DAQC-159-11
Site ID 14151 (B1)

MEMORANDUM

TO: FILE – DENISON MINES – LA SAL MINES COMPLEX

THROUGH: Jay Monis, Minor Source Compliance Section Manager

FROM: Sarah Malluche, Environmental Scientist

DATE: February 3, 2011

SUBJECT: Partial Compliance Evaluation Minor/, San Juan County, AIRS #4900253

REVIEW DATE:	February 3, 2011
SOURCE LOCATION:	Denison Mines – La Sal Mines Complex
SOURCE CONTACT(S):	David Frydenlund, Vice President, 303 389 4130
OPERATING STATUS:	Operating
PROCESS DESCRIPTION:	Underground uranium mine.
APPLICABLE REGULATIONS:	40 CFR Part 61, Subpart B review only

SOURCE INSPECTION EVALUATION:

40 CFR Part 61, Subpart B

61.24 Annual Reporting Requirements

(b) if facility is not in compliance with emission limits, then monthly reports are required to be submitted which include 61.24 (a) (1-8) and 61.24 (b)(1-2).

Status: In compliance. The December 2010 monthly report was submitted on February 2, 2011 to the Division of Air Quality. On August 17, 2010, EPA cited the facility for four violations, including an emission standard violation. Due to the NOV issued by EPA, monthly reports are required until EPA detennines othenvise.

(b)(1) all controls or changes in operation to bring facility into compliance are included in the report.

Status: In compliance. On page 9 of the report, Denison describes the steps to comply with the standards. The steps include monitoring unforced vents, improved onsite communications, bulkheading of underground access areas, reduced fan operations, and ventilation plan changes.

(b)(2) if facility is under a judicial or administrative enforcement review, the report will describe performance under the terms of the decree.

Status: Not applicable.

61.24 (a)(1) name/location of mine.

Status: In compliance. The mine is located in La Sal, San Juan County, Utah.

(a)(2) responsible person/person preparing report.

Status: In compliance. David Frydenlund appears to have prepared the report. Consuiting data regarding emissions were obtained from Douglas Chambers, Vice President with SENES Consultants Limited. Aiso, Jim Fisher, with Denison Mines prepared the report for "Report of Compliance with The Clean Air Act Limits for Radionuclide Emissions from the Compiy-R Code, Version 1.2"

(a)(3) emission testing results and dose calculated.

Status: In compliance. 2010 emission results are discussed on page 6 of the report, and dose information is located on page 8 and 12, tabie 3, 4, & 5 on the SENES consultants report. Aii COMPLY – R and AERMOD readings were within the 10 mrem per year requirement. Until EPA Region VIII approves the AERMOD, Denison is required to comply with the Compiy-R Model.

(a)(4) list of stacks/vents where radioactive materials are released into the atmosphere....

Status: in compliance. The above information is listed in table 1, page 6 of the SENES report.

(a)(5) description of effiuent controls.....

Status: In compliance. The monthly report on page 8, states that "no specific effluent control equipment is employed." A fan is present and operates either by forced exhaust or intake on some vents.

(a)(6) distances from the points of release....

Status: in compliance. In the SENES report on page 7 table 2, a list of residences schools, livestock are tabulated in meters. The closest resident is 298.87 meters from the vent from Pandora #8.

(a)(7) values used for all other user-supplied input parameters for computer models.....

Status: In compliance. Meteorological data was obtained from an EPA data set for Grand Junction, CO (page 5 SENES report). Monthly emissions were tabulated in tabie 1 of the SENES report.

(a)(8) signed and certified report..

Status: In compliance. Mr. David Frydenlund signed the report on January 31, 2011.

COMPLIANCE STATUS & RECOMMENDATIONS: In compliance with 40 CFR Part 61 Subpart B requirements. Recommend monthly monitoring until EPA Region VIII determines otherwise.

ATTACHMENTS: Monthiy submittal received 2/2/11

INSPECTOR SIGNATURE: [signature] 2-5-11

DENISON MINES

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY

FEB 0 2 2011

DIVISION OF AIR QUALITY

Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265
USA

Tel : 303 628-7798
Fax : 303 389-4125

www.denisonmines.com

January 31, 2011

Cheryl Heying
Division Director
Utah Department of Environmental Quality
Air Quality Division
195 North 1950 West
Salt Lake City, Utah
84116

Re: January 31, 2010 Monthly Report for the La Sal Mines Complex Under 40 CFR 61.24 (b)

Dear Ms. Heying:

Enclosed with this letter is the January 31, 2011 monthly report for Denison Mines (USA) Corp.'s La Sal Mines Complex for the month of December 2010, pursuant to 40 CFR 61.24(b) (the "Monthly Report"). The La Sal Mines Complex includes several underground uranium mines in one mining complex. Included with the montidy report is a letter report entitled *Modeling of Radon Emissions from Denison La Sal Mine*, dated January 31, 2011, prepared by SENES Consultants Limited.

Please feel free to call me at (303) 389-4130 with any questions you may have.

Yours very truly,

David C. Frydenlund
Vice President, Regulatory Affairs and Counsel

Enclosure.

cc: Philip G. Buck
Ron F. Hochstein
Jo Ann S. Tischler
Christy Woodward
Kathy Weinel
Danny Flannery
Seth McCourt
Director, Air and Toxics Technical Enforcement Program,
Office of Enforcement, Compliance and Environmental Justice,
U.S. Environmental Protection Agency
Linda Kato, U.S Environmental Protection Agency

DENISON MINES (USA) CORP.
40 CODE OF FEDERAL REGULATIONS 61 SUBPART B

LASAL MINES
LA SAL, SAN JUAN COUNTY, UTAH

MONTHLY COMPLIANCE REPORT FOR December 2010

January 31, 2011

Denison Mines (USA) Corp,
1050 17th Street, Ste. 950
Denver, Colorado 80265
(303) 628-7798

1) Name and Location of the Mine

Denison Mines (USA) Corp. ("Denison") owns the La Sal Mines Complex (the "Mine"), near La Sal in San Juan County, Utah, which includes the Pandora, Beaver Shaft and other mines in the same mine complex. The Mine she is generally located at Universal Transverse Mercator (UTM) coordinates 654,311 meters (m) east and 4,241,669 m north (North American Datum [NAD] 83), zone 12.

2) Monthly Report

This Report is the monthly report for the Mine for December 2010, required under 40 Code of Federal Regulations (CFR) 61.24(b).

A summary of the radon emissions from the Mine during 2009 and the results of the compliance calculations under 40 CFR 61.23 for 2009, reported in the 2009 Annual Compliance Report for the Mine dated March 2010 reqnired under 40 CFR 61.24(a) (the "2009 Annual Report"), are set out in Section 4 of this Report.

The monthly report for December 2010 required under 40 CFR 61.24(b) is set out in Section 5(a) of this Report. Section 5(b) of this Report describes the mdon emission results and compliance calculations for all of 2010 based on results of the radon monitoring conducted at the Mine sites.

3) Name of the Person Responsible for Operation and Preparer of Report

Denison Mines (USA) Corp.
1050 17th Street, Ste. 950
Denver, Colorado 80265
303.628.7798 (phone)
303.389.4125 (fax)

Denison is the operator of the Mine, an active underground uranium mine which will mine over 100,000 tons of ore during the life of the mine and has an annual ore production rate greater than 10,000 tons. Based on this information, the Mine is subject to 40 CFR Part 61, subpart B – National Emission Standards for Hazardous Air Pollutants. Denison is submitting this monthly compliance report in conformance with those standards.

4) Background Information – Snmmary of 2009 Annual Report, 2009 Resnlts, and Modeling Used in the 2009 Annual Report

a) Model to be Used to Determine Compliance with Emission Standards

Under 40 CFR 61.22, emissions of radon-222 to the ambient air from an underground uranium mine shall not exceed those amounts that would cause any member of the public to receive in any year an effective dose equivalent ("dose") of 10 millirem per year ("mrem/year"). Further, 40 CFR 61.23(a) provides that compliance with that emission standard shall be detennined and the effective dose equivalent calculated by the United States Environmental Protection Agency ("EPA") computer code COMPLY-R However, 40 CFR 61.23(b) provides that owners or operators may demonstrate compliance with the emission standard through the use of computer models that are equivalent to COMPLY-R, provided that the model has received prior approval from EPA headquarters.

During a conference call between Denison representatives and representatives of EPA head office, EPA Region 8 and the State of Utah Department of Environmental Quality, Division of Air Quality on February 23, 2010, Denison advised that it did not believe COMPLY-R was a suitable model to determine compliance with the emission standard in 40 CFR 61.22 at the Mine, due to the complex site-specific features of the Mine. Denison requested guidance as to how it should proceed to obtain prior approval from EPA headquarters for the use of the EPA-approved AERMOD model as a more sophisticated basis for demonstrating compliance with those standards. It was determined during the conference call that Denison would perform an analysis of the suitability of each of those models to the site specific features at the Mine, including a comparison of emission results from each model, and prepare a report that would support an application by Denison for EPA approval of the use of AERMOD, rather than COMPLY-R for demonstrating compliance with the emission standards at the Mine. It was further agreed that such report and application could be submitted to EPA headquarters simultaneously with the submittal of the 2009 Annual Report.

Denison engaged SENES Consultants Limited ("SENES") to evaluate the suitability of COMPLY-R for calculating doses to members of the public in the vicinity of the Mine in comparison to AERMOD, and to calculate the doses to such members of the public. SENES issued its Report (the "2009 SENES Report") entitled Dose Es*tim*ation *f*or Ra*d*on *Em*issions *F*rom *L*a Sa*l*, *Utah* Mines, dated March 2010, a copy of which was included with the 2009 Annual Report.

In the 2009 SENES Report, SENES concluded that COMPLY-R is not a suitable model for calculating doses in the vicinity of the Mine, due to the complex features associated with the Mine, and that AERMOD will provide much more accurate estimates of such doses. SENES concluded that the COMPLY-R model is unduly conservative for the Mine because it is not equipped to accurately deal with the multiple sources and receptors spread over a broad area, the complex terrain and elevations and the variable emission rates associated with the Mine. By comparison, SENES concluded that AERMOD will provide more accurate model predictions of the radon concentrations and doses, because it is equipped to handle multiple sources and receptors, complex terrain and variable emission rates. SENES concluded that, while the COMPLY-R model may not be unduly conservative for other sites, the AERMOD model is proposed for use in evaluating the dose from radon emissions at the Mine.

Denison submitted its request to EPA headquarters for approval to use AERMOD instead of COMPLY-R on March 30, 2010, along with its submittal of the 2009 Annual Report.

b) Summary of 2009 Results

Testing for radon-222 emitted during 2009 from the vent holes at the Mine was completed in accordance with 40 CFR 61, Appendix B, Method 115, Section 1 ("Radon-222 emissions from Underground Uranium Mine Vents"). Specifically, Denison tested radon-222 emissions per Sections 1.1.1 ("Continuous Measurement") and 1.2 ("Test Methods and Procedures"). Section 1.1.1 specifies that the radon-222 concentration shall be continuously measured at each mine vent whenever the mine ventilation system is operational. Radon-222 emission rates were calculated and recorded utilizing monthly radon concentration data and ventilation rate measurements. The Mine began underground development operations in April of 2007 and reported 2007 and 2008 data in March of 2008 and 2009 respectively, using COMPLY-R.

Denison used Method A-7 to analyze radon-222 and used commercially-available, alpha track radon-222 detectors to continuously collect radon-222 emissions on a monthly basis fbr January through December of 2009, as per previous reports and industry practice. Denison also believes that the use of Method A-7 was previously approved by EPA for use specifically at the Mine, although this position is not accepted by EPA today. As a result of the position taken by EPA on this issue, on April 26, 2010 Denison submitted to EPA headquarters an application to use Method A-7 at the Mine.

The dose results for AERMOD, calculated by SENES, show 2009 potential doses ranging from 4.3 to 8.9 mrem/yr for the receptors in the vicinity of the Mine. See Table 5.1 and the discussion in Sections 4.0 and 5.0 of the 2009 SENES Report. Those doses are less than the 10 mrem/yr standard set out in 40 CFR 61.22, and are considered by SENES to be the best estimate of doses in the vicinity of the Mine for 2009 radon emissions.

COMPLY-R was then run in a number of different ways on the 2009 radon emission data, from the simple base case to increasingly more complex ways in an attempt to take into consideration the multiple sources and receptors, complex ten ain and variable emission rates at the Mine site. See Sections 3.0 and 5.0 of the 2009 SENES Report. All of those runs resulted in one or more receptors exceeding the 10 mrem/yr standard, based on 2009 radon emissions data. However, SENES concluded that in using COMPLY-R, an accurate dose estimate incorporating the monthly variation in emissions and elevation changes at the Mine was not possible. SENES firther concluded that the investigation into monthly emissions and sensitivity of elevations in site terrain suggests that COMPLY-R is overly conservative for the Mine site, and that, although COMPLY-R may be appropriate for simpler cases (e.g. single sources, distant receptors, constant emissions through the year), it should only be considered as a screening model for a complex site such as the Mine. SENES therefore recommended the use of AERMOD to address the site-specific conditions at the Mine.

c) July 21, 2010 EPA Response

On July 21, 2010, EPA responded to Denison's March 30, 2010 application to use AERMOD at the Mine for purposes of compliance calculations under 40 CFR 61.23 and Denison's April 26, 2010 application to use Method A-7 at the Mine. EPA concluded that:

i) It is unable to approve the use of Method A-7 at the Mine until Denison collects data from the Mine vents using both Methods A-6 and A-7 at the same time; and

ii) Since EPA has concerns about the accuracy of the monitoring data collected using Method A-7, which was collected and subsequently used for the direct comparison of the two computer models, EPA cannot approve Denison's request to use AERMOD until Denison has demonstrated the accuracy of the input data.

On December 13, 2010, Denison submitted a proposed approach for implementing a site-specific comparison of Method A-6 and Method A-7 that will provide test results acceptable to EPA. The test plan which delineated the site-specific comparison is currentiy undergoing revision to address comments provided by EPA in a January 11, 2011 conference call. The comparison test is currentiy expected to commence in February of 2011. In the meantime, Denison continues to test radon emissions at the Mine solely using Method A-7. Denison has also requested EPA to evaluate the use of AERMOD at the site while this comparison study is taking place, on the basis that it is still possible to undertake a meaningful comparison of AERMOD and COMPLY-R so long as the same input data is used for each model.

d) August 17, 2010 Notice of Violation

On August 17, 2010 EPA issued a Notice of Violation (the "NOV") relating to Denison's compliance with the standards in 40 CFR Subpart B for 2009. In the NOV, EPA noted that on July 21, 2010 it had denied Denison's March 30, 2010 request to use AERMOD for compliance calculations at the Mine and Denison's April 26, 2010 request to use Method A-7 at the Mine, and cited the following alleged violations:

i) Emissions of radon-222 from the Mine during 2009 exceeded the emission standards for six receptors, in violation of 40 CFR 61.22 and Section 112 of the Clean Air Act (the "CAA"), using COMPLY-R;

ii) Denison has not submitted monthly reports following the emissions exceedances of radon-222 for the year 2009, in violation of 40 CFR 61.24(b) and Section 112 of the CAA;

iii) Emissions of radon-222 from Vent 1350, Pandora 3, Pandora 7, and Pandora 12 have not been continuously monitored, in violation of 40 CFR 61.23(a) and Method 115, and Section 112 of the CAA; and

iv) Method A-7 has been used to analyze radon-222 in lieu of Method A-6 at the Mine, without prior approval from EPA, in violation of 40 CFR 61.23(a) and Method 115 and Section 112 of the CAA.

As a result of the NOV, Denison submitted the first monthly report under 40 CFR 61.23(b) for the month of September 2010, being the month immediately following Denison's receipt of the NOV and EPA's determination that Denison is not in compliance with the emission standard in 40 CFR 21.22 for 2009.

Although not the subject of separate monthly reports, the results for all of the months from January through September were included in the analysis in the September monthly report and in Section 5(b) below.

This Report is the monthly report for December 2010.

5) 2010 Results

Denison has engaged SENES to calculate potential doses to nearby receptors in the vicinity of the Mine using both COMPLY-R and AERMOD: (a) from radon-222 emissions during December 2010; and (b) on an annual basis for all of calendar 2010 based on the radon monitoring results from January through December 2010. SENES issued a letter report entitled *Modeling of Radon Emissions from Denison La Sal Mine*, dated January 31, 2011, a copy of which is included with this Report. The January 31, 2011 SENES Report will hereafter be referred to as the "attached SENES report".

The monitored radon-222 emissions from each vent or portal at the Mine for January through December 2010 are set out in Table 3 of the attached SENES Report. It should be noted that, the radon detectors were changed out on January 5, and January 6, 2011, due to weather events which precluded access to the vent sites in late December 2010. As a result, the December monthly and 2010 annual emissions from each vent or portal include the actual monitoring results through December 31, 2010. The annual results presented herein should be considered preliminary. Final annual results will be presented in the annual report for 2010, which will be submitted under separate cover on or before March 31, 2011.

a) December 2010 Results

The December 2010 results shown in Table 3 of the attached SENES Report showed a monthly reported result of 515.21 Curies. These emissions are higher than for previous months. However, it can be seen from Table 3 that the average monthly radon emissions vary by month and by season, and appear to be higher in the winter months than in the summer months. SENES notes that, although not fully understood, it can be postulated that as the result of greater temperature differences between mine air and ambient air in wimer months, the effect of natural ventilation is greater in winter months increasing air flow and hence radon emissions.

The December 2010 montiily results were used as inputs to the AERMOD and COMPLY-R modeling. The doses to each receptor fiom the application of both COMPLY-R and AERMOD to the monitored radon-222 emissions for the month of December 2010 are set out in Table 4 of the attached SENES Report.

As noted in the previous report, the results reported for November in this repurt (469.62 Curies) are greater than the 342.88 Curies reported for November 2010 in Table 3 of the December 30, 2010 SENES Report. This difference is due to the way in which radon detectors have been deployed to date at the Mine which does not typically allow for the calculation of the full month's radon emissions until the second month after the reporting date. This is because radon detectors are typically deployed for approximately 30 days, but, due to operational practicalities and work schedules and the large number of vents for all mines combined (including mines at different locations), the detectors are not typically placed on each vent on the first minute of the first day of each month and replaced on the last minute of the last day of the month. In the case of November 2010, most of the radon detectors were deployed at midday on October 28, 2010, and replaced at midday on November 23, 2010. The results for November 1, 2010 through midday November 23, 2010 were included in last month's Report. However, the results for midday November 23 through November 30 were not available until the results from the replacement detectors, which were placed midday November 23 and removed on midday January 5, or January 6, were received from the analytical laboratory late in January. The Noveniber 2010 radon emissions in Table 3 of the attached SENES Report include the radon emissions for the last seven and a half days in November, which were added to the results for November 1 through November 23, 2010 as reported in the December 30, 2010 SENES Report. As a result, the November emissions reported in last month's report, understated the radon emissions for November. This understatement of November results is rectified in the attached SENES Report and the full November emissions are attached. As noted above, the radon detectors for December were changed out on January 5 and January 6, 2011, due to weather events which precluded access to the vent sites in late December 2010. As a result, unlike for previous months, the December monthly and 2010 annual emissions fiom each vent or portal include the actual monitoring results through December 31, 2010.

It should be noted that while the 30-day reporting requirement may be reasonable in situations where scintillometers are used under Method A-6 and it is not necessary to obtain analytical results from a third party analytical laboratory during the 30-day period, it is not reasonable when Method A-7 is used, which requires use of a third party laboratory. Generally, when reporting requires that results from a third party laboratory must be obtained before the report can be prepared, a reporting period of at least 60 days appears to be the norm.

This issue was identified by Denison in the December 2010 Report. Denison intends to discuss this issue with EPA to determine how to proceed in the future.

2010 Results Based on Actual 2010 Results Through December 2010

It is evident from Table 3 of the attached SENES report that total radon emissions for 2010 are virtually the same as those for 2009, despite a number of increased mining activities in 2010 and the addition of several new vents and other emission points in 2010. The maintenance of 2010 emission levels to those of 2009, in light of these factors, is due in large part to the mitigation measures undertaken by Denison, as described in Section 7 below.

Estimated doses to members of the public from these emissions, using AERMOD, and adjusting for the typical occupancy of two receptors, indicates that the emission standard set out in 40 CFR 61.22 has been met at all locations for 2010.

Based on the application of AERMOD, the doses to each receptor for 2010 are set out in Table 5 of the attached SENES Report. It is evident from that Table that doses to all receptors in the vicinity of the Mine are below the 10 mrem/yr standard for 2010, after adjusting for typical occupancy of Residence 1 and the Maintenance Shed. The dose to Residence 1 of 11.7 mrem/yr is based on continuous occupancy, whereas that residence is only typically occupied during the months of April through October. Based on typical occupancy, the projected potential dose to that receptor would be 4.6 mrem/yr, which is below the standard. The Maintenance Shed is a staging facility for heavy equipment. To the best of Denison's knowledge it does not serve full time as an office. Even if it were a full time office it would be occupied no more than 2,000 hours per year. Based on that level of occupancy, the dose to any workers at that facility would be 2.4 mrem/yr, which would also be lower than the 10 mrem/yr standard set out in 40 CFR 61.22.

The doses to each receptor from the application of COMPLY-R to the radon emissions for 2010 are also set out in Table 5 of the attached SENES Report. Based on the application of COMPLY-R, which, as discussed above, Denison does not believe is an appropriate model for estimating potential doses at the Mine, all receptors except three would be in compliance with the emission standard set out in 40 CFR 61.22 for 2010. Of the three receptors that would not meet the standard, the dose to Residence 1 of 19.2 mrem/yr is based on continuous occupancy. Based on typical occupancy of seven months per year, the projected potential dose to that receptor would be 11.2 mrem/yr, which would be slightly above the standard. Denison made changes in mid-December to the Pandora 8 vent to address this issue, as discussed below.

The second receptor is the Maintenance Shed, based on continuous occupancy. However, based on occupancy of 2,000 hours per year, the dose to any workers at that facility would be 3.3 mrem/yr, which would also be lower than the 10 mrem/yr standard set out in 40 CFR 61.22.

The third receptor, Residence 2, would be marginally above the 10 mrem/yr standard set out in 40 CFR 61.22, based on the application of COMPLY-R. However, the reported results are within the analytical error associated with radon measurement. Nonetheless, the contributing vents were reviewed and it was noted that Residence 2 has also been affected by emissions from the Pandora 8 vent. In November, the Pandora 8 vent contributed 18% of the estimated dose to Residence 2 and in December the Pandora 8 vent contributed 24% of the estimated dose to Residence 2. As described below, Denison has addressed the contributions to receptor doses from the Pandora 8 vent by changing the ventilation pattern for that vent.

The monthly and annual doses to Residence 1 and Residence 2 have shown an increasing trend through December 2010. There may be two explanations for this trend. First, as mentioned above, radon-222 emissions appear to be affected by seasonal factors, which appear to result in higher emissions in the winter months. Second, the increases to Residences 1 and 2 were due in part to recent increases in emissions from the Pandora 8 vent. That vent was on a timer and, until the latter part of December, was forced downcast during working hours but turned off after working hours. When the fan was off, the vent exhausted, due to other influences in the Mine. In the latter part of December, that vent was taken off of the timer and changed to a full time forced downcast vent, thereby eliminating emissions from that vent. The Curies contributed from that vent decreased from 17.04 Curies in November to 7.51 Curies in December, which is a 56% decrease. Since the Pandora 8 vent is now forced downcast all the time, the full impact of that change on Residence 1 and Residence 2 should be observed starting in January 2011.

6) Other Information

a) List of Ventilation

A list of stacks or vents or other points where radioactive materials are released to the atmosphere, including their location, diameter, flow rate, effluent temperature and release height used in the calculations described in Section 5 above is set out in Table 1 of the attached SENES Report.

b) Description of Effluent Controls

Effluent control is based on the duration of fan operation and on underground controls, such as bulk-heading of certain underground workings that are not in production. Some vents are either forced exhaust or forced intake 24 hours per day, seven days per week. Other vents are on timers and are generally turned off after working hours and on weekends. Other vents and portals are not forced and either exhaust or intake depending on atmospheric conditions and the status of other fans in the Mine.

Radon is modeled only for air emissions and not when the vents are used to pull fresh air into the Mine.

As no specific effluent control equipment is employed, it is not possible to estimate the efficiency of any such equipment.

c) Distances from Points of Release to the Nearest Residence, School, or Business or Office

Distances from the sources to the receptors, being the distances from the points of release to the nearest residence, school, business or office are set out in Table 2 of the attached SENES Report. A map showing the sources and receptors is included as Figure 1 of the attached SENES Report. The nearest residence, Residence 1, is used as a private residence during the months of April through October and is located approximately 300 meters from the nearest mine vent (Pandora #8) that exhausted during the period.

d) <u>Distances from nearest farm producing vegetables, milk and meat</u>

The nearest residence is used as a private residence during the months of April through October and is located approximately 300 meters from the nearest mine vent that exhausted during the period. There are no farms producing vegetables or milk in the vicinity. There are some cattle grazing from time to time on nearby range land.

e) <u>Values used for other user-supplied input parameters</u>

Values used for other user supplied input parameters are provided in the following locations:

i) Radon emissions (Ci) from monthly measurements from vents are set out in Tables 1 and 3 of the attached SENES Report; and

ii) Meteorological inputs are set out in Appendix E of the 2009 SENES Report.

7) Additional Information Required for Monthly Reports

a) <u>Controls or Other Changes in Operation of the Facility</u>

40 CFR 61.24(b) requires that in addition to all the information required for an Annual Report under 40 CFR 61.24(a), monthly reports shall also include a description of all controls or other changes in operation of the facility that will be or are being installed to bring the facility into compliance.

Denison has taken the following steps towards ensuring that radon emissions from the Mine are kept as low as reasonably achievable and within the applicable standards:

i) <u>Monitoring of Unforced Vents and Portals</u>

One of the alleged violations cited in the NOV was failure to monitor certain vents that were unforced (i.e., were not equipped with fans or if equipped, the fans were not operating). Some of those vents or portals had been observed from time to time to have been exhausting mine air naturally. Denison now monitors every vent and portal that is not equipped with a fan (or where the fan is turned off). Actual and estimated radon emissions from such vents and portals are included in the actual and annualized radon emissions used for the modeling described in Sections 5(a) and 5(b) above.

ii) <u>Completeness of Data</u>

It was also noted in the NOV that one vent had not been continuously monitored for some portions of the year while it was exhausting. This is because the fan on the vent had been changed from intake to exhaust without notification being given to Denison's environmental monitoring personnel. Denison has improved its procedures to minimize the chance that such ventilation changes could occur without proper approvals and notification to the environmental monitoring staff prior to such change. Actual radon emissions from this vent are included in the annual radon emissions used for the modeling described in Sections 5(a) and 5(b) above.

iii) Bulkheading nf Underground Areas

Denison has increased its efforts in 2010 to bulkhead off mined out areas underground and other underground areas not required for active mining, thereby reducing the radon emissions from such areas.

iv) Reduced Fan Operations

A number of vent fans were placed on automatic timers in May, such that they were generally tumed off after worldng hours and on weekends, thereby reducing the impacts of ventilation on the Mine and reducing the radon emissions to the environment.

v) Ventilation Plan Changes

Throughout 2010 a number of ventilation changes have been made, such as changing some vent fans from exhaust to intake and others from intake to exhaust, while for other vents the fans were tumed off. In addition, some new vent holes were added in 2010 that were not in existence in 2009. This has resulted in a different distribution of radon emissions fiom vents in 2010 as compared to 2009. As mentioned above, in order to reduce emissions that could impact Residence 1 and Residence 2, the Pandora 8 vent was changed finm a forced downcast vent during working hours only, to a forced downcast vent fiill time.

As discussed in Section 5 above, AERMOD modeling for the month of December 2010 and, on an annual basis for 2010, indicates that the Mine should be expected to continue to be in comphance with the standard in 40 CFR 61.22 for 2010, when typical occupancy at Residence 1 and the Maintenance Shed are taken into account.

Facillty's Performance Under Terms of Judicial or Administrative Enforeement Decree

The Mine is not under a judicial or administrative enforcement decree.

8) Certification

I Certify under penalty of law that I have personally examined and am familiar with the information submitted herein and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment. See 18, U.S.C. 1001.

Signed: ____________________ Date: January 31, 2011

David C. Frydenlund
Vice President, Regulatory Affairs and Counsel

SENES Consultants Limited

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350227-004

31 January 2011

Dave Frydenlund
Vice President – Regulatory Affairs and Counsel
Denison Mines (USA) Corp.
1050 17th Street, Suite 950
Denver, CO 80265

Via Email: DFrydenlund@denisonmines.com

Re: Modelling of December 2010 Radon Emissions from Denison La Sal Mine

Dear Dave,

In March last year, we provided Denison with a report on doses from radon released from Denison's La Sal underground uranium mines ["Mine"] (SENES 2010). The EPA's regulations at 40 CFR 61.23(a) provide that compliance with this emission standard shall be determined and the effective dose equivalent calculated by the U.S. Environmental Protection Agency ("EPA") computer code COMPLY-R. In addition, however, 40 CFR 61.23(b) provides that owners or operators may demonstrate compliance with this emission standard through the use of computer models that are equivalent to COMPLY-R, provided that the model has received prior approval from EPA headquarters.

The purpose of the March 2010 report was to evaluate the suitability of COMPLY-R for calculating doses to members of the public in the vicinity of the Mine and compare to an alternate approach using a more sophisticated EPA - approved regulatory model, AERMOD, for the air dispersion component of the assessment. The doses to members of the public would be based on using the more appropriate of the two models.

For reasons given in the March 2010 report, we concluded that COMPLY-R is not a suitable model for calculating doses in the vicinity of the Mine, due to the complex features associated with the Mine and the location of the Mine (i.e. terrain), and that AERMOD provides much more reliable estimates of such doses. Overall, we concluded that COMPLY-R should be considered a conservative model for predicting doses in simple situations, such as for a mine with one vent in flat terrain and with relatively constant emission rates. Moreover, we concluded that

COMPLY-R will generally overstate doses for mines that have numerous vents and numerous receptors, particularly where the vents and receptors are distributed over a broad area if used with the most simple COMPLY-R application. If the application of COMPLY-R in those circumstances shows the highest dose to a member of the public being lower than the 10 mrem/y standard, then that should be considered to be a very conservative evaluation. However, if the application of COMPLY-R shows that the highest dose to a member of the public exceeds the 10 mrem/y standard, the dose estimate is likely to be overstated and a more refined model should be employed.

In addition to simply running COMPLY-R as if the terrain was flat, which it most certainly is not near the Mine, we also ran COMPLY-R in March 2010 for a select set of receptors where the modelled vent stack heights were increased by the difference in terrain elevation to accoumt for the fact that certain receptors are located at a lower elevation than the vents, which provides the same result as increasing stack height. (The effect of differences in heights of vents is intrinsic to the meteorological model embedded in COMPLY-R as described in Appendix G of the COMPLY-R User's Guide and, hence, adjustment for different heights is necessarlly contemplated by the User's Guide.) Taking into account the difference in elevation, this partial move to a more realistic dispersion scenario resulted in somewhat lower doses for those receptors. Finally, as previously indicated, we ran the EPA's regulatory air dispersion model AERMOD to estimate radon concentrations at receptors and then used those concentrations with the COMPLY-R dose calculation protocol to estimate doses.

As a result of the Notice of Violation ("NOV"), docket No. CAA-08-2010-0016 dated August 17, 2010 relating to the Mine, Denison requested that SENES model the doses from the Mine in order that dose estimates can be provided to the EPA on a monthly basis, starting with results for September 2010 as provided to you in our letter dated 30 October 2010.

As previously noted, Denison provides the radon emissions. The results reported for November in this report (469.62 Curies) are greater than the 342.88 Curies reported for November 2010 in Table 3 of our December 30, 2010 Report. This difference is due to the way in which radon detectors have been deployed to date at the Mine which does not typically allow for the calculation of the full month's radon emissions until the second month after the reporting date. This is because radon detectors are typically deployed for approximately 30 days, but, due to operational challenges, the detectors are not typically placed on each vent on the first minute of the first day of each month and replaced on the last minute of the last day of the month. In the case of November 2010, most of the radon detectors were deployed at midday on October 28, 2010, and replaced at midday on November 23, 2010. These detectors were subsequently removed midday on either January 5 or January 6, 2011. The radon emissions included in last month's Report were for the period November 1, 2010 through midday November 23, 2010. The November 2010 radon emissions in Table 3 of this report also include the radon emissions for the last seven and a half days in November, which were added to the results for November1 through November 23, 2010. The December monthly and 2010 annual emissions from each vent or portal are based on the actual concentrstions reported on the ATDs.

It should be noted that two sets of results are provided incorporsting the December radon emissions data. The first results are from the application of COMPLY-R using multiple runs to calculate doses at each individual location and taking (roughly) into account terrain effects as previously described in our March 2010 report. The second analysis was performed using the AERMOD model as previously described in our March 2010 report. In both cases, adjustments are made for occupancy at two receptors which are only occupied for part of the year. An exemplar COMPLY-R mn is provided in Appendix A. It shouid also be noted that results from both models are provided for December 2010 and for the full year 2010.

The methods and results of our analysis can be described as follows:

1.0 Models and Model Inputs

1.1 Models

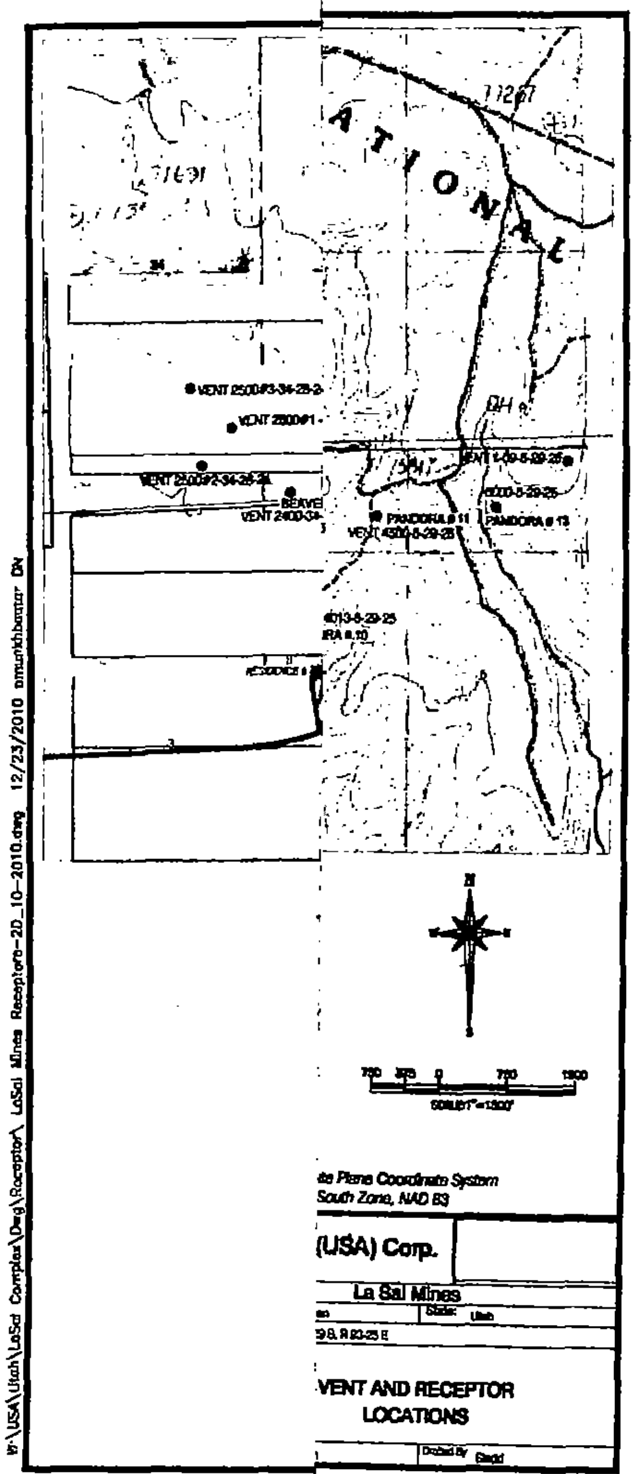
COMPLY R is the EPA's reference model for assessing the dose from rsdon from mine upcasts.

As noted earlier in this report, the EPA's regulatory afr dispersion code AERMOD was also used to estimate atmospheric dispersion. AERMOD is a steady state Gaussian plume dispersion model that can be used to assess pollutant concentrations from a wide variety of complex industrial settings including multiple stacks, fugitive emissions, and building wake effects. The AERMOD Modelling System consists of two pre-processors (AERMET vereion 06341 and AERMAP version 09040) and tie dispersion model AERMOD. The AERMOD Model is the regulatory model currently recommended by the EPA for simulating short-term afr quality impacts from industrial complexes.

1.2 Model Inputs

<u>Sources and Receptors</u>

The surface features and locations of mine vents and receptors are shown on Figure 1.



Note: Locations from Utah State Plan

The characteristics of the various mine vents are summarized in Table 1, distances between sources and receptors are shown in Table 2 and monthly radon emissions in Table 3. The radon emissions provided in Table 3 represent Denison's current best estimate of radon emissions and take into account estimates of radon releases from all venting stacks whether mechanically vented or not. It can be seen from Table 3 that the average monthly radon emissions vary by month and by season. Although not fully understood, it can be postulated that as the result of greater temperature differences between mine air and ambient air in winter months, the effect of natural ventilation is greater in winter months increasing air flow and hence radon emissions. The locations of the various vents have been surveyed using a high quality GPS system, and the receptor locations have been confirmed. Note that emission points are those previously considered in our December 30 2010 report. The receptor locations are those reported in our October 30, 2010 report. It should be noted that vents indicated in Figure 1 as vents 2500#2, 2500#3, 1-09-5-29-25, and 4-09-5-29-25 are proposed vents that have not yet been installed.

Meteorological Data

The EPA data set for Grand Junction Airport, CO (for the period 1987-1991) was considered to be representative of the Mine vicinity and was used for the modelling in this Report [EPA 2009 (http://www.epa.gov/scram001/) available on the SCRAM Web page]. This location has been accepted by the State of Utah Department of Environmental Quality, Division of Air Quality ("UDAQ") for purposes of modelling in connection with the issuance of a State Air Approval Order for the Mine.

Table 1 Summary of Stack Characteristics and Radon Emissions Based on Measurements to Dec 31 2010

Source No.	Source name	Easting	Northing	Elevations (m)	Diameter(m)	Height(m)	Texit(°K)	Flow(m3/s)	Cumulative Radon Emissions for 2010 (Ci/year)
S1	Beaver 500 (500-36-28-24)	654227.7	4242644.9	2200.93	1.80	3.73	285.78	24.46	94.40
S2	Beaver 700 (700 36-29-24) (Plugged)	653999.1	4242424.4	2168.04	plugged	plugged	plugged	0.00	0.00
S3	Beaver 900 (900 #2 35-28-24)	653717.5	4242658.6	2169.32	1.81	1.00	285.78	26.58	209.20
S4	Beaver 1050 (1050 35-28-24)	653388.0	4242573.5	2156.90	1.85	2.18	285.78	46.69	273.67
S5	Beaver 1280 (1280-2-29-24) (plugged)	652905.0	4242417.2	2152.30	plugged	plugged	plugged	0.00	0.00
S6	Beaver 1350 (1301-2-29-24)	652793.2	4242368.9	2149.31	1.59	1.89	285.78	11.34	139.51
S7	Beaver 1800 (1800 35-28-24)	652485.3	4242472.5	2152.28	1.36	2.83	285.78	0.00	0.00
S8	Beaver 2200 (2200-36-28-24) (plugged)	654636.6	4242749.5	2145.48	plugged	plugged	plugged	0.00	0.00
S9	Beaver 2300 #1 (2300 #1-1-29-24)	654724.7	4241913.3	2148.22	1.19	1.52	285.78	23.60	60.82
S10	Beaver 2300 #2 (2300 #2 1-29-24)	655001.2	4241659.4	2150.56	1.58	1.93	285.78	27.68	833.05
S11	Beaver 2400 (2400-34-28-24)	652034.5	4242457.4	2145.48	2.19	2.11	285.78	56.06	9.78
S12	Beaver 2500 (2500 #1-34-28-24)	651837.8	4242678.3	2153.06	2.14	1.43	285.78	40.02	122.13
S13	Beaver Shaft	652864.5	4242478.4	2158.20	1.80	0.00	285.78	14.75	91.99
S14	La Sal Portal	654285.5	4241759.5	2132.28	4.04	3.25	285.78	0.00	0.00
S15	Pandora #1 (5000 #1-6-29-25)	656622.7	4242318.8	2219.20	1.45	2.57	285.78	4.49	7.37
S16	Pandora #2 (5000 #2-6-29-25)	656981.7	4242297.8	2204.12	1.42	2.41	285.78	5.12	8.18
S17	Pandora #3 (4000 #1-6-29-25)	656316.6	4241966.8	2244.52	0.74	0.48	285.78	1.96	58.72
S18	Pandora #5 (3000 #3-36-28-24)	655736.0	4242662.6	2246.51	1.60	1.97	285.78	5.43	303.72
S19	Pandora #6 (4100 #1-31-28-25)	656348.2	4242560.4	2210.91	1.70	1.78	285.78	0.00	0.00
S20	Pandora #7 (3000 #1-1-29-24)	654767.9	4242274.2	2197.04	1.60	1.02	285.78	10.32	6.94
S21	Pandora #8 (4100 #2-6-29-25)(AKA #1672)	656711.2	4242449.2	2236.52	1.60	1.83	285.78	4.18	88.57
S22	Pandora #9 (5000 #3-5-29-25)	657475.8	4242322.7	2237.50	1.78	2.77	285.78	0.00	0.00
S23	Pandora #10 (4013-5-29-25)	657511.4	4241974.3	2272.67	1.60	1.33	285.78	90.14	411.96
S24	Pandora #11 (4500-5-29-25)	657838.9	4242321.8	2294.10	1.96	0.89	285.78	0.00	0.00
S25	Pandora #12 (4014-6-29-25)	657216.6	4242061.6	2211.01	2.44	0.44	285.78	35.82	510.95
S26	Pandora #13 (6000-5-29-25)	657239.9	4242350.9	2302.46	2.24	1.32	285.78	25.24	77.29
S27	Pandora Portal	655747.9	4241607.6	2128.03	2.82	2.21	285.78	19.52	92.95
S28	Snowball #2 (3000 #2-1-29-24)	655464.7	4242461.7	2241.67	1.65	2.22	285.78	32.11	1121.96
S29	Snowball Portal	655788.6	4242115.3	2195.45	2.93	2.49	285.78	8.53	11.87

Table 2 Source Receptor Distances (m)

Source Name	Src. No.	RESIDENCE #1	RESIDENCE #2	RESIDENCE #3	LA SAL LIVESTOCK	CATHOLIC CHURCH	STORE/POST OFFICE	ROAD MAINTENANCE SHED	ELEMENTARY SCHOOL	RESIDENCE #4	RESIDENCE #5
Beaver 500 (500-36-28-24)	S1	2266.60	2103.79	1923.70	1387.67	904.10	1412.79	761.89	1565.26	1797.84	2252.14
Beaver 700 (700 36-29-24) (Plugged)	S2	2505.81	2378.04	2225.62	1082.23	597.85	1108.41	487.03	1267.89	1516.69	1964.86
Beaver 900 (900 #2 35-28-24)	S3	2776.84	2603.53	2393.00	989.01	766.81	1009.09	749.10	1134.84	1330.63	1789.26
Beaver 1050 (1050 35-28-24)	S4	3107.35	2942.42	2732.29	719.50	761.49	733.83	835.46	831.94	1000.04	1458.40
Beaver 1280 (1280-2-29-24) (plugged)	S5	3597.17	3445.58	3239.96	480.46	975.90	472.71	1134.12	456.15	515.79	966.30
Beaver 1350 (1301-2-29-24)	S6	3712.09	3564.52	3361.26	477.07	1048.91	462.30	1218.68	399.56	402.72	847.64
Beaver 1800 (1800 35-28-24)	S7	4013.17	3849.67	3625.40	750.05	1371.16	728.16	1543.48	601.36	405.70	717.32
Beaver 2200 (2200-36-28-24) (plugged)	S8	1860.09	1682.33	1509.96	1797.81	1249.95	1823.84	1070.32	1981.03	2218.95	2672.19
Beaver 2300 #1 (2300 #1-1-29-24)	S9	1918.65	1943.17	1976.71	1699.78	997.54	1729.39	790.64	1910.09	2205.49	2607.16
Beaver 2300 #2 (2300 #2 1-29-24)	S10	1794.48	1907.21	2032.44	1997.41	1294.86	2026.87	1103.36	2207.71	2510.13	2889.77
Beaver 2400 (2400-34-28-24)	S11	4464.17	4297.72	4065.20	1112.28	1784.87	1085.43	1968.83	920.61	625.57	606.92
Beaver 2500 (2500 #1-34-28-24)	S12	4656.53	4467.91	4210.71	1392.02	2046.72	1366.22	2222.41	1207.32	918.37	868.57
Beaver Shaft	S13	3634.07	3474.45	3259.77	550.38	1043.39	541.29	1197.16	510.86	532.27	971.66
La Sal Portal	S14	2383.32	2391.87	2386.52	1274.76	573.57	1304.20	395.36	1485.03	1787.75	2169.50
Pandora #1 (5000 #1-6-29-25)	S15	359.67	818.63	1293.97	3615.95	2926.59	3645.27	2714.43	3823.17	4105.60	4528.20
Pandora #2 (5000 #2-6-29-25)	S16	604.13	1034.66	1520.88	3971.41	3279.53	4000.78	3067.87	4179.12	4462.88	4883.54
Pandora #3 (4000 #1-6-29-25)	S17	710.55	1099.82	1512.61	3291.27	2590.30	3320.86	2382.16	3501.15	3793.28	4199.90
Pandora #5 (3000 #3-36-28-24)	S18	758.37	684.61	815.68	2802.17	2151.36	2830.49	1940.29	3001.52	3265.71	3706.56
Pandora #6 (4100 #1-31-28-25)	S19	173.93	509.36	955.15	3378.06	2704.74	3406.96	2491.68	3581.76	3854.99	4288.25
Pandora #7 (3000 #1-1-29-24)	S20	1767.84	1714.85	1681.77	1772.06	1108.54	1800.95	897.24	1976.02	2252.60	2682.50
Pandora #8 (4100 #2-6-29-25)(AKA #1672)	S21	298.87	747.78	1233.08	3719.26	3035.46	3748.42	2822.68	3925.16	4203.80	4631.20
Pandora #9 (5000 #3-5-29-25)	S22	1036.12	1400.57	1868.64	4465.81	3773.06	4495.20	3561.64	4673.65	4957.58	5377.87
Pandora #10 (4013-5-29-25)	S23	1223.77	1639.24	2121.49	4486.10	3784.92	4515.69	3576.99	4695.96	4987.61	5394.54
Pandora #11 (4500-5-29-25)	S24	1385.26	1719.58	2170.96	4827.75	4133.96	4857.16	3922.82	5035.79	5320.26	5739.68
Pandora #12 (4014-6-29-25)	S25	934.68	1367.53	1853.51	4192.67	3493.34	4222.22	3284.22	4402.10	4691.92	5102.57
Pandora #13 (6000-5-29-25)	S26	805.13	1190.03	1667.03	4233.35	3542.37	4262.70	3330.55	4440.81	4723.63	5145.55
Pandora Portal	S27	1285.95	1555.74	1848.08	2744.20	2040.36	2773.71	1843.79	2954.70	3255.98	3638.20
Snowball #2 (3000 #2-1-29-24)	S28	1047.59	1022.19	1106.30	2491.95	1828.33	2520.68	1616.04	2694.46	2966.10	3400.81
Snowball Portal	S29	888.30	1074.55	1339.51	2768.03	2073.26	2797.50	1862.12	2976.67	3264.21	3679.54

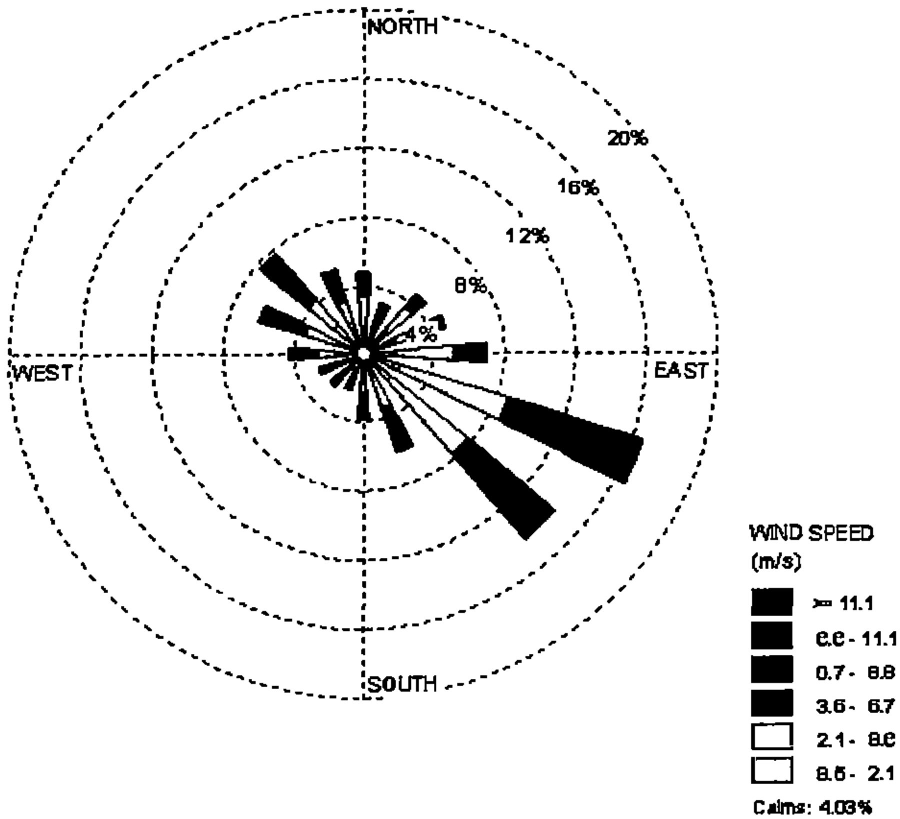
Table 3 Monthly Radon Emissions

Vent	Source No.	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	2010 Cumulative to Date
Beaver 500 (500-36-28-24)	S1	0.00	0.00	0.00	3.75	8.58	6.10	9.13	11.32	19.75	26.74	1.78	7.26	94.40
Beaver 700 (700 36-29-24) (Plugged)	S2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver 900 (900 #2 35-28-24)	S3	0.00	0.00	0.22	13.98	9.77	17.89	28.43	22.08	19.40	23.30	34.41	39.71	200.20
Beaver 1050 (1050 35-28-24)	S4	49.85	62.06	65.61	38.27	22.50	28.22	7.16	0.00	0.00	0.00	0.00	0.00	273.67
Beaver 1280 (1280-2-29-24) (plugged)	S5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver 1350 (1301-2-29-24)	S6	11.71	12.64	13.53	1.61	0.03	0.14	1.98	14.14	23.84	38.49	16.40	5.00	139.51
Beaver 1800 (1800 35-28-24)	S7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver 2200 (2200-36-28-24) (plugged)	S8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Beaver 2300 #1 (2300 #1-1-29-24)	S9	16.68	18.18	16.39	4.15	1.82	1.28	2.03	0.31	0.07	0.00	0.00	0.00	60.92
Beaver 2300 #2 (2300 #2 1-29-24)	S10	17.97	16.82	28.14	61.19	73.42	81.22	17.63	124.57	133.66	106.90	76.49	95.02	833.05
Beaver 2400 (2400-34-28-24)	S11	0.00	0.00	0.00	0.00	0.00	0.00	6.54	0.00	0.00	0.44	2.79	0.00	9.78
Beaver 2500 (2500 #1-34-28-24)	S12	0.00	0.00	0.00	0.00	0.99	3.15	19.86	16.65	14.80	15.72	19.16	31.80	122.13
Beaver Shaft	S13	1.53	1.38	1.57	3.99	1.49	0.62	3.85	11.34	20.22	8.80	11.81	25.39	91.99
La Sal Portal	S14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pandora #1 (5000 #1-6-29-25)	S15	0.00	0.00	0.00	0.00	0.53	0.56	0.58	0.37	1.05	0.97	1.91	1.40	7.37
Pandora #2 (5000 #2-6-29-25)	S16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	4.76	1.95	1.17	8.13
Pandora #3 (4000 #1-6-29-25)	S17	3.61	3.26	3.61	3.50	1.84	0.11	0.54	0.79	1.30	3.05	14.65	22.46	58.72
Pandora #5 (3000 #3-36-28-24)	S18	79.53	69.81	57.32	15.56	2.70	0.20	0.12	1.89	7.27	11.46	19.93	39.92	305.72
Pandora #6 (4100 #1-31-28-25)	S19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pandora #7 (3000 #1-1-29-24)	S20	0.00	2.64	3.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.34
Pandora #8 (4100 #2-6-29-25)(AKA #1672)	S21	0.00	0.00	0.00	0.00	1.85	1.95	1.34	0.00	0.34	8.55	17.04	7.51	38.57

Vent	Source No.	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	2010 Cumulative to Date
Pandora #9 (5000 #3-5-29-25)	S22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pandora #10 (4013-5-29-25)	S23	26.88	26.70	29.84	29.89	37.26	28.05	37.86	45.57	44.10	41.35	35.90	31.98	411.36
Pandora #11 (4500-5-29-25)	S24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pandora #12 (4014-6-29-25)	S25	44.61	60.29	44.61	43.17	44.61	45.16	54.55	51.06	24.92	26.07	50.63	41.26	510.95
Pandora #13 (6000-5-29-25)	S26	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	8.60	29.62	39.04	77.25
Pandora Portal	S27	1.21	3.20	4.39	2.25	2.60	7.94	11.81	16.46	25.22	12.84	2.29	2.72	92.95
Snowball #2 (3000 #2-1-29-24)	S28	204.73	198.37	191.21	109.01	46.67	35.61	19.99	21.58	13.75	34.60	123.07	123.57	1121.96
Snowball Portal	S29	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.00	1.58	9.79	0.00	11.37

2010 Cumulative All Vents by Month		458.32	455.37	460.15	330.32	256.68	258.19	223.40	338.14	345.94	374.01	469.62	515.21	4485.34

Figure 2 **Wind Rose Grand Junction Airport (1987-1991)**



The model inputs are provided in the exemplar COMPLY-R files provided in Appendix A.

2.0 Results

The COMPLY-R model was evaluated using annual aversge meteorology and radon enrissions for December 2010 as well as for annual 2010 radon emissions and amual meteorology. The aversge annual emissions for 2010 that were used in the COMPLY-R modelling are set out in Table 1.

The AERMOD model was evaluated using monthly rsdon emissions estimates and hourly meteorological data with results compiled by month. In considering the results, it should be noted that the meteorology varies from month to month and therefore, so also wlll the montiily dispersion pattems.

December 2010 Resnlts

Table 4 shows the estimated doses from radon emissions in December. Table 5 shows the estimated doses for the amual 2010 rsdon emissions.

It can be seen from these tables that for annual results are considered without correction for occupancy, that 3 receptors, R1, R2 and R7 are predicted to exceed the 10 mrem per year limit. However, R1 (Residence) is only occupied part of a year from April 1 through October 31. When occupancy is considered (Rib), die dose to this receptor is still predicted to exceed 10 mrem per year, albeit by a small amount. Receptors who live full time at Residence R2 are also predicted to exceed 10 mrem per year albeit marginally. Receptor R7 is a maintenance shed which is only occupied during part of the working year. For present purposes, we have assumed that a person is present at this location 2000 hours in a year. This is thought to be a very conservative assumption. Based on this assumption (R7b), the potential dose to receptor R7 is expected to be below 10 mrem per year.

When the AERMOD results are considered, all but two of the receptors are predicted to receive annual doses in 2010 below the 10 mrem per year limit, even without the correction for occupancy. Residence 1 is predicted to be marginally over 10 mrem; however, when adjusted for occupancy, is below the 10 mrem per year limit. Similarly, when occupancy is considered, the annual dose to a receptor at the maintenance shed R7 is also below 10 mrem per year.

As previously described, we believe that the COMPLY-R model should be considered to provide a very conservative evaluation, essentially a conservative screening model and that if the application of COMPLY-R shows that the highest dose to a member of the public exceeds the 10 mrem/y standard, the dose estimate is likely to be overstated and a more refined model should be employed. We also argue that the EPAs regulatory AERMOD model is better suited to addressing the complex terrain at the mine site and importantiy, the month to month variation in both rsdon emissions and meteorology. Thus, notwithstanding the COMPLY-R results, it is our opinion the potential doses to people who live or work around the Mine arising from radon emissions are likely to be less than 10 mrem per year for 2010.

Table 4 Doses from December 2010 Emissions (mrem/yr)

Receptor	Description	COMPLY-R	AERMOD	Contributing AERMOD Sources		
				Highest	Second	Third
R1	Residence #1	2.3	1.8	S21 (19%)	S26 (17%)	S25 (17%)
Rib		-	0	S21 (19%)	S26 (17%)	S25 (17%)
R2	Residence #2	1.2	1.1	S18 (24%)	826 (18%)	S28 (15%)
R3	Residence #3	0.8	0.7	S18 (22%)	826 (19%)	S28 (14%)
R4	Livestock	0.6	1.2	S10 (22%)	813 (18%)	S28 (16%)
R5	Church	0.9	1.4	S10 (33%)	828 (18%)	S3 (11%)
R6	Post Office	0.6	1.2	810 (22%)	813 (18%)	S28 (16%)
R7	Maintenance Shed	1.5	1.6	S10 (38%)	S28 (18%)	S3 (12%)
R7b		-	0.4	S10 (38%)	S28 (18%)	S3 (12%)
R8	La Sal School	0.7	1.1	S10 (21%)	S13 (17%)	S28 (16%)
R9	Residence #5	0.7	1.1	S10 (19%)	813 (19%)	S28 (16%)
R10	Residence #6	0.4	0.9	S10 (20%)	S28 (17%)	813 (14%)

Note: Rib is Residence #1 with partial occupancy during the year. R7b is an occupational setting with doses received for 2,000 hours each year.

Table 5 Annual Doses Estimated with Pro-rated Exposures Based on Emissions to November 23 2010 (mrem/yr)

Receptor	Description	COMPLY-R	AERMOD	Contributing AERMOD Sources		
				Highest	Second	Third
R1	Residence #1	19.2	11.7	S25 (30%)	821 (15%)	823 (14%)
Rib		11.2	4.6	S25 (30%)	821 (15%)	823 (14%)
R2	Residence #2	10.2	6.5	S18 (23%)	825 (21%)	828 (20%)
R3	Residence #3	7.2	4.1	828 (22%)	S18 (21%)	825 (20%)
R4	Livestock	5.6	7.5	810 (18%)	86 (17%)	828 (16%)
R5	Church	8.4	8.9	S10 (29%)	828 (20%)	S4 (10%)
R6	Post Office	5.4	7.6	S6 (18%)	810 (17%)	S28 (16%)
R7	Maintenance Shed	14.3	10.5	810 (35%)	828 (19%)	S3 (8%)
R7b		3.3	2.4	810 (35%)	828 (19%)	S3 (8%)
R8	La Sal School	6.6	7.5	86 (22%)	810 (16%)	S28 (15%)
R9	Residence #5	6.2	7.2	86 (23%)	828 (14%)	810 (14%)
R10	Residence #6	3.7	4.8	S28 (18%)	810 (16%)	S6 (13%)

Note: Rib is Residence #1 with partial occupancy during the year. R7b is an occupational setting with doses received for 2,000 hours each year

Overall, our conclusion is that the potential doses to people who live or work around the Mine arising from radon emissions are likely to be less than 10 mrem per year for 2010.

We would be pleased to respond to any questions you may have.

Yours very truly,

SENES Consultants Limited

DB Chambers

Douglas B. Chambers, Ph.D.
Vice President,
Director of Radioactivity and Risk Studies

References

Environmental Protection Agency (EPA) 2004a. *User's Guide for the AMS/EPA Regulatory Model – AERMOD - EPA-454/B-03-001.* September.

Environmental Protection Agency (EPA) 2004b. *Addendum User's Guide for the AMS/EPA Regulatory Model – AERMOD - EPA-454/B-03-001.* September.

Environmental Protection Agency (EPA) 2004c. *User's Guide for the AERMOD Terrain Preprocessor (AERMAP) - EPA-454/B-03-003.* October.

Environmental Protection Agency (EPA) 2004d. *Addendum User's Guide for the AERMOD Terrain Preprocessor (AERMAP) - EPA-454/B-03-003.* October.

Appendix A

Exemplar COMPLY-R file

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40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY-R CODE, VERSION 1.2

Prepared by:

Denision
La Sal Mine
La Sal, Utah

Jim Fisher
970-677-2702

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D.C. 20460

Stack	Release Rate (curies/YEAR)
1	9.440E+01
2	1.000E-02
3	2.092E+02
4	2.737E+02
5	1.000E-02
6	1.395E+02
7	1.000E-02
8	1.000E-02
9	6.092E+01
10	8.330E+02
11	9.780E+00
12	1.221E+02
13	9.199E+01
14	1.000E-02
15	7.370E+00
16	8.130E+00
17	5.872E+01
18	3.057E+02
19	1.000E-02
20	6.340E+00
21	3.857E+01
22	1.000E-02
23	4.114E+02
24	1.000E-02
25	5.110E+02
26	7.725E+01
27	9.295E+01
28	1.122E+03
29	1.137E+01

SITE DATA FOR VENT 1.

Release Height 3.73 meters.

Vertical momentum present for vent 1

Vent diameter 1.80 meters.

Volumetric flow rate is 24.460 cu m/sec.

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STACK DISTANCES, FILE: R1S1.DAT

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2260.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 2.

Release Height 2.00 meters.

Vertical momentum present for vent 2

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1S2.DAT

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2510.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 3.

Release Height 1.00 meters.

Vertical momentum present for vent 3

Vent diameter 1.83 meters.

Volumetric flow rate is 26.580 cu m/sec.

STACK DISTANCES, FILE: Rls3.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2770.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 4.

Release Height 2.18 meters.

Vertical momentum present for vent 4

Vent diameter 1.85 meters.

Volumetric flow rate is 46.690 cu m/sec.

STACK DISTANCES, FILE: R1s4.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3110.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 5.

Release Height 2.00 meters.

Vertical momentum present for vent 5

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1s5.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3590.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 6.

Release Height 1.89 meters.

Vertical momentum present for vent 6

Vent diameter 1.59 meters.

Volumetric flow rate is 11.340 cu m/sec.

STACK DISTANCES, FILE: Rls6.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3710.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 7.

Release Height 2.83 meters.

Vertical momentum present for vent 7

Vent diameter 1.36 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls7.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4010.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 8.

Release Height 2.00 meters.

Vertical momentum present for vent 8

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls8.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	1860.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 9.

Release Height 1.52 meters.

Vertical momentum present for vent 9

Vent diameter 1.19 meters.

Volumetric flow rate is 23.600 cu m/sec.

STACK DISTANCES, FILE: R1s9.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	1920.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 10.

Release Height 1.93 meters.

Vertical momentum present for vent 10

Vent diameter 1.58 meters.

Volumetric flow rate is 27.680 cu m/sec.

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STACK DISTANCES, FILE: R1s10.dat

DIR	Distance (meters)
N	********
NNE	********
NE	1790.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 11.

Release Height 2.11 meters.

Vertical momentum present for vent 11

Vent diameter 2.19 meters.

Volumetric flow rate is 56.060 cu m/sec.

STACK DISTANCES, FILE: R1s11.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4460.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 12.

Release Height 1.43 meters.

Vertical momentum present for vent 12

Vent diameter 2.14 meters.

Volumetric flow rate is 40.020 cu m/sec.

STACK DISTANCES, FILE: Rlsl2.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4660.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 13.

Release Height 2.00 meters.

Vertical momentum present for vent 13

Vent diameter 1.80 meters.

Volumetric fiow rate is 14.750 cu m/sec.

STACK DISTANCES, FILE: R1s13.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3630.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 14.

Release Height 3.25 meters.

Vertical momentum present for vent 14

Vent diameter 4.04 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1s14.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	2380.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 15.

Release Height 2.57 meters.

Vertical momentum present for vent 15

Vent diameter 1.45 meters.

Volumetric flow rate is 4.490 cu m/sec.

STACK DISTANCES, FILE: Rls15.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	359.0

SITE DATA FOR VENT 16.

Release Height 2.41 meters.

Vertical momentum present for vent 16

Vent diameter 1.42 meters.

Volumetric flow rate is 5.120 cu m/sec.

STACK DISTANCES, FILE: R1s16.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	604.0
NNW	********

SITE DATA FOR VENT 17.

Release Height 0.48 meters.

Vertical momentum present for vent 17

Vent diameter 0.74 meters.

Volumetric flow rate is 1.960 cu m/sec.

STACK DISTANCES, FILE: R1s17.dat

DIR	Distance (meters)
N	********
NNE	710.0
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 18.

Release Height 1.97 meters.

Vertical momentum present for vent 18

Vent diameter 1.60 meters.

Volumetric flow rate is 5.430 cu m/sec.

STACK DISTANCES, FILE: R1s18.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	758.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 19.

Release Haight 1.78 meters.

Vertical momentum present for vent 19

Vent diameter 1.70 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls19.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	173.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 20.

Release Height 1.02 meters.

Vertical momentum present for vent 20

Vent diameter 1.60 meters.

Volumetric flow rate is 10.320 cu m/sec.

STACK DISTANCES, FILE: Rls20.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	1760.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 21.

Release Height 4.17 meters.

Vertical momentum present for vent 21

Vent diameter 1.60 meters.

Volumetric flow rate is 4.180 cu m/sec.

STACK DISTANCES, FILE: Rls21.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	298.0
NNW	********

SITE DATA FOR VENT 22.

Release Height 6.09 meters.

Vertical momentum present for vent 22

Vent diameter 1.78 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls22.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	1030.0
NW	********
NNW	********

SITE DATA FOR VENT 23.

Release Height 39.82 meters.

Vertical momentum present for vent 23

Vent diameter 1.60 meters.

Volumetric flow rate is 30.140 cu m/sec.

STACK DISTANCES, FILE: Rls23.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	1220.0
NNW	********

SITE DATA FOR VENT 24.

Release Height 60.81 meters.

Vertical momentum present for vent 24

Vent diameter 1.96 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls24.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	1380.0
NW	********
NNW	********

SITE DATA FOR VENT 25.

Release Height 0.44 meters.

Vertical momentum present for vent 25

Vent diameter 2.44 meters.

Volumetric flow rate is 35.820 cu m/sec.

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STACK DISTANCES, FILE: Rls25.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	934.0
NNW	********

SITE DATA FOR VENT 26.

Release Height 69.60 meters.

Vertical momentum present for vent 26

Vent diameter 2.24 meters.

Volumetric flow rate is 25.240 cu m/sec.

STACK DISTANCES, FILE: Rls26.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	805.0
NW	********
NNW	********

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SITE DATA FOR VENT 27.

Release Height 2.21 meters.

Vertical momentum present for vent 27

Vent diameter 2.82 meters.

Volumetric flow rate is 19.520 cu m/sec.

STACK DISTANCES, FILE: R1s27.dat

DIR	Distance (meters)
N	********
NNE	********
NE	1280.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 28.

Release Height 9.71 meters.

Vertical momentum present for vent 28

Vent diameter 1.65 meters.

Volumetric flow rate is 32.110 cu m/sec.

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STACK DISTANCES, FILE: Rls28.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	1050.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 29.

Release Height 2.49 meters.

Vertical momentum present for vent 29

Vent diameter 2.93 meters.

Volumetric flow rate is 8.530 cu m/sec.

STACK DISTANCES, FILE: Rls29.dat

DIR	Distance (meters)
N	********
NNE	********
NE	888.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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WINDROSE DATA, FILE: d:\comply-r\windrose.dat

Source of wind rose data: GrandJunction
Dates of coverage: 8791Jan
Wind rose location: Grand
Distance to facility: 50mi

Percent calm: 0.04

Wind FROM	Frequency	Speed (meters/s)
N	0.062	3.45
NNE	0.028	3.29
NE	0.040	3.25
ENE	0.045	3.10
E	0.091	3.34
ESE	0.170	3.84
SE	0.118	3.73
SSE	0.057	3.92
S	0.050	3.90
SSW	0.020	4.06
SW	0.021	3.74
WSW	0.025	3.37
W	0.057	3.78
WNW	0.060	3.84
NW	0.067	4.01
NNW	0.048	3.78

NOTES:

Default air temperature used (55.0 degrees F).

Default vent temperature used (55.0 degrees F). Vent 1.

The receptor exposed to the highest concentration is located 2260. meters to the E. Vent 1.

Default vent temperature used (55.0 degrees F). Vent 2.

The receptor exposed to the highest concentration is located 2510. meters to the E. Vent 2.

Default vent temperature used (55.0 degrees F). Vent 3.

The receptor exposed to the highest concentration is located 2770. meters to the E. Vent 3.

Default vent temperature used (55.0 degrees F). Vent 4.

The receptor exposed to the highest concentration is located 3110. meters to the E. Vent 4.

Default vent temperature used (55.0 degrees F). Vent 5.

The receptor exposed to the highest concentration is located
3590. meters to the E. Vent 5.

Default vent temperature used (55.0 degrees F). Vent 6.

The receptor exposed to the highest concentration is located
3710. meters to the E. Vent 6.

Default vent temperature used (55.0 degrees F). Vent 7.

The receptor exposed to the highest concentration is located
4010. meters to the E. Vent 7.

Default vent temperature used (55.0 degrees F). Vent 8.

The receptor exposed to the highest concentration is located
1860. meters to the E. Vent 8.

Default vent temperature used (55.0 degrees F). Vent 9.

The receptor exposed to the highest concentration is located
1920. meters to the ENE. Vent 9.

Default vent temperature used (55.0 degrees F). Vent 10.

The receptor exposed to the highest concentration is located
1790. meters to the NE. Vent 10.

Default vent temperature used (55.0 degrees F). Vent 11.

The receptor exposed to the highest concentration is located
4460. meters to the E. Vent 11.

Default vent temperature used (55.0 degrees F). Vent 12.

The receptor exposed to the highest concentration is located
4660. meters to the E. Vent 12.

Default vent temperature used (55.0 degrees F). Vent 13.

The receptor exposed to the highest concentration is located
3630. meters to the E. Vent 13.

Default vent temperature used (55.0 degrees F). Vent 14.

The receptor exposed to the highest concentration is located
2380. meters to the ENE. Vent 14.

Default vent temperature used (55.0 degrees F). Vent 15.

The receptor exposed to the highest concentration is located
359. meters to the NNW. Vent 15.

Default vent temperature used (55.0 degrees F). Vent 16.

The receptor exposed to the highest concentration is located 604. meters to the NW. Vent 16.

Default vent temperature used (55.0 degrees F). Vent 17.

The receptor exposed to the highest concentration is located 710. meters to the NNE. Vent 17.

Default vent temperature used (55.0 degrees F). Vent 18.

The receptor exposed to the highest concentration is located 758. meters to the E. Vent 18.

Default vent temperature used (55.0 degrees F). Vent 19.

The receptor exposed to the highest concentration is located 173. meters to the ENE. Vent 19.

Default vent temperature used (55.0 degrees F). Vent 20.

The receptor exposed to the highest concentration is located 1760. meters to the ENE. Vent 20.

Default vent temperature used (55.0 degrees F). Vent 21.

The receptor exposed to the highest concentration is located 298. meters to the NW. Vent 21.

Default vent temperature used (55.0 degrees F). Vent 22.

The receptor exposed to the highest concentration is located 1030. meters to the WNW. Vent 22.

Default vent temperature used (55.0 degrees F). Vent 23.

The receptor exposed to the highest concentration is located 1220. meters to the NW. Vent 23.

Default vent temperature used (55.0 degrees F). Vent 24.

The receptor exposed to the highest concentration is located 1380. meters to the WNW. Vent 24.

Default vent temperature used (55.0 degrees F). Vent 25.

The receptor exposed to the highest concentration is located 934. meters to the NW. Vent 25.

Default vent temperature used (55.0 degrees F). Vent 26.

The receptor exposed to the highest concentration is located

805. meters to the WNW. Vent 26.

Default vent temperature used (55.0 degrees F). Vent 27.

The receptor exposed to the highest concentration is located
1280. meters to the NE. Vent 27.

Default vent temperature used (55.0 degrees F). Vent 28.

The receptor exposed to the highest concentration is located
1050. meters to the E. Vent 28.

Default vent temperature used (55.0 degrees F). Vent 29.

The receptor exposed to the highest concentration is located
888. meters to the NE. Vent 29.

Input parameters outside the "normal" range:

Vent diameter is unusually LARGE.
Release height is unusually HIGH.
Vent flow is unusually LOW.
Distance from vent to receptor is unusually CLOSE.
Distance from vent to receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 19.2 (mrem/year).

Does NOT comply with emission standards.

*** This facility is NOT in COMPLIANCE ***

Please send this report to your regional EPA office.

You may contact your regional EPA office to determine further action.

********** END OF COMPLIANCE REPORT **********

01/28/11 10:38

40 CFR Part 61
National Emission Standards
for Hazardous Air Pollutants

REPORT ON COMPLIANCE WITH

THE CLEAN AIR ACT LIMITS FOR RADIONUCLIDE EMISSIONS

FROM THE COMPLY-R CODE, VERSION 1.2

Prepared by:

Denision
La Sal Mine
La Sal, Utah

Jim Fisher
970-677-2702

Prepared for:

U.S. Environmental Protection Agency
Office of Radiation Programs
Washington, D.C. 20460

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Stack	Release Rate (curies/YEAR)
1	9.440E+01
2	1.000E-02
3	2.092E+02
4	2.737E+02
5	1.000E-02
6	1.395E+02
7	1.000E-02
8	1.000E-02
9	6.092E+01
10	8.330E+02
11	9.780E+00
12	1.221E+02
13	9.199E+01
14	1.000E-02
15	7.370E+00
16	8.130E+00
17	5.872E+01
18	3.057E+02
19	1.000E-02
20	6.340E+00
21	3.857E+01
22	1.000E-02
23	4.114E+02
24	1.000E-02
25	5.110E+02
26	7.725E+01
27	9.295E+01
28	1.122E+03
29	1.137E+01

SITE DATA FOR VENT 1.

Release Height 3.73 meters.

Vertical momentum present for vent 1

Vent diameter 1.80 meters.

Volumetric flow rate is 24.460 cu m/sec.

STACK DISTANCES, FILE: R1S1.DAT

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2260.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 2.

Release Height 2.00 meters.

Vertical momentum present for vent 2

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1S2.DAT

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2510.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 3.

Release Height 1.00 meters.

Vertical momentum present for vent 3

Vent diameter 1.83 meters.

Volumetric flow rate is 28.580 cu m/sec.

STACK DISTANCES, FILE: Rls3.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	2770.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 4.

Release Height 2.18 meters.

Vertical momentum present for vent 4

Vent diameter 1.85 meters.

Volumetric flow rate is 46.890 cu m/sec.

STACK DISTANCES, FILE: R1s4.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3110.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 5.

Release Height 2.00 meters.

Vertical momentum present for vent 5

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1s5.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3590.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 6.

Release Height 1.89 meters.

Vertical momentum present for vent 6

Vent diameter 1.59 meters.

Volumetric flow rate is 11.340 cu m/sec.

STACK DISTANCES, FILE: Rls6.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3710.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 7.

Release Height 2.83 meters.

Vertical momentum present for vent 7

Vent diameter 1.36 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls7.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4010.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 8.

Release Height 2.00 meters.

Vertical momentum present for vent 8

Vent diameter 2.00 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls8.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	1860.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 9.

Release Height 1.52 meters.

Vertical momentum present for vent 9

Vent diameter 1.19 meters.

Volumetric flow rate is 23.600 cu m/sec.

STACK DISTANCES, FILE: Rls9.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	1920.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 10.

Release Height 1.93 meters.

Vertical momentum present for vent 10

Vent diameter 1.58 meters.

Volumetric flow rate is 27.680 cu m/sec.

STACK DISTANCES, FILE: R1s10.dat

DIR	Distance (meters)
N	********
NNE	********
NE	1790.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 11.

Release Height 2.11 meters.

Vertical momentum present for vent 11

Vent diameter 2.19 meters.

Volumetric flow rate is 56.060 cu m/sec.

STACK DISTANCES, FILE: R1s11.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4460.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 12.

Release Height 1.43 meters.

Vertical momentum present for vent 12

Vent diameter 2.14 meters.

Volumetric flow rate is 40.020 cu m/sec.

STACK DISTANCES, FILE: Rlsl2.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	4660.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 13.

Release Height 2.00 meters.

Vertical momentum present for vent 13

Vent diameter 1.60 meters.

Volumetric flow rate is 14.750 cu m/sec.

STACK DISTANCES, FILE: R1s13.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	3630.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 14.

Release Height 3.25 meters.

Vertical momentum present for vent 14

Vent diameter 4.04 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: R1s14.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	2380.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 15.

Release Height 2.57 meters.

Vertical momentum present for vent 15

Vent diameter 1.45 meters.

Volumetric flow rate is 4.490 cu m/sec.

STACK DISTANCES, FILE: Rls15.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	359.0

SITE DATA FOR VENT 16.

Release Height 2.41 meters.

Vertical momentum present for vent 16

Vent diameter 1.42 meters.

Volumetric flow rate is 5.120 cu m/sec.

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STACK DISTANCES, FILE: Rls16.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	604.0
NNW	********

SITE DATA FOR VENT 17.

Release Height 0.46 meters.

Vertical momentum present for vent 17

Vent diameter 0.74 meters.

Volumetric flow rate is 1.960 cu m/sec.

STACK DISTANCES, FILE: Rls17.dat

DIR	Distance (meters)
N	********
NNE	710.0
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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SITE DATA FOR VENT 18.

Release Height 1.97 meters.

Vertical momentum present for vent 18

Vent diameter 1.60 meters.

Volumetric flow rate is 5.430 cu m/sec.

STACK DISTANCES, FILE: R1s18.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	758.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 19.

Release Height 1.76 meters.

Vertical momentum present for vent 19

Vent diameter 1.70 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls19.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	173.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 20.

Release Height 1.02 meters.

Vertical momentum present for vent 20

Vent diameter 1.60 meters.

Volumetric flow rate is 10.320 cu m/sec.

STACK DISTANCES, FILE: Rls20.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	1760.0
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 21.

Release Height 1.83 meters.

Vertical momentum present for vent 21

Vent diameter 1.60 meters.

Volumetric flow rate is 4.180 cu m/sec.

STACK DISTANCES, FILE: Rls21.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	298.0
NNW	********

SITE DATA FOR VENT 22.

Release Height 2.77 meters.

Vertical momentum present for vent 22

Vent diameter 1.78 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls22.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	1030.0
NW	********
NNW	********

SITE DATA FOR VENT 23.

Release Height 1.33 meters.

Vertical momentum present for vent 23

Vent diameter 1.60 meters.

Volumetric flow rate is 30.140 cu m/sec.

STACK DISTANCES, FILE: Rls23.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	1220.0
NNW	********

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SITE DATA FOR VENT 24.

Release Height 0.89 meters.

Vertical momentum present for vent 24

Vent diameter 1.96 meters.

Volumetric flow rate is 25.000 cu m/sec.

STACK DISTANCES, FILE: Rls24.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	1380.0
NW	********
NNW	********

SITE DATA FOR VENT 25.

Release Height 0.44 meters.

Vertical momentum present for vent 25

Vent diameter 2.44 meters.

Volumetric flow rate is 35.820 cu m/sec.

STACK DISTANCES, FILE: Rls25.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	934.0
NNW	********

SITE DATA FOR VENT 26.

Release Height 1.32 meters.

Vertical momentum present for vent 26

Vent diameter 2.24 meters.

Volumetric flow rate is 25.240 cu m/sec.

STACK DISTANCES, FILE: Rls26.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	805.0
NW	********
NNW	********

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SITE DATA FOR VENT 27.

Release Height 2.21 meters.

Vertical momentum present for vent 27

Vent diameter 2.82 meters.

Volumetric flow rate is 19.520 cu m/sec.

STACK DISTANCES, FILE: Rls27.dat

DIR	Distance (meters)
N	********
NNE	********
NE	1280.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 28.

Release Height 2.22 meters.

Vertical momentum present for vent 28

Vent diameter 1.65 meters.

Volumetric flow rate is 32.110 cu m/sec.

STACK DISTANCES, FILE: R1s28.dat

DIR	Distance (meters)
N	********
NNE	********
NE	********
ENE	********
E	1050.0
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

SITE DATA FOR VENT 29.

Release Height 2.49 meters.

Vertical momentum present for vent 29

Vent diameter 2.93 meters.

Volumetric flow rate is 8.530 cu m/sec.

STACK DISTANCES, FILE: R1s29.dat

DIR	Distance (meters)
N	********
NNE	********
NE	888.0
ENE	********
E	********
ESE	********
SE	********
SSE	********
S	********
SSW	********
SW	********
WSW	********
W	********
WNW	********
NW	********
NNW	********

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WINDROSE DATA, FILE: d:\comply-r\windrose.dat

Source of wind rose data: GrandJunction
Dates of coverage: 8791Jan
Wind rose location: Grand
Distance to facility: 50mi

Percent calm: 0.04

Wind FROM	Frequency	Speed (meters/s)
N	0.062	3.45
NNE	0.028	3.29
NE	0.040	3.25
ENE	0.045	3.10
E	0.091	3.34
ESE	0.170	3.84
SE	0.116	3.73
SSE	0.057	3.92
S	0.050	3.90
SSW	0.020	4.06
SW	0.021	3.74
WSW	0.025	3.37
W	0.057	3.78
WNW	0.060	3.84
NW	0.067	4.01
NNW	0.048	3.76

NOTES:

Default air temperature used (55.0 degrees F).

Default vent temperature used (55.0 degrees F). Vent 1.

The receptor exposed to the highest concentration is located 2260. meters to the E. Vent 1.

Default vent temperature used (55.0 degrees F). Vent 2.

The receptor exposed to the highest concentration is located 2510. meters to the E. Vent 2.

Default vent temperature used (55.0 degrees F). Vent 3.

The receptor exposed to the highest concentration is located 2770. meters to the E. Vent 3.

Default vent temperature used (55.0 degrees F). Vent 4.

The receptor exposed to the highest concentration is located 3110. meters to the E. Vent 4.

Default vent temperature used (55.0 degrees F). Vent 5.

The receptor exposed to the highest concentration is located 3590. meters to the E. Vent 5.

Default vent temperature used (55.0 degrees F). Vent 6.

The receptor exposed to the highest concentration is located 3710. meters to the E. Vent 6.

Default vent temperature used (55.0 degrees F). Vent 7.

The receptor exposed to the highest concentration is located 4010. meters to the E. Vent 7.

Default vent temperature used (55.0 degrees F). Vent 8.

The receptor exposed to the highest concentration is located 1860. meters to the E. Vent 8.

Default vent temperature used (55.0 degrees F). Vent 9.

The receptor exposed to the highest concentration is located 1920. meters to the ENE. Vent 9.

Default vent temperature used (55.0 degrees F). Vent 10.

The receptor exposed to the highest concentration is located 1790. meters to the NE. Vent 10.

Default vent temperature used (55.0 degrees F). Vent 11.

The receptor exposed to the highest concentration is located 4460. meters to the E. Vent 11.

Default vent temperature used (55.0 degrees F). Vent 12.

The receptor exposed to the highest concentration is located 4660. meters to the E. Vent 12.

Default vent temperature used (55.0 degrees F). Vent 13.

The receptor exposed to the highest concentration is located 3630. meters to the E. Vent 13.

Default vent temperature used (55.0 degrees F). Vent 14.

The receptor exposed to the highest concentration is located 2380. meters to the ENE. Vent 14.

Default vent temperature used (55.0 degrees F). Vent 15.

The receptor exposed to the highest concentration is located
359. meters to the NNW. Vent 15.

Default vent temperature used (55.0 degrees F). Vent 16.

The receptor exposed to the highest concentration is located 604. meters to the NW. Vent 16.

Default vent temperature used (55.0 degrees F). Vent 17.

The receptor exposed to the highest concentration is located 710. meters to the NNE. Vent 17.

Default vent temperature used (55.0 degrees F). Vent 18.

The receptor exposed to the highest concentration is located 758. meters to the E. Vent 18.

Default vent temperature used (55.0 degrees F). Vent 19.

The receptor exposed to the highest concentration is located 173. meters to the ENE. Vent 19.

Default vent temperature used (55.0 degrees F). Vent 20.

The receptor exposed to the highest concentration is located 1760. meters to the ENE. Vent 20.

Default vent temperature used (55.0 degrees F). Vent 21.

The receptor exposed to the highest concentration is located 298. meters to the NW. Vent 21.

Default vent temperature used (55.0 degrees F). Vent 22.

The receptor exposed to the highest concentration is located 1030. meters to the WNW. Vent 22.

Default vent temperature used (55.0 degrees F). Vent 23.

The receptor exposed to the highest concentration is located 1220. meters to the NW. Vent 23.

Default vent temperature used (55.0 degrees F). Vent 24.

The receptor exposed to the highest concentration is located 1380. meters to the WNW. Vent 24.

Default vent temperature used (55.0 degrees F). Vent 25.

The receptor exposed to the highest concentration is located 934. meters to the NW. Vent 25.

Default vent temperature used (55.0 degrees F). Vent 26.

The receptor exposed to the highest concentration is located

805. meters to the WNW. Vent 26.

Default vent temperature used (55.0 degrees F). Vent 27.

The receptor exposed to the highest concentration is located 1280. meters to the NE. Vent 27.

Default vent temperature used (55.0 degrees F). Vent 28.

The receptor exposed to the highest concentration is located 1050. meters to the E. Vent 28.

Default vent temperature used (55.0 degrees F). Vent 29.

The receptor exposed to the highest concentration is located 888. meters to the NE. Vent 29.

Input parameters outside the "normal" range:

Vent diameter is unusually LARGE.
Vent flow is unusually LOW.
Distance from vent to receptor is unusually CLOSE.
Distance from vent to receptor is unusually FAR.

RESULTS:

Effective dose equivalent: 22.9 (mrem/year).

Does NOT comply with emission standards.

*** This facility is NOT in COMPLIANCE ***

Please send this report to your regional EPA office.

You may contact your regional EPA office to determine further action.

********** END OF COMPLIANCE REPORT **********