> limit the migration of VOCs to the compliance point so that compliance is achieved by at least one order of magnitude
- the panel closure system shall consider potential flow of VOCs through the disturbed rock zone (**DRZ**) in addition to flow through closure components
- the panel closure system shall perform its intended functions under loads generated by creep closure of the tunnels
- the panel closure system shall perform its intended function under the conditions of a postulated methane explosion
- the nominal operational life of the closure system is 35 years
- the panel closure system <u>may require minimal maintenance per 20.4.1.500 NMAC</u> (<u>incorporating 40 CFR 264.111</u>) for each individual panel shall not require routing maintenance during its operational life
- the panel closure system shall address the <u>expected</u> ground conditions expected in the waste disposal area
- the design class of the panel closure system shall be <u>built of substantial construction</u> and non-combustible material except for flexible flashing used to accommodate salt <u>movement IIIb</u> (which means that it is to be built to generally accepted national design and construction standards)
- the design and construction shall follow conventional mining practices
- structural analysis shall use data acquired from the WIPP underground
- materials shall be compatible with their emplacement environment and function
- treatment of surfaces in the closure areas shall be considered in the design
- thermal cracking of concrete shall be addressed
- during construction, a QA/QC program shall be established to verify material properties and construction practices
- construction of the panel closure system shall consider shaft and underground access and services for materials handling

The performance standard for air emissions from the WIPP facility is established in Permit Part 4-and Permit Attachment A2. Releases shall be below these limits for the facility to remain in compliance with standards to protect human health and the environment. The following-panel closure design has been shown, through analysis, to meet these standards, if emplaced in accordance with the specifications in Permit Attachment G1.

Appendix 1-A 1-A-5 of 100 Panel Closure

The approved design for the panel closure system calls for a composite panel barrier system consisting of a rigid concrete plug with removal of the DRZ, and an explosion-isolation wall. The design basis for this closure is such that the migration of hazardous waste constituents from closed panels during the operational and closure period would result in concentrations well below health-based standards. The source term used as the design basis included the average concentrations of VOCs from CH waste containers as measured in headspace gases through November 2010 January 1995. The VOCs are assumed to have been released by diffusion through the container vents and are assumed to be in equilibrium with the air in the panel. Emissions from the closed panel occur at a rate determined by gas generation within the waste and creep closure of the panel.

Figures G-4 and G-5 show a diagram of the panel closure design and installation envelopes. Permit Attachment G1 provides the detailed design description and associated specification and drawings the design analysis for the panel closure system. Although the permit application proposed several panel closure design options, depending on the gas generated by wastes and the age of the mined openings, the NMED and EPA determined that only the most robust design option (D) would be approved. This decision does not prevent the Permittees from continuing to collect data on the behavior of the wastes and mined openings, or proposing a modification to the Closure Plan in the future, using the available data to support a request for reconsideration of one or more of the original design options. If a design different from Option D as defined in Permit Attachment G1 is proposed, the appropriate permit modification will be sought.

G-1e(2) Decontamination and Decommissioning

The objective of D&D activities at the WIPP facility is to return the surface to as close to the preconstruction condition as reasonably possible, while protecting the health and safety of the public and the environment. Major activities required to accomplish this objective include, but are not limited to the following:

- 1. Review of operational records for historical information on releases
- 2. Visual examination of surface structures for evidence of spills or releases
- 3. Performance of site contamination surveys
- 4. Decontamination, if necessary, of usable equipment, materials, and structures including surface facilities and areas surrounding the WHB.
- Disposal of equipment/materials that cannot be decontaminated but that meet the treatment, storage, and disposal facility waste acceptance criteria (TSDF-WAC) in an underground HWDU
- 6. Emplacement of final-panel closure system in the last HWDU
- 7. Emplacement of shaft seals²

Appendix 1-A 1-A-6 of 100 Panel Closure

² For the purposes of planning, the conclusion of shaft sealing is used by the DOE as the end of closure activities and the beginning of the Post-Closure Care Period.

- 8. Regrading the surface to approximately original contours
- 9. Initiation of active controls

Table G-1
Anticipated Earliest Closure Dates for the Underground HWDUs

| HWDU | OPERATIONS START | OPERATIONS END | CLOSURE START | CLOSURE END |
|----------|-----------------------------|-----------------------------|-----------------------------|--------------------------------|
| PANEL 1 | 3/99* | 3/03* | 3/03* | 7/03* SEE NOTE 5 |
| PANEL 2 | 3/03* | 10/05* | 10/05* | 3/06* SEE NOTE 5 |
| PANEL 3 | 4/05* | 2/07* | 2/07* | 2/07* SEE NOTE <u>5</u> 6 |
| PANEL 4 | 1/07* | 5/09* | 5/09* | 8/09* SEE NOTE <u>5</u> 6 |
| PANEL 5 | 3/09* | 7/11* | 7/11* | 1/12 SEE NOTE 5 |
| PANEL 6 | 3/11* | 1/13 <u>2/14</u> | <u>3/14</u> 2/13 | <u>9/14</u> 8/13 SEE NOTE 5 |
| PANEL 7 | <u>&</u> 1/13 | <u>9/17</u> 1/15 | <u>10/17</u> 2/15 | <u>4/18</u> 8/15 |
| PANEL 8 | <u>1/17</u> 1/15 | <u>5/21</u> 1/17 | <u>6/21</u> 2/17 | <u>12/21</u> 8/17 |
| PANEL 9 | 1/17 <u>9/20</u> | 1/28<u>1/25</u> | 2/28 <u>2/25</u> | SEE NOTE 4 |
| PANEL 10 | 1/28<u>5/24</u> | 9/30 | 10/30 | SEE NOTE 4 |

^{*} Actual date

NOTE 1: Only Panels 1 to 4 will be closed under the initial term of this permit. Closure schedules for Panels 5 through 10 are projected assuming new permits will be issued in 2009 and 2019.

NOTE 2: The point of closure start is defined as the date when ventilation to the panel is blocked per Permit Attachment A260 days following notification to the NMED of closure.

NOTE 3: The point of closure end is defined as 180 days following placement of final waste in the panel.

NOTE 4: The time to close these areas may be extended depending on the nature and extent of the disturbed rock zone. The excavations that constitute these panels will have been opened for as many as 40 years so that the preparation for closure may take longer than the time allotted in Figure G-2. If this extension is needed, it will be requested as an amendment to the Closure Plan.

NOTE 5: Installation of the 12-foot explosion-isolation wall for Panels 1, 2, and 5 must be completed by the closure end date. Final closure of Panels 1 through 6, 2, and 5 will be completed as specified in this Permit no later than January 31, 2016.

NOTE 6: Final closure of Panels 3 and 4 will be completed as specified in this Permit no later than January 31, 2016.

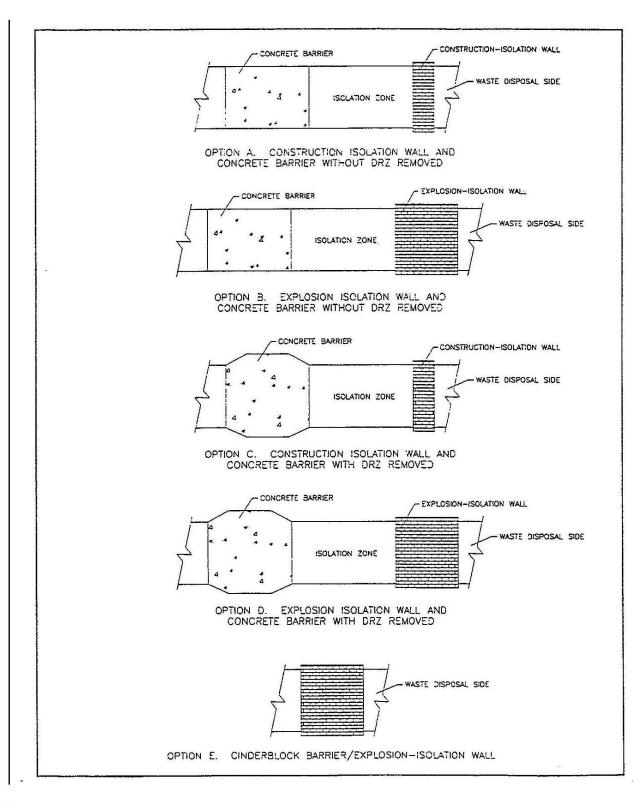
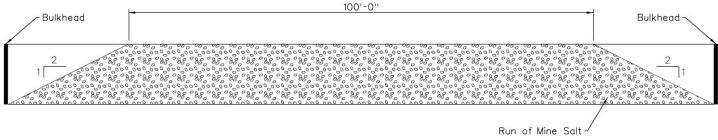


Figure G-4
Design of a Panel Closure System

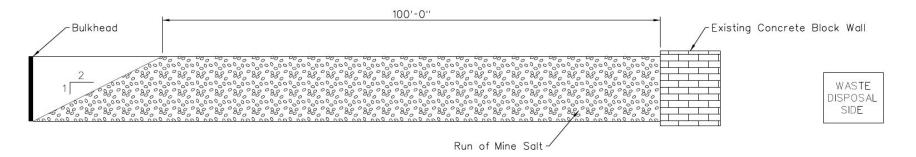


WASTE DISPOSAL SIDE

- . Salt Zone 100'-0" minimum length.
- 2. Salt layers can be inclined within specifications.
- 3. Detailed design drawings are presented in Appendix D.
- 4. The ROM salt shall be placed to fill up to the back.
- ROM salt is a porous salt in the loose state derived from underground mining operations at WIPP.

Panel access drifts without existing block walls.

Figure G-4
Design of a Panel Closure System



- 1. Salt Zone 100'-0" minimum length.
- 2. Salt layers can be inclined within specifications.
- 3. Detailed design drawings are presented in Appendix D.
- 4. The ROM salt shall be placed to fill up to the back.
- ROM salt is a porous salt in the loose state derived from underground mining operations at WIPP.

TYPICAL INTAKE/EXHAUST DRIFT

Panel access drifts with existing block walls.

Panel 1 intake and Panel 5 exhaust drifts represent extremes with respect to drifts with existing block walls. Panel closures for other drifts with existing block walls will be constructed at or within these two extremes.

<u>Figure G-4</u>
Design of a Panel Closure System (continued)

ATTACHMENT G1 DESIGN REPORT FOR A PANEL CLOSURE SYSTEM AT THE WASTE ISOLATION PILOT PLANTWIPP PANEL CLOSURE (WPC) DESCRIPTION AND SPECIFICATIONS Adapted from the October 2012 Design Report for a Panel Closure System at the Waste **Isolation Pilot Plant**

Appendix 1-A 1-A-12 of 100 Panel Closure

ATTACHMENT G1

WIPP PANEL CLOSURE (WPC) DESCRIPTION AND SPECIFICATIONS

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<u> Appendix G1-A — Technical Specifications</u> <u>Appendix G1-B — Drawings</u>

Table Title Table G1-1 Technical Specification for the WIPP Panel Closure System Table G1-2 WIPP Panel Closure System Drawings LIST OF FIGURES Figure Title Figure G1-1 Typical Bulkhead for the WPC

Appendix 1-A 1-A-14 of 100 Panel Closure

ATTACHMENT G1

WIPP PANEL CLOSURE (WPC) DESCRIPTION AND SPECIFICATIONS

Introduction

An important aspect of repository operations at the WIPP facility is the closure of filled waste disposal panels. Each panel consists, among other things, of a panel air-intake drift and a panel air-exhaust drift. After completion of waste disposal activities in a panel, that panel must be closed. The closure of individual panels during the operational period is conducted in compliance with the requirements in the this Permit (Permit). The WIPP Panel Closure (WPC) design has been selected to close filled panels at the WIPP facility in compliance with Permit requirements.

This attachment presents the applicable specifications and requirements for fabrication, installation and maintenance of the WPC in the WIPP facility and the information presented here is taken primarily from the Design Report for a Panel Closure System at the Waste Isolation Plant (RockSol, 2012).

G1-1 WPC Description

Engineering drawings of the WPC design are presented in Appendix B. The WPC design consists of a minimum of 100 feet of emplaced run-of-mine (ROM) salt configured between two steel bulkheads for panels that do not have explosion-isolation walls installed in them. For panels with installed explosion-isolation walls, an alternate WPC configuration consists of one steel bulkhead, a minimum of 100 feet of emplaced ROM salt and one block wall. The minimum 100 feet of ROM salt is emplaced to completely fill the drift from side to side and top to bottom. The construction methods and materials used in the design represent available technologies. No special requirements are identified for these components during the operational period of the repository. The fabrication, installation and maintenance of ventilation bulkheads are standard practice. Salt can be pushed tight to the underground surfaces of the drifts.

After completion of waste emplacement operations in future active panels, steel bulkheads will be installed in the intake and exhaust panel entries. Next the minimum 100 feet of ROM salt is emplaced using conventional mining equipment. After ROM salt emplacement, the outer (accessible) steel bulkhead is installed.

The performance of the WPC design has been numerically modeled. The model results show that an air gap forms between the excavation roof and the top of the ROM salt fill due to the settlement of the emplaced ROM salt. The model predicts that an air gap above the emplaced ROM salt remains until creep closure of the salt closes the air gap. This process is expected to take 23 years after panel closure. While the air gap is present, restriction to release of volatile organic compounds (VOCs) through the WPC is controlled by the accessible bulkhead. After closure of the air gap, the resistance to release of VOCs through the WPC is dominated by the 100 feet of emplaced ROM salt. Until closure of the air gap, maintenance of the accessible bulkhead will be conducted, as necessary, to restrict the release of VOCs from the panel.

G1-1a Permit Design Requirements

The applicable design requirements are provided in Permit Attachment G, Section G-1e(1). The WPC was designed and evaluated to be compliant with these requirements

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G1-1b Design Component Descriptions

This section presents a description of the components of the WPC to be installed (i.e., steel bulkheads and ROM salt). Technical specifications and drawings for the WPC are provided in Appendices A and B, respectively. Individual specifications address shaft and underground access and materials handling, construction quality control, treatment of surfaces in the closure areas, and applicable design and construction standards. Bulkheads are not included in the specifications since they are routinely constructed and used at the WIPP facility.

G1-1b(1) Steel Bulkhead

The steel bulkhead (Figure G1-1) serves to block ventilation at the intake and exhaust of the panel and prevents personnel access. This use of a bulkhead is a standard practice and will be constructed as a typical WIPP bulkhead with no access. The bulkhead will consist of a noncombustible steel member frame covered with sheet metal. Telescoping tubular steel is used to bolt the bulkhead to the floor and roof. Flexible flashing material such as a rubber conveyor belt (or other appropriate material) will be attached to the steel frame and the salt as a gasket, thereby providing an effective yet flexible blockage to ventilation air. The steel bulkheads need maintenance for air flow resistance and the accommodation of panel entry salt creep during a 23-year period following each individual panel closure installation. The WPC relies upon bulkheads for approximately 23 years to control VOC flow. During this period accessible steel bulkheads may need to be maintained or replaced and the surrounding DRZ may need to be treated or removed to provide air flow resistance as intended. The maintenance activities will include repair and/or replacement of bulkhead components or may included construction of a new accessible bulkhead in front of the existing one.

The WPC design was evaluated assuming an air flow resistance value for the accessible bulkhead during the 23 years after installation. Instead of monitoring each accessible WPC bulkhead for air flow resistance, the performance of accessible WPC bulkheads will be monitored using a two component approach as follows:

- Inspection of accessible WPC bulkheads for integrity and deterioration as required in Permit Attachment E. Corrective actions will be taken in accordance with associated operational procedures to repair observed deterioration as needed. General inspection requirements pertaining to WPC bulkhead inspections (e.g., schedule, frequency, log forms, records, etc.) are as specified in Permit Part 2, Section 2.7.
- Monitoring closed panel emissions of VOCs through a system wide approach utilizing the running annual averages for VOCs derived from the Repository VOC Monitoring Program (Permit Attachment N). Running annual average trends will be used to initiate corrective actions that may include additional VOC monitoring activities around specific panels to better locate the source of the increased emissions, corrective actions to limit VOC emissions from the active panel, and/or repair/replacement of accessible WPC bulkheads. Associated Repository VOC Monitoring requirements (e.g., reporting, notification, remedial action, etc.) are as specified in Permit Part 4, Section 4.6.2.

G1-1b(2) ROM Salt

ROM salt material from mining operations is as delivered by haul truck or load haul dump (LHD) units to the panel closure area in a loose state. As such, it is a noncombustible natural material

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that is completely compatible with the repository environment. The ROM salt is emplaced over a minimum length of 100 feet.

The ROM salt can be emplaced using conventional mining equipment in such a manner that will result in a slope at the ends. The ROM salt can be emplaced as is from the mining operations or from a storage pile. The ROM salt is emplaced up to the block wall in panels with existing block walls installed.

Attachment G, Figure G-4 illustrates the design for panels with and without block walls. Variations in entry height are expected for individual WPCs. For WPCs emplaced in panel entries with block walls, the end slope for the ROM salt may be steepened to accommodate the full length of ROM salt. The emplacement of ROM salt will avoid putting significant lateral pressure on bulkheads.

G1-2 Technical Specifications

The technical specifications are included in Appendix A and are summarized in Table G1-3. The specifications cover the general requirements of the system, quality assurance and quality control, site work, and ROM salt emplaced in the panel entries. Bulkheads are not included in the specifications since they are routinely constructed and used at the WIPP facility.

<u>Table G1-1</u> <u>Technical Specifications for the WIPP Panel Closure System</u>

| <u>Division 1 – General Requirements</u> | | |
|------------------------------------------|---------------------------------|--|
| Section 01010 | Summary of Work | |
| Section 01090 | Reference Standards | |
| Section 01400 | Contractor Quality Control | |
| Section 01600 | Material and Equipment | |
| Division 2 – Site Work | | |
| Section 02010 | Mobilization and Demobilization | |
| Section 02222 | Excavation | |
| <u>Division 4 – Salt</u> | | |
| Section 04100 | Run-of-Mine-Salt | |

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G1-3 Drawings

<u>The Drawings (Appendix B) are summarized in Table G1-4. The drawings illustrate and describe the construction and details for the WPC.</u>

<u>Table G1-2</u> <u>WIPP Panel Closure System Drawings</u>

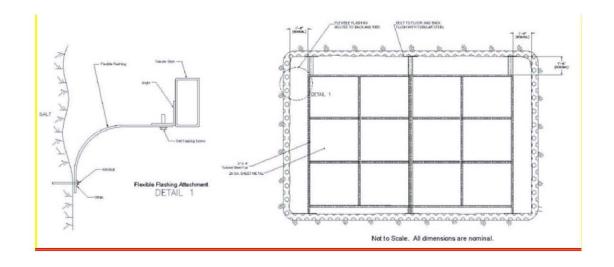
| <u>Drawing Number</u> | <u>Title</u> |
|-----------------------|--------------------------------------------------------------------------------------------|
| <u>262-001</u> | WIPP Panel Closure System Title Sheet |
| 262-002 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (3, 4, 6, 7, 8) |
| 262-003 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (1, 2, 5) |
| <u>262-004</u> | WIPP Panel Closure System, Construction Details |

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References

RockSol Consulting Group, Inc., 2012, Design Report for a Panel Closure System at the Waste Isolation Pilot Plant, Westminster, CO

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<u>Figure G1-1</u> Typical Bulkhead for the WPC

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*Appendix A — Derivation of Relationships for the Air-Flow Models
*Appendix B — Analysis and Review of Existing Information
Appendix G1-C — Technical Specifications
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*Appendices A and B are not included in the Permit.

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LIST OF ABBREVIATIONS/ACRONYMS/UNITS

cubic feet per minute CFR_ Code of Federal Regulations CCI₄ Carbon tetrachloride centimeter cm **Department of Energy** DOE disturbed rock zone DRZ foot (feet) Fast Lagrangian Analysis of Continua Fast Lagrangian Analysis of Continua in Three Dimensions FLAC3D HBL Health Based Levels kcfm thousands of cubic feet per minute kilogram kg ____ LHD load haul dump meter min_ minute mm milimeter MPa megapascal Mine Safety and Health Administration MSHA-NMAC New Mexico Administrative Code NMED New Mexico Environment Department PCS panel closure system WIPP Hazardous Waste Facility Permit Permit parts per billion by volume ppbv pounds per square inch psi QA/QC quality assurance/quality control RAA running annual average RCRA Resource Conservation and Recovery Act run-of-mine ROM second Sandia National Laboratories SNL TRU transuranic VOC volatile organic compound WIPP Waste Isolation Pilot Plant WIPP Panel Closure

ATTACHMENT G1

DETAILED DESIGN REPORT FOR AN OPERATION PHASE PANEL CLOSURE SYSTEM

Executive Summary

Scope. This report describes the design and evaluation of a Waste Isolation Pilot Plant (WIPP)
Panel Closure (WPC) system consisting of run-of-mine (ROM) salt and steel bulkheads.

The report was modified to make it a part of the Resource Conservation and Recovery Act (RCRA) Permit issued by the New Mexico Environment Department (NMED) and represents a proposal to modify the closure plan from the previously described Option D design. Other changes included in this version of the report revised for the Permit are minor formatting changes to be consistent with the Permit format that include revision of table and figure numbers and the movement of all figures to the end of the document. Appendices A through C in the original document are not included in this Permit Attachment. Although these Appendices were important in demonstrating that the panel closures will meet the Panel Closure requirements identified in Permit Attachment G, they do not provide design details or plans to be implemented as Permit requirements. References to these original Appendices were modified to indicate that they were part of the design report, but are not included in the Permit. In contrast, Appendix C (Technical Specifications) and Appendix D (Design Drawings) are necessary components of future activities and are retained as parts of this Permit Attachment.

Purpose. The purpose of the WPC is to comply with the closure performance standard in Permit Attachment G, Section G-1a pursuant to 20.4.1.500 NMAC (incorporating 40 CFR 264 Subpart X).

The WPC will be located in the panel air-intake and panel air-exhaust drifts of each waste-filled panel as shown in Figure G1-1. Two steel bulkheads will be placed at the ends of the ROM salt. This report also presents an alternate design for filled Panels 1, 2 and 5 where explosion isolation walls have been installed. The alternate design consists of one steel bulkhead and a block wall placed at the ends of the ROM salt.

Volatile Organic Compounds (VOCs) flow analyses through the WPC and then from the repository show that VOC concentrations will not exceed VOC Health Based Levels (HBLs) at the WIPP site boundary. In addition, the WPC will comply with the applicable requirements of the Mine Safety and Health Administration (MSHA). Finally, the WPC will use common construction practices according to existing standards to the extent practicable.

Background. In 1996, a report entitled "Detailed Design Report for an Operational Phase Panel-Closure System" was prepared. This design was submitted as part of the original Hazardous Waste Facility Permit (Permit) application to the NMED. The NMED subsequently selected portions of the report and included them in the issued permit.

Section 4.6.2 of the current Permit establishes limits and actions for VOCs of concern. The VOCs of concern in the Permit include carbon tetrachloride (**CCI**₄), chlorobenzene, chloroform, 1,1-dichloroethene, 1,2-dichloroethane, methylene chloride, 1,1,2,2-tetrachloroethane, toluene and 1,1,1-trichloroethane. Additional VOCs that contribute lesser risks are considered in this report. New VOCs and HBLs for the VOCs have been identified for the WIPP site boundary and are used in the report (Kehrman, 2012, Table 11).

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Revised performance requirements are presented in this report. The WPC is evaluated against these revised performance requirements.

Design. The WPC consists of two steel bulkheads and ROM salt. An alternate WPC for Panels 1, 2, and 5 consists of one steel bulkhead, ROM salt and one block wall. The construction methods and materials used in the design represent available technologies from previous mining projects (Fernandez et al., 1994, pp. 5-11 to 5-20) and as demonstrated by recent insitu testing of ROM salt (Zimmerly and Zavicar, 2012). No special requirements are identified for these components during the operational period of the repository. The fabrication, installation and maintenance of ventilation bulkheads are standard practice. Salt can be pushed reasonably tight to the underground surfaces of the drifts. A variety of techniques are available for placing the salt. These construction methods are simple and allow flexibility in construction scheduling and construction materials transportation.

Evaluation of WPC Performance. The evaluation of the WPC presented in this report included a review of current information on repository ventilation, VOC source terms and expected concentrations of VOCs in the mine exhaust air stream. Based upon a review of this information, a design performance specification was developed to emplace salt over a minimum length of 100 ft.

The ROM salt may be emplaced in a series of layers. The emplacement density is expressed in terms of fractional density, which is represented as a percentage of the intact density (135 lbf/ft³ [2,160 kg/m³]). The ROM salt is emplaced at an assumed fractional density of 65% (88 lbf/ft³ [1,400 kg/m³]).

Steel bulkheads with flexible flashing to accommodate salt creep are used in the WPC design. Farnsworth (2011) indicated that smaller drifts with bulkheads near the Exhaust Shaft in the WIPP underground have resistances as high as 2,200 Practical Units [2,200 (milli-in wg)/kcfm²]. The smaller drifts with bulkheads near the Exhaust Shaft are the closest in size to the Panel intake and exhaust drifts.

Structural analyses of the ROM salt in a single zone were performed using a Fast Lagrangian Analysis of Continua in Three Dimensions (FLAC3D) computer code. FLAC3D is used by the WIPP site for geotechnical analyses and was used for the previous WPC design analyses. The FLAC3D analyses showed that an air gap between panel entry ceilings and the top of the run-of mine salt forms and increases over a period of several years. The air gap forms because initially the rate of settlement of the ROM salt exceeds the rate of panel-entry creep closure. Two years after WPC installation, the air gap starts to close. The air gap reaches a maximum value of 19 inches (47 centimeter [cm]). After approximately 23 years, the air gap is eliminated. Also, the fractional density of ROM salt increases with time. These calculations are input into the VOCs Flow Model.

VOCs Flow Model. The VOC flow analyses evaluate the flow of VOCs of concern through the WPC. The VOCs Flow Model considers VOCs emissions from open rooms (Kehrman, 2012, Table 12) up until the time that air gaps close within individual WPCs. When air gaps are present, air flow resistance is predominately due to steel bulkhead resistances for individual panels. After approximately 23 years, the air gap closes and the air flow resistance is predominately due to the consolidated ROM salt. VOCs flow equals the product of the air flow rate and the average headspace concentration for individual panels at this time. The VOCs flow model is based upon inventory average headspace concentrations (Kehrman, 2012, Table 1). The analysis compares the predicted results to measured results. The model is then used to

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evaluate future VOCs emissions considering ventilation air flow effects, other source terms for air flow (panel creep closure and gas generation) and average headspace concentrations of individual VOCs. Air flow due to ventilation through the air gap and ROM salt zone of the WPC is evaluated considering the air conductivity of ROM salt and the surrounding disturbed rock zone (PRZ), and the air flow resistance of steel bulkheads. The air conductivity values for all components are discussed in Section 3.

The results show a reduction in the air gap and air conductivity with time from panel intake drift and exhaust drift creep closure that isolates the waste from the underground ventilation air stream starting approximately 2 years after WPC installation with complete air gap closure after 23 years. The results indicate that for a period of about 23 years after WPC installation (28 years after panel excavation), the air flow induced from ventilation effects is dominant and that after this period of time, gas generation and panel creep closure would become dominant.

The analysis accounts for the reduction of VOC concentrations at the Exhaust Shaft of the WIPP due to underground repository ventilation, and then due to atmospheric dispersion to the WIPP site boundary (Kehrman, 2012, Table 6). The analyses consider only this receptor boundary, and do not provide calculations at other intermediate surface and underground receptor points.

The analysis uses HBLs that have been identified by the WIPP Project (Kehrman, 2012, Table 11). The projected concentrations from the VOC flow model are compared to the HBLs at the site boundary through calculation of risk fractions. These evaluations include the case for peak emissions from the WIPP repository.

The predicted mass flow rates for VOCs through the WPC (including flow through the air gap; the ROM salt; DRZ and the steel bulkheads) from ventilation, panel creep closure and gas generation are estimated to result in concentrations that are below the HBLs (Kehrman, 2012, Table 11) for the receptor point at the WIPP site boundary. Concentrations at other surface and underground receptor locations were not analyzed as part of this scope of work.

While no specific requirements exist for closing disposal areas under MSHA regulations, the intent of the regulations is to safely isolate abandoned areas from active workings using barricades of substantial construction.

This report presents the WPC system description with supporting calculations (Appendices A to B), Specifications (Appendix C), and Engineering Drawings (Appendix D) that comply with the design requirements for the WPC. Structural and air flow analyses are used to select the design features and are based upon data acquired from the WIPP underground. The Drawings illustrate the construction and details for the WPC. The Specifications cover the general requirements of the system, quality assurance and quality control, site work, and ROM salt emplaced in the panel entries. The WPC can be built to generally accepted national design and construction standards.

The design complies with the revised design requirements established for the WPC. The design can be constructed in the underground environment with no special requirements at the WIPP facility.

Appendix 1-A 1-A-27 of 100 Panel Closure

1.0 Introduction

The Waste Isolation Pilot Plant (WIPP) facility is a U.S. Department of Energy (DOE) facility located near Carlsbad, New Mexico, established for the safe disposal of defense-generated transuranic (TRU) waste. The WIPP repository is 2,150 feet (ft) (655 meters [m]) below the surface, in the Salado Formation.

One important aspect of repository operations at the WIPP facility is the activity associated with closure of waste disposal panels. Each panel consists of a panel air-intake drift, a panel air-exhaust drift, and seven rooms (Figure G1-1). After completion of waste disposal activities in a panel, it must be closed. The closure of individual panels during the operational period is conducted in compliance with the WIPP Hazardous Waste Facility Permit (Permit).

In 1996, a report entitled "Detailed Design Report for an Operational Phase Panel-Closure System" (DOE, 1996) was prepared. That design was submitted as part of the original Permit application to the New Mexico Environment Department (NMED). The NMED subsequently selected portions of the 1996 report and included them in the Permit.

This report builds on data collection and presents a design consisting of a run-of-mine (ROM) salt and steel bulkheads as are currently used in the WIPP repository. ROM salt is defined as a porous salt in the loose state derived from underground mining operations.

1.1 Scope

This report describes the design of the WIPP Panel Closure (**WPC**), presents WPC analyses relating to structural response and volatile organic compounds (**VOCs**) flow, and provides an evaluation of the WPC against revised design requirements presented in Chapter 2. The WPC consists of ROM salt and steel bulkheads for 10 panels. The WPC relies on air flow resistance of ventilation bulkheads to control VOCs emissions at the WIPP site receptor boundary for 23 years following each individual panel closure installation. The work scope does not include other intermediate receptor points.

The design complies with the revised design requirements established for the WPC. The proposed design is of substantial construction and complies with applicable requirements promulgated by the U.S. Department of Labor Mine Safety and Health Administration (MSHA).

1.2 Regulatory Requirements

The following subsections discuss the regulatory requirements specified in the Resource Conservation and Recovery Act (RCRA) and MSHA that apply to closure.

1.2.1 Resource Conservation and Recovery Act (40 CFR 264 and 270)

The Closure Plan in the WIPP Permit (NMED, 2012) was prepared in accordance with the requirements of 20.4.1.500 New Mexico Administrative Code (incorporating Title 40, Code of Federal Regulations [CFR], Part 264, Subparts G, Land X). The WPC design incorporates measures to mitigate VOC migration for compliance with environmental performance standards.

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1.2.2 Mine Safety and Health Administration

Under 30 CFR 57 (MSHA, 2012), "seals and stoppings" must be constructed of noncombustible materials appropriate for the specific mine category and must be of "substantial construction." "Substantial construction" implies construction of such strength, material and workmanship that the barrier could withstand conditions expected in the mining environment. As discussed subsequently in this report, the WPC complies with relevant requirements.

1.3 Report Organization

This report presents the engineering analysis of the WPC in each panel entry consisting of two steel bulkheads and ROM salt emplaced to a minimum length of 100 feet. Chapter 2 presents the Permit Design Requirements and a description of the final design in terms of WPC design components. Chapter 3 presents the design evaluations addressing the structural adequacy and the VOC flow of the WPC. Chapter 4 presents a list of the technical specifications for the design. Chapter 5 presents a list of the design drawings. Chapter 6 presents conclusions. Chapter 7 presents supporting references.

Appendix 1-A 1-A-29 of 100 Panel Closure

2.0 Design Descriptions

This chapter presents the WPC evaluated in this report, including its design requirements and design components.

2.1 Permit Design Requirements

Original design requirements were presented in Table 7-1 of DOE, 1996, and were accepted in the Permit. Since then, the Permittees have collected gas emission and mined opening performance data that has greatly increased the understanding of current and future conditions in the repository. This increased understanding has led to a reassessment of the design requirements for a panel closure system. The WPC was evaluated against the following revised design requirements:

- The panel closure system shall contribute to meeting the environmental performance standards in Permit Part 4 Section 4.6.2 by mitigating the migration of VOCs from closed panels.
- The panel closure system shall consider potential flow of VOCs through the disturbed rock zone (DRZ) in addition to flow through closure components.
- The panel closure system shall perform its intended functions under loads generated by creep closure of the tunnels.
- The nominal operational life of the closure system is 35 years.
- The panel closure system may require minimal maintenance per 20.4.1.500 NMAC (incorporating 40 CFR 264.111).
- The panel closure system shall address the expected ground conditions in the waste disposal areas.
- The panel closure system shall be built of substantial construction and noncombustible material except for flexible flashing used to accommodate salt movement.
- The design and construction shall follow conventional mining practices.
- Structural analysis shall use data acquired from the WIPP underground.
- Materials shall be compatible with their emplacement environment and function.
- Treatment of surfaces in the closure areas shall be considered in the design.
- A Quality Assurance/Quality Control (QA/QC) program shall verify material properties and construction.
- Construction of the panel closure system shall consider shaft and underground access and services for materials handling.

Chapter 6 presents the expected compliance of the WPC with these requirements and identifies the sections of this report where each requirement is addressed.

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Figure G1-2 and Figure G1-3 illustrate the design that is evaluated in this report. Figure G1-2 applies to drifts without existing block walls. Figure G1-3 shows the configuration for drifts with existing block walls.

Conventional mining practices will be used in construction of the WPC. After completion of waste emplacement operations in future active panels, in-by steel bulkheads will be installed in the intake and exhaust panel entries as illustrated in Figure G1-2. Work packages prepared for the fabrication and installation of bulkheads will list the materials used, the equipment used, special precautions and limitations. Each work package will address prerequisites for installing the WPC and the required performance and documentation of such performance.

The ROM salt can be emplaced using conventional mining equipment in such a manner as to maintain a slope of 2 horizontal to 1 vertical at the ends. The ROM salt can be emplaced as is from the mining operations at an assumed fractional density of 65% (Zimmerly and Zavicar, 2012). After salt emplacement, the outer steel bulkhead is installed.

Three panels have block walls³-installed and an alternate design is presented for these panels. The installation of the WPC in these panels shall follow preapproved work packages as outlined previously. In these cases (Figure G1-3), the ROM salt is emplaced up to the block wall. After salt emplacement, the outer steel bulkhead is installed.

2.2 Design Components

The following subsection presents system and component design features. Appendices C and D present specifications and drawings for the WPC, respectively. Individual specifications address shaft and underground access and materials handling, construction quality control, treatment of surfaces in the closure areas, and applicable design and construction standards.

2.2.1 Steel Bulkhead

The steel bulkhead (Figure G1-4) serves to block ventilation at the intake and exhaust of the panel and prevents personnel access. This use of a bulkhead is a standard practice and will be constructed as a typical WIPP bulkhead with no access (NMED, 2012, Figure N1-2). The bulkhead will consist of a noncombustible steel member frame covered with sheet metal. Telescoping tubular steel is used to bolt the bulkhead to the floor and roof. Flexible flashing material such as a rubber conveyor belt (or other appropriate material) will be attached to the steel frame and the salt as a gasket, thereby providing an effective yet flexible blockage to ventilation air. The steel bulkheads need maintenance for air flow resistance and the accommodation of panel entry salt creep during a 23-year period following each individual panel closure installation. The out-by bulkhead will be repaired, renovated or replaced as required. The WPC relies upon bulkheads for approximately 23 years to control VOCs flow. During this period steel bulkheads may need to be maintained or replaced and the surrounding DRZ may need to be treated or removed to provide air flow resistance as intended.

³ The block wall was originally designed to resist underground methane deflagration due to a hypothetical buildup of methane gas after panel closure.

2.2.2 ROM Salt

ROM salt material from mining operations is as delivered by haul truck or load haul dump (**LHD**) units to the panel closure area in a loose state. As such, it is a noncombustible natural material that is completely compatible with the repository environment. The ROM salt is emplaced over a minimum length of 100 feet. The ROM salt at the ends would be emplaced at a slope of approximately 2 horizontal 1 vertical.

The air flow and structural modeling analyses (Chapter 3) use the basic design for the WPC. Air flow resistance through a panel closure is proportional to flow path length and inversely proportional to the product of the air conductivity and the flow path cross sectional area.

Figures G1-2 and G1-3 illustrate the design for typical cases with and without block walls. Variations in entry height are expected for individual WPCs. For WPCs emplaced in panel entries with block walls, the end slope for the ROM salt can be steepened to 1.4 horizontal to 1.0 vertical to accommodate the full length of ROM salt. The emplacement of ROM salt will avoid putting significant lateral pressure on bulkheads.

The bulk density of the ROM salt is not prescribed in this report. A fractional density of 64% to 65% for ROM salt is nearly universal for WIPP and other salt mining operations throughout the world (Hansen, et. al, 1998 and Rothfuchs and Wieczorek, 2010). It is assumed that any additional salt compaction that occurs during construction will improve the performance by reducing the air gap that forms above and lowering permeability within the ROM salt.

2.3 Constructability, Environmental and Worker Safety, Operational Considerations, and Longevity

This section presents information on the constructability, environmental and worker safety, operational considerations, and longevity. More detailed information is presented in the supporting Appendices C and D that present specifications and engineering drawings.

2.3.1 Constructability

The WPC can be constructed using available technologies for the construction of steel bulkheads and placement of salt. The construction methods and materials used in the design represent available technologies from previous mining projects (Fernandez et al., 1994, pp. 5-11 to 5-20) and as demonstrated by recent insitu testing of ROM salt at WIPP (Zimmerly and Zavicar, 2012). Field tests and construction experience at the WIPP facility will guide the emplacement and construction methods used to construct these barriers. Construction quality control and quality assurance requirements will be based on the construction method employed. The steel bulkheads are commonly used and ROM salt is available in sufficient quantities at minimum cost.

2.3.2 Environmental and Worker Safety

The proposed WPC is not expected to adversely impact environmental safety. The construction materials are primarily natural material removed from the mine, with the exception of the bulkheads, which are already used throughout the underground. The construction methods use equipment identical or similar to day-to-day mining operations or in construction.

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Note that the analysis presented in this report does not address specific compliance with Health Based Levels (**HBLs**) for worker exposure at WIPP during installation and operation of the WPC. Such analyses are beyond the scope of this report.

The following qualitative discussion addresses the complexity and risks in the current design as compared to those in the previous design. Two factors are involved in qualitatively estimating the increase in worker safety and risk reduction associated with installation of the proposed WPC. One factor involves the complexity of the construction project. The other related factor is the number of workers and the time that they spend transporting, handling, and installing the WPC. The exposure of workers to VOCs relates to exposure times during the construction and emplacement of individual WPCs.

The Permittees reviewed the complexity of the construction project associated with Option D versus the construction of the current WPC. The previous design (DOE, 1996) used complex steel formwork and concrete, with removal of portions of the DRZ and closure of the interface zones. The current design is easier to construct as there is no need for complex formwork or the production and placement of Salado Mass Concrete.

As part of a previous redesign process, the Permittees prepared installation schedules for the Option D panel closure system (PCS) and WPC (NMED, 2002). The underground construction activities for Option D were estimated to require approximately 14 months. The comparable period for construction of the WPC is estimated at six months or less (40 CFR 264.113 (b)). The WPC construction project uses more common materials for the steel bulkheads and salt than Salado Mass Concrete, thus reducing the number of workers required and the time required for workers to be in the construction area. Less complex construction translates into less time for transportation, handling, and emplacement of materials. Shorter construction time translates to an increase in worker safety and lower risk to workers.

2.3.3 Operational Considerations

The construction of the current WPC can be stopped and re-started as necessary to accommodate operational concerns and reduce or eliminate impact on waste handling. Temporarily stopping construction will not affect the performance of the WPC. The equipment used to construct the WPC can be quickly mobilized and demobilized to accommodate waste handling and other operational needs. Shaft schedules would not be impacted as the majority of the construction materials are already underground.

2.3.4 Longevity

As discussed in Chapter 3, the WPC closures derive their air flow resistances primarily from steel bulkheads for a period of 23 years and from ROM salt thereafter. During the 23-year period of time that steel bulkheads are relied on for air flow resistance, the steel bulkheads will be maintained in the underground environment. The panel entry creep closure with time reduces the air gap at the interface of the ROM salt and entry roof as well as the porosity of the ROM salt, which in turn reduces the air conductivity due to the plastic deformation of the ROM salt. ROM salt is completely compatible with the underground environment. This results in improved performance with time or longevity. Eventually, the ROM salt will become structurally indistinguishable from the surrounding intact salt.

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3.0 Analysis

This chapter presents evaluations of the engineered WPC: (1) structural analyses; (2) projected VOC emissions from air flow analysis and advection analysis; and (3) a material compatibility evaluation.

3.1 Analyses Addressing Operational Requirements

To evaluate the effectiveness of the panel closure system, structural analyses were performed to examine the geomechanical performance of the WPC over the operational period of the repository. Air flow analyses were then performed to evaluate the change in WPC air flow resistance, and then evaluate VOCs flow through the WPC. Structural analyses predict a gap forms between the roof and top of the ROM and reduction of the fractional density due to creep of intact rock salt of the surrounding panel entry surfaces. Air flow analyses are then conducted to predict the release of VOCs through the panel closure system due to gas generation, panel creep closure and the effects of underground ventilation. These analyses support the WPC design for the protection of human health and the environment at the WIPP site boundary. Explosion effects on the WPC were not analyzed because monitoring of methane and hydrogen concentrations indicates that they will not reach minimum explosive concentrations during the operational period (Myers, 2012 and Nelson, 2011).

3.2 Structural Analyses of ROM Salt Emplacements

Three dimensional geomechanical models of a 100-foot long section of ROM salt were analyzed using Fast Lagrangian Analysis of Continua in Three Dimensions (FLAC3D). The following discussion presents the properties of the ROM salt, the structural modeling method, a crushed salt benchmark calculation, model geometry, modeling sequence, and modeling results.

3.2.1 ROM Salt Properties

The FLAC3D requires the initial densities and material properties of the ROM salt. As discussed previously, the ROM salt initial density is assumed to be 65% of the intact density of salt. The intact density used in this study is 2,160 kilograms (kg)/m³ (Callahan, 1999).

3.2.2 Structural Modeling Method

The settlement and change in density with time (and implicitly intrinsic permeability) of the ROM salt was calculated using the three-dimensional geomechanical modeling program FLAC3D (Itasca Consulting Group, 2006). The predecessor program Fast Lagrangian Analysis of Continua (FLAC) and FLAC3D have been used for 20 years for the WIPP project, including structural analyses for the previous panel closure design. FLAC3D implements the Callahan and DeVries (1991) crushed salt creep constitutive model. This model is based on Sjaardema and Krieg (1987) and was verified by Callahan (1999) through comparisons of numerical analysis predictions with laboratory test results. Material properties for the other materials in the surrounding salt are from Krieg (1984).

3.2.3 Crushed Salt Benchmark Calculation

A benchmark calculation (Wagner et al., 1990) was performed to provide comparisons of the predicted consolidation of salt from several models. These included the SANCHO model developed by Sandia National Laboratories (SNL). A FLAC3D model was developed for

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comparison to Wagner's results. The FLAC3D three-dimensional model consisted of a backfilled disposal room at the repository horizon that is subjected to a lithostatic stress of 2070 pounds per square inch (psi) (14.3 megapascal [MPa]). In order to simulate the two-dimensional model in FLAC3D, the lateral displacements were set to zero for the plane strain condition. The FLAC3D model used the material properties and crushed salt constitutive model in the room-scale model developed by RE/SPEC for SNL.

Figure G1-5 compares the FLAC3D results to the SNL SANCHO results from a previous calculation. The FLAC3D results were reasonably close to the SANCHO results because both use the same constitutive model and backfill type as implemented in FLAC3D.

3.2.4 Model Geometry

The horizontal extents of the intake and exhaust models are shown in Figure G1-6 and Figure G1-7 respectively. Separate models were developed for the panel intake and exhaust drifts. These figures show the model extents for each case below the roof of the room. The model includes half of Room 1 of a generic panel and the access drift from a line halfway between the rib of Room 1 and the ventilation drift (E-300 or W-170, depending on the panel). The north-south extents go from halfway between panels to an east-west line bisecting the panel. The salt fill is modeled in half-symmetry so only the half nearest Room 1 is modeled. The vertical extents run from about 250 ft (75 m) above and below the floor of the openings.

The crushed salt is modeled in half-symmetry along its length to reduce the run-time of the model, which in turn allows a more refined discretization, producing more accurate results. The behavior of the out-by end of the emplaced salt is not expected to be significantly different than the in-by end. This is because the closure rates that would affect the void or pore space of the WPC do not vary significantly along the length of the WPC. Additionally, the end effects are assumed to be essentially identical at each end.

The stratigraphy consists of rock salt with the inclusion of the anhydrite Marker Bed 139 located below the floor of the repository horizon and thin clay seams E, G and H. The roof of the entry corresponds to Clay G. The model grid is made up of over 313,000 three-dimensional zones. The model uses interface elements at the boundary between the emplaced salt and the surrounding drift. These interface elements provide a sliding boundary condition along this surface.

The ROM salt is emplaced at an assumed initial density of 65 % of intact density (88 lbf/ft³ [1,404 kg/m³]). This is the natural fractional density of ROM salt.

3.2.5 Modeling Sequence

The openings in the model are excavated instantaneously to reduce model run time. The model is then run without the ROM salt to five years after excavation to simulate the waste emplacement period in the active panel. This time was chosen based on estimates for the time between excavation and closure of Panel 5. In the models, the creep rates that control salt compaction reach steady state within the first two years, so the timing of ROM salt emplacement only affects the volume of the ROM salt, not the consolidation or permeability. Figure G1-8 shows the model-calculated vertical (roof-to-floor) and horizontal (wall-to-wall) closure rate histories at the center of the panel intake drift where the ROM salt will be located. Elapsed time in the FLAC3D analysis is from the time of excavation with the completion of waste emplacement activities in five years.

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Figure G1-9 shows the same calculations for the panel exhaust drift. The horizontal measurements were only recorded after the ROM salt was emplaced. Oscillations in the curves occur at Year 28 when the top of the salt fill re-contacts the excavation roof (see Figures G1-11 and G1-12).

3.2.6 Structural Modeling Results

The variation with time of the fractional density of the emplaced salt in each drift is shown in Figure G1-10. These calculations are input into the air flow calculations. The values in Figure G1-10 were calculated by taking a volumetric average of the fractional density of all zones (model elements) in the compacted salt. The fractional density values for the panel intake and exhaust drifts are nearly identical. The intake drift is about 30% wider than the exhaust drift. The larger span results in larger intact rock displacement rates, but it also leads to a larger volume of fill under consolidation. In this case, the effect of the higher displacement rates in the intake drift is nearly balanced by the larger volume of material undergoing compaction. In other words, the larger volume in the intake drift requires larger displacements to reach the same level of compaction (volumetric strain) as seen in the exhaust drift.

As a result of the self-settlement of the ROM salt, the post-installation consolidation rate is faster in this case than the roof-to-floor convergence rate. This results in an air gap forming between the roof of the excavation and the top of the emplaced salt. Figure G1-11 shows the gap magnitude versus time for points at the center and ends of the fill in the intake drift. Figure G1-12 shows the gap magnitude versus time in the exhaust drift. The gap reaches a maximum of 18.5 inches (47 cm) in the intake drift and 16.5 inches (42 cm) in the exhaust drift. The maximum gap occurs 2.5 years after installation in the intake drift and 1.8 years after installation in the exhaust drift. The gap magnitude reduces when the consolidation rate slows to less than the excavation closure rate. The gap closes in approximately 23 years after installation in both drifts. Gap magnitude and duration is slightly lower at the ends of the fill.

3.3 VOCs Flow Analyses

The VOCs flow analyses evaluate the flow of VOCs of concern through the WPC to the time of completion of waste emplacement operations at the WIPP facility. These analyses address the VOCs of concern; the VOC concentration data; the current emission rate of VOCs of concern; the schedule for closure of panels; and the future projected VOC emission rates. Also, the effective air conductivity of the panel closure system is evaluated and used as input to the air flow model (DOE, 1996) to assess VOCs flow performance.

Three sources for air flow are considered in projecting future emission rates. These include: (1) an average gas generation rate due to microbial degradation (Kehrman, 2012, Table 2); (2) a volumetric closure rate due to salt creep; and (3) an underground ventilation rate.

3.3.1 WPC VOCs Evaluation Procedure

The WPC VOCs evaluation procedure includes the analysis of air flow rates from a single panel. A detailed evaluation is then made of VOC concentrations for CCl₄-based upon open room emissions prior to closure of the air gap, and average headspace CCl₄-concentrations after closure of the air gap. A schedule is considered for individual WPC closure assuming approval of a Class 3 Permit Modification to include the WPC in the Permit in December 2013. The contributions from individual panels are superimposed to obtain the repository CCl₄-emissions.

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The risk fractions at the WIPP site boundary receptor point are then evaluated for CCI₄. The risk fractions for other VOCs are then calculated at the time of peak VOC emissions.

The WPC VOC analysis for a single panel closure includes: (1) evaluation of air flow rates after placement of a single layer of salt (65% fractional density) and the construction of steel bulkheads; (2) the period of time when a gap exists and air flow resistance is provided by steel bulkheads; (3) a period of time when the air gap is closed and air flow resistance is increased; and (4) a final period of time when air flows through consolidating ROM salt. The VOC concentrations are evaluated as the CCl₄ emission rate for open rooms (Kehrman, 2012, Table 12) during time periods when the air gap exists. After the gap is closed in 23 years, the dominant air flow resistance is through the pore space of the ROM salt. VOC emission then equals the product of the air flow rate and the average headspace concentration. These analyses compare predicted VOC concentrations from the model with existing VOC emissions measurements for Panels 1 through 5 and part of 6 to July 2012. Other assumptions used in the analysis are:

- Air flow occurs under quasi-steady state conditions. Air flows from gas generation and panel creep closure are source terms from each panel while air flow from underground ventilation occurs under Darcy's Law between the panel entries.
- The gas generation rate is 4,020 moles per panel per year (0.1 moles per drum per year) (Kehrman, 2012).
- Volumetric reduction of a panel due to creep closure reduces the void space at a rate of 28,680 ft³ per year (812 m³ per year) (DOE 1996, Appendix B).
- Underground ventilation in the adjacent main exhaust drift⁴ results in a pressure drop between the panel air-intake and panel air-exhaust drifts for each panel (See Appendix A). The ventilation air flow entering each panel air-intake drift equals the air flow leaving the panel air-exhaust drift for each waste panel under a pressure drop of 170 milli-inches (4.3 millimeters [mm]) of water gage. The ventilation network analysis results in an average flow rate of several hundred cubic feet per minute (cfm) prior to closure of the air gap. The air flow rate is then reduced to less than 0.1 cfm.
- Steel bulkheads (Section 2.2.1) with flexible flashing to accommodate salt creep are used in the WPC design. Farnsworth (2011) indicated that smaller drifts with bulkheads near the Exhaust Shaft in the WIPP underground have air flow resistances as high as 2,200 Practical Units. The smaller drifts with bulkheads near the Exhaust Shaft are the closest in size to the Panel intake and exhaust drifts. Steel bulkheads will be maintained to accommodate panel entry salt creep to achieve a minimum air flow resistance of 2,200 Practical Units for as long as the bulkheads are needed to provide flow resistance.
- VOC transport occurs by advection. Hydrodynamic dispersion through the WPC is neglected. The VOC releases are determined for individual panels and then are superimposed in time.

⁴-The E-300 drift is the adjacent main exhaust drift for Panels 1 through 4, while W-170 is the adjacent main exhaust drift for Panels 5 through 8.

The WPC VOC flow analyses are considered bounding because: (1) the pressure drop of 170 milli-inches (4 mm) of water gage is considered a maximum value; (2) a permeability vs. porosity relationship provides a maximum envelope for measured data (see Figure G1-13); and (3) the analysis models panel creep closure and gas generation as point-source at the panel air exhaust drift. These bounds are discussed in the following subsections.

3.3.2——Existing VOCs Emissions Measurements for Panels 1 through 5

The WIPP collected measurements on VOC concentration data and ventilation rates at the E-300 point of compliance were collected during the period from January 2008 to July 2012 for the VOCs of concern. The E-300 point is located at the intersection of the E-300 main exhaust drift, and S-1300 cross drift. The existing measurements reflect VOC emissions from Panels 1 through 6, with Panel 6 being the active panel during the measurement time period.

3.3.3 Estimation of Air Flow Rates

Three sources for air flow are considered in projecting future emission rates. These include: (1) a gas generation rate due to microbial degradation; (2) a volumetric closure rate due to salt creep; and (3) an air flow rate due to underground ventilation in the adjacent exhaust drift. The air flow rate due to ventilation in the adjacent exhaust drift includes estimates of the potential air flow boundary condition for the WPC, the air flow resistances for components of the WPC and how these resistances change with time due to closure of the air gap, and consolidation of the salt.

Underground ventilation measurements and the analysis of these measurements are provided by the operating staff (Appendix B). This information is used to assess VOC emissions rates for the underground repository.

Figure A-1 shows the configuration for evaluating ventilation effects. A comparison of the analyses presented in Appendix A and DOE (1996, Appendix B) indicates that ventilation effects in the adjacent main exhaust drift are more significant than gas generation and panel creep closure. Since the flow in the adjacent exhaust drift is the path of least resistance for air flow, the pressure drop or potential is set by the head loss down the adjacent main exhaust drift. The potential difference then provides the pressure or head differential for flow through the WPC. It is much smaller than flow through the adjacent exhaust drift. However, it is much larger than flow generated by gas generation and panel creep closure used in previous studies (DOE, 1996).

Appendix B presents information on ventilation rates in thousands of cubic feet per minute (kcfm) and pressure drops in milli-inches of water gage for the WIPP underground ventilation network. The measurements include pressure drop measurements in the main exhaust drift adjacent to each WPC as shown in Figure A-1.

The normal and full operating modes provide measurements during testing and balancing that are representative of underground ventilation conditions. Appendix B describes the normal and full operating modes. For the normal operating mode, the average value for the pressure drop was 163 milli-inches of water gage. The range of pressure drops was from 12 to 350 milli-inches (0.3 to 9 mm) of water gage. For the full operating mode, the average value was 165 milli-inches of water gage with a range of values from 0 to 394 milli-inches (0 to 10 mm) of water gage.

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The FLAC3D analysis provides the settlement time histories of ROM salt that results in the reduction of the air gap and increase in fractional density or reduction in porosity of the ROM salt.

The FLAC3D analysis indicates closure of the air gap at different locations within the ROM salt ever time. The analyses of both the WPC Intake and Exhaust drift show an increase in air gap occurs for two years followed by a reduction in the air gap after this time. The air gap closes first near the ends, and then followed by the middle of the ROM salt. These times are approximately 23 years after panel closure. Prior to the time of closure of the air gap, air flow resistance through the WPC is predominately due to the steel bulkhead resistance. After approximately 20 years, the air gap closes to a point at which the air flow resistance offered by the consolidating salt equals the air flow resistance through steel bulkheads. Flow rates through the WPC are calculated using methods presented in Appendix A Section A5.0. The estimated flow rates are of the order of several hundred cfm.

After closure of the air gap, the dominant air flow resistance is through the consolidating salt. Air flow is reduced to a small percentage of the air flow through the gap. The air conductivities were then calculated based upon the intrinsic permeability relationship that accounts for both the relative density and the average particle size of the ROM salt backfill (Kelsall et al., 1983, Equation A-4). This relationship is illustrated in Figure G1-13 and is based upon the investigations made by Shor, et al. (1981) and bounds the intrinsic permeability relationship derived from laboratory investigations of crushed salt (Case et al., 1987, Figure 1, and from Mellegard, 1999, Figure 4-15). The analysis is bounding in that measured intrinsic permeabilities of ROM salt from measured relationships (Case et al., 1987, Figure 1 and Mellegard, 1999, Figure 4-15) are lower than those predicted on the basis of the Shor relationship for a particle size of 0.13 inches (0.34 cm). Figure G1-14 and Figure G1-15 present the air conductivities based upon the relative density vs. intrinsic permeability relationship for a single panel. The reduction in fractional density is anticipated to result in a reduction in air conductivity through the ROM salt over a 30-year period.

Small amounts of moisture exist in the ROM salt. Also small amounts of brine will flow from the surrounding entries into the ROM salt (Deal and Case, 1987). Moisture within the salt is conservatively neglected in the analysis. The technical basis for this assumption is that moisture existing or being introduced in the pore space will reduce the intrinsic air permeability to the gas phase, and thus reduce the flow of VOCs.

Bear (1972, p. 712) provides an air flow network resistance method. Appendix A presents derivations for the air flow model. Air flow is governed by Darcy's Law under quasi steady state conditions.

The air flow analysis considers flow through other components as presented in Table G1-1. Flow through the disturbed rock zone (referred to as fractured and dilated salt in Table G1-1), clay seams and Marker Bed 139 occur in parallel to air flow through the WPC.

Case and Kelsall (1987) evaluated permeability measurements performed by Peterson et al. (1985). These data showed a zone of increased permeability (10⁻¹⁸-to 10⁻²⁰-ft²-[10⁻¹⁹-to 10⁻²¹-m²]) from 3 to 42 ft (1 to 14 m) from the opening. Based on this observation, the calculations assumed that the cross-sectional area for flow through the DRZ and the panel closure system will equal nine times the panel intake or panel exhaust drift area or that the DRZ extends out three radii from the center (DOE 1996, Section 2.1.1.1).

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A distinction is made between "dilated rock salt" and "fractured rock salt." Dilated rock salt exhibits a higher permeability than intact rock salt due to stress relief from the lithostatic state of stress and this corresponds to the increased permeability zone observed by Case and Kelsall (1987). The value used here for the intrinsic permeability of dilated rock salt (10⁻¹⁸ ft² (10⁻¹⁹ m²)) is more conservative than measurements using the guarded packer straddle system (Case and Kelsall, 1987, Figure 5). The fractured rock salt refers to the highly fractured zone in the immediate vicinity of the openings.

A comparison is made of the air conductance of the ROM salt emplaced in the drift to the air conductance in the surrounding DRZ. The flow resistance through the DRZ and the adjacent 100 ft (30.5 m) of ROM salt can be compared by considering the sum of the product of the air conductivities times the cross sectional areas of each DRZ component to the product of the air conductivity times the cross sectional area of the ROM salt. The estimated flow is several orders of magnitude lower through the DRZ. The analysis predicts the dominant flow path is through the ROM salt and flows through components of the DRZ are small.

Comparisons were made between the flow resistance of the ROM salt with a minimum length of 100 ft (30.5 m) with steel bulkheads. Using the fundamental relationship relating head loss to air flow and considering 170 milli-inches (4 mm) of water gage with bulkhead resistance of 2,200 Practical Units⁵-(0.070 mm/(m³/min)²), the estimated air flow resistance through a gap above the ROM salt was about two orders of magnitude smaller than the resistance of bulkheads. After 23 years following WPC emplacement, the air gaps are closed and the resistance of the salt is much higher than that of steel bulkheads. Flow resistance through 100 ft (30.5 m) of ROM salt is dominant after 23 years. See Appendix A for details. Steel bulkheads will be maintained to provide a minimum air flow resistance of 2,200 Practical Units during the 23-year period following WPC construction.

Figure G1-16 presents the results of the single panel air flow analysis and compares air flow from air-ventilation effects of the adjacent main exhaust drift with the other point source terms for gas generation and panel creep closure. The analysis assumes that gas generation and panel creep closure are point source terms for air flow out of the WPC and that the total air flow is the sum of the air flow from ventilation effects of the adjacent main exhaust drift and the other source terms.

After ROM salt emplacement and installation of steel bulkheads, the analysis predicts that air flow through the WPC is initially of the order of 10 cfm. Soon after emplacement, the air gap aperture quickly grows and air flow increases until flow is limited by the bulkheads to about 200 cfm. After about 20 years, the air flow resistance through closing air gap and the steel bulkheads are nearly equal. After about 23 years, closure of the air gaps above the consolidating salt is complete, and air flow resistance is dominantly through the pore space of the consolidating salt. The estimated flow through the WPC is of the order of 1 cfm (0.028 m³/min) and air flows from ventilation effects are twice the flow from gas generation and panel creep closure.

⁵-A Practical Unit equals 1 milli-inch of water gage divided by (1 kcfm [1000 cubic feet per minute)² (Mine Ventilation Services (2003, p. 10). 1 kcfm = 1000 ft³/min (28.3 m³/min). The Practical Unit is equivalent to 3.17 x 10⁻⁵-mm/(m³/min)²-in the metric system. The Practical Unit is derived from the Square Law used in underground ventilation analysis.

Table G1-1

Air Conductivity of Other Flow Components

| | Air Conductivity | | |
|----------------|------------------------------------|-----------------------------------|----------------------|
| Component | ft/s | <mark>m/s</mark> | References |
| Dilated salt | 2.03 x 10⁻¹³ | 6.2 x 10⁻¹⁴ | DOE, 1996 |
| Fractured salt | 2.03 x 10 ⁹ | 6.2 x 10⁻¹⁰ | DOE, 1996 |
| Clay seams | 2.03 x 10 ⁻¹¹ | 6.2 x 10⁻¹² | DOE, 1996 |
| Marker Bed 139 | 2.03 x 10⁻¹⁰ | 6.2 x 10⁻¹¹ | DOE, 1996 |

3.3.4 Transport of VOCs by Advection

Transport of VOCs occurs either from the open room emissions (Kehrman, 2012, Table 12) prior to closure of the air gap in each WPC, and then by advection with the projected emission rate determined as the product of the air flow rate times the average head space concentration for each VOC. When the air gap is closed, it is assumed for the air flow model that the average headspace concentrations serve as a constant source of VOCs. This assumption is conservative because some containers may only have trace quantities of VOCs, either trapped in the headspace or on the surfaces of the various waste components. The analysis uses the weighted average headspace concentration for VOCs (Kehrman, 2012, Table 1) and no VOC source depletion is assumed.

Previous analysis (DOE, 1996) evaluated the effects of hydrodynamic dispersion on VOC transport through the WPC, using a one-dimensional dispersion model (Freeze and Cherry, 1979). Analysis was performed to evaluate the breakthrough or travel time of a concentration front considering the average linear velocity of the air flow. The analysis shows that breakthrough times increase with time as the salt compacts to higher fractional densities. The analysis shows that breakthrough times range from 7 to 70 days over 10 years. Hydrodynamic effects can be neglected for this rapid breakthrough time.

Comparisons of the model predictions with existing VOCs running average measurements at E-300 provide model validation. Figure G1-17 presents the analysis of CCl₄-and compares predictions with existing CCl₄ measurements from January 2008 to July 2012. The measurements include the emission rates during the time period when Panels 1 through 3 were closed and Panels 4 through 6 were active. The analysis initially predicts a higher rate of VOC emissions than what has been measured. This is because Panels 1 and 2 received smaller inventories of Type IV solidified organic wastes. At the time that Panel 6 is in operation, the VOCs model is in agreement with measurements of the running annual average (RAA) for CCl₄ at the E-300 location. The analysis predicts that the estimated CCl₄ emissions reach a value of about 300 parts per billion by volume (ppbv) at year 20, and then reduce with time as individual WPCs are constructed followed by closure of the air gap 23 years after each closure. The field measurements include a variety of factors that are not considered in the emissions model. These include changes in ventilation, temperature, barometric pressure, etc. This results in the oscillations in the field measurements that are not seen in the model predictions.

3.3.5 VOCS Analysis Results

The evaluation includes the case when all but one panel is closed using the WPC at the time of repository closure, and the single open active panel consists of six filled and closed rooms and

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one open room at current existing emissions rates. The case being evaluated is equivalent to the evaluations performed for other panel closures with the updated source term information.

The current Permit Application considers compliance with HBLs (Kehrman, 2012, Table 11) at the WIPP site boundary. Kehrman (2012, Table 6) provides the air dispersion factor for evaluating concentrations at this point. Kehrman (2012, Table 11) provides HBLs for these WIPP boundary receptor points for CCl₄ for carcinogenic risk and noncarcinogenic risk scenarios.

Figure G1-18 presents the risk fractions for the carcinogenic scenario for CCl₄ at the WIPP site boundary. Noncarcinogenic scenarios result in lower risk fractions than for carcinogenic scenarios (see Table G1-2). The figure also shows the average risk fractions for CCl₄ at the WIPP boundary receptor location are about 0.16 or less.

The predicted mass flow rates for CCl₄ through the WPC due to open room emissions prior to closure of the interface gap and then through the WPC after interface gap closure (including flow through the DRZ, the steel bulkheads and ROM salt) from gas generation, panel creep closure and ventilation effects of the adjacent main exhaust drift are predicted to result in concentrations that are below the limits established at the WIPP receptor boundary. The risk fractions are in compliance at the time of completion of waste emplacement operations in which nine WPCs have been installed, and there are six closed rooms with one open room in a single panel. The evaluation of risk fractions at intermediate locations has not been performed, and is not part of the scope of work.

3.3.6 Other VOCs

Table G1-2 presents an evaluation of risk fractions for all VOCs in the waste inventory at the time of maximum release. Risk fractions are the ratio of the predicted emissions to the HBLs. The analysis shows that the release fractions are less than one and that releases from the WIPP repository results in VOCs concentrations that are less than HBLs for VOCs of interest (Kehrman, 2012, Table 11) at the WIPP site boundary. Concentrations at other surface and underground locations were not analyzed as part of this scope of work.

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Table G1-2

Maximum Risk Fractions for VOCS at WIPP Site Boundary

| VOC | <mark>Carcinogen</mark> Site Boundary Ratio | Non-carcinogen Site Boundary Ratio |
|---------------------------------------|------------------------------------------------|---------------------------------------|
| Carbon Tetrachloride | 1.59E-01 | 5.26E-04 |
| <u>Chloroform</u> | 1.13E-02 | 1.04E-05 |
| Trichloroethylene | 6.13E-03 | 1.50E-03 |
| 1,1,2,2-Tetrachloroethane | 5.24E-03 | N/A |
| 1,2-Dichloroethane | 2.95E-03 | 3.37E-05 |
| Benzene | 1.02E-03 | 8.85E-06 |
| 1,1-Dichloroethane | 5.11E-04 | N/A |
| Ethyl Benzene | 2.35E-04 | 1.88E-07 |
| Bromoform | 4.81E-05 | N/A |
| Tetrachloroethylene | 4.59E-05 | 8.82E-06 |
| Methylene Chloride | 1.25E-05 | 4 .18E-06 |
| 1,2,4-Trimethlybenzene | N/A | 1.81E-05 |
| Butanol | N/A | 1.41E-05 |
| Methyl Chloride | N/A | 1.31E-05 |
| 1,1,1-Trichloroethane | N/A | 8.46E-06 |
| trans-1,2-Dichloroethylene | N/A | 4.52E-06 |
| 1,1-Dichloroethylene | N/A | 4.26E-06 |
| m,p-Xylene | N/A | 3.34E-06 |
| Chlorobenzene | N/A | 2.93E-06 |
| o-Xylene | N/A | 1.95E-06 |
| Methanol | N/A | 1.61E-06 |
| Carbon Disulfide | N/A | 1.11E-06 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | N/A | 4.43E-07 |
| Methyl Isobutyl Ketone | N/A | 2.15E-07 |
| Methyl Ethyl Ketone | N/A | 1.71E-07 |
| Toluene | N/A | 1.37E-07 |
| Acetone | N/A | 1.17E-07 |
| Cyclohexane | N/A | 1.05E-07 |
| Total | 1.87E-01 | 2.17E-03 |

Note: N/A indicates there is no regulatory limit for the VOC.

3.4 ROM Salt Material Compatibility Evaluation

The WPC consists of bulkheads and ROM salt. Additional steel from bulkheads used in the WPC for individual panels is not expected to affect repository modeling and analysis. Since only the outer steel bulkheads are subject to repository ventilation, only trace amounts of brine would contact the steel bulkheads over the operational period. This is due to the low moisture content of the halite. The outer steel bulkheads can be replaced or repaired if needed. ROM salt is entirely compatible with the underground environment.

Appendix 1-A 1-A-44 of 100 Panel Closure

4.0—Technical Specifications

The specifications are in the engineering file room at the WIPP facility. These specifications are included as an attachment in Appendix C and are summarized in Table G1-3.

Table G1-3

Technical Specifications for the WIPP Panel Closure System

| Division 1 – General Requirements | | |
|-----------------------------------|---------------------------------|--|
| Section 01010 | Summary of Work | |
| Section 01090 | Reference Standards | |
| Section 01400 | Contractor Quality Control | |
| Section 01600 | Material and Equipment | |
| Division 2 - Site Work | | |
| Section 02010 | Mobilization and Demobilization | |
| Section 02222 | Excavation | |
| Division 4 – Salt | | |
| Section 04100 | Run-of-Mine-Salt | |

Appendix 1-A 1-A-45 of 100 Panel Closure

5.0 Drawings

The Drawings (Appendix D) are in the engineering file room at the WIPP facility and are summarized in Table G1-4.

Table G1-4 WIPP Panel Closure System Drawings

| Drawing Number | Title |
|--------------------|--------------------------------------------------------------------------------------------|
| 262-001 | WIPP Panel Closure System Title Sheet |
| 262-002 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (3, 4, 6, 7, 8) |
| 262-003 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (1, 2, 5) |
| 262-004 | WIPP Panel Closure System, Construction Details |

Appendix 1-A 1-A-46 of 100 Panel Closure

6.0 Conclusions

This chapter presents the conclusions for the design activities for the WPC. Table G1-5 shows the Permit design requirements for the WPC and the compliance of the design with these requirements. The design configuration and essential features for the WPC include ROM salt, and two barriers. The barriers consist of two steel bulkheads placed at the ends of the ROM salt or alternatively, one steel bulkhead and a block wall. The design includes a minimum length of 100 ft of ROM salt.

This report presents the design as a series of calculations and engineering drawings and specifications that comply with the design requirements for the WPC. Structural and air flow analyses are used to select the design features and are based upon data acquired from the WIPP underground. The drawings illustrate and describe the construction and details for the WPC. The specifications cover the general requirements of the system, quality assurance and quality control, site work, and ROM salt emplaced in the panel entries. The WPC can be built to generally accepted national design and construction standards. Bulkheads are not included in the specifications (Section 2.1) since they are routinely constructed and used at the WIPP facility. There is no construction or materials specification for bulkheads, only a performance requirement (2,200 P.U. air flow resistance).

The design complies with all aspects of the design basis established for the WPC. The design can be constructed in the underground environment with no special requirements at the WIPP facility. To investigate several key aspects of the design and to implement the design, design evaluations were performed. The conclusions reached from the evaluations are as follows:

- An air gap forms between the excavation roof and the top of the fill due to the settlement of the ROM salt. Structural modeling results using the three dimensional finite difference code FLAC3D predict the change in gap height and density of the salt with time. The salt compacts from its initial placement density to approximately 90% of the intact salt density under its own weight 23 years after panel closure.
- A VOC Flow Model accounts for gas generation, panel-creep closure, and the effects of underground ventilation of the adjacent main exhaust drift. The VOC Flow Model evaluates the reduction in air conductivity that occurs with the increase in salt density, reduction in gap size and reduction in porosity. The low air flow through the WPC is initially caused by the effects of ventilation of the adjacent main exhaust drift. About 23 years after closure, the air gap above the ROM salt is eliminated. The ROM salt consolidates due to panel-entry closure and air conductivity is significantly reduced. This results in low air flow rates.
- The passive design components of the WPC require minimal routine maintenance during the nominal operational life. Out-by bulkheads must be maintained to provide 2,200 P.U. resistance for 23 years after installation.
- The WPC provides for flexibility over the remaining operational life in construction scheduling and construction material transportation and therefore minimizes the effect on waste receipt.

In addition to the design requirements presented above, the design includes a construction QA/QC program to verify material properties and construction practices.

Appendix 1-A 1-A-47 of 100 Panel Closure

The predicted mass flow rates for CCI₄ and other VOCs through the WPC (including flow through the DRZ, the steel bulkheads and the ROM salt) will result in concentrations that are below the HBLs established at the WIPP site boundary. Concentrations at other surface and underground locations were not analyzed. Modeling results of the WPC did not produce VOC concentrations from combined effects that would exceed limits for the repository. If the HBLs, air dispersion factors, or the average headspace values change, the calculations should be revaluated to ensure that compliance is maintained.

It is also concluded that:

- The WPC provides for flexibility over the remaining operational life in construction scheduling and construction material transportation effects on facility operations.
- The existing shafts and underground access can accommodate the construction of the WPC.

While no specific requirements exist for closing disposal areas under MSHA regulations, the intent of the regulations is to safely isolate abandoned areas from active workings using barricades of substantial construction. The ROM salt is considered substantial construction.

Appendix 1-A 1-A-48 of 100 Panel Closure

Table G1-5

Expected Compliance with Performance Specifications

| No. | Current Design Requirement | Expected Compliance with Requirement | Section in Report | Notes on Compliance |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | The panel closure system shall contribute to meeting the environmental performance standards in Permit Part 4 Section 4.6.2 by mitigating the migration of VOCs from closed panels. | Complies | 3.3.5, Appendix A | Complies with the use of ventilation bulkheads with flexible flashing to accommodate salt creep and ROM salt a minimum of 100 ft in length. |
| 2 | The panel closure system shall consider potential flow of VOCs through the DRZ in addition to flow through closure components. | Complies | 3.3.3 | VOCs flow model considers flow through the DRZ. |
| 3 | The panel closure system shall perform its intended functions under loads generated by creep closure of the tunnels. | Complies | 3.2.7 | The flexible flashing and maintenance of the steel bulkhead accommodates panel entry creep closure. The plastic deformation of the ROM salt will result in a reduction in porosity and permeability with time. |
| 4 | The nominal operational life of the closure system is thirty-five (35) years. | Complies | 3.2.7, 3.3.5 | The combination of maintaining the outer bulkheads with ROM salt can accommodate a design life of 35 years. |
| 5 | The panel closure system may require minimal maintenance per 20.4.1.500 NMAC (incorporating 40 CFR 264.111) | Complies | 2.2.1 | The ROM salt requires no future maintenance. The outbye bulkhead can be maintained or replaced with minimal maintenance. |
| 6 | The panel closure system addresses the expected ground conditions in the waste disposal areas. | Complies | 2.2, 3.2.6 | Design is based upon structural analyses and flow for the most severe ground conditions. |
| 7 | The panel closure system shall be built of substantial construction and non-combustible material except for flexible flashing used to accommodate salt movement. | Complies | Appendix G1-C Section 01400 | The panel closure system uses ROM salt which is of substantial construction. The materials are noncombustible except for the flexible flashing. |

Appendix 1-A 1-A-49 of 100 Panel Closure

| No. | Current Design Requirement | Expected Compliance with Requirement | Section in Report | Notes on Compliance |
|---------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8 | The design and construction shall follow conventional mining practices. | Complies | 2.3 | The future construction sequence for the design will follow conventional civil and mining practices. |
| 9 | Structural analysis shall use data acquired from the WIPP underground. | Complies | 3.2, 3.3 | Available geomechanical, air flow and gas generation measurements were used in the analysis. |
| 10 | Materials shall be compatible with their emplacement environment and function. | Complies | 3.4 | ROM salt is compatible with the surrounding environment. The outbye steel bulkheads can be replaced when the design life is exceeded. |
| 11 | Treatment of surfaces in the closure areas shall be considered in the design. | Complies | 2.1, Appendix G1-C Section 02222 | Surface scaling of loose material surrounding the WPC is included in the design specifications. |
| 12 | A QA/QC program shall verify material properties and construction. | <u>Complies</u> | 2.1, Appendix G1-C Section 01400 | Future submittals according to the design specifications will utilize materials testing to verify material properties and future construction practices as necessary. |
| 13 | The construction of the panel closure system shall consider shaft and underground access and services for materials handling. | Complies | 2.1, Appendix G1-C Section 01010 | The specification allows future construction within the capacities of the underground access. |

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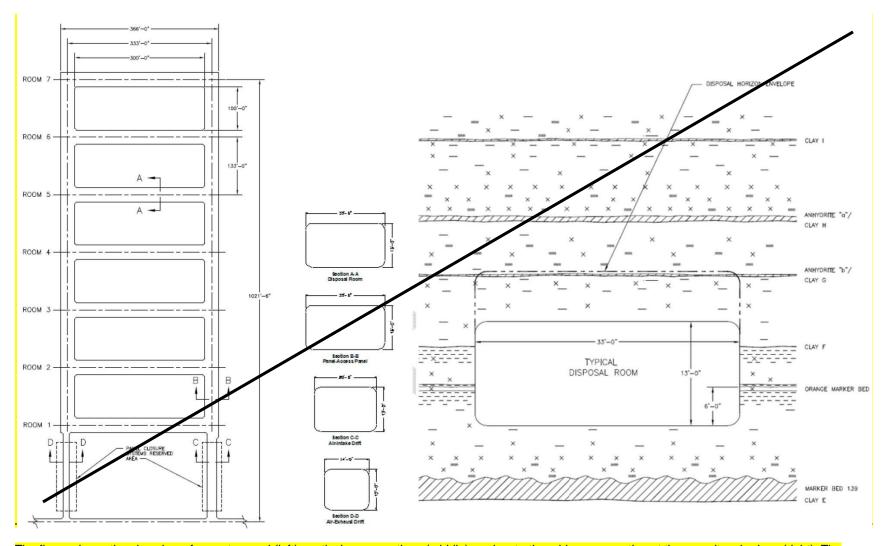
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The figure shows the plan view of a waste panel (left), vertical cross sections (middle), and a stratigraphic cross section at the repository horizon (right). The disposal horizon may be selected within the envelope shown based on geomechanical, operational, and safety considerations (Westinghouse, 1995).

Figure G1-1
Typical Panel Layout with Drift Cross Sections

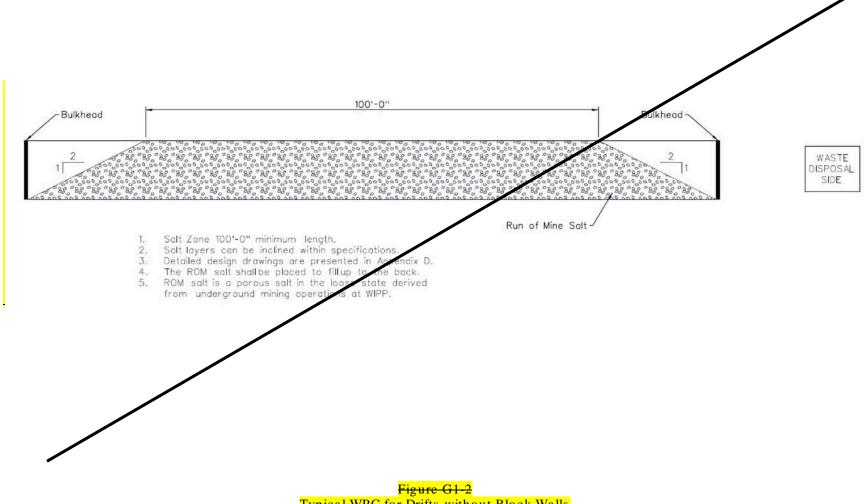


Figure G1-2 Typical WPC for Drifts without Block Walls

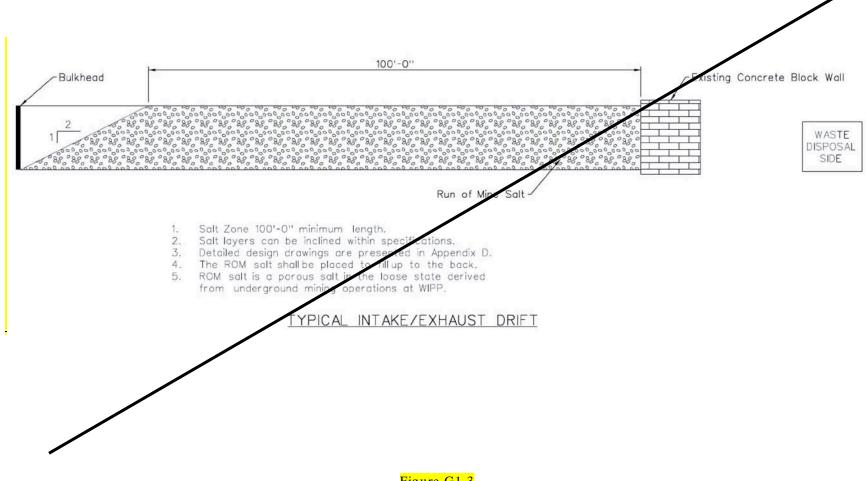


Figure G1-3
Typical WPC for Drifts with Existing Block Walls

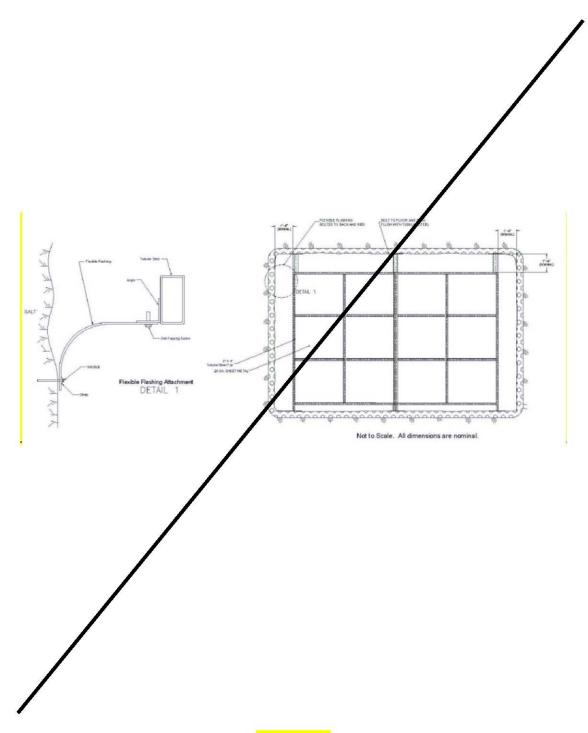
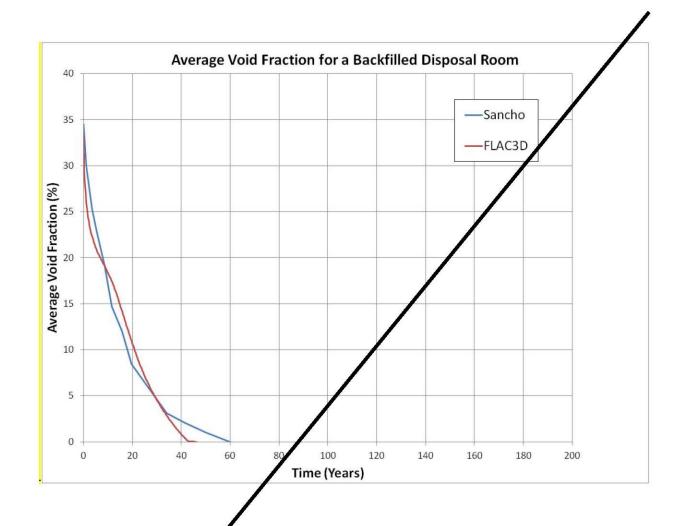
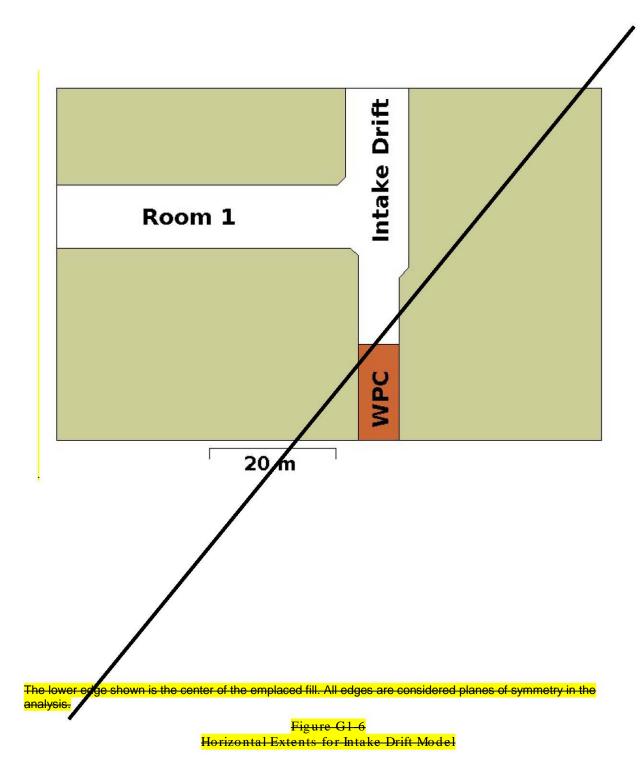


Figure G1-4
Typical Bulkhead for the WPC



The average void fraction equals 1 minus the porosity.

Figure G1-5
Comparison of FLAC3D and Previous SANCHO Results for the Crushed Salt Benchmark
Problem



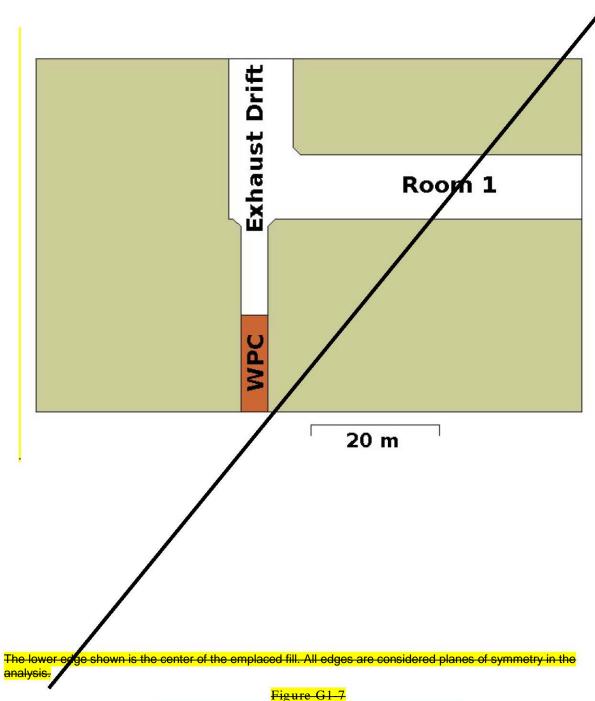


Figure G1-7
Horizontal Extents for Panel Exhaust Drift Model

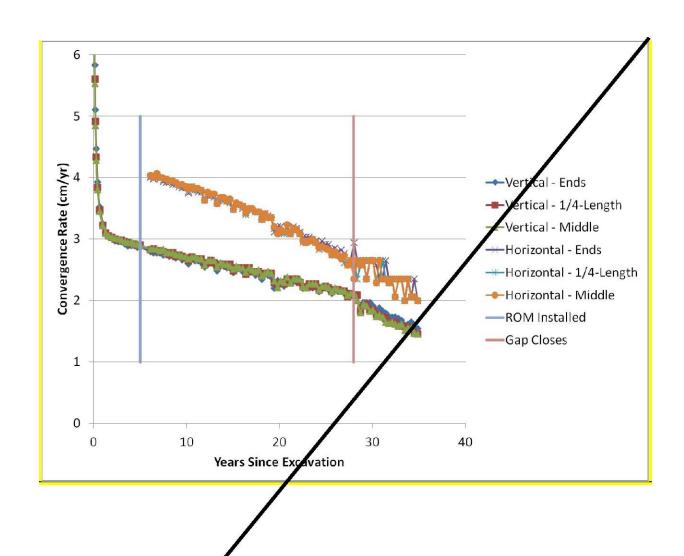
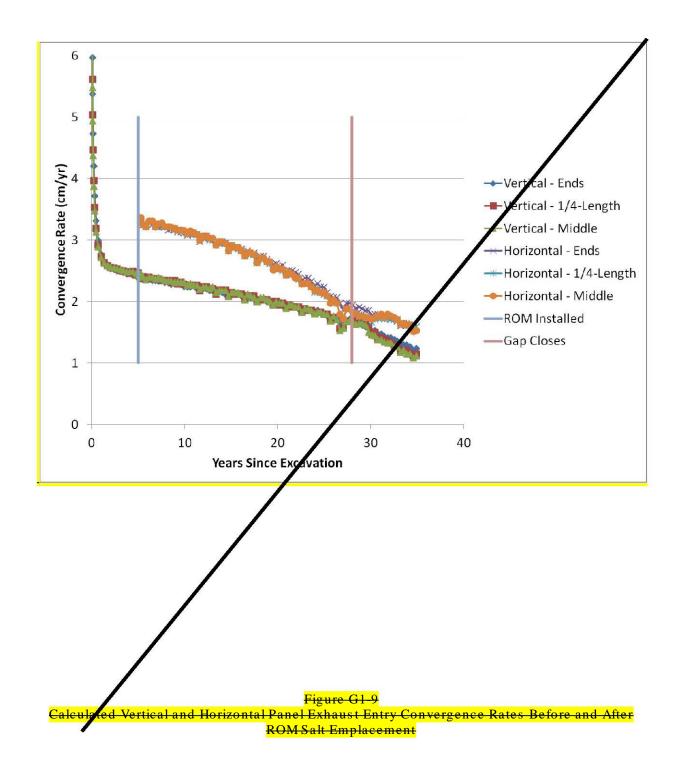


Figure G1-8

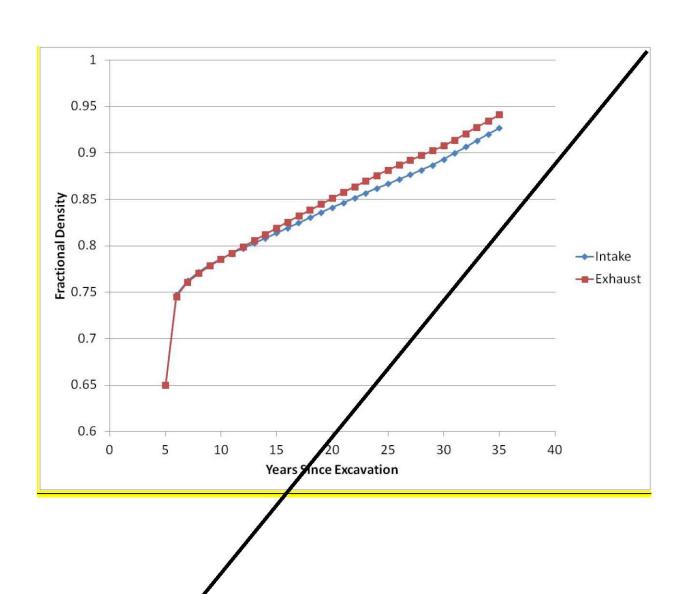
Calculated Vertical and Horizontal Panel Intake Entry Convergence Rates Before and After ROM

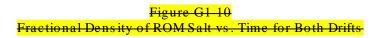
Salt Emplacement

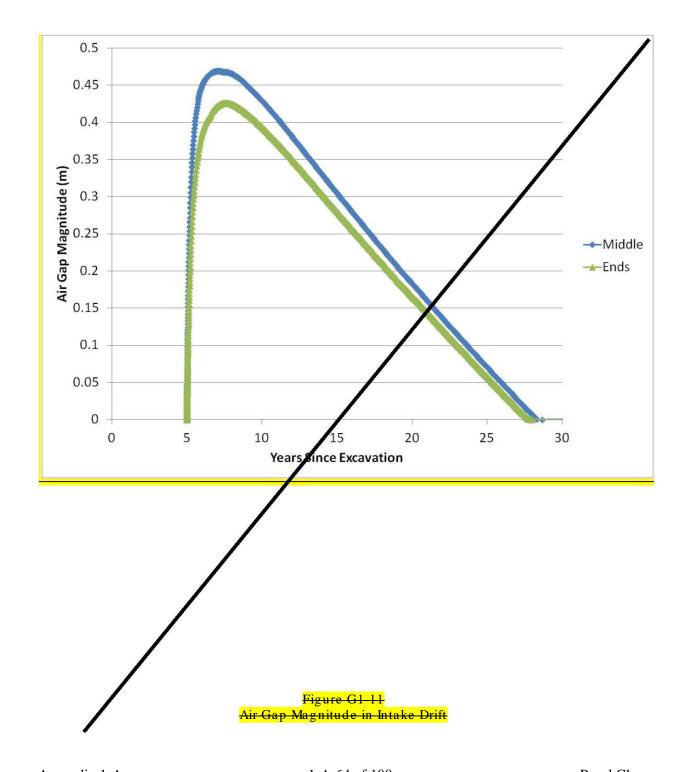
Appendix 1-A 1-A-61 of 100 Panel Closure

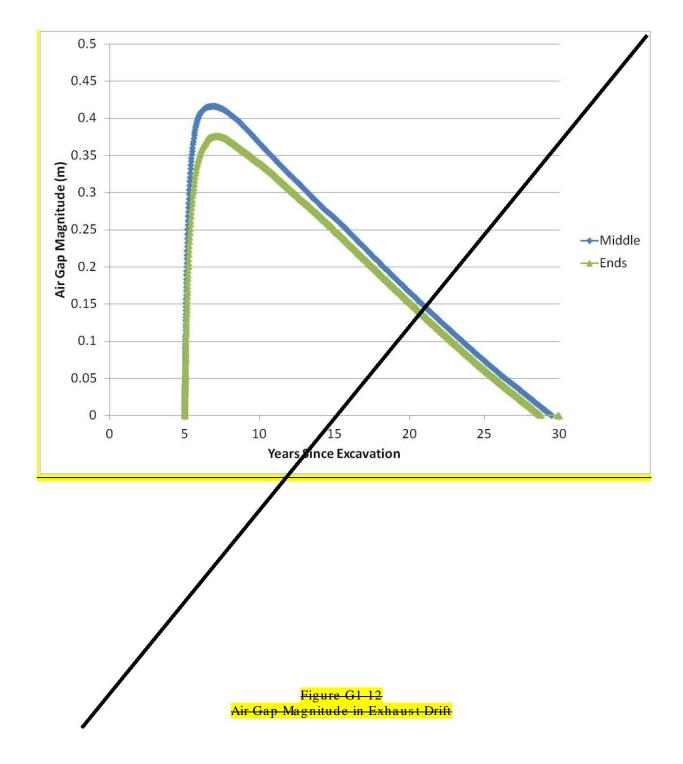


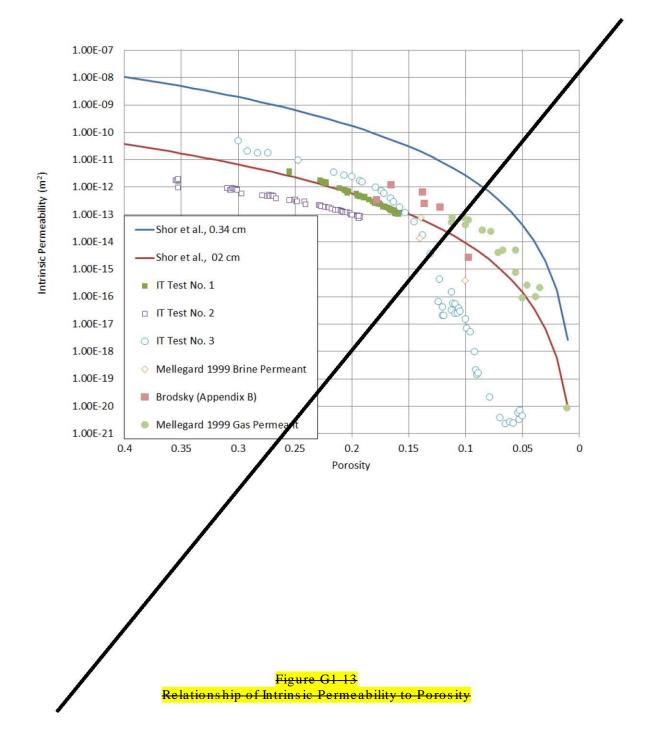
Appendix 1-A 1-A-62 of 100 Panel Closure



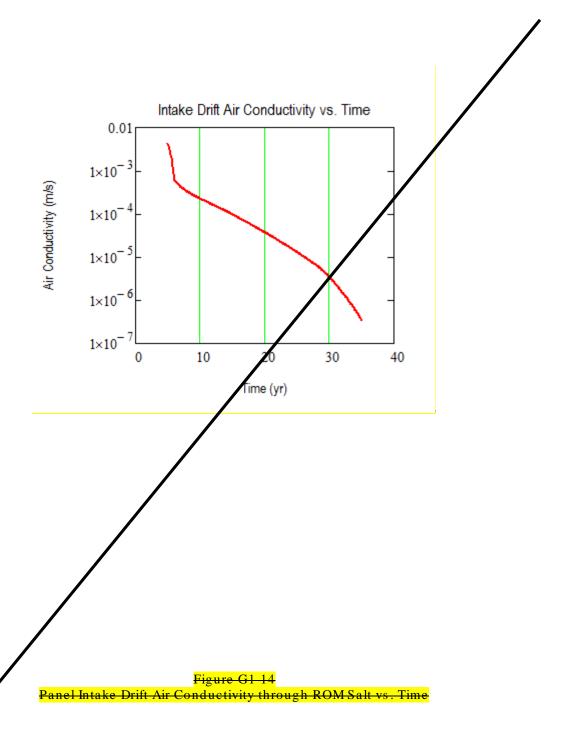


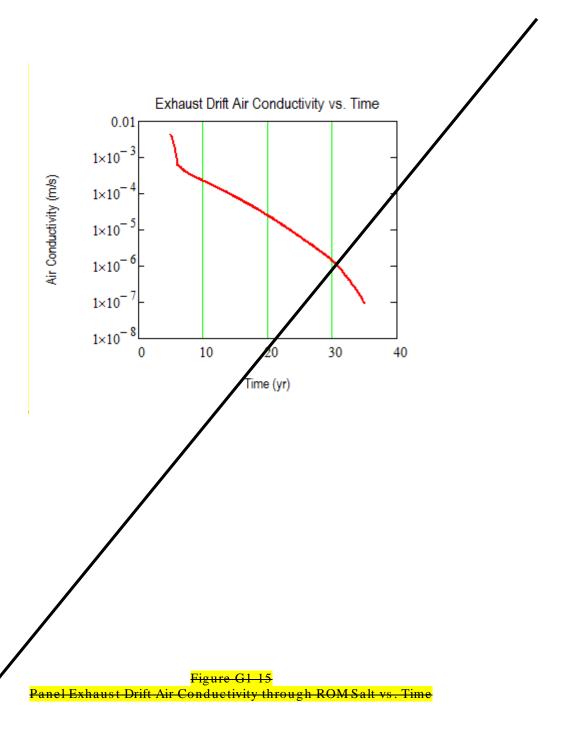




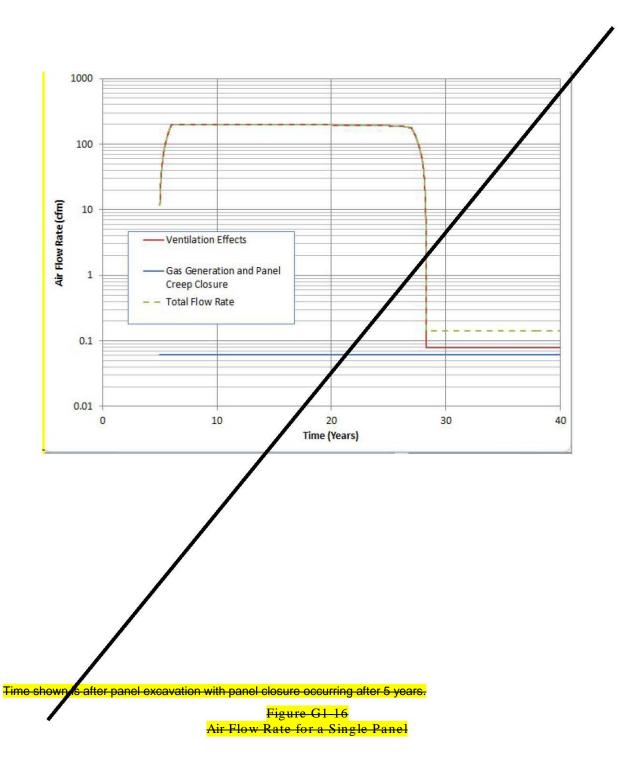


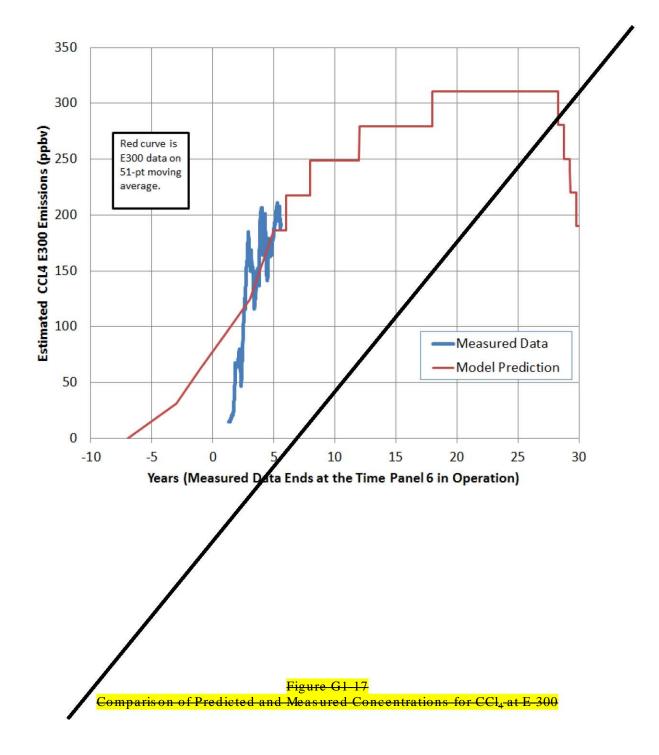
Appendix 1-A 1-A-66 of 100 Panel Closure

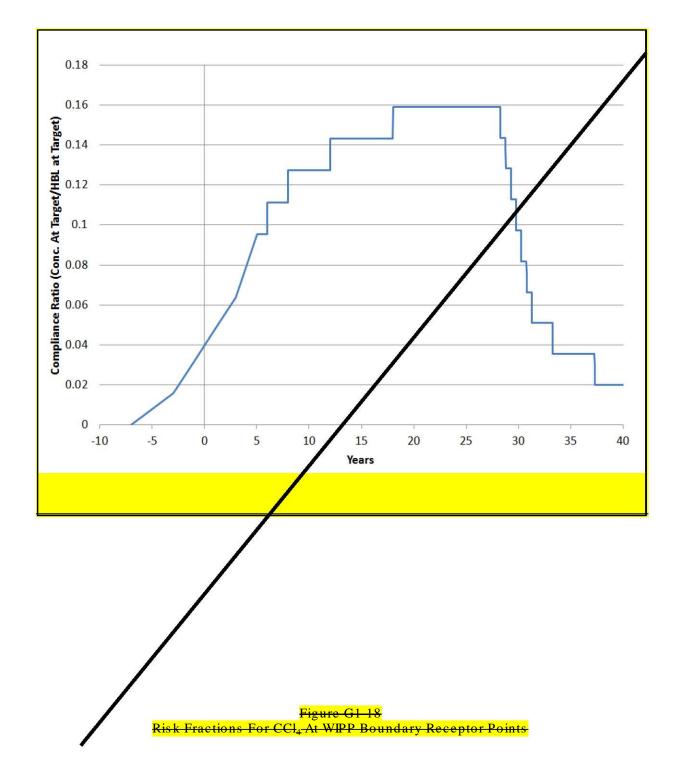




Appendix 1-A 1-A-68 of 100 Panel Closure







ATTACHMENT G1 APPENDIX CA

TECHNICAL SPECIFICATIONS

PANEL CLOSURE SYSTEM
WASTE ISOLATION PILOT PLANT
CARLSBAD, NEW MEXICO

Section 01010

Summary of Work

Part 1 - General

1.1 Scope

This section includes:

- Scope of Work
- Definitions and Abbreviations
- List of Drawings
- Work by Others
- Contractors Use of Site
- Contractors Use of Facilities
- Work Sequence
- Work Plan
- Health and Safety Plan (HASP)
- Contractor Quality Control Plan (CQCP)
- Submittals

1.2 Scope of Work

The Contractor shall furnish all labor, materials, equipment and tools to construct two (2) WIPP panel closure systems for Panels 1 through 10. Each WIPP Panel closure system consists of two steel bulkheads or one steel bulkhead and one block wall and ROM salt, one of each to be installed in the air-intake drift and the air-exhaust drift of a waste disposal panel, as shown on the Drawings and described in these Specifications. Unless otherwise agreed by Nuclear Waste Partnership, the Contractor shall use Nuclear Waste Partnership supplied equipment underground. Such use shall be coordinated with Nuclear Waste Partnership and may include the use of Nuclear Waste Partnership qualified operators.

The scope of work shall include but not necessarily be limited to the following units of work:

- Develop work plan, health and safety plan (HASP) and contractors quality control plan (CQCP) and submit it to the designated WIPP authority for approval
- Prepare and submit all plans requiring approval
- Mobilize to site
- Coordinate construction with WIPP operations
- Perform the following operations for the air-intake entry and the air-exhaust entries that do not contain block walls:
 - 1. Construct the inner steel bulkhead
 - 21. Prepare the surfaces for the ROM salt.
 - 32. Construct the inner steel bulkhead

- 43. Place ROM salt material in multiple layers
- 54. Construct the outer steel bulkhead
- 65. Clean up construction areas in underground and above ground
- 76. Submit all required record documents
- 87. Demobilize from site
- Perform the following operations for the air-intake entry and the air-exhaust entries that
 do-contain block walls:
 - 1. Prepare the surfaces for the ROM salt
 - 2. Place ROM salt material in multiple layers
 - 3. Construct the outer steel bulkhead
 - 4. Clean up construction areas in underground and above ground
 - 5. Submit all required record documents
 - 6. Demobilize from site

1.3 Definitions and Abbreviations

Definitions

<u>Block wall—Existing mortared concrete brick wall adjacent to the panel waste disposal area as shown in the drawings.</u>

<u>Creep—Viscoplastic deformation of salt under deviatoric stress.</u>

Methane explosion—A postulated deflagration caused by methane gas at an explosive level.

<u>Partial closure—The process of rendering a part of the hazardous waste management unit in the underground repository inactive and closed according to approved facility closure plans.</u>

Run-of-Mine Salt (ROM)—A salt backfill Salt obtained from mining operations or a storage pile emplaced in an uncompacted state.

<u>Volatile organic compound (VOC)—Any VOC with Hazardous Waste Facility Permit emission limits.</u>

Nuclear Waste Partnership— Nuclear Waste Partnership LLC, as the construction management authority.

Abbreviations/Acronyms

| ACI | American Concrete Institute |
|------|--------------------------------------------|
| ANSI | American National Standards Institute |
| ASTM | American Society for Testing and Materials |
| | |
| CFR | Code of Federal Regulations |
| CQCP | Contractor Quality Control Plan |
| | • |
| DOE | U.S. Department of Energy |
| DWG | drawing |
| DOE | U.S. Department of Energy |

| <u>EPA</u> | U.S. Environmental Protection Agency |
|------------|----------------------------------------------|
| HASP | Health and Safety Plan |
| JHA | Job Hazard Analysis |
| LHD LLC | load haul dump Limited Liability Corporation |
| MSHA | U.S. Mine Safety and Health Administration |
| RCRA | Resource Conservation and Recovery Act |
| USACE | U.S. Army Corps of Engineers |
| VOC | volatile organic compound |
| WIPP | Waste Isolation Pilot Plant |

1.4 List of Drawings

The following drawings are made a part of this specification:

| DWG 262-001 | WIPP Panel Closure System Title Sheet |
|-------------|-------------------------------------------------------------|
| DWG 262-002 | WIPP Panel Closure System, Underground Waste Disposal Panel |
| | Configurations (3,4,6,7,8) |
| DWG 262-003 | WIPP Panel Closure System, Underground Waste Disposal Panel |
| | Configurations (1,2,5) |
| DWG 262-004 | Construction Details |

1.5 Work by Others

Survey

All surveySurvey work to locate, control, confirm, and complete the work will be performed by Nuclear Waste Partnership. All surveySurvey work for record purposes will be performed by Nuclear Waste Partnership. The Contractor shall be responsible for developing the ROM salt backfill to fit the excavation.

Nuclear Waste Partnership may elect to perform certain portions or all of the work. The work performed by the Nuclear Waste Partnership will be defined prior to the contract. Unless otherwise agreed by Nuclear Waste Partnership, the Contractor shall use underground equipment furnished by Nuclear Waste Partnership for construction of the steel bulkheads and placement of ROM salt. Underground mining personnel who are qualified for the operation of such underground construction equipment may be made available to the Contractor. The use of Nuclear Waste Partnership WIPP facility government furnished equipment shall be coordinated with Nuclear Waste Partnership.

1.6 Contractor's Use of Site

Site Conditions

The WIPP site is located near Carlsbad in southeastern New Mexico, as shown on the Drawings. The underground arrangements and location of the WIPP waste disposal panels are shown on the Drawings. The work is to construct steel bulkheads and place ROM salt in the air-intake and air-exhaust drifts of one of the panels upon completion of the disposal phase of that panel. The waste disposal panels are located approximately 2,150 ft (655 m) below the ground surface. The Contractor shall visit the site and become familiar with the site and site conditions prior to preparing a bid proposal.

Contractor's Use of Site and Coordination of Contractor's Work

Areas at the ground surface will be designated for the Contractor's use in assembling and storing his equipment and materials. The Contractor shall utilize only those areas so designated.

<u>Limited space within the underground area will be designated for the Contractor's use for storage of material and setup of equipment.</u>

Coordination of Contractor's Work

Areas at the ground surface will be designated for the Contractor's use in assembling and storing his equipment and materials. The Contractor shall utilize only those areas so designated.

Limited space within the underground area will be designated for the Contractor's use for storage of material and setup of equipment.

1.7 Contractor's Use of Facilities

Existing facilities at the site available for use by the Contractor are:

- Waste shaft conveyance
- Salt skip hoist
- 460 volt AC, 3 phase power
- Water (underground, at waste shaft only) (above ground, at location designated by Nuclear Waste Partnership)
- Fuel underground and above ground at fueling stations

Contractor will only enter areas of the underground designated by NWP.

NWP will provide mine safety inspection services and will release areas for work after determining that such areas are safe for the work to be performed. Remediation of areas prior to performing work is the responsibility of NWP.

NWP will establish the ventilation needed for the contractor to perform work. The Contractor will not enter areas of the underground that have insufficient ventilation.

Additional information on mobilization and demobilization to these facilities is presented in Section 02010.

1.8 Work Sequence

Work Sequence shall be as shown on the Drawings and as directed by Nuclear Waste Partnership.

1.9 Work Plans

The Contractor shall prepare Work Plans fully describing the proposed fabrication, installation and construction for each WIPP Panel Closure System. The work plan shall define all proposed materials, equipment and construction methods. The Work Plan shall state all supporting processes, procedures, materials safety data sheets, and regulations by reference. The work plans shall address precautions related to the Job Hazards Check List. The Work Plan shall address limitations such as hold and witness points. The Work Plans shall address all prerequisites for work. Nuclear Waste Partnership shall approve the Work Plan and no work shall be performed prior to approval of the Work Plan.

1.10 Health and Safety Plan (HASP)

The Contractor shall obtain, review, and agree to applicable portions of the existing WIPP Safety Manual, WP 12-1. The Contractor shall prepare a project-specific HASP taking into account applicable sections of the WIPP Safety Manual. All personel Personnel shall be qualified to work underground as necessary. All personnel personnel operating heavy construction equipment shall be qualified to operate such equipment. The Contractor shall also perform a Job Hazard Analysis (JHA) in accordance with WP 12-111 applicable NWP procedures. Nuclear Waste Partnership shall approve the HASP and JHA and no work shall be performed prior to approval of the HASP and JHA.

1.11 Contractor Quality Control Plan (CQCP)

The Contractor shall prepare a CQCP identifying all-personnel and procedures necessary to produce an end product, which complies with the contract requirements. The CQCP shall comply with all applicable Nuclear Waste Partnership requirements, including operator training and qualification; and Section 01400, Contractor Quality Control, of this Specification. Nuclear Waste Partnership shall approve the CQCP and no work shall be performed prior to approval of the CQCP.

1.12 Submittals

<u>Submittals shall be in accordance with Nuclear Waste Partnership Submittal Procedures and as required by the individual Specifications.</u>

Part 2 - Products

Not used.

Part 3 - Execution

Not Used

End of Section

Section 01090

Reference Standards

Part 1 - General

1.1 Scope

This section includes:

- Provision of Reference Standards at Site
- Acronyms used in Contract Documents for Reference Standards

1.2 Quality Assurance

For products or workmanship specified by association, trade, or Federal Standards, the Contractor shall comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

Conform to reference by date of issue current on the date of the owner-contractor agreement.

The Contractor shall obtain, at his own expense, a copy of the standards referenced in the individual Specification sections and shall maintain that copy at the job site until completion and acceptance of the work.

<u>Should specified Reference Standards conflict with the contract documents, the Contractor shall request clarification from Nuclear Waste Partnership before proceeding.</u>

1.3 Schedule of References

<u>Various publications referenced in other sections of the Specifications establish requirements</u> for the work. These references are identified by document number and title. The addresses of the organizations responsible for these publications are listed below.

ANSI American National Standards Institute

25 West 43rd St. New York NY 10036 Ph: 212-642-4900 Fax: 212-398-0023

ASTM <u>ASTM International</u>

100 Barr Harbor Drive

P.O. Box C700

West Conshohocken, PA 19428-2959

Ph: 610-832-9585 Fax: 610-832-9555 <u>CFR</u> <u>Code of Federal Regulations</u>

Government Printing Office 732 N. Capital Street, NW Washington, DC 20402-0002

Ph: 202-512-1530 Fax: 202 512-1262

EPA Environmental Protection Agency (Region VI)

1455 Ross Avenue

Suite 1200

Dallas, TX 75202-2733 Ph: 214-665-2200 Fax: 800-887-6063

FTM-STD Federal Test Method Standards

Standardization Documents Order Desk

Bldg. 4D

700 Robbins Ave.

Philadelphia, PA 19111-5094

Ph: 215-697-2179 Fax: 215-697-2978

NIST National Institute of Standards and Technology

100 Bureau Drive, Stop 1000 Gaithersburg, MD 20899-1000

Ph: 301-975-6478 Fax: 301-975-8295

NTIS National Technical Information Service

U.S. Department of Commerce

5301 Shawnee Rd Alexandria, VA 22312 Ph: 703-605-6000 Fax: 703-321-8547

End of Section

<u>Section 01400</u>

Contractor Quality Control

Part 1 - General

1.1 Scope

This section includes:

- Contractor Quality Control Plan (CQCP)
- Reference Standards
- Quality Assurance
- Tolerances
- Testing Services
- Inspection Services
- Submittals

1.2 Related Sections

- 01090 Reference Standards
- 01600 Material and Equipment
- 02222 Excavation
- 04100 Run-of-Mine Salt

1.3 Contractor Quality Control Plan (CQCP)

The Contractor shall prepare a Contractor Quality Control Plan (CQCP) describing the methods to be used to verify the performance of the engineered components of the Panel Closure System. The quality control plan for the run-of-mine (ROM) salt shall detail the methods the Contractor proposes to meet the minimum requirements, and the standard quality control test methods to be used to verify compliance with minimum requirements. All equipment Equipment methods employed shall be traceable to standard quality control tests as approved in the CQCP. No work shall be performed prior to Nuclear Waste Partnership approval of the CQCP.

1.4 References and Standards

Refer to individual specification sections for standards referenced therein, and to Section 01090, Reference Standards, for general listing. Additional standards will be identified in the CQCP.

Standards referenced in this section are as follows:

| ASTM E 329-01b | Standard Specification for Agencies Engaged in Construction |
|----------------|-------------------------------------------------------------|
| | Inspection, Testing, or Special Inspection |
| | |
| ASTM E 543-02 | Standard Practice for Agencies Performing Nondestructive |
| | Testing |

1.5 Quality Assurance

The Contractor shall:

- Monitor suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of specified quality
- Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship
- Perform work with qualified persons to produce required and specified quality

1.6 Tolerances

The Contractor shall:

Monitor excavation, fabrication, and tolerances in order to produce acceptable work.
 The Contractor shall not permit tolerances to accumulate.

1.7 Testing Services

<u>Unless otherwise agreed by Nuclear Waste Partnership, the Contractor shall employ an independent firm qualified to perform the testing services and other services specified in the individual Specification sections, and as may otherwise be required by Nuclear Waste Partnership. Testing and source quality control may occur on or off the project site. An independent firm is one that is not associated with the firm performing the work being tested.</u>

The testing laboratory shall comply with applicable sections of the Reference Standards and shall be authorized to operate in the State of New Mexico.

<u>Testing equipment shall be calibrated at reasonable intervals traceable to either the National Institute of Standards and Technology or accepted values of natural physical constants.</u>

1.8 Inspection Services

The Contractor may employ an independent firm individual(s) to perform inspection services as a supplement to the Contractor's quality control as specified in the individual Specification sections, and as may be required by Nuclear Waste Partnership. Inspection may occur on or off the project site. An independent individual is one that did not perform the work being inspected.

The inspectorsion firm shall comply with applicable sections of the Reference Standards.

1.9 Submittals

The Contractor shall submit a CQCP as described herein.

Prior to start of work, the Contractor shall submit for approval, the testing laboratory name, address, telephone number and name of responsible officer of the firm as well as a copy of the testing laboratory compliance with the reference ASTM standards and a copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Institute of

<u>Standards and Technology with memorandum of remedies of any deficiencies reported by the inspection.</u>

The Contractor shall submit the names and qualifications of personnel proposed to perform the required inspections, along with their individual qualifications and certifications. Once approved by Nuclear Waste Partnership these personnel shall be available as may be required to promptly and efficiently complete the work.

Part 2 - Products

Not used.

Part 3 - Execution

3.1 General

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system. The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on site and off site, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job. The project superintendent in this context is the individual with the responsibility for the overall management of the project, including quality and production.

3.2 Contractor Quality Control Plan

3.2.1 General

The Contractor shall supply, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control Plan (CQCP) which implements the requirements of the Contract. The CQCP shall identify personnel, procedures, control, instructions, tests, records, and forms to be used. Construction shall not begin until the CQCP is approved by Nuclear Waste Partnership.

3.2.2 Content of the Contractor Quality Control Plan (QCQC)

The CQCP shall cover all applicable construction operations, both on site and off site, including work by subcontractors, fabricators, suppliers, and purchasing agents and shall include, as a minimum, the following items:

- A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the Contractor Quality Control (CQC) staff shall implement the control system for all aspects of the work specified.
- The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function.
- A description of CQCP responsibilities and a delegation of authority to adequately perform the functions described in the CQCP, including authority to stop work.

- Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Nuclear Waste Partnership Submittal Pprocedures.
- Control, verification, and acceptance testing procedures as may be necessary to ensure that the work is completed to the requirements of the Drawings and Specifications.
- Procedures for tracking deficiencies from identification, through acceptable corrective action, to verification that identified deficiencies have been corrected.
- Reporting procedures, including proposed reporting formulas.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is conditional. Nuclear Waste Partnership reserves the right to require the Contractor to make changes in the CQCP and operations, including removal of personnel, if necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQCP, the Contractor shall notify Nuclear Waste Partnership in writing of any proposed change. Proposed changes are subject to acceptance by Nuclear Waste Partnership prior to implementation.

3.3 Tests

3.3.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to complete the work to contract requirements. Upon request, the Contractor shall furnish, at his own expense, duplicate samples of test specimens for testing by Nuclear Waste Partnership. The Contractor shall perform, as necessary, the following activities and permanently record the results:

- Verify that testing procedures comply with contract requirements and are the most current version of such procedures.
- Verify that facilities and testing equipment are available and comply with testing standards.
- Check test instrument calibration data against certified standards.
- Verify that recording forms and test identification control number system, including all of the applicable test documentation requirements, have been prepared.
- Record the results of all-tests taken, both passing and failing. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. If approved by Nuclear Waste Partnership, actual test reports may be submitted later with a reference to the test number and date taken. An

- information copy of tests performed by an offsite or commercial test facility will be provided directly to Nuclear Waste Partnership.
- The Contractor may elect to develop an equipment specification with construction parameters based upon test results of a test section of compacted emplaced ROM salt. The equipment specification based upon construction parameters shall be traceable to standard test results identified in the CQCP. Specification paragraph reference, location where construction parameters were taken, and the sequential control number identifying the construction parameters will be given. If approved by Nuclear Waste Partnership, actual construction parameter reports may be submitted later with a reference to the recording of construction parameters, location, time and date taken.

3.4 Testing Laboratory

The testing laboratory shall provide qualified personnel to perform specified sampling and testing of products in accordance with specified standards, and the requirements of Contract Documents.

Reports indicating results of tests, and compliance or noncompliance with the contract documents will be submitted in accordance with Nuclear Waste Partnership submittal procedures. Testing by an independent firm does not relieve the Contractor of the responsibility to perform the work to the contract requirements.

3.5 Inspection Services

The inspection firm shall provide qualified personnel to perform specified inspection of products in accordance with specified standards.

Reports indicating results of the inspection and compliance or noncompliance with the contract documents will be submitted in accordance with Nuclear Waste Partnership submittal procedures.

<u>Inspection by the independent firmindividual(s)</u> does not relieve the Contractor of the responsibility to perform the work to the contract requirements.

3.6 Completion Inspection

3.6.1 Pre-Final Inspection

At appropriate times and at the completion of all work, the Contractor shall conduct an inspection of the work and develop a punch-list of items which do not conform to the Drawings and Specifications. The Contractor shall then notify Nuclear Waste Partnership that the work is ready for inspection. Nuclear Waste Partnership will perform this inspection to verify that the work is satisfactory and appropriately complete. A final punch-list will be developed as a result of this inspection. The Contractor shall ensure that all items on this list are corrected and notify Nuclear Waste Partnership so that a final inspection can be scheduled. Any items noted on the final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time slated for completion of the entire work.

3.6.2 Final Acceptance Inspection

The final acceptance inspection will be formally scheduled by Nuclear Waste Partnership based upon notice from the Contractor. This notice will be given to Nuclear Waste Partnership at least 14 days prior to the final acceptance inspection. The Contractor shall assureensure that specific items previously identified as unacceptable, along with all-remaining work performed under the contract, will be complete and acceptable by the date scheduled forprior to the final acceptance inspection.

3.7 **Documentation**

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form approved by Nuclear Waste Partnership.

3.8 Notification of Noncompliance

Nuclear Waste Partnership will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the worksite, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, Nuclear Waste Partnership may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

End of section.

Appendix 1-A 1-A-86 of 100 Panel Closure

Section 01600

Material and Equipment

Part 1 - General

1.1 Scope

This section includes:

- Equipment
- Products
- Transportation and Handling
- Storage and Protection
- Substitutions

1.2 Related Sections

- 01010 Summary of Work
- 01400 Contractor Quality Control
- 02010 Mobilization and Demobilization
- 02222 Excavation
- 04100 Run-of-Mine Salt

1.3 Equipment

The Contractor shall specify his proposed equipment in the Work Plan. Power equipment for use underground shall be either electrical or diesel engine driven. All diesel engine equipment shall be certified appropriate for use underground at the WIPP site.

1.4 Products

The Contractor shall specify in the Work Plan, or in subsequently required submittals, the proposed products including, but not limited to steel bulkheads and ROM salt. The proposed products shall be supported by laboratory test results as required by the Specifications. All products Products shall be subject to approval by Nuclear Waste Partnership.

1.5 Transportation and Handling

The Contractor shall:

- Transport and handle products in accordance with manufacturer's manufacturers' instructions.
- Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.6 Storage and Protection

The Contractor shall:

- Store and protect products in accordance with manufacturers' instructions.
- Store with seals and labels intact and legible.
- Store sensitive products in weather-tight, climate-controlled enclosures in an environment favorable to product.
- Provide ventilation to prevent condensation and degradation of products.
- Store loose granular materials on solid flat surfaces in a well-drained area and prevent mixing with foreign matter.
- Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- Arrange storage of products to permit access for inspection and periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.7 Substitutions

1.7.1 Equipment Substitutions

<u>The Contractor may substitute equipment for that proposed in the Work Plan subject to Nuclear Waste Partnership approval.</u>

1.7.2 Product Substitutions

The Contractor may not substitute products after the proposed products have been approved by Nuclear Waste Partnership unless he can demonstrate that the supplier/source of that product no longer exists in which case he shall submit alternate products with lab test results to Nuclear Waste Partnership for approval.

Part 2 - Products

Not used.

Part 3 - Execution

Not used.

End of section.

Section 02010

Mobilization and Demobilization

Part 1 - General

1.1 Scope

This section includes:

- Mobilization of Equipment and Facilities to Site
- Contractor Use of Site
- Use of Existing Facilities
- Demobilization of Equipment and Facilities
- Site Cleanup

1.2 Related Sections

- 01010 Summary of Work
- 01600 Material and Equipment

Part 2 - Products

Not used.

Part 3 - Execution

3.1 Mobilization of Equipment and Facilities to Site

<u>Upon authorization to proceed, the Contractor shall mobilize his equipment and facilities to the jobsite.</u> Equipment and facilities shall be as specified and as defined in the Contractor's Work Plan.

Nuclear Waste Partnership will provide utilities at designated locations. The Contractor shall be responsible for all hookups and tie-ins required for his operations.

The Contractor shall be responsible for providing his own office, storage, and sanitary facilities.

Areas will be designated for the Contractor's use in the underground area in the vicinity of the panel closure system installation. These areas are limited.

3.2 Contractor Use of Site

The Contractor shall use only those areas specifically designated for his use by Nuclear Waste Partnership. The Contractor shall limit his on-site travel to the specific routes required for performance of his work, and designated by Nuclear Waste Partnership.

3.3 Use of Existing Facilities

Existing facilities available for use by the Contractor are:

- Waste shaft conveyance
- Salt skip hoist
- 460 Volt AC, 3 phase power
- Water underground at waste shaft only
- Water on surface at location designated by Nuclear Waste Partnership
- Fuel for construction equipment on the surface and underground

<u>The Contractor shall arrange for use of the facilities with Nuclear Waste Partnership and coordinate his actions and requirements with ongoing Nuclear Waste Partnership operations.</u>

<u>Use of water in the underground will be restricted. No washout or cleanup will be permitted in the underground except as designated by Nuclear Waste Partnership. Above ground washout or cleanup of equipment will be allowed in the areas designated by Nuclear Waste Partnership.</u>

The Contractor is cautioned to be aware of the physical dimensions of the waste conveyance and the air lock.

The Contractor shall be responsible for any damage incurred by the existing site facilities as a result of his operations. Any damage shall be reported immediately to Nuclear Waste Partnership and repaired at the Contractor's cost.

3.4 Demobilization of Equipment and Facilities

At completion of this work, the Contractor shall demobilize his equipment and facilities from the job site. All Contractor's equipment and materials shall be removed and all-disturbed areas restored. Utilities shall be removed to their connection points unless otherwise directed by Nuclear Waste Partnership.

3.5 Site Cleanup

At conclusion of the work, the Contractor shall remove all trash, waste, debris, excess construction materials, and restore the affected areas as close to their prior condition as practical, to the satisfaction of Nuclear Waste Partnership. A final inspection will be conducted by Nuclear Waste Partnership and the Contractor before final payment is approved.

End of section.

Section 02222

Excavation

Part 1 - General

1.1 Scope

This section includes:

- Excavation for surface preparation and leveling of surrounding areas for compacted ROM salt
- Disposition of excavated materials
- Field measurement and survey

1.2 Related Sections

- 01010 Summary of Work
- 01600 Material and Equipment

1.3 Reference Documents

Krieg, R. D., 1984, Reference Stratigraphy and Rock Properties for the Waste Isolation Pilot Plant, SAND83-1908, Sandia National Laboratories, Albuquerque, New Mexico.

1.4 Field Measurements and Survey

All surveySurvey required for performance of the work will be provided by Nuclear Waste Partnership.

Part 2 - Products

Not used.

Part 3 - Execution

3.1 Excavation for Surface Preparation and Leveling of Surrounding Areas for Salt

The Contractor shall inspect the panel entry excavations for loose material at locations where the panel closure system is emplaced. If loose material is found, the contractor shall excavate and prepare the surface for the panel closure system component by removing all loose material, and cleaning all rock surfaces and perform any necessary ground control to ensure worker safety. The contractor may install ground support, as necessary, to address loose material (rock slabs). The surface preparation of the floor shall produce a surface suitable for placing the first layer of ROM salt. Excavation may be performed by either mechanical or manual means. Use of explosives is prohibited.

3.2 Disposition of Excavated Materials

<u>The Contractor shall dispose of all excavated materials as directed by Nuclear Waste Partnership.</u>

3.3 Field Measurements and Survey

All surveySurvey required for performance of the work will be provided by Nuclear Waste Partnership. The Contractor shall protect all survey control points, benchmarks, etc., from damage by his operations. Nuclear Waste Partnership will verify that the Contractor has excavated to the required lines and grades. No salt shall be emplaced until approved by Nuclear Waste Partnership.

End of section.

Appendix 1-A 1-A-92 of 100 Panel Closure

<u>Section 04100</u>

Run-of-Mine Salt

Part 1 - General

1.1 Scope

This section includes:

Salt Placement

1.2 Related Sections

- 01010 Summary of Work
- 01400 Contractor Quality Control
- 01600 Material and Equipment

1.3 Submittals for Review and Approval

The salt emplacement method, dust control plan and other safety-related material shall be approved by Nuclear Waste Partnership.

1.4 Quality Assurance

The Contractor shall perform the work in accordance with the CQCP.

Part 2 - Products

2.1 Salt Material

The salt is ROM salt and requires no grading or compaction. The salt shall be free of organic material that could impact performance of the closure such as trash, wood, plastic, rubber, and other organic debris.

Part 3 - Execution

3.1 General

The Contractor shall furnish all labor, material, equipment and tools to handle and place the salt.

The Contractor shall use underground equipment and underground mine personnel as required in Part 1.5, Work by Others in Section 01010 Summary of Work. Nuclear Waste Partnership will supply ROM salt. The Contractor shall make suitable arrangements for transporting and placing the ROM salt.

3.2 Installation

ROM salt shall be transported to the panel closure area after the construction of the inner steel bulkhead, for those panels that do not already have walls constructed. The ROM salt is not required to achieve a specified density. The salt shall be free of organic material that could

impact performance of the closure, such as trash, wood, plastic, rubber, and other organic debris.

Salt may be emplaced in layers to facilitate the construction. The ROM Salt is emplaced in layers with a 2:1an appropriate slope near the ends of the WIPP Panel Closure System. The inner and outer salt emplacements are designated on the drawings.

For the inner emplacement of the ROM Salt, the salt is emplaced at the an appropriate angle of repose, of 1 (rise) to 2 (run) as designated on the drawings. There Initially, there shall be no gap left between salt and roof or sidewalls. Hand placement or the use of push plates can be used to fill all the voids if necessary. ROM salt will be pushed up to the roof against explosion isolation walls in Panels 1, 2, and 5 as designated in the drawings.

3.3 Field Quality Control

The Contractor shall provide a Quality Control Inspector to inspect the emplacement of salt.

End of Section.

Appendix 1-A 1-A-94 of 100 Panel Closure

ATTACHMENT G1

APPENDIX DB

DESIGN DRAWINGS

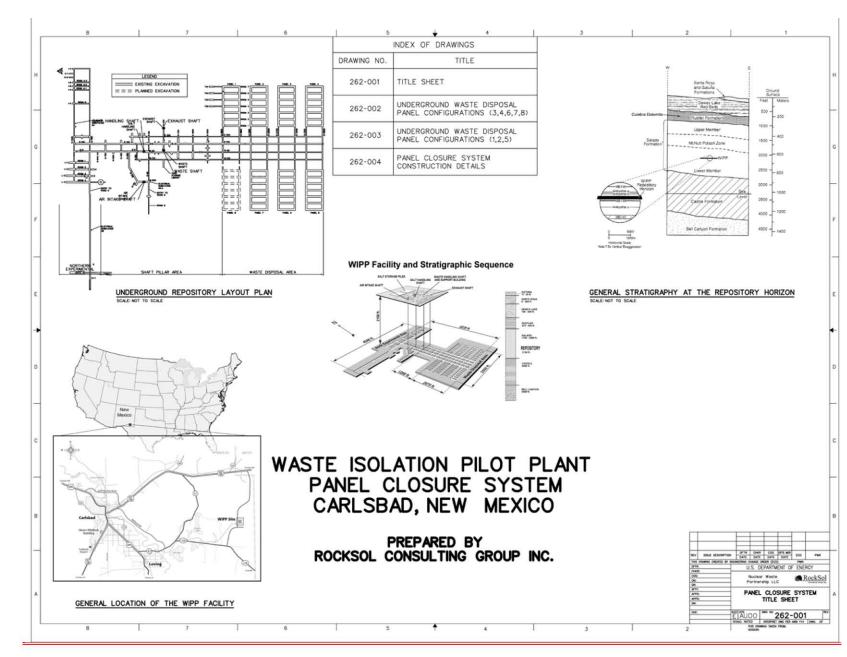
PANEL CLOSURE SYSTEM
WASTE ISOLATION PILOT PLANT
CARLSBAD, NEW MEXICO

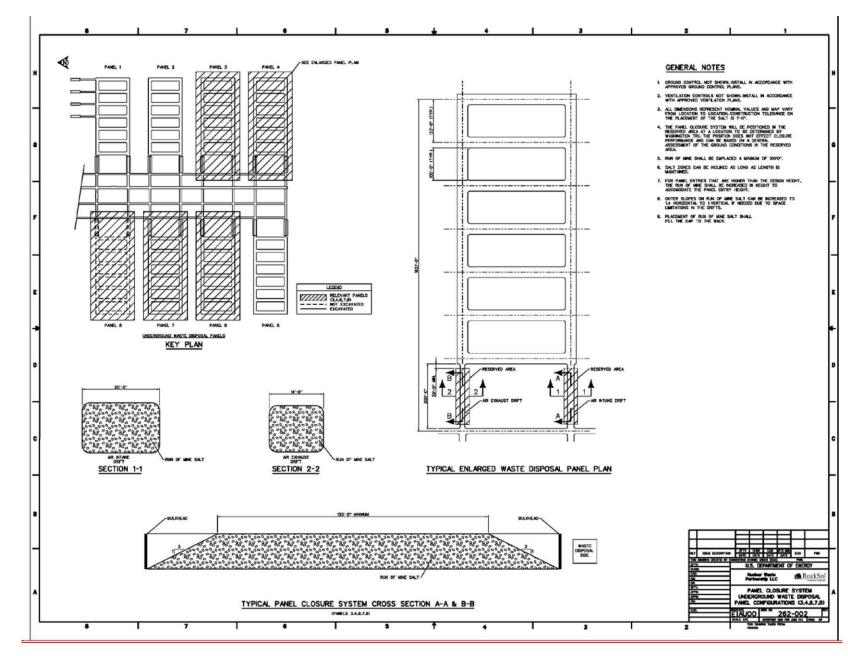
ATTACHMENT G1 APPENDIX DB

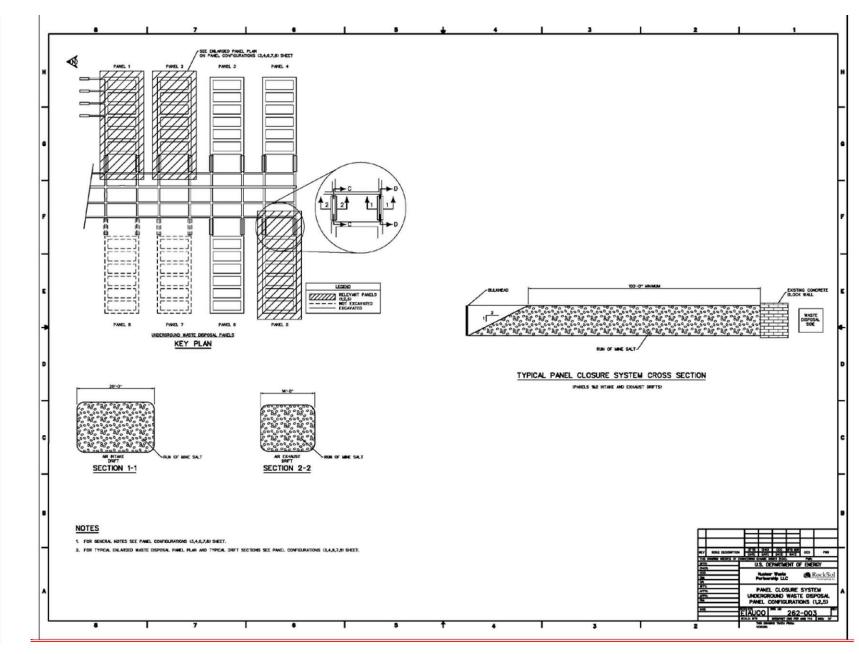
DESIGN DRAWINGS

PANEL CLOSURE SYSTEM WASTE ISOLATION PILOT PLANT CARLSBAD, NEW MEXICO

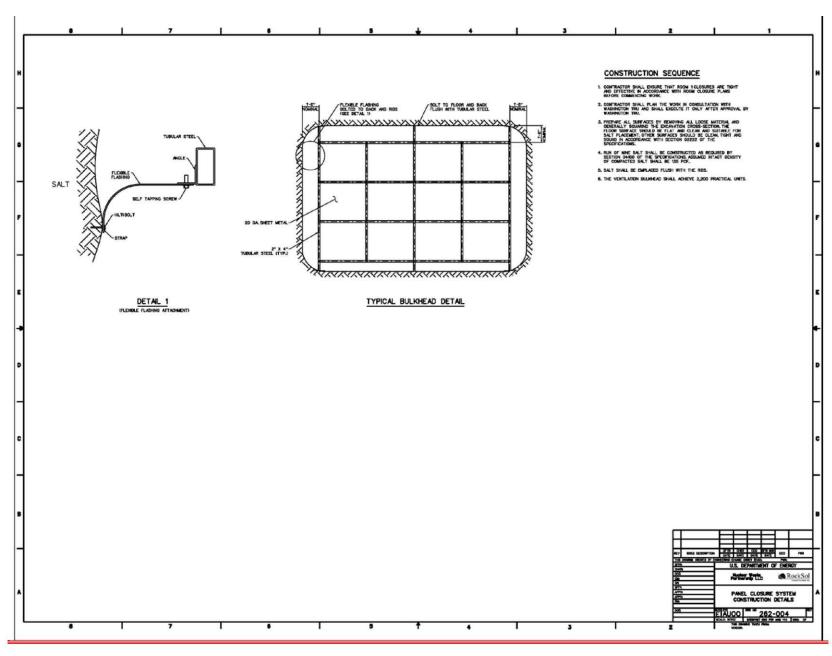
| <u>Drawing</u> | <u>Title</u> |
|----------------|--------------------------------------------------------------------------------------------|
| 262-001 | WIPP Panel Closure System Title Sheet |
| 262-002 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (3, 4, 6, 7, 8) |
| 262-003 | WIPP Panel Closure System, Underground Waste Disposal Panel Configurations (1, 2, 5) |
| 262-004 | WIPP Panel Closure System, Construction Details |







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Appendix 1-A 1-A-100 of 100 Panel Closure

Appendix 1-B

Panel Closure Bulkhead Maintenance (PM000011)

PM000011

Revision 1

PANEL CLOSURE BULKHEAD MAINTENANCE

Maintenance Procedure Reference Only [VU03]

APPROVED FOR USE

PM000011 Rev. 1 2 of 10

1.0 INTRODUCTION

Specifically, this work will accomplish the following:

 This procedure provides instructions for performing a Monthly inspection of Panel Closure Bulkheads. Panel Closure Bulkheads are bulkheads without penetrations of any kind, such as cable glands, vehicle doors, man doors, man ways, or regulators. This procedure also includes the entry requirements and its associated Surveillance Requirements for the entry into the Exhaust of Panel 4 to inspect 74-B-466.

This procedure generates the following Quality records in accordance with WP 13-1, Quality Assurance Program Description (QAPD).

RCRA records to remain on-site for the life of the Facility.

Attachment 1

2.0 REFERENCES

BASELINE (DEVELOPMENTAL)

| WP 04-AD3011 | Equipment Tagout/Lockout |
|------------------|-----------------------------------------------------------|
| WP 10-AD3005 | Control and Use of Maintenance Locks |
| WP 10-2 | MOIM |
| WP 10-WC3010 | Maintenance PM/MWI Controlled Document Processing |
| WP 10-WC3011 | Maintenance Process |
| WP 12 IS.01 | Industrial Safety Program |
| WP 12 IS.01-1 | Postings, Warnings, and Hazard Identification |
| WP 13-1 | Quality Assurance Program Description |
| DOE/WIPP-07-3372 | Waste Isolation Pilot Plant Documented Safety Analysis |
| DOE/WIPP-07-3373 | Waste Isolation Pilot Plant Technical Safety Requirements |
| WP12-FP.01 | Fire Protection Program |
| WIPP-0223 | Fire Hazards Analysis For the Waste Isolation Pilot Plant |
| | Carlsbad, New Mexico |
| | |

REFERENCED (REQUIRED ON-HAND)

None Listed

3.0 MATERIAL LIST

None Listed

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4.0 EQUIPMENT LIST

None Listed

5.0 PRECAUTIONS

The JOB HAZARDS CHECKLIST indicates types of hazards that may be present during the performance of this work. See the indicated section for precautions and mitigating actions.

JOB HAZARDS CHECKLIST

| HAZARD | MITIGATED AT SECTION |
|-----------------------|----------------------|
| GROUND CONTROL HAZARD | [] 8.1 |

6.0 LIMITATIONS

- [] 6.1. HOLD AND WITNESS POINTS
 - None Listed
- [] 6.2. TAGOUT/LOCKOUT
- [] 6.3. OTHER LIMITATIONS
 - A Person-In-Charge (PIC), if required by this work instruction, will be assigned and identified below.

PIC Print Name

- The order of completion of this work may be modified or sections may be performed in parallel, provided that proper Tagout/Lockout is observed and that no Hold Points or precautionary actions associated with Warning statements are bypassed.
- Any employee who has a concern for employee safety, the safety of the environment, or the quality of the activity has the responsibility and authority to suspend the performance of that activity.
- Work shall be stopped when instructions cannot be performed; field conditions change, or additional job hazards are identified.

- Brackets at the beginning of steps are optional place-keeping aids, and may be checked off as work progresses.
- All personnel affixing initials to this package shall provide the information listed in the PERSONNEL DATA TABLE.
- Troubleshooting or other activities outside the scope of this PM may require the initiation of a work order as directed by the Responsible Engineer or Zone Maintenance.
- The Technical Safety Requirements (TSRs) Manual contains Limiting Conditions for Operation (LCOs) and Specific Administrative Controls(SACs) which provide specific preventative or mitigative limits and required actions for identified accident scenarios. Failure to comply with LCOs or SACs and their Required Actions constitutes a violation which must be immediately reported to the FSM. Specific LCOs and SACs applicable during performance of this procedure are referenced within the body of this procedure in bold brackets, e.g. [LCO 3.X.X.].
- Failure to complete a surveillance requirement (SR) within its specified frequency SHALL constitute a violation of the associated LCO and must be immediately reported to the Facility Shift Manager (FSM). Specific LCO Surveillances applicable during the performance of this procedure are referenced at the end of the implementing step in bold brackets, e.g. [SR 4.X.X.X.].
- If barriers are required for this work package they will be constructed and installed in a manner that will ensure their integrity throughout the expected duration of use and environmental conditions.

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7.0 PREREQUISITES

NOTE

Steps [] 7.1.3, [] 7.1.4, and [] 7.1.5 are prerequisites for the inspection of: **74-B-466**.

This note applies to section [] 7.1

[] 7.1. ADMINISTRATIVE

- [] 7.1.1. Personnel performing this work review these work instructions and appropriate sections of the references listed in the REFERENCED (REQUIRED ON HAND) section.
- [] 7.1.2. Before starting work, Zone Maintenance Manager/Zone Superintendent conduct a pre-job safety meeting.

SIGN-OFF ZMM/ZS

[] 7.1.3. Underground Facility Operation to verify there are no alarms on Local Fire Panel 534-FP0700 in E-140/S-3310 before progressing past E-300 in S-3310.

SIGN-OFF OPS

[] 7.1.4. Underground Facility Operations to complete the **Surveillance Data Sheet(s)**, EA04AD3001-SR-41, for **LCO 3.8.1**, **SR 4.8.1.1 AND 4.8.1.2**, as found in WP 04-AD3001, FACILITY MODE COMPLIANCE.

SIGN-OFF OPS

[] 7.1.5. Underground Facility Operations to complete the **Surveillance Data Sheet(s)**, EA04AD3001-SR42, for **LCO 3.8.2**, **SR 4.8.2.1**, as found in WP 04-AD3001, FACILITY MODE COMPLIANCE.

SIGN-OFF OPS

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[] 7.1.6. Record work order number on Attachments.

[] 7.2. TASK PREPARATION

NOTE

This note applies to section [] 7.2.1

This preparation is only for the inspection of **74-B-466**, and its entry requirements.

[] 7.2.1. Ensure that the large ventilation fan at E-300 north of S-3310 is on and operating.

8.0 PERFORMANCE

WARNING

Ground Control Hazard Exists

This warning applies to section [] 8.1

All personnel involved in this work shall have had ground control hazard training.

[] 8.1. WORK AREA INSPECTION

[] 8.1.1. All personnel involved in the performance of this work discuss Ground Control Hazards, precautions, and mitigating actions to be taken.

SIGN-OFF

[] 8.1.2. All personnel involved in the performance of this work perform Ground Control Checks at the beginning of each shift and at any time conditions warrant.

SIGN-OFF

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|----------|--------|---------|
| | | |

[] 8.1.3. Inspect work area for safe working conditions (for example ventilation, accessibility, etc.) and ensure any problems are corrected before starting work.

SIGN-OFF

[] 8.2. EQUIPMENT VISUAL INSPECTION

- [] 8.2.1. Inspect bulkhead physical condition per the following criteria:
 - [] 8.2.1.1. Flashing is intact and tight at:
 - Ribs, back and floor
 - Bulkhead frame
 - Flashing joints
 - VOC Tubing
 - [] 8.2.1.2. Bulkhead skin is intact and tight.
 - [] 8.2.1.3. Bulkhead frame is not structurally damaged.
 - [] 8.2.1.4. Adequate movement remains at slip connections.
 - [] 8.2.1.5. Bulkhead is not damaged.
- [] 8.2.2. Inspect ground deformation ("creep") around the bulkhead and note any abnormal conditions in the data sheet comment section.
- [] 8.2.3. Record inspection results on Attachment 1.

SIGN-OFF

[] 8.2.4. **IF** rework, repair or replacement is required,

THEN contact the Cognizant Engineer (CE) for resolution.

SIGN-OFF

[] 8.2.5. CE will determine the means to rework, repair or replace without compromising the function of the bulkhead. (N/A if not required)

SIGN-OFF CE

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[] 8.3. TASK VERIFICATION
[] 8.3.1. None listed.
[] 8.4. OPERATIONAL STATUS REVIEW
[] 8.4.1. Cognizant Engineer conduct post-job review.

SIGN-OFF CE

Appendix 1-B Page 1-B-9 of 11 Panel Closure Redesign

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SIGN-OFF SHEET

PREREQUISITES

| Section | Action | Initials |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------|----------|
| [] 7.1.2 | | |
| | Superintendent conduct a pre-job safety meeting. | CRAFT |
| | | ZMM/ZS |
| [] 7.1.3 | Underground Facility Operation to verify there are no | OPS |
| | alarms on Local Fire Panel 534-FP0700 in E-140/S-3310 before progressing past E-300 in S-3310. | N/A |
| []7.1.4 | Underground Facility Operations to complete the | OPS |
| | Surveillance Data Sheet(s), EA04AD3001-SR-41, for LCO 3.8.1, SR 4.8.1.1 AND 4.8.1.2, as found in WP 04-AD3001, FACILITY MODE COMPLIANCE. | N/A |
| [] 7.1.5 | Underground Facility Operations to complete the | OPS |
| | Surveillance Data Sheet(s), EA04AD3001-SR42, for LCO 3.8.2, SR 4.8.2.1, as found in WP 04-AD3001, | N/A |
| | FACILITY MODE COMPLIANCE. | |

PERFORMANCE

| Section | Action | Initials |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| []8.1.1 | All personnel involved in the performance of this work discuss Ground Control Hazards, precautions, and mitigating actions to be taken. | CRAFT |
| []8.1.2 | All personnel involved in the performance of this work perform Ground Control Checks at the beginning of each shift and at any time conditions warrant. | CRAFT |
| []8.1.3 | Inspect work area for safe working conditions (for example ventilation, accessibility, etc.) and ensure any problems are corrected before starting work. | CRAFT |
| [] 8.2.3 | Record inspection results on Attachment 1. | CRAFT |

| ATTACHMENT 1 - W.O # | Page 1 of 2 |
|------------------------|--------------|
| ATTACITIVENT 1 - W.O # | 1 age 1 UI Z |

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| PM000011 | Rev. 1 | 10 of 10 |
|----------|--------|----------|

| Section | Action | Initials |
|-----------|------------------------------------------------------------------------------------------------------------------|----------|
| [] 8.2.4 | IF rework, repair or replacement is required, | CRAFT |
| | THEN contact the Cognizant Engineer (CE) for resolution. | N/A |
| [] 8.2.5 | CE will determine the means to rework, repair or replace without compromising the function of the bulkhead. (N/A | CE |
| | if not required) | N/A |
| [] 8.4.1 | Cognizant Engineer conduct post-job review. | CE |

| Comments: | |
|-----------|------|
| | |
| | |
| | |
| | |
| | |
| | |
| | |

PERSONNEL DATA

| PRINTED NAME | SIGNATURE | INITIALS | DATE/TIME |
|--------------|-----------|----------|-----------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

ATTACHMENT 1 - W.O # _____ Page 2 of 2

Appendix 1-C

Golder Associates Inc. Memorandum, <u>WIPP Panel</u>
<u>Closure System – Influence of Steel Bulkhead</u>
<u>Resistance to Operational Flow Rates and VOC</u>
<u>Concentration</u>



CALCULATIONS

Date:07/31/2013Made by:Gordan GjerapicProject No.:063-2213Checked by:Bill ThompsonSubject:Air Flow CalculationsReviewed by:Bill Thompson

Project: WIPP PANEL CLOSURE SYSTEM – INFLUENCE OF STEEL BULKHEAD RESISTANCE

TO OPERATIONAL FLOW RATES AND VOC CONCENTRATION

1.0 OBJECTIVE

Evaluate the influence of a steel bulkhead resistance on flow rates through the Waste Panel Closure (WPC) system and estimate potential impact to VOC concentrations.

2.0 METHOD

The methodology used for estimating VOC concentrations in the MathCad files and RockSol report (2012) involves the following steps:

- The flow rate through a closed panel is calculated based upon the pressure drop between the intake and exhaust entries of the panel and the internal flow resistances of ROM salt and bulkheads. Until such time as the air gap on top of the run of mine (ROM) salt closes, the resistance to flow through the closure is controlled by the resistance of the end bulkheads. In the RockSol report this bulkhead resistance is estimated as 2200 PUs.
- The quantity (mass or volume) of any VOC emitted from each drum is controlled by the total VOC emission rate and the molar fraction of the particular VOC. The emission rate per panel is then equal to the single drum rate multiplied by the total number of drums in the panel. RockSol calculate the emission rate from each panel as 1505 mol/yr based on the assumption of an average 95% fill rate of the panels. If it is assumed that 100% of the panels are filled with drums then the total emission rate is 1586 mol/panel/yr
- The quantity of any VOC emitted through the closure could be as high as the value calculated from the head space gas concentrations of VOCs and the flow rate through the closure. However the actual quantity released from the panel is limited by the emission rate from all of the drums in the panel that is 1505 mol/panel/year for the 95% full case, or 1586 mol/panel/yr for the 100% full case.
- The concentration of the VOC at the exhaust shaft is then calculated from the total release from all panels combined, the dilution effect of the ventilation, and the air dispersion between the E300 entry and the shaft.

3.0 FLOW CALCULATIONS

Before considering the VOC concentrations, the effect of bulkhead resistance on flow rates is calculated. The following assumptions are made:

c:\users\bthompson\documents\wipp\panel closures\2013\063-2213-wipp-flow-calc-10-17-2013_open.docx

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Panel Closure Redesign

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- The WPC system consists of steel bulkheads and the run-of-mine (ROM) salt material located at the intake and exhaust drifts (RockSol, 2012).
- For approximately 23 years after WPC installation, the flow rates will be governed mostly by the flow resistance of steel bulkheads until the gap between the ROM salt and the surrounding rock closes due to creep of the surrounding salt formation (RockSol, 2012).
- After the gap between the ROM salt and the surrounding rock is closed, the steel bulkhead resistance to flow is relatively minor compared to the flow resistance of the ROM salt (RockSol, 2012)
- Pressure drop across the panel: 170 milli inches of water gage;
- Number of bulkheads in flow path: 2;
- Single bulkhead resistance: 30 to 2200 practical units (2.3 x 10⁻³ to 2.5 x 10⁻¹ s²/m⁵);

Based on the reported pressure drop across the panel and the adopted bulkhead resistance values, the flow rate through the WPC closure system can be calculated as

$$Q = \sqrt{\frac{h}{2R}}$$

where

h = pressure drop across the flow path through the repository panel (mili inch of water gage)

R = resistance for a single steel bulkhead in practical units (PU), 1 PU = 1 mili inch of water / kcfm.

Q = flow rate in kcfm.

Calculated flow rates are summarized in Table 1

Table 1: Estimated Flow Rates Prior to ROM Salt Gap Closure

| Bulkhead Resistance (PU) | Flow Rate (cfm) | Flow Rate (m³/sec) |
|-----------------------------|--------------------|-----------------------|
| 30 | 1683 | 0.79 |
| 200 | 652 | 0.31 |
| 2200 | 197 | 0.09 |

4.0 VOC CONCENTRATION CALCULATIONS

Based on the RockSol (2012) report, the critical organic compound affecting air quality is carbon tetrachloride (CCl₄). Using CCl₄ as the most important VOC, the per drum emission rates given by Kerhman (2012), the assumed number of drums per panel, the assumed flow resistance across the closure, the known ventilation rates and the air dispersion factors, the concentration at the shaft can be calculated. In reviewing the calculations in the MathCad files for the RockSol report it is noted that the mass of CCl₄ calculated to be released from each panel is considerably less than would be for the calculated flow rate though the closure if the emission rate from each drum was unlimited. That is, the



emission rate through the closure, before the air gap is closed and the resistance of the closure increased, is controlled by the source term - the rate of VOC emission from each drum - and not by the flow through the closure. Because of this limiting factor an upper bound on concentrations at the points of compliance can be calculated by assuming that all panels are open, without any flow restrictions.

Since the VOC releases are controlled by the source term, the CCI4 concentrations at the point of compliance (WIPP site boundary) were estimated based on the following assumptions:

- Maximum emission rate is limited by the open room emission rate reported by Kehrman (2012).
- VOC generation is limited by the amount of drums stored in 9 individual panels (Kehrman, 2012).
- Each panel contains 6 to 7 rooms filled with containers (Kehrman, 2012).
- Assume that all 7 rooms in a panel are responsible for VOC emissions.
- For conservatism, calculate VOC concentration assuming that all rooms within the panel are open. Based on the average CCl₂ emission rate for the open room of 226.54 mol/room/year (Kehrman, 2012) and assuming that all 7 rooms are emitting VOC gas, the maximum panel emission rate is E_n=1586 mol/panel/year;
- Molar mass of CCl4 molecule: M_{CCl4}=153.84 g/mol (Kehrman, 2012).
- Ventilation rate: Qv=260,000 cfm (122.7 m³/s) based on Kehrman (2012).
- Assume molar volume for CCl₄ gas of Vn=24.445 m³/kmol;
- Air dispersion factor at the site boundary: $\zeta=8.78 \times 10^{-5}$ (Kehrman, 2012).
- Health Based Level (HBL) for CCl₄ gas (10⁻⁶ risk level), C_{HBL,CCl4}=0.33 μg/m³ based on Kehrman (2012).

Assuming that all nine panels are emitting VOC gas from open rooms, one can calculate the upper bound for the total emission rate as

$$E_t = n_p E_p = 9 \text{ panels} \times 1586 \frac{mol}{panel \ yr} = 14,274 \ mol \ / \ yr = 4.526 \times 10^{-4} \ mol \ / \ s$$

For the ventilation rate of 260,000 cfm, one can determine the CCI₄ concentration in the exhaust shaft as:

$$C_{CCI4,ES} = \frac{M_{CCI4} E_t}{Q_v} = \frac{153.84 \, g / \, mol \times 4.526 \times 10^{-4} \, mol / \, s}{122.7 \, m^3 / \, s} = 5.68 \times 10^{-4} \, g / \, m^3$$

At the site boundary, the upper bound estimate for the CCI₄ concentration can be calculated as

$$C_{CCI4,SB} = \zeta C_{CCI4,ES} = 8.78 \times 10^{-5} \times 5.68 \times 10^{-4} \ g / m^3 = 0.0499 \mu g / m^3$$

The risk fraction for the CCI₄ gas at the WIPP site boundary can now be calculated as:

$$RF_{CCI4} = \frac{C_{CCI4,SB}}{C_{HBL,CCI4}} = \frac{0.0499 \,\mu g \,/\, m^3}{0.33 \,\mu g \,/\, m^3} = 0.15 \quad < \quad 1.0$$



The VOC calculations shown here are based on the assumptions that (1) the source term defines the VOC releases in a closed panel, and (2) the VOC gas is allowed to reach the exhaust shaft without flow restrictions, i.e. ignoring the presence of the WPC system. Consequently, the prescribed HBL levels will not be exceeded when the WPC system is installed, even for very low bulkhead resistance values.

5.0 CONCLUSIONS

If the bulkhead resistance is less than that assumed by RockSol of 2200 PU, the flow rate though the closures before the air gap is closed will be increased, as shown in Table 1. However the quantity of any VOC which can be transported out of each panel, and to the point of compliance, cannot exceed the source term, that is the quantity of that VOC emitted by all of the drums in the panels. If the resistance to flow is ignored in calculating the risk factor at the exhaust shaft, that is if the panels are all assumed to be open, then the maximum possible release can be estimated. For CCl₄, the critical organic component of the VOCs, the risk factor at the exhaust shaft is calculated to be 0.15.

6.0 REFERENCES

Kehrman, R. 2012. "Revised Calculations to Support Panel Closure", URS Interoffice Correspondence to R.R. Chavez dated September 4, 2012, File# URS:12:179, Washington TRU Solutions, Carlsbad, New Mexico.

RockSol Consulting Group, Inc. 2012. "Design Report for a Panel Closure System at the Waste Isolation Pilot Plant", report prepared for Nuclear Waste Partnership LLC, October 2012.



Appendix 1-D

Revision 2 of the Statistical Analysis to Evaluate

Methane and Hydrogen Concentrations in Filled

Panels at the Waste Isolation Pilot Plant

(August 2013)

Statistical Analysis to Evaluate Methane and Hydrogen Concentrations in Filled Panels at the Waste Isolation Pilot Plant

Revision 2

August 2013

URS Professional Solutions

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I. Introduction

The Waste Isolation Pilot Plant (WIPP) Hazardous Waste Facility Permit (Permit) requires monitoring for hydrogen and methane in filled Panels 3 through 8, unless an explosion isolation wall is installed. A *filled panel* is an underground Hazardous Waste Disposal Unit (HWDU) that will no longer receive waste for emplacement. The filled panels consist of seven closed rooms filled with vented containers of transuranic (TRU) waste. The monitoring process includes collecting samples of closed room air to determine hydrogen and methane concentrations that may be emitted from the waste containers. The purpose of the monitoring is to determine if changes in hydrogen and methane concentrations in filled panels can be correlated to early gas-generation modeling studies (Wang and Brush 1996, Devarakonda 2006, Golder Associates 2006).

II. Purpose and Scope

The purpose of this report is to evaluate, using statistical methods, the hydrogen and methane data collected to date, in accordance with Permit Part 4.6.5 and as specified in Permit Attachment N1. This evaluation will be used as input to the design of an appropriate panel closure system. The scope of this report covers hydrogen and methane data obtained between April 2008 and June 2013 for Panel 3 and between May 2009 and June 2013 for Panel 4. Panel 5 is a filled panel that does not require monitoring since an explosion isolation wall is installed. Panel 6 is currently being filled, and Panels 7 and 8 are not yet being used for TRU waste disposal.

The current panel closure system is designed to withstand a postulated flammable gas explosion. However, this element of the design may not be necessary if a postulated explosion is not possible prior to closure of the WIPP repository.

III. Background

Hydrogen and methane monitoring was conducted in compliance with Permit Attachment N1 because TRU wastes disposed in the WIPP underground panels have the potential to generate hydrogen and methane. Hydrogen can be generated by radiolysis (Devarakonda 2006) and by corrosion of iron-based materials under anoxic conditions (Wang and Brush 1996). Methane can be produced from microbial degradation of organic materials such as cellulosics, plastics, and rubber under humid or inundated conditions (Wang and Brush 1996). However, only humid conditions are expected to occur during operations and closure.

IV. Monitoring Methods and Data

Based on the U.S. Environmental Protection Agency (EPA) Compendium Method TO-15 (EPA 1999), samples were collected in six-liter passivated canisters using passivated stainless steel sample lines after purging. Samples were collected using sub-atmospheric sampling methods, which included a pressure dilution by the analytical laboratory with

ultra-high purity nitrogen prior to analysis. Hydrogen and methane concentrations were measured with a gas chromatograph/thermal conductivity detector (GC/TCD). Identification of eluted analytes was based solely on known retention times determined during calibration of the instrumentation. Quantitation was based on the results of a 5-point calibration and results were corrected for sample dilutions. The method detection limit (MDL) was determined in accordance with 40 CFR Part 136 and corrected for the sample dilutions. Data for methane and hydrogen in Panels 3 and 4 appear in Appendices C through F. When the reported result is less than the dilution-corrected MDL, the value used for the statistical evaluation is 1/2 the dilution-corrected MDL. The appendices indicate the reported results, dilution factors, MDLs, the dilution-corrected MDLs, and the values used for the statistical evaluation.

An underground HWDU is a single excavated panel consisting of seven rooms and two access drifts designated for disposal of TRU waste. Each room is approximately 300 ft (91 m) long, 33 ft (10 m) wide, and 13 ft (4 m) high. Access drifts connect the rooms and have the same cross-section. Figure 1 is a diagram of an underground disposal panel and room layout at the WIPP facility. The rooms and the two interconnecting access drifts are the areas containing emplaced wastes in Figure 1 (hexagons used to depict waste drums) and have increasing numbers starting with Room 1 for the room closest to the main access drift (known as E-300 for Panels 3 and 4), and culminating in Room 7, the room furthest from the main access drift. Two sample head locations for filled panel monitoring are shown in Figure 1 for each room, corresponding to intake and exhaust locations. Bulkheads separate Room 1 from the main access drift and the bulkhead areas also contains sample heads on both sides (Waste (W) and Accessible (A)). Sample data are identified by the source panel number, room number or "B" for bulkhead, and intake (i) or exhaust (e) function (first and capitalized for bulkheads). For example, the Panel 3 Room 7 exhaust location is coded Panel 3 7e or simply P3 7e. Similarly, Panel 3 Exhaust Bulkhead's Waste side is coded Panel 3 EBW (or P3 EBW).

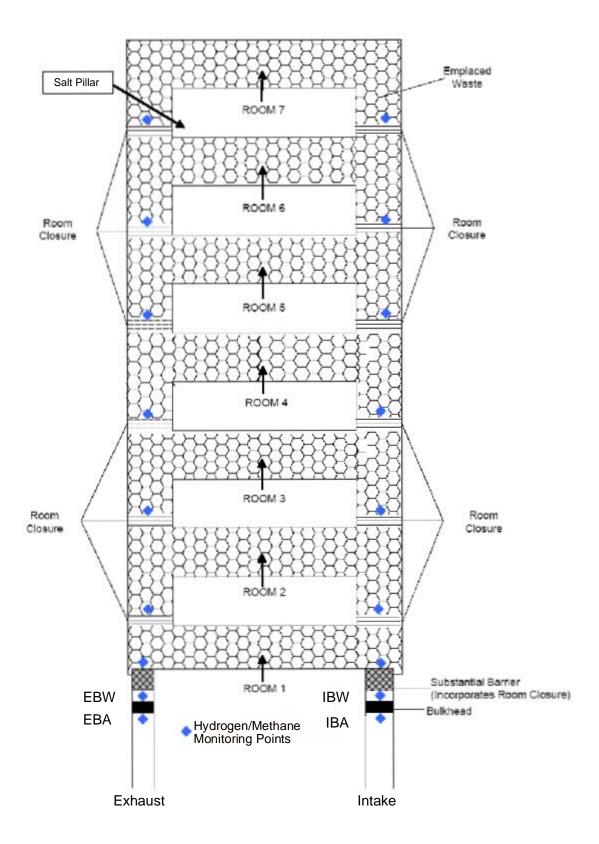


Figure 1: WIPP Disposal Panel Design and Monitoring Locations (Not to Scale)

The data set for this statistical analysis contains 934 samples in Panel 3 for hydrogen and methane and 843 samples in Panel 4. All of the samples for methane in both Panels 3 and 4 were reported as below the MDL. As such, a statistical analysis is unnecessary. Hydrogen samples exhibited both detectable and nondetectable concentrations in both Panels 3 and 4, with dilution-corrected MDLs ranging from approximately 14 ppmv to 35 ppmv.

This statistical analysis includes data for a maximum of 63 sampling events for most of the Panel 3 monitoring locations and a maximum of 50 sampling events for most of the Panel 4 monitoring locations. Locations with fewer sampling events are associated with unusable sampling lines. The following sampling lines in Panels 3 and 4 were determined to be unusable:

- Panel 3 7i and 1i sampling lines were determined to be unusable on July 14, 2008 (Note: Only three samples were collected for each of these two lines and the June 2008 sample collected for Panel 3 7i was voided)
- The Panel 3 IBW sampling line was determined to be unusable on April 21, 2010 (Note: The sampling line was replaced and sampling resumed on May 25, 2010)
- The Panel 3 7e sampling line was determined to be unusable on August 30, 2010
- The Panel 3 6i sampling line was determined to be unusable on September 22, 2010
- The Panel 4 4e sampling line was determined to be unusable on April 7, 2011
- The Panel 4 6e sampling line was determined to be unusable on December 13, 2011
- The Panel 4 5e sampling line was determined to be unusable on August 14, 2012
- The Panel 3 6e sampling line was determined to be unusable on October 10, 2012

The sampling line for Panel 3 IBW was replaced because it is in an accessible location. The other unusable sampling line locations listed above are not accessible and were not replaced.

Hydrogen and methane measurement levels are monitored with respect to action levels specified in Table 4.6.5.3 of the Permit. Action Level 1 (the lowest action level) is set at 10 percent of the lower explosive limit (LEL) in air. As such, Action Level 1 is set at 4,000 ppmv for hydrogen and 5,000 ppmv for methane. Specified reporting and remedial actions are initiated if a monitoring level exceeds an action level.

V. Statistical Analysis

A. Monitoring Location Averages

Mean (average) hydrogen concentrations were calculated for each monitoring location in Panels 3 and 4. Each of the seven rooms is represented by two values, an *exhaust mean* and an *intake mean*. This partitioning also applies to each side of the panel bulkhead. Results are presented in Tables 1 and 2 for Panels 3 and 4 respectively. The designations "exhaust" and "intake" only refer to the geographic locations of the respective sampling points. They do not indicate a flow direction for the panel because both Panels 3 and 4 are isolated from the mine ventilation system.

| Table 1: Mean Concentrations of H | Hvdrogen i | in Panel 3 | Locations |
|-----------------------------------|------------|------------|-----------|
|-----------------------------------|------------|------------|-----------|

| WIPP - Hydrogen Levels (ppmv) | | | |
|-------------------------------|----------|---------|--------|
| Panel | Location | Mean | |
| ганен | Location | Exhaust | Intake |
| | 7 | 104 | 10.8 |
| | 6 | 58.1 | 47.9 |
| | 5 | 57.2 | 35.6 |
| | 4 | 46.1 | 24.8 |
| 3 | 3 | 42.5 | 18.4 |
| | 2 | 33.5 | 15.8 |
| | 1 | 24.3 | 10.8 |
| | BW | 22.7 | 15.1 |
| | BA | 14.6 | 14.0 |

The mean data for exhaust measurements in Panel 3 are presented graphically in Figure 2.

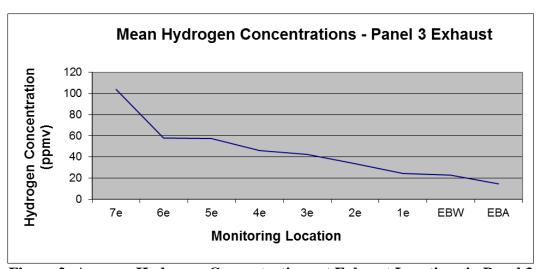


Figure 2: Average Hydrogen Concentrations at Exhaust Locations in Panel 3

The mean data for intake measurements in Panel 3 are presented graphically in Figure 3. Note that the maximum location mean observed for both intake and exhaust locations

was 104 ppmv, with the remaining concentrations below 60 ppmv. There is also a general downward trend in hydrogen concentrations from Room 7 toward the E-300 drift.

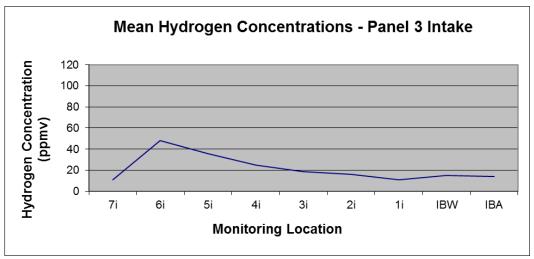


Figure 3: Average Hydrogen Concentrations at Intake Locations in Panel 3

Table 2 and Figures 4 and 5 present the average hydrogen concentrations for monitoring locations in Panel 4, which shows a downward trend in the hydrogen concentration from Room 7 toward the E-300 drift.

Table 2: Mean Concentrations of Hydrogen in Panel 4 Locations

| WIPP - Hydrogen Levels (ppmv) | | | |
|-------------------------------|----------|---------|--------|
| Panel | Location | Mean | |
| Failei | Location | Exhaust | Intake |
| | 7 | 520 | 421 |
| | 6 | 531 | 395 |
| | 5 | 494 | 417 |
| | 4 | 395 | 376 |
| 4 | 3 | 421 | 370 |
| | 2 | 334 | 307 |
| | 1 | 281 | 276 |
| | BW | 130 | 188 |
| | BA | 13.9 | 19.8 |

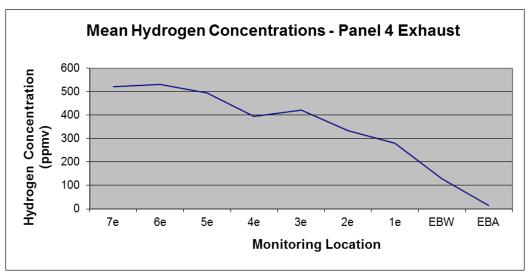


Figure 4: Average Hydrogen Concentrations at Exhaust Locations in Panel 4

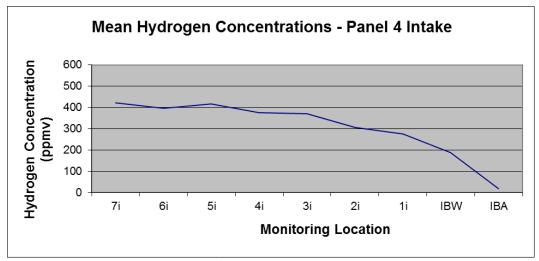


Figure 5: Average Hydrogen Concentrations at Intake Locations in Panel 4

B. Box-and-Whisker Plots

Figure 6 is a *box-and-whisker plot* of the hydrogen concentrations for Panel 3. In contrast to the mean, which describes the central tendency of a data set, a box-and-whisker plot displays the range of concentration values observed in the sample data. A box-and-whisker plot is composed of a central box divided by a median line (50% of sample data above, 50% below), with two lines extending out from the box, called whiskers. The length of the central box indicates the spread of the bulk of the data, the central 50%, which is called the *interquartile range* (IQR). The IQR is bounded by the 25th and 75th percentiles, with the median located at the 50th percentile. The length of the whiskers shows how extensive the tails of the distribution are. The width of the box has no particular meaning.

Unusually small or large data are displayed by white (hollow circles) and red dots (solid circles) on the plot. The white dots indicate data that are less than three IQRs from the 25th and 75th percentiles, whereas the red dots are data that are more than three IQRs from the 25th and 75th percentiles. Using these conventions, the graphs show the relative ranges of the distributions being compared, the central tendencies, outliers, and other aspects that allow for a visual, qualitative comparison of two or more distributions.

Figure 6 displays the distribution of monitoring data from each monitoring location in Panel 3. Sample values range from a high of approximately 350 ppmv in Room 7e to non-detects in rooms and locations closer to the E-300 drift. The general downward trend from Room 7 toward the E-300 drift is also apparent.

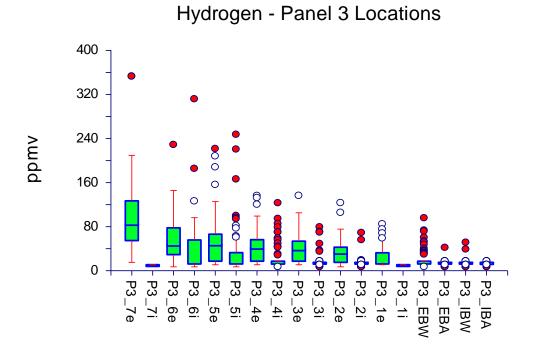


Figure 6: Box-and-Whisker Plot of Hydrogen Concentrations in Panel 3

Figure 7 is a box-and-whisker plot of Panel 3 data with the lower action level (i.e., Action Level 1) plotted on the graph. The lower action level for hydrogen is 4,000 ppmv, which is substantially greater than any concentration observed in Panel 3 monitoring.

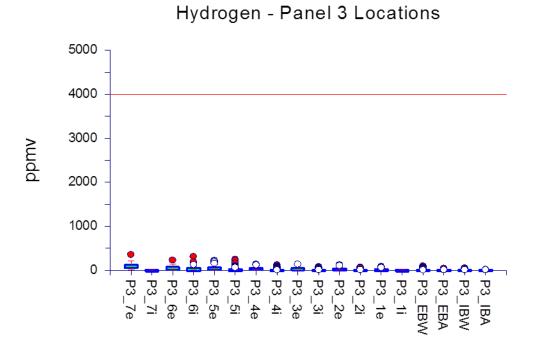


Figure 7: Box-and-Whisker Plot of Hydrogen Concentrations in Panel 3 Compared to Action Level 1

Figure 8 is a box-and-whisker plot of the hydrogen concentrations for Panel 4. Figure 8 shows that the sample data in Panel 4 span a greater range than those for Panel 3, with Panel 4 data slightly exceeding 1,000 ppmv in the Room 6 exhaust monitoring location. The general downward trend from Room 7 toward the E-300 drift is also apparent. Figure 9 plots the Panel 4 data in relation to the hydrogen lower action level. None of the data pose a challenge to the lower action level.

Hydrogen - Panel 4 Locations

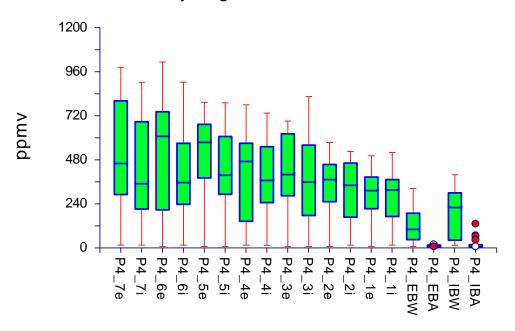


Figure 8: Box-and-Whisker Plot of Hydrogen Concentrations in Panel 4

Hydrogen - Panel 4 Locations

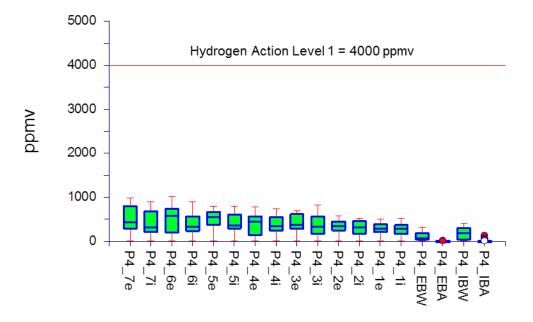


Figure 9: Box-and-Whisker Plot of Hydrogen Concentrations in Panel 4 Compared to Action Level 1

C. Time Series Plots

In addition to the central tendencies and concentration ranges (minimums/maximums), how the data are distributed over time is of interest for correlating concentration data to the early gas-generation modeling studies. Figures 10 and 11 show time series plots for hydrogen concentrations in Panel 3, Room 7. Note that only two samples are available to construct Figure 11, both of which are nondetects and equal in value. Figures 12 and 13 show time series plots for hydrogen concentrations in Panel 4, Room 7. Full suites of time series plots for Panels 3 and 4 appear in Appendices A and B respectively.

Hydrogen - Panel 3, Room 7e

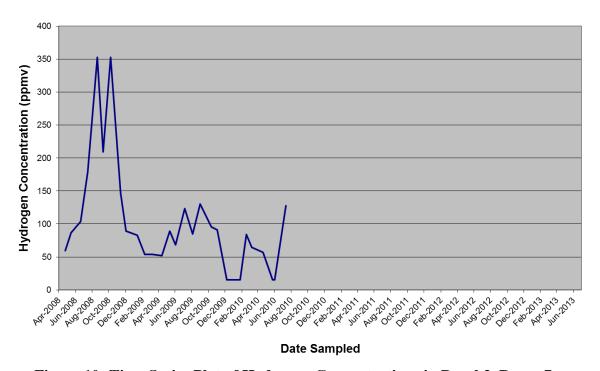


Figure 10: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 7e

Hydrogen - Panel 3, Room 7i

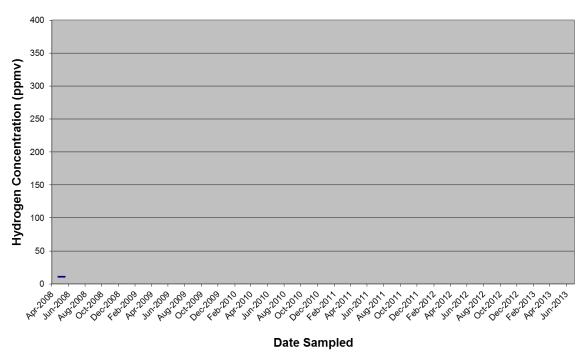


Figure 11: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 7i

Hydrogen - Panel 4, Room 7e

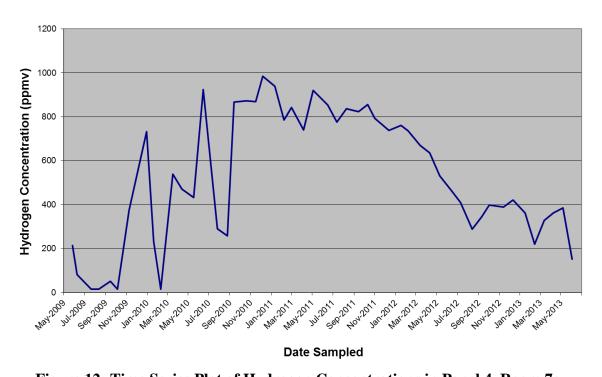


Figure 12: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 7e

Hydrogen - Panel 4, Room 7i

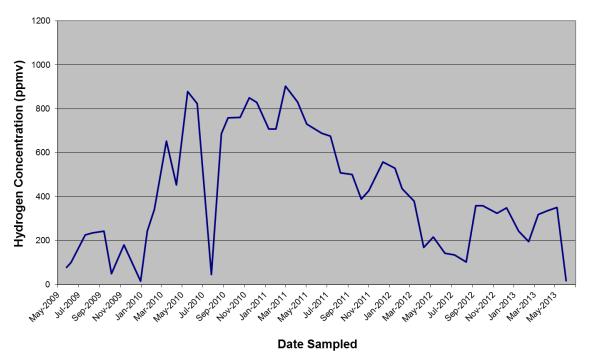


Figure 13: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 7i

D. Hydrogen Concentration Plots

While time series plots show hydrogen concentrations for individual room and bulkhead locations, hydrogen concentration plots present an aggregated picture of these locations simultaneously. Most importantly, hydrogen concentration plots display the degree to which hydrogen concentrations fluctuate from the time a room was closed. Accessible bulkhead locations (IBA and EBA) have been excluded since they are outside the filled panels. Waste side bulkhead locations (IBW and EBW) are plotted using Room 1 closure dates.

1. Panel 3 Hydrogen Concentration Plots

Figure 14 presents the hydrogen concentration data for rooms and waste-side bulkhead locations in Panel 3. The graph plots the number of months since the associated room was closed on the x-axis and the hydrogen concentration on the y-axis. Figures 15 through 17 plot respectively the median, mean, and maximum hydrogen concentrations versus months since the room was closed. Figure 18 overlays the three for ease of comparison.

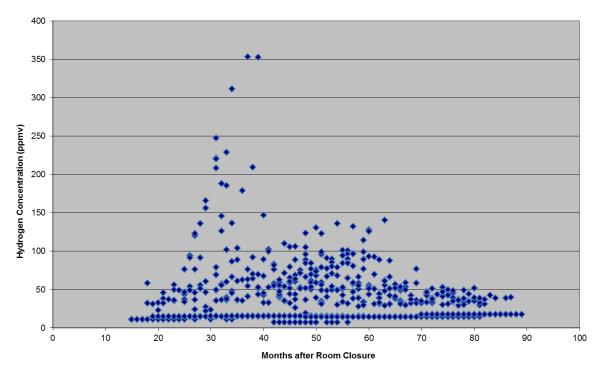


Figure 14: Plot of Hydrogen Concentrations in Panel 3

WIPP - Median Hydrogen Concentrations over Time - Panel 3

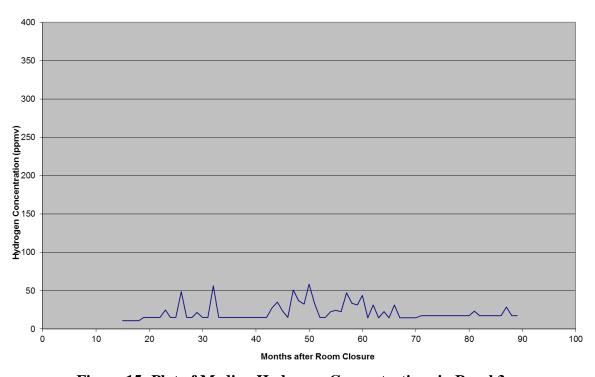


Figure 15: Plot of Median Hydrogen Concentrations in Panel 3

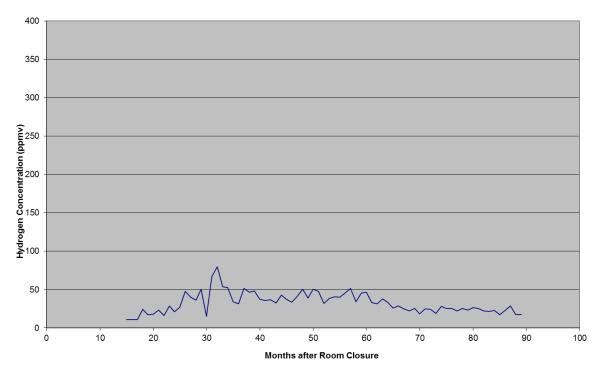


Figure 16: Plot of Mean Hydrogen Concentrations in Panel 3



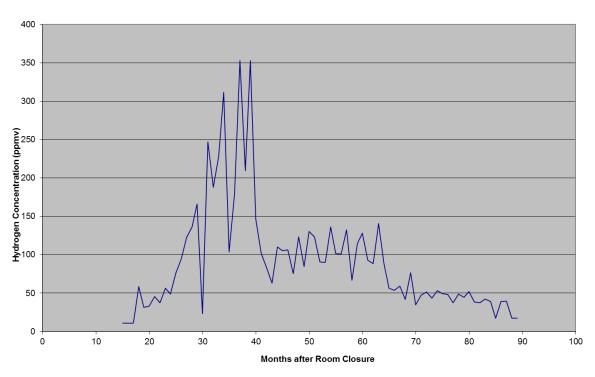


Figure 17: Plot of Maximum Hydrogen Concentrations in Panel 3

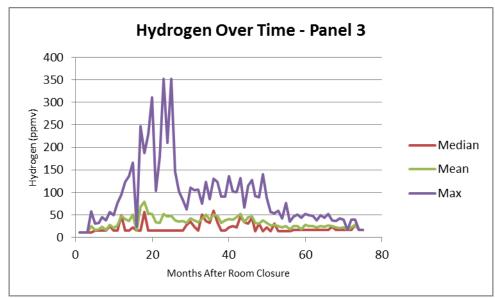
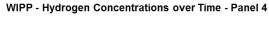


Figure 18: Plot of Median, Mean and Max Hydrogen in Panel 3

2. Panel 4 Hydrogen Concentration Plots

Figure 19 presents the hydrogen concentration data for rooms and waste-side bulkhead locations in Panel 4. Figures 20 through 22 show respectively the median, mean, and maximum hydrogen concentrations versus months since the room was closed. Figure 23 overlays the three for ease of comparison.



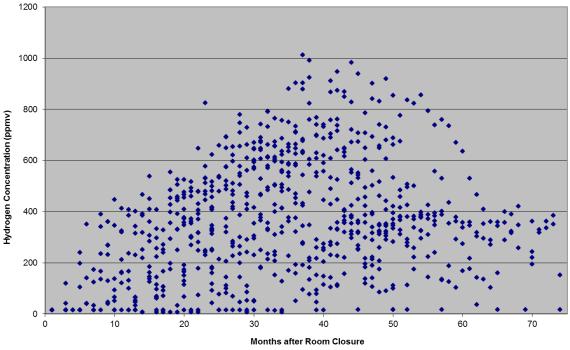


Figure 19: Plot of Hydrogen Concentrations in Panel 4

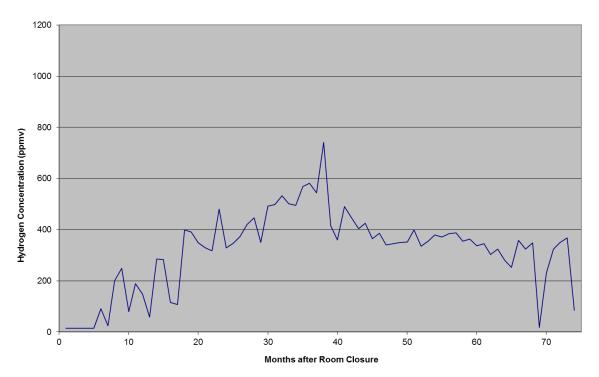


Figure 20: Plot of Median Hydrogen Concentrations in Panel 4



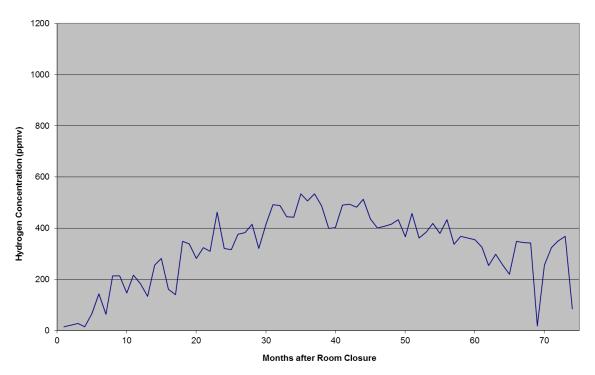


Figure 21: Plot of Mean Hydrogen Concentrations in Panel 4

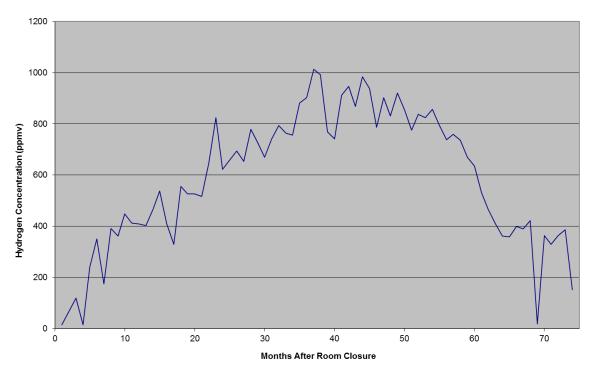


Figure 22: Plot of Maximum Hydrogen Concentrations in Panel 4

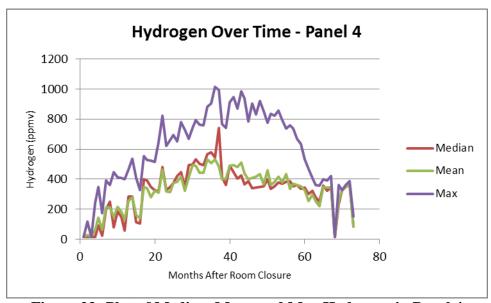


Figure 23: Plot of Median, Mean and Max Hydrogen in Panel 4

E. Linear Regression on Hydrogen Concentration Data

Hydrogen concentration plots show the concentration of hydrogen in closed rooms over time. The change in hydrogen concentration over time is believed to be related to the hydrogen generation rate and the rate at which hydrogen leaves the disposal room. The change in hydrogen concentration over time can be analyzed in a quantitative way to predict the length of time necessary for hydrogen concentrations to accumulate to explosive levels. Linear regression has been used to quantify the change in hydrogen concentration with time in Panels 3 and 4. Accessible bulkhead locations (IBA and EBA) were excluded.

1. Panel 3 Regression Plots

Figures 24 through 26 show respectively the median, mean, and maximum hydrogen concentrations versus the number of months since rooms in Panel 3 were closed. The best-fit line is drawn through each data set. Figures 27 and 28 re-plot the maximum hydrogen concentration in relation to Action Level 1 (4,000 ppmv) and the LEL (40,000 ppmv).

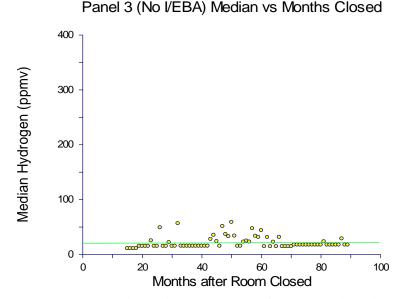


Figure 24: Regression of Median Hydrogen Concentrations in Panel 3



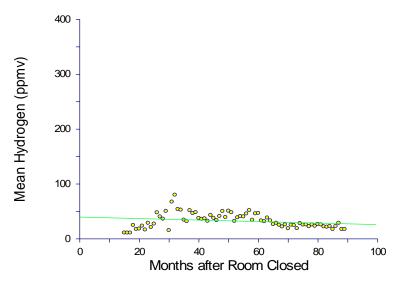


Figure 25: Regression of Mean Hydrogen Concentrations in Panel 3



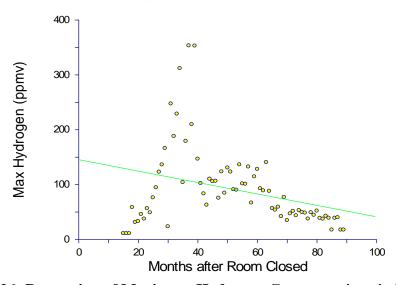


Figure 26: Regression of Maximum Hydrogen Concentrations in Panel 3



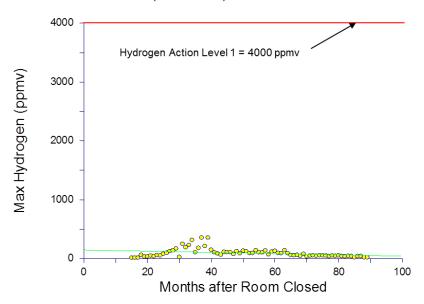


Figure 27: Regression of Maximum Hydrogen Concentrations in Panel 3 Compared to Action Level 1

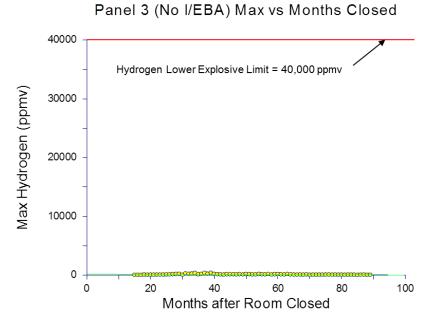


Figure 28: Regression of Maximum Hydrogen Concentrations in Panel 3 Compared to the Lower Explosive Limit

Because the regression equation for the maximum hydrogen concentrations shown in Figures 26 through 28 has a negative slope (downward trend), the hydrogen concentration will not reach Action Level 1 or LEL.

2. Panel 4 Regression Plots

Figures 29 through 31 show respectively the median, mean, and maximum hydrogen concentrations versus the number of months since rooms in Panel 4 were closed. Figures 32 and 33 plot the maximum hydrogen concentrations in relation to Action Level 1 (4,000 ppmv) and the LEL (40,000 ppmv).

Panel 4 (No I/EBA) Median vs Months Closed

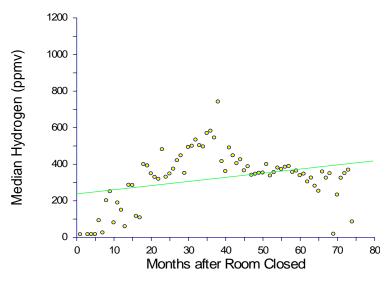


Figure 29: Regression of Median Hydrogen Concentrations in Panel 4



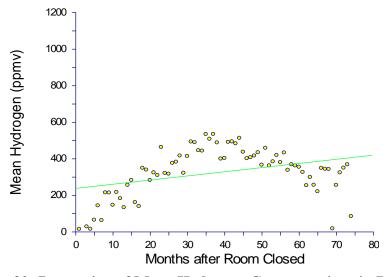


Figure 30: Regression of Mean Hydrogen Concentrations in Panel 4



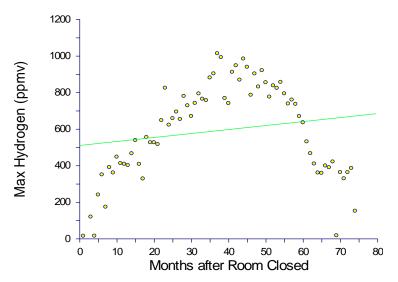


Figure 31: Regression of Maximum Hydrogen Concentrations in Panel 4

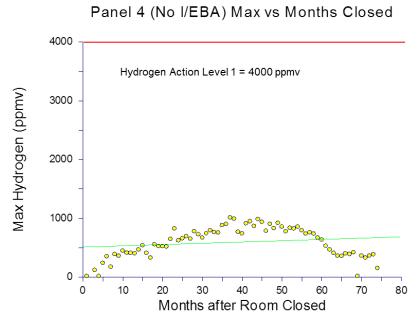


Figure 32: Regression of Maximum Hydrogen Concentrations in Panel 4 Compared to Action Level 1



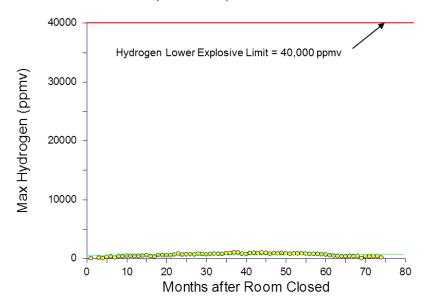


Figure 33: Regression of Maximum Hydrogen Concentrations in Panel 4 Compared to the Lower Explosive Limit

Using the regression equation for the maximum hydrogen concentrations shown in Figures 31 through 33, the hydrogen concentrations will reach Action Level 1 in approximately 130 years, assuming this historical rate of hydrogen concentration change.

VI. Discussion

The statistical analysis has revealed several pertinent results:

- Rooms further from the main access drift tend to show higher average
 concentrations than rooms closer to the drift. This phenomenon can be seen in
 Figures 2 through 5. Rooms further from the main access drift have a longer time
 period during which hydrogen may accumulate given that ventilation barriers
 were installed after completion of waste emplacement in each room.
- Box-and-whisker plots (Figures 6 through 9) also show that rooms closer to the main access drift generally have lower hydrogen than rooms further away. Box-and-whisker plots including the lower action level show that all sample data are substantially below Action Level 1.
- Time series plots reveal that hydrogen concentration maximums are temporary and that concentrations can fall to near non-detectable levels after peaking.

- Hydrogen concentration plots in Panel 3 rooms show a peak in hydrogen concentrations followed by a sustained period of low hydrogen levels, which is ongoing according to the latest sample data. Hydrogen concentration plots in Panel 4 rooms show erratically rising concentrations, with maximum levels exhibiting a leveling off trend or most recently a decline.
- Linear regression of panel hydrogen concentration data, excluding accessible-side bulkhead locations, shows varying results between Panels 3 and 4. The regression model predicts a continued decline of Panel 3 hydrogen concentrations, thus neither Action Level 1 nor the LEL will ever be reached, as shown in Table 3. In Panel 4, the hydrogen levels rose for a time after completion of panel filling, followed by a moderating trend that continues currently. Based on analysis of the full data set, the regression model predicts it will be over 130 years in Panel 4 before hydrogen levels rise to Action Level 1. Moreover, the regression models indicate it would take more than 1400 years for the hydrogen levels to rise to the LEL in Panel 4 (Table 3).

Table 3: Predicted Time to Exceedance of Hydrogen Regulatory Thresholds in Panels 3 and 4

| WIPP - Hydrogen Levels | | | |
|------------------------|--------------------------------------|-----------------------|--|
| Panel | Predicted Time to Exceedance (Years) | | |
| ranei | Action Level 1 | Lower Explosive Limit | |
| 3 | Never | Never | |
| 4 | 130+ | 1400+ | |

Linear regressions for the individual monitoring locations (IBA and EBA again not included) similarly produce varying results, from predictions of continual decline to longer or shorter exceedance times. Individual predictions are shown in Table 4 below, while the plots are in Appendices G and H. The soonest time to exceedance prediction within Panel 3 is more than 2300 years for Rooms 1e and 2e to exceed Action Level 1. The corresponding time to LEL is more than 23,000 years. Within Panel 4, excluding the three rooms with static information due to plugged sample lines, the soonest time to exceedance prediction is 85 years for Room 1e to exceed Action Level 1. The corresponding time to LEL is more than 890 years.

Table 4: Predicted Time to Exceedance of Hydrogen Regulatory Thresholds in Individual Locations of Panels 3 and 4

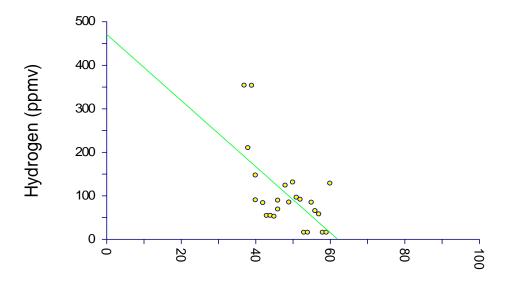
| WIPP - Hydrogen Levels | | | | |
|-------------------------------------------|--------------------|--------------------------------------|------------------------------|--|
| Panel Location | | Predicted Time to Exceedance (Years) | | |
| Гапеі | Location | Action Level 1 | Lower Explosive Limit | |
| | 2e | 2300+ | 23000+ | |
| | 2i | 6900+ | 69000+ | |
| 3 | 1e | 2300+ | 23000+ | |
| 3 | EBW | 2600+ | 26000+ | |
| | IBW | 5700+ | 57000+ | |
| | Others | Never | Never | |
| | 7e | 110 | 1200 | |
| | *6e | *16 | *150 | |
| | *5e | *31 | *320 | |
| | *4e | *13 | *120 | |
| 4i | | 230+ | 2400+ | |
| | 3e | 130+ | 1400+ | |
| | 3i | 140+ | 1500+ | |
| | 2e | 99 | 1000+ | |
| | 2i | 170+ | 1800+ | |
| | 1e | 85 | 890+ | |
| | 1i | 110+ | 1100+ | |
| | EBW | 160+ | 1600+ | |
| | IBW | 140+ | 1500+ | |
| | Others Never Never | | | |
| * Sample line is plugged; data is static. | | | | |

• Because individual locations with sufficient data produced arch shaped plots indicating a reduction of hydrogen concentration accumulation, it is more appropriate to conduct the linear regressions on data in and after the peak regions for extrapolating to the future. Such later data were plotted for the locations within each panel (Figures 34 to 63, following) and resulting regression slopes are captured in Table 5 below. All slopes are significantly negative, indicating that these data are trending downward. Based on the current trend, no exceedance is predicted to ever occur at any of these locations.

Table 5: Linear Regression Slopes for Individual Locations of Panel 3 and 4

| WIPP - Hydrogen Decline (ppmv/mo) | | | |
|-----------------------------------|----------|-----------------|--------|
| Panel | Location | Slope from Peak | |
| ranci | Location | Exhaust | Intake |
| | 7 | -7.6 | na |
| | 6 | -0.95 | -1.9 |
| | 5 | -1.2 | -1.0 |
| 3 | 4 | -0.40 | -0.35 |
| J | 3 | -1.9 | -0.62 |
| | 2 | -1.1 | -0.44 |
| | 1 | -0.96 | na |
| | BW | -1.2 | -0.14 |
| | 7 | -23 | -21 |
| | 6 | -22 | -19 |
| | 5 | -13 | -15 |
| 4 | 4 | -17 | -13 |
| 4 | 3 | -13 | -14 |
| | 2 | -8.6 | -9.1 |
| | 1 | -4.9 | -6.5 |
| | BW | -1.5 | -6.8 |

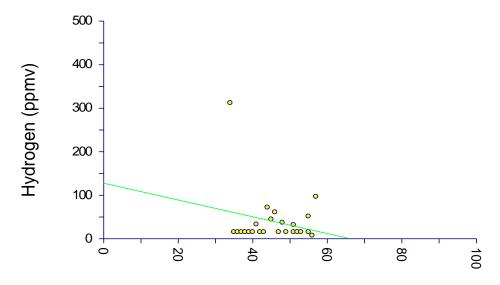
Panel 3 Room 7e, Late



Months after Room Closure

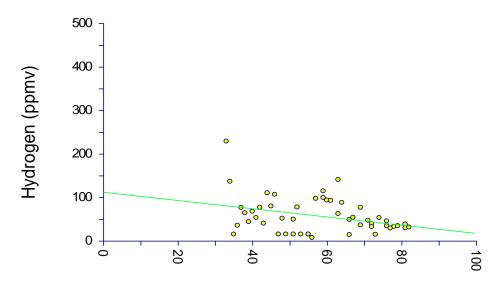
Figure 34: Regression of Later Hydrogen Data in Panel 3 Room 7e

Panel 3 Room 6i, Late



Months after Room Closure

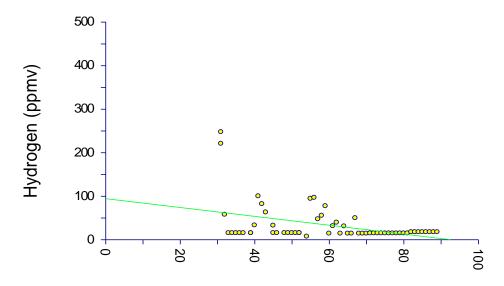
Figure 35: Regression of Later Hydrogen Data in Panel 3 Room 6i
Panel 3 Room 6e, Late



Months after Room Closure

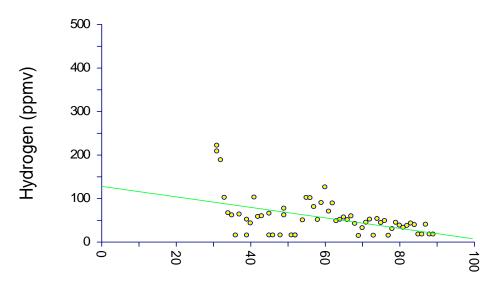
Figure 36: Regression of Later Hydrogen Data in Panel 3 Room 6e

Panel 3 Room 5i, Late



Months after Room Closure

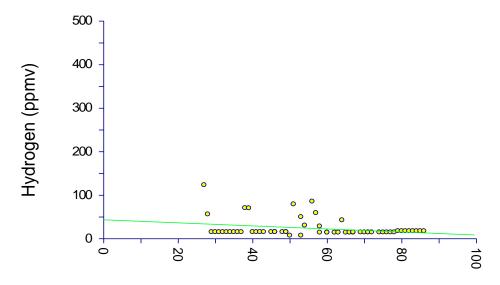
Figure 37: Regression of Later Hydrogen Data in Panel 3 Room 5i Panel 3 Room 5e, Late



Months after Room Closure

Figure 38: Regression of Later Hydrogen Data in Panel 3 Room 5e

Panel 3 Room 4i, Late



Months after Room Closure

Figure 39: Regression of Later Hydrogen Data in Panel 3 Room 4i
Panel 3 Room 4e, Late

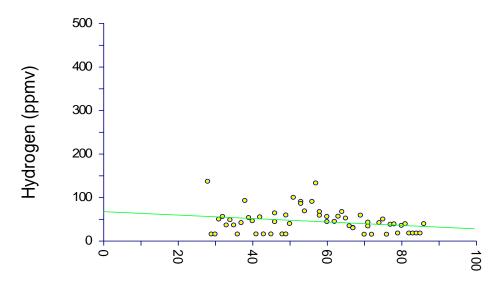
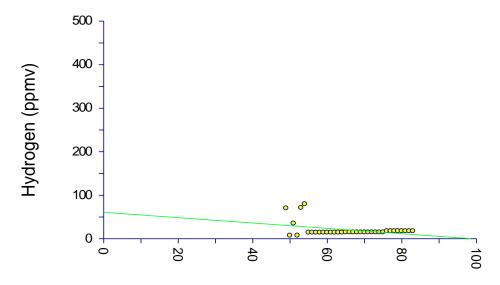


Figure 40: Regression of Later Hydrogen Data in Panel 3 Room 4e

Panel 3 Room 3i, Late



Months after Room Closure

Figure 41: Regression of Later Hydrogen Data in Panel 3 Room 3i Panel 3 Room 3e, Late

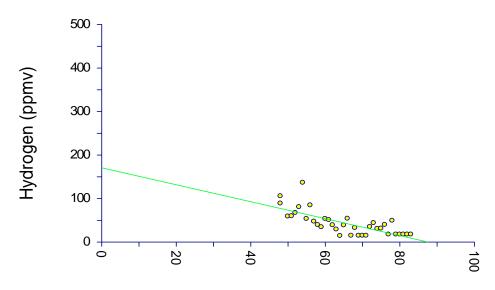
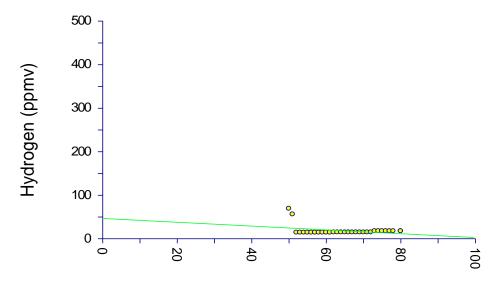


Figure 42: Regression of Later Hydrogen Data in Panel 3 Room 3e

Panel 3 Room 2i, Late



Months after Room Closure

Figure 43: Regression of Later Hydrogen Data in Panel 3 Room 2i
Panel 3 Room 2e, Late

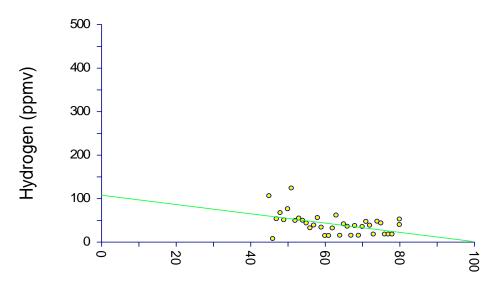
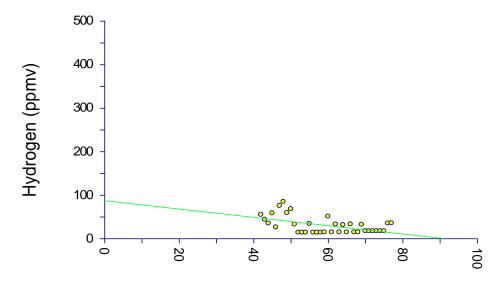


Figure 44: Regression of Later Hydrogen Data in Panel 3 Room 2e

Panel 3 Room 1e, Late



Months after Room Closure

Figure 45: Regression of Later Hydrogen Data in Panel 3 Room 1e Panel 3 Bulkhead IBW, Late

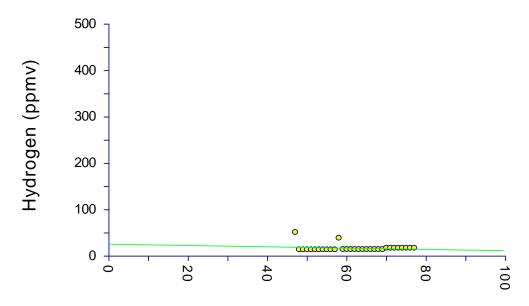


Figure 46: Regression of Later Hydrogen Data at Panel 3 Bulkhead IBW

Panel 3 Bulkhead EBW, Late

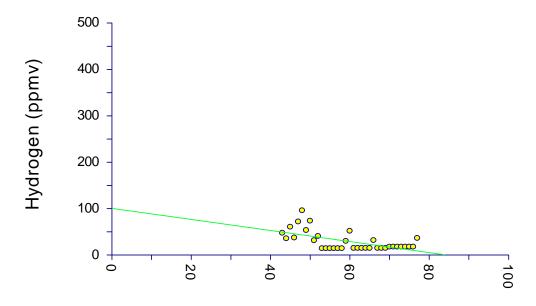
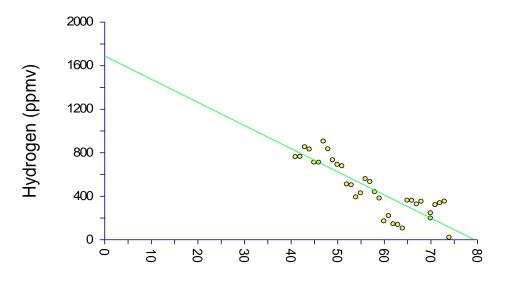


Figure 47: Regression of Later Hydrogen Data at Panel 3 Bulkhead EBW

Panel 4 Room 7i, Late



Months after Room Closure

Figure 48: Regression of Later Hydrogen Data in Panel 4 Room 7i

Panel 4 Room 7e, Late

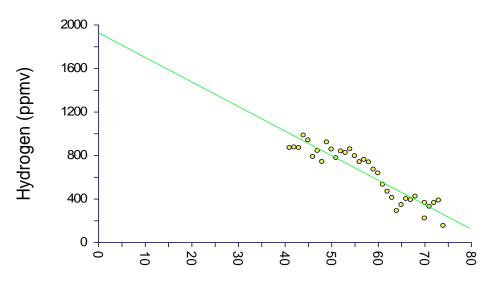
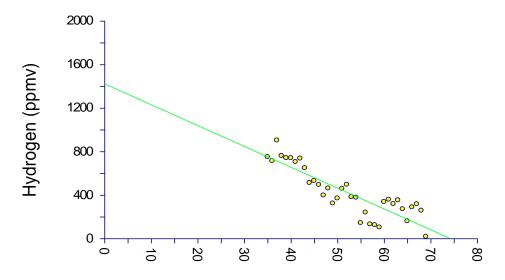


Figure 49: Regression of Later Hydrogen Data in Panel 4 Room 7e

Panel 4 Room 6i, Late



Months after Room Closure

Figure 50: Regression of Later Hydrogen Data in Panel 4 Room 6i

Panel 4 Room 6e, Late

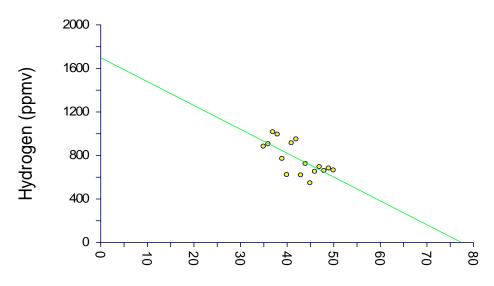
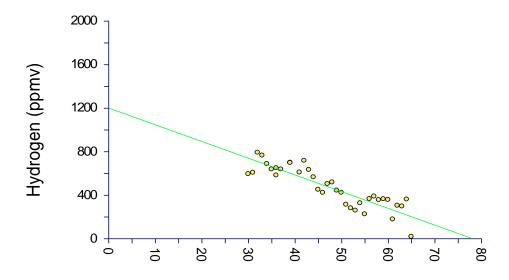


Figure 51: Regression of Later Hydrogen Data in Panel 4 Room 6e

Panel 4 Room 5i, Late



Months after Room Closure

Figure 52: Regression of Later Hydrogen Data in Panel 4 Room 5i

Panel 4 Room 5e, Late

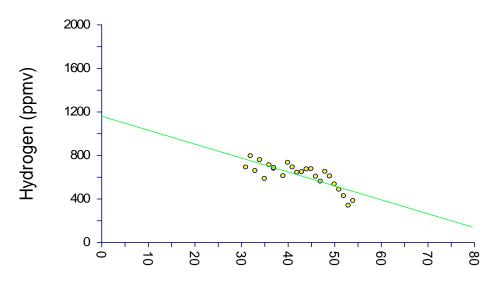
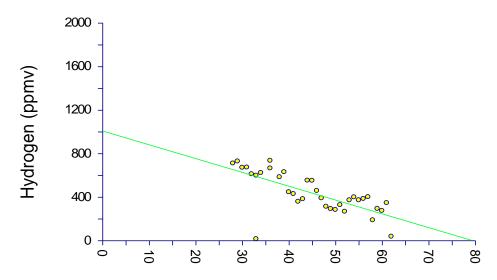


Figure 53: Regression of Later Hydrogen Data in Panel 4 Room 5e

Panel 4 Room 4i, Late



Months after Room Closure

Figure 54: Regression of Later Hydrogen Data in Panel 4 Room 4i

Panel 4 Room 4e, Late

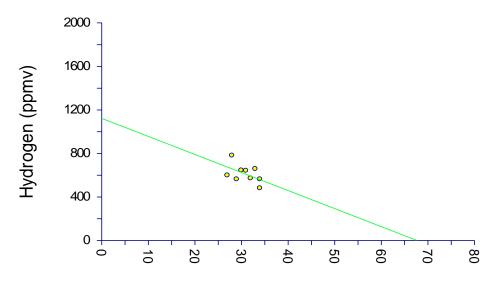
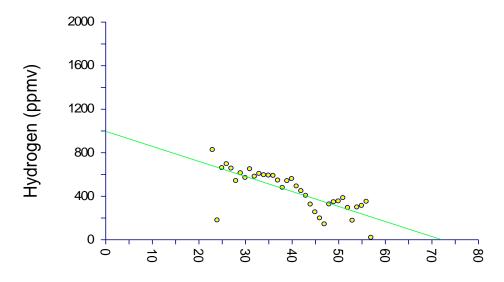


Figure 55: Regression of Later Hydrogen Data in Panel 4 Room 4e

Panel 4 Room 3i, Late



Months after Room Closure

Figure 56: Regression of Later Hydrogen Data in Panel 4 Room 3i

Panel 4 Room 3e, Late

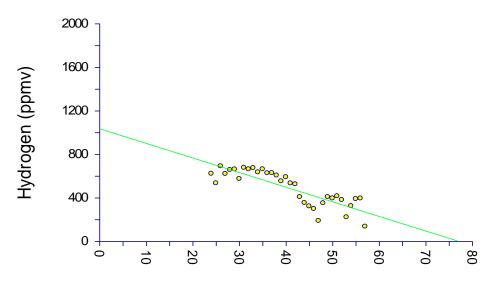
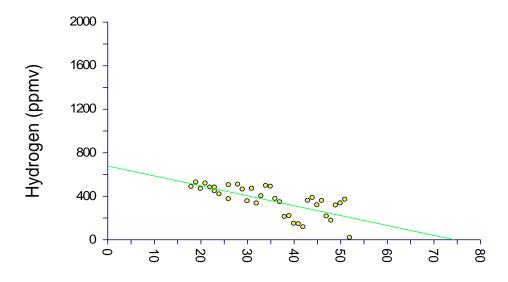


Figure 57: Regression of Later Hydrogen Data in Panel 4 Room 3e

Panel 4 Room 2i, Late



Months after Room Closure

Figure 58: Regression of Later Hydrogen Data in Panel 4 Room 2i

Panel 4 Room 2e, Late

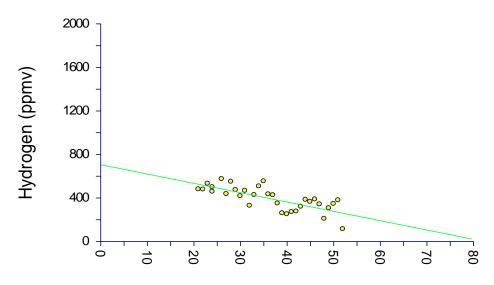
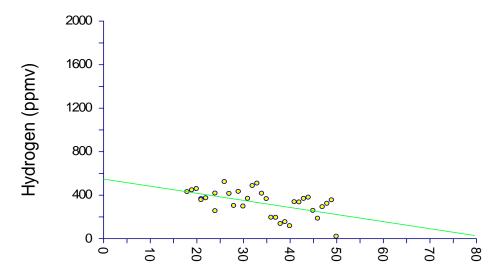


Figure 59: Regression of Later Hydrogen Data in Panel 4 Room 2e

Panel 4 Room 1i, Late



Months after Room Closure

Figure 60: Regression of Later Hydrogen Data in Panel 4 Room 1i

Panel 4 Room 1e, Late

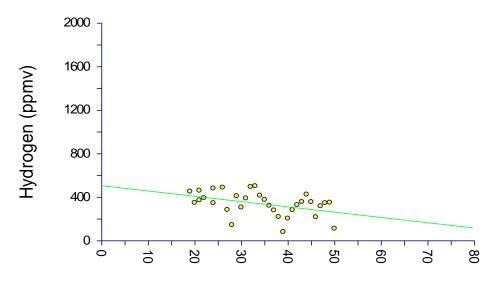
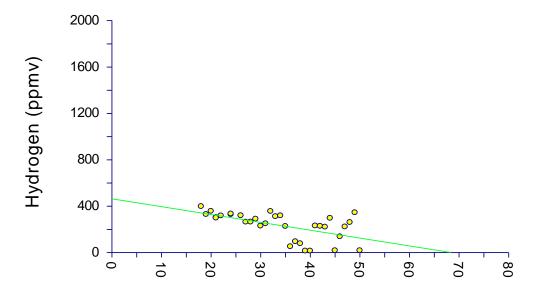


Figure 61: Regression of Later Hydrogen Data in Panel 4 Room 1e

Panel 4 Bulkhead IBW, Late



Months after Room 1 Closure

Figure 62: Regression of Later Hydrogen Data at Panel 4 Bulkhead IBW

Panel 4 Bulkhead EBW, Late

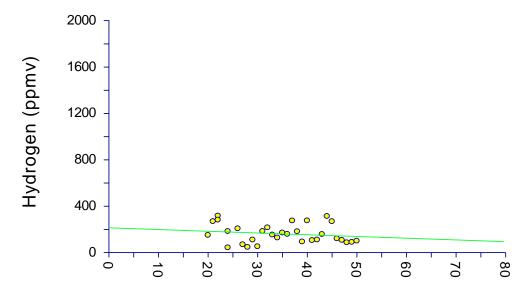


Figure 63: Regression of Later Hydrogen Data at Panel 4 Bulkhead EBW

• Rooms and panels are not completely sealed to the outside areas of the mine, which may contribute to the fluctuations observed in the room hydrogen levels. Changes in mine ventilation flow or filtration, changes in the efficacy of bulkheads in a dynamic environment subject to various factors could influence hydrogen accumulation to an unknown degree.

VII. Summary

The air monitoring data in Panels 3 and 4 indicate methane concentrations are below the MDL.

Hydrogen concentrations in Panels 3 and 4 have remained substantially below the action level of 4,000 ppmv during the entire monitoring program. The maximum hydrogen concentration observed (1,013 ppmv) slightly exceeded 25 percent of the lower action level, indicating no challenge to either the action level or LEL of 4 percent (40,000 ppmv). Conservative regression models indicate that hydrogen levels would not rise to the LEL in Panels 3 or 4 during the operational period of the WIPP (Table 3). Best estimates indicate hydrogen is actually in decline at all locations (Table 5).

VIII. References

Devarakonda, 2006. Letter from M. Devarakonda to D. Mercer: *Estimation of Hydrogen Generation Rates from Radiolysis in WIPP Panels*, Washington TRU Solutions LLC, July 26, 2006.

EPA, 1999. Compendium Method TO-15: Determination of Volatile Organic Compounds (VOCs) in Air Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry, EPA 625/R-96/010b. Center for Environmental Research Information, Office of Research and Development, Cincinnati, OH, January 1999.

Golder Associates, 2006. Letter from Golder Associates Inc. to Rick Chavez: *Early Time Generation of Methane and Hydrogen in Filled Panels at the WIPP*, November 30, 2006.

Wang and Brush, 1996. Letter from Yifeng Wang and Larry Brush to Martin S. Tierney: *Estimates of Gas-Generation Parameters for the Long-Term WIPP Performance*, Sandia National Laboratories, January 26, 1996.

Waste Isolation Pilot Plant Hazardous Waste Facility Permit, NM 4890139088-TSDF issued by the New Mexico Environment Department.

Appendix A

Time Series Plots for Hydrogen Concentrations in Panel 3

Hydrogen - Panel 3, Room 7e

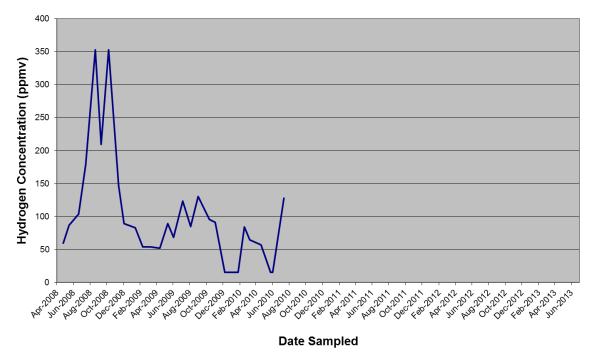


Figure A1: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 7e

The Time Series Plot of Hydrogen Concentrations in Panel 3, Room 7i has been omitted here due to a lack of data. The plot does appear in the main body of the report as Figure 11 on page 17. Only two samples are represented, each of which has a statistical evaluation concentration of 10.79 ppmv. These data appear in Appendix E.

Hydrogen - Panel 3, Room 6e

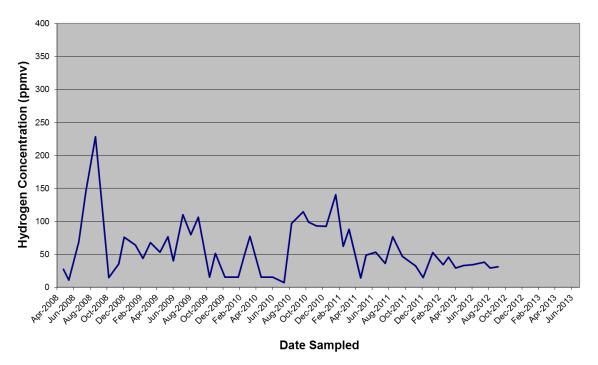
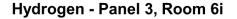


Figure A2: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 6e



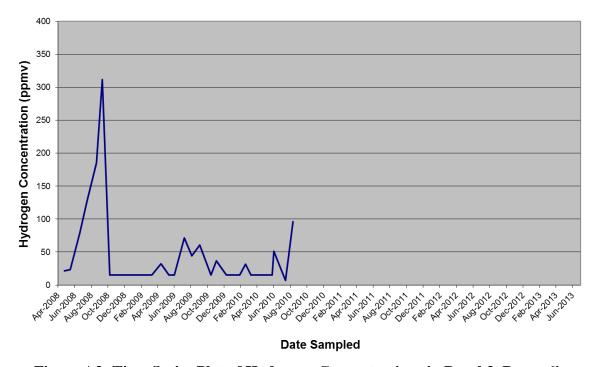


Figure A3: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 6i

Hydrogen - Panel 3, Room 5e

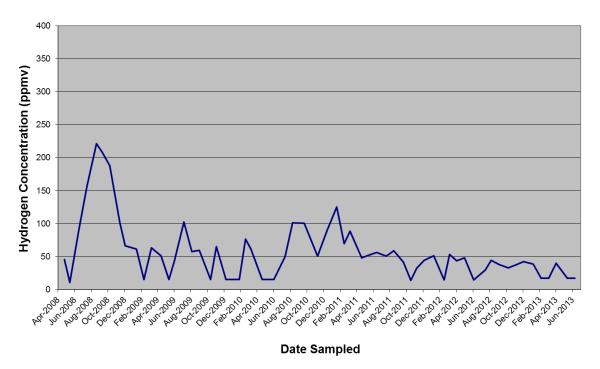


Figure A4: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 5e

Hydrogen - Panel 3, Room 5i

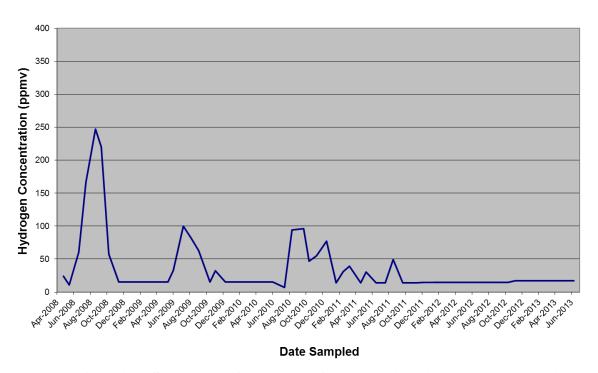


Figure A5: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 5i

Hydrogen - Panel 3, Room 4e

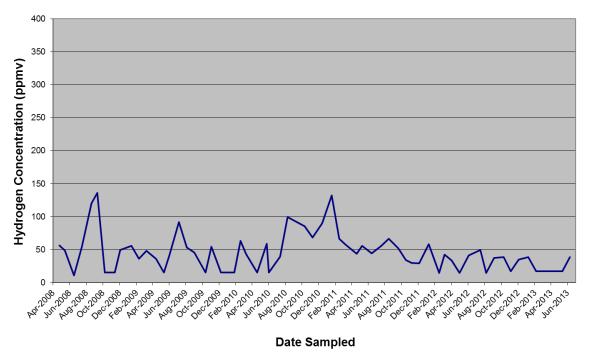


Figure A6: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 4e

Hydrogen - Panel 3, Room 4i

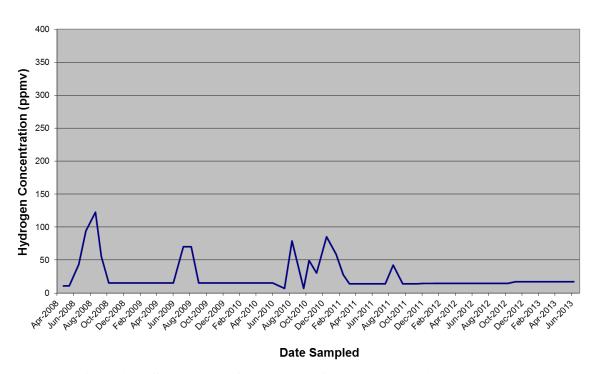


Figure A7: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 4i

Hydrogen - Panel 3, Room 3e

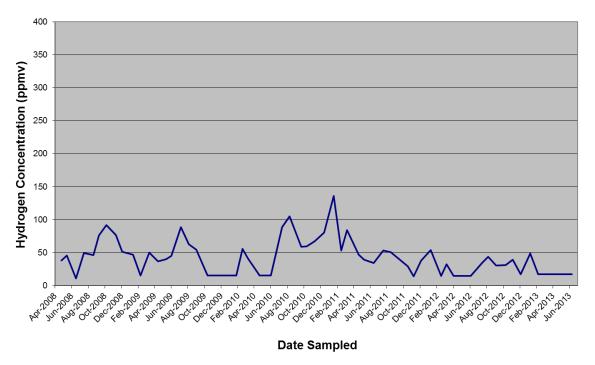


Figure A8: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 3e

Hydrogen - Panel 3, Room 3i

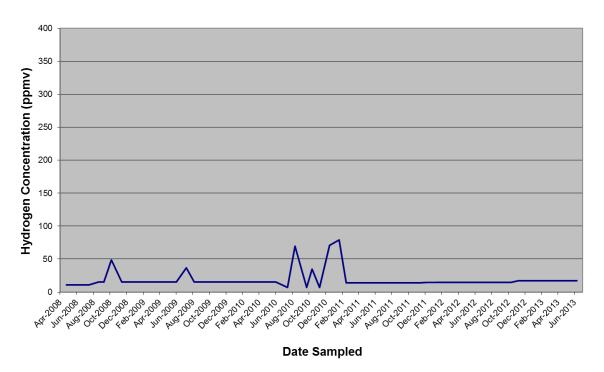


Figure A9: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 3i

Hydrogen - Panel 3, Room 2e

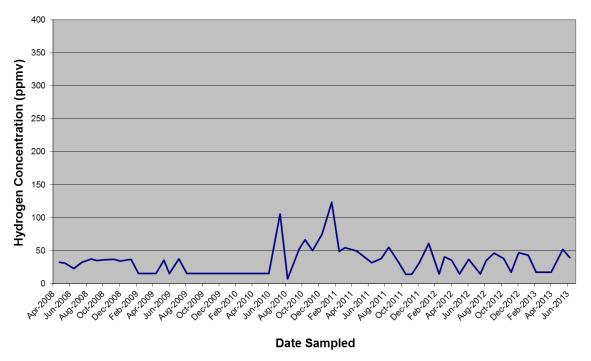


Figure A10: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 2e

Hydrogen - Panel 3, Room 2i

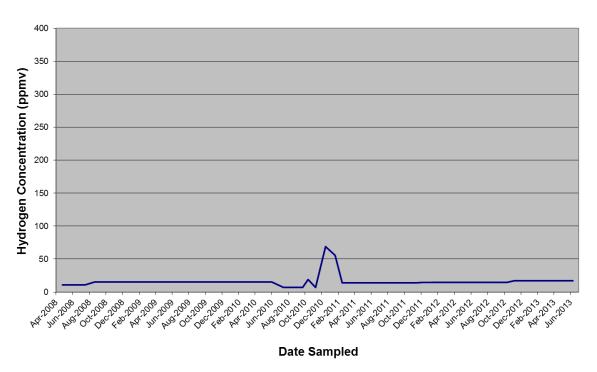


Figure A11: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 2i

Hydrogen - Panel 3, Room1e

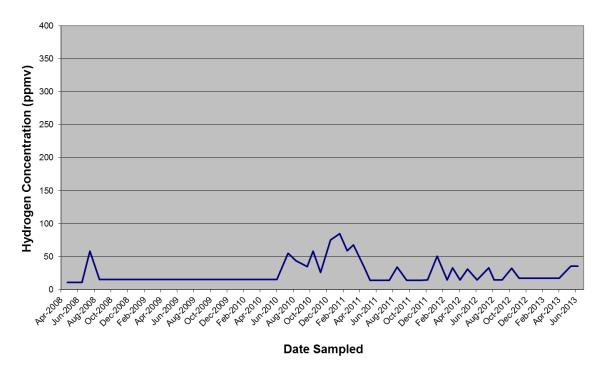


Figure A12: Time Series Plot of Hydrogen Concentrations in Panel 3, Room 1e

The *Time Series Plot of Hydrogen Concentrations in Panel 3, Room 1i* has been omitted due to a lack of data. Only three samples exist at this location, each of which has a statistical evaluation concentration of 10.79 ppmv. These data appear in Appendix E.

Hydrogen - Panel 3, Bulkhead EBW

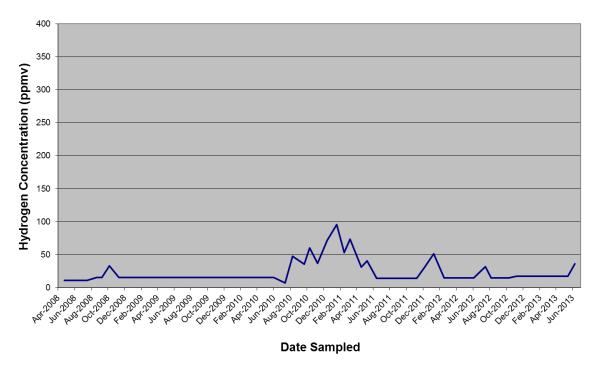


Figure A13: Time Series Plot of Hydrogen Concentrations in Panel 3, Bulkhead EBW

Hydrogen - Panel 3, Bulkhead IBW

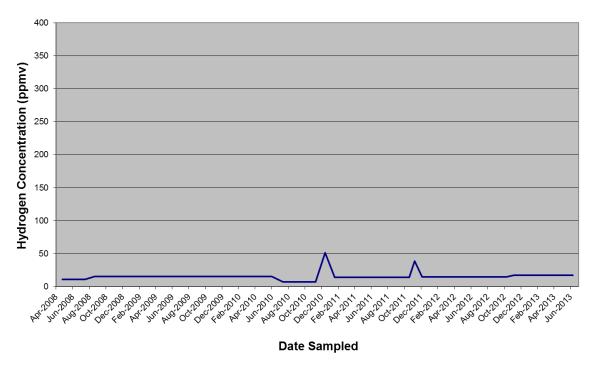


Figure A14: Time Series Plot of Hydrogen Concentrations in Panel 3, Bulkhead IBW

Hydrogen - Panel 3, Bulkhead EBA

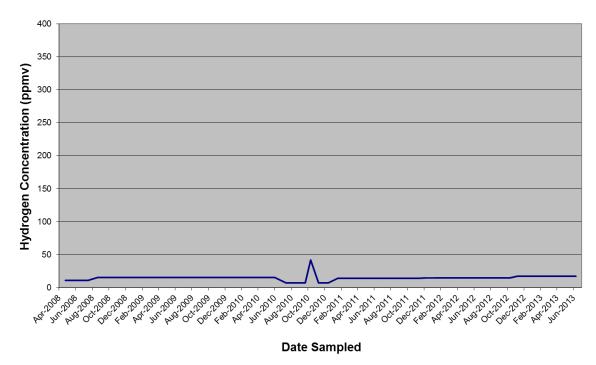


Figure A15: Time Series Plot of Hydrogen Concentrations in Panel 3, Bulkhead EBA

Hydrogen - Panel 3, Bulkhead IBA

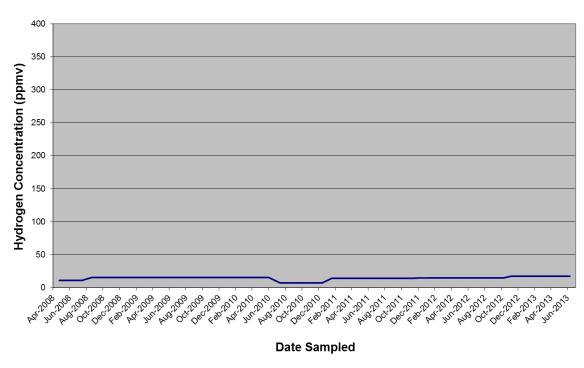


Figure A16: Time Series Plot of Hydrogen Concentrations in Panel 3, Bulkhead IBA

Appendix B

Time Series Plots for Hydrogen Concentrations in Panel 4

Hydrogen - Panel 4, Room 7e

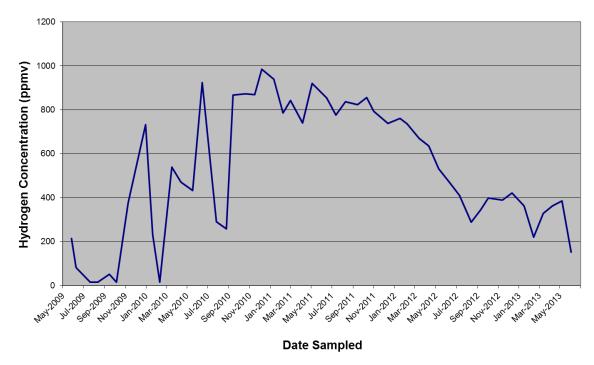


Figure B1: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 7e

Hydrogen - Panel 4, Room 7i

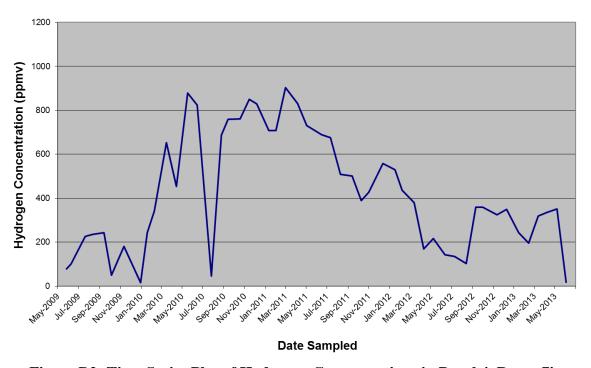


Figure B2: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 7i

Hydrogen - Panel 4, Room 6e

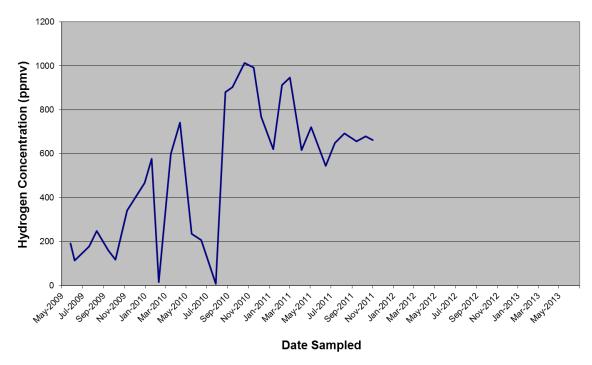


Figure B3: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 6e

Hydrogen - Panel 4, Room 6i

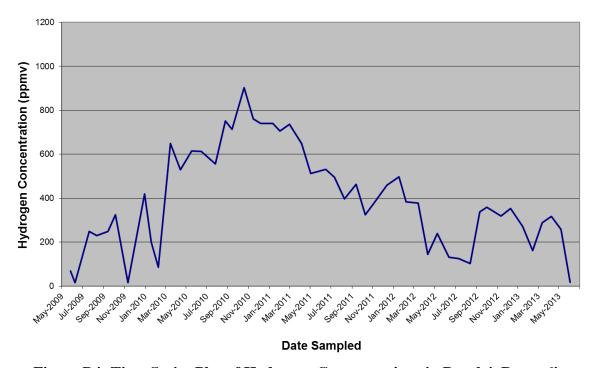


Figure B4: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 6i

Hydrogen - Panel 4, Room 5e

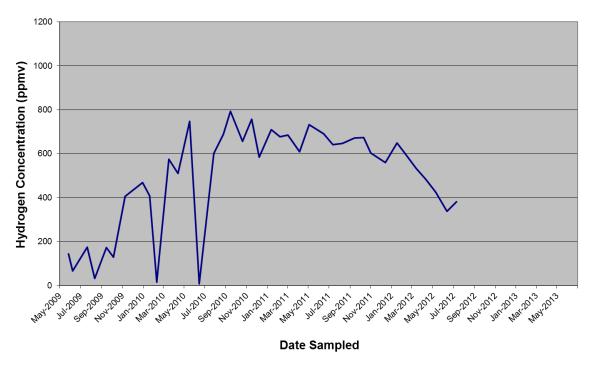


Figure B5: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 5e

Hydrogen - Panel 4, Room 5i

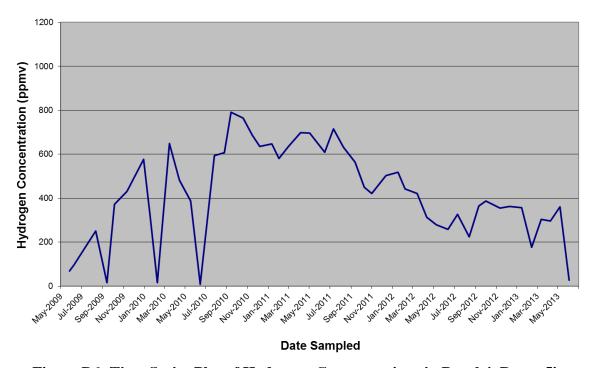


Figure B6: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 5i

Hydrogen - Panel 4, Room 4e

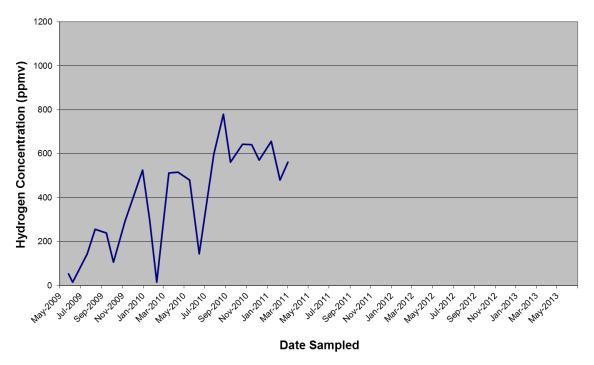


Figure B7: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 4e

Hydrogen - Panel 4, Room 4i

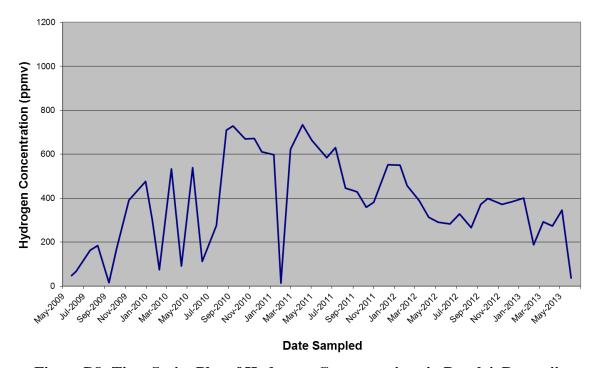


Figure B8: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 4i

Hydrogen - Panel 4, Room 3e

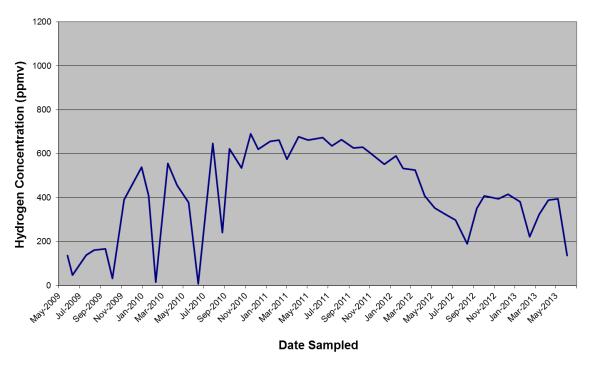


Figure B9: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 3e

Hydrogen - Panel 4, Room 3i

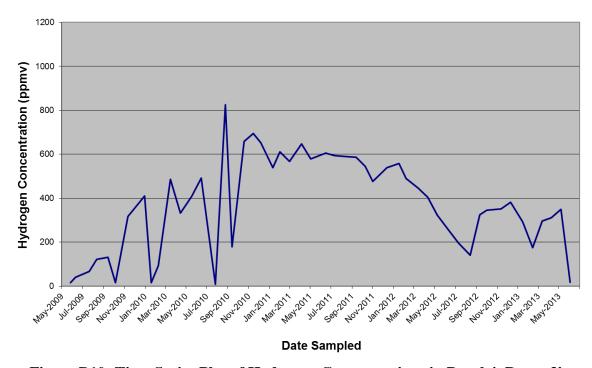


Figure B10: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 3i

Hydrogen - Panel 4, Room 2e

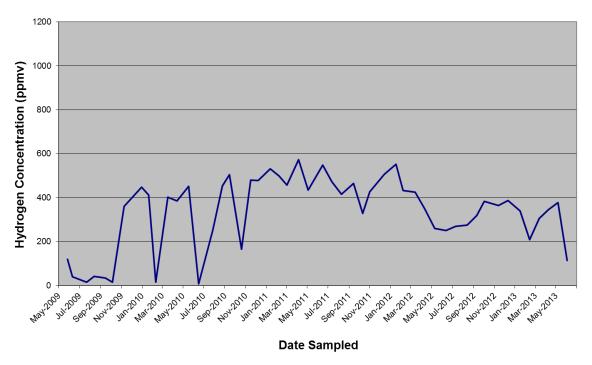


Figure B11: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 2e

Hydrogen - Panel 4, Room 2i

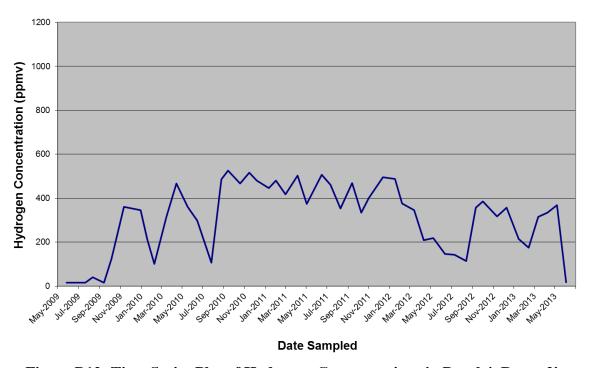


Figure B12: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 2i

Hydrogen - Panel 4, Room 1e

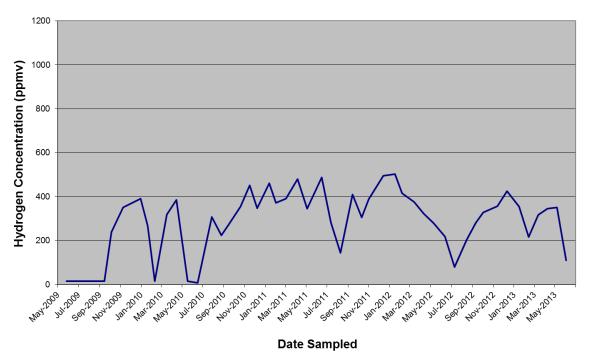


Figure B13: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 1e

Hydrogen - Panel 4, Room 1i

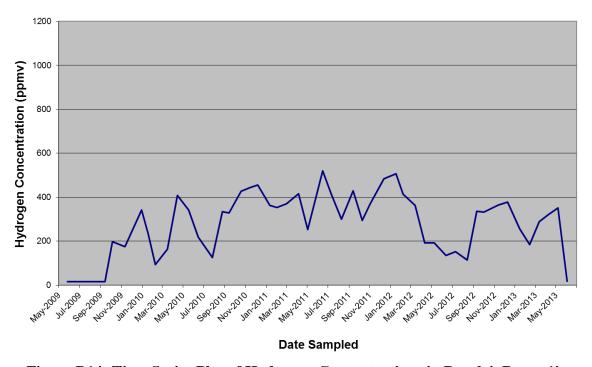


Figure B14: Time Series Plot of Hydrogen Concentrations in Panel 4, Room 1i

Hydrogen - Panel 4, Bulkhead EBW

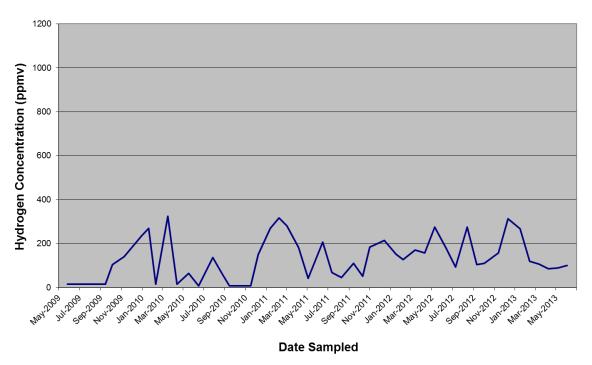


Figure B15: Time Series Plot of Hydrogen Concentrations in Panel 4, Bulkhead EBW

Hydrogen - Panel 4, Bulkhead IBW

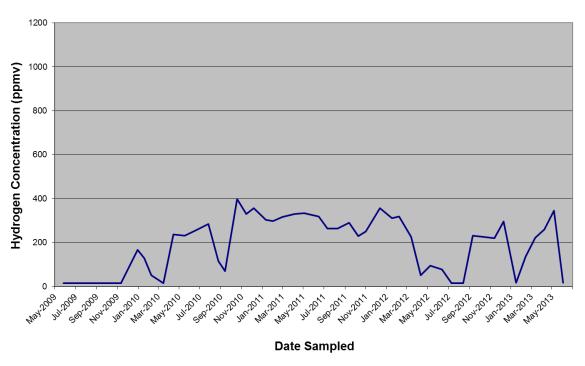


Figure B16: Time Series Plot of Hydrogen Concentrations in Panel 4, Bulkhead IBW

Hydrogen - Panel 4, Bulkhead EBA

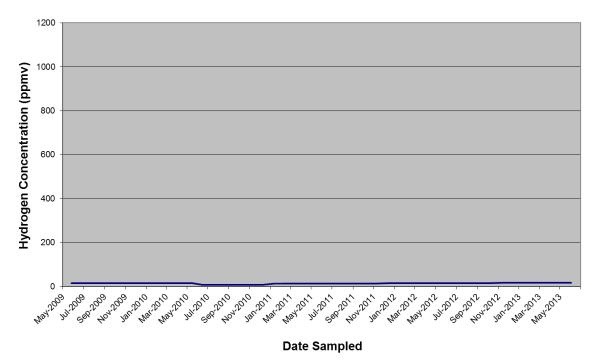


Figure B17: Time Series Plot of Hydrogen Concentrations in Panel 4, Bulkhead EBA

Hydrogen - Panel 4, Bulkhead IBA

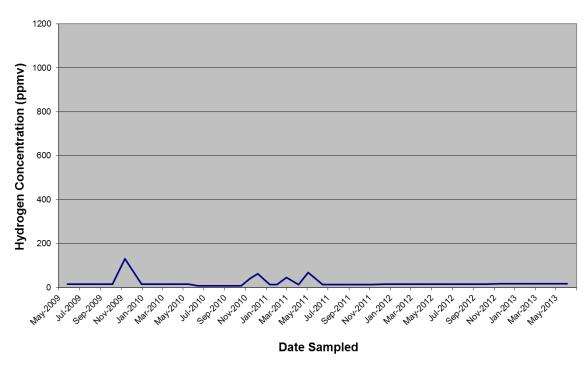


Figure B18: Time Series Plot of Hydrogen Concentrations in Panel 4, Bulkhead IBA

Appendix C

Panel 3 Methane Data

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | | |
| | 3176 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3213 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3281 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3340 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3405 | 8/19/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3453 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3509 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3582 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3621 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3720 | 1/13/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3777 | 2/10/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3844 | 3/11/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3919 | 4/14/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| Panel 3 | 3990 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| Room 7e | 4048 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4106 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4165 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4236 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4333 | 10/12/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4375 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4465 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4626 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4724 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4790 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4958 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5082 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5117 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5255 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| Panel 3 | 3175 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| Room 7i | 3222 | 5/19/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |

| | | | IV | lethane (| CH₄) | | | |
|----------|--------------|-------------------------|-------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3178 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3212 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3280 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3339 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3426 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3452 3508 | 9/10/2008 10/8/2008 | 9/12/2008 10/10/2008 | N.D. | 2 | 23.74 23.74 | 47.48 47.48 | 23.74 |
| | 3581 | 11/13/2008 | | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3620 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3719 | 1/13/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3776 | 2/10/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3843 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3918 | 4/14/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3989 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4047 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4107 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4166 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4237 4334 | 9/1/2009 10/12/2009 | 9/4/2009 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 4376 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4466 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4627 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4725 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4791 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4959 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5083 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| Panel 3 | 5118 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| Room 6e | 5256 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5349 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5475 5534 | 9/21/2010 10/11/2010 | 9/27/2010 10/18/2010 | N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 |
| | 5627 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5746 | 12/14/2010 | | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5844 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5930 | 2/15/2011 | | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6018 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6131 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6213 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6313 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6427 | 7/18/2011 | 7/28/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6495 6573 | 8/15/2011 9/19/2011 | 8/22/2011 | N.D. N.D. | 2 | 23.97 | 47.94 47.94 | 23.97 |
| | 6646 | 10/17/2011 | 9/27/2011 | N.D. | 2 | 23.97 23.97 | 47.94 | 23.97 |
| | 6718 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6773 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 6858 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 6961 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7011 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7084 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7162 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7235 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7362 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7420 7505 | 8/6/2012 9/4/2012 | 8/10/2012 9/7/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 7 303 | 3/4/2012 | 9///2012 | N.D. | 2 | 17.45 | 34.9 | 17.43 |

| | | | - | | | | | |
|----------|--------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|
| | | | IV | lethane (| CH ₄) | | | |
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3166 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3221 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3289 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3348 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3412 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3460 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3516 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3589 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3628 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3723 | 1/14/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3784 | 2/11/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3847 | 3/11/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3922 | 4/14/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| Panel 3 | 3986 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4055 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| Room 6i | 4114 | 7/8/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4171 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4244 | 9/2/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4341 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4383 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4473 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4634 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4732 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4800 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4966 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5090 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5125 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5263 | 7/14/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5356 | 8/10/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |

| | | | N | lethane (| CH₄) | | | |
|----------|--------------|-------------------------|-------------------------|-------------------|----------|----------------|-----------------------|-------------------------------|
| | Sample | Sample | Analysis | Reported | Dilution | MDL | Dilution Corrected | Concentration for Statistical |
| Location | ID | Date | Analysis Date | Results (ppmv) | Factor | (ppmv) | MDL (ppmv) | Evaluation (ppmv) |
| | 3179 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3211 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3279 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3338 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3403 | 8/19/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3451 3507 | 9/10/2008 | 9/12/2008 10/10/2008 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 3580 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3619 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3718 | 1/13/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3775 | 2/10/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3842 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3917 | 4/14/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3988 4046 | 5/12/2009 6/1/2009 | 5/15/2009 6/8/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 4108 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4167 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4238 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4335 | 10/12/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4377 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4467 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4628 4726 | 1/26/2010 2/17/2010 | 2/2/2010 2/23/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 4792 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4960 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5084 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5119 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5257 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5350 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5476 5535 | 9/21/2010 10/11/2010 | 9/27/2010 | N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 |
| Panel 3 | 5628 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 5e | 5747 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5845 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5931 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6019 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6132 6214 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6314 | 5/9/2011 6/14/2011 | 5/13/2011 6/21/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 |
| | 6428 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6496 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6574 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6647 | 10/17/2011 | | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6719 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6774 6859 | 1/9/2012 | 12/9/2011 1/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 | 17.45 17.45 |
| | 6962 | 1/9/2012 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.90 34.90 | 17.45 |
| | 7012 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7085 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7163 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7236 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7363 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7421 7506 | 8/6/2012 9/4/2012 | 8/10/2012 9/7/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.90 34.90 | 17.45 17.45 |
| | 7617 | 10/8/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 |
| | 7687 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7773 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7866 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7929 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8002 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8088 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8187 8261 | 5/13/2013 6/9/2013 | 5/17/2013 6/14/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 |
| | 0201 | 0/3/2013 | 0/14/2013 | N.D. | 2 | 15.71 | 31.42 | 19.71 |

| Cocation Sample Date D | | | | IV | lethane (| CH₄) | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------|------------|------------|-----------|------|-------|------------------|----------------------------------------------------------|
| 3220 5/15/2008 6/23/2008 N.D. 2 17.99 35.98 17.99 3288 6/19/2008 6/25/2008 N.D. 2 17.99 35.98 17.99 3347 7/16/2008 7/22/2008 N.D. 2 17.99 35.98 17.99 3411 8/19/2008 8/22/2008 N.D. 2 17.99 35.98 17.99 3411 8/19/2008 3/22/2008 N.D. 2 23.74 47.48 23.74 3459 9/10/2008 9/12/2008 N.D. 2 23.74 47.48 23.74 3515 10/8/2008 10/10/2008 N.D. 2 23.74 47.48 23.74 3515 10/8/2008 10/10/2008 N.D. 2 23.74 47.48 23.74 3527 12/3/2008 11/18/2008 N.D. 2 23.74 47.48 23.74 3627 12/3/2008 12/2/2009 N.D. 2 23.74 47.48 23.74 3722 1/13/2009 1/21/2009 N.D. 2 23.74 47.48 23.74 3738 2/11/2009 2/13/2009 N.D. 2 23.74 47.48 23.74 3846 3/11/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 3891 4/14/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 3921 4/14/2003 4/22/2009 N.D. 2 23.74 47.48 23.74 4054 6/2/2009 6/8/2009 N.D. 2 23.74 47.48 23.74 4155 7/8/2009 7/10/2009 N.D. 2 22.74 47.48 23.74 4156 8/6/2009 8/13/2009 N.D. 2 22.74 47.48 23.74 4176 8/6/2009 3/13/2009 N.D. 2 22.74 47.48 23.74 4176 8/6/2009 3/13/2009 N.D. 2 22.21 44.42 22.21 4476 8/6/2009 3/13/2009 N.D. 2 22.21 44.42 22.21 4434 10/13/2009 10/15/2009 N.D. 2 22.21 44.42 22.21 4434 10/13/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4434 10/13/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4434 10/13/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4434 11/3/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4436 1/2/2009 3/2/2009 N.D. 2 22.21 44.42 22.21 4437 9/2/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4535 1/27/2000 12/2/2010 N.D. 2 22.21 44.42 22.21 4536 1/27/2000 12/2/2010 N.D. 2 22.21 44.42 22.21 4537 1/27/2010 3/2/2010 N.D. 2 22.21 44.42 22.21 5264 7/14/2010 7/19/2010 N.D. 2 23.97 47.94 23.97 6330 1/2/2010 8/17/2010 N.D. 2 23.97 47.94 23.97 6330 6/15/2011 3/2/2010 N.D. 2 23.97 47.94 23.97 6330 6/15/2011 3/2/2010 N.D. 2 23.97 47.94 23.97 6351 1/19/2011 1/12/2011 N.D. 2 23.97 47.94 23.97 6350 7/19/2011 5/12/2011 N.D. 2 23.97 47.94 23.97 6436 7/19/2011 5/12/2011 N.D. 2 23.97 47.94 23. | Location | | _ | _ | Results | | | Corrected MDL | Concentration for Statistical Evaluation (ppmv) |
| 3288 6/19/2008 7/25/2008 N.D. 2 17.99 35.98 17.99 3347 7/16/2008 7/25/2008 N.D. 2 17.99 35.98 17.99 3411 8/19/2008 8/25/2008 N.D. 2 23.74 47.48 23.74 3459 9/10/2008 9/12/2008 N.D. 2 23.74 47.48 23.74 3459 9/10/2008 19/10/2008 N.D. 2 23.74 47.48 23.74 3551 10/8/2008 10/10/2008 N.D. 2 23.74 47.48 23.74 3588 11/13/2008 11/18/2008 N.D. 2 23.74 47.48 23.74 3627 12/3/2008 12/2008 N.D. 2 23.74 47.48 23.74 3722 1/13/2009 11/21/2009 N.D. 2 23.74 47.48 23.74 3722 1/13/2009 12/12/2009 N.D. 2 23.74 47.48 23.74 3846 3/11/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 3846 3/11/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 3921 4/14/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 3921 4/14/2009 3/27/2009 N.D. 2 23.74 47.48 23.74 4054 6/2/2009 6/8/2009 N.D. 2 23.74 47.48 23.74 4054 6/2/2009 6/8/2009 N.D. 2 23.74 47.48 23.74 4054 6/2/2009 6/8/2009 N.D. 2 23.74 47.48 23.74 4115 7/8/2009 3/3/2009 N.D. 2 22.21 44.42 22.21 4446 8/2/2009 8/3/2009 N.D. 2 22.21 44.42 22.21 44245 9/2/2009 6/8/2009 N.D. 2 22.21 44.42 22.21 4434 10/13/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4434 11/3/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4436 13/10/2009 11/12/2009 N.D. 2 22.21 44.42 22.21 4667 4/21/2010 3/22/2010 N.D. 2 22.21 44.42 22.21 4687 4/21/2010 3/23/2010 N.D. 2 22.21 44.42 22.21 46967 4/21/2010 3/23/2010 N.D. 2 22.21 44.42 22.21 46967 4/21/2010 3/23/2010 N.D. 2 22.21 44.42 22.21 5091 5/26/2010 5/28/2010 N.D. 2 23.97 47.94 23.97 6650 3/6/10/2010 3/12/2010 N.D. 2 23.97 47.94 23.97 6650 3/6/2011 6/2/2011 N.D. 2 23.97 47.94 23.97 6651 10/17/2011 11/17/2011 N.D. 2 23.97 47.94 23.97 6650 3/20/2011 5/20/2011 N.D. 2 23.97 47.94 23.97 6650 3/20/2011 6/20/2011 N.D. 2 23.97 47.94 23.97 6780 3/20/2011 6/20/2011 N.D. 2 23.97 47. | | | | | | | | | 17.99 |
| 3347 7/16/2006 7/22/2008 N.D. 2 17.99 35.98 17.99 34.99 9710/2008 9712/2008 N.D. 2 23.74 47.48 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 23.74 | | | | | | | | | |
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| 7169 5/1/2012 5/4/2012 N.D. 2 17.45 34.9 17.45 7242 6/5/2012 6/8/2012 N.D. 2 17.45 34.9 17.45 7369 7/17/2012 7/23/2012 N.D. 2 17.45 34.9 17.45 7427 8/6/2012 8/10/2012 N.D. 2 17.45 34.9 17.45 7512 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | 3/6/2012 | | | 2 | | | 17.45 |
| 7242 6/5/2012 6/8/2012 N.D. 2 17.45 34.9 17.45 7369 7/17/2012 7/23/2012 N.D. 2 17.45 34.9 17.45 7427 8/6/2012 8/10/2012 N.D. 2 17.45 34.9 17.45 7512 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | 17.45 |
| 7369 7/17/2012 7/23/2012 N.D. 2 17.45 34.9 17.45 7427 8/6/2012 8/10/2012 N.D. 2 17.45 34.9 17.45 7512 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | 17.45 |
| 7427 8/6/2012 8/10/2012 N.D. 2 17.45 34.9 17.45 7512 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 7512 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 7623 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 7693 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | 17.45 |
| 7779 12/4/2012 12/7/2012 N D 2 15.71 31.42 15.71 | | | | | | | | | 15.71 |
| | | 7779 | 12/4/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | | | | | | | | | 15.71 |
| | | | | | | | | | 15.71 |
| | | | | | | | | | 15.71 15.71 |
| | | | | | | | | | 15.71 15.71 |
| | | | | | | | | | 15.71 |

| | | | N | lethane (| CH₄) | | | |
|----------|--------------|------------------------|-------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3174 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3210 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3278 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3337 3402 | 7/16/2008 8/19/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 17.99 23.74 | 35.98 47.48 | 17.99 23.74 |
| | 3450 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3506 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3579 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3618 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3717 | 1/13/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3774 3841 | 2/10/2009 3/10/2009 | 2/13/2009 3/27/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 3916 | 4/14/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3987 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4045 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4109 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4168 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4239 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4336 4378 | 10/12/2009 | 10/15/2009 | N.D. N.D. | 2.1 | 22.21 | 44.42 46.64 | 22.21 |
| | 4468 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4629 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4727 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4793 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4961 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5085 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5120 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5258 5351 | 7/13/2010 8/9/2010 | 7/19/2010 8/17/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 |
| | 5477 | 9/21/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5536 | | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Panel 3 | 5629 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 4e | 5748 | | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5846 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5932 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6020 6133 | 3/8/2011 4/19/2011 | 3/11/2011 4/26/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 |
| | 6215 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6315 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6429 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6497 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6575 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6648 | 10/17/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6720 6775 | 11/7/2011 12/5/2011 | 11/11/2011 12/9/2011 | N.D. N.D. | 2 | 23.97 17.45 | 47.94 34.9 | 23.97 17.45 |
| | 6860 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 6963 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7013 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7086 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7164 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7237 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7364 7422 | 7/16/2012 8/6/2012 | 7/23/2012 8/10/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 7507 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7618 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7688 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7774 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7867 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7930 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8003 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8089 8188 | 4/2/2013 5/13/2013 | 4/5/2013 5/17/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 |
| | 8262 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | | | | | | | | |

| Location | | Concentration |
|----------------------------------------------------------------------------|----------------------------|-----------------------------------------|
| | or (ppmv) MDL (ppmv) | for Statistical Evaluation (ppmv) |
| | 17.99 35.98 | 17.99 |
| 3219 5/15/2008 5/23/2008 N.D. 2 | 17.99 35.98 | 17.99 |
| 3287 6/19/2008 6/25/2008 N.D. 2 | 17.99 35.98 | 17.99 |
| 3346 7/16/2008 7/22/2008 N.D. 2 3410 8/19/2008 8/22/2008 N.D. 2 | 17.99 35.98 23.74 47.48 | 17.99 23.74 |
| 3458 9/10/2008 9/12/2008 N.D. 2 | 23.74 47.48 | 23.74 |
| 3514 10/8/2008 10/10/2008 N.D. 2 | 23.74 47.48 | 23.74 |
| 3587 11/13/2008 11/18/2008 N.D. 2 | 23.74 47.48 | 23.74 |
| 3626 12/3/2008 12/6/2008 N.D. 2 | 23.74 47.48 | 23.74 |
| 3721 1/13/2009 1/21/2009 N.D. 2 | 23.74 47.48 | 23.74 |
| 3782 2/10/2009 2/13/2009 N.D. 2 3845 3/11/2009 3/27/2009 N.D. 2 | 23.74 47.48 23.74 47.48 | 23.74 |
| 3920 4/14/2009 4/22/2009 N.D. 2 | 23.74 47.48 | 23.74 |
| 3984 5/12/2009 5/15/2009 N.D. 2 | 23.74 47.48 | 23.74 |
| 4053 6/2/2009 6/8/2009 N.D. 2 | 23.74 47.48 | 23.74 |
| 4116 7/8/2009 7/10/2009 N.D. 2 | 22.21 44.42 | 22.21 |
| 4177 8/6/2009 8/13/2009 N.D. 2 4246 9/2/2009 9/4/2009 N.D. 2 | 22.21 44.42 22.21 44.42 | 22.21 22.21 |
| 4343 10/13/2009 10/15/2009 N.D. 2 | 22.21 44.42 | 22.21 |
| 4385 11/3/2009 11/12/2009 N.D. 2 | 22.21 44.42 | 22.21 |
| 4475 12/9/2009 12/15/2009 N.D. 2 | 22.21 44.42 | 22.21 |
| 4636 1/27/2010 2/2/2010 N.D. 2 | 22.21 44.42 | 22.21 |
| 4734 2/18/2010 2/23/2010 N.D. 2 | 22.21 44.42 | 22.21 |
| 4802 3/10/2010 3/12/2010 N.D. 2 4968 4/21/2010 4/28/2010 N.D. 2 | 22.21 44.42 22.21 44.42 | 22.21 22.21 |
| 5092 5/26/2010 5/28/2010 N.D. 2 | 22.21 44.42 | 22.21 |
| 5127 6/2/2010 6/7/2010 N.D. 2 | 22.21 44.42 | 22.21 |
| 5265 7/14/2010 7/19/2010 N.D. 2 | 21.39 42.78 | 21.39 |
| 5358 8/10/2010 8/17/2010 N.D. 2 | 21.39 42.78 | 21.39 |
| 5484 9/22/2010 9/27/2010 N.D. 2 | 21.39 42.78 | 21.39 |
| Panel 3 5542 10/12/2010 10/18/2010 N.D. 2 5635 11/9/2010 11/15/2010 N.D. 2 | 21.39 42.78 21.39 42.78 | 21.39 21.39 |
| Room 4i 5754 12/15/2010 12/20/2010 N.D. 2 | 21.39 42.78 | 21.39 |
| 5852 1/19/2011 1/24/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 5938 2/15/2011 2/21/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6026 3/9/2011 3/11/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6139 4/19/2011 4/26/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6221 5/10/2011 5/13/2011 N.D. 2 6321 6/15/2011 6/21/2011 N.D. 2 | 23.97 47.94 23.97 47.94 | 23.97 23.97 |
| 6437 7/19/2011 7/22/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6503 8/16/2011 8/22/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6581 9/20/2011 9/27/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6656 10/18/2011 10/25/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6726 11/7/2011 11/11/2011 N.D. 2 6781 12/6/2011 12/9/2011 N.D. 2 | 23.97 47.94 | 23.97 |
| 6781 12/6/2011 12/9/2011 N.D. 2 6866 1/10/2012 1/13/2012 N.D. 2 | 17.45 34.9 17.45 34.9 | 17.45 17.45 |
| 6969 2/16/2012 2/22/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7019 3/6/2012 3/9/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7092 4/3/2012 4/9/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7170 5/1/2012 5/4/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7243 6/5/2012 6/8/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7370 7/17/2012 7/23/2012 N.D. 2 7428 8/6/2012 8/10/2012 N.D. 2 | 17.45 34.9 17.45 34.9 | 17.45 17.45 |
| 7513 9/4/2012 9/7/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7624 10/9/2012 10/16/2012 N.D. 2 | 17.45 34.9 | 17.45 |
| 7694 11/6/2012 11/9/2012 N.D. 2 | 15.71 31.42 | 15.71 |
| 7780 12/4/2012 12/7/2012 N.D. 2 | 15.71 31.42 | 15.71 |
| 7873 1/8/2013 1/14/2013 N.D. 2 | 15.71 31.42 | 15.71 |
| 7936 2/5/2013 2/8/2013 N.D. 2 8009 3/5/2013 3/11/2013 N.D. 2 | 15.71 31.42 15.71 31.42 | 15.71 15.71 |
| 8009 3/5/2013 3/11/2013 N.D. 2 8095 4/2/2013 4/5/2013 N.D. 2 | 15.71 31.42 | 15.71 |
| 8194 5/14/2013 5/17/2013 N.D. 2 | 15.71 31.42 | 15.71 |
| 8268 6/10/2013 6/14/2013 N.D. 2 | 15.71 31.42 | 15.71 |

| | | | IV | lethane (| CH₄) | | | |
|----------|--------------|-------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3172 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3209 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3277 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3336 3401 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 17.99 23.74 | 35.98 47.48 | 17.99 23.74 |
| | 3449 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3505 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3578 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3617 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3712 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3773 3834 | 2/9/2009 3/12/2009 | 2/13/2009 3/27/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 3911 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3979 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4044 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4110 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4169 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4240 4337 | 9/1/2009 | 9/4/2009 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 4379 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4469 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4630 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4728 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4796 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4962 5086 | 4/21/2010 5/26/2010 | 4/28/2010 5/28/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 5121 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5259 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5352 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5478 | 9/21/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Panel 3 | 5537 5630 | | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 3e | 5749 | 11/8/2010 12/14/2010 | 11/15/2010 12/20/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 |
| | 5847 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5933 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6021 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6134 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6216 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6316 6430 | 6/14/2011 7/18/2011 | 6/21/2011 7/22/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 |
| | 6498 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6576 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6649 | 10/17/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6721 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6776 6861 | 1/9/2012 | 12/9/2011 1/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 6964 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7014 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7087 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7165 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7238 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7365 7423 | 7/16/2012 8/6/2012 | 7/23/2012 8/10/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 7508 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7619 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7689 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7775 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7868 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7931 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8004 8090 | 3/5/2013 4/2/2013 | 3/11/2013 4/5/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 |
| | 8189 | 5/13/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8263 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |

| Cocation Date Dat | | | | N | lethane (| CH₄) | | | |
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| 6140 4/19/2011 4/26/2011 N.D. 2 23.97 47.94 23.97 6222 5/10/2011 5/13/2011 N.D. 2 23.97 47.94 23.97 6322 6/15/2011 6/21/2011 N.D. 2 23.97 47.94 23.97 6438 7/19/2011 7/22/2011 N.D. 2 23.97 47.94 23.97 6504 8/16/2011 8/22/2011 N.D. 2 23.97 47.94 23.97 6582 9/20/2011 9/27/2011 N.D. 2 23.97 47.94 23.97 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | - | | | | | | | _ | |
| 6222 5/10/2011 5/13/2011 N.D. 2 23.97 47.94 23.97 6322 6/15/2011 6/21/2011 N.D. 2 23.97 47.94 23.97 6438 7/19/2011 7/22/2011 N.D. 2 23.97 47.94 23.97 6504 8/16/2011 8/22/2011 N.D. 2 23.97 47.94 23.97 6582 9/20/2011 9/27/2011 N.D. 2 23.97 47.94 23.97 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 6322 6/15/2011 6/21/2011 N.D. 2 23.97 47.94 23.97 6438 7/19/2011 7/22/2011 N.D. 2 23.97 47.94 23.97 6504 8/16/2011 8/22/2011 N.D. 2 23.97 47.94 23.97 6582 9/20/2011 9/27/2011 N.D. 2 23.97 47.94 23.97 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | İ | | | | | 2 | | 47.94 | |
| 6504 8/16/2011 8/22/2011 N.D. 2 23.97 47.94 23.97 6582 9/20/2011 9/27/2011 N.D. 2 23.97 47.94 23.97 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | | 6322 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | |
| 6582 9/20/2011 9/27/2011 N.D. 2 23.97 47.94 23.97 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | | | | | | | | 1 | |
| 6657 10/18/2011 10/25/2011 N.D. 2 23.97 47.94 23.97 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | - | | | | | | | | |
| 6727 11/8/2011 11/11/2011 N.D. 2 23.97 47.94 23.97 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 6782 12/6/2011 12/9/2011 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| | | | | | | | | | |
| | | 6867 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| 6970 2/16/2012 2/22/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7020 3/6/2012 3/9/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7093 4/3/2012 4/9/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | 1 | |
| 7171 5/1/2012 5/4/2012 N.D. 2 17.45 34.9 17.45 7244 6/5/2012 6/8/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7371 7/17/2012 7/23/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7429 8/6/2012 8/10/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7514 9/4/2012 9/7/2012 N.D. 2 17.45 34.9 17.45 | | | 9/4/2012 | 9/7/2012 | | 2 | 17.45 | | |
| 7625 10/9/2012 10/16/2012 N.D. 2 17.45 34.9 17.45 | | | | | | | | | |
| 7695 11/6/2012 11/9/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 7781 12/4/2012 12/7/2012 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 7874 1/8/2013 1/14/2013 N.D. 2 15.71 31.42 15.71 7937 2/5/2013 2/8/2013 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 8010 3/5/2013 3/11/2013 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 8096 4/2/2013 4/5/2013 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 8195 5/14/2013 5/17/2013 N.D. 2 15.71 31.42 15.71 | | | | | | | | | |
| 8269 6/10/2013 6/14/2013 N.D. 2 15.71 31.42 15.71 | | 8269 | 6/10/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |

| | | | IV | lethane (| CH₄) | | | |
|----------|--------------|-------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3164 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3208 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3276 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3335 3400 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 17.99 23.74 | 35.98 47.48 | 17.99 23.74 |
| | 3448 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3504 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3577 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3616 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3711 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3772 3833 | 2/9/2009 3/12/2009 | 2/13/2009 3/27/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 3910 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3978 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4043 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4111 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4170 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4241 4338 | 9/1/2009 10/13/2009 | 9/4/2009 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 4380 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4470 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4631 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4729 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4797 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4963 5087 | 4/21/2010 5/26/2010 | 4/28/2010 5/28/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 5122 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5260 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5353 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5479 | 9/21/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Panel 3 | 5538 5631 | | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 2e | 5750 | 11/8/2010 12/14/2010 | 11/15/2010 12/20/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 |
| | 5848 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5934 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6022 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6135 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6217 6317 | 5/10/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6431 | 6/14/2011 7/18/2011 | 6/21/2011 7/22/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 |
| | 6499 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6577 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6650 | 10/17/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6722 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6777 6862 | 12/5/2011 1/9/2012 | 12/9/2011 1/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 6965 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7015 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7088 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7166 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7239 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7366 7424 | 7/16/2012 8/6/2012 | 7/23/2012 8/10/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 7509 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7620 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7690 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7776 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7869 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7932 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8005 8091 | 3/5/2013 4/2/2013 | 3/11/2013 4/5/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 |
| | 8190 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8264 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |

| | | | N | lethane (| CH₄) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|--------------------|----------------|------------------------------|------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL | Concentration for Statistical Evaluation |
| | | | | | | | (ppmv) | (ppmv) |
| | 3162 | 4/24/2008 | | N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3217 3285 | 5/14/2008 6/17/2008 | 5/23/2008 6/25/2008 | N.D. N.D. | 2 | 17.99 | 35.98 | 17.99 |
| | 3344 | 7/15/2008 | 7/22/2008 | N.D. | 2 | 17.99 17.99 | 35.98 35.98 | 17.99 17.99 |
| | 3408 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3456 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3512 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3585 | | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3624 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3713 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3780 | 2/10/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3835 | 3/12/2009 | 3/27/2009 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 3912 3980 | 4/13/2009 5/12/2009 | 5/15/2009 | N.D. N.D. | 2 | 23.74 23.74 | 47.48 47.48 | 23.74 23.74 |
| | 4051 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4118 | 7/8/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4179 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4248 | 9/2/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4345 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4387 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4477 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4638 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4736 4804 | 2/18/2010 3/10/2010 | 2/23/2010 3/12/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 |
| | 4970 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5094 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5129 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5267 | 7/14/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5360 | 8/10/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5486 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Panel 3 | 5544 | | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 2i | 5637 | 11/9/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5756 | 12/15/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5854 5940 | 1/19/2011 2/15/2011 | 1/24/2011 2/21/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 |
| | 6028 | 3/9/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6141 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6223 | 5/10/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6323 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6439 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6505 | 8/16/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6583 | 9/20/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6658 | 10/18/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6728 | 11/8/2011 | 11/11/2011 | N.D. N.D. | 2 | 23.97 17.45 | 47.94 | 23.97 |
| | 6783 6868 | 12/6/2011 1/10/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 34.9 | 17.45 17.45 |
| | 6971 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7021 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7094 | 4/3/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7172 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7245 | 6/5/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7372 | 7/17/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7430 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7515 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 |
| | 7626 7696 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 15.71 |
| | 7696 7782 | 11/6/2012 12/4/2012 | 11/9/2012 12/7/2012 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 |
| | 7875 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 7938 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8011 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8097 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8196 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |
| | 8270 | 6/10/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| | 3163 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3207 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3293 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3334 3399 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 17.99 23.74 | 35.98 47.48 | 17.99 23.74 | | | |
| | 3447 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3503 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3575 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3614 3709 | 1/12/2009 | 1/21/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 | | | |
| | 3770 | 2/9/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3831 | 3/11/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3908 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3976 4041 | 5/12/2009 6/1/2009 | 5/15/2009 6/8/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 | | | |
| | 4112 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4172 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4242 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4339 4381 | 10/13/2009 | 10/15/2009 11/12/2009 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 | | | |
| | 4471 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4632 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4730 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4798 | 3/10/2010 4/21/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4964 5088 | 5/26/2010 | 4/28/2010 5/28/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 | | | |
| | 5123 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5261 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5354 | 8/10/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5480 5539 | 9/21/2010 | 9/27/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | |
| Panel 3 | 5632 | 11/9/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| Room 1e | 5751 | 12/15/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5849 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5935 6023 | 2/15/2011 3/9/2011 | 2/21/2011 3/11/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 | | | |
| | 6136 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6218 | 5/10/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6318 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6433 6506 | 7/19/2011 8/16/2011 | 7/22/2011 8/22/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 | | | |
| | 6584 | 9/20/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6659 | 10/18/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6729 | 11/8/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6784 6869 | 1/10/2012 | 12/9/2011 1/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 | | | |
| | 6972 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7022 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7095 | 4/3/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7173 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7246 7373 | 6/5/2012 7/17/2012 | 6/8/2012 7/23/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 | | | |
| | 7431 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7516 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7627 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7697 7783 | 11/6/2012 12/4/2012 | 11/9/2012 12/7/2012 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | |
| | 7876 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7939 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8012 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8098 | 4/2/2013 | 4/5/2013 | N.D. N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8197 8271 | 5/14/2013 6/10/2013 | 5/17/2013 6/14/2013 | N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | |
| | 0271 | 3/10/2013 | 3/17/2013 | IV.D. | 2 | 10.71 | 31.42 | 10.71 | | | |

| | Methane (CH₄) | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | |
| Panel 3 | 3169 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| | 3216 | 5/19/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| Room 1i | 3284 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |

| Methane (CH ₄) | | | | | | | | | | | |
|----------------------------|--------------|------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| | 3165 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3215 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3283 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3342 | 7/15/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3407 3455 | 8/20/2008 9/8/2008 | 8/22/2008 9/12/2008 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 | | | |
| | 3511 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3584 | | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3623 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3716 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3779 | 2/9/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3838 | 3/12/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3915 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 23.74 | | | |
| | 3983 4049 | 5/12/2009 6/2/2009 | 5/15/2009 6/8/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 | | | |
| | 4105 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4164 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4235 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4332 | 10/12/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4374 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4464 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4625 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 | | | |
| | 4723 4789 | 2/17/2010 3/9/2010 | 2/23/2010 3/12/2010 | N.D. N.D. | 2 | 22.21 | 44.42 | 22.21 22.21 | | | |
| | 4957 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5081 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5116 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5254 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5347 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| Donal 2 | 5474 | 9/21/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| Panel 3 Location | 5533 5626 | 11/8/2010 | 10/18/2010 11/15/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | |
| EBW | 5745 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5843 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5929 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6017 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6130 | 4/18/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6212 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6312 6432 | 6/14/2011 7/18/2011 | 6/21/2011 7/22/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | | |
| | 6500 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6578 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6652 | 10/17/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6723 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6778 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 6863 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 6966 7016 | 2/16/2012 3/6/2012 | 2/22/2012 3/9/2012 | N.D. | 2 | 17.45 17.45 | 34.9 | 17.45 17.45 | | | |
| | 7016 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 34.9 | 17.45 | | | |
| | 7167 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7240 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7367 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7425 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7510 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7621 7691 | 10/9/2012 11/6/2012 | 10/16/2012 | N.D. N.D. | 2 | 17.45 15.71 | 34.9 31.42 | 17.45 15.71 | | | |
| | 7691 | 12/4/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7870 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7933 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8006 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8092 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8191 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8265 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|-------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | | |
| | 3167 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3214 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3282 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | | |
| | 3341 3406 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 17.99 23.74 | 35.98 47.48 | 17.99 23.74 | | | | |
| | 3454 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3510 | 10/6/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3583 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3622 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3715 3778 | 1/12/2009 2/9/2009 | 1/21/2009 2/13/2009 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 | | | | |
| | 3837 | 3/12/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3914 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 3982 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4050 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4104 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 | | | | |
| | 4163 4234 | 8/5/2009 9/1/2009 | 8/13/2009 9/4/2009 | N.D. N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4331 | 10/12/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4373 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4463 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4624 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4722 4788 | 2/17/2010 | 2/23/2010 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 | | | | |
| | 4956 | 3/9/2010 4/20/2010 | 3/12/2010 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5080 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5115 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5253 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5346 | 8/9/2010 | 8/17/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| Panel 3 | 5473 5532 | 9/21/2010 10/11/2010 | 9/27/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | | |
| Location | 5625 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| EBA | 5744 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5842 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5928 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6016 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6129 6211 | 4/18/2011 5/9/2011 | 4/26/2011 5/13/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | | | |
| | 6311 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6435 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6501 | 8/16/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6579 | 9/20/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6653 6724 | 10/17/2011 11/7/2011 | 10/25/2011 11/11/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | | | |
| | 6779 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 6864 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 6967 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7017 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7090 | 4/3/2012 5/1/2012 | 4/9/2012 5/4/2012 | N.D. N.D. | 2 | 17.45 | 34.9 | 17.45 17.45 | | | | |
| | 7168 7241 | 6/5/2012 | 6/8/2012 | N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 | | | | |
| | 7368 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7426 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7511 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7622 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7692 | 11/6/2012 12/4/2012 | 11/9/2012 12/7/2012 | N.D. | 2 | 15.71 | 31.42 31.42 | 15.71 | | | | |
| | 7778 7871 | 1/8/2013 | 1/14/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 | 15.71 15.71 | | | | |
| | 7934 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8007 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8093 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8192 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8266 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |

| Methane (CH₄) | | | | | | | | | | |
|---------------|--------------|-------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | |
| | 3173 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| | 3224 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| | 3292 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| | 3350 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | |
| | 3414 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3462 3518 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3516 | 10/8/2008 11/13/2008 | | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 | | |
| | 3630 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3725 | 1/14/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3786 | 2/11/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3840 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3924 | 4/15/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 3992 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4040 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4103 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4181 4250 | 8/6/2009 9/2/2009 | 8/13/2009 9/4/2009 | N.D. N.D. | 2 | 22.21 | 44.42 44.42 | 22.21 22.21 | | |
| | 4347 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4372 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4479 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4640 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4738 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4795 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5078 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5130 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5252 5362 | 7/13/2010 8/10/2010 | 7/19/2010 8/17/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | |
| | 5487 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5531 | 10/11/2010 | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| Panel 3 | 5624 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| Location | 5743 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| IBW | 5841 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5927 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6015 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6128 | 4/18/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6210 6309 | 5/9/2011 6/14/2011 | 5/13/2011 6/21/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | |
| | 6426 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6494 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6571 | 9/19/2011 | | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6654 | 10/18/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6716 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6771 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 6857 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 6959 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7009 7083 | 3/6/2012 4/2/2012 | 3/9/2012 4/9/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 | | |
| | 7161 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7234 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7361 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7419 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7504 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7615 | 10/8/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | |
| | 7686 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7772 7865 | 12/3/2012 | 12/7/2012 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | |
| | 7928 | 1/8/2013 2/5/2013 | 1/14/2013 2/8/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8001 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8087 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8186 | 5/13/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8260 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |

| Methane (CH₄) | | | | | | | | | | | |
|---------------|--------------|------------------------|-------------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| | 3168 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3223 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3291 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3349 | 7/16/2008 | 7/22/2008 | N.D. | 2 | 17.99 | 35.98 | 17.99 | | | |
| | 3413 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3461 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3517 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3590 3629 | 12/3/2008 | 11/18/2008 12/6/2008 | N.D. N.D. | 2 | 23.74 | 47.48 47.48 | 23.74 23.74 | | | |
| | 3724 | 1/14/2009 | 1/21/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3785 | 2/11/2009 | 2/13/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3839 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3923 | 4/15/2009 | 4/22/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 3991 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4039 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4102 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4180 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4249 4346 | 9/2/2009 10/13/2009 | 9/4/2009 | N.D. N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 22.21 | | | |
| | 4371 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4478 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4639 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4737 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4794 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4954 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5079 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5131 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5251 | 7/13/2010 8/10/2010 | 7/19/2010 | N.D. N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5361 5488 | 9/22/2010 | 8/17/2010 9/27/2010 | N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | |
| Panel 3 | 5530 | | 10/18/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| Location | 5623 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| IBA | 5742 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5840 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5926 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6014 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6127 | 4/18/2011 | 4/26/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6209 6310 | 5/9/2011 6/14/2011 | 5/13/2011 6/21/2011 | N.D. N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | | |
| | 6425 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6493 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6572 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6655 | 10/18/2011 | 10/25/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6717 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6772 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 6856 | 1/9/2012 2/16/2012 | 1/13/2012 2/22/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 | | | |
| | 6960 7010 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 17.45 | | | |
| | 7010 | 4/2/2012 | 4/9/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7160 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7233 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7360 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7418 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7503 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7614 | 10/8/2012 | 10/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | |
| | 7685 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7771 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7864 7927 | 1/8/2013 2/5/2013 | 1/14/2013 2/8/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | |
| | 8000 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8086 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8185 | 5/13/2013 | 5/17/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8259 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

Appendix D

Panel 4 Methane Data

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4032 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4069 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4139 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4200 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4274 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4315 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4404 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4531 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4595 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4680 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4833 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4915 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5050 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5175 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5310 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5396 5450 | 8/24/2010 9/13/2010 | 8/30/2010 9/20/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | | |
| | 5569 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5661 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5718 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5816 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5892 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5980 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6083 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Panel 4 | 6182 | 5/3/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Room 7e | 6333 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6409 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6477 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6553 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6627 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6700 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6804 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 6890 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 6942 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7043 7113 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 | | | | |
| | 7113 | 4/10/2012 5/9/2012 | 4/13/2012 | N.D. N.D. | 2 | | 34.9 | 17.45 | | | | |
| | 7191 | 6/11/2012 | 5/15/2012 6/18/2012 | N.D. | 2 | 17.45 17.45 | 34.9 | 17.45 17.45 | | | | |
| | 7341 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7457 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7535 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7581 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7721 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7809 | 12/11/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7896 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7963 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8035 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8109 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8168 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8252 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4028 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4073 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4130 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4191 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4265 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4306 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4413 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4522 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4586 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4671 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4824 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4925 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5041 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5166 | 6/14/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5301 | 7/26/2010 | 8/2/2010 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5387 5441 | 8/24/2010 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | | |
| | 5560 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5652 | 11/15/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5709 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5807 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5881 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5971 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6074 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Panel 4 | 6173 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Room 7i | 6324 | 6/15/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6400 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6461 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6544 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6618 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6691 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6795 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 6881 6933 | 1/17/2012 2/7/2012 | 1/23/2012 2/10/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.9 34.9 | 17.45 17.45 | | | | |
| | 7034 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7104 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7182 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7261 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7332 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7448 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7526 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7572 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.9 | 17.45 | | | | |
| | 7712 | 11/12/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7800 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7887 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7954 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| - | 8026 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8100 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8159 8243 | 5/7/2013 6/3/2013 | 5/10/2013 6/7/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | | |
| | 0243 | 0/3/2013 | 0///2013 | IN.D. | | 13.71 | 31.42 | 15.71 | | | | |

| | | | N | Methane (| CH₄) | | | |
|----------|--------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|--------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) |
| | 4031 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4068 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 |
| | 4140 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4201 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4275 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4316 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4403 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4532 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4596 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4681 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4834 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 4916 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5051 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 |
| | 5176 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5311 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Panel 4 | 5397 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| Room 6e | 5451 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5570 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5662 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5719 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 |
| | 5817 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5893 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 5981 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6084 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6183 | 5/3/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6334 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6410 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6478 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6554 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6628 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |
| | 6701 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 |

| | Methane (CH₄) | | | | | | | | | | | |
|------------|---------------|-------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4027 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4072 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4131 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4192 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4266 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4307 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4412 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4523 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4587 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4672 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4825 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4926 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5042 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5167 | 6/14/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5302 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5388 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5442 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5561 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5653 5710 | 11/15/2010 12/7/2010 | 11/22/2010 12/13/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 | 21.39 21.39 | | | | |
| | 5808 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 42.78 47.94 | 23.97 | | | | |
| | 5882 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5972 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6075 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Panel 4 | 6174 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Room 6i | 6325 | 6/15/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| 1100111 01 | 6401 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6469 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6545 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6619 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6692 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6796 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6882 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6934 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7035 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7105 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7183 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7262 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7333 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7449 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7527 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7573 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7713 | 11/12/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7801 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7888 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7955 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8027 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8101 8160 | 4/9/2013 5/7/2013 | 4/12/2013 5/10/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | | |
| | 8244 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 0244 | 0/3/2013 | 0///2013 | IN.D. | | 15.71 | 31.42 | 10.71 | | | | |

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4030 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4067 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4141 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4202 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4276 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4317 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4402 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4533 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4597 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4682 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4835 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4917 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5052 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5177 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5312 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5398 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5452 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5571 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| Panel 4 | 5663 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| Room 5e | 5720 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| Koom se | 5818 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5894 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5982 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6085 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6184 | 5/3/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6335 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6411 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6479 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6557 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6629 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6702 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6806 | 12/13/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6892 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6943 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7044 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7114 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7192 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7271 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7342 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|--------------------------|--------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4026 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4071 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4132 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4193 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4267 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4308 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4411 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4524 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4588 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4673 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4826 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4927 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5043 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5168 | 6/14/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5303 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5389 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5443 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5562 5654 | 10/19/2010 11/15/2010 | 10/25/2010 11/22/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | | |
| | 5711 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | + | 21.39 | | | | |
| | 5809 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 42.78 47.94 | 23.97 | | | | |
| | 5883 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 5973 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6076 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Panel 4 | 6175 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Room 5i | 6326 | 6/15/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6402 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6470 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6546 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6620 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6693 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6797 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6883 6935 | 1/17/2012 2/7/2012 | 1/23/2012 2/10/2012 | N.D. | 2 | 17.45 17.45 | 34.90 34.90 | 17.45 17.45 | | | | |
| | 7036 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7106 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7184 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7263 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7334 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7450 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7528 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7574 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7714 | 11/12/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7802 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7889 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7956 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| - | 8028 8102 | 3/12/2013 4/9/2013 | 3/15/2013 4/12/2013 | N.D. N.D. | 2 | 15.71 15.71 | 31.42 31.42 | 15.71 15.71 | | | | |
| | 8161 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8245 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 0240 | 0/0/2010 | V1112010 | 11.0. | _ | 10.71 | UIITE | 1017 1 | | | | |

| Methane (CH₄) | | | | | | | | | | | |
|---------------|--------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4029 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4066 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4142 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4203 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4277 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4318 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4401 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4534 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4598 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4683 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| Panel 4 | 4836 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| Room 4e | 4918 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| 1100111 40 | 5053 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5178 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5313 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5399 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5453 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5572 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5664 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5721 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5819 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5895 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5983 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |

| Methane (CH₄) | | | | | | | | | | | |
|---------------|--------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4025 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4070 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4133 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4194 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4268 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4309 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4410 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4525 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4589 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4674 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4827 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 22.21 | 44.42 44.42 | 22.21 | | | |
| | 4928 | 4/14/2010 | 4/20/2010 | N.D. | 2 | | | | | | |
| | 5044 5169 | 5/17/2010 6/14/2010 | 5/24/2010 6/21/2010 | N.D. N.D. | 2 | 22.21 21.39 | 44.42 42.78 | 22.21 21.39 | | | |
| | 5304 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5390 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5444 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5563 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5655 | 11/15/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5712 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5810 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5884 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5974 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6077 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Room 4i | 6176 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6327 6403 | 6/15/2011 7/11/2011 | 6/24/2011 7/15/2011 | N.D. N.D. | 2 2 | 23.97 23.97 | 47.94 47.94 | 23.97 | | | |
| | 6471 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6547 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6621 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6694 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6798 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6884 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6936 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7037 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7107 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7185 | 5/8/2012 | 5/15/2012 | N.D. | 2 2 | 17.45 | 34.90 34.90 | 17.45 | | | |
| | 7264 7335 | 6/11/2012 7/10/2012 | 6/18/2012 7/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.90 | 17.45 17.45 | | | |
| | 7451 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7529 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7575 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7715 | 11/12/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7803 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7890 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7957 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| - | 8029 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8103 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8162 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8246 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| | Methane (CH₄) | | | | | | | | | | | |
|----------|---------------|------------------------|-------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | | |
| | 4019 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4077 | 6/10/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | | |
| | 4143 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4204 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4278 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4319 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4400 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4535 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4599 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4684 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4837 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 4919 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5054 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | | |
| | 5179 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5314 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5400 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5454 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5573 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5665 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | | |
| | 5722 5820 | 12/8/2010 1/12/2011 | 12/13/2010 1/18/2011 | N.D. | 2 | 21.39 23.97 | 42.78 | 21.39 23.97 | | | | |
| | 5896 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 47.94 | 23.97 | | | | |
| | 5984 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6087 | 4/6/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Panel 4 | 6185 | 5/3/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| Room 3e | 6336 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6412 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6480 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6558 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6630 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6703 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | | |
| | 6807 | 12/13/2011 | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6893 | 1/17/2012 | | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 6944 7045 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 17.45 | 34.90 34.90 | 17.45 | | | | |
| | 7115 | 3/13/2012 4/10/2012 | 3/16/2012 4/13/2012 | N.D. N.D. | 2 | 17.45 | 34.90 | 17.45 17.45 | | | | |
| | 7113 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7272 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7343 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7459 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7536 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7582 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | | |
| | 7722 | 11/13/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7810 | 12/11/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7897 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 7964 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8036 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8110 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8169 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |
| | 8253 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | | |

| Methane (CH₄) | | | | | | | | | | |
|---------------|--------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | |
| | 4024 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4079 | 6/10/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4134 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4195 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4269 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4310 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4409 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4526 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4590 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4675 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4828 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4929 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5045 5170 | 5/17/2010 6/15/2010 | 5/24/2010 6/21/2010 | N.D. | 2 | 22.21 21.39 | 44.42 42.78 | 22.21 21.39 | | |
| | 5305 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5391 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5445 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5564 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5656 | 11/15/2010 | | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5713 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5811 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5885 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5975 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6078 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Panel 4 | 6177 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Room 3i | 6328 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6404 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6472 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6548 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6622 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6695 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6799 | | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6885 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6937 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7038 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7108 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7186 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7265 | 6/11/2012 7/10/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7336 7452 | 8/13/2012 | 7/13/2012 8/17/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.90 34.90 | 17.45 17.45 | | |
| | 7530 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7576 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7716 | 11/12/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7804 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7891 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7958 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8030 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8104 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8163 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8247 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4018 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4076 | 6/10/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4144 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4205 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4279 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4320 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4399 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4536 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4600 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4685 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4838 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4920 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5055 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5180 5315 | 6/16/2010 7/27/2010 | 6/21/2010 8/2/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | | |
| | 5401 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5455 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5574 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5666 | 11/16/2010 | | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5723 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5821 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5897 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5985 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6088 | 4/6/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6186 | 5/3/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Room 2e | 6337 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6413 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6481 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6559 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6631 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6704 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6808 | | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6894 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6945 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7046 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7116 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7194 7273 | 5/9/2012 6/11/2012 | 5/15/2012 6/18/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.90 | 17.45 17.45 | | | |
| | 7344 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 34.90 | 17.45 | | | |
| | 7460 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7537 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7583 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7723 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7811 | 12/11/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7898 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7965 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8037 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8111 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8170 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8254 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|----------------------|-----------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4023 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4078 | 6/10/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4135 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4196 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4270 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4311 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4408 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4527 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4591 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4676 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4829 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4930 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5046 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5171 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5306 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5392 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5446 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5565 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5657 | 11/15/2010 | | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5714 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5812 5886 | 1/11/2011 | 1/18/2011 | N.D. N.D. | 2 | 23.97 | 47.94 47.94 | 23.97 | | | |
| | 5976 | 2/1/2011 3/1/2011 | 2/10/2011 3/4/2011 | N.D. | 2 | 23.97 23.97 | 47.94 | 23.97 | | | |
| | 6079 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6178 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Room 2i | 6329 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| ROOM 21 | 6405 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6473 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6549 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6623 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6696 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6800 | | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6886 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6938 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7039 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7109 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7187 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7266 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7337 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7453 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7531 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7577 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7717 | 11/12/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7805 | 12/10/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7892 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7959 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8031 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8105 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8164 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8248 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| Methane (CH₄) | | | | | | | | | | |
|---------------|--------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | |
| | 4016 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4074 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4145 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4206 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4280 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4321 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4397 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4537 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4601 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4686 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4839 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4923 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5056 | 5/18/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5181 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5316 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5402 5456 | 8/25/2010 9/14/2010 | 8/30/2010 9/20/2010 | N.D. N.D. | 2 | 21.39 21.39 | 42.78 42.78 | 21.39 21.39 | | |
| | 5575 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5667 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5724 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5822 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5890 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5986 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6089 | 4/6/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Panel 4 | 6187 | 5/4/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Room 1e | 6338 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6414 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6482 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6560 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6634 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6707 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6811 | 12/13/2011 | | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6897 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6948 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7049 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7119 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7197 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7276 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7347 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 17.45 | | |
| | 7463 7540 | 8/14/2012 | 8/17/2012 | N.D. | 2 | 17.45 17.45 | 34.90 | 17.45 | | |
| | 7586 | 9/10/2012 | 9/14/2012 | N.D. N.D. | 2 | 17.45 | 34.90 34.90 | 17.45 | | |
| | 7726 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7814 | 12/11/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7901 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7968 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8040 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8114 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8173 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8257 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|------------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4020 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4061 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4136 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4197 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4271 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4312 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4407 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4528 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4592 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4677 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4830 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4931 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5047 5172 | 5/17/2010 6/15/2010 | 5/24/2010 6/21/2010 | N.D. N.D. | 2 | 22.21 21.39 | 44.42 42.78 | 22.21 21.39 | | | |
| | 5307 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5393 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5447 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5566 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5658 | 11/15/2010 | | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5715 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5813 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5887 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5977 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6080 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6179 | 5/2/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Room 1i | 6330 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6406 | 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6474 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6550 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6624 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6697 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6801 | | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6887 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6939 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7040 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7110 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7188 7267 | 5/8/2012 | 5/15/2012 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7338 | 6/11/2012 7/10/2012 | 7/13/2012 | N.D. N.D. | 2 | 17.45 17.45 | 34.90 34.90 | 17.45 17.45 | | | |
| | 7454 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7532 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7578 | 10/1/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7718 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7806 | 12/10/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7893 | 1/14/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7960 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8032 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8106 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8165 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8249 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|------------------------|-----------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4015 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4065 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4147 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4208 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4282 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4323 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4396 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4539 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4603 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4688 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4841 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4921 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5058 | 5/18/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5183 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5318 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5404 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5458 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5577 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5669 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5726 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5824 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5898 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5988 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6091 | 4/6/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Location | 6189 | 5/4/2011 | 5/6/2011 6/24/2011 | N.D. N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| EBW | 6340 6416 | 6/16/2011 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 | | | |
| | 6484 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6562 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6632 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6705 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6809 | 12/13/2011 | | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6895 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6946 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7047 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7117 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7195 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7274 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7345 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7461 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7538 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7584 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7724 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7812 | 12/11/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7899 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7966 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8038 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8112 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8171 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8255 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| Methane (CH₄) | | | | | | | | | | |
|---------------|--------------|-----------------------|------------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | |
| | 4014 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4064 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4148 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4209 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4283 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4324 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4395 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4540 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4604 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4689 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4842 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4922 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5059 | 5/18/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5184 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5319 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5405 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5459 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5578 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5670 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5727 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5825 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5899 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5989 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Panel 4 | 6092 | 4/6/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Location | 6190 | 5/4/2011 | 5/6/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| EBA | 6341 6417 | 6/16/2011 | 6/24/2011 7/15/2011 | N.D. | 2 | 23.97 23.97 | 47.94 | 23.97 | | |
| | 6485 | 7/12/2011 8/9/2011 | 8/19/2011 | N.D. N.D. | 2 | 23.97 | 47.94 47.94 | 23.97 | | |
| | 6563 | | | N.D. | 2 | | 1 | | | |
| | 6633 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 47.94 | 23.97 | | |
| | 6706 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | | 12/13/2011 | | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6896 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6947 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7048 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7118 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7196 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7275 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7346 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7462 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7539 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7585 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7725 | 11/13/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7813 | 12/11/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7900 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7967 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8039 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8113 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8172 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8256 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |

| | Methane (CH₄) | | | | | | | | | | |
|----------|---------------|------------------------|-----------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | | |
| | 4022 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4063 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | | |
| | 4137 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4198 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4272 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4313 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4406 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4529 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4593 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4678 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4831 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 4932 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5048 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | | |
| | 5173 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5308 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5394 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5448 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5567 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5659 | 11/15/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5716 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | | |
| | 5814 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5888 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 5978 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Panel 4 | 6081 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| Location | 6180 | 5/3/2011 | 5/6/2011 6/24/2011 | N.D. N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| IBW | 6331 6407 | 6/16/2011 7/11/2011 | 7/15/2011 | N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 | | | |
| | 6475 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6551 | 9/13/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6625 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6698 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | | |
| | 6802 | 12/12/2011 | | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6888 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 6940 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7041 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7111 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7189 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7268 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7339 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7455 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7533 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7579 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | | |
| | 7719 | 11/13/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7807 | 12/10/2012 | | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7894 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 7961 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8033 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8107 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8166 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |
| | 8250 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | | |

| Methane (CH₄) | | | | | | | | | | |
|---------------|--------------|----------------------|-----------------------|-------------------------------|--------------------|----------------|----------------------------------------|--------------------------------------------------------|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution Corrected MDL (ppmv) | Concentration for Statistical Analysis (ppmv) | | |
| | 4021 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4062 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 23.74 | 47.48 | 23.74 | | |
| | 4138 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4199 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4273 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4314 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4405 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4530 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4594 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4679 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4832 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 4933 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5049 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 22.21 | 44.42 | 22.21 | | |
| | 5174 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5309 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5395 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5449 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5568 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5660 | 11/15/2010 | 11/22/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5717 | 12/7/2010 | 12/13/2010 | N.D. | 2 | 21.39 | 42.78 | 21.39 | | |
| | 5815 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5889 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 5979 | 3/1/2011 | 3/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| Panel 4 | 6082 6181 | 4/5/2011 5/3/2011 | 4/20/2011 5/6/2011 | N.D. | 2 | 23.97 23.97 | 47.94 47.94 | 23.97 23.97 | | |
| Location | 6332 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| IBA | 6408 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6476 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6552 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6626 | 10/10/2011 | 10/14/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6699 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 23.97 | 47.94 | 23.97 | | |
| | 6803 | | 12/16/2011 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6889 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 6941 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7042 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7112 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7190 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7269 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7340 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7456 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7534 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7580 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 17.45 | 34.90 | 17.45 | | |
| | 7720 | 11/13/2012 | 11/16/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7808 | 12/11/2012 | 12/14/2012 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7895 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 7962 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8034 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8108 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8167 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |
| | 8251 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 15.71 | 31.42 | 15.71 | | |

Appendix E

Panel 3 Hydrogen Data

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|----------------|------------------|-------------------------------|---------------------|---------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3176 | 4/24/2008 | 4/30/2008 | 59.74 | 2 | 10.79 | 21.58 | 59.74 |
| | 3213 | 5/15/2008 | 5/23/2008 | 86.52 | 2 | 10.79 | 21.58 | 86.52 |
| | 3281 | 6/19/2008 | 6/25/2008 | 103.78 | 2 | 10.79 | 21.58 | 103.78 |
| | 3340 | 7/16/2008 | 7/22/2008 | 178.92 | 2 | 10.79 | 21.58 | 178.92 |
| | 3405 | 8/19/2008 | 8/22/2008 | 353.02 | 2 | 14.93 | 29.86 | 353.02 |
| | 3453 | 9/10/2008 | 9/12/2008 | 209.46 | 2 | 14.93 | 29.86 | 209.46 |
| | 3509 | 10/8/2008 | 10/10/2008 | 352.68 | 2 | 14.93 | 29.86 | 352.68 |
| | 3582 | 11/13/2008 | 11/18/2008 | 146.54 | 2 | 14.93 | 29.86 | 146.54 |
| | 3621 | 12/3/2008 | 12/6/2008 | 89.50 | 2 | 14.93 | 29.86 | 89.50 |
| | 3720 | 1/13/2009 | 1/21/2009 | 83.18 | 2 | 14.93 | 29.86 | 83.18 |
| | 3777 | 2/10/2009 | 2/13/2009 | 53.76 | 2 | 14.93 | 29.86 | 53.76 |
| | 3844 | 3/11/2009 | 3/27/2009 | 53.88 | 2 | 14.93 | 29.86 | 53.88 |
| | 3919 | 4/14/2009 | 4/22/2009 | 51.82 | 2 | 14.93 | 29.86 | 51.82 |
| Panel 3 | 3990 | 5/12/2009 | 5/15/2009 | 88.94 | 2 | 14.93 | 29.86 | 88.94 |
| Room 7e | 4048 | 6/2/2009 | 6/8/2009 | 68.52 | 2 | 14.93 | 29.86 | 68.52 |
| | 4106 | 7/7/2009 | 7/10/2009 | 123.32 | 2 | 15.17 | 30.34 | 123.32 |
| | 4165 | 8/5/2009 | 8/13/2009 | 84.52 | 2 | 15.17 | 30.34 | 84.52 |
| | 4236 | 9/1/2009 | 9/4/2009 | 130.44 | 2 | 15.17 | 30.34 | 130.44 |
| | 4333 | 10/12/2009 | 10/15/2009 | 95.60 | 2 | 15.17 | 30.34 | 95.60 |
| | 4375 | 11/2/2009 | 11/12/2009 | 90.80 | 2 | 15.17 | 30.34 | 90.80 |
| | 4465 | 12/8/2009 | 12/15/2009 | 23.62 | 2 | 15.17 | 30.34 | 15.17 |
| | 4626 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4724 | 2/17/2010 | 2/23/2010 | 84.12 | 2 | 15.17 | 30.34 | 84.12 |
| | 4790 | 3/9/2010 | 3/12/2010 | 64.72 | 2 | 15.17 | 30.34 | 64.72 |
| | 4958 | 4/20/2010 | 4/28/2010 | 57.18 | 2 | 15.17 | 30.34 | 57.18 |
| | 5082 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5117 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5255 | 7/13/2010 | 7/19/2010 | 127.94 | 2 | 7.00 | 14.00 | 127.94 |

| | Hydrogen (H₂) | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| Panel 3 | 3175 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 | | | |
| Room 7i | 3222 | 5/19/2008 | 5/23/2008 | 10.40 | 2 | 10.79 | 21.58 | 10.79 | | | |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|------------------------|--------------------------|-------------------------------|---------------------|----------------|----------------------------------------|-------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3178 | 4/24/2008 | 4/30/2008 | 27.34 | 2 | 10.79 | 21.58 | 27.34 |
| | 3212 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3280 | 6/19/2008 | 6/25/2008 | 69.22 | 2 | 10.79 | 21.58 | 69.22 |
| | 3339 | 7/16/2008 | 7/22/2008 | 145.62 | 2 | 10.79 | 21.58 | 145.62 |
| | 3426 | 8/20/2008 | 8/22/2008 | 228.66 | 2 | 14.93 | 29.86 | 228.66 |
| | 3452 | 9/10/2008 | 9/12/2008 | 136.30 | 2 | 14.93 | 29.86 | 136.30 |
| | 3508 | 10/8/2008 | 10/10/2008 | 12.42 | 2 | 14.93 | 29.86 | 14.93 |
| | 3581 | 11/13/2008 | 11/18/2008 | 35.30 | 2 | 14.93 | 29.86 | 35.30 |
| | 3620 | 12/3/2008 | 12/6/2008 | 76.10 | 2 | 14.93 | 29.86 | 76.10 |
| | 3719 | 1/13/2009 | 1/21/2009 | 64.12 | 2 | 14.93 | 29.86 | 64.12 |
| | 3776 | 2/10/2009 | 2/13/2009 | 43.60 | 2 | 14.93 | 29.86 | 43.60 |
| | 3843 | 3/10/2009 | 3/27/2009 | 67.46 | 2 | 14.93 | 29.86 | 67.46 |
| | 3918 | 4/14/2009 | 4/22/2009 | 53.12 | 2 | 14.93 | 29.86 | 53.12 |
| | 3989 | 5/12/2009 | 5/15/2009 | 76.46 | 2 | 14.93 | 29.86 | 76.46 |
| | 4047 | 6/2/2009 | 6/8/2009 | 39.94 | 2 | 14.93 | 29.86 | 39.94 |
| | 4107 | 7/7/2009 | 7/10/2009 | 110.02 | 2 | 15.17 | 30.34 | 110.02 |
| | 4166 | 8/5/2009 | 8/13/2009 | 79.50 | 2 | 15.17 | 30.34 | 79.50 |
| | 4237 | 9/1/2009 | 9/4/2009 | 106.26 | 2 | 15.17 | 30.34 | 106.26 |
| | 4334 4376 | 10/12/2009 | 10/15/2009 | N.D. 51.54 | 2 | 15.17 15.17 | 30.34 | 15.17 |
| | 4466 | 11/2/2009 12/8/2009 | 11/12/2009 12/15/2009 | N.D. | 2 | 15.17 | 30.34 30.34 | 51.54 15.17 |
| | 4627 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4725 | 2/17/2010 | 2/23/2010 | 49.20 | 2 | 15.17 | 30.34 | 49.20 |
| | 4723 | 3/9/2010 | 3/12/2010 | 77.26 | 2 | 15.17 | 30.34 | 77.26 |
| | 4959 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5083 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| Panel 3 | 5118 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| Room 6e | 5256 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5349 | 8/9/2010 | 8/17/2010 | 97.04 | 2 | 7.00 | 14.00 | 97.04 |
| | 5475 | 9/21/2010 | 9/27/2010 | 114.26 | 2 | 7.00 | 14.00 | 114.26 |
| | 5534 | 10/11/2010 | 10/18/2010 | 98.94 | 2 | 7.00 | 14.00 | 98.94 |
| | 5627 | 11/8/2010 | 11/15/2010 | 93.20 | 2 | 7.00 | 14.00 | 93.20 |
| | 5746 | 12/14/2010 | 12/20/2010 | 92.60 | 2 | 7.00 | 14.00 | 92.60 |
| | 5844 | 1/18/2011 | 1/24/2011 | 140.32 | 2 | 14.03 | 28.06 | 140.32 |
| | 5930 | 2/15/2011 | 2/21/2011 | 62.32 | 2 | 14.03 | 28.06 | 62.32 |
| | 6018 | 3/8/2011 | 3/11/2011 | 87.88 | 2 | 14.03 | 28.06 | 87.88 |
| | 6131 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6213 | 5/9/2011 | 5/13/2011 | 48.58 | 2 | 14.03 | 28.06 | 48.58 |
| | 6313 | 6/14/2011 | 6/21/2011 | 53.46 | 2 | 14.03 | 28.06 | 53.46 |
| | 6427 | 7/18/2011 | 7/28/2011 | 36.06 | 2 | 14.03 | 28.06 | 36.06 |
| | 6495 | 8/15/2011 | 8/22/2011 | 76.68 | 2 | 14.03 | 28.06 | 76.68 |
| | 6573 | 9/19/2011 | 9/27/2011 | 46.88 | 2 | 14.03 | 28.06 | 46.88 |
| | 6646 | 10/17/2011 | 10/25/2011 | 38.82 | 2 | 14.03 | 28.06 | 38.82 |
| | 6718 | 11/7/2011 | 11/11/2011 | 32.08 | 2 | 14.03 | 28.06 | 32.08 |
| | 6773 6858 | 12/5/2011 1/9/2012 | 12/9/2011 1/13/2012 | 27.48 52.82 | 2 | 14.40 14.40 | 28.80 | 14.40 52.82 |
| | 6961 | 2/16/2012 | 2/22/2012 | 34.02 | 2 | 14.40 | 28.80 28.80 | 34.02 |
| | 7011 | 3/6/2012 | 3/9/2012 | 45.38 | 2 | 14.40 | 28.80 | 45.38 |
| | 7011 | 4/2/2012 | 4/9/2012 | 29.00 | 2 | 14.40 | 28.80 | 29.00 |
| | 7162 | 5/1/2012 | 5/4/2012 | 32.72 | 2 | 14.40 | 28.80 | 32.72 |
| | 7102 | 6/4/2012 | 6/8/2012 | 34.30 | 2 | 14.40 | 28.80 | 34.30 |
| | 7362 | 7/16/2012 | 7/23/2012 | 37.86 | 2 | 14.40 | 28.80 | 37.86 |
| | 7420 | 8/6/2012 | 8/10/2012 | 29.30 | 2 | 14.40 | 28.80 | 29.30 |
| _ | 7505 | 9/4/2012 | 9/7/2012 | 31.18 | 2 | 14.40 | 28.80 | 31.18 |
| | . 000 | U. 1/2012 | 0.772312 | 01110 | - | 7 11 70 | _0.00 | 31113 |

| | Hydrogen (H ₂) | | | | | | | | | | | |
|----------|----------------------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | | |
| | 3166 | 4/24/2008 | 4/30/2008 | 21.80 | 2 | 10.79 | 21.58 | 21.80 | | | | |
| | 3221 | 5/15/2008 | 5/23/2008 | 23.28 | 2 | 10.79 | 21.58 | 23.28 | | | | |
| | 3289 | 6/19/2008 | 6/25/2008 | 78.90 | 2 | 10.79 | 21.58 | 78.90 | | | | |
| | 3348 | 7/16/2008 | 7/22/2008 | 126.18 | 2 | 10.79 | 21.58 | 126.18 | | | | |
| | 3412 | 8/20/2008 | 8/22/2008 | 185.26 | 2 | 14.93 | 29.86 | 185.26 | | | | |
| | 3460 | 9/10/2008 | 9/12/2008 | 311.62 | 2 | 14.93 | 29.86 | 311.62 | | | | |
| | 3516 | 10/8/2008 | 10/10/2008 | 19.46 | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3589 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3628 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3723 | 1/14/2009 | 1/21/2009 | 25.66 | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3784 | 2/11/2009 | 2/13/2009 | 22.22 | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3847 | 3/11/2009 | 3/27/2009 | 27.96 | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 3922 | 4/14/2009 | 4/22/2009 | 32.58 | 2 | 14.93 | 29.86 | 32.58 | | | | |
| Panel 3 | 3986 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 | | | | |
| | 4055 | 6/2/2009 | 6/8/2009 | 28.90 | 2 | 14.93 | 29.86 | 14.93 | | | | |
| Room 6i | 4114 | 7/8/2009 | 7/10/2009 | 71.36 | 2 | 15.17 | 30.34 | 71.36 | | | | |
| | 4171 | 8/5/2009 | 8/13/2009 | 44.14 | 2 | 15.17 | 30.34 | 44.14 | | | | |
| | 4244 | 9/2/2009 | 9/4/2009 | 60.60 | 2 | 15.17 | 30.34 | 60.60 | | | | |
| | 4341 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4383 | 11/3/2009 | 11/12/2009 | 36.66 | 2 | 15.17 | 30.34 | 36.66 | | | | |
| | 4473 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4634 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4732 | 2/18/2010 | 2/23/2010 | 31.48 | 2 | 15.17 | 30.34 | 31.48 | | | | |
| | 4800 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4966 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 5090 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 5125 | 6/2/2010 | 6/7/2010 | 50.92 | 2 | 15.17 | 30.34 | 50.92 | | | | |
| | 5263 | 7/14/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 | | | | |
| | 5356 | 8/10/2010 | 8/17/2010 | 96.30 | 2 | 7.00 | 14.00 | 96.30 | | | | |

| 3211 | Sample Date 4/24/2008 5/14/2008 6/17/2008 6/17/2008 8/19/2008 10/8/2008 11/13/2008 11/13/2008 12/3/2008 12/3/2009 4/14/2009 5/12/2009 6/1/2009 10/12/2009 11/26/2009 11/26/2010 2/17/2010 3/9/2010 4/20/2010 | Analysis Date 4/30/2008 5/23/2008 6/25/2008 7/22/2008 8/22/2008 10/10/2008 11/18/2008 11/21/2009 2/13/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 11/12/2009 12/15/2009 12/15/2009 12/15/2009 | Reported Results (ppmv) 45.70 N.D. 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 12.40 N.D. | Dilution Factor 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | MDL (ppmv) 10.79 10.79 10.79 10.79 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 | Dilution corrected MDL (ppmv) 21.58 21.58 21.58 21.58 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | Concentration for Statistical Evaluation (ppmv) 45.70 10.79 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3211 8 3279 6 3338 3 3403 8 3451 9 3507 4 3580 1 3619 3718 7 3775 2 3842 3 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 7 4468 4726 2 4792 4960 4 5084 8 | 5/14/2008 6/17/2008 7/16/2008 8/19/2008 9/10/2008 10/8/2008 11/13/2008 11/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 | 5/23/2008 6/25/2008 7/22/2008 8/22/2008 9/12/2008 10/10/2008 11/18/2008 11/18/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 11/12/2009 12/15/2009 12/15/2009 12/15/2009 | N.D. 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 10.79 10.79 10.79 10.79 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 21.58 21.58 21.58 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 | 10.79 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3279 (3338 3403 4403 451 451 451 451 451 451 451 451 451 451 | 6/17/2008 7/16/2008 8/19/2008 9/10/2008 10/8/2008 11/13/2008 11/13/2008 11/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 | 6/25/2008 7/22/2008 8/22/2008 9/12/2008 10/10/2008 11/18/2008 12/6/2008 1/21/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 12/15/2009 2/2/2010 2/2/3/2010 | 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 10.79 10.79 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 21.58 21.58 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 | 91.62 156.04 221.24 207.98 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3338 3 3403 8 3451 9 3507 4 3580 1 3619 3718 6 3775 2 3842 3 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 6 4628 6 4726 2 4792 4960 4 5084 8 | 7/16/2008 8/19/2008 9/10/2008 10/8/2008 11/13/2008 11/13/2008 12/3/2008 12/3/2009 3/10/2009 4/14/2009 5/12/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 | 7/22/2008 8/22/2008 9/12/2008 10/10/2008 11/18/2008 12/6/2008 1/21/2009 3/27/2009 4/22/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 156.04 221.24 207.98 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 10.79 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 21.58 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | 156.04 221.24 207.98 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 |
| 3403 8 3451 9 3507 7 3580 1 3619 3 3775 2 3842 3917 4 3988 9 4046 4108 4167 4238 4335 1 4377 4467 7 4628 7 4628 7 4792 4960 4 5084 9 | 8/19/2008 9/10/2008 10/8/2008 11/13/2008 12/3/2008 1/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 11/2/2009 13/2009 13/2009 13/2009 13/2009 13/2009 13/2009 13/2009 13/2009 13/2010 | 8/22/2008 9/12/2008 10/10/2008 11/18/2008 12/6/2008 1/21/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 221.24 207.98 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 | 221.24 207.98 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3507 | 10/8/2008 11/13/2008 12/3/2008 1/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 1/26/2010 2/17/2010 | 10/10/2008 11/18/2008 12/6/2008 1/21/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 187.98 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 | 187.98 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3580 1 3619 3718 3775 2 3842 3 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 4628 4726 2 4792 4960 4 5084 6 | 11/13/2008 12/3/2008 1/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 | 11/18/2008 12/6/2008 1/21/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 101.64 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | 101.64 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3619 3718 3775 3842 3917 3988 4046 4108 4167 4238 4335 1 4377 4467 4628 4726 4792 4960 5084 | 12/3/2008 1/13/2009 2/10/2009 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 12/6/2008 1/21/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 66.24 61.18 N.D. 63.18 51.28 N.D. 42.80 102.20 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 | 66.24 61.18 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 |
| 3775 2 3842 3 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 4628 4726 2 4960 4 5084 6 | 2/10/2009 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 10/12/2009 11/2/2009 1/26/2010 2/17/2010 3/9/2010 | 1/21/2009 2/13/2009 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | N.D. 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 14.93 14.93 15.17 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | 14.93 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3842 3 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 4628 4 4726 2 4792 4960 4 5084 6 | 3/10/2009 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 10/12/2009 11/2/2009 11/2/2009 1/26/2010 2/17/2010 3/9/2010 | 3/27/2009 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 63.18 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 | 2 2 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 14.93 15.17 15.17 15.17 15.17 | 29.86 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | 63.18 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3917 4 3988 4 4046 4108 4167 4238 4335 1 4377 4467 4628 4726 4792 4960 4 5084 6 | 4/14/2009 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 11/2/2009 11/2/2009 11/2/2009 1/26/2010 2/17/2010 3/9/2010 | 4/22/2009 5/15/2009 6/8/2009 7/10/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 | 51.28 N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 12.40 | 2 2 2 2 2 2 2 2 2 | 14.93 14.93 14.93 15.17 15.17 15.17 15.17 | 29.86 29.86 29.86 30.34 30.34 30.34 30.34 | 51.28 14.93 42.80 102.20 57.74 59.18 15.17 |
| 3988 4046 4108 4167 4238 4335 1 4377 4467 4628 4726 2 4960 4 5084 8 | 5/12/2009 6/1/2009 7/7/2009 8/5/2009 9/1/2009 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 5/15/2009 6/8/2009 7/10/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | N.D. 42.80 102.20 57.74 59.18 N.D. 65.18 12.40 | 2 2 2 2 2 2 2 2 | 14.93 14.93 15.17 15.17 15.17 15.17 | 29.86 29.86 30.34 30.34 30.34 30.34 | 14.93 42.80 102.20 57.74 59.18 15.17 |
| 4108 4167 4238 4335 1 4377 4467 4628 4726 2 4792 4960 4 5084 8 | 7/7/2009 8/5/2009 9/1/2009 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 7/10/2009 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 102.20 57.74 59.18 N.D. 65.18 12.40 | 2 2 2 2 2 | 15.17 15.17 15.17 15.17 15.17 | 30.34 30.34 30.34 30.34 | 102.20 57.74 59.18 15.17 |
| 4167 4238 4335 1 4377 4467 4628 4726 2 4792 4960 4 5084 5 | 8/5/2009 9/1/2009 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 8/13/2009 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 57.74 59.18 N.D. 65.18 12.40 | 2 2 2 2 | 15.17 15.17 15.17 15.17 | 30.34 30.34 30.34 | 57.74 59.18 15.17 |
| 4238 4335 1 4377 4467 4628 4726 2 4792 4960 4 5084 5 | 9/1/2009 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 9/4/2009 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | 59.18 N.D. 65.18 12.40 | 2 2 2 | 15.17 15.17 15.17 | 30.34 30.34 | 59.18 15.17 |
| 4335 1 4377 4467 4628 4726 2 4792 4960 4 5084 5 | 10/12/2009 11/2/2009 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 10/15/2009 11/12/2009 12/15/2009 2/2/2010 2/23/2010 | N.D. 65.18 12.40 | 2 | 15.17 15.17 | 30.34 | 15.17 |
| 4467 4628 4726 4792 4960 5084 | 12/8/2009 1/26/2010 2/17/2010 3/9/2010 | 12/15/2009 2/2/2010 2/23/2010 | 12.40 | | | 30.34 | |
| 4628 4726 2 4792 4960 4 5084 5 | 1/26/2010 2/17/2010 3/9/2010 | 2/2/2010 2/23/2010 | | 2 | | | 65.18 |
| 4726 2 4792 4960 4 5084 8 | 2/17/2010 3/9/2010 | 2/23/2010 | N.D. | 0 | 15.17 15.17 | 30.34 | 15.17 |
| 4792 4960 5084 | 3/9/2010 | | 76.68 | 2 | 15.17 | 30.34 30.34 | 15.17 76.68 |
| 5084 | 4/20/2010 | 3/12/2010 | 61.28 | 2 | 15.17 | 30.34 | 61.28 |
| | | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| 5119 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 6/1/2010 7/13/2010 | 6/7/2010 7/19/2010 | N.D. 49.72 | 2 | 7.00 | 30.34 14.00 | 15.17 49.72 |
| | 8/9/2010 | 8/17/2010 | 101.44 | 2 | 7.00 | 14.00 | 101.44 |
| | 9/21/2010 | 9/27/2010 | 100.80 | 2 | 7.00 | 14.00 | 100.80 |
| Panel 3 | 10/11/2010 | 10/18/2010 | 80.42 | 2 | 7.00 | 14.00 | 80.42 |
| Room be | 11/8/2010 12/14/2010 | 11/15/2010 12/20/2010 | 50.66 89.50 | 2 | 7.00 7.00 | 14.00 14.00 | 50.66 89.50 |
| | 1/18/2011 | 1/24/2011 | 125.50 | 2 | 14.03 | 28.06 | 125.50 |
| | 2/15/2011 | 2/21/2011 | 69.84 | 2 | 14.03 | 28.06 | 69.84 |
| | 3/8/2011 | 3/11/2011 | 88.68 | 2 | 14.03 | 28.06 | 88.68 |
| | 4/19/2011 5/9/2011 | 4/26/2011 5/13/2011 | 47.86 51.18 | 2 | 14.03 14.03 | 28.06 28.06 | 47.86 51.18 |
| | 6/14/2011 | 6/21/2011 | 56.52 | 2 | 14.03 | 28.06 | 56.52 |
| | 7/18/2011 | 7/22/2011 | 50.44 | 2 | 14.03 | 28.06 | 50.44 |
| | 8/15/2011 9/19/2011 | 8/22/2011 | 59.04 | 2 | 14.03 | 28.06 | 59.04 |
| | 10/17/2011 | 9/27/2011 | 41.84 25.74 | 2 | 14.03 14.03 | 28.06 28.06 | 41.84 25.74 |
| 6719 | 11/7/2011 | 11/11/2011 | 32.00 | 2 | 14.03 | 28.06 | 32.00 |
| | 12/5/2011 | 12/9/2011 | 44.44 | 2 | 14.40 | 28.80 | 44.44 |
| | 1/9/2012 2/16/2012 | 1/13/2012 2/22/2012 | 51.44 22.48 | 2 | 14.40 14.40 | 28.80 28.80 | 51.44 14.40 |
| | 3/6/2012 | 3/9/2012 | 52.86 | 2 | 14.40 | 28.80 | 52.86 |
| 7085 | 4/2/2012 | 4/9/2012 | 43.68 | 2 | 14.40 | 28.80 | 43.68 |
| | 5/1/2012 | 5/4/2012 | 48.28 | 2 | 14.40 | 28.80 | 48.28 |
| | 6/4/2012 7/16/2012 | 6/8/2012 7/23/2012 | N.D. 29.78 | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 29.78 |
| | 8/6/2012 | 8/10/2012 | 44.24 | 2 | 14.40 | 28.80 | 44.24 |
| | 9/4/2012 | 9/7/2012 | 37.76 | 2 | 14.40 | 28.80 | 37.76 |
| | 10/8/2012 | 10/16/2012 | 32.84 | 2 | 14.40 | 28.80 | 32.84 |
| | 11/5/2012 12/3/2012 | 11/9/2012 12/7/2012 | 37.16 42.52 | 2 | 17.29 17.29 | 34.58 34.58 | 37.16 42.52 |
| | 1/8/2013 | 1/14/2013 | 38.90 | 2 | 17.29 | 34.58 | 38.90 |
| 7929 | 2/5/2013 | 2/8/2013 | 24.94 | 2 | 17.29 | 34.58 | 17.29 |
| | 3/5/2013 | 3/11/2013 | 18.64 | 2 | 17.29 | 34.58 | 17.29 |
| | 4/2/2013 5/13/2013 | 4/5/2013 5/17/2013 | 39.80 26.72 | 2 | 17.29 17.29 | 34.58 34.58 | 39.80 17.29 |
| | 6/9/2013 | 6/14/2013 | 25.48 | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|-------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3177 | 4/24/2008 | 4/30/2008 | 24.18 | 2 | 10.79 | 21.58 | 24.18 |
| | 3220 | 5/15/2008 | 5/23/2008 | 17.68 | 2 | 10.79 | 21.58 | 10.79 |
| | 3288 3347 | 6/19/2008 7/16/2008 | 6/25/2008 7/22/2008 | 60.62 | 2 | 10.79 10.79 | 21.58 21.58 | 60.62 |
| | 3411 | 8/19/2008 | 8/22/2008 | 166.08 247.14 | 2 | 14.93 | 29.86 | 166.08 247.14 |
| | 3459 | 9/10/2008 | 9/12/2008 | 220.32 | 2 | 14.93 | 29.86 | 220.32 |
| | 3515 | 10/8/2008 | 10/10/2008 | 57.40 | 2 | 14.93 | 29.86 | 57.40 |
| | 3588 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3627 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3722 3783 | 1/13/2009 2/11/2009 | 1/21/2009 2/13/2009 | 26.62 N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3846 | 3/11/2009 | 3/27/2009 | 16.56 | 2 | 14.93 | 29.86 | 14.93 |
| | 3921 | 4/14/2009 | 4/22/2009 | 18.66 | 2 | 14.93 | 29.86 | 14.93 |
| | 3985 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4054 | 6/2/2009 | 6/8/2009 | 32.80 | 2 | 14.93 | 29.86 | 32.80 |
| | 4115 | 7/8/2009 | 7/10/2009 | 99.70 | 2 | 15.17 | 30.34 | 99.70 |
| | 4176 4245 | 8/6/2009 9/2/2009 | 8/13/2009 9/4/2009 | 81.66 62.66 | 2 | 15.17 15.17 | 30.34 30.34 | 81.66 62.66 |
| | 4342 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4384 | 11/3/2009 | 11/12/2009 | 32.30 | 2 | 15.17 | 30.34 | 32.30 |
| | 4474 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4635 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4733 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4801 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4967 5091 | 4/21/2010 5/26/2010 | 4/28/2010 5/28/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 5126 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5264 | 7/14/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5357 | 8/10/2010 | 8/17/2010 | 93.94 | 2 | 7.00 | 14.00 | 93.94 |
| | 5483 | 9/22/2010 | 9/27/2010 | 96.22 | 2 | 7.00 | 14.00 | 96.22 |
| Panel 3 | 5541 | 10/12/2010 | 10/18/2010 | 46.98 | 2 | 7.00 | 14.00 | 46.98 |
| Room 5i | 5634 | 11/9/2010 12/15/2010 | 11/15/2010 | 54.98 | 2 | 7.00 | 14.00 | 54.98 |
| | 5753 5851 | 1/19/2011 | 1/24/2011 | 76.98 N.D. | 2 | 7.00 14.03 | 14.00 28.06 | 76.98 14.03 |
| | 5937 | 2/15/2011 | 2/21/2011 | 31.10 | 2 | 14.03 | 28.06 | 31.10 |
| | 6025 | 3/9/2011 | 3/11/2011 | 39.10 | 2 | 14.03 | 28.06 | 39.10 |
| | 6138 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6220 | 5/10/2011 | 5/13/2011 | 30.62 | 2 | 14.03 | 28.06 | 30.62 |
| | 6320 | 6/15/2011 | 6/21/2011 | 18.64 | 2 | 14.03 | 28.06 | 14.03 |
| | 6436 6502 | 7/19/2011 8/16/2011 | 7/22/2011 8/22/2011 | N.D. 49.46 | 2 | 14.03 | 28.06 28.06 | 14.03 49.46 |
| | 6580 | 9/20/2011 | 9/27/2011 | 27.16 | 2 | 14.03 | 28.06 | 14.03 |
| | 6651 | 10/17/2011 | 10/25/2011 | 15.38 | 2 | 14.03 | 28.06 | 14.03 |
| | 6725 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6780 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6865 | 1/10/2012 2/16/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 14.40 |
| | 6968 7018 | 3/6/2012 | 2/22/2012 3/9/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 |
| | 7010 | 4/3/2012 | 4/9/2012 | 12.68 | 2 | 14.40 | 28.80 | 14.40 |
| | 7169 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7242 | 6/5/2012 | 6/8/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7369 | 7/17/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7427 7512 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7623 | 9/4/2012 | 9/7/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7693 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7779 | 12/4/2012 | 12/7/2012 | 29.86 | 2 | 17.29 | 34.58 | 17.29 |
| | 7872 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7935 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8008 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8094 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8193 8267 | 5/14/2013 6/10/2013 | 5/17/2013 6/14/2013 | 29.56 N.D. | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 0201 | 3/10/2013 | 0/14/2013 | N.D. | 2 | 17.23 | 34.30 | 11.23 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3174 | 4/24/2008 | 4/30/2008 | 56.32 | 2 | 10.79 | 21.58 | 56.32 |
| | 3210 | 5/14/2008 | 5/23/2008 | 48.84 | 2 | 10.79 | 21.58 | 48.84 |
| | 3278 3337 | 6/17/2008 7/16/2008 | 6/25/2008 7/22/2008 | 20.00 54.12 | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 54.12 |
| | 3402 | 8/19/2008 | 8/22/2008 | 120.12 | 2 | 14.93 | 29.86 | 120.12 |
| | 3450 | 9/10/2008 | 9/12/2008 | 136.06 | 2 | 14.93 | 29.86 | 136.06 |
| | 3506 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3579 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3618 | 12/3/2008 | 12/6/2008 | 49.22 | 2 | 14.93 | 29.86 | 49.22 |
| | 3717 3774 | 1/13/2009 2/10/2009 | 1/21/2009 2/13/2009 | 55.40 35.76 | 2 | 14.93 14.93 | 29.86 29.86 | 55.40 35.76 |
| | 3841 | 3/10/2009 | 3/27/2009 | 47.92 | 2 | 14.93 | 29.86 | 47.92 |
| | 3916 | 4/14/2009 | 4/22/2009 | 35.76 | 2 | 14.93 | 29.86 | 35.76 |
| | 3987 | 5/12/2009 | 5/15/2009 | 15.26 | 2 | 14.93 | 29.86 | 14.93 |
| | 4045 | 6/1/2009 | 6/8/2009 | 41.08 | 2 | 14.93 | 29.86 | 41.08 |
| | 4109 | 7/7/2009 | 7/10/2009 | 91.98 | 2 | 15.17 | 30.34 | 91.98 |
| | 4168 | 8/5/2009 | 8/13/2009 | 52.92 | 2 | 15.17 | 30.34 | 52.92 |
| | 4239 4336 | 9/1/2009 | 9/4/2009 | 45.46 N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 45.46 15.17 |
| | 4378 | 11/2/2009 | 11/12/2009 | 54.43 | 2.1 | 15.17 | 31.86 | 54.43 |
| | 4468 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4629 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4727 | 2/17/2010 | 2/23/2010 | 63.46 | 2 | 15.17 | 30.34 | 63.46 |
| | 4793 | 3/9/2010 | 3/12/2010 | 43.46 | 2 | 15.17 | 30.34 | 43.46 |
| | 4961 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5085 5120 | 5/25/2010 6/1/2010 | 5/28/2010 6/7/2010 | 58.64 N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 58.64 15.17 |
| | 5258 | 7/13/2010 | 7/19/2010 | 39.14 | 2 | 7.00 | 14.00 | 39.14 |
| | 5351 | 8/9/2010 | 8/17/2010 | 99.22 | 2 | 7.00 | 14.00 | 99.22 |
| | 5477 | 9/21/2010 | 9/27/2010 | 90.04 | 2 | 7.00 | 14.00 | 90.04 |
| Panel 3 | 5536 | 10/11/2010 | 10/18/2010 | 85.22 | 2 | 7.00 | 14.00 | 85.22 |
| Room 4e | 5629 | 11/8/2010 | 11/15/2010 | 68.10 | 2 | 7.00 | 14.00 | 68.10 |
| | 5748 | 12/14/2010 | 12/20/2010 | 89.98 | 2 | 7.00 | 14.00 | 89.98 |
| | 5846 5932 | 1/18/2011 2/15/2011 | 1/24/2011 2/21/2011 | 132.24 66.56 | 2 | 14.03 14.03 | 28.06 28.06 | 132.24 66.56 |
| | 6020 | 3/8/2011 | 3/11/2011 | 58.04 | 2 | 14.03 | 28.06 | 58.04 |
| | 6133 | 4/19/2011 | 4/26/2011 | 43.64 | 2 | 14.03 | 28.06 | 43.64 |
| | 6215 | 5/9/2011 | 5/13/2011 | 55.34 | 2 | 14.03 | 28.06 | 55.34 |
| | 6315 | 6/14/2011 | 6/21/2011 | 43.96 | 2 | 14.03 | 28.06 | 43.96 |
| | 6429 | 7/18/2011 | 7/22/2011 | 55.78 | 2 | 14.03 | 28.06 | 55.78 |
| | 6497 6575 | 8/15/2011 | 8/22/2011 | 66.62 | 2 | 14.03 | 28.06 | 66.62 51.62 |
| | 6575 6648 | 9/19/2011 | 9/27/2011 | 51.62 34.04 | 2 | 14.03 14.03 | 28.06 28.06 | 34.04 |
| | 6720 | 11/7/2011 | 11/11/2011 | 30.00 | 2 | 14.03 | 28.06 | 30.00 |
| | 6775 | 12/5/2011 | 12/9/2011 | 29.26 | 2 | 14.40 | 28.80 | 29.26 |
| | 6860 | 1/9/2012 | 1/13/2012 | 58.28 | 2 | 14.40 | 28.80 | 58.28 |
| | 6963 | 2/16/2012 | 2/22/2012 | 14.74 | 2 | 14.40 | 28.80 | 14.40 |
| | 7013 | 3/6/2012 | 3/9/2012 | 42.20 | 2 | 14.40 | 28.80 | 42.20 |
| | 7086 7164 | 4/2/2012 5/1/2012 | 4/9/2012 5/4/2012 | 33.40 N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 33.40 14.40 |
| | 7237 | 6/4/2012 | 6/8/2012 | 41.10 | 2 | 14.40 | 28.80 | 41.10 |
| | 7364 | 7/16/2012 | 7/23/2012 | 49.44 | 2 | 14.40 | 28.80 | 49.44 |
| | 7422 | 8/6/2012 | 8/10/2012 | 27.22 | 2 | 14.40 | 28.80 | 14.40 |
| | 7507 | 9/4/2012 | 9/7/2012 | 37.36 | 2 | 14.40 | 28.80 | 37.36 |
| | 7618 | 10/9/2012 | 10/16/2012 | 38.28 | 2 | 14.40 | 28.80 | 38.28 |
| | 7688 7774 | 11/5/2012 12/3/2012 | 11/9/2012 12/7/2012 | 23.10 34.96 | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 34.96 |
| | 7867 | 1/8/2013 | 1/14/2013 | 38.68 | 2 | 17.29 | 34.58 | 38.68 |
| | 7930 | 2/5/2013 | 2/8/2013 | 34.48 | 2 | 17.29 | 34.58 | 17.29 |
| | 8003 | 3/5/2013 | 3/11/2013 | 18.38 | 2 | 17.29 | 34.58 | 17.29 |
| | 8089 | 4/2/2013 | 4/5/2013 | 34.22 | 2 | 17.29 | 34.58 | 17.29 |
| | 8188 | 5/13/2013 | 5/17/2013 | 25.96 | 2 | 17.29 | 34.58 | 17.29 |
| | 8262 | 6/9/2013 | 6/14/2013 | 38.84 | 2 | 17.29 | 34.58 | 38.84 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|-------------------------|--------------------------|---------------------|---------------------|----------------|------------------------------|------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results | Dilution Factor | MDL (ppmv) | Dilution corrected MDL | Concentration for Statistical Evaluation |
| | | | | (ppmv) | | , | (ppmv) | (ppmv) |
| | 3170 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3219 3287 | 5/15/2008 6/19/2008 | 5/23/2008 6/25/2008 | N.D. 43.70 | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 43.70 |
| | 3346 | 7/16/2008 | 7/22/2008 | 94.38 | 2 | 10.79 | 21.58 | 94.38 |
| | 3410 | 8/19/2008 | 8/22/2008 | 122.86 | 2 | 14.93 | 29.86 | 122.86 |
| | 3458 | 9/10/2008 | 9/12/2008 | 55.78 | 2 | 14.93 | 29.86 | 55.78 |
| | 3514 3587 | 10/8/2008 11/13/2008 | 10/10/2008 11/18/2008 | 14.80 21.26 | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3626 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3721 | 1/13/2009 | 1/21/2009 | 14.98 | 2 | 14.93 | 29.86 | 14.93 |
| | 3782 | 2/10/2009 | 2/13/2009 | 19.84 | 2 | 14.93 | 29.86 | 14.93 |
| | 3845 3920 | 3/11/2009 4/14/2009 | 3/27/2009 4/22/2009 | 5.50 18.42 | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3984 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4053 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4116 | 7/8/2009 | 7/10/2009 | 70.10 | 2 | 15.17 | 30.34 | 70.10 |
| | 4177 4246 | 8/6/2009 9/2/2009 | 8/13/2009 9/4/2009 | 69.88 19.66 | 2 | 15.17 15.17 | 30.34 30.34 | 69.88 15.17 |
| | 4343 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4385 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4475 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4636 4734 | 1/27/2010 2/18/2010 | 2/2/2010 2/23/2010 | N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4802 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4968 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5092 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5127 5265 | 6/2/2010 7/14/2010 | 6/7/2010 7/19/2010 | N.D. N.D. | 2 | 7.00 | 30.34 14.00 | 15.17 7.00 |
| | 5358 | 8/10/2010 | 8/17/2010 | 78.80 | 2 | 7.00 | 14.00 | 78.80 |
| | 5484 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| Panel 3 | 5542 | 10/12/2010 | 10/18/2010 | 49.60 | 2 | 7.00 | 14.00 | 49.60 |
| Room 4i | 5635 5754 | 11/9/2010 12/15/2010 | 11/15/2010 12/20/2010 | 30.22 85.24 | 2 | 7.00 7.00 | 14.00 14.00 | 30.22 85.24 |
| | 5852 | 1/19/2011 | 1/24/2011 | 58.84 | 2 | 14.03 | 28.06 | 58.84 |
| | 5938 | 2/15/2011 | 2/21/2011 | 28.12 | 2 | 14.03 | 28.06 | 28.12 |
| | 6026 | 3/9/2011 | 3/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6139 6221 | 4/19/2011 5/10/2011 | 4/26/2011 5/13/2011 | N.D. 24.72 | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6321 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6437 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6503 | 8/16/2011 | 8/22/2011 | 42.26 | 2 | 14.03 | 28.06 | 42.26 |
| | 6581 6656 | 9/20/2011 | 9/27/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6726 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6781 | 12/6/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6866 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6969 7019 | 2/16/2012 3/6/2012 | 2/22/2012 3/9/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7019 | 4/3/2012 | 4/9/2012 | 15.68 | 2 | 14.40 | 28.80 | 14.40 |
| | 7170 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7243 | 6/5/2012 | 6/8/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7370 7428 | 7/17/2012 8/6/2012 | 7/23/2012 8/10/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7513 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7624 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7694 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7780 7873 | 12/4/2012 1/8/2013 | 12/7/2012 1/14/2013 | N.D. 29.02 | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 7936 | 2/5/2013 | 2/8/2013 | 29.02 N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8009 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8095 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8194 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8268 | 6/10/2013 | 6/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|-------------------------|--------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3172 | 4/24/2008 | 4/30/2008 | 38.24 | 2 | 10.79 | 21.58 | 38.24 |
| | 3209 | 5/14/2008 | 5/23/2008 | 45.78 | 2 | 10.79 | 21.58 | 45.78 |
| | 3277 3336 | 6/17/2008 7/15/2008 | 6/25/2008 7/22/2008 | N.D. 49.56 | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 49.56 |
| | 3401 | 8/20/2008 | 8/22/2008 | 46.38 | 2 | 14.93 | 29.86 | 46.38 |
| | 3449 | 9/8/2008 | 9/12/2008 | 76.02 | 2 | 14.93 | 29.86 | 76.02 |
| | 3505 | 10/6/2008 | 10/10/2008 | 91.54 | 2 | 14.93 | 29.86 | 91.54 |
| | 3578 3617 | 11/10/2008 12/3/2008 | 11/18/2008 | 76.38 51.44 | 2 | 14.93 14.93 | 29.86 29.86 | 76.38 51.44 |
| | 3712 | 1/12/2009 | 1/21/2009 | 46.52 | 2 | 14.93 | 29.86 | 46.52 |
| | 3773 | 2/9/2009 | 2/13/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3834 | 3/12/2009 | 3/27/2009 | 49.78 | 2 | 14.93 | 29.86 | 49.78 |
| | 3911 3979 | 4/13/2009 5/12/2009 | 4/22/2009 5/15/2009 | 36.44 40.06 | 2 | 14.93 14.93 | 29.86 29.86 | 36.44 40.06 |
| | 4044 | 6/1/2009 | 6/8/2009 | 44.98 | 2 | 14.93 | 29.86 | 44.98 |
| | 4110 | 7/7/2009 | 7/10/2009 | 88.52 | 2 | 15.17 | 30.34 | 88.52 |
| | 4169 | 8/5/2009 | 8/13/2009 | 62.82 | 2 | 15.17 | 30.34 | 62.82 |
| | 4240 | 9/1/2009 | 9/4/2009 | 54.22 | 2 | 15.17 | 30.34 | 54.22 |
| | 4337 4379 | 10/12/2009 | 10/15/2009 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 | 15.17 15.17 |
| | 4469 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 30.34 | 15.17 |
| | 4630 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4728 | 2/17/2010 | 2/23/2010 | 55.36 | 2 | 15.17 | 30.34 | 55.36 |
| | 4796 | 3/10/2010 | 3/12/2010 | 41.42 | 2 | 15.17 | 30.34 | 41.42 |
| | 4962 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5086 5121 | 5/26/2010 6/2/2010 | 5/28/2010 6/7/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 5259 | 7/13/2010 | 7/19/2010 | 88.48 | 2 | 7.00 | 14.00 | 88.48 |
| | 5352 | 8/9/2010 | 8/17/2010 | 105.14 | 2 | 7.00 | 14.00 | 105.14 |
| | 5478 | 9/21/2010 | 9/27/2010 | 58.68 | 2 | 7.00 | 14.00 | 58.68 |
| Panel 3 | 5537 | 10/11/2010 | 10/18/2010 | 59.18 | 2 | 7.00 | 14.00 | 59.18 |
| Room 3e | 5630 5749 | 11/8/2010 12/14/2010 | 11/15/2010 12/20/2010 | 66.94 80.20 | 2 | 7.00 7.00 | 14.00 14.00 | 66.94 80.20 |
| | 5847 | 1/18/2011 | 1/24/2011 | 136.16 | 2 | 14.03 | 28.06 | 136.16 |
| | 5933 | 2/15/2011 | 2/21/2011 | 53.02 | 2 | 14.03 | 28.06 | 53.02 |
| | 6021 | 3/8/2011 | 3/11/2011 | 84.28 | 2 | 14.03 | 28.06 | 84.28 |
| | 6134 | 4/19/2011 | 4/26/2011 | 47.04 | 2 | 14.03 | 28.06 | 47.04 |
| | 6216 6316 | 5/9/2011 6/14/2011 | 5/13/2011 6/21/2011 | 39.22 34.02 | 2 | 14.03 14.03 | 28.06 28.06 | 39.22 34.02 |
| | 6430 | 7/18/2011 | 7/22/2011 | 53.20 | 2 | 14.03 | 28.06 | 53.20 |
| | 6498 | 8/15/2011 | 8/22/2011 | 50.46 | 2 | 14.03 | 28.06 | 50.46 |
| | 6576 | 9/19/2011 | 9/27/2011 | 38.60 | 2 | 14.03 | 28.06 | 38.60 |
| | 6649 | 10/17/2011 | 10/25/2011 | 28.86 | 2 | 14.03 | 28.06 | 28.86 |
| | 6721 6776 | 11/7/2011 12/5/2011 | 11/11/2011 | 26.00 38.26 | 2 | 14.03 14.40 | 28.06 28.80 | 14.03 38.26 |
| | 6861 | 1/9/2012 | 1/13/2012 | 53.60 | 2 | 14.40 | 28.80 | 53.60 |
| | 6964 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7014 | 3/6/2012 | 3/9/2012 | 32.26 | 2 | 14.40 | 28.80 | 32.26 |
| | 7087 | 4/2/2012 | 4/9/2012 | 23.00 | 2 | 14.40 | 28.80 | 14.40 |
| | 7165 7238 | 5/1/2012 6/4/2012 | 5/4/2012 6/8/2012 | 27.48 19.22 | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7365 | 7/16/2012 | 7/23/2012 | 34.56 | 2 | 14.40 | 28.80 | 34.56 |
| | 7423 | 8/6/2012 | 8/10/2012 | 43.44 | 2 | 14.40 | 28.80 | 43.44 |
| | 7508 | 9/4/2012 | 9/7/2012 | 30.22 | 2 | 14.40 | 28.80 | 30.22 |
| | 7619 | 10/9/2012 | 10/16/2012 | 30.90 | 2 | 14.40 | 28.80 | 30.90 |
| | 7689 7775 | 11/5/2012 12/3/2012 | 11/9/2012 12/7/2012 | 39.38 31.02 | 2 | 17.29 17.29 | 34.58 34.58 | 39.38 17.29 |
| | 7868 | 1/8/2013 | 1/14/2013 | 48.88 | 2 | 17.29 | 34.58 | 48.88 |
| | 7931 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8004 | 3/5/2013 | 3/11/2013 | 25.10 | 2 | 17.29 | 34.58 | 17.29 |
| | 8090 | 4/2/2013 | 4/5/2013 | 33.66 | 2 | 17.29 | 34.58 | 17.29 |
| | 8189 | 5/13/2013 | 5/17/2013 | 31.26 | 2 | 17.29 | 34.58 | 17.29 |
| | 8263 | 6/9/2013 | 6/14/2013 | 33.64 | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3171 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3218 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3286 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 |
| | 3345 3409 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 14.93 | 29.86 | 10.79 14.93 |
| | 3457 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3513 | 10/6/2008 | 10/10/2008 | 48.84 | 2 | 14.93 | 29.86 | 48.84 |
| | 3586 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3625 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3714 3781 | 1/12/2009 2/10/2009 | 1/21/2009 2/13/2009 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3836 | 3/12/2009 | 3/27/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3913 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3981 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4052 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4117 4178 | 7/8/2009 | 7/10/2009 | 36.74 | 2 | 15.17 | 30.34 | 36.74 |
| | 4247 | 8/6/2009 9/2/2009 | 8/13/2009 9/4/2009 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4344 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4386 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4476 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4637 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4735 4803 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 15.17 | 30.34 30.34 | 15.17 |
| | 4969 | 3/10/2010 4/21/2010 | 3/12/2010 4/28/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 | 15.17 15.17 |
| | 5093 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5128 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5266 | 7/14/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5359 | 8/10/2010 | 8/17/2010 | 69.66 | 2 | 7.00 | 14.00 | 69.66 |
| | 5485 5543 | 9/22/2010 | 9/27/2010 | N.D. 34.78 | 2 | 7.00 7.00 | 14.00 14.00 | 7.00 34.78 |
| Panel 3 | 5636 | 11/9/2010 | 11/15/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5755 | 12/15/2010 | 12/20/2010 | 70.66 | 2 | 7.00 | 14.00 | 70.66 |
| | 5853 | 1/19/2011 | 1/24/2011 | 79.18 | 2 | 14.03 | 28.06 | 79.18 |
| | 5939 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6027 6140 | 3/9/2011 | 3/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6222 | 4/19/2011 5/10/2011 | 4/26/2011 5/13/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6322 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6438 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6504 | 8/16/2011 | 8/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6582 | 9/20/2011 | 9/27/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6657 6727 | 10/18/2011 | 10/25/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 | 14.03 |
| | 6782 | 11/8/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 28.80 | 14.03 14.40 |
| | 6867 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6970 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7020 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7093 | 4/3/2012 | 4/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7171 7244 | 5/1/2012 6/5/2012 | 5/4/2012 6/8/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7371 | 7/17/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7429 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7514 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7625 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7695 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7781 7874 | 12/4/2012 1/8/2013 | 12/7/2012 | N.D. N.D. | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 7937 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8010 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8096 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8195 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8269 | 6/10/2013 | 6/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3164 | 4/24/2008 | 4/30/2008 | 32.02 | 2 | 10.79 | 21.58 | 32.02 |
| | 3208 | 5/14/2008 | 5/23/2008 | 31.20 | 2 | 10.79 | 21.58 | 31.20 |
| | 3276 3335 | 6/17/2008 7/15/2008 | 6/25/2008 7/22/2008 | 22.78 32.36 | 2 | 10.79 10.79 | 21.58 21.58 | 22.78 32.36 |
| | 3400 | 8/20/2008 | 8/22/2008 | 37.30 | 2 | 14.93 | 29.86 | 37.30 |
| | 3448 | 9/8/2008 | 9/12/2008 | 35.04 | 2 | 14.93 | 29.86 | 35.04 |
| | 3504 | 10/6/2008 | 10/10/2008 | 36.14 | 2 | 14.93 | 29.86 | 36.14 |
| | 3577 | 11/10/2008 | 11/18/2008 | 36.90 | 2 | 14.93 | 29.86 | 36.90 |
| | 3616 3711 | 1/12/2009 | 12/6/2008 | 33.86 | 2 | 14.93 14.93 | 29.86 | 33.86 |
| | 3772 | 2/9/2009 | 1/21/2009 2/13/2009 | 36.68 24.04 | 2 | 14.93 | 29.86 29.86 | 36.68 14.93 |
| | 3833 | 3/12/2009 | 3/27/2009 | 16.42 | 2 | 14.93 | 29.86 | 14.93 |
| | 3910 | 4/13/2009 | 4/22/2009 | 23.94 | 2 | 14.93 | 29.86 | 14.93 |
| | 3978 | 5/12/2009 | 5/15/2009 | 35.24 | 2 | 14.93 | 29.86 | 35.24 |
| | 4043 | 6/1/2009 | 6/8/2009 | 14.40 | 2 | 14.93 | 29.86 | 14.93 |
| | 4111 4170 | 7/7/2009 8/5/2009 | 7/10/2009 8/13/2009 | 37.48 18.32 | 2 | 15.17 15.17 | 30.34 30.34 | 37.48 15.17 |
| | 4241 | 9/1/2009 | 9/4/2009 | 21.32 | 2 | 15.17 | 30.34 | 15.17 |
| | 4338 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4380 | 11/3/2009 | 11/12/2009 | 22.38 | 2 | 15.17 | 30.34 | 15.17 |
| | 4470 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4631 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4729 4797 | 2/17/2010 3/10/2010 | 2/23/2010 3/12/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4963 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5087 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5122 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5260 | 7/13/2010 | 7/19/2010 | 105.46 | 2 | 7.00 | 14.00 | 105.46 |
| | 5353 | 8/9/2010 | 8/17/2010 | N.D. 52.60 | 2 | 7.00 7.00 | 14.00 14.00 | 7.00 |
| | 5479 5538 | 9/21/2010 | 9/27/2010 | 66.54 | 2 | 7.00 | 14.00 | 52.60 66.54 |
| Panel 3 | 5631 | 11/8/2010 | 11/15/2010 | 50.14 | 2 | 7.00 | 14.00 | 50.14 |
| Room 2e | 5750 | 12/14/2010 | 12/20/2010 | 75.48 | 2 | 7.00 | 14.00 | 75.48 |
| | 5848 | 1/18/2011 | 1/24/2011 | 123.08 | 2 | 14.03 | 28.06 | 123.08 |
| | 5934 | 2/15/2011 | 2/21/2011 | 48.58 | 2 | 14.03 | 28.06 | 48.58 |
| | 6022 6135 | 3/8/2011 4/19/2011 | 3/11/2011 4/26/2011 | 54.10 49.12 | 2 | 14.03 14.03 | 28.06 28.06 | 54.10 49.12 |
| | 6217 | 5/10/2011 | 5/13/2011 | 42.72 | 2 | 14.03 | 28.06 | 42.72 |
| | 6317 | 6/14/2011 | 6/21/2011 | 31.62 | 2 | 14.03 | 28.06 | 31.62 |
| | 6431 | 7/18/2011 | 7/22/2011 | 37.94 | 2 | 14.03 | 28.06 | 37.94 |
| | 6499 | 8/15/2011 | 8/22/2011 | 55.18 | 2 | 14.03 | 28.06 | 55.18 |
| | 6577 6650 | 9/19/2011 | 9/27/2011 | 33.10 22.14 | 2 | 14.03 14.03 | 28.06 28.06 | 33.10 14.03 |
| | 6722 | 11/7/2011 | 11/11/2011 | 20.36 | 2 | 14.03 | 28.06 | 14.03 |
| | 6777 | 12/5/2011 | 12/9/2011 | 31.18 | 2 | 14.40 | 28.80 | 31.18 |
| | 6862 | 1/9/2012 | 1/13/2012 | 60.96 | 2 | 14.40 | 28.80 | 60.96 |
| | 6965 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7015 | 3/6/2012 | 3/9/2012 | 40.78 | 2 | 14.40 | 28.80 | 40.78 |
| | 7088 7166 | 4/2/2012 5/1/2012 | 4/9/2012 5/4/2012 | 35.32 25.76 | 2 | 14.40 14.40 | 28.80 28.80 | 35.32 14.40 |
| | 7239 | 6/4/2012 | 6/8/2012 | 36.96 | 2 | 14.40 | 28.80 | 36.96 |
| | 7366 | 7/16/2012 | 7/23/2012 | 28.50 | 2 | 14.40 | 28.80 | 14.40 |
| | 7424 | 8/6/2012 | 8/10/2012 | 34.66 | 2 | 14.40 | 28.80 | 34.66 |
| | 7509 | 9/4/2012 | 9/7/2012 | 46.42 | 2 | 14.40 | 28.80 | 46.42 |
| | 7620 7690 | 10/9/2012 | 10/16/2012 | 37.68 | 2 | 14.40 17.29 | 28.80 | 37.68 17.29 |
| | 7690 | 11/6/2012 12/3/2012 | 11/9/2012 12/7/2012 | 26.16 46.82 | 2 | 17.29 | 34.58 34.58 | 46.82 |
| | 7869 | 1/8/2013 | 1/14/2013 | 42.76 | 2 | 17.29 | 34.58 | 42.76 |
| | 7932 | 2/5/2013 | 2/8/2013 | 29.44 | 2 | 17.29 | 34.58 | 17.29 |
| | 8005 | 3/5/2013 | 3/11/2013 | 29.30 | 2 | 17.29 | 34.58 | 17.29 |
| | 8091 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8190 | 5/14/2013 | 5/17/2013 | 51.84 | 2 | 17.29 | 34.58 | 51.84 |
| | 8264 | 6/9/2013 | 6/14/2013 | 39.08 | 2 | 17.29 | 34.58 | 39.08 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3162 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3217 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3285 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3344 3408 | 7/15/2008 8/20/2008 | 7/22/2008 8/22/2008 | N.D. N.D. | 2 | 10.79 14.93 | 21.58 29.86 | 10.79 14.93 |
| | 3456 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3512 | 10/6/2008 | 10/10/2008 | 13.24 | 2 | 14.93 | 29.86 | 14.93 |
| | 3585 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3624 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3713 3780 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3835 | 2/10/2009 3/12/2009 | 2/13/2009 3/27/2009 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3912 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3980 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4051 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4118 | 7/8/2009 | 7/10/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4179 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4248 4345 | 9/2/2009 | 9/4/2009 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4343 | 11/3/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4477 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4638 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4736 | 2/18/2010 | 2/23/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4804 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4970 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5094 | 5/26/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5129 5267 | 6/2/2010 7/14/2010 | 6/7/2010 7/19/2010 | N.D. N.D. | 2 | 7.00 | 30.34 14.00 | 15.17 7.00 |
| | 5360 | 8/10/2010 | 8/17/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5486 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| Panel 3 | 5544 | 10/12/2010 | 10/18/2010 | 19.24 | 2 | 7.00 | 14.00 | 19.24 |
| Room 2i | 5637 | 11/9/2010 | 11/15/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5756 | 12/15/2010 | 12/20/2010 | 68.86 | 2 | 7.00 | 14.00 | 68.86 |
| | 5854 5940 | 1/19/2011 2/15/2011 | 1/24/2011 2/21/2011 | 55.84 N.D. | 2 | 14.03 14.03 | 28.06 | 55.84 |
| | 6028 | 3/9/2011 | 3/11/2011 | N.D. | 2 | 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6141 | 4/19/2011 | 4/26/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6223 | 5/10/2011 | 5/13/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6323 | 6/15/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6439 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6505 | 8/16/2011 | 8/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6583 6658 | 9/20/2011 | 9/27/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6728 | 11/8/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6783 | 12/6/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6868 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6971 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7021 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7094 | 4/3/2012 | 4/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7172 7245 | 5/1/2012 6/5/2012 | 5/4/2012 6/8/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7372 | 7/17/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7430 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7515 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7626 | 10/9/2012 | 10/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7696 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7782 | 12/4/2012 | 12/7/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7875 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7938 8011 | 2/5/2013 3/5/2013 | 2/8/2013 3/11/2013 | N.D. N.D. | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 8097 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8196 | 5/14/2013 | 5/17/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8270 | 6/10/2013 | 6/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|-------------------------|--------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3163 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3207 | 5/14/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3293 3334 | 6/17/2008 7/15/2008 | 6/25/2008 7/22/2008 | N.D. 58.36 | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 58.36 |
| | 3399 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3447 | 9/8/2008 | 9/12/2008 | 19.46 | 2 | 14.93 | 29.86 | 14.93 |
| | 3503 | 10/6/2008 | 10/10/2008 | 21.18 | 2 | 14.93 | 29.86 | 14.93 |
| | 3575 3614 | 11/10/2008 12/3/2008 | 11/18/2008 | 14.10 23.54 | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3709 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3770 | 2/9/2009 | 2/13/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3831 | 3/11/2009 | 3/27/2009 | 8.86 | 2 | 14.93 | 29.86 | 14.93 |
| | 3908 3976 | 4/13/2009 5/12/2009 | 4/22/2009 5/15/2009 | 8.00 N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 4041 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4112 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4172 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4242 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4339 4381 | 10/13/2009 | 10/15/2009 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 | 15.17 15.17 |
| | 4471 | 12/9/2009 | 11/12/2009 12/15/2009 | N.D. | 2 | 15.17 | 30.34 30.34 | 15.17 |
| | 4632 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4730 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4798 | 3/10/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4964 | 4/21/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5088 5123 | 5/26/2010 6/2/2010 | 5/28/2010 6/7/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 5261 | 7/13/2010 | 7/19/2010 | 54.82 | 2 | 7.00 | 14.00 | 54.82 |
| | 5354 | 8/10/2010 | 8/17/2010 | 43.64 | 2 | 7.00 | 14.00 | 43.64 |
| | 5480 | 9/21/2010 | 9/27/2010 | 34.86 | 2 | 7.00 | 14.00 | 34.86 |
| Panel 3 | 5539 | 10/12/2010 | 10/18/2010 | 58.30 | 2 | 7.00 | 14.00 | 58.30 |
| Room 1e | 5632 5751 | 11/9/2010 12/15/2010 | 11/15/2010 12/20/2010 | 26.00 75.32 | 2 | 7.00 7.00 | 14.00 14.00 | 26.00 75.32 |
| | 5849 | 1/18/2011 | 1/24/2011 | 84.54 | 2 | 14.03 | 28.06 | 84.54 |
| | 5935 | 2/15/2011 | 2/21/2011 | 58.96 | 2 | 14.03 | 28.06 | 58.96 |
| | 6023 | 3/9/2011 | 3/11/2011 | 67.98 | 2 | 14.03 | 28.06 | 67.98 |
| | 6136 | 4/19/2011 | 4/26/2011 | 32.52 | 2 | 14.03 | 28.06 | 32.52 |
| | 6218 6318 | 5/10/2011 6/15/2011 | 5/13/2011 6/21/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6433 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6506 | 8/16/2011 | 8/22/2011 | 34.00 | 2 | 14.03 | 28.06 | 34.00 |
| | 6584 | 9/20/2011 | 9/27/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6659 | 10/18/2011 | 10/25/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6729 6784 | 11/8/2011 12/6/2011 | 11/11/2011 | N.D. N.D. | 2 | 14.03 14.40 | 28.06 28.80 | 14.03 14.40 |
| | 6869 | 1/10/2012 | 1/13/2012 | 50.88 | 2 | 14.40 | 28.80 | 50.88 |
| | 6972 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7022 | 3/6/2012 | 3/9/2012 | 32.80 | 2 | 14.40 | 28.80 | 32.80 |
| | 7095 | 4/3/2012 | 4/9/2012 | 16.56 | 2 | 14.40 | 28.80 | 14.40 |
| | 7173 7246 | 5/1/2012 6/5/2012 | 5/4/2012 6/8/2012 | 31.26 16.54 | 2 | 14.40 14.40 | 28.80 28.80 | 31.26 14.40 |
| | 7373 | 7/17/2012 | 7/23/2012 | 33.04 | 2 | 14.40 | 28.80 | 33.04 |
| | 7431 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7516 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7627 | 10/9/2012 | 10/16/2012 | 32.06 | 2 | 14.40 | 28.80 | 32.06 |
| | 7697 7783 | 11/6/2012 12/4/2012 | 11/9/2012 12/7/2012 | 21.14 32.90 | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 7876 | 1/8/2013 | 1/14/2013 | 25.30 | 2 | 17.29 | 34.58 | 17.29 |
| | 7939 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8012 | 3/5/2013 | 3/11/2013 | 19.38 | 2 | 17.29 | 34.58 | 17.29 |
| | 8098 | 4/2/2013 | 4/5/2013 | 21.22 | 2 | 17.29 | 34.58 | 17.29 |
| | 8197 | 5/14/2013 | 5/17/2013 | 35.12 | 2 | 17.29 | 34.58 | 35.12 |
| | 8271 | 6/10/2013 | 6/14/2013 | 35.40 | 2 | 17.29 | 34.58 | 35.40 |

| | Hydrogen (H ₂) | | | | | | | | | | |
|-----------|----------------------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| Donal 2 | 3169 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 | | | |
| Panel 3 - | 3216 | 5/19/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 | | | |
| | 3284 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 | | | |

| | | | | Hydrogei | n (H ₂) | | | |
|------------------|--------------|-------------------------|--------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3165 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3215 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3283 | 6/17/2008 | 6/25/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3342 | 7/15/2008 | 7/22/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3407 3455 | 8/20/2008 9/8/2008 | 8/22/2008 9/12/2008 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3511 | 10/6/2008 | 10/10/2008 | 32.88 | 2 | 14.93 | 29.86 | 32.88 |
| | 3584 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3623 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3716 | 1/12/2009 | 1/21/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3779 3838 | 2/9/2009 3/12/2009 | 2/13/2009 3/27/2009 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3915 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3983 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4049 | 6/2/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4105 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4164 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4235 4332 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4374 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4464 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4625 | 1/26/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4723 | 2/17/2010 | 2/23/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4789 4957 | 3/9/2010 4/20/2010 | 3/12/2010 4/28/2010 | N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 |
| | 5081 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 15.17 |
| | 5116 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5254 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5347 | 8/9/2010 | 8/17/2010 | 47.32 | 2 | 7.00 | 14.00 | 47.32 |
| Daniel 2 | 5474 | 9/21/2010 | 9/27/2010 | 35.28 | 2 | 7.00 | 14.00 | 35.28 |
| Panel 3 Location | 5533 5626 | 10/11/2010 11/8/2010 | 10/18/2010 11/15/2010 | 60.22 36.90 | 2 | 7.00 7.00 | 14.00 14.00 | 60.22 36.90 |
| EBW | 5745 | 12/14/2010 | 12/20/2010 | 71.48 | 2 | 7.00 | 14.00 | 71.48 |
| | 5843 | 1/18/2011 | 1/24/2011 | 95.56 | 2 | 14.03 | 28.06 | 95.56 |
| | 5929 | 2/15/2011 | 2/21/2011 | 53.14 | 2 | 14.03 | 28.06 | 53.14 |
| | 6017 | 3/8/2011 | 3/11/2011 | 73.22 | 2 | 14.03 | 28.06 | 73.22 |
| | 6130 6212 | 4/18/2011 5/9/2011 | 4/26/2011 | 31.08 40.20 | 2 | 14.03 | 28.06 | 31.08 |
| | 6312 | 6/14/2011 | 5/13/2011 6/21/2011 | 40.20 N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 40.20 14.03 |
| | 6432 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6500 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6578 | 9/19/2011 | 9/27/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6652 | 10/17/2011 | 10/25/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6723 6778 | 11/7/2011 12/5/2011 | 11/11/2011 | N.D. 29.60 | 2 | 14.03 14.40 | 28.06 28.80 | 14.03 29.60 |
| | 6863 | 1/9/2012 | 1/13/2012 | 51.46 | 2 | 14.40 | 28.80 | 51.46 |
| | 6966 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7016 | 3/6/2012 | 3/9/2012 | 23.10 | 2 | 14.40 | 28.80 | 14.40 |
| | 7089 | 4/2/2012 | 4/9/2012 | 27.82 | 2 | 14.40 | 28.80 | 14.40 |
| | 7167 | 5/1/2012 6/4/2012 | 5/4/2012 | N.D. N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7240 7367 | 7/16/2012 | 6/8/2012 7/23/2012 | N.D. 31.38 | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 31.38 |
| | 7425 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7510 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7621 | 10/9/2012 | 10/16/2012 | 26.92 | 2 | 14.40 | 28.80 | 14.40 |
| | 7691 | 11/6/2012 | 11/9/2012 | 28.84 | 2 | 17.29 | 34.58 | 17.29 |
| | 7777 | 12/4/2012 | 12/7/2012 | 22.64 | 2 | 17.29 17.29 | 34.58 | 17.29 17.29 |
| | 7870 7933 | 1/8/2013 2/5/2013 | 1/14/2013 2/8/2013 | 25.12 21.18 | 2 | 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 8006 | 3/5/2013 | 3/11/2013 | 20.60 | 2 | 17.29 | 34.58 | 17.29 |
| | 8092 | 4/2/2013 | 4/5/2013 | 18.10 | 2 | 17.29 | 34.58 | 17.29 |
| | 8191 | 5/14/2013 | 5/17/2013 | 19.28 | 2 | 17.29 | 34.58 | 17.29 |
| | 8265 | 6/9/2013 | 6/14/2013 | 36.10 | 2 | 17.29 | 34.58 | 36.10 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3167 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3214 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3282 3341 | 6/19/2008 7/15/2008 | 6/25/2008 7/22/2008 | N.D. N.D. | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 10.79 |
| | 3406 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3454 | 9/8/2008 | 9/12/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3510 | 10/6/2008 | 10/10/2008 | 15.14 | 2 | 14.93 | 29.86 | 14.93 |
| | 3583 | 11/10/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3622 3715 | 1/12/2009 | 12/6/2008 1/21/2009 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3778 | 2/9/2009 | 2/13/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3837 | 3/12/2009 | 3/27/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3914 | 4/13/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3982 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4050 4104 | 6/2/2009 7/7/2009 | 6/8/2009 7/10/2009 | N.D. N.D. | 2 | 14.93 15.17 | 29.86 30.34 | 14.93 15.17 |
| | 4163 | 8/5/2009 | 8/13/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4234 | 9/1/2009 | 9/4/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4331 | 10/12/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4373 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4463 | 12/8/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4624 4722 | 1/26/2010 2/17/2010 | 2/2/2010 2/23/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4788 | 3/9/2010 | 3/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4956 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5080 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5115 | 6/1/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5253 | 7/13/2010 | 7/19/2010 8/17/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5346 5473 | 8/9/2010 9/21/2010 | 9/27/2010 | N.D. N.D. | 2 | 7.00 7.00 | 14.00 14.00 | 7.00 7.00 |
| Panel 3 | 5532 | 10/11/2010 | 10/18/2010 | 41.80 | 2 | 7.00 | 14.00 | 41.80 |
| Location | 5625 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| EBA | 5744 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5842 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5928 6016 | 2/15/2011 3/8/2011 | 2/21/2011 3/11/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6129 | 4/18/2011 | 4/26/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6211 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6311 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6435 | 7/19/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6501 | 8/16/2011 9/20/2011 | 8/22/2011 9/27/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6579 6653 | 10/17/2011 | 10/25/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6724 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6779 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6864 | 1/10/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6967 7017 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7017 | 3/6/2012 4/3/2012 | 3/9/2012 4/9/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7168 | 5/1/2012 | 5/4/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7241 | 6/5/2012 | 6/8/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7368 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7426 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7511 7622 | 9/4/2012 | 9/7/2012 10/16/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7692 | 11/6/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7778 | 12/4/2012 | 12/7/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7871 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7934 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8007 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8093 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8192 8266 | 5/14/2013 6/9/2013 | 5/17/2013 6/14/2013 | N.D. N.D. | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 0200 | 0/3/2013 | 0/14/2013 | N.D. | 4 | 11.23 | J4.J0 | 11.23 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3173 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3224 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3292 | 6/19/2008 | 6/25/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3350 3414 | 7/16/2008 8/20/2008 | 7/22/2008 | N.D. N.D. | 2 | 10.79 14.93 | 21.58 29.86 | 10.79 14.93 |
| | 3462 | 9/10/2008 | 8/22/2008 9/12/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3518 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3591 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3630 | 12/3/2008 | 12/6/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3725 | 1/14/2009 | 1/21/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3786 | 2/11/2009 | 2/13/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3840 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3924 | 4/15/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3992 4040 | 5/12/2009 6/1/2009 | 5/15/2009 6/8/2009 | N.D. N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 4103 | 7/7/2009 | 7/10/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4181 | 8/6/2009 | 8/13/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4250 | 9/2/2009 | 9/4/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4347 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4372 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4479 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4640 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4738 4795 | 2/18/2010 3/9/2010 | 2/23/2010 3/12/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 5078 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5130 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5252 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5362 | 8/10/2010 | 8/17/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5487 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| Panel 3 | 5531 | 10/11/2010 | 10/18/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| Location | 5624 5743 | 11/8/2010 12/14/2010 | 11/15/2010 | N.D. 51.16 | 2 | 7.00 7.00 | 14.00 14.00 | 7.00 51.16 |
| IBW | 5841 | 1/18/2010 | 1/24/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5927 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6015 | 3/8/2011 | 3/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6128 | 4/18/2011 | 4/26/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6210 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6309 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6426 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6494 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6571 6654 | 9/19/2011 | 9/27/2011 | N.D. N.D. | 2 | 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6716 | 11/7/2011 | 11/11/2011 | 38.82 | 2 | 14.03 | 28.06 | 38.82 |
| | 6771 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6857 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6959 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7009 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7083 7161 | 4/2/2012 5/1/2012 | 4/9/2012 5/4/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7101 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7361 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7419 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7504 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7615 | 10/8/2012 | 10/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7686 | 11/5/2012 | 11/9/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7772 7865 | 12/3/2012 1/8/2013 | 12/7/2012 1/14/2013 | N.D. N.D. | 2 | 17.29 17.29 | 34.58 34.58 | 17.29 17.29 |
| | 7928 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8001 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8087 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8186 | 5/13/2013 | 5/17/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8260 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|------------------------|-------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 3168 | 4/24/2008 | 4/30/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3223 | 5/15/2008 | 5/23/2008 | N.D. | 2 | 10.79 | 21.58 | 10.79 |
| | 3291 3349 | 6/19/2008 7/16/2008 | 6/25/2008 7/22/2008 | N.D. N.D. | 2 | 10.79 10.79 | 21.58 21.58 | 10.79 10.79 |
| | 3413 | 8/20/2008 | 8/22/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3461 | 9/10/2008 | 9/12/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3517 | 10/8/2008 | 10/10/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3590 | 11/13/2008 | 11/18/2008 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3629 3724 | 12/3/2008 1/14/2009 | 1/21/2009 | N.D. | 2 | 14.93 14.93 | 29.86 29.86 | 14.93 14.93 |
| | 3785 | 2/11/2009 | 2/13/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3839 | 3/10/2009 | 3/27/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3923 | 4/15/2009 | 4/22/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 3991 | 5/12/2009 | 5/15/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4039 | 6/1/2009 | 6/8/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4102 4180 | 7/7/2009 8/6/2009 | 7/10/2009 8/13/2009 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4249 | 9/2/2009 | 9/4/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4346 | 10/13/2009 | 10/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4371 | 11/2/2009 | 11/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4478 | 12/9/2009 | 12/15/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4639 | 1/27/2010 | 2/2/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4737 4794 | 2/18/2010 3/9/2010 | 2/23/2010 3/12/2010 | N.D. N.D. | 2 | 15.17 15.17 | 30.34 30.34 | 15.17 15.17 |
| | 4954 | 4/20/2010 | 4/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5079 | 5/25/2010 | 5/28/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5131 | 6/2/2010 | 6/7/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5251 | 7/13/2010 | 7/19/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5361 | 8/10/2010 | 8/17/2010 | N.D. N.D. | 2 | 7.00 | 14.00 | 7.00 |
| Panel 3 | 5488 5530 | 9/22/2010 | 9/27/2010 | N.D. | 2 | 7.00 7.00 | 14.00 14.00 | 7.00 7.00 |
| Location | 5623 | 11/8/2010 | 11/15/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| IBA | 5742 | 12/14/2010 | 12/20/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5840 | 1/18/2011 | 1/24/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5926 | 2/15/2011 | 2/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6014 6127 | 3/8/2011 4/18/2011 | 3/11/2011 4/26/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6209 | 5/9/2011 | 5/13/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6310 | 6/14/2011 | 6/21/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6425 | 7/18/2011 | 7/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6493 | 8/15/2011 | 8/22/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6572 6655 | 9/19/2011 | 9/27/2011 | N.D. N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 14.03 |
| | 6717 | 11/7/2011 | 11/11/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6772 | 12/5/2011 | 12/9/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6856 | 1/9/2012 | 1/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6960 | 2/16/2012 | 2/22/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7010 7082 | 3/6/2012 | 3/9/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7082 | 4/2/2012 5/1/2012 | 4/9/2012 5/4/2012 | N.D. N.D. | 2 | 14.40 14.40 | 28.80 28.80 | 14.40 14.40 |
| | 7233 | 6/4/2012 | 6/8/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7360 | 7/16/2012 | 7/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7418 | 8/6/2012 | 8/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7503 | 9/4/2012 | 9/7/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7614 7685 | 10/8/2012 11/5/2012 | 10/16/2012 11/9/2012 | N.D. N.D. | 2 | 14.40 17.29 | 28.80 34.58 | 14.40 17.29 |
| | 7771 | 12/3/2012 | 12/7/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7864 | 1/8/2013 | 1/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7927 | 2/5/2013 | 2/8/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8000 | 3/5/2013 | 3/11/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8086 | 4/2/2013 | 4/5/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8185 | 5/13/2013 | 5/17/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8259 | 6/9/2013 | 6/14/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

Appendix F

Panel 4 Hydrogen Data

| | | | | Hydroger | n (H ₂) | | | |
|-----------|--------------|-------------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4032 | 5/27/2009 | 5/29/2009 | 214.50 | 2 | 14.93 | 29.86 | 214.50 |
| | 4069 | 6/9/2009 | 6/12/2009 | 81.40 | 2 | 14.93 | 29.86 | 81.40 |
| | 4139 | 7/21/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4200 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4274 | 9/15/2009 | 9/18/2009 | 52.08 | 2 | 15.17 | 30.34 | 52.08 |
| | 4315 | 10/5/2009 | 10/12/2009 | 29.58 | 2 | 15.17 | 30.34 | 15.17 |
| | 4404 | 11/9/2009 | 11/16/2009 | 376.32 | 2 | 15.17 | 30.34 | 376.32 |
| | 4531 4595 | 12/30/2009 1/20/2010 | 1/12/2010 1/22/2010 | 732.38 230.68 | 2 | 15.17 15.17 | 30.34 30.34 | 732.38 230.68 |
| | 4680 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4833 | 3/17/2010 | 3/29/2010 | 538.04 | 2 | 15.17 | 30.34 | 538.04 |
| | 4915 | 4/13/2010 | 4/20/2010 | 470.54 | 2 | 15.17 | 30.34 | 470.54 |
| | 5050 | 5/17/2010 | 5/24/2010 | 432.10 | 2 | 15.17 | 30.34 | 432.10 |
| | 5175 | 6/15/2010 | 6/21/2010 | 923.52 | 2 | 7.00 | 14.00 | 923.52 |
| | 5310 | 7/26/2010 | 8/2/2010 | 291.14 | 2 | 7.00 | 14.00 | 291.14 |
| | 5396 | 8/24/2010 | 8/30/2010 | 257.50 | 2 | 7.00 | 14.00 | 257.50 |
| | 5450 | 9/13/2010 | 9/20/2010 | 867.36 | 2 | 7.00 | 14.00 | 867.36 |
| | 5569 | 10/20/2010 | 10/25/2010 | 873.20 | 2 | 7.00 | 14.00 | 873.20 |
| | 5661 | 11/16/2010 | 11/22/2010 | 868.52 | 2 | 7.00 | 14.00 | 868.52 |
| | 5718 | 12/7/2010 | 12/13/2010 | 983.72 | 2 | 7.00 | 14.00 | 983.72 |
| | 5816 | 1/11/2011 | 1/18/2011 | 938.74 | 2 | 14.03 | 28.06 | 938.74 |
| | 5892 | 2/7/2011 | 2/10/2011 | 785.90 | 2 | 14.03 | 28.06 | 785.90 |
| | 5980 | 3/1/2011 | 3/4/2011 | 841.20 | 2 | 14.03 | 28.06 | 841.20 |
| | 6083 | 4/5/2011 | 4/20/2011 | 739.96 | 2 | 14.03 | 28.06 | 739.96 |
| Panel 4 | 6182 | 5/3/2011 | 5/6/2011 | 920.04 | 2 | 14.03 | 28.06 | 920.04 |
| Room 7e | 6333 | 6/16/2011 | 6/24/2011 | 854.28 | 2 | 14.03 | 28.06 | 854.28 |
| 110011110 | 6409 | 7/12/2011 | 7/15/2011 | 775.72 | 2 | 14.03 | 28.06 | 775.72 |
| | 6477 | 8/9/2011 | 8/19/2011 | 837.04 | 2 | 14.03 | 28.06 | 837.04 |
| | 6553 | 9/14/2011 | 9/16/2011 | 823.62 | 2 | 14.03 | 28.06 | 823.62 |
| | 6627 | 10/11/2011 | 10/14/2011 | 856.32 | 2 | 14.03 | 28.06 | 856.32 |
| | 6700 | 11/1/2011 | 11/4/2011 | 793.36 | 2 | 14.03 | 28.06 | 793.36 |
| | 6804 | 12/12/2011 | 12/16/2011 | 737.98 | 2 | 14.40 | 28.80 | 737.98 |
| | 6890 | 1/17/2012 | 1/23/2012 | 759.70 | 2 | 14.40 | 28.80 | 759.70 |
| | 6942 | 2/7/2012 | 2/10/2012 | 735.92 | 2 | 14.40 | 28.80 | 735.92 |
| | 7043 | 3/13/2012 | 3/16/2012 | 669.68 | 2 | 14.40 | 28.80 | 669.68 |
| | 7113 | 4/10/2012 | 4/13/2012 | 635.18 | 2 | 14.40 | 28.80 | 635.18 |
| | 7191 | 5/9/2012 | 5/15/2012 | 530.68 | 2 | 14.40 | 28.80 | 530.68 |
| | 7270 | 6/11/2012 | 6/18/2012 | 466.46 | 2 | 14.40 | 28.80 | 466.46 |
| | 7341 | 7/10/2012 | 7/13/2012 | 409.74 | 2 | 14.40 | 28.80 | 409.74 |
| | 7457 | 8/13/2012 | 8/17/2012 | 288.84 | 2 | 14.40 | 28.80 | 288.84 |
| | 7535 | 9/10/2012 | 9/14/2012 | 344.36 | 2 | 14.40 | 28.80 | 344.36 |
| | 7581 | 10/2/2012 | 10/5/2012 | 399.12 | 2 | 14.40 | 28.80 | 399.12 |
| | 7721 | 11/13/2012 | 11/16/2012 | 389.44 | 2 | 17.29 | 34.58 | 389.44 |
| | 7809 | 12/11/2012 | 12/14/2012 | 421.08 | 2 | 17.29 | 34.58 | 421.08 |
| | 7896 | 1/15/2013 | 1/18/2013 | 363.00 | 2 | 17.29 | 34.58 | 363.00 |
| | 7963 | 2/12/2013 | 2/15/2013 | 220.44 | 2 | 17.29 | 34.58 | 220.44 |
| | 8035 | 3/12/2013 | 3/15/2013 | 328.82 | 2 | 17.29 | 34.58 | 328.82 |
| | 8109 | 4/9/2013 | 4/12/2013 | 362.76 | 2 | 17.29 | 34.58 | 362.76 |
| | 8168 | 5/7/2013 | 5/10/2013 | 385.40 | 2 | 17.29 | 34.58 | 385.40 |
| | 8252 | 6/3/2013 | 6/7/2013 | 151.62 | 2 | 17.29 | 34.58 | 151.62 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|----------------------|-----------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4028 | 5/27/2009 | 5/29/2009 | 77.78 | 2 | 14.93 | 29.86 | 77.78 |
| | 4073 | 6/9/2009 | 6/12/2009 | 100.20 | 2 | 14.93 | 29.86 | 100.20 |
| | 4130 | 7/20/2009 | 7/24/2009 | 226.46 | 2 | 15.17 | 30.34 | 226.46 |
| | 4191 | 8/11/2009 | 8/17/2009 | 235.94 | 2 | 15.17 | 30.34 | 235.94 |
| | 4265 | 9/14/2009 | 9/18/2009 | 242.14 | 2 | 15.17 | 30.34 | 242.14 |
| | 4306 | 10/5/2009 | 10/12/2009 | 48.62 | 2 | 15.17 | 30.34 | 48.62 |
| | 4413 | 11/11/2009 | 11/16/2009 | 179.38 | 2 | 15.17 | 30.34 | 179.38 |
| | 4522 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4586 | 1/19/2010 | 1/22/2010 | 242.94 | 2 | 15.17 | 30.34 | 242.94 |
| | 4671 | 2/9/2010 | 2/12/2010 | 341.44 | 2 | 15.17 | 30.34 | 341.44 |
| | 4824 | 3/16/2010 | 3/29/2010 | 652.14 | 2 | 15.17 | 30.34 | 652.14 |
| | 4925 | 4/14/2010 | 4/20/2010 | 453.88 | 2 | 15.17 | 30.34 | 453.88 |
| | 5041 | 5/17/2010 | 5/24/2010 | 879.08 | 2 | 15.17 | 30.34 | 879.08 |
| | 5166 | 6/14/2010 | 6/21/2010 | 823.70 | 2 | 7.00 | 14.00 | 823.70 |
| | 5301 | 7/26/2010 | 8/2/2010 | 45.56 | 2 | 7.00 | 14.00 | 45.56 |
| | 5387 | 8/24/2010 | 8/30/2010 | 686.82 | 2 | 7.00 | 14.00 | 686.82 |
| | 5441 | 9/13/2010 | 9/20/2010 | 758.66 | 2 | 7.00 | 14.00 | 758.66 |
| | 5560 | 10/19/2010 | 10/25/2010 | 761.02 | 2 | 7.00 | 14.00 | 761.02 |
| | 5652 | 11/15/2010 | 11/22/2010 | 849.62 | 2 | 7.00 | 14.00 | 849.62 |
| | 5709 | 12/7/2010 | 12/13/2010 | 828.18 | 2 | 7.00 | 14.00 | 828.18 |
| | 5807 | 1/11/2011 | 1/18/2011 | 708.12 | 2 | 14.03 | 28.06 | 708.12 |
| | 5881 | 2/1/2011 | 2/10/2011 | 707.46 | 2 | 14.03 | 28.06 | 707.46 |
| | 5971 | 3/1/2011 | 3/4/2011 | 902.20 | 2 | 14.03 | 28.06 | 902.20 |
| Panel 4 | 6074 6173 | 4/5/2011 5/2/2011 | 4/20/2011 5/6/2011 | 831.04 729.88 | 2 | 14.03 14.03 | 28.06 28.06 | 831.04 729.88 |
| Room 7i | 6324 | 6/15/2011 | 6/24/2011 | 687.94 | 2 | 14.03 | 28.06 | 687.94 |
| | 6400 | 7/11/2011 | 7/15/2011 | 674.94 | 2 | 14.03 | 28.06 | 674.94 |
| | 6461 | 8/9/2011 | 8/19/2011 | 507.68 | 2 | 14.03 | 28.06 | 507.68 |
| | 6544 | 9/13/2011 | 9/16/2011 | 500.24 | 2 | 14.03 | 28.06 | 500.24 |
| | 6618 | 10/10/2011 | 10/14/2011 | 388.58 | 2 | 14.03 | 28.06 | 388.58 |
| | 6691 | 11/1/2011 | 11/4/2011 | 425.88 | 2 | 14.03 | 28.06 | 425.88 |
| | 6795 | 12/12/2011 | 12/16/2011 | 557.70 | 2 | 14.40 | 28.80 | 557.70 |
| | 6881 | 1/17/2012 | 1/23/2012 | 529.76 | 2 | 14.40 | 28.80 | 529.76 |
| | 6933 | 2/7/2012 | 2/10/2012 | 435.94 | 2 | 14.40 | 28.80 | 435.94 |
| | 7034 | 3/13/2012 | 3/16/2012 | 378.74 | 2 | 14.40 | 28.80 | 378.74 |
| | 7104 | 4/10/2012 | 4/13/2012 | 168.24 | 2 | 14.40 | 28.80 | 168.24 |
| | 7182 | 5/8/2012 | 5/15/2012 | 217.16 | 2 | 14.40 | 28.80 | 217.16 |
| | 7261 | 6/11/2012 | 6/18/2012 | 141.74 | 2 | 14.40 | 28.80 | 141.74 |
| | 7332 | 7/10/2012 | 7/13/2012 | 135.10 | 2 | 14.40 | 28.80 | 135.10 |
| | 7448 | 8/13/2012 | 8/17/2012 | 102.58 | 2 | 14.40 | 28.80 | 102.58 |
| | 7526 | 9/10/2012 | 9/14/2012 | 358.82 | 2 | 14.40 | 28.80 | 358.82 |
| | 7572 | 10/1/2012 | 10/5/2012 | 357.82 | 2 | 14.40 | 28.80 | 357.82 |
| | 7712 | 11/12/2012 | 11/16/2012 | 323.84 | 2 | 17.29 | 34.58 | 323.84 |
| | 7800 | 12/10/2012 | 12/14/2012 | 348.26 | 2 | 17.29 | 34.58 | 348.26 |
| | 7887 | 1/14/2013 | 1/18/2013 | 242.66 | 2 | 17.29 | 34.58 | 242.66 |
| | 7954 | 2/12/2013 | 2/15/2013 | 194.70 | 2 | 17.29 | 34.58 | 194.70 |
| | 8026 | 3/12/2013 | 3/15/2013 | 317.90 | 2 | 17.29 | 34.58 | 317.90 |
| | 8100 | 4/9/2013 | 4/12/2013 | 335.64 | 2 | 17.29 | 34.58 | 335.64 |
| | 8159 8243 | 5/7/2013 6/3/2013 | 5/10/2013 | 350.10 | 2 | 17.29 17.29 | 34.58 | 350.10 17.29 |
| | 0243 | 0/3/2013 | 6/7/2013 | N.D. | | 17.29 | 34.58 | 17.29 |

| | Hydrogen (H₂) | | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | | |
| | 4031 | 5/27/2009 | 5/29/2009 | 190.82 | 2 | 14.93 | 29.86 | 190.82 | | | | |
| | 4068 | 6/8/2009 | 6/12/2009 | 114.46 | 2 | 14.93 | 29.86 | 114.46 | | | | |
| | 4140 | 7/21/2009 | 7/24/2009 | 177.58 | 2 | 15.17 | 30.34 | 177.58 | | | | |
| | 4201 | 8/11/2009 | 8/17/2009 | 247.88 | 2 | 15.17 | 30.34 | 247.88 | | | | |
| | 4275 | 9/15/2009 | 9/18/2009 | 159.46 | 2 | 15.17 | 30.34 | 159.46 | | | | |
| | 4316 | 10/5/2009 | 10/12/2009 | 117.88 | 2 | 15.17 | 30.34 | 117.88 | | | | |
| | 4403 | 11/9/2009 | 11/16/2009 | 341.80 | 2 | 15.17 | 30.34 | 341.80 | | | | |
| | 4532 | 12/30/2009 | 1/12/2010 | 466.88 | 2 | 15.17 | 30.34 | 466.88 | | | | |
| | 4596 | 1/20/2010 | 1/22/2010 | 576.72 | 2 | 15.17 | 30.34 | 576.72 | | | | |
| | 4681 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4834 | 3/17/2010 | 3/29/2010 | 599.50 | 2 | 15.17 | 30.34 | 599.50 | | | | |
| | 4916 | 4/13/2010 | 4/20/2010 | 741.36 | 2 | 15.17 | 30.34 | 741.36 | | | | |
| | 5051 | 5/17/2010 | 5/24/2010 | 234.98 | 2 | 15.17 | 30.34 | 234.98 | | | | |
| | 5176 | 6/15/2010 | 6/21/2010 | 207.18 | 2 | 7.00 | 14.00 | 207.18 | | | | |
| | 5311 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 | | | | |
| Panel 4 | 5397 | 8/25/2010 | 8/30/2010 | 880.34 | 2 | 7.00 | 14.00 | 880.34 | | | | |
| Room 6e | 5451 | 9/14/2010 | 9/20/2010 | 902.54 | 2 | 7.00 | 14.00 | 902.54 | | | | |
| | 5570 | 10/20/2010 | 10/25/2010 | 1012.68 | 2 | 7.00 | 14.00 | 1012.68 | | | | |
| | 5662 | 11/16/2010 | 11/22/2010 | 991.58 | 2 | 7.00 | 14.00 | 991.58 | | | | |
| | 5719 | 12/8/2010 | 12/13/2010 | 768.08 | 2 | 7.00 | 14.00 | 768.08 | | | | |
| | 5817 | 1/12/2011 | 1/18/2011 | 619.40 | 2 | 14.03 | 28.06 | 619.40 | | | | |
| | 5893 | 2/7/2011 | 2/10/2011 | 911.52 | 2 | 14.03 | 28.06 | 911.52 | | | | |
| | 5981 | 3/2/2011 | 3/4/2011 | 946.96 | 2 | 14.03 | 28.06 | 946.96 | | | | |
| | 6084 | 4/5/2011 | 4/20/2011 | 616.24 | 2 | 14.03 | 28.06 | 616.24 | | | | |
| | 6183 | 5/3/2011 | 5/6/2011 | 720.54 | 2 | 14.03 | 28.06 | 720.54 | | | | |
| | 6334 | 6/16/2011 | 6/24/2011 | 543.56 | 2 | 14.03 | 28.06 | 543.56 | | | | |
| | 6410 | 7/12/2011 | 7/15/2011 | 648.56 | 2 | 14.03 | 28.06 | 648.56 | | | | |
| | 6478 | 8/9/2011 | 8/19/2011 | 692.68 | 2 | 14.03 | 28.06 | 692.68 | | | | |
| | 6554 | 9/14/2011 | 9/16/2011 | 656.56 | 2 | 14.03 | 28.06 | 656.56 | | | | |
| | 6628 | 10/11/2011 | 10/14/2011 | 679.30 | 2 | 14.03 | 28.06 | 679.30 | | | | |
| | 6701 | 11/1/2011 | 11/4/2011 | 661.62 | 2 | 14.03 | 28.06 | 661.62 | | | | |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|----------------------|------------------|-------------------------------|---------------------|---------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4027 | 5/27/2009 | 5/29/2009 | 67.96 | 2 | 14.93 | 29.86 | 67.96 |
| | 4072 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4131 | 7/20/2009 | 7/24/2009 | 247.58 | 2 | 15.17 | 30.34 | 247.58 |
| | 4192 | 8/11/2009 | 8/17/2009 | 230.00 | 2 | 15.17 | 30.34 | 230.00 |
| | 4266 | 9/14/2009 | 9/18/2009 | 247.62 | 2 | 15.17 | 30.34 | 247.62 |
| | 4307 | 10/5/2009 | 10/12/2009 | 324.08 | 2 | 15.17 | 30.34 | 324.08 |
| | 4412 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4523 | 12/30/2009 | 1/12/2010 | 419.66 | 2 | 15.17 | 30.34 | 419.66 |
| | 4587 | 1/19/2010 | 1/22/2010 | 199.04 | 2 | 15.17 | 30.34 | 199.04 |
| | 4672 | 2/9/2010 | 2/12/2010 | 85.18 | 2 | 15.17 | 30.34 | 85.18 |
| | 4825 | 3/16/2010 | 3/29/2010 | 647.86 | 2 | 15.17 | 30.34 | 647.86 |
| | 4926 | 4/14/2010 | 4/20/2010 | 528.88 | 2 | 15.17 | 30.34 | 528.88 |
| | 5042 | 5/17/2010 | 5/24/2010 | 613.98 | 2 | 15.17 | 30.34 | 613.98 |
| | 5167 | 6/14/2010 | 6/21/2010 | 613.10 | 2 | 7.00 | 14.00 | 613.10 |
| | 5302 | 7/26/2010 | 8/2/2010 | 555.22 | 2 | 7.00 | 14.00 | 555.22 |
| | 5388 5442 | 8/24/2010 | 8/30/2010 | 750.22 | 2 | 7.00 7.00 | 14.00 | 750.22 |
| | 5561 | 9/13/2010 | 9/20/2010 | 713.28 902.74 | 2 | 7.00 | 14.00 14.00 | 713.28 902.74 |
| | 5653 | 11/15/2010 | 11/22/2010 | 760.56 | 2 | 7.00 | 14.00 | 760.56 |
| | 5710 | 12/7/2010 | 12/13/2010 | 740.56 | 2 | 7.00 | 14.00 | 740.56 |
| | 5808 | 1/11/2011 | 1/18/2011 | 740.30 | 2 | 14.03 | 28.06 | 740.30 |
| | 5882 | 2/1/2011 | 2/10/2011 | 704.76 | 2 | 14.03 | 28.06 | 704.76 |
| | 5972 | 3/1/2011 | 3/4/2011 | 736.38 | 2 | 14.03 | 28.06 | 736.38 |
| | 6075 | 4/5/2011 | 4/20/2011 | 648.88 | 2 | 14.03 | 28.06 | 648.88 |
| Panel 4 | 6174 | 5/2/2011 | 5/6/2011 | 512.20 | 2 | 14.03 | 28.06 | 512.20 |
| Room 6i | 6325 | 6/15/2011 | 6/24/2011 | 531.00 | 2 | 14.03 | 28.06 | 531.00 |
| | 6401 | 7/11/2011 | 7/15/2011 | 494.48 | 2 | 14.03 | 28.06 | 494.48 |
| | 6469 | 8/9/2011 | 8/19/2011 | 397.04 | 2 | 14.03 | 28.06 | 397.04 |
| | 6545 | 9/13/2011 | 9/16/2011 | 461.88 | 2 | 14.03 | 28.06 | 461.88 |
| | 6619 | 10/10/2011 | 10/14/2011 | 323.52 | 2 | 14.03 | 28.06 | 323.52 |
| | 6692 | 11/1/2011 | 11/4/2011 | 370.18 | 2 | 14.03 | 28.06 | 370.18 |
| | 6796 | 12/12/2011 | 12/16/2011 | 459.02 | 2 | 14.40 | 28.80 | 459.02 |
| | 6882 | 1/17/2012 | 1/23/2012 | 496.08 | 2 | 14.40 | 28.80 | 496.08 |
| | 6934 | 2/7/2012 | 2/10/2012 | 382.54 | 2 | 14.40 | 28.80 | 382.54 |
| | 7035 | 3/13/2012 | 3/16/2012 | 376.90 | 2 | 14.40 | 28.80 | 376.90 |
| | 7105 | 4/10/2012 | 4/13/2012 | 143.80 | 2 | 14.40 | 28.80 | 143.80 |
| | 7183 | 5/8/2012 | 5/15/2012 | 239.76 | 2 | 14.40 | 28.80 | 239.76 |
| | 7262 | 6/11/2012 | 6/18/2012 | 131.74 | 2 | 14.40 | 28.80 | 131.74 |
| | 7333 | 7/10/2012 | 7/13/2012 | 125.18 | 2 | 14.40 | 28.80 | 125.18 |
| | 7449 | 8/13/2012 | 8/17/2012 | 103.14 | 2 | 14.40 | 28.80 | 103.14 |
| | 7527 | 9/10/2012 | 9/14/2012 | 337.64 | 2 | 14.40 | 28.80 | 337.64 |
| | 7573 | 10/1/2012 | 10/5/2012 | 358.46 | 2 | 14.40 | 28.80 | 358.46 |
| | 7713 | 11/12/2012 | 11/16/2012 | 318.78 | 2 | 17.29 | 34.58 | 318.78 |
| | 7801 | 12/10/2012 | 12/14/2012 | 352.86 | 2 | 17.29 | 34.58 | 352.86 |
| | 7888 | 1/14/2013 | 1/18/2013 | 270.80 | 2 | 17.29 | 34.58 | 270.80 |
| | 7955 | 2/12/2013 | 2/15/2013 | 160.74 | 2 | 17.29 | 34.58 | 160.74 |
| | 8027 | 3/12/2013 | 3/15/2013 | 288.12 | 2 | 17.29 | 34.58 | 288.12 |
| | 8101 | 4/9/2013 | 4/12/2013 | 316.54 | 2 | 17.29 | 34.58 | 316.54 |
| | 8160 8244 | 5/7/2013 6/3/2013 | 5/10/2013 | 257.66 | 2 | 17.29 | 34.58 | 257.66 |
| | 0244 | 0/3/2013 | 6/7/2013 | N.D. | | 17.29 | 34.58 | 17.29 |

| | Hydrogen (H₂) | | | | | | | | | | | |
|----------|---------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | | |
| | 4030 | 5/27/2009 | 5/29/2009 | 143.28 | 2 | 14.93 | 29.86 | 143.28 | | | | |
| | 4067 | 6/8/2009 | 6/12/2009 | 65.66 | 2 | 14.93 | 29.86 | 65.66 | | | | |
| | 4141 | 7/21/2009 | 7/24/2009 | 175.06 | 2 | 15.17 | 30.34 | 175.06 | | | | |
| | 4202 | 8/11/2009 | 8/17/2009 | 33.02 | 2 | 15.17 | 30.34 | 33.02 | | | | |
| | 4276 | 9/15/2009 | 9/18/2009 | 172.86 | 2 | 15.17 | 30.34 | 172.86 | | | | |
| | 4317 | 10/5/2009 | 10/12/2009 | 129.82 | 2 | 15.17 | 30.34 | 129.82 | | | | |
| | 4402 | 11/9/2009 | 11/16/2009 | 406.36 | 2 | 15.17 | 30.34 | 406.36 | | | | |
| | 4533 | 12/30/2009 | 1/12/2010 | 468.60 | 2 | 15.17 | 30.34 | 468.60 | | | | |
| | 4597 | 1/20/2010 | 1/22/2010 | 408.40 | 2 | 15.17 | 30.34 | 408.40 | | | | |
| | 4682 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | | |
| | 4835 | 3/17/2010 | 3/29/2010 | 575.58 | 2 | 15.17 | 30.34 | 575.58 | | | | |
| | 4917 | 4/13/2010 | 4/20/2010 | 510.30 | 2 | 15.17 | 30.34 | 510.30 | | | | |
| | 5052 | 5/17/2010 | 5/24/2010 | 747.14 | 2 | 15.17 | 30.34 | 747.14 | | | | |
| | 5177 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 | | | | |
| | 5312 | 7/27/2010 | 8/2/2010 | 601.06 | 2 | 7.00 | 14.00 | 601.06 | | | | |
| | 5398 | 8/25/2010 | 8/30/2010 | 688.94 | 2 | 7.00 | 14.00 | 688.94 | | | | |
| | 5452 | 9/14/2010 | 9/20/2010 | 792.94 | 2 | 7.00 | 14.00 | 792.94 | | | | |
| | 5571 | 10/20/2010 | 10/25/2010 | 655.86 | 2 | 7.00 | 14.00 | 655.86 | | | | |
| Devel 4 | 5663 | 11/16/2010 | 11/22/2010 | 756.48 | 2 | 7.00 | 14.00 | 756.48 | | | | |
| Panel 4 | 5720 | 12/8/2010 | 12/13/2010 | 583.38 | 2 | 7.00 | 14.00 | 583.38 | | | | |
| Room 5e | 5818 | 1/12/2011 | 1/18/2011 | 709.40 | 2 | 14.03 | 28.06 | 709.40 | | | | |
| | 5894 | 2/7/2011 | 2/10/2011 | 677.24 | 2 | 14.03 | 28.06 | 677.24 | | | | |
| | 5982 | 3/2/2011 | 3/4/2011 | 683.92 | 2 | 14.03 | 28.06 | 683.92 | | | | |
| | 6085 | 4/5/2011 | 4/20/2011 | 608.70 | 2 | 14.03 | 28.06 | 608.70 | | | | |
| | 6184 | 5/3/2011 | 5/6/2011 | 731.70 | 2 | 14.03 | 28.06 | 731.70 | | | | |
| | 6335 | 6/16/2011 | 6/24/2011 | 689.48 | 2 | 14.03 | 28.06 | 689.48 | | | | |
| | 6411 | 7/12/2011 | 7/15/2011 | 640.36 | 2 | 14.03 | 28.06 | 640.36 | | | | |
| | 6479 | 8/9/2011 | 8/19/2011 | 646.18 | 2 | 14.03 | 28.06 | 646.18 | | | | |
| | 6557 | 9/14/2011 | 9/16/2011 | 671.18 | 2 | 14.03 | 28.06 | 671.18 | | | | |
| | 6629 | 10/11/2011 | 10/14/2011 | 673.00 | 2 | 14.03 | 28.06 | 673.00 | | | | |
| | 6702 | 11/1/2011 | 11/4/2011 | 604.10 | 2 | 14.03 | 28.06 | 604.10 | | | | |
| | 6806 | 12/13/2011 | 12/16/2011 | 558.76 | 2 | 14.40 | 28.80 | 558.76 | | | | |
| | 6892 | 1/17/2012 | 1/23/2012 | 648.78 | 2 | 14.40 | 28.80 | 648.78 | | | | |
| | 6943 | 2/7/2012 | 2/10/2012 | 606.14 | 2 | 14.40 | 28.80 | 606.14 | | | | |
| | 7044 | 3/13/2012 | 3/16/2012 | 533.38 | 2 | 14.40 | 28.80 | 533.38 | | | | |
| | 7114 | 4/10/2012 | 4/13/2012 | 484.22 | 2 | 14.40 | 28.80 | 484.22 | | | | |
| | 7192 | 5/9/2012 | 5/15/2012 | 425.66 | 2 | 14.40 | 28.80 | 425.66 | | | | |
| | 7271 | 6/11/2012 | 6/18/2012 | 337.64 | 2 | 14.40 | 28.80 | 337.64 | | | | |
| | 7342 | 7/10/2012 | 7/13/2012 | 381.12 | 2 | 14.40 | 28.80 | 381.12 | | | | |

| | | | | Hydroger | า (H ₂) | | | |
|----------|--------------|----------------|------------------|-------------------------------|---------------------|---------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4026 | 5/27/2009 | 5/29/2009 | 68.62 | 2 | 14.93 | 29.86 | 68.62 |
| | 4071 | 6/9/2009 | 6/12/2009 | 95.90 | 2 | 14.93 | 29.86 | 95.90 |
| | 4132 | 7/20/2009 | 7/24/2009 | 198.24 | 2 | 15.17 | 30.34 | 198.24 |
| | 4193 | 8/11/2009 | 8/17/2009 | 250.44 | 2 | 15.17 | 30.34 | 250.44 |
| | 4267 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4308 | 10/5/2009 | 10/12/2009 | 371.50 | 2 | 15.17 | 30.34 | 371.50 |
| | 4411 | 11/11/2009 | 11/16/2009 | 429.94 | 2 | 15.17 | 30.34 | 429.94 |
| | 4524 | 12/30/2009 | 1/12/2010 | 576.48 | 2 | 15.17 | 30.34 | 576.48 |
| | 4588 | 1/19/2010 | 1/22/2010 | 312.66 | 2 | 15.17 | 30.34 | 312.66 |
| | 4673 | 2/9/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4826 | 3/16/2010 | 3/29/2010 | 649.22 | 2 | 15.17 | 30.34 | 649.22 |
| | 4927 | 4/14/2010 | 4/20/2010 | 480.98 | 2 | 15.17 | 30.34 | 480.98 |
| | 5043 | 5/17/2010 | 5/24/2010 | 386.14 | 2 | 15.17 | 30.34 | 386.14 |
| | 5168 | 6/14/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5303 | 7/26/2010 | 8/2/2010 | 593.42 | 2 | 7.00 | 14.00 | 593.42 |
| | 5389 | 8/24/2010 | 8/30/2010 | 606.30 | 2 | 7.00 | 14.00 | 606.30 |
| | 5443 | 9/13/2010 | 9/20/2010 | 790.44 | 2 | 7.00 | 14.00 | 790.44 |
| | 5562 | 10/19/2010 | 10/25/2010 | 764.12 | 2 | 7.00 | 14.00 | 764.12 |
| | 5654 | 11/15/2010 | 11/22/2010 | 686.16 | 2 | 7.00 | 14.00 | 686.16 |
| | 5711 | 12/7/2010 | 12/13/2010 | 636.06 | 2 | 7.00 | 14.00 | 636.06 |
| | 5809 | 1/11/2011 | 1/18/2011 | 647.44 | 2 | 14.03 | 28.06 | 647.44 |
| | 5883 | 2/1/2011 | 2/10/2011 | 580.90 | 2 | 14.03 | 28.06 | 580.90 |
| | 5973 | 3/1/2011 | 3/4/2011 | 636.12 | 2 | 14.03 | 28.06 | 636.12 |
| | 6076 | 4/5/2011 | 4/20/2011 | 698.90 | 2 | 14.03 | 28.06 | 698.90 |
| Panel 4 | 6175 | 5/2/2011 | 5/6/2011 | 695.86 | 2 | 14.03 | 28.06 | 695.86 |
| Room 5i | 6326 | 6/15/2011 | 6/24/2011 | 608.70 | 2 | 14.03 | 28.06 | 608.70 |
| | 6402 | 7/11/2011 | 7/15/2011 | 715.64 | 2 | 14.03 | 28.06 | 715.64 |
| | 6470 | 8/9/2011 | 8/19/2011 | 631.96 | 2 | 14.03 | 28.06 | 631.96 |
| | 6546 | 9/13/2011 | 9/16/2011 | 564.12 | 2 | 14.03 | 28.06 | 564.12 |
| | 6620 | 10/10/2011 | 10/14/2011 | 449.38 | 2 | 14.03 | 28.06 | 449.38 |
| | 6693 | 11/1/2011 | 11/4/2011 | 421.78 | 2 | 14.03 | 28.06 | 421.78 |
| | 6797 | 12/12/2011 | 12/16/2011 | 502.48 | 2 | 14.40 | 28.80 | 502.48 |
| | 6883 | 1/17/2012 | 1/23/2012 | 517.00 | 2 | 14.40 | 28.80 | 517.00 |
| | 6935 | 2/7/2012 | 2/10/2012 | 442.04 | 2 | 14.40 | 28.80 | 442.04 |
| | 7036 | 3/13/2012 | 3/16/2012 | 421.60 | 2 | 14.40 | 28.80 | 421.60 |
| | 7106 | 4/10/2012 | 4/13/2012 | 312.30 | 2 | 14.40 | 28.80 | 312.30 |
| | 7184 | 5/8/2012 | 5/15/2012 | 279.52 | 2 | 14.40 | 28.80 | 279.52 |
| | 7263 | 6/11/2012 | 6/18/2012 | 258.10 | 2 | 14.40 | 28.80 | 258.10 |
| | 7334 | 7/10/2012 | 7/13/2012 | 325.82 | 2 | 14.40 | 28.80 | 325.82 |
| | 7450 | 8/13/2012 | 8/17/2012 | 223.98 | 2 | 14.40 | 28.80 | 223.98 |
| | 7528 | 9/10/2012 | 9/14/2012 | 364.56 | 2 | 14.40 | 28.80 | 364.56 |
| | 7574 | 10/1/2012 | 10/5/2012 | 387.78 | 2 | 14.40 | 28.80 | 387.78 |
| | 7714 | 11/12/2012 | 11/16/2012 | 354.74 | 2 | 17.29 | 34.58 | 354.74 |
| | 7802 | 12/10/2012 | 12/14/2012 | 362.94 | 2 | 17.29 | 34.58 | 362.94 |
| | 7889 | 1/14/2013 | 1/18/2013 | 356.84 | 2 | 17.29 | 34.58 | 356.84 |
| - | 7956 | 2/12/2013 | 2/15/2013 | 177.06 | 2 | 17.29 | 34.58 | 177.06 |
| | 8028 | 3/12/2013 | 3/15/2013 | 303.32 | 2 | 17.29 | 34.58 | 303.32 |
| | 8102 | 4/9/2013 | 4/12/2013 | 296.04 | 2 | 17.29 | 34.58 | 296.04 |
| | 8161 | 5/7/2013 | 5/10/2013 | 360.62 | 2 | 17.29 | 34.58 | 360.62 |
| | 8245 | 6/3/2013 | 6/7/2013 | 26.42 | 2 | 17.29 | 34.58 | 17.29 |

| Hydrogen (H ₂) | | | | | | | | | | | |
|----------------------------|--------------|----------------|------------------|-------------------------------|--------------------|---------------|----------------------------------------|----------------------------------------------------------|--|--|--|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) | | | |
| | 4029 | 5/27/2009 | 5/29/2009 | 52.26 | 2 | 14.93 | 29.86 | 52.26 | | | |
| | 4066 | 6/8/2009 | 6/12/2009 | 29.26 | 2 | 14.93 | 29.86 | 14.93 | | | |
| | 4142 | 7/21/2009 | 7/24/2009 | 145.02 | 2 | 15.17 | 30.34 | 145.02 | | | |
| | 4203 | 8/13/2009 | 8/17/2009 | 256.40 | 2 | 15.17 | 30.34 | 256.40 | | | |
| | 4277 | 9/15/2009 | 9/18/2009 | 239.74 | 2 | 15.17 | 30.34 | 239.74 | | | |
| | 4318 | 10/5/2009 | 10/12/2009 | 107.02 | 2 | 15.17 | 30.34 | 107.02 | | | |
| | 4401 | 11/9/2009 | 11/16/2009 | 293.96 | 2 | 15.17 | 30.34 | 293.96 | | | |
| | 4534 | 12/30/2009 | 1/12/2010 | 525.70 | 2 | 15.17 | 30.34 | 525.70 | | | |
| | 4598 | 1/20/2010 | 1/22/2010 | 298.72 | 2 | 15.17 | 30.34 | 298.72 | | | |
| | 4683 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 | | | |
| Panel 4 | 4836 | 3/17/2010 | 3/29/2010 | 512.92 | 2 | 15.17 | 30.34 | 512.92 | | | |
| | 4918 | 4/13/2010 | 4/20/2010 | 516.80 | 2 | 15.17 | 30.34 | 516.80 | | | |
| Room 4e | 5053 | 5/17/2010 | 5/24/2010 | 479.40 | 2 | 15.17 | 30.34 | 479.40 | | | |
| | 5178 | 6/15/2010 | 6/21/2010 | 144.16 | 2 | 7.00 | 14.00 | 144.16 | | | |
| | 5313 | 7/27/2010 | 8/2/2010 | 597.18 | 2 | 7.00 | 14.00 | 597.18 | | | |
| | 5399 | 8/25/2010 | 8/30/2010 | 779.30 | 2 | 7.00 | 14.00 | 779.30 | | | |
| | 5453 | 9/14/2010 | 9/20/2010 | 561.66 | 2 | 7.00 | 14.00 | 561.66 | | | |
| | 5572 | 10/20/2010 | 10/25/2010 | 643.42 | 2 | 7.00 | 14.00 | 643.42 | | | |
| | 5664 | 11/16/2010 | 11/22/2010 | 640.36 | 2 | 7.00 | 14.00 | 640.36 | | | |
| | 5721 | 12/8/2010 | 12/13/2010 | 570.10 | 2 | 7.00 | 14.00 | 570.10 | | | |
| | 5819 | 1/12/2011 | 1/18/2011 | 656.70 | 2 | 14.03 | 28.06 | 656.70 | | | |
| | 5895 | 2/7/2011 | 2/10/2011 | 479.42 | 2 | 14.03 | 28.06 | 479.42 | | | |
| | 5983 | 3/2/2011 | 3/4/2011 | 561.46 | 2 | 14.03 | 28.06 | 561.46 | | | |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-----------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4025 | 5/27/2009 | 5/29/2009 | 46.62 | 2 | 14.93 | 29.86 | 46.62 |
| | 4070 | 6/9/2009 | 6/12/2009 | 66.00 | 2 | 14.93 | 29.86 | 66.00 |
| | 4133 | 7/20/2009 | 7/24/2009 | 162.30 | 2 | 15.17 | 30.34 | 162.30 |
| | 4194 | 8/11/2009 | 8/17/2009 | 184.72 | 2 | 15.17 | 30.34 | 184.72 |
| | 4268 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4309 | 10/5/2009 | 10/12/2009 | 167.38 | 2 | 15.17 | 30.34 | 167.38 |
| | 4410 | 11/11/2009 | 11/16/2009 | 390.88 | 2 | 15.17 | 30.34 | 390.88 |
| | 4525 | 12/30/2009 | 1/12/2010 | 476.76 | 2 | 15.17 | 30.34 | 476.76 |
| | 4589 | 1/19/2010 | 1/22/2010 | 302.16 | 2 | 15.17 | 30.34 | 302.16 |
| | 4674 | 2/9/2010 | 2/12/2010 | 73.90 | 2 | 15.17 | 30.34 | 73.90 |
| | 4827 | 3/16/2010 | 3/29/2010 | 532.06 | 2 | 15.17 | 30.34 | 532.06 |
| | 4928 | 4/14/2010 | 4/20/2010 | 91.48 | 2 | 15.17 | 30.34 | 91.48 |
| | 5044 | 5/17/2010 | 5/24/2010 | 537.96 | 2 | 15.17 | 30.34 | 537.96 |
| | 5169 | 6/14/2010 | 6/21/2010 | 111.78 | 2 | 7.00 | 14.00 | 111.78 |
| | 5304 | 7/26/2010 | 8/2/2010 | 275.10 | 2 | 7.00 | 14.00 | 275.10 |
| | 5390 | 8/24/2010 | 8/30/2010 | 709.50 | 2 | 7.00 | 14.00 | 709.50 |
| | 5444 | 9/13/2010 | 9/20/2010 | 728.04 | 2 | 7.00 | 14.00 | 728.04 |
| | 5563 | 10/19/2010 | 10/25/2010 | 670.12 | 2 | 7.00 | 14.00 | 670.12 |
| | 5655 | 11/15/2010 | 11/22/2010 | 672.26 | 2 | 7.00 | 14.00 | 672.26 |
| | 5712 | 12/7/2010 | 12/13/2010 | 610.84 | 2 | 7.00 | 14.00 | 610.84 |
| | 5810 | 1/11/2011 | 1/18/2011 | 597.58 | 2 | 14.03 | 28.06 | 597.58 |
| | 5884 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5974 | 3/1/2011 | 3/4/2011 | 622.32 | 2 | 14.03 | 28.06 | 622.32 |
| Donal 4 | 6077 | 4/5/2011 | 4/20/2011 | 734.34 | 2 | 14.03 | 28.06 | 734.34 |
| Panel 4 | 6176 | 5/2/2011 | 5/6/2011 | 663.88 | 2 | 14.03 | 28.06 | 663.88 |
| Room 4i | 6327 | 6/15/2011 | 6/24/2011 | 583.40 | 2 | 14.03 | 28.06 | 583.40 |
| | 6403 | 7/11/2011 | 7/15/2011 | 629.18 | 2 | 14.03 | 28.06 | 629.18 |
| | 6471 6547 | 8/9/2011 9/13/2011 | 8/19/2011 9/16/2011 | 445.40 428.76 | 2 | 14.03 14.03 | 28.06 28.06 | 445.40 428.76 |
| | 6621 | 10/10/2011 | 10/14/2011 | 357.76 | 2 | 14.03 | 28.06 | 357.76 |
| | 6694 | 11/1/2011 | 11/4/2011 | 381.34 | 2 | 14.03 | 28.06 | 381.34 |
| | 6798 | 12/12/2011 | 12/16/2011 | 552.18 | 2 | 14.40 | 28.80 | 552.18 |
| | 6884 | 1/17/2012 | 1/23/2012 | 550.82 | 2 | 14.40 | 28.80 | 550.82 |
| | 6936 | 2/7/2012 | 2/10/2012 | 457.42 | 2 | 14.40 | 28.80 | 457.42 |
| | 7037 | 3/13/2012 | 3/16/2012 | 389.74 | 2 | 14.40 | 28.80 | 389.74 |
| | 7107 | 4/10/2012 | 4/13/2012 | 312.08 | 2 | 14.40 | 28.80 | 312.08 |
| | 7185 | 5/8/2012 | 5/15/2012 | 290.96 | 2 | 14.40 | 28.80 | 290.96 |
| | 7264 | 6/11/2012 | 6/18/2012 | 282.70 | 2 | 14.40 | 28.80 | 282.70 |
| | 7335 | 7/10/2012 | 7/13/2012 | 327.42 | 2 | 14.40 | 28.80 | 327.42 |
| | 7451 | 8/13/2012 | 8/17/2012 | 266.40 | 2 | 14.40 | 28.80 | 266.40 |
| | 7529 | 9/10/2012 | 9/14/2012 | 370.90 | 2 | 14.40 | 28.80 | 370.90 |
| | 7575 | 10/1/2012 | 10/5/2012 | 398.82 | 2 | 14.40 | 28.80 | 398.82 |
| | 7715 | 11/12/2012 | 11/16/2012 | 371.26 | 2 | 17.29 | 34.58 | 371.26 |
| | 7803 | 12/10/2012 | 12/14/2012 | 383.66 | 2 | 17.29 | 34.58 | 383.66 |
| | 7890 | 1/14/2013 | 1/18/2013 | 400.52 | 2 | 17.29 | 34.58 | 400.52 |
| | 7957 | 2/12/2013 | 2/15/2013 | 187.84 | 2 | 17.29 | 34.58 | 187.84 |
| | 8029 | 3/12/2013 | 3/15/2013 | 292.78 | 2 | 17.29 | 34.58 | 292.78 |
| | 8103 | 4/9/2013 | 4/12/2013 | 273.76 | 2 | 17.29 | 34.58 | 273.76 |
| | 8162 | 5/7/2013 | 5/10/2013 | 345.92 | 2 | 17.29 | 34.58 | 345.92 |
| | 8246 | 6/3/2013 | 6/7/2013 | 36.88 | 2 | 17.29 | 34.58 | 36.88 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-----------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4019 | 5/26/2009 | 5/29/2009 | 135.72 | 2 | 14.93 | 29.86 | 135.72 |
| | 4077 | 6/10/2009 | 6/12/2009 | 46.60 | 2 | 14.93 | 29.86 | 46.60 |
| | 4143 | 7/21/2009 | 7/24/2009 | 137.72 | 2 | 15.17 | 30.34 | 137.72 |
| | 4204 | 8/13/2009 | 8/17/2009 | 160.64 | 2 | 15.17 | 30.34 | 160.64 |
| | 4278 | 9/15/2009 | 9/18/2009 | 166.84 | 2 | 15.17 | 30.34 | 166.84 |
| | 4319 | 10/5/2009 | 10/12/2009 | 33.06 | 2 | 15.17 | 30.34 | 33.06 |
| | 4400 | 11/9/2009 | 11/16/2009 | 391.36 | 2 | 15.17 | 30.34 | 391.36 |
| | 4535 | 12/30/2009 | 1/12/2010 | 538.14 | 2 | 15.17 | 30.34 | 538.14 |
| | 4599 | 1/20/2010 | 1/22/2010 | 407.96 | 2 | 15.17 | 30.34 | 407.96 |
| | 4684 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4837 | 3/17/2010 | 3/29/2010 | 554.86 | 2 | 15.17 | 30.34 | 554.86 |
| | 4919 | 4/13/2010 | 4/20/2010 | 458.06 | 2 | 15.17 | 30.34 | 458.06 |
| | 5054 | 5/17/2010 | 5/24/2010 | 377.58 | 2 | 15.17 | 30.34 | 377.58 |
| | 5179 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5314 | 7/27/2010 | 8/2/2010 | 647.24 | 2 | 7.00 | 14.00 | 647.24 |
| | 5400 | 8/25/2010 | 8/30/2010 | 241.08 | 2 | 7.00 | 14.00 | 241.08 |
| | 5454 | 9/14/2010 | 9/20/2010 | 622.18 | 2 | 7.00 | 14.00 | 622.18 |
| | 5573 | 10/20/2010 | 10/25/2010 | 533.98 | 2 | 7.00 | 14.00 | 533.98 |
| | 5665 | 11/16/2010 | 11/22/2010 | 691.12 | 2 | 7.00 | 14.00 | 691.12 |
| | 5722 | 12/8/2010 | 12/13/2010 | 620.50 | 2 | 7.00 | 14.00 | 620.50 |
| | 5820 | 1/12/2011 | 1/18/2011 | 656.18 | 2 | 14.03 | 28.06 | 656.18 |
| | 5896 | 2/7/2011 | 2/10/2011 | 661.56 | 2 | 14.03 | 28.06 | 661.56 |
| | 5984 | 3/2/2011 | 3/4/2011 | 573.94 | 2 | 14.03 | 28.06 | 573.94 |
| Daniel 4 | 6087 | 4/6/2011 | 4/20/2011 | 676.52 | 2 | 14.03 | 28.06 | 676.52 |
| Panel 4 | 6185 | 5/3/2011 | 5/6/2011 | 662.62 | 2 | 14.03 | 28.06 | 662.62 |
| Room 3e | 6336 | 6/16/2011 | 6/24/2011 | 674.22 | 2 | 14.03 | 28.06 | 674.22 |
| | 6412 | 7/12/2011 | 7/15/2011 | 635.28 | 2 | 14.03 | 28.06 | 635.28 |
| | 6480 | 8/9/2011 | 8/19/2011 | 663.40 | 2 2 | 14.03 | 28.06 | 663.40 |
| | 6558 | 9/14/2011 | 9/16/2011 | 626.82 | | 14.03 | 28.06 | 626.82 |
| | 6630 | 10/11/2011 | 10/14/2011 | 628.78 | 2 | 14.03 | 28.06 | 628.78 |
| | 6703 6807 | 11/1/2011 | 11/4/2011 | 605.58 | 2 2 | 14.03 14.40 | 28.06 | 605.58 |
| | | 12/13/2011 | 12/16/2011 | 552.70 | 2 | | 28.80 | 552.70 |
| | 6893 6944 | 1/17/2012 2/7/2012 | 1/23/2012 2/10/2012 | 590.80 533.58 | 2 | 14.40 14.40 | 28.80 28.80 | 590.80 533.58 |
| | 7045 | 3/13/2012 | 3/16/2012 | 524.88 | 2 | 14.40 | 28.80 | 524.88 |
| | 7045 | 4/10/2012 | 4/13/2012 | 407.36 | 2 | 14.40 | 28.80 | 407.36 |
| | 7113 | 5/9/2012 | 5/15/2012 | 353.58 | 2 | 14.40 | 28.80 | 353.58 |
| | 7193 | 6/11/2012 | 6/18/2012 | 322.22 | 2 | 14.40 | 28.80 | 322.22 |
| | 7343 | 7/10/2012 | 7/13/2012 | 298.32 | 2 | 14.40 | 28.80 | 298.32 |
| | 7459 | 8/13/2012 | 8/17/2012 | 188.78 | 2 | 14.40 | 28.80 | 188.78 |
| | 7536 | 9/10/2012 | 9/14/2012 | 351.60 | 2 | 14.40 | 28.80 | 351.60 |
| | 7582 | 10/2/2012 | 10/5/2012 | 408.14 | 2 | 14.40 | 28.80 | 408.14 |
| | 7722 | 11/13/2012 | 11/16/2012 | 395.10 | 2 | 17.29 | 34.58 | 395.10 |
| | 7810 | 12/11/2012 | 12/14/2012 | 415.32 | 2 | 17.29 | 34.58 | 415.32 |
| | 7897 | 1/15/2013 | 1/18/2013 | 380.88 | 2 | 17.29 | 34.58 | 380.88 |
| | 7964 | 2/12/2013 | 2/15/2013 | 221.86 | 2 | 17.29 | 34.58 | 221.86 |
| | 8036 | 3/12/2013 | 3/15/2013 | 324.78 | 2 | 17.29 | 34.58 | 324.78 |
| | 8110 | 4/9/2013 | 4/12/2013 | 388.98 | 2 | 17.29 | 34.58 | 388.98 |
| | 8169 | 5/7/2013 | 5/10/2013 | 395.20 | 2 | 17.29 | 34.58 | 395.20 |
| | 8253 | 6/3/2013 | 6/7/2013 | 136.12 | 2 | 17.29 | 34.58 | 136.12 |

| | | | | Hydroger | า (H ₂) | | | |
|----------|--------------|-----------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4024 | 5/27/2009 | 5/29/2009 | 15.48 | 2 | 14.93 | 29.86 | 14.93 |
| | 4079 | 6/10/2009 | 6/12/2009 | 40.10 | 2 | 14.93 | 29.86 | 40.10 |
| | 4134 | 7/20/2009 | 7/24/2009 | 65.92 | 2 | 15.17 | 30.34 | 65.92 |
| | 4195 | 8/11/2009 | 8/17/2009 | 120.62 | 2 | 15.17 | 30.34 | 120.62 |
| | 4269 | 9/14/2009 | 9/18/2009 | 130.34 | 2 | 15.17 | 30.34 | 130.34 |
| | 4310 | 10/5/2009 | 10/12/2009 | 23.22 | 2 | 15.17 | 30.34 | 15.17 |
| | 4409 | 11/11/2009 | 11/16/2009 | 317.70 | 2 | 15.17 | 30.34 | 317.70 |
| | 4526 | 12/30/2009 | 1/12/2010 | 410.20 | 2 | 15.17 | 30.34 | 410.20 |
| | 4590 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4675 | 2/9/2010 | 2/12/2010 | 92.42 | 2 | 15.17 | 30.34 | 92.42 |
| | 4828 | 3/16/2010 | 3/29/2010 | 484.76 | 2 | 15.17 | 30.34 | 484.76 |
| | 4929 | 4/14/2010 | 4/20/2010 | 331.22 | 2 | 15.17 | 30.34 | 331.22 |
| | 5045 | 5/17/2010 | 5/24/2010 | 408.70 | 2 | 15.17 | 30.34 | 408.70 |
| | 5170 | 6/15/2010 | 6/21/2010 | 491.76 | 2 | 7.00 | 14.00 | 491.76 |
| | 5305 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5391 | 8/24/2010 | 8/30/2010 | 824.28 | 2 | 7.00 | 14.00 | 824.28 |
| | 5445 | 9/13/2010 | 9/20/2010 | 177.42 | 2 | 7.00 | 14.00 | 177.42 |
| | 5564 | 10/19/2010 | 10/25/2010 | 658.14 | 2 | 7.00 | 14.00 | 658.14 |
| | 5656 | 11/15/2010 | 11/22/2010 | 693.76 | 2 | 7.00 | 14.00 | 693.76 |
| | 5713 | 12/7/2010 | 12/13/2010 | 653.24 | 2 | 7.00 | 14.00 | 653.24 |
| | 5811 | 1/11/2011 | 1/18/2011 | 539.18 | 2 | 14.03 | 28.06 | 539.18 |
| | 5885 | 2/1/2011 | 2/10/2011 | 610.30 | 2 | 14.03 | 28.06 | 610.30 |
| | 5975 | 3/1/2011 | 3/4/2011 | 567.88 | 2 | 14.03 | 28.06 | 567.88 |
| Donal 4 | 6078 | 4/5/2011 | 4/20/2011 | 647.26 | 2 | 14.03 | 28.06 | 647.26 |
| Panel 4 | 6177 | 5/2/2011 | 5/6/2011 | 579.32 | 2 | 14.03 | 28.06 | 579.32 |
| Room 3i | 6328 | 6/16/2011 | 6/24/2011 | 604.84 | 2 2 | 14.03 | 28.06 | 604.84 |
| | 6404 6472 | 7/11/2011 | 7/15/2011 | 592.78 | 2 | 14.03 | 28.06 | 592.78 |
| | 6548 | 8/9/2011 9/13/2011 | 8/19/2011 9/16/2011 | 589.06 586.56 | 2 | 14.03 14.03 | 28.06 28.06 | 589.06 586.56 |
| | 6622 | 10/10/2011 | 10/14/2011 | 543.54 | 2 | 14.03 | 28.06 | 543.54 |
| | 6695 | 11/1/2011 | 11/4/2011 | 476.68 | 2 | 14.03 | 28.06 | 476.68 |
| | 6799 | 12/12/2011 | 12/16/2011 | 538.20 | 2 | 14.40 | 28.80 | 538.20 |
| | 6885 | 1/17/2012 | 1/23/2012 | 557.32 | 2 | 14.40 | 28.80 | 557.32 |
| | 6937 | 2/7/2012 | 2/10/2012 | 489.38 | 2 | 14.40 | 28.80 | 489.38 |
| | 7038 | 3/13/2012 | 3/16/2012 | 446.26 | 2 | 14.40 | 28.80 | 446.26 |
| | 7108 | 4/10/2012 | 4/13/2012 | 403.18 | 2 | 14.40 | 28.80 | 403.18 |
| | 7186 | 5/8/2012 | 5/15/2012 | 322.48 | 2 | 14.40 | 28.80 | 322.48 |
| | 7265 | 6/11/2012 | 6/18/2012 | 251.78 | 2 | 14.40 | 28.80 | 251.78 |
| | 7336 | 7/10/2012 | 7/13/2012 | 195.46 | 2 | 14.40 | 28.80 | 195.46 |
| | 7452 | 8/13/2012 | 8/17/2012 | 141.14 | 2 | 14.40 | 28.80 | 141.14 |
| | 7530 | 9/10/2012 | 9/14/2012 | 324.08 | 2 | 14.40 | 28.80 | 324.08 |
| | 7576 | 10/1/2012 | 10/5/2012 | 344.38 | 2 | 14.40 | 28.80 | 344.38 |
| | 7716 | 11/12/2012 | 11/16/2012 | 351.76 | 2 | 17.29 | 34.58 | 351.76 |
| | 7804 | 12/10/2012 | 12/14/2012 | 381.98 | 2 | 17.29 | 34.58 | 381.98 |
| | 7891 | 1/14/2013 | 1/18/2013 | 291.36 | 2 | 17.29 | 34.58 | 291.36 |
| | 7958 | 2/12/2013 | 2/15/2013 | 174.32 | 2 | 17.29 | 34.58 | 174.32 |
| | 8030 | 3/12/2013 | 3/15/2013 | 296.12 | 2 | 17.29 | 34.58 | 296.12 |
| | 8104 | 4/9/2013 | 4/12/2013 | 310.82 | 2 | 17.29 | 34.58 | 310.82 |
| | 8163 | 5/7/2013 | 5/10/2013 | 348.24 | 2 | 17.29 | 34.58 | 348.24 |
| | 8247 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|----------------------|-----------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4018 | 5/26/2009 | 5/29/2009 | 119.42 | 2 | 14.93 | 29.86 | 119.42 |
| | 4076 | 6/10/2009 | 6/12/2009 | 40.70 | 2 | 14.93 | 29.86 | 40.70 |
| | 4144 | 7/22/2009 | 7/24/2009 | 21.58 | 2 | 15.17 | 30.34 | 15.17 |
| | 4205 | 8/13/2009 | 8/17/2009 | 41.80 | 2 | 15.17 | 30.34 | 41.80 |
| | 4279 | 9/15/2009 | 9/18/2009 | 33.74 | 2 | 15.17 | 30.34 | 33.74 |
| | 4320 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4399 | 11/9/2009 | 11/16/2009 | 360.32 | 2 | 15.17 | 30.34 | 360.32 |
| | 4536 | 12/30/2009 | 1/12/2010 | 447.06 | 2 | 15.17 | 30.34 | 447.06 |
| | 4600 | 1/20/2010 | 1/22/2010 | 412.04 | 2 | 15.17 | 30.34 | 412.04 |
| | 4685 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4838 | 3/17/2010 | 3/29/2010 | 401.50 | 2 | 15.17 | 30.34 | 401.50 |
| | 4920 | 4/13/2010 | 4/20/2010 | 384.86 | 2 | 15.17 | 30.34 | 384.86 |
| | 5055 | 5/17/2010 | 5/24/2010 | 450.50 | 2 | 15.17 | 30.34 | 450.50 |
| | 5180 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5315 | 7/27/2010 | 8/2/2010 | 252.22 | 2 | 7.00 | 14.00 | 252.22 |
| | 5401 | 8/25/2010 | 8/30/2010 | 453.70 | 2 | 7.00 | 14.00 | 453.70 |
| | 5455 | 9/14/2010 | 9/20/2010 | 505.30 | 2 | 7.00 | 14.00 | 505.30 |
| | 5574 | 10/20/2010 | 10/25/2010 | 164.70 | 2 | 7.00 | 14.00 | 164.70 |
| | 5666 | 11/16/2010 | 11/22/2010 | 478.96 | 2 | 7.00 | 14.00 | 478.96 |
| | 5723 | 12/8/2010 | 12/13/2010 | 477.24 | 2 | 7.00 | 14.00 | 477.24 |
| | 5821 | 1/12/2011 | 1/18/2011 | 530.64 | 2 | 14.03 | 28.06 | 530.64 |
| | 5897 | 2/7/2011 | 2/10/2011 | 498.90 | 2 | 14.03 | 28.06 | 498.90 |
| | 5985 | 3/2/2011 | 3/4/2011 | 456.92 | 2 | 14.03 | 28.06 | 456.92 |
| Panel 4 | 6088 | 4/6/2011 5/3/2011 | 4/20/2011 | 573.66 | 2 | 14.03 | 28.06 | 573.66 |
| Room 2e | 6186 6337 | 6/16/2011 | 5/6/2011 6/24/2011 | 435.26 549.10 | 2 | 14.03 14.03 | 28.06 28.06 | 435.26 549.10 |
| Room 2e | 6413 | 7/12/2011 | 7/15/2011 | 472.86 | 2 | 14.03 | 28.06 | 472.86 |
| | 6481 | 8/9/2011 | 8/19/2011 | 416.32 | 2 | 14.03 | 28.06 | 416.32 |
| | 6559 | 9/14/2011 | 9/16/2011 | 465.28 | 2 | 14.03 | 28.06 | 465.28 |
| | 6631 | 10/11/2011 | 10/14/2011 | 327.84 | 2 | 14.03 | 28.06 | 327.84 |
| | 6704 | 11/1/2011 | 11/4/2011 | 426.68 | 2 | 14.03 | 28.06 | 426.68 |
| | 6808 | 12/13/2011 | 12/16/2011 | 506.18 | 2 | 14.40 | 28.80 | 506.18 |
| | 6894 | 1/17/2012 | 1/23/2012 | 552.66 | 2 | 14.40 | 28.80 | 552.66 |
| | 6945 | 2/7/2012 | 2/10/2012 | 432.98 | 2 | 14.40 | 28.80 | 432.98 |
| | 7046 | 3/13/2012 | 3/16/2012 | 424.60 | 2 | 14.40 | 28.80 | 424.60 |
| | 7116 | 4/10/2012 | 4/13/2012 | 348.22 | 2 | 14.40 | 28.80 | 348.22 |
| | 7194 | 5/9/2012 | 5/15/2012 | 259.10 | 2 | 14.40 | 28.80 | 259.10 |
| | 7273 | 6/11/2012 | 6/18/2012 | 249.62 | 2 | 14.40 | 28.80 | 249.62 |
| | 7344 | 7/10/2012 | 7/13/2012 | 269.48 | 2 | 14.40 | 28.80 | 269.48 |
| | 7460 | 8/13/2012 | 8/17/2012 | 274.92 | 2 | 14.40 | 28.80 | 274.92 |
| | 7537 | 9/10/2012 | 9/14/2012 | 319.26 | 2 | 14.40 | 28.80 | 319.26 |
| | 7583 | 10/2/2012 | 10/5/2012 | 382.74 | 2 | 14.40 | 28.80 | 382.74 |
| | 7723 | 11/13/2012 | 11/16/2012 | 363.98 | 2 | 17.29 | 34.58 | 363.98 |
| | 7811 | 12/11/2012 | 12/14/2012 | 386.38 | 2 | 17.29 | 34.58 | 386.38 |
| | 7898 | 1/15/2013 | 1/18/2013 | 339.92 | 2 | 17.29 | 34.58 | 339.92 |
| | 7965 | 2/12/2013 | 2/15/2013 | 207.92 | 2 | 17.29 | 34.58 | 207.92 |
| | 8037 | 3/12/2013 | 3/15/2013 | 305.26 | 2 | 17.29 | 34.58 | 305.26 |
| | 8111 | 4/9/2013 | 4/12/2013 | 345.36 | 2 | 17.29 | 34.58 | 345.36 |
| | 8170 | 5/7/2013 | 5/10/2013 | 377.98 | 2 | 17.29 | 34.58 | 377.98 |
| | 8254 | 6/3/2013 | 6/7/2013 | 113.44 | 2 | 17.29 | 34.58 | 113.44 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-----------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4023 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4078 | 6/10/2009 | 6/12/2009 | 9.74 | 2 | 14.93 | 29.86 | 14.93 |
| | 4135 | 7/20/2009 | 7/24/2009 | 18.58 | 2 | 15.17 | 30.34 | 15.17 |
| | 4196 | 8/11/2009 | 8/17/2009 | 39.14 | 2 | 15.17 | 30.34 | 39.14 |
| | 4270 | 9/14/2009 | 9/18/2009 | 27.80 | 2 | 15.17 | 30.34 | 15.17 |
| | 4311 | 10/5/2009 | 10/12/2009 | 123.80 | 2 | 15.17 | 30.34 | 123.80 |
| | 4408 | 11/11/2009 | 11/16/2009 | 360.98 | 2 | 15.17 | 30.34 | 360.98 |
| | 4527 | 12/30/2009 | 1/12/2010 | 345.20 | 2 | 15.17 | 30.34 | 345.20 |
| | 4591 | 1/19/2010 | 1/22/2010 | 212.78 | 2 | 15.17 | 30.34 | 212.78 |
| | 4676 | 2/9/2010 | 2/12/2010 | 100.50 | 2 | 15.17 | 30.34 | 100.50 |
| | 4829 | 3/16/2010 | 3/29/2010 | 315.38 | 2 | 15.17 | 30.34 | 315.38 |
| | 4930 | 4/14/2010 | 4/20/2010 | 465.72 | 2 | 15.17 | 30.34 | 465.72 |
| | 5046 | 5/17/2010 | 5/24/2010 | 359.90 | 2 | 15.17 | 30.34 | 359.90 |
| | 5171 | 6/15/2010 | 6/21/2010 | 297.24 | 2 | 7.00 | 14.00 | 297.24 |
| | 5306 | 7/26/2010 | 8/2/2010 | 106.64 | 2 | 7.00 | 14.00 | 106.64 |
| | 5392 | 8/24/2010 | 8/30/2010 | 484.80 | 2 | 7.00 | 14.00 | 484.80 |
| | 5446 | 9/13/2010 | 9/20/2010 | 525.82 | 2 | 7.00 | 14.00 | 525.82 |
| | 5565 | 10/19/2010 | 10/25/2010 | 466.74 | 2 | 7.00 | 14.00 | 466.74 |
| | 5657 | 11/15/2010 | 11/22/2010 | 516.38 | 2 | 7.00 | 14.00 | 516.38 |
| | 5714 | 12/7/2010 | 12/13/2010 | 479.42 | 2 | 7.00 | 14.00 | 479.42 |
| | 5812 | 1/11/2011 | 1/18/2011 | 445.86 | 2 | 14.03 | 28.06 | 445.86 |
| | 5886 | 2/1/2011 | 2/10/2011 | 479.84 | 2 | 14.03 | 28.06 | 479.84 |
| | 5976 | 3/1/2011 | 3/4/2011 | 417.06 | 2 | 14.03 | 28.06 | 417.06 |
| | 6079 | 4/5/2011 | 4/20/2011 | 501.76 | 2 | 14.03 | 28.06 | 501.76 |
| Panel 4 | 6178 | 5/2/2011 | 5/6/2011 | 373.08 | 2 | 14.03 | 28.06 | 373.08 |
| Room 2i | 6329 | 6/16/2011 | 6/24/2011 | 505.80 | 2 | 14.03 | 28.06 | 505.80 |
| | 6405 | 7/11/2011 | 7/15/2011 | 460.76 | 2 | 14.03 | 28.06 | 460.76 |
| | 6473 6540 | 8/9/2011 | 8/19/2011 | 353.70 | 2 | 14.03 | 28.06 | 353.70 |
| | 6549 | 9/13/2011 | 9/16/2011 | 468.10 | | 14.03 | 28.06 | 468.10 |
| | 6623 | 10/10/2011 | 10/14/2011 | 332.94 | 2 | 14.03 | 28.06 | 332.94 |
| | 6696 6800 | 11/1/2011 | 11/4/2011 | 399.78 | 2 2 | 14.03 14.40 | 28.06 | 399.78 |
| | | 12/12/2011 | 12/16/2011 | 494.62 | 2 | _ | 28.80 | 494.62 486.72 |
| | 6886 6938 | 1/17/2012 2/7/2012 | 1/23/2012 2/10/2012 | 486.72 375.26 | 2 | 14.40 14.40 | 28.80 28.80 | 375.26 |
| | 7039 | 3/13/2012 | 3/16/2012 | 344.34 | 2 | | | 344.34 |
| | 7109 | 4/10/2012 | 4/13/2012 | 209.40 | 2 | 14.40 14.40 | 28.80 28.80 | 209.40 |
| | 7109 | 5/8/2012 | 5/15/2012 | 217.40 | 2 | 14.40 | 28.80 | 217.40 |
| | 7266 | 6/11/2012 | 6/18/2012 | 146.80 | 2 | 14.40 | 28.80 | 146.80 |
| | 7337 | 7/10/2012 | 7/13/2012 | 140.80 | 2 | 14.40 | 28.80 | 142.92 |
| | 7453 | 8/13/2012 | 8/17/2012 | 114.18 | 2 | 14.40 | 28.80 | 114.18 |
| | 7531 | 9/10/2012 | 9/14/2012 | 357.32 | 2 | 14.40 | 28.80 | 357.32 |
| | 7577 | 10/1/2012 | 10/5/2012 | 384.32 | 2 | 14.40 | 28.80 | 384.32 |
| | 7717 | 11/12/2012 | 11/16/2012 | 317.22 | 2 | 17.29 | 34.58 | 317.22 |
| | 7805 | 12/10/2012 | 12/14/2012 | 356.80 | 2 | 17.29 | 34.58 | 356.80 |
| | 7892 | 1/14/2013 | 1/18/2013 | 213.82 | 2 | 17.29 | 34.58 | 213.82 |
| | 7959 | 2/12/2013 | 2/15/2013 | 174.24 | 2 | 17.29 | 34.58 | 174.24 |
| | 8031 | 3/12/2013 | 3/15/2013 | 314.18 | 2 | 17.29 | 34.58 | 314.18 |
| | 8105 | 4/9/2013 | 4/12/2013 | 334.40 | 2 | 17.29 | 34.58 | 334.40 |
| | 8164 | 5/7/2013 | 5/10/2013 | 367.36 | 2 | 17.29 | 34.58 | 367.36 |
| | 8248 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-----------------------|------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4016 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4074 | 6/9/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4145 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4206 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4280 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4321 | 10/6/2009 | 10/12/2009 | 239.96 | 2 | 15.17 | 30.34 | 239.96 |
| | 4397 | 11/9/2009 | 11/16/2009 | 350.24 | 2 | 15.17 | 30.34 | 350.24 |
| | 4537 | 12/30/2009 | 1/12/2010 | 390.52 | 2 | 15.17 | 30.34 | 390.52 |
| | 4601 | 1/20/2010 | 1/22/2010 | 267.72 | 2 | 15.17 | 30.34 | 267.72 |
| | 4686 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4839 | 3/17/2010 | 3/29/2010 | 319.58 | 2 | 15.17 | 30.34 | 319.58 |
| | 4923 | 4/14/2010 | 4/20/2010 | 384.86 | 2 | 15.17 | 30.34 | 384.86 |
| | 5056 | 5/18/2010 | 5/24/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5181 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5316 | 7/27/2010 | 8/2/2010 | 307.08 | 2 | 7.00 | 14.00 | 307.08 |
| | 5402 | 8/25/2010 | 8/30/2010 | 223.64 | 2 | 7.00 | 14.00 | 223.64 |
| | 5456 | 9/14/2010 | 9/20/2010 | 270.82 | 2 | 7.00 | 14.00 | 270.82 |
| | 5575 | 10/20/2010 | 10/25/2010 | 355.54 | 2 | 7.00 | 14.00 | 355.54 |
| | 5667 5724 | 11/16/2010 | 11/22/2010 | 451.70 | 2 | 7.00 7.00 | 14.00 14.00 | 451.70 |
| | 5822 | 12/8/2010 | 12/13/2010 | 347.96 | 2 | | | 347.96 |
| | 5890 | 1/12/2011 2/1/2011 | 1/18/2011 2/10/2011 | 460.36 371.40 | 2 | 14.03 14.03 | 28.06 28.06 | 460.36 371.40 |
| | 5986 | 3/2/2011 | 3/4/2011 | 391.48 | 2 | 14.03 | 28.06 | 391.48 |
| | 6089 | 4/6/2011 | 4/20/2011 | 480.62 | 2 | 14.03 | 28.06 | 480.62 |
| Panel 4 | 6187 | 5/4/2011 | 5/6/2011 | 345.60 | 2 | 14.03 | 28.06 | 345.60 |
| Room 1e | 6338 | 6/16/2011 | 6/24/2011 | 488.10 | 2 | 14.03 | 28.06 | 488.10 |
| | 6414 | 7/12/2011 | 7/15/2011 | 283.24 | 2 | 14.03 | 28.06 | 283.24 |
| | 6482 | 8/9/2011 | 8/19/2011 | 143.48 | 2 | 14.03 | 28.06 | 143.48 |
| | 6560 | 9/14/2011 | 9/16/2011 | 410.04 | 2 | 14.03 | 28.06 | 410.04 |
| | 6634 | 10/11/2011 | 10/14/2011 | 305.92 | 2 | 14.03 | 28.06 | 305.92 |
| | 6707 | 11/1/2011 | 11/4/2011 | 388.88 | 2 | 14.03 | 28.06 | 388.88 |
| | 6811 | 12/13/2011 | 12/16/2011 | 494.32 | 2 | 14.40 | 28.80 | 494.32 |
| | 6897 | 1/17/2012 | 1/23/2012 | 501.80 | 2 | 14.40 | 28.80 | 501.80 |
| | 6948 | 2/7/2012 | 2/10/2012 | 414.88 | 2 | 14.40 | 28.80 | 414.88 |
| | 7049 | 3/13/2012 | 3/16/2012 | 376.52 | 2 | 14.40 | 28.80 | 376.52 |
| | 7119 | 4/10/2012 | 4/13/2012 | 322.28 | 2 | 14.40 | 28.80 | 322.28 |
| | 7197 | 5/9/2012 | 5/15/2012 | 278.46 | 2 | 14.40 | 28.80 | 278.46 |
| | 7276 | 6/11/2012 | 6/18/2012 | 219.08 | 2 | 14.40 | 28.80 | 219.08 |
| | 7347 | 7/10/2012 | 7/13/2012 | 79.50 | 2 | 14.40 | 28.80 | 79.50 |
| | 7463 | 8/14/2012 | 8/17/2012 | 203.66 | 2 | 14.40 | 28.80 | 203.66 |
| | 7540 | 9/10/2012 | 9/14/2012 | 281.34 | 2 | 14.40 | 28.80 | 281.34 |
| | 7586 | 10/2/2012 | 10/5/2012 | 329.02 | 2 | 14.40 | 28.80 | 329.02 |
| | 7726 | 11/13/2012 | 11/16/2012 | 356.44 | 2 | 17.29 | 34.58 | 356.44 |
| | 7814 | 12/11/2012 | 12/14/2012 | 424.38 | 2 | 17.29 | 34.58 | 424.38 |
| | 7901 | 1/15/2013 | 1/18/2013 | 355.52 | 2 | 17.29 | 34.58 | 355.52 |
| | 7968 | 2/12/2013 | 2/15/2013 | 216.66 | 2 | 17.29 | 34.58 | 216.66 |
| | 8040 | 3/12/2013 | 3/15/2013 | 316.90 | 2 | 17.29 | 34.58 | 316.90 |
| | 8114 | 4/9/2013 | 4/12/2013 | 345.72 | 2 | 17.29 | 34.58 | 345.72 |
| | 8173 | 5/7/2013 | 5/10/2013 | 350.46 | 2 | 17.29 | 34.58 | 350.46 |
| | 8257 | 6/3/2013 | 6/7/2013 | 110.94 | 2 | 17.29 | 34.58 | 110.94 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|----------------|------------------|-------------------------------|---------------------|---------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4020 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4061 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4136 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4197 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4271 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4312 | 10/5/2009 | 10/12/2009 | 197.06 | 2 | 15.17 | 30.34 | 197.06 |
| | 4407 | 11/11/2009 | 11/16/2009 | 173.66 | 2 | 15.17 | 30.34 | 173.66 |
| | 4528 | 12/30/2009 | 1/12/2010 | 340.76 | 2 | 15.17 | 30.34 | 340.76 |
| | 4592 | 1/19/2010 | 1/22/2010 | 231.74 | 2 | 15.17 | 30.34 | 231.74 |
| | 4677 | 2/9/2010 | 2/12/2010 | 93.12 | 2 | 15.17 | 30.34 | 93.12 |
| | 4830 | 3/16/2010 | 3/29/2010 | 163.52 | 2 | 15.17 | 30.34 | 163.52 |
| | 4931 | 4/14/2010 | 4/20/2010 | 408.26 | 2 | 15.17 | 30.34 | 408.26 |
| | 5047 | 5/17/2010 | 5/24/2010 | 342.24 | 2 | 15.17 | 30.34 | 342.24 |
| | 5172 | 6/15/2010 | 6/21/2010 | 218.42 | 2 | 7.00 | 14.00 | 218.42 |
| | 5307 | 7/26/2010 | 8/2/2010 | 125.26 | 2 | 7.00 | 14.00 | 125.26 |
| | 5393 | 8/24/2010 | 8/30/2010 | 333.46 | 2 | 7.00 | 14.00 | 333.46 |
| | 5447 | 9/13/2010 | 9/20/2010 | 328.02 | 2 | 7.00 | 14.00 | 328.02 |
| | 5566 | 10/19/2010 | 10/25/2010 | 427.46 | 2 | 7.00 | 14.00 | 427.46 |
| | 5658 | 11/15/2010 | 11/22/2010 | 443.82 | 2 | 7.00 | 14.00 | 443.82 |
| | 5715 | 12/7/2010 | 12/13/2010 | 455.58 | 2 | 7.00 | 14.00 | 455.58 |
| | 5813 | 1/11/2011 | 1/18/2011 | 362.94 | 2 | 14.03 | 28.06 | 362.94 |
| | 5887 | 2/1/2011 | 2/10/2011 | 353.66 | 2 | 14.03 | 28.06 | 353.66 |
| | 5977 | 3/1/2011 | 3/4/2011 | 370.72 | 2 | 14.03 | 28.06 | 370.72 |
| | 6080 | 4/5/2011 | 4/20/2011 | 414.54 | 2 | 14.03 | 28.06 | 414.54 |
| Panel 4 | 6179 | 5/2/2011 | 5/6/2011 | 252.54 | 2 | 14.03 | 28.06 | 252.54 |
| Room 1i | 6330 | 6/16/2011 | 6/24/2011 | 519.66 | 2 | 14.03 | 28.06 | 519.66 |
| | 6406 | 7/11/2011 | 7/15/2011 | 411.26 | 2 | 14.03 | 28.06 | 411.26 |
| | 6474 | 8/9/2011 | 8/19/2011 | 300.02 | 2 | 14.03 | 28.06 | 300.02 |
| | 6550 | 9/13/2011 | 9/16/2011 | 429.54 | 2 | 14.03 | 28.06 | 429.54 |
| | 6624 | 10/10/2011 | 10/14/2011 | 294.66 | 2 | 14.03 | 28.06 | 294.66 |
| | 6697 | 11/1/2011 | 11/4/2011 | 365.72 | 2 | 14.03 | 28.06 | 365.72 |
| | 6801 | 12/12/2011 | 12/16/2011 | 483.68 | 2 | 14.40 | 28.80 | 483.68 |
| | 6887 | 1/17/2012 | 1/23/2012 | 505.60 | 2 | 14.40 | 28.80 | 505.60 |
| | 6939 | 2/7/2012 | 2/10/2012 | 412.76 | 2 | 14.40 | 28.80 | 412.76 |
| | 7040 | 3/13/2012 | 3/16/2012 | 362.80 | 2 | 14.40 | 28.80 | 362.80 |
| | 7110 | 4/10/2012 | 4/13/2012 | 192.06 | 2 | 14.40 | 28.80 | 192.06 |
| | 7188 | 5/8/2012 | 5/15/2012 | 191.24 | 2 | 14.40 | 28.80 | 191.24 |
| | 7267 | 6/11/2012 | 6/18/2012 | 134.02 | 2 | 14.40 | 28.80 | 134.02 |
| | 7338 | 7/10/2012 | 7/13/2012 | 151.34 | 2 | 14.40 | 28.80 | 151.34 |
| | 7454 | 8/13/2012 | 8/17/2012 | 114.52 | 2 | 14.40 | 28.80 | 114.52 |
| | 7532 | 9/10/2012 | 9/14/2012 | 334.94 | 2 | 14.40 | 28.80 | 334.94 |
| | 7578 | 10/1/2012 | 10/5/2012 | 332.66 | 2 | 14.40 | 28.80 | 332.66 |
| | 7718 | 11/13/2012 | 11/16/2012 | 364.88 | 2 | 17.29 | 34.58 | 364.88 |
| | 7806 | 12/10/2012 | 12/14/2012 | 376.58 | 2 | 17.29 | 34.58 | 376.58 |
| | 7893 | 1/14/2013 | 1/18/2013 | 255.32 | 2 | 17.29 | 34.58 | 255.32 |
| | 7960 | 2/12/2013 | 2/15/2013 | 183.22 | 2 | 17.29 | 34.58 | 183.22 |
| | 8032 | 3/12/2013 | 3/15/2013 | 288.84 | 2 | 17.29 | 34.58 | 288.84 |
| | 8106 | 4/9/2013 | 4/12/2013 | 319.72 | 2 | 17.29 | 34.58 | 319.72 |
| | 8165 | 5/7/2013 | 5/10/2013 | 351.74 | 2 | 17.29 | 34.58 | 351.74 |
| | 8249 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|----------------------|-----------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4015 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4065 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4147 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4208 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4282 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4323 | 10/6/2009 | 10/12/2009 | 105.10 | 2 | 15.17 | 30.34 | 105.10 |
| | 4396 | 11/9/2009 | 11/16/2009 | 141.00 | 2 | 15.17 | 30.34 | 141.00 |
| | 4539 | 12/30/2009 | 1/12/2010 | 235.40 | 2 | 15.17 | 30.34 | 235.40 |
| | 4603 | 1/20/2010 | 1/22/2010 | 270.16 | 2 | 15.17 | 30.34 | 270.16 |
| | 4688 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4841 | 3/17/2010 | 3/29/2010 | 324.28 | 2 | 15.17 | 30.34 | 324.28 |
| | 4921 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5058 | 5/18/2010 | 5/24/2010 | 64.70 | 2 | 15.17 | 30.34 | 64.70 |
| | 5183 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5318 | 7/27/2010 | 8/2/2010 | 137.54 | 2 | 7.00 | 14.00 | 137.54 |
| | 5404 | 8/25/2010 | 8/30/2010 | 60.18 | 2 | 7.00 | 14.00 | 60.18 |
| | 5458 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5577 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5669 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5726 | 12/8/2010 | 12/13/2010 | 149.84 | 2 | 7.00 | 14.00 | 149.84 |
| | 5824 | 1/12/2011 | 1/18/2011 | 268.54 | 2 | 14.03 | 28.06 | 268.54 |
| | 5898 5988 | 2/7/2011 3/2/2011 | 2/10/2011 | 316.50 | 2 | 14.03 | 28.06 | 316.50 281.32 |
| | 6091 | 4/6/2011 | 3/4/2011 4/20/2011 | 281.32 182.90 | 2 | 14.03 14.03 | 28.06 28.06 | 182.90 |
| Panel 4 | 6189 | 5/4/2011 | 5/6/2011 | 42.48 | 2 | 14.03 | 28.06 | 42.48 |
| Location | 6340 | 6/16/2011 | 6/24/2011 | 206.20 | 2 | 14.03 | 28.06 | 206.20 |
| EBW | 6416 | 7/12/2011 | 7/15/2011 | 68.52 | 2 | 14.03 | 28.06 | 68.52 |
| | 6484 | 8/9/2011 | 8/19/2011 | 45.78 | 2 | 14.03 | 28.06 | 45.78 |
| | 6562 | 9/14/2011 | 9/16/2011 | 109.38 | 2 | 14.03 | 28.06 | 109.38 |
| | 6632 | 10/11/2011 | 10/14/2011 | 51.88 | 2 | 14.03 | 28.06 | 51.88 |
| | 6705 | 11/1/2011 | 11/4/2011 | 183.10 | 2 | 14.03 | 28.06 | 183.10 |
| | 6809 | 12/13/2011 | 12/16/2011 | 214.68 | 2 | 14.40 | 28.80 | 214.68 |
| | 6895 | 1/17/2012 | 1/23/2012 | 152.46 | 2 | 14.40 | 28.80 | 152.46 |
| | 6946 | 2/7/2012 | 2/10/2012 | 126.92 | 2 | 14.40 | 28.80 | 126.92 |
| | 7047 | 3/13/2012 | 3/16/2012 | 169.86 | 2 | 14.40 | 28.80 | 169.86 |
| | 7117 | 4/10/2012 | 4/13/2012 | 158.14 | 2 | 14.40 | 28.80 | 158.14 |
| | 7195 | 5/9/2012 | 5/15/2012 | 274.44 | 2 | 14.40 | 28.80 | 274.44 |
| | 7274 | 6/11/2012 | 6/18/2012 | 181.18 | 2 | 14.40 | 28.80 | 181.18 |
| | 7345 | 7/10/2012 | 7/13/2012 | 93.14 | 2 | 14.40 | 28.80 | 93.14 |
| | 7461 | 8/13/2012 | 8/17/2012 | 274.60 | 2 | 14.40 | 28.80 | 274.60 |
| | 7538 | 9/10/2012 | 9/14/2012 | 105.10 | 2 | 14.40 | 28.80 | 105.10 |
| | 7584 | 10/2/2012 | 10/5/2012 | 110.02 | 2 | 14.40 | 28.80 | 110.02 |
| | 7724 | 11/13/2012 | 11/16/2012 | 157.24 | 2 | 17.29 | 34.58 | 157.24 |
| | 7812 | 12/11/2012 | 12/14/2012 | 312.46 | 2 | 17.29 | 34.58 | 312.46 |
| | 7899 | 1/15/2013 | 1/18/2013 | 268.06 | 2 | 17.29 | 34.58 | 268.06 |
| | 7966 | 2/12/2013 | 2/15/2013 | 119.78 | 2 | 17.29 | 34.58 | 119.78 |
| | 8038 | 3/12/2013 | 3/15/2013 | 106.72 | 2 | 17.29 | 34.58 | 106.72 |
| | 8112 | 4/9/2013 | 4/12/2013 | 85.90 | 2 | 17.29 | 34.58 | 85.90 |
| | 8171 | 5/7/2013 | 5/10/2013 | 89.32 | 2 | 17.29 | 34.58 | 89.32 |
| | 8255 | 6/3/2013 | 6/7/2013 | 100.18 | 2 | 17.29 | 34.58 | 100.18 |

| | | | | Hydrogei | n (H ₂) | | | |
|----------|--------------|----------------------|-----------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4014 | 5/26/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4064 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4148 | 7/22/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4209 | 8/13/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4283 | 9/15/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4324 | 10/6/2009 | 10/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4395 | 11/9/2009 | 11/16/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4540 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4604 | 1/20/2010 | 1/22/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4689 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4842 | 3/17/2010 | 3/29/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4922 | 4/13/2010 | 4/20/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5059 | 5/18/2010 | 5/24/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5184 | 6/16/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5319 | 7/27/2010 | 8/2/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5405 | 8/25/2010 | 8/30/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5459 | 9/14/2010 | 9/20/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5578 | 10/20/2010 | 10/25/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5670 | 11/16/2010 | 11/22/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5727 | 12/8/2010 | 12/13/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5825 | 1/12/2011 | 1/18/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5899 | 2/7/2011 | 2/10/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5989 | 3/2/2011 | 3/4/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| Panel 4 | 6092 | 4/6/2011 5/4/2011 | 4/20/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 14.03 |
| Location | 6190 6341 | 6/16/2011 | 5/6/2011 6/24/2011 | N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 |
| EBA | 6417 | 7/12/2011 | 7/15/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6485 | 8/9/2011 | 8/19/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6563 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6633 | 10/11/2011 | 10/14/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6706 | 11/1/2011 | 11/4/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6810 | 12/13/2011 | 12/16/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6896 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6947 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7048 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7118 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7196 | 5/9/2012 | 5/15/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7275 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7346 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7462 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7539 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7585 | 10/2/2012 | 10/5/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7725 | 11/13/2012 | 11/16/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7813 | 12/11/2012 | 12/14/2012 | 31.60 | 2 | 17.29 | 34.58 | 17.29 |
| | 7900 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7967 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8039 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8113 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8172 | 5/7/2013 | 5/10/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8256 | 6/3/2013 | 6/7/2013 | 29.10 | 2 | 17.29 | 34.58 | 17.29 |

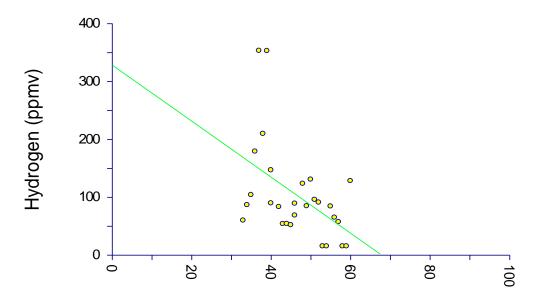
| | | | | Hydroger | n (H ₂) | | | |
|----------|--------------|-----------------------|-------------------------|-------------------------------|---------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| | 4022 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4063 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4137 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4198 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4272 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4313 | 10/5/2009 | 10/12/2009 | 12.56 | 2 | 15.17 | 30.34 | 15.17 |
| | 4406 | 11/11/2009 | 11/16/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4529 | 12/30/2009 | 1/12/2010 | 166.08 | 2 | 15.17 | 30.34 | 166.08 |
| | 4593 | 1/19/2010 | 1/22/2010 | 129.08 | 2 | 15.17 | 30.34 | 129.08 |
| | 4678 | 2/9/2010 | 2/12/2010 | 50.74 | 2 | 15.17 | 30.34 | 50.74 |
| | 4831 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4932 | 4/14/2010 | 4/20/2010 | 236.70 | 2 | 15.17 | 30.34 | 236.70 |
| | 5048 | 5/17/2010 | 5/24/2010 | 230.88 | 2 | 15.17 | 30.34 | 230.88 |
| | 5173 | 6/15/2010 | 6/21/2010 | 252.06 | 2 | 7.00 | 14.00 | 252.06 |
| | 5308 | 7/26/2010 | 8/2/2010 | 283.86 | 2 | 7.00 | 14.00 | 283.86 |
| | 5394 | 8/24/2010 | 8/30/2010 | 114.94 | 2 | 7.00 | 14.00 | 114.94 |
| | 5448 | 9/13/2010 | 9/20/2010 | 70.54 | 2 | 7.00 | 14.00 | 70.54 |
| | 5567 | 10/19/2010 | 10/25/2010 | 398.20 | 2 | 7.00 | 14.00 | 398.20 |
| | 5659 | 11/15/2010 | 11/22/2010 | 329.56 | 2 | 7.00 | 14.00 | 329.56 |
| | 5716 | 12/7/2010 | 12/13/2010 | 357.10 | 2 | 7.00 | 14.00 | 357.10 |
| | 5814 | 1/11/2011 | 1/18/2011 | 302.90 | 2 | 14.03 | 28.06 | 302.90 |
| | 5888 | 2/1/2011 | 2/10/2011 | 298.64 | 2 | 14.03 | 28.06 | 298.64 |
| | 5978 | 3/1/2011 | 3/4/2011 | 317.72 | 2 | 14.03 | 28.06 | 317.72 |
| Panel 4 | 6081 | 4/5/2011 | 4/20/2011 | 329.26 | 2 | 14.03 | 28.06 | 329.26 |
| Location | 6180 | 5/3/2011 | 5/6/2011 | 334.28 | 2 | 14.03 | 28.06 | 334.28 |
| IBW | 6331 | 6/16/2011 | 6/24/2011 | 319.28 | 2 | 14.03 | 28.06 | 319.28 |
| | 6407 | 7/11/2011 | 7/15/2011 | 263.72 | 2 | 14.03 | 28.06 | 263.72 |
| | 6475 CEE4 | 8/9/2011 | 8/19/2011 | 264.52 | 2 | 14.03 | 28.06 | 264.52 |
| | 6551 | 9/13/2011 | 9/16/2011 | 289.72 | | 14.03 | 28.06 | 289.72 |
| | 6625 | 10/10/2011 | 10/14/2011 | 229.52 | 2 | 14.03 | 28.06 | 229.52 |
| | 6698 6802 | 11/1/2011 | 11/4/2011 12/16/2011 | 249.70 | 2 2 | 14.03 14.40 | 28.06 | 249.70 |
| | | 12/12/2011 | | 356.14 | 2 | | 28.80 | 356.14 |
| | 6888 6940 | 1/17/2012 2/7/2012 | 1/23/2012 2/10/2012 | 310.84 318.06 | 2 | 14.40 14.40 | 28.80 28.80 | 310.84 318.06 |
| | 7041 | 3/13/2012 | 3/16/2012 | 226.60 | 2 | 14.40 | 28.80 | 226.60 |
| | 7041 | 4/10/2012 | 4/13/2012 | 51.64 | 2 | 14.40 | 28.80 | 51.64 |
| | 7111 | 5/8/2012 | 5/15/2012 | 95.04 | 2 | 14.40 | 28.80 | 95.04 |
| | 7169 | 6/11/2012 | 6/18/2012 | 77.72 | 2 | 14.40 | 28.80 | 77.72 |
| | 7339 | 7/10/2012 | 7/13/2012 | 16.24 | 2 | 14.40 | 28.80 | 14.40 |
| | 7455 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7533 | 9/10/2012 | 9/14/2012 | 230.78 | 2 | 14.40 | 28.80 | 230.78 |
| | 7579 | 10/2/2012 | 10/5/2012 | 227.70 | 2 | 14.40 | 28.80 | 227.70 |
| | 7719 | 11/13/2012 | 11/16/2012 | 220.86 | 2 | 17.29 | 34.58 | 220.86 |
| | 7807 | 12/10/2012 | 12/14/2012 | 296.50 | 2 | 17.29 | 34.58 | 296.50 |
| | 7894 | 1/15/2013 | 1/18/2013 | 33.08 | 2 | 17.29 | 34.58 | 17.29 |
| | 7961 | 2/12/2013 | 2/15/2013 | 137.52 | 2 | 17.29 | 34.58 | 137.52 |
| | 8033 | 3/12/2013 | 3/15/2013 | 222.48 | 2 | 17.29 | 34.58 | 222.48 |
| | 8107 | 4/9/2013 | 4/12/2013 | 260.22 | 2 | 17.29 | 34.58 | 260.22 |
| | 8166 | 5/7/2013 | 5/10/2013 | 344.92 | 2 | 17.29 | 34.58 | 344.92 |
| | 8250 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

| Hydrogen (H₂) | | | | | | | | |
|----------------------------|--------------|----------------|------------------|-------------------------------|--------------------|----------------|----------------------------------------|----------------------------------------------------------|
| Location | Sample ID | Sample Date | Analysis Date | Reported Results (ppmv) | Dilution Factor | MDL (ppmv) | Dilution corrected MDL (ppmv) | Concentration for Statistical Evaluation (ppmv) |
| Panel 4 Location IBA | 4021 | 5/27/2009 | 5/29/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4062 | 6/8/2009 | 6/12/2009 | N.D. | 2 | 14.93 | 29.86 | 14.93 |
| | 4138 | 7/20/2009 | 7/24/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4199 | 8/11/2009 | 8/17/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4273 | 9/14/2009 | 9/18/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4314 | 10/5/2009 | 10/12/2009 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4405 | 11/11/2009 | 11/16/2009 | 130.72 | 2 | 15.17 | 30.34 | 130.72 |
| | 4530 | 12/30/2009 | 1/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4594 | 1/19/2010 | 1/22/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4679 | 2/10/2010 | 2/12/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4832 | 3/16/2010 | 3/29/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 4933 | 4/14/2010 | 4/20/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5049 | 5/17/2010 | 5/24/2010 | N.D. | 2 | 15.17 | 30.34 | 15.17 |
| | 5174 | 6/15/2010 | 6/21/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5309 | 7/26/2010 | 8/2/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5395 | 8/24/2010 | 8/30/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5449 | 9/13/2010 | 9/20/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5568 | 10/19/2010 | 10/25/2010 | N.D. | 2 | 7.00 | 14.00 | 7.00 |
| | 5660 | 11/15/2010 | 11/22/2010 | 42.12 | 2 | 7.00 | 14.00 | 42.12 |
| | 5717 | 12/7/2010 | 12/13/2010 | 63.50 | 2 | 7.00 | 14.00 | 63.50 |
| | 5815 | 1/11/2011 | 1/18/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5889 | 2/1/2011 | 2/10/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 5979 | 3/1/2011 | 3/4/2011 | 45.52 | 2 | 14.03 | 28.06 | 45.52 |
| | 6082 | 4/5/2011 | 4/20/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6181 | 5/3/2011 | 5/6/2011 | 67.86 | 2 | 14.03 | 28.06 | 67.86 |
| | 6332 | 6/16/2011 | 6/24/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6408 | 7/12/2011 | 7/15/2011 | N.D. | | 14.03 | 28.06 | 14.03 |
| | 6476 6552 | 8/9/2011 | 8/19/2011 | N.D. N.D. | 2 | 14.03 | 28.06 | 14.03 |
| | 6626 | 9/14/2011 | 9/16/2011 | N.D. | 2 | 14.03 14.03 | 28.06 28.06 | 14.03 |
| | 6699 | 10/10/2011 | 11/4/2011 | N.D. | 2 | 14.03 | 28.06 | 14.03 14.03 |
| | 6803 | 12/12/2011 | 12/16/2011 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6889 | 1/17/2012 | 1/23/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 6941 | 2/7/2012 | 2/10/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7042 | 3/13/2012 | 3/16/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7112 | 4/10/2012 | 4/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7112 | 5/8/2012 | 5/15/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7269 | 6/11/2012 | 6/18/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7340 | 7/10/2012 | 7/13/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7456 | 8/13/2012 | 8/17/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7534 | 9/10/2012 | 9/14/2012 | N.D. | 2 | 14.40 | 28.80 | 14.40 |
| | 7580 | 10/2/2012 | 10/5/2012 | 20.80 | 2 | 14.40 | 28.80 | 14.40 |
| | 7720 | 11/13/2012 | 11/16/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7808 | 12/11/2012 | 12/14/2012 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7895 | 1/15/2013 | 1/18/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 7962 | 2/12/2013 | 2/15/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8034 | 3/12/2013 | 3/15/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8108 | 4/9/2013 | 4/12/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |
| | 8167 | 5/7/2013 | 5/10/2013 | 24.58 | 2 | 17.29 | 34.58 | 17.29 |
| | 8251 | 6/3/2013 | 6/7/2013 | N.D. | 2 | 17.29 | 34.58 | 17.29 |

Appendix G

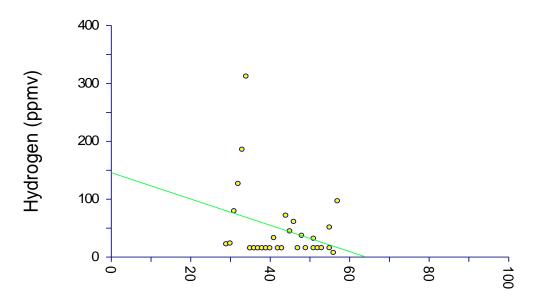
Panel 3 Individual Linear Regression Plots

Panel 3 Room 7e



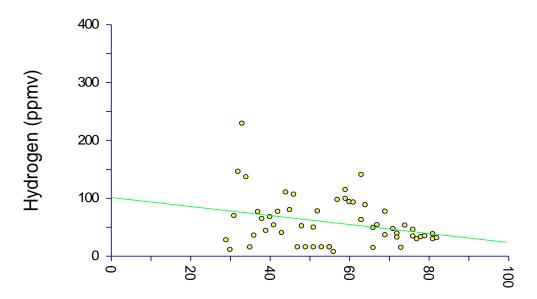
Months after Room Closure

Panel 3 Room 6i



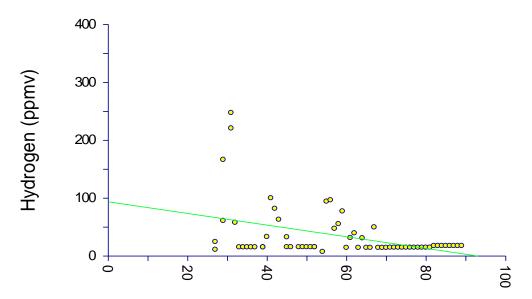
Months after Room Closure

Panel 3 Room 6e



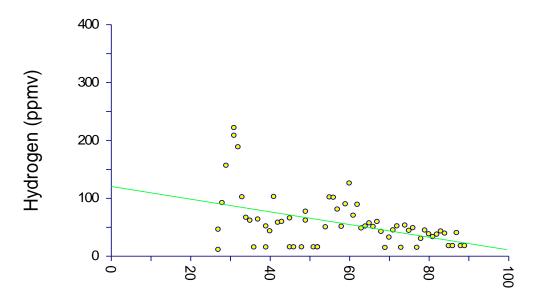
Months after Room Closure

Panel 3 Room 5i



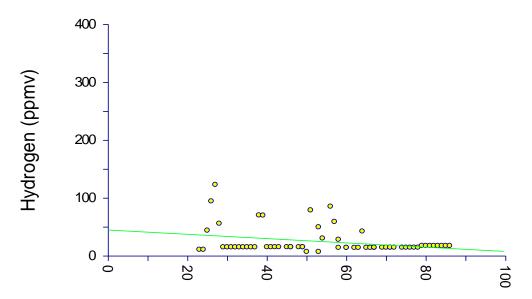
Months after Room Closure

Panel 3 Room 5e



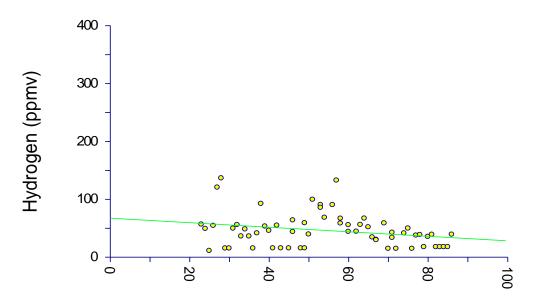
Months after Room Closure

Panel 3 Room 4i



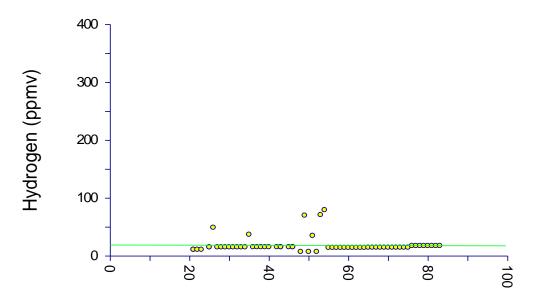
Months after Room Closure

Panel 3 Room 4e



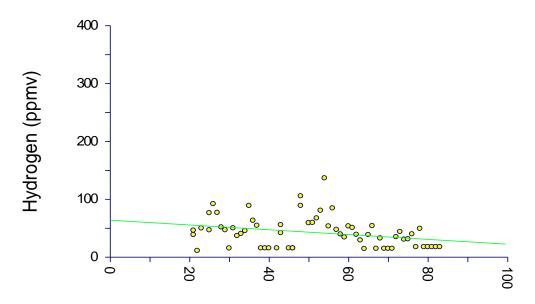
Months after Room Closure

Panel 3 Room 3i



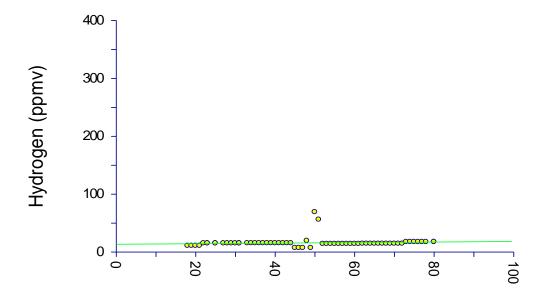
Months after Room Closure

Panel 3 Room 3e



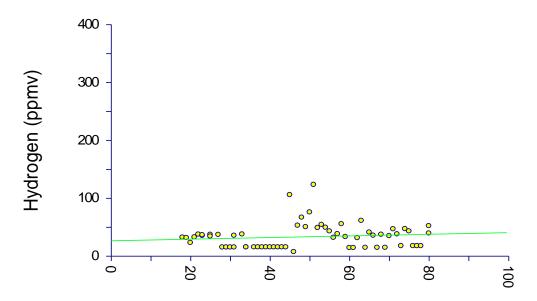
Months after Room Closure

Panel 3 Room 2i



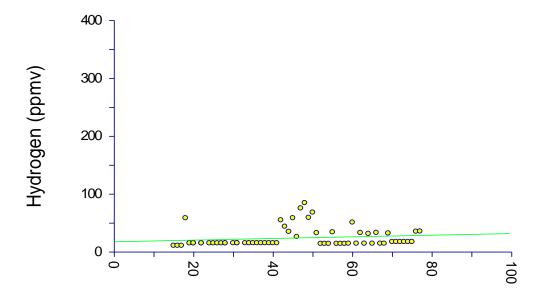
Months after Room Closure

Panel 3 Room 2e



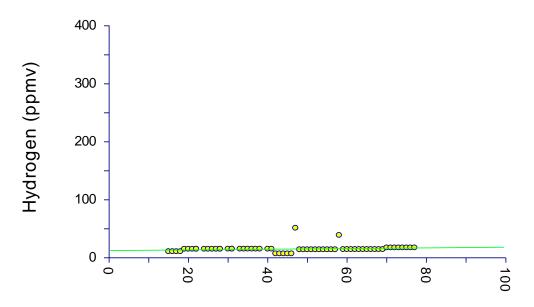
Months after Room Closure

Panel 3 Room 1e



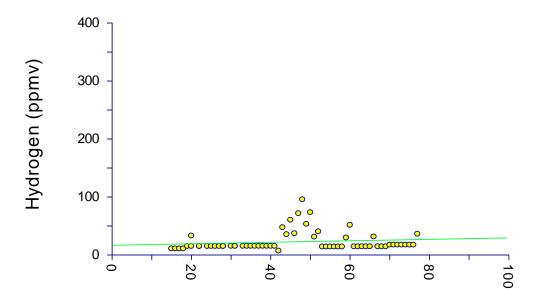
Months after Room Closure

Panel 3 Bulkhead IBW



Months after Room 1 Closure

Panel 3 Bulkhead EBW

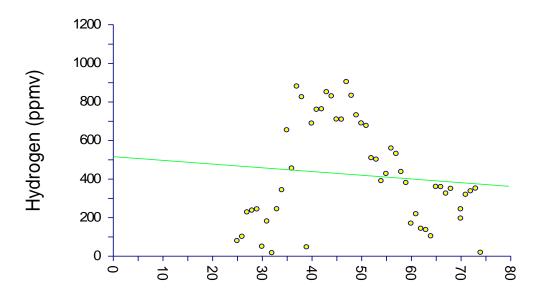


Months after Room 1 Closure

Appendix H

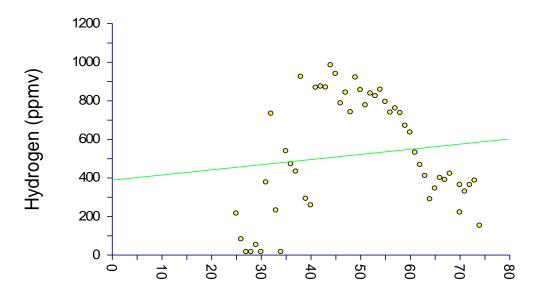
Panel 4 Individual Linear Regression Plots

Panel 4 Room 7i



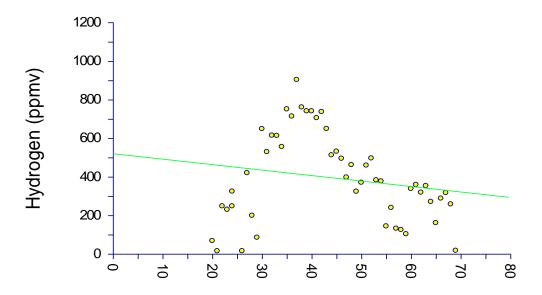
Months after Room Closure

Panel 4 Room 7e



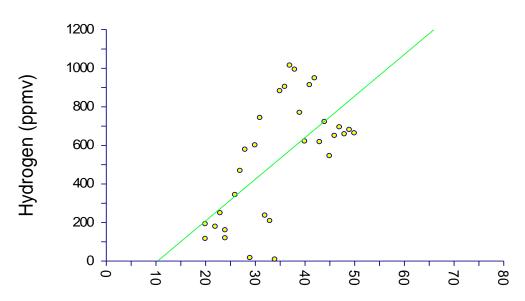
Months after Room Closure

Panel 4 Room 6i



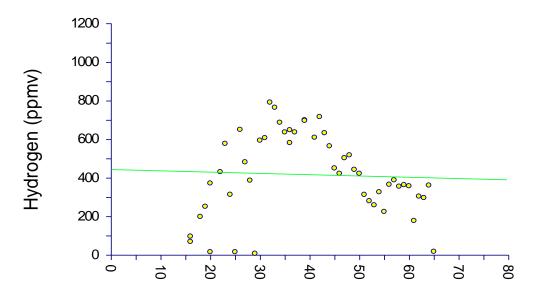
Months after Room Closure

Panel 4 Room 6e



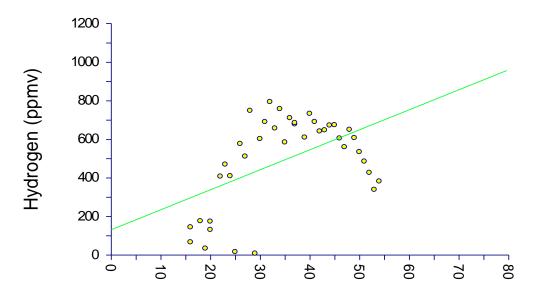
Months after Room Closure

Panel 4 Room 5i



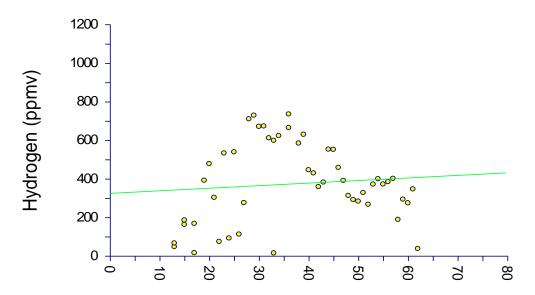
Months after Room Closure

Panel 4 Room 5e



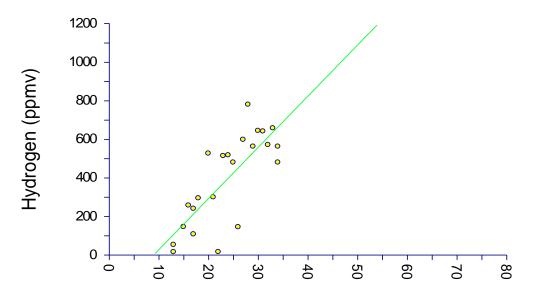
Months after Room Closure

Panel 4 Room 4i



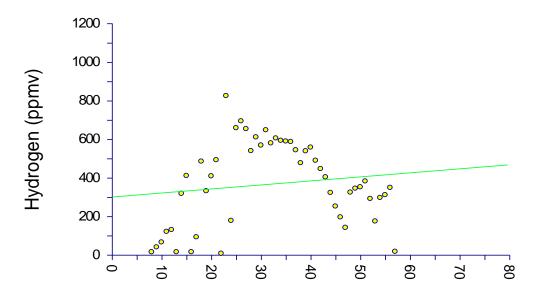
Months after Room Closure

Panel 4 Room 4e



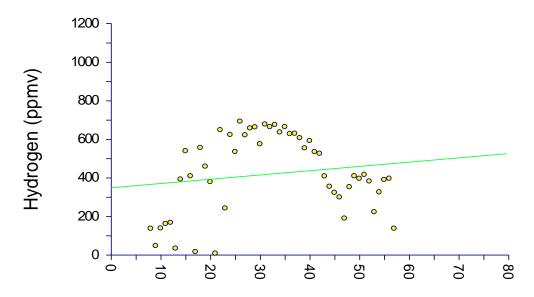
Months after Room Closure

Panel 4 Room 3i



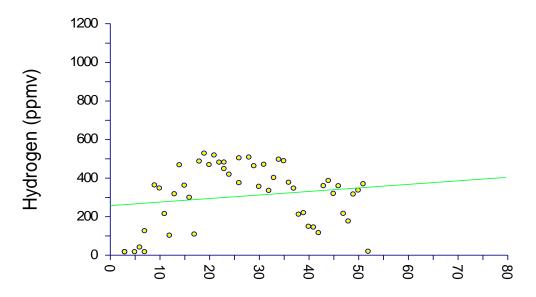
Months after Room Closure

Panel 4 Room 3e



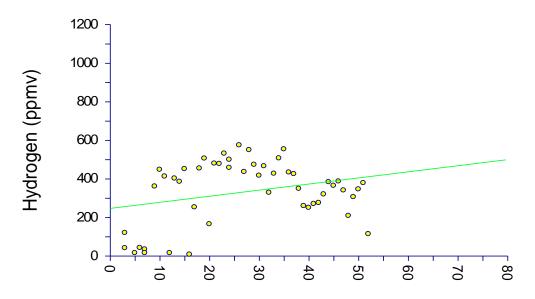
Months after Room Closure

Panel 4 Room 2i



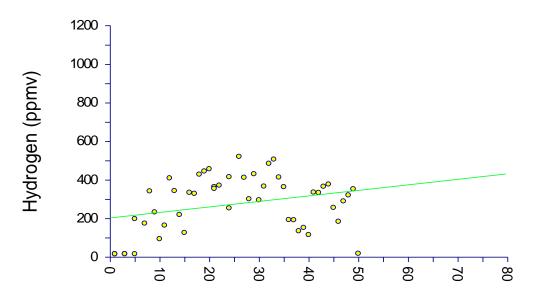
Months after Room Closure

Panel 4 Room 2e



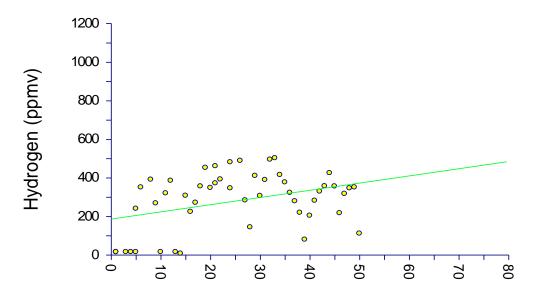
Months after Room Closure

Panel 4 Room 1i



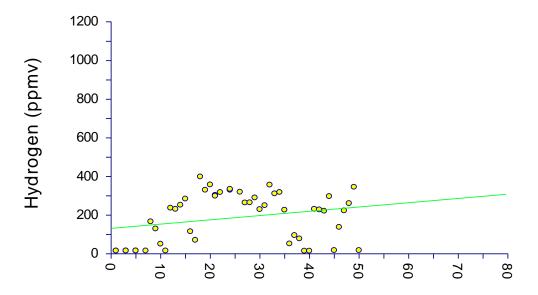
Months after Room Closure

Panel 4 Room 1e



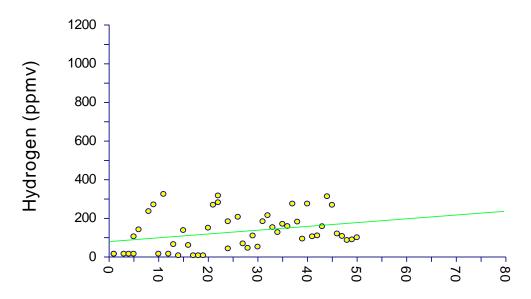
Months after Room Closure

Panel 4 Bulkhead IBW



Months after Room 1 Closure

Panel 4 Bulkhead EBW



Months after Room 1 Closure