Cameco

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June 24, 2014

Andrew Pesinko
Mailstop T8 F5
US Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: NRC Request for Additional Information Dated March 14, 2014 - Crow Butte and Smith Ranch/ Highland Public Dose Compliance

Dear Mr. Pesinko,

In response to your letter dated March 14, 2014, Cameco is providing information regarding compliance with dose limits for individual members of the public. For administrative expediency, in Attachment A Cameco is framing its Crow Butte response in the context of the draft license conditions. In Attachment B Cameco is framing its Smith Ranch/Highland response in the context of the RAIs currently outstanding for the license renewal.

If you have any questions or comments please do not hesitate to call me at 307.316.7587

Sincerely,

Josh Leftwich
Director, Safety, Health, Environment and Quality

Attachments
Ec.

Attachment A

Cameco Response to Draft Crow Butte License Conditions 11.11 A through C

1.0 Draft License Condition 11.11 A.

"Discuss how, in accordance with 10 CFR 40.65, the quantity of the principal radionuclides from all point and diffuse sources will be accounted for, and verified by, surveys and/or monitoring."

As per 10 CFR 40.65, semi-annually a report must be provided to the NRC that specifies the quantity of each principal radionuclide released to the restricted and unrestricted areas in the liquid and gaseous effluents and other information required for the NRC to estimate maximum potential annual radiation doses to the public resulting from effluent releases. In addition, the report must indicate if quantities of a radioactive material released during the reporting period are significantly above the licensee's design objectives. The license condition requires a description of how this legal requirement will be met, specifically addressing how surveys and/or monitoring will be used as part of this process.

Cameco Corporation's Crow Butte operation currently has a comprehensive environmental and workplace monitoring program that includes measurements of airborne effluents and external radiation for the purposes of calculation and/or verification of public and worker dose, demonstration of compliance to legal requirements and verification that our operation performance is within the bounds of the design. In additional to a significant surface and groundwater sampling program used to detect excursions and monitor liquid effluent, Crow Butte Operation has six primary environmental monitoring stations for gaseous and particulate airborne effluent and external gamma monitoring distributed around the main plant and wellfields with the majority of stations downwind of the source terms along the lease boundary. On a recent campaign basis, the site has also collected additional environmental radon data over a three year period and continuous radon progeny measurements for a one year period at a further 12 locations throughout the license boundary. Additional radon sampling devices are also deployed at other locations across the site, including four inside of header houses, to provide additional information. The background station is located near the town of Crawford approximately 6 km away and out of the prevailing wind directions.

To address the requirements of 10 CFR 40.65, Cameco is proposing continuation of the particulate and gamma sampling at the current stations and, to address radon emissions, a combination of additional monitoring of radon source terms and modeling. It is important to point out that direct measurement of each point and diffuse source (e.g. well heads, header houses, tanks, etc.) for the purpose of quantifying the radionuclides released from it is not a feasible or realistic option at a large operating site for meeting of this license condition. Further, environmental monitoring capable of measuring emissions and detecting upset conditions does not provide sufficient information to actually quantify the emissions from each individual source; in reality there is no environmental monitoring program that would be capable of providing this information. Due to dispersion, a monitoring point measures portions of numerous sources but does not measure the entirety of the emissions from any single source. A further complication is the uncertainty associated with measurement of small amounts radioactivity in the environment, specifically, measurement uncertainty and to a greater degree background variability. However, a combination of modeling and measurement does provide a reasonable solution to the requirement to quantify emissions for each source.

In summary, to provide additional quantification of source terms, the measurements listed below will be performed, with the first semi-annual data set collected in the second half of 2013 and two data sets collected in 2014. The emissions calculated from this information will compared with the modelled source terms using Regulatory Guide 3.59. The measurements will be used in combination with modeling to determine the most accurate emissions estimate for the site. This is a long-term operation that rarely has changes to process that would result is significantly differences in emissions. Therefore, this full set of measurements will be repeated once per license period or following a significant change to the process. Annually the predicted Rn-222 concentrations will be compared statistically to measurements at our environmental monitoring stations to ensure the emissions estimate remains accurate.

1) 5 track etch cups will be placed in the main plant semi-annually at locations of highest predicted radon gas concentrations;
2) 1 track etch cup per quarter will be placed in each of the 5(??) accessible exhaust ventilation streams from tanks that are considered the primary emitters of radon, e.g. IX columns, injection water storage tanks, etc.;
3) 5 track etch cups header houses randomly selected throughout the wellfield area semi-annually and varied for each 6-month period;
4) Quarterly 1 vented wellhead will be sampled for radon gas using scintillation cells.

Track etch cups have been chosen as the measurement method because they provide integrated sampling over a longer timeframe making them a more accurate measure of radon gas concentrations compared with short-term grab samples using a scintillation cell.

During consultations with the manufacturer, Landauer, it was determined that with the potential for humidity in the vents, track etch cups with a thoron filter will be used for this application to prevent deterioration of the paper filter used on the RADTRAK detectors typically used. It was also noted that the track etch cups have a radon saturation limit of 100,000 pCi/L-days. The vents will be sampled with scintillation cells to provide a preliminary estimate of the concentration of radon and determine the appropriate amount of time the detectors can remain in the vents to avoid reaching the saturation point. Track etch cups will be used as the ongoing means of measuring radon.

1.1 Main Plant

On a semi-annual basis 5 track etch cups will be placed in the main plant at locations of highest predicted radon gas concentrations. An engineering assessment of the main plant will be used to estimate the rate of release from the exhaust fans. Because the plant operates continuously, it will be assumed that this release rate is constant for the entire year. This is a reasonable, yet conservative assumption, because if a fan were temporarily non-operational, the actual release rate would be decreased somewhat from the calculated value. If an extended shut-down of a fan were to take place, the release rates will be adjusted accordingly. The total effluent from the plant will be estimated using the following formula:

*Plant activity (μCi) = Radon concentration (μCi/ml) * Release rate (ml/min)*Time (min)*

Releases of radon from ventilated tanks will be calculated by measuring the concentration of radon in the ventilated exhaust from tanks considered to be the primary emitters of radon, combined with the ventilation rate of the tank determined through an engineering analysis. It is important to note that not all vents are readily or safely accessible and some vents are not associated with key radon sources, therefore not all vents will be measured. The radon concentration will be measured using track etch cups placed semi-annually in the ventilation systems of tanks that are considered the primary emitters of radon. This method aligns with the

"Continuous Method" for sampling of Rn-222 in underground uranium mine vents in 40 CFR 61 Appendix B Method 115. Though this method describes monitoring of underground mine ventilation , it can be applied to this situation. Again, track etch cups provide a more accurate means of determining the radon concentration when compared with grab sampling and as per the recommendations of 40 CFR 61, the continuous method is more applicable if there is an intermittent nature to the emissions. In this case, processes such as resin transfer could represent a transient increase in the radon concentration and it is more accurate to measure over a longer time frame rather than intermittently. The effluent from tanks will be calculated, as per the equation above, and reported semi-annually. Grab samples using scintillation cells may be collected for additional information as applicable.

1.2 Header Houses

On a semi-annual basis track etch cups will be placed in a total of 5 header houses randomly selected throughout the wellfield area and varied for each 6-month period. The average concentration from these header houses will be calculated semi-annually and converted into a total activity emitted by multiplying this value by the actual number of header houses and the exhaust rate of the header houses as per the equation below. In the event that a header house is identified as having significantly higher radon gas concentration compared with the distribution of concentrations measured in the other locations, that header house result will be removed from the calculation of the average and the emissions from that header house calculated independently and added to the total activity.

*HH activity (μCi) =No. of HH * Average Radon concentration (μCi/ml) * Release rate (ml/min)*Time (min)*

1.3 Wellfields

The only likely source of radon emitted from the wellheads and piping occurs when the wellheads are opened to the atmosphere to depressurize a wellhead that has become pressurized. Because this situation is transient and very short lived by nature, in addition to being highly localized, emissions from this situation will be measured through the use of grab samples collected with scintillation cells. Sampling of at least one well per quarter will be planned. These samples will be collected in the airstream being vented from the well. Currently, wells are vented at nominally 50 per month and venting lasts an average over about 10 minutes. This information will be used to estimate the release of radon from the wellfields using the following formula:

Wellfield Activity (*(μCi) = Average of semi-annual radon samples (μCi/ml) * Release rate (ml/min)*Nominal venting time (min) * No. wells per semi-annual period*

1.4 Summary

The total site emissions can be estimated by summing the individual source terms. This information can also be used to refine the input data for the MILDOS-Area model. A MILDOS model, with input parameters refined based on measurements and outputs shown to be comparable to measured environmental conditions, provides a reasonable method for calculation and prediction of environmental conditions and doses as well as confirmation of emissions. Due to the inherent variability of background radon and the potential for measurement error at very low concentrations, environmental radon data collected at receptor locations can be uncertain. To attempt to mitigate this, multiple track etch cups will be placed at the receptor locations. In addition, Crow Butte will continue to maintain and update a

MILDOS model of the site based on and compared to measurement data as a means of corroborating and identifying sampling outliers.

2.0 Draft License Condition 11.11 B.

"Evaluate the member(s) of the public likely to receive the highest exposures from licensed operations consistent with 10 CFR 20.1302."

The Addendum to this document contains a description of MILDOS-Area modelling performed to determine the member of the public likely to receive the maximum dose. In summary, the assessment of receptor doses considered both actual and potential receptors. The actual receptors included local residents, including the nearest resident located approximately 1000 m north-east of the main plant. Potential receptors were members of the public who may be at or near the site for greater than 50 hours per year and included a delivery person and ranchers performing haying or cattle related activities. For the potential receptors an estimate was made of the hours spent at or near the site.

Based on the outputs of this assessment, the member of the public likely to receive the maximum dose is the resident located approximately 1000m to the north-east of the plant.

3.0 Draft License Condition 11.11 C.

"Discuss and identify how radon (radon-222) progeny will be factored into analyzing potential public dose from operations consistent with 10 CFR Part 20, Appendix B, Table 2."

In 10 CFR 20.1302 (1), the regulation states that it is acceptable to show compliance to public dose limits by demonstrating by measurement or calculation that the total effective dose equivalent to the individual most likely to receive the highest dose from the licensed operation does not exceed the annual dose limit. In the response to condition 11.11B, the Edelman resident was identified as the member of the public likely to receive the maximum dose. CBO will show compliance to this requirement for this receptor through one of the following two methods outlined below.

The first method is to perform a dose assessment using measured effluent concentrations at a monitoring location positions 30 m from the residence of the maximum receptor. In regards to radon and radon progeny dose, the dose assessment will be performed using the following equation:

$$D = DCF \sum_i C_i F_i T_i$$

Where:

- D = annual dose (TEDE) (mrem/yr)
- DCF = dose conversion factor for Rn-222 with 100% equilibrium factor with its progeny from 10 CRF 20 Appendix B - 500 mrem/hr per pCi Rn/L
- C_i = annual average concentration of Rn-222 in air (pCi/L) at the receptor location
- F_i = radon equilibrium factor at the receptor
- T_i = occupancy factor for the receptor

In the event that a receptor is exposed in multiple locations, e.g. indoors and outdoors, applicable equilibrium and occupancy factors will be used for those locations. For this receptor, currently all exposure will be assumed to be indoors as this is the most conservative assumption. If multiple exposure locations are to be used in the future, the NRC will be notified prior to this change.

Dose conversion factor was established by taking the 10 CFR 10 Appendix B, Table 2, value for radon with daughters present in air, (1 × 10-10 µCi/mL or 0.1 pCi/L). The annual dose is 50 mrem/yr (0.5 mSv/yr). Therefore, the dose conversion factor for radon-222 with progeny at 100% equilibrium is determined as 50 mrem/yr (0.5 mSv/yr) divided by 0.1 pCi/L, or 500 mrem/yr per pCi Rn/L.

The annual radon concentration at the receptor will be determined by calculating the average net radon concentration at the receptor location based on semi-annual radon-222 measurements with track etch cups. As this is a private resident, measurements indoors on private property is not a feasible alternative. In an article published by Shiager (1974), it was shown that buildings immediately adjacent to tailing piles had indoor radon concentration in equilibrium with those found outdoors. In FSME-ISG-01 draft guidance, it is stated as acceptable to assume that the indoor radon concentration due to licensee activities is equal to the outdoor concentration.

The equilibrium factor between radon and radon progeny is assumed to be 50% for indoor exposure. This value is based on Regulatory Guide 3.51 and NCRP 160 and is mentioned in FSME-ISG-01 draft guidance as an acceptable default for indoor equilibrium factor.

The actual occupancy factor for this receptor will be determined based on an assessment of actual residency time.

The alternate method involves use of the MILDOS-Area atmospheric dispersion code. As per the discussion on condition 11.11A, measurements will be collected and release rates for radon will be determined for each source term. This information can be used as inputs to the MILDOS-Area model in order to determine a dose to this receptor.

Addendum

MILDOS-Area Modelling and Validation of Emissions and
Public Dose for the Crow Butte Facility

The MILDOS-Area predictive modelling software has commonly been used as part of facility licensing to predictively model emissions and doses to members of the public as part of regulatory decision making. This document provides supplemental information to the original MILDOS-Area estimate for the Crow Butte Operation. Specifically, there is an enhanced assessment of the maximally exposure member of the public and comparison of modelled outputs to actual measured airborne effluent concentrations.

1.0 Operations Summary

The following summary of operational process at Crow Butte is based upon year 2013 operations, however the process has been in this configuration since 2011.

1.1 Production Circuits

1.1.1 Down-flow IX Circuit Process Summary

Currently the Down-flow Ion Exchange Circuit consists of Mine Units 7, 9 and 11. Within a mine unit, process water, also called lixiviant, is injected in to injection wells and uranium (and radon) bearing fluid is extracted from production wells. The lixiviant is transferred through a network of pipes to the Central Processing Plant (CPP), where the water is injected in to one of three pairs of down-flow ion exchange (IX) columns. Each down-flow IX column is sealed, with water entering at the top and leaving at the bottom. As the uranium bearing water travels through the column, uranium is stripped out of the water and attaches to resin beads in a chemical reaction. Once the resin is loaded with uranium, the column is taken offline to transfer the resin to the elution columns, where the uranium is stripped off of the resin. The IX column is filled with unloaded resin, and put back online.

When the loaded resin column is taken offline, the pressure inside is released through a vent that is plumbed in to the Eluent tank, which is itself vented through the roof to atmosphere. The resin is then either transferred directly to the elution column with process water, or is first run across a resin shaker deck to clean it. When the resin runs across the shaker deck, it is moved with process water.

Each pair of down-flow columns run in a lead-lag configuration. Uranium loaded lixiviant from the mine units enter the top of the lead IX column, travels down through the resin beads, and exits the bottom of the column. This water then enters the top of the lag column, travels down through the resin beads, and exits the bottom of that column. Since more uranium will be stripped out in the lead column, the resin beads become saturated with uranium in this column before the lag, and when the loaded resin is transferred out and replaced with unloaded resin, this column becomes the lag and the other becomes the lead.

The effluent leaving each pair of down-flow IX columns contains very little uranium, and is returned to the well fields to be re-injected in to the injection wells. A 1% bleed is taken off of the effluent of each pair of columns, and is either recycled into chemical makeup or used to move resin. The process water used to move resin eventually becomes dirty and is either sent to the commercial evaporation ponds or to the deep disposal feed tank, for disposal in the deep injection well.

Since the majority of the down-flow IX circuit is closed and under pressure, radon release can only occur at certain points. The piping in the wellfields is sealed which means the potential for radon to be released from the wellfields as part our routine operations in minimal. However, if a well becomes pressurized, a bleed port is opened to relieve the pressure; radon can be vented to the atmosphere when this operation is performed. In the CPP radon will periodically be released from the columns when the loaded resin is transferred to the elution columns. Radon will also be released from the bleed water when it is used in chemical makeup, or for moving resin with final disposal in the commercial evaporation ponds.

1.1.2 Up-flow IX Circuit Process Summary

Currently the Up-flow Ion Exchange Circuit consists of Mine Units 8 and 10. Within a mine unit lixiviant is injected into injection wells, and uranium (and radon) bearing lixiviant is extracted from production wells. This lixiviant is transferred through a network of pipes to the Central Processing Plant (CPP), where it is injected in to one of two trains of up-flow ion exchange (IX) columns. Each train of up-flow columns consists of four columns, all open to atmosphere. The uranium bearing lixiviant enters the columns from the bottom, traveling up through resin beads, and is then extracted from the top. The process water from the top of the column is then injected in to the bottom of the next column in series. The barren lixiviant from the last column is then processed through backwash injection filters, and is returned to the well fields for re-injection into the injection wells. The waste water from the injection filters, from backwash cleaning cycles, is primarily delivered to a backwash tank and then to the deep injection well.

As the uranium bearing lixiviant travels through the column train, and passes over the resin beads, the majority of the uranium will be stripped out in the leading columns. When the lead column's resin beads become saturated, it is taken offline and the next column in the train becomes the lead. The offline column has its resin transferred to the resin elution column, to strip the uranium from the resin, and unloaded resin is transferred back in to the column. The column is then brought back online as the last column in the train.

As with the down-flow columns, radon may be released when the bleed value on the well heads is opened as part of remediation of a pressurized well. Since the up-flow columns are open to atmosphere, most of the radon in the lixiviant will be released there. Any radon left in the fluid, with the exception of a small amount released in the backwash waste water, will be returned to the well fields for injection back into the wells.

1.1.3 Restoration Circuit

Currently the Restoration Circuit consists of Mine Units 4, 5 and 6. Within a mine unit restoration process water is injected into injection wells, and uranium (and radon) bearing water is extracted from the production wells. The process water is transferred through a network of pipes to the Restoration Plant (RO Building), where the water is injected in to one of three pairs of restoration down-flow ion exchange (IX) columns. The process follows the same as the production down-flow IX columns, except for the column pairs servicing Mine Units 4 and 5.

Instead of the effluent going directly back to the well fields (with an approximate 1% bleed), the effluent of the columns servicing mine units 4 and 5 are passed through separate reverse osmosis filtration systems before returning to the well fields for re-injection. Additionally, the bleed from the column pair servicing mine unit 6 is processed through mine unit 5's RO system, in order to make up for waste water lost during the RO treatment. The waste water from the RO filters, approximately 25%-30% of the input, is transferred to the deep disposal feed tank, and the disposed of in the deep injection well.

As with the production down-flow circuit, the majority of the restoration circuit is closed and under pressure, and radon release can only occur at certain points. Opening of bleed valves to remediate pressurized wells is the only potential release mechanism in the wellfields. In the restoration building, radon will periodically be released from the columns when the loaded resin is transferred to the elution columns. Radon will also be released from the RO waste water. The RO waste water will be stored in the deep disposal feed tank before deep injection, during which it will release radon gas.

2.0 Model inputs and assumptions

2.1 General Information

The primary radionuclides of interest from this model are radon gas (Rn-222) and radon progeny (Po-218, Pb-214 and Bi-214), however MILDOS also calculates dose from Pb-210 and Po-210 as well. These radionuclides are part of the U-238 decay series and this decay series is assumed to be the primary source of exposure because the contribution of the U-235 decay series is less than 5% of that from the U-238 series. Primary release mechanisms for radon gas from the circuit have been discussed in the previous section. NRC's recommendation that for modern, low temperature vacuum driers the particulate release is essentially zero, as stated in NUREG 1910 (USNRC 2009), has been adopted for this model. As shown in Table 2.1-1, measurements of airborne particulate collected to date demonstrate that uranium concentrations at our environmental monitoring stations are comparable to or below background concentrations and provide basis for use of this assumption.

Table 2.1- 1: Airborne Particulate Concentrations for 2013 Above Background

	Uranium (μCi/ml)	Radium 226 (μCi/ml)	Lead-210 (μCi/ml)	Thorium-230
AM6 (background)	1E-16	1E-16	2E-14	1E-16
10 CRF 20 Effluent Concentration	9E-14 (D)	9E-13	6E-13	3E-12 (W)
AM1	0	0	0	0
AM2	1E-16	0	0	0
AM3	0	0	0	0

The transport of modelled radiological emissions from the sources is predicted using a sector-averaged Gaussian plume dispersion model. The dispersion model uses the meteorological data provided by the user and also includes mechanisms of dry deposition of particulates, re-suspension, radioactive decay and progeny in-growth and plume reflection. Deposition build-up and in-growth of radioactive progeny are considered in estimating ground concentrations.

2.2 Source Term Calculations

The radionuclide releases from the Crow Butte operation have been determined for each source of emissions. Sources addressed in this model are the wellfields, specifically the emissions from header houses and well heads resulting from venting, up-flow IX columns, down-flow IX columns and the reverse osmosis plant. These sources include emissions from both production and restoration activities. The locations of these sources have been defined within the MILDOS model based on Cartesian coordinates relative to a reference point. In this model the reference point is central processing plant (CPP) located at 0,0.

As is discussed further in Section 2.2.5, consideration was given to whether wellfields sources were best characterized as point or area source terms. The use of area source terms was selected based on the ability to more accurately match actual measurement radon gas concentrations at our monitoring stations. Table 2.2-1 provides the location of each source. For wellfield source terms, the location represents the center of the wellfield. IX column and RO plant source terms are located at the CPP.

Table 2.2-1: Locations of Source Terms

Source Name	X - Location (km)	Y - Location (km)
MU2+3	0.057	0.103
MU4	0.223	-0.101
MU5	-0.145	0.619
MU6	-0.958	1.345
MU7	-0.028	-0.451
MU8	-1.631	2.183
MU9	0.609	-0.794
MU10	-2.621	3.02
MU11	0.921	-0.977
CPP	0	0

For the initial assessment, source emissions were calculated using guidance from NRC Regulatory Guide 3.59 (USNRC 1987). The formulas used to determine the emissions are shown below. The radon release rate from 1 m3 of rock was calculated using equation (1) and the amount of radon circulated within the lixiviant on an annual basis is calculated using equation (2).

$$G = \frac{R\rho E(1-p)}{p} x10^{6} \qquad (1)$$

Where:
G =the radon release rate from $1m^3$ of rock
R = radium content, pCi/g
ρ = the rock density, g/cm^3
E = emanating power and
p = formation porosity

$$Y = GM\epsilon D \; x \; 1.44 \qquad (2)$$

Where:
Y = yearly radon release to the lixiviant, Ci/yr
M = lixiviant production rate, L/min
ε = equilibrium factor for radon ($1 - e^{-\lambda t}$ where λ = radon decay constant and t = residence time)
D = production days per year

Table 2.2-2 contains the input parameters used in determination of source terms. As data related to the magnitude of specific source terms are collected through the proposed radon emissions monitoring program, this data can be used to refine and improve the source term estimates. For the production and restoration mine units, mine unit specific lixiviant production rates were used in the calculation of source terms. The total production lixiviant flow rate is approximately 26,500 L/min. Of this total 50 percent, coming from mine units 8 and 10, is processed by the upflow columns and 50 percent, coming from mine units 7, 9 and 11, by the downflow.

Table 2.2-2: Input parameters for MILDOS Model

Parameter	Value
Average ore grade	0.27%
Radium-226 content in ore	764 (pCi/g)
Rock density	1.89 g/cm^3
Emanating power	0.2
Formation porosity	0.29
Radon decay constant	0.181 /day
Residence time	7 days
Production days per year	365.25
Mine Unit 2 Restoration Flow Rate	133.3 L/min
Mine Unit 3 Restoration Flow Rate	120.5 L/min
Mine Unit 4 Restoration Flow Rate	979.8 L/min
Mine Unit 5 Restoration Flow Rate	816.1 L/min
Mine Unit 6 Restoration Flow Rate	606.3 L/min
Mine Unit 7 Lixiviant Flow Rate	4758 L/min
Mine Unit 8 Lixiviant Flow Rate	5971 L/min
Mine Unit 9 Lixiviant Flow Rate	4565 L/min
Mine Unit 10 Lixiviant Flow Rate	7279 L/min
Mine Unit 11 Lixiviant Flow Rate	3927 L/min

This information can be used to determine the total radon available for release. The final parameter is the radon release fraction from each source. For example, the fraction of the total radon in the lixiviant released through well venting. To determine a reasonable estimate of these release rates, a sensitivity analysis was performed in which the release rate parameters were varied and the resulting modelled radon gas concentration was compared with measured values. The parameters that produced the closest overall fit to measurements were used in this analysis. The sensitivity analysis is described in Section 2.2.5. Sections 2.2.1 through 2.2.4 include the best fit release rate parameters in the descriptions of the source terms.

2.2.1 Wellfields

Radium 226 is assumed to be in equilibrium with its parent radionuclide, U-238. At an average grade of 0.27%, the radium 226 content of the ore is 764 pCi/g. Using this value and the applicable parameters stated in Table 2.2.2, the radon release rate from 1 m3 of rock, using equation (1), is 7.05E-4 Ci/m3. Using equation (2) and the flow rate for each of the mine units, the total annual radon present within the restoration or production fluid was calculated by mine unit. The yearly radon emission for each mine unit was then determined using the assumed radon release rate of 5% within the wellfields. The radon emissions from the production and restoration wellfields are shown in Table 2.2.1-1.

Table 2.2.1-1: Radon Release Rates Calculated for Each Source

Source	Radon Release (Ci/yr)
Mine Unit 2+3	4.7
Mine Unit 4	18.0
Mine Unit 5	15.0
Mine Unit 6	11.1
Mine Unit 7	63.5
Mine Unit 8	79.7
Mine Unit 9	60.9
Mine Unit 10	97.1
Mine Unit 11	52.4
CPP (upflow IX+downflow IX+ RO)	4698.9

2.2.2 Upflow IX Columns

The lixiviant from mine units 8 and 10 is processed by the upflow IX columns at the CPP. Because these columns are open to the atmosphere, the majority of the radon present in the fluid will be degassed and released to the atmosphere. It is difficult to determine the exact percentage of radon released, therefore to be somewhat conservative in our modeling, we have assumed that 100% of the radon remaining in the lixiviant is degassed within the upflow IX columns. Table 2.2.1-1 presents the combined radon emissions from the CPP (up-flow columns, downflow columns and Reverse Osmosis).

2.2.3 Down-flow IX Columns

The lixiviant from mine units 7, 9 and 11 is processed by down-flow IX columns as well as the restoration water from mine units 4 through 6. Down-flow columns are kept under pressure until the resin beads are transferred, at which time the system is depressurized. There are a total of 7 down-flow columns and each column has its resin transferred approximately once per week. Therefore, nominally, one column is transferred per day. Though the emission from down-flow columns are not continuous, because the columns are, on average, depressurized for transfers daily this has been approximated by a continuous release, using the assumption that 20% of the radon remaining in the lixiviant is released when the system depressurizes. Table 2.2.1-1 presents the combined radon emissions from the CPP (up-flow columns, downflow columns and Reverse Osmosis).

2.2.4 Reverse Osmosis Plant

After passing through down-flow IX columns, restoration water from mine units 4 and 5 is further treated in the reverse osmosis plant. The RO system is a closed, pressurized circuit, therefore radon is not emitted from the RO plant as part of the filtration process. However, approximately 25% of the input water volume is removed as waste water. Once outside the RO system, this water is no longer under pressure and can release radon to the environment. As with the up-flow columns, it was assumed that 100% of the radon from the waste water was released. Table 2.2.1-1 presents the combined radon emissions from the CPP (up-flow columns, downflow columns and Reverse Osmosis).

2.2.5 Sensitivity Analysis

In the calculation of source terms using Regulatory Guide 3.59, the primarily variable is the percentage of available radon released to the atmosphere. The other input parameters, e.g. ore body grade and size, water volumes, etc., are determined by physical or operational conditions. To determine the best estimate for the radon release rate for the source terms, a sensitivity analysis was performed in which the radon venting rate was altered and the resulting modelled radon gas concentrations were compared with the measured radon gas concentrations at those receptor points.

Measurements for the sensitivity analysis included data from 1999 – 2013 at the 6 environmental monitoring stations (AM1 – AM5 and AM8), data from 2011 – 2013 at four locations within the wellfield areas (AM22 – AM25) and from 2011 – 2013 at four wellfield header houses (WH9, WH17, WH47, WH50). Because individual data points have significant uncertainty due to both measurement uncertainty at low levels and background radon fluctuations, a statistical analysis of the data was performed in order to determine the most reasonable data for comparison to the modelled results. To determine the most appropriate concentration for background subtraction, a distribution analysis of the annual average radon results from 1999-2013 at the background station (AM6) was performed. This data set fit a lognormal distribution based on a Shapiro-Wilk test with a W=0.968 and significance level of p=0.82. The geometric mean of the distribution of background radon results was 0.48x10-9 μCi/ml. This geometric mean background was subtracted from the annual average radon concentration measured at each station for each of the years stated earlier. Finally, for each location, the median background subtracted radon concentration was calculated over the 1999-2013 time period. Table 2.2.5-1 shows median radon concentrations calculated from measurements for each location.

Table 2.2.5-1: Median Radon Gas Concentrations for Comparison with Modelled Results

Monitoring Location	Median Radon Gas Concentration (pCi/m^3)
AM-1	0
AM-2	215
AM-3	0
AM-4	15
AM-5	315
AM-8	165
AM-22	115
AM-23	565
AM-24	315
AM-25	1065
WH-9	515
WH-17	415
WH-50	0
WH-47	115

The parameters considered in the sensitivity analysis were the radon release rate in the wellfields and the downflow IX columns. Because both the upflow IX columns and RO storage tank are open to the atmosphere, they are likely to be highly degassed. Therefore the release rate for both sources was left at 100% (1.0). In addition, the use of point and area source terms for the wellfields was assessed. The predicted radon gas concentrations at each of the measurement points was compared to the mean radon concentrations in Table 2.2.5-1 determined from measurement data. Two non-parametric statistical tests, the Sign Test and Wilcoxon Matched Pairs Test, were used to compare measured radon to predicted radon concentrations. Wilcoxon Matched Pairs Test results were given priority because it is a somewhat more powerful statistical test for comparing two data sets. Table 2.2.5-2 shows the variable combinations considered in this assessment and the results of both statistical tests for each combination. All combinations provide statistically significant fits to the measured data with some combinations giving the same results. The best overall fit to the measurement data was an area source geometry for the wellfields with a wellfield release rate of 5%, an upflow IX release rate of 100%, a downflow IX release rate of 20% and a reverse osmosis release rate of 100%. Though many options had similar results, it was more reasonable to consider the wellfields as area sources and this set of source terms had the best statistical fit results within the area source term options. These parameters have been used as the starting point for the MILDOS model for Crow Butte. This information will be updated with additional measurement data as it becomes available.

Table 2.2.5-2: Results of Comparison of Measured Radon Gas Data to MILDOS Predictions

Wellfield Source Geometry	Radon Release Rate in Wellfields	Radon Release Rate in Downflow IX Columns	Sign Test		Wilcoxin Matched Pairs	
			Z-Value	p-Value	Z-Value	p-Value
Point Source	0.1	0.1	0.27	0.79	0.09	0.92
	0.2	0.1	1.34	0.18	0.16	0.88
	0.05	0.1	0.27	0.79	0.22	0.83
	0.01	0.1	0.80	0.42	0.09	0.92
	0.1	0.2	0.80	0.42	0.09	0.92
	0.05	0.2	0.80	0.42	0.03	0.97
Area Source	0.1	0.1	0.27	0.79	0.09	0.92
	0.2	0.1	1.34	0.18	0.16	0.88
	0.05	0.1	0.27	0.79	0.22	0.83
	0.01	0.1	0.80	0.42	0.09	0.92
	0.1	0.2	0.80	0.42	0.09	0.92
	0.05	0.2	0.80	0.42	0.03	0.97

2.3 Meteorological Data

Meteorological conditions influence the dispersion of radionuclides from our emission sources. This information is one of the key inputs to the MILDOS-Area program. For this assessment, the wind rose generated from data collected from May 1982 through April 1984 was utilized. In the Safety and Evaluation Report for the Crow Butte License Renewal NRC "found no technical reason for invalidating previous wind data".

2.4 Receptors

Receptors used in this assessment included the actual and potential receptors. Actual receptors are the nearby residents. Members of the public who may be at or near the site, i.e. potential receptors are listed in Table 2.4-1, and include a delivery person and ranchers performing haying and cattle ranching activities. For potential receptors, only people spending at least 50 hours per year in the vicinity of the site were considered. For each potential receptor an estimate was made of the hours spent at or near the site. The exposure time for the delivery person and the vendor were based on the assumptions shown in Table 2.4-1. This assessment assumes that it is the same delivery person and vendor that visits the site each time throughout the year, however it is likely that a different individuals will perform these roles at various time during the year. All other potential receptors in the wellfield area, e.g. drillers, are considered occupationally exposed.

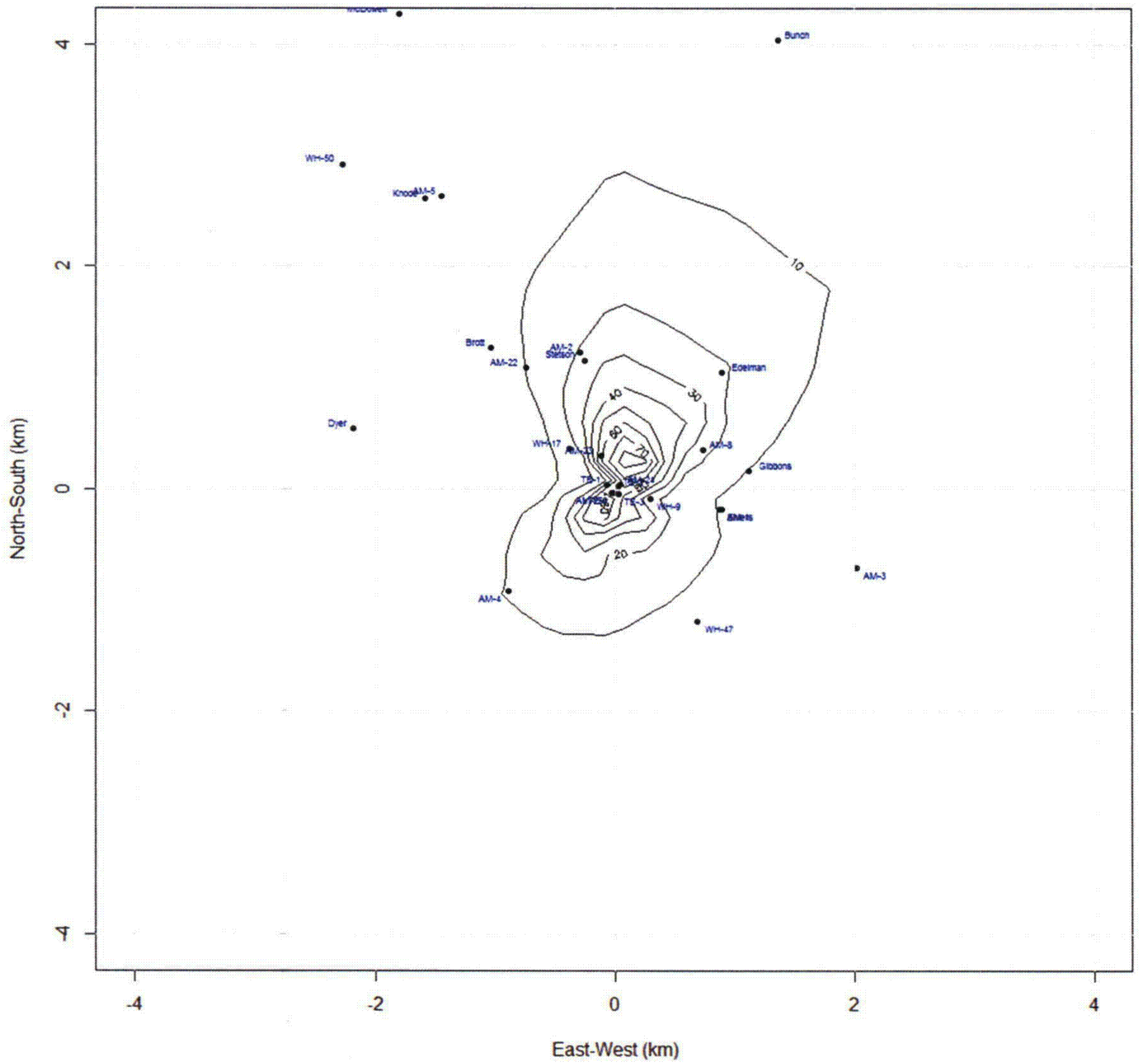
Table 2.4-1: List of Potential Receptors

Receptor Name	Annual Hours	Assumptions for Calculation

Delivery Person	130	0.5 hr/day * 5 days/week * 52 weeks/yr
Rancher - Haying	160	8 hr/day * 5 days/week * 4 weeks/yr
Rancher – Cattle	416	8 hr/day * 1 day/week * 52 weeks/yr

A grid analysis was also performed in which hypothetical receptors were placed at periodically spaced locations around the CPP. Grid points were located along the cardinal coordinates at spacings of 10m, 50m, 250m, 500m and 1000m as distance increased from the CPP. The grid analysis allows us to better visualize the dispersion plume of radon gas around the site and determine the expected location of the maximally exposed members of the public. Figure 2.4-1 presents a contour plot of annual dosesin mrem/year, with areas of similar predicted dose connected to produce iso-curves over the property. In this figure, the CPP is located at the origin (0,0). Monitoring locations and actual receptors are also indicated on this figure.

Figure 2.4-1 Iso-curves of Predicted Annual Dose in mrem/year



3.0 Dose Estimates

The MILDOS-Area model was used to calculated doses to actual and potential members of the public. Resident doses were calculated based on the location of their actual residences. Delivery personnel were assumed to be located within 10m of the CPP and ranchers at least 250m from the CPP. In addition, for comparison doses were calculated at 265 locations throughout the site as part of the grid analysis, assuming a 2000 hr/yr occupancy. Four grid points were located at 10m from the CPP, but the results indicated MILDOS somewhat underestimates concentrations of radon very close to buildings. However, as part of the sampling program at the site during 2013, four sampling stations for radon gas and radon progeny located within about 10 m of the CPP, one on each side. From these locations, the maximum background subtracted radon gas and radon progeny measurements were 0.7E-9 μCi/ml and 0.0007 WL, respectively. This is essentially the same concentrations as those modelled for the grid point at 250m east and 500m north of the CPP. Using the MILDOS dose estimate for this grid point scaled by the hours per year of exposure for the delivery person, the modelled dose was 0.8mrem/yr. For the ranchers, we selected the grid point located 200m north of the CPP, which is the location with the highest predicted dose based on the grid analysis. Though this location is closer than a rancher is likely to be able to come to the operation due to restrictions to wellfield access, it provides a conservative estimate for dose. For the rancher haying the dose estimate is 2.0 mrem/yr and for the cattle rancher it is 5.3 mrem/yr

The maximum actual receptor dose, assuming full time occupancy, was receptor #36 (Edelman) at 21.3 mrem. Though the predicted dose at receptor #28 (Stetson) was actually higher, this residence is occupied significantly less than 50% of the time, meaning the actual dose received by a resident is less than that of the Edelman residence, which is currently occupied essentially full time. This assessment will be updated if occupancy rates change for actual resident receptors. Dose estimates from the MILDOS model for actual receptors and environmental monitoring stations are presented in Table 3.0-1. Dose estimates for grid points are presented in Table 3.0-2.

Table 3.0-1: MILDOS Results for Actual Receptors and Environmental Monitoring Stations Based on Full-Time Occupancy

Location Name	X(KM)	Y(KM)	Dose mrem/yr (8760 hours)
AM-1	0.891	-0.178	8.92
AM-2	-0.292	1.228	20.90
AM-3	2.022	-0.708	2.50
AM-4	-0.893	-0.912	10.60
AM-5	-1.444	2.628	5.64
AM-6	-3.908	4.805	1.22
AM-8	0.738	0.356	21.90
AM-22	-0.744	1.094	10.10
AM-23	-0.116	0.3	53.80
AM-24	0.044	0.041	30.10
AM-25	-0.03	-0.035	30.20
TE-1	-0.061	0.043	19.10
TE-2	0.024	0.017	3.80
TE-3	0.031	-0.043	22.40
TE-4	-0.002	-0.033	6.32
WH-9	0.298	-0.082	22.40
WH-17	-0.377	0.368	13.40
WH-50	-2.27	2.921	2.88
WH-47	0.685	-1.182	7.35
TCA-1	-8.383	-1.662	0.47
TCA-2	-8.251	-0.387	0.39
TCA-3	-8.762	-0.357	0.36
TCA-4	-8.156	-1.227	0.46
TCA-5	-10.956	-0.811	0.29
Crawford	-4.676	4.54	0.77
Ehlers	0.878	-0.176	9.03
Gibbons	1.125	0.163	9.70
Stetson	-0.253	1.158	23.30
Knode	-1.583	2.608	5.27
Brott	-1.04	1.27	6.50
McDowell	-1.801	4.271	3.49
Taggart	-1.513	4.361	3.67
Franey	-0.6	4.621	4.77
Bunch	1.366	4.035	5.34
Dyer	-2.187	0.543	1.98
Edelman	0.898	1.052	21.30

Table 3.0-2: MILDOS Results for Grid Point Receptors Based on 2000 Hour/Year Occupancy

Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)
G10-1	-0.01	-0.01	0.6	G250-1	-0.5	-0.5	5.4	G1000a-24	-3	-4	0.4
G10-2	-0.01	0	0.6	G250-2	-0.5	-0.25	3.6	G1000a-25	-3	-3	0.5
G10-3	-0.01	0.01	0.6	G250-3	-0.5	0	1.9	G1000a-26	-3	-2	0.5
G10-4	0	-0.01	0.6	G250-4	-0.5	0.25	1.9	G1000a-27	-3	-1	0.4
G10-5	0	0.01	0.6	G250-5	-0.5	0.5	2.4	G1000a-28	-3	0	0.3
G10-6	0.01	-0.01	0.6	G250-6	-0.25	-0.5	7.1	G1000a-29	-3	1	0.3
G10-7	0.01	0	0.6	G250-7	-0.25	-0.25	12.4	G1000a-30	-3	2	0.4
G10-8	0.01	0.01	0.6	G250-8	-0.25	0	4.2	G1000a-31	-3	3	0.4
G50a-1	-0.2	-0.2	15.2	G250-9	-0.25	0.25	4.3	G1000a-32	-3	4	0.5
G50a-2	-0.2	-0.15	13.2	G250-10	-0.25	0.5	7.4	G1000a-33	-3	5	0.5
G50a-3	-0.2	-0.1	9.1	G250-11	0	-0.5	3.7	G1000a-34	-2	-5	0.4
G50a-4	-0.2	-0.05	6.8	G250-12	0	-0.25	10.6	G1000a-35	-2	-4	0.5
G50a-5	-0.2	0	5.2	G250-13	0	0	0.6	G1000a-36	-2	-3	0.7
G50a-6	-0.2	0.05	4.1	G250-14	0	0.25	24.9	G1000a-37	-2	-2	0.9
G50a-7	-0.2	0.1	3.6	G250-15	0	0.5	16.7	G1000a-38	-2	-1	0.7
G50a-8	-0.2	0.15	4.6	G250-16	0.25	-0.5	4.5	G1000a-39	-2	0	0.4
G50a-9	-0.2	0.2	5.1	G250-17	0.25	-0.25	9.0	G1000a-40	-2	1	0.5
G50a-10	-0.15	-0.2	16.5	G250-18	0.25	0	5.7	G1000b-1	-2	2	0.6
G50a-11	-0.15	-0.15	18.6	G250-19	0.25	0.25	19.0	G1000b-2	-2	3	0.8
G50a-12	-0.15	-0.1	14.2	G250-20	0.25	0.5	12.6	G1000b-3	-2	4	0.8
G50a-13	-0.15	-0.05	8.3	G250-21	0.5	-0.5	4.2	G1000b-4	-2	5	0.6
G50a-14	-0.15	0	6.5	G250-22	0.5	-0.25	3.4	G1000b-5	-1	-5	0.4
G50a-15	-0.15	0.05	4.1	G250-23	0.5	0	3.4	G1000b-6	-1	-4	0.6
G50a-16	-0.15	0.1	5.0	G250-24	0.5	0.25	7.7	G1000b-7	-1	-3	0.8
G50a-17	-0.15	0.15	6.0	G250-25	0.5	0.5	10.5	G1000b-8	-1	-2	1.2
G50a-18	-0.15	0.2	8.4	G500-1	-1.5	-1.5	1.3	G1000b-9	-1	2	1.6
G50a-19	-0.1	-0.2	16.9	G500-2	-1.5	-1	1.2	G1000b-10	-1	3	1.4
G50a-20	-0.1	-0.15	19.3	G500-3	-1.5	-0.5	0.8	G1000b-11	-1	4	1.1
G50a-21	-0.1	-0.1	20.1	G500-4	-1.5	0	0.6	G1000b-12	-1	5	0.9
G50a-22	-0.1	-0.05	10.6	G500-5	-1.5	0.5	0.7	G1000b-13	0	-5	0.4
G50a-23	-0.1	0	6.9	G500-6	-1.5	1	0.8	G1000b-14	0	-4	0.6
G50a-24	-0.1	0.05	4.0	G500-7	-1.5	1.5	0.8	G1000b-15	0	-3	0.8
G50a-25	-0.1	0.1	6.5	G500-8	-1	-1.5	1.6	G1000b-16	0	-2	1.3
G50a-26	-0.1	0.15	9.9	G500-9	-1	-1	2.2	G1000b-17	0	2	3.6
G50a-27	-0.1	0.2	12.4	G500-10	-1	-0.5	1.6	G1000b-18	0	3	2.1
G50a-28	-0.05	-0.2	15.6	G500-11	-1	0	0.9	G1000b-19	0	4	1.5
G50a-29	-0.05	-0.15	17.9	G500-12	-1	0.5	1.1	G1000b-20	0	5	1.1
G50a-30	-0.05	-0.1	18.2	G500-13	-1	1	1.2	G1000b-21	1	-5	0.4
G50a-31	-0.05	-0.05	14.8	G500-14	-1	1.5	1.7	G1000b-22	1	-4	0.4

Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)
G50a-32	-0.05	0	2.7	G500-15	-0.5	-1.5	1.9	G1000b-23	1	-3	0.5
G50a-33	-0.05	0.05	5.3	G500-16	-0.5	-1	2.9	G1000b-24	1	-2	0.8
G50a-34	-0.05	0.1	8.6	G500-17	-0.5	1	3.6	G1000b-25	1	2	2.7
G50a-35	-0.05	0.15	14.0	G500-18	-0.5	1.5	3.0	G1000b-26	1	3	1.8
G50a-36	-0.05	0.2	18.1	G500-19	0	-1.5	1.9	G1000b-27	1	4	1.3
G50a-37	0	-0.2	12.1	G500-20	0	-1	2.9	G1000b-28	1	5	1.1
G50a-38	0	-0.15	13.6	G500-21	0	1	8.5	G1000b-29	2	-5	0.3
G50a-39	0	-0.1	14.2	G500-22	0	1.5	5.2	G1000b-30	2	-4	0.3
G50a-40	0	-0.05	8.1	G500-23	0.5	-1.5	1.4	G1000b-31	2	-3	0.4
G50b-1	0	0.05	4.7	G500-24	0.5	-1	2.2	G1000b-32	2	-2	0.6
G50b-2	0	0.1	13.1	G500-25	0.5	1	6.5	G1000b-33	2	-1	0.6
G50b-3	0	0.15	21.9	G500-26	0.5	1.5	4.4	G1000b-34	2	0	0.8
G50b-4	0	0.2	25.3	G500-27	1	-1.5	1.2	G1000b-35	2	1	1.5
G50b-5	0.05	-0.2	12.0	G500-28	1	-1	2.2	G1000b-36	2	2	1.9
G50b-6	0.05	-0.15	12.9	G500-29	1	-0.5	1.8	G1000b-37	2	3	1.5
G50b-7	0.05	-0.1	11.7	G500-30	1	0	1.9	G1000b-38	2	4	1.1
G50b-8	0.05	-0.05	6.6	G500-31	1	0.5	3.7	G1000b-39	2	5	0.9
G50b-9	0.05	0	3.3	G500-32	1	1	4.7	G1000b-40	3	-5	0.2
G50b-10	0.05	0.05	9.1	G500-33	1	1.5	3.6	G1000c-1	3	-4	0.3
G50b-11	0.05	0.1	13.0	G500-34	1.5	-1.5	0.9	G1000c-2	3	-3	0.4
G50b-12	0.05	0.15	18.4	G500-35	1.5	-1	1.0	G1000c-3	3	-2	0.4
G50b-13	0.05	0.2	21.8	G500-36	1.5	-0.5	1.0	G1000c-4	3	-1	0.3
G50b-14	0.1	-0.2	11.5	G500-37	1.5	0	1.2	G1000c-5	3	0	0.5
G50b-15	0.1	-0.15	13.2	G500-38	1.5	0.5	1.9	G1000c-6	3	1	0.7
G50b-16	0.1	-0.1	12.6	G500-39	1.5	1	2.6	G1000c-7	3	2	1.1
G50b-17	0.1	-0.05	6.8	G500-40	1.5	1.5	2.8	G1000c-8	3	3	1.1
G50b-18	0.1	0	6.6	G1000a-1	-5	-5	0.3	G1000c-9	3	4	1.0
G50b-19	0.1	0.05	11.7	G1000a-2	-5	-4	0.3	G1000c-10	3	5	0.8
G50b-20	0.1	0.1	20.2	G1000a-3	-5	-3	0.3	G1000c-11	4	-5	0.2
G50b-21	0.1	0.15	21.2	G1000a-4	-5	-2	0.2	G1000c-12	4	-4	0.3
G50b-22	0.1	0.2	20.2	G1000a-5	-5	-1	0.2	G1000c-13	4	-3	0.3
G50b-23	0.15	-0.2	11.6	G1000a-6	-5	0	0.2	G1000c-14	4	-2	0.2
G50b-24	0.15	-0.15	13.2	G1000a-7	-5	1	0.2	G1000c-15	4	-1	0.3
G50b-25	0.15	-0.1	10.2	G1000a-8	-5	2	0.2	G1000c-16	4	0	0.3
G50b-26	0.15	-0.05	6.8	G1000a-9	-5	3	0.2	G1000c-17	4	1	0.5
G50b-27	0.15	0	7.0	G1000a-10	-5	4	0.2	G1000c-18	4	2	0.6
G50b-28	0.15	0.05	12.5	G1000a-11	-5	5	0.2	G1000c-19	4	3	0.8
G50b-29	0.15	0.1	18.6	G1000a-12	-4	-5	0.3	G1000c-20	4	4	0.8
G50b-30	0.15	0.15	23.7	G1000a-13	-4	-4	0.4	G1000c-21	4	5	0.7
G50b-31	0.15	0.2	21.8	G1000a-14	-4	-3	0.4	G1000c-22	5	-5	0.2

Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)	Grid Point	X(KM)	Y(KM)	Dose (mrem/yr)
G50b-32	0.2	-0.2	11.1	G1000a-15	-4	-2	0.3	G1000c-23	5	-4	0.2
G50b-33	0.2	-0.15	10.0	G1000a-16	-4	-1	0.3	G1000c-24	5	-3	0.2
G50b-34	0.2	-0.1	7.4	G1000a-17	-4	0	0.2	G1000c-25	5	-2	0.2
G50b-35	0.2	-0.05	6.6	G1000a-18	-4	1	0.2	G1000c-26	5	-1	0.2
G50b-36	0.2	0	6.5	G1000a-19	-4	2	0.2	G1000c-27	5	0	0.2
G50b-37	0.2	0.05	11.1	G1000a-20	-4	3	0.2	G1000c-28	5	1	0.3
G50b-38	0.2	0.1	15.0	G1000a-21	-4	4	0.2	G1000c-29	5	2	0.4
G50b-39	0.2	0.15	19.4	G1000a-22	-4	5	0.3	G1000c-30	5	3	0.5
G50b-40	0.2	0.2	21.8	G1000a-23	-3	-5	0.4	G1000c-31	5	4	0.6
								G1000c-32	5	5	0.6

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  5.5 0.4880 0.4950 0.4820 0.2470 0.1110 0.0490 0.0990 0.1420 0.2100 0.1110 0.2100
0.1170 0.0990 0.0800 0.1300 0.2230    3.2930
 10.0 0.1480 0.1670 0.0740 0.0310 0.0430 0.0120 0.0930 0.0930 0.0870 0.1170 0.0870
0.0870 0.0990 0.0560 0.0870 0.1050    1.3860
 15.5 0.0060 0.0060 0.0000 0.0000 0.0000 0.0000 0.0000 0.0060 0.0000 0.0120 0.0000
0.0000 0.0060 0.0250 0.0060 0.0250    0.0920
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000
 ALL  0.6980 0.8100 0.6490 0.3150 0.2220 0.0800 0.2480 0.2660 0.3530 0.2710 0.3400
0.2410 0.2410 0.2040 0.2600 0.4400    5.6380

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  STABILITY CLASS 2
  1.5 0.0740 0.0990 0.0680 0.0620 0.0120 0.0430 0.0060 0.0490 0.0800 0.0740 0.0680
0.0430 0.0310 0.0490 0.0190 0.0310    0.8080
  5.5 0.1980 0.2600 0.3890 0.1300 0.0620 0.0430 0.0930 0.0870 0.0740 0.1480 0.2350
0.1480 0.0990 0.0800 0.0800 0.1110    2.2370
 10.0 0.4080 0.2780 0.4020 0.2100 0.0560 0.0800 0.1670 0.1790 0.2970 0.1670 0.1850
0.1920 0.1730 0.1550 0.2970 0.3650    3.6110
 15.5 0.0490 0.0250 0.0370 0.0190 0.0060 0.0000 0.0190 0.0370 0.0680 0.0560 0.0430
0.0620 0.0310 0.0250 0.0800 0.1240    0.6810
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0060 0.0060 0.0000 0.0060 0.0060    0.0240
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000    0.0000
 ALL  0.7290 0.6620 0.8960 0.4210 0.1360 0.1660 0.2850 0.3520 0.5190 0.4450 0.5310
0.4510 0.3400 0.3090 0.4820 0.6370    7.3610

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  STABILITY CLASS 3
  1.5 0.0800 0.0680 0.0990 0.0490 0.0000 0.0250 0.0190 0.0490 0.1050 0.1240 0.1110
0.1050 0.0120 0.0190 0.0430 0.0430    0.9510
  5.5 0.1670 0.2840 0.2470 0.1110 0.0620 0.0370 0.0740 0.0800 0.1790 0.3280 0.3650
0.3280 0.0990 0.0560 0.0800 0.1550    2.6520
```

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 10.0 0.2910 0.3150 0.6180 0.3210 0.8000 0.0990 0.1980 0.2410 0.5750 0.4270 0.5070
0.3890 0.2160 0.1110 0.4020 0.3710     5.8810
 15.5 0.0800 0.0930 0.1300 0.1050 0.0310 0.0250 0.0800 0.1610 0.0800 0.0930 0.1300
0.1050 0.0310 0.0250 0.0800 0.1610     1.4100
 21.5 0.0800 0.0930 0.1300 0.1050 0.0000 0.0250 0.0800 0.1610 0.0000 0.0000 0.0120
0.0060 0.0120 0.0060 0.0060 0.0000     0.7160
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0060 0.0000 0.0000 0.0000 0.0000     0.0060
 ALL  0.6980 0.8530 1.2240 0.6910 0.8930 0.2110 0.4510 0.6920 0.9390 0.9720 1.1250
0.9390 0.3700 0.2170 0.6110 0.7300    11.6160

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  STABILITY CLASS 4
  1.5 0.0870 0.0800 0.0680 0.0190 0.0120 0.0060 0.0310 0.0680 0.1730 0.1110 0.0870
0.0870 0.0490 0.0250 0.0250 0.0190     0.9470
  5.5 0.2660 0.5750 0.7850 0.2410 0.0310 0.1300 0.2160 0.9150 0.8590 0.7050 1.0880
0.3150 0.1050 0.0870 0.1610 0.2530     6.7320
 10.0 0.5870 1.2050 1.3110 0.4080 0.1420 0.1790 0.3650 0.7730 1.8400 1.9660 2.9860
1.1750 0.3280 0.4700 0.8220 0.9270    15.4840
 15.5 0.4270 1.4900 1.3970 0.2600 0.1110 0.0680 0.2660 1.3400 4.0000 1.8540 1.9530
1.4090 0.5320 0.7170 2.6400 1.2100    19.6740
 21.5 0.1050 0.4570 0.2350 0.0310 0.0190 0.0000 0.0930 0.6240 1.8400 0.3890 0.1480
0.2780 0.2410 0.3400 1.3790 0.4640     6.6430
 28.0 0.0120 0.0990 0.0430 0.0000 0.0000 0.0000 0.0060 0.1730 0.2970 0.0620 0.0120
0.0800 0.0990 0.1420 0.7970 0.1050     1.9270
 ALL  1.4840 3.9060 3.8390 0.9590 0.3150 0.3830 0.9770 3.8930 9.0090 5.0870 6.2740
3.3440 1.3540 1.7810 5.8240 2.9780    51.4070

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  STABILITY CLASS 5
  1.5 0.1300 0.1480 0.1480 0.0680 0.0250 0.0430 0.0740 0.2600 0.3400 0.3210 0.2720
0.1610 0.0990 0.0560 0.0680 0.0930     2.3060
  5.5 0.4450 0.4270 0.5070 0.1920 0.1110 0.0990 0.2780 1.1600 1.6900 1.6070 1.2490
0.4390 0.1480 0.1480 0.1790 0.2040     8.8830
 10.0 0.0990 0.2780 0.2910 0.1110 0.0310 0.0680 0.1300 0.1610 0.6610 0.4270 0.8650
0.3770 0.0560 0.1240 0.1300 0.0740     3.8830
 15.5 0.0060 0.0000 0.0120 0.0000 0.0000 0.0000 0.0190 0.0120 0.0250 0.0060 0.0190
0.0060 0.0060 0.0000 0.0310 0.0000     0.1420
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0060
0.0000 0.0000 0.0000 0.0000 0.0000     0.0060
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000
 ALL  0.6800 0.8530 0.9580 0.3710 0.1670 0.2100 0.5010 1.5930 2.7160 2.3610 2.4110
0.9830 0.3090 0.3280 0.4080 0.3710    15.2200

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  STABILITY CLASS 6
  1.5 0.3210 0.1610 0.0930 0.1360 0.1240 0.1730 0.1670 0.3650 0.7290 0.7050 0.6310
0.2660 0.1730 0.0800 0.1300 0.1300     4.3840
  5.5 0.1610 0.1300 0.1360 0.0740 0.0430 0.0990 0.1730 0.4640 1.1800 1.2800 0.7790
0.2530 0.1420 0.0930 0.1170 0.0490     5.1730
 10.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000
 15.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000
 21.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000
 28.0 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000
0.0000 0.0000 0.0000 0.0000 0.0000     0.0000
 ALL  0.4820 0.2910 0.2290 0.2100 0.1670 0.2720 0.3400 0.8290 1.9090 1.9850 1.4100
```

```
0.5190 0.3150 0.1730 0.2470 0.1790    9.5570

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 ALL  4.7710 7.3750 7.7950 2.9670 1.9000 1.3220 2.8020 7.625015.445011.121012.0910
6.4770 2.9290 3.0120 7.8320 5.3350  100.7990
1REGION:                              CODE: MILDOS-AREA (02/12)         PAGE   3
 METSET:                              DATA: Base.MIL                    06/17/14

  -------------------------------INDIVIDUAL RECEPTOR LOCATION DATA,  36 LOCATIONS
INPUT THIS RUN-------------------------------
   I      LOCATION NAMES      X(KM)   Y(KM)    Z(M) DIST(KM) TYPE      I      LOCATION
NAMES     X(KM)  Y(KM)   Z(M) DIST(KM) TYPE

-------------------------------------------------------------------------------------
------------------------------------------

    1  AM-1                  0.89  -0.18    0.00    0.91      1      19  WH-47
      0.69  -1.18    0.00   1.37    1
    2  AM-2                 -0.29   1.23    0.00    1.26      1      20  TCA-1
     -8.38  -1.66    0.00   8.55    1
    3  AM-3                  2.02  -0.71    0.00    2.14      1      21  TCA-2
     -8.25  -0.39    0.00   8.26    1
    4  AM-4                 -0.89  -0.91    0.00    1.28      1      22  TCA-3
     -8.76  -0.36    0.00   8.77    1
    5  AM-5                 -1.44   2.63    0.00    3.00      1      23  TCA-4
     -8.16  -1.23    0.00   8.25    1
    6  AM-6                 -3.91   4.80    0.00    6.19      1      24  TCA-5
    -10.96  -0.81    0.00  10.99    1
    7  AM-8                  0.74   0.36    0.00    0.82      1      25  Crawford
     -4.68   4.54    0.00   6.52    1
    8  AM-22                -0.74   1.09    0.00    1.32      1      26  Ehlers
      0.88  -0.18    0.00   0.90    1
    9  AM-23                -0.12   0.30    0.00    0.32      1      27  Gibbons
      1.13   0.16    0.00   1.14    1
   10  AM-24                 0.04   0.04    0.00    0.06      1      28  Stetson
     -0.25   1.16    0.00   1.19    1
   11  AM-25                -0.03  -0.04    0.00    0.05      1      29  Knode
     -1.58   2.61    0.00   3.05    1
   12  TE-1                 -0.06   0.04    0.00    0.07      1      30  Brott
     -1.04   1.27    0.00   1.64    1
   13  TE-2                  0.02   0.02    0.00    0.03      1      31  McDowell
     -1.80   4.27    0.00   4.64    1
   14  TE-3                  0.03  -0.04    0.00    0.05      1      32  Taggart
     -1.51   4.36    0.00   4.62    1
   15  TE-4                  0.00  -0.03    0.00    0.03      1      33  Franey
     -0.60   4.62    0.00   4.66    1
   16  WH-9                  0.30  -0.08    0.00    0.31      1      34  Bunch
      1.37   4.03    0.00   4.26    1
   17  WH-17                -0.38   0.37    0.00    0.53      1      35  Dyer
     -2.19   0.54    0.00   2.25    1
   18  WH-50                -2.27   2.92    0.00    3.70      1      36  Edelman
      0.90   1.05    0.00   1.38    1

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                                   MISCELLANEOUS INPUTABLE PARAMETER
VALUES

    DMM      DMA      TSTART       FFORI       FHAYI        FFORP        FHAYP
FPR(1)       FPR(2)       FPR(3)       ACTRAT

-------------------------------------------------------------------------------------
```

100.0 100.0 1998.00 0.50 0.50 0.50 0.50
0.00 0.00 0.00 2.50

IPACT EQUALS 3, 3, 3, 3, 3, 2, 1, 2, 1, 0,

JC EQUALS 1, 0, 1, 0, 0, 0, 0, 0, 1, 0

TIME STEP DATA....	STEP NAMES	LENGTH, YRS	IFTODO
1		5.00	1

XRHO EQUALS 1.5, 2.5, 3.5, 4.5, 7.5, 15.0, 25.0, 35.0, 45.0, 55.0, 65.0, 75.0,

HDP EQUALS 50.0

1REGION: CODE: MILDOS-AREA (02/12) PAGE 4
METSET: DATA: Base.MIL 06/17/14

POPULATION DISTRIBUTION

KILOMETERS	N 0.0	NNE 22.5	NE 45.0	ENE 67.5	E 90.0	ESE 112.5	SE 135.0	SSE 157.5	S 180.0	SSW 202.5	SW 225.0	WSW 247.5	W 270.0	WNW 292.5	NW 315.0	NNW 337.5
1.0- 2.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2.0- 3.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3.0- 4.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4.0- 5.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0-10.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.0-20.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20.0-30.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.0-40.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40.0-50.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
50.0-60.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.0-70.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70.0-80.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

```
--------------------------------------------------------------------------------
---------------------------------------------
            |
  1.0-80.0  |      0      0      0      0      0      0      0      0      0      0
     0      0      0      0      0      0

                                            TOTAL 1-80 KM POPULATION IS       0
PERSONS
1REGION:                                CODE: MILDOS-AREA (02/12)       PAGE   5
 METSET:                                DATA: Base.MIL                  06/17/14

 NUMBER OF SOURCES=10


        KM      KM        M       KM2                      CI/YEAR
          PSIZE   M/SEC
 NO.     X       Y        Z      AREA     U-238    Th-230    Ra-226    Pb-210
Rn-222     ID     SET   EXIT VEL   SOURCE NAME

--------------------------------------------------------------------------------
---------------------------------------------
  1   -0.03   -0.45    0.00  0.2065   0.00E+00  0.00E+00  0.00E+00  0.00E+00
6.39E+01   2001     1    0.00E+00   Mine Unit 7
  2   -1.63    2.18    0.00  0.2530   0.00E+00  0.00E+00  0.00E+00  0.00E+00
7.82E+01   2002     1    0.00E+00   Mine Unit 8
  3    0.61   -0.79    0.00  0.1981   0.00E+00  0.00E+00  0.00E+00  0.00E+00
6.13E+01   2003     1    0.00E+00   Mine Unit 9
  4   -2.62    3.02    0.00  0.3083   0.00E+00  0.00E+00  0.00E+00  0.00E+00
9.54E+01   2004     1    0.00E+00   Mine Unit 10
  5    0.92   -0.98    0.00  0.1704   0.00E+00  0.00E+00  0.00E+00  0.00E+00
5.27E+01   2005     1    0.00E+00   Mine Unit 11
  6   -0.96    1.35    0.00  0.1401   0.00E+00  0.00E+00  0.00E+00  0.00E+00
9.72E+00   2006     1    0.00E+00   Mine Unit 6
  7   -0.14    0.62    0.00  0.5247   0.00E+00  0.00E+00  0.00E+00  0.00E+00
1.99E+01   2007     1    0.00E+00   Mine Unit 5
  8    0.22   -0.10    0.00  0.2898   0.00E+00  0.00E+00  0.00E+00  0.00E+00
2.01E+01   2008     1    0.00E+00   Mine Unit 4
  9    0.06    0.10    0.00  0.1018   0.00E+00  0.00E+00  0.00E+00  0.00E+00
3.86E+00   2009     1    0.00E+00   Mine unit 2 and 3
 10    0.00    0.00   12.20  0.0000   0.00E+00  0.00E+00  0.00E+00  0.00E+00
4.70E+03   1001     1    3.30E+00   CPP

                         INPUT TAILS ACTIVITIES, PCI/G                 AMAD AND
FRACTIONAL DISTRIBUTION
                    SET URANIUM   THORIUM    RADIUM     LEAD           SET    1.5
 3.0    7.7     54.0
                    ------------------------------------------
----------------------------
                    1  0.00E+00  0.00E+00  0.00E+00  0.00E+00          1     0.000
 1.000  0.000   0.000
                    2  0.00E+00  0.00E+00  0.00E+00  0.00E+00          2     1.000
 0.000  0.000   0.000
                    3  0.00E+00  0.00E+00  0.00E+00  0.00E+00          3     0.000
 0.000  0.300   0.700

                          PARTICULATE SOURCE STRENGTH MULTIPLIERS BY TIME STEP,  1 TIME
STEP(S) USED FOR THIS RUN
  SOURCE    TSTEP 1     TSTEP 2     TSTEP 3     TSTEP 4     TSTEP 5     TSTEP 6
TSTEP 7     TSTEP 8     TSTEP 9     TSTEP10
  NUMBER    5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS
5.00YRS     5.00YRS     5.00YRS     5.00YRS
```

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--------------------------------------------------------------------------------
------------------------------------------
     1      1.000E+00
     2      1.000E+00
     3      1.000E+00
     4      1.000E+00
     5      1.000E+00
     6      1.000E+00
     7      1.000E+00
     8      1.000E+00
     9      1.000E+00
    10      1.000E+00

            RADON SOURCE STRENGTH MULTIPLIERS BY TIME STEP, 1 TIME STEP(S) USED FOR
THIS RUN
  SOURCE    TSTEP 1     TSTEP 2     TSTEP 3     TSTEP 4     TSTEP 5     TSTEP 6
TSTEP 7     TSTEP 8     TSTEP 9     TSTEP10
  NUMBER    5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS     5.00YRS
5.00YRS     5.00YRS     5.00YRS     5.00YRS

--------------------------------------------------------------------------------
------------------------------------------
     1      1.000E+00
     2      1.000E+00
     3      1.000E+00
     4      1.000E+00
     5      1.000E+00
     6      1.000E+00
     7      1.000E+00
     8      1.000E+00
     9      1.000E+00
    10      1.000E+00
1REGION:                         CODE: MILDOS-AREA (02/12)          PAGE   6
 METSET:                         DATA: Base.MIL                     06/17/14
                             TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

                                          INDIVIDUAL RECEPTOR PARTICULATE
CONCENTRATIONS
                                        AIRBORNE CONCENTRATIONS, PCI/M3
        GROUND CONCENTRATIONS, PCI/M2
 NO.          NAME        PTSZ      U-238        Th-230        Ra-226        Pb-210
 U-238         Th-230       Ra-226       Pb-210
 ---------------------------  ------------------------------------------------
------------------------------------------------
  1  AM-1                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
  1  AM-1                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
  1  AM-1                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
  1  AM-1                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ---------------------------  ------------------------------------------------
------------------------------------------------
  2  AM-2                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
  2  AM-2                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
  2  AM-2                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
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  2  AM-2                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  3  AM-3                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  3  AM-3                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  3  AM-3                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  3  AM-3                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  4  AM-4                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  4  AM-4                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  4  AM-4                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  4  AM-4                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  5  AM-5                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  5  AM-5                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  5  AM-5                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  5  AM-5                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  6  AM-6                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  6  AM-6                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  6  AM-6                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  6  AM-6                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  7  AM-8                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  7  AM-8                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  7  AM-8                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  7  AM-8                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS           0.000E+00     0.000E+00     0.000E+00     0.000E+00
```

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0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
  8  AM-22                     1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  8  AM-22                     2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  8  AM-22                     3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  8  AM-22                     4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
1REGION:                                CODE: MILDOS-AREA (02/12)          PAGE    7
 METSET:                                DATA: Base.MIL                     06/17/14
                                TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

                                             INDIVIDUAL RECEPTOR PARTICULATE
CONCENTRATIONS
                                           AIRBORNE CONCENTRATIONS, PCI/M3
        GROUND CONCENTRATIONS, PCI/M2
 NO.          NAME         PTSZ      U-238        Th-230        Ra-226        Pb-210
  U-238        Th-230        Ra-226        Pb-210
 ----------------------------   ------------------------------------------------
------------------------------------------------
  9  AM-23                     1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  9  AM-23                     2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  9  AM-23                     3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
  9  AM-23                     4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 10  AM-24                     1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 10  AM-24                     2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 10  AM-24                     3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 10  AM-24                     4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 11  AM-25                     1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 11  AM-25                     2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 11  AM-25                     3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 11  AM-25                     4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
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-----------------------------------------------
 12  TE-1                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 12  TE-1                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 12  TE-1                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 12  TE-1                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   -----------------------------------------------
-----------------------------------------------
 13  TE-2                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 13  TE-2                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 13  TE-2                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 13  TE-2                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   -----------------------------------------------
-----------------------------------------------
 14  TE-3                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 14  TE-3                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 14  TE-3                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 14  TE-3                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   -----------------------------------------------
-----------------------------------------------
 15  TE-4                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 15  TE-4                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 15  TE-4                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 15  TE-4                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   -----------------------------------------------
-----------------------------------------------
 16  WH-9                    1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 16  WH-9                    2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 16  WH-9                    3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 16  WH-9                    4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS          0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   -----------------------------------------------
-----------------------------------------------
1REGION:                                CODE: MILDOS-AREA (02/12)        PAGE    8
 METSET:                                DATA: Base.MIL                   06/17/14
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                          TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

                                          INDIVIDUAL RECEPTOR PARTICULATE
CONCENTRATIONS
                                        AIRBORNE CONCENTRATIONS, PCI/M3
       GROUND CONCENTRATIONS, PCI/M2
 NO.          NAME          PTSZ     U-238       Th-230       Ra-226       Pb-210
  U-238        Th-230        Ra-226       Pb-210
 ----------------------------   ------------------------------------------------
------------------------------------------------

 17  WH-17                    1     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 17  WH-17                    2     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 17  WH-17                    3     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 17  WH-17                    4     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
     CONCENTRATION TOTALS           0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------

 18  WH-50                    1     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 18  WH-50                    2     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 18  WH-50                    3     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 18  WH-50                    4     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
     CONCENTRATION TOTALS           0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------

 19  WH-47                    1     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 19  WH-47                    2     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 19  WH-47                    3     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 19  WH-47                    4     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
     CONCENTRATION TOTALS           0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------

 20  TCA-1                    1     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 20  TCA-1                    2     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 20  TCA-1                    3     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 20  TCA-1                    4     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
     CONCENTRATION TOTALS           0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------

 21  TCA-2                    1     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
 21  TCA-2                    2     0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00     0.000E+00     0.000E+00    0.000E+00
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 21  TCA-2                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 21  TCA-2                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS            0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 22  TCA-3                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 22  TCA-3                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 22  TCA-3                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 22  TCA-3                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS            0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 23  TCA-4                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 23  TCA-4                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 23  TCA-4                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 23  TCA-4                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS            0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 24  TCA-5                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 24  TCA-5                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 24  TCA-5                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 24  TCA-5                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS            0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
1REGION:                               CODE: MILDOS-AREA (02/12)             PAGE    9
 METSET:                               DATA: Base.MIL                        06/17/14
                               TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

                                          INDIVIDUAL RECEPTOR PARTICULATE
CONCENTRATIONS
                                        AIRBORNE CONCENTRATIONS, PCI/M3
        GROUND CONCENTRATIONS, PCI/M2
 NO.          NAME         PTSZ      U-238         Th-230         Ra-226         Pb-210
  U-238         Th-230        Ra-226        Pb-210
 ----------------------------   ------------------------------------------------
------------------------------------------------
 25  Crawford                 1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 25  Crawford                 2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 25  Crawford                 3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
```

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 25  Crawford              4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 26  Ehlers                1    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 26  Ehlers                2    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 26  Ehlers                3    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 26  Ehlers                4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 27  Gibbons               1    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 27  Gibbons               2    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 27  Gibbons               3    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 27  Gibbons               4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 28  Stetson               1    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 28  Stetson               2    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 28  Stetson               3    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 28  Stetson               4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 29  Knode                 1    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 29  Knode                 2    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 29  Knode                 3    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 29  Knode                 4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ------------------------------------------------
------------------------------------------------
 30  Brott                 1    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 30  Brott                 2    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 30  Brott                 3    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 30  Brott                 4    0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00     0.000E+00     0.000E+00     0.000E+00
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0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ---------------------------   ---------------------------------------------
---------------------------------------------------
 31  McDowell                  1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 31  McDowell                  2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 31  McDowell                  3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 31  McDowell                  4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ---------------------------   ---------------------------------------------
---------------------------------------------------
 32  Taggart                   1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 32  Taggart                   2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 32  Taggart                   3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 32  Taggart                   4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ---------------------------   ---------------------------------------------
---------------------------------------------------
1REGION:                                CODE: MILDOS-AREA (02/12)            PAGE  10
 METSET:                                DATA: Base.MIL                       06/17/14
                                    TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

                                                INDIVIDUAL RECEPTOR PARTICULATE
CONCENTRATIONS
                                              AIRBORNE CONCENTRATIONS, PCI/M3
        GROUND CONCENTRATIONS, PCI/M2
 NO.         NAME           PTSZ     U-238         Th-230        Ra-226        Pb-210
  U-238        Th-230        Ra-226        Pb-210
 ---------------------------   ---------------------------------------------
---------------------------------------------------
 33  Franey                    1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 33  Franey                    2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 33  Franey                    3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 33  Franey                    4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ---------------------------   ---------------------------------------------
---------------------------------------------------
 34  Bunch                     1     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 34  Bunch                     2     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 34  Bunch                     3     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 34  Bunch                     4     0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
    CONCENTRATION TOTALS             0.000E+00     0.000E+00     0.000E+00     0.000E+00
0.000E+00     0.000E+00     0.000E+00     0.000E+00
 ---------------------------   ---------------------------------------------
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---------------------------------------------
 35  Dyer                  1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 35  Dyer                  2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 35  Dyer                  3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 35  Dyer                  4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ---------------------------------------------------
---------------------------------------------
 36  Edelman               1    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 36  Edelman               2    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 36  Edelman               3    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 36  Edelman               4    0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
    CONCENTRATION TOTALS        0.000E+00    0.000E+00    0.000E+00    0.000E+00
0.000E+00    0.000E+00    0.000E+00    0.000E+00
 ----------------------------   ---------------------------------------------------
---------------------------------------------
1REGION:                                 CODE: MILDOS-AREA (02/12)          PAGE  11
 METSET:                                 DATA: Base.MIL                     06/17/14
                                 TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

                                         INDIVIDUAL RECEPTOR RADON AND RADON DAUGHTER
CONCENTRATIONS
                                      AIRBORNE CONCENTRATIONS, PCI/M3
          GROUND CONCENTRATIONS, PCI/M2
   NO.    Rn-222    Po-218    Pb-214    Bi-214    Pb-210    Bi-210    Po-210
WL      Po-218    Pb-214    Bi-214    Pb-210
   ---
-------------------------------------------------------------------------------
---------------------------------------
    1     1.177E+02 8.893E+01 2.051E+01 5.233E+00 2.619E-06 2.875E-09 1.725E-13
2.151E-04 7.044E+01 7.044E+01 7.044E+01 1.110E+00
    2     2.742E+02 2.310E+02 6.664E+01 2.200E+01 1.357E-05 1.062E-08 2.568E-13
6.578E-04 1.829E+02 1.829E+02 1.829E+02 5.754E+00
    3     3.219E+01 2.919E+01 1.238E+01 6.144E+00 7.360E-06 1.153E-08 6.279E-13
1.158E-04 2.312E+01 2.312E+01 2.312E+01 3.120E+00
    4     1.390E+02 1.140E+02 2.922E+01 9.429E+00 6.350E-06 6.370E-09 2.548E-13
3.008E-04 9.030E+01 9.030E+01 9.030E+01 2.692E+00
    5     7.225E+01 6.477E+01 2.983E+01 1.685E+01 2.885E-05 5.792E-08 3.249E-12
2.808E-04 5.130E+01 5.130E+01 5.130E+01 1.223E+01
    6     1.492E+01 1.480E+01 1.049E+01 7.862E+00 3.259E-05 1.527E-07 1.931E-11
9.776E-05 1.172E+01 1.172E+01 1.172E+01 1.382E+01
    7     2.893E+02 2.100E+02 4.231E+01 1.001E+01 4.288E-06 3.187E-09 1.261E-13
4.682E-04 1.663E+02 1.663E+02 1.663E+02 1.818E+00
    8     1.317E+02 1.141E+02 3.521E+01 1.222E+01 8.094E-06 6.816E-09 1.778E-13
3.416E-04 9.035E+01 9.035E+01 9.035E+01 3.432E+00
    9     7.164E+02 2.838E+02 1.940E+01 2.337E+00 1.086E-06 1.449E-09 7.747E-14
3.994E-04 2.248E+02 2.248E+02 2.248E+02 4.606E-01
   10     4.007E+02 5.703E+01 4.135E+00 9.713E-01 8.357E-07 1.501E-09 9.469E-14
8.333E-05 4.517E+01 4.517E+01 4.517E+01 3.543E-01
   11     4.019E+02 4.639E+01 3.585E+00 8.636E-01 7.855E-07 1.463E-09 9.351E-14
6.918E-05 3.674E+01 3.674E+01 3.674E+01 3.330E-01
   12     2.539E+02 4.944E+01 3.911E+00 9.212E-01 8.120E-07 1.437E-09 8.846E-14
7.418E-05 3.916E+01 3.916E+01 3.916E+01 3.443E-01
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   13     5.048E+01 2.113E+01 3.650E+00 9.306E-01 8.184E-07 1.489E-09 9.443E-14
4.374E-05 1.674E+01 1.674E+01 1.674E+01 3.470E-01
   14     2.984E+02 4.162E+01 3.694E+00 8.758E-01 7.921E-07 1.498E-09 9.743E-14
6.486E-05 3.296E+01 3.296E+01 3.296E+01 3.358E-01
   15     8.400E+01 2.227E+01 3.492E+00 8.754E-01 7.917E-07 1.477E-09 9.486E-14
4.391E-05 1.764E+01 1.764E+01 1.764E+01 3.357E-01
   16     2.975E+02 1.196E+02 1.050E+01 1.525E+00 9.223E-07 1.710E-09 1.181E-13
1.821E-04 9.475E+01 9.475E+01 9.475E+01 3.911E-01
   17     1.785E+02 1.066E+02 1.410E+01 2.573E+00 1.243E-06 1.400E-09 6.542E-14
1.909E-04 8.444E+01 8.444E+01 8.444E+01 5.268E-01
   18     3.659E+01 3.334E+01 1.751E+01 1.100E+01 2.441E-05 6.219E-08 4.371E-12
1.641E-04 2.641E+01 2.641E+01 2.641E+01 1.035E+01
   19     9.668E+01 7.335E+01 1.956E+01 6.801E+00 4.990E-06 5.891E-09 3.193E-13
2.001E-04 5.810E+01 5.810E+01 5.810E+01 2.116E+00
   20     5.628E+00 5.626E+00 4.471E+00 3.615E+00 2.332E-05 1.635E-07 3.008E-11
4.195E-05 4.456E+00 4.456E+00 4.456E+00 9.889E+00
   21     4.676E+00 4.674E+00 3.680E+00 2.973E+00 1.895E-05 1.293E-07 2.314E-11
3.456E-05 3.702E+00 3.702E+00 3.702E+00 8.032E+00
   22     4.275E+00 4.274E+00 3.417E+00 2.781E+00 1.903E-05 1.399E-07 2.689E-11
3.210E-05 3.385E+00 3.385E+00 3.385E+00 8.067E+00
   23     5.552E+00 5.549E+00 4.366E+00 3.515E+00 2.185E-05 1.468E-07 2.588E-11
4.096E-05 4.395E+00 4.395E+00 4.395E+00 9.265E+00
   24     3.462E+00 3.463E+00 2.914E+00 2.432E+00 2.098E-05 2.000E-07 4.967E-11
2.741E-05 2.743E+00 2.743E+00 2.743E+00 8.897E+00
   25     9.368E+00 9.330E+00 6.918E+00 5.346E+00 2.468E-05 1.267E-07 1.742E-11
6.463E-05 7.390E+00 7.390E+00 7.390E+00 1.047E+01
   26     1.192E+02 8.967E+01 2.042E+01 5.151E+00 2.558E-06 2.827E-09 1.710E-13
2.151E-04 7.102E+01 7.102E+01 7.102E+01 1.084E+00
   27     1.273E+02 1.053E+02 3.069E+01 9.696E+00 5.570E-06 4.843E-09 1.944E-13
3.003E-04 8.344E+01 8.344E+01 8.344E+01 2.362E+00
   28     3.059E+02 2.529E+02 6.898E+01 2.161E+01 1.246E-05 9.240E-09 2.167E-13
6.908E-04 2.003E+02 2.003E+02 2.003E+02 5.283E+00
   29     6.759E+01 5.974E+01 2.719E+01 1.545E+01 2.694E-05 5.495E-08 3.129E-12
2.570E-04 4.732E+01 4.732E+01 4.732E+01 1.142E+01
   30     8.472E+01 7.217E+01 2.610E+01 1.073E+01 9.033E-06 9.305E-09 2.828E-13
2.467E-04 5.716E+01 5.716E+01 5.716E+01 3.830E+00
   31     4.369E+01 4.250E+01 2.591E+01 1.748E+01 5.036E-05 1.694E-07 1.564E-11
2.403E-04 3.366E+01 3.366E+01 3.366E+01 2.135E+01
   32     4.585E+01 4.489E+01 2.785E+01 1.898E+01 5.411E-05 1.787E-07 1.622E-11
2.582E-04 3.555E+01 3.555E+01 3.555E+01 2.294E+01
   33     5.931E+01 5.845E+01 3.737E+01 2.618E+01 7.769E-05 2.603E-07 2.380E-11
3.473E-04 4.630E+01 4.630E+01 4.630E+01 3.294E+01
   34     6.631E+01 6.564E+01 4.239E+01 2.938E+01 7.988E-05 2.433E-07 2.020E-11
3.921E-04 5.199E+01 5.199E+01 5.199E+01 3.387E+01
   35     2.524E+01 2.424E+01 1.279E+01 7.022E+00 8.834E-06 1.279E-08 5.240E-13
1.160E-04 1.920E+01 1.920E+01 1.920E+01 3.745E+00
   36     2.788E+02 2.426E+02 7.498E+01 2.676E+01 1.850E-05 1.606E-08 4.350E-13
7.299E-04 1.921E+02 1.921E+02 1.921E+02 7.842E+00
1REGION:                             CODE: MILDOS-AREA (02/12)          PAGE  12
 METSET:                             DATA: Base.MIL                     06/17/14
                             TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

 NUMBER  1  NAME=AM-1                X=    0.9KM, Y=  -0.2KM, Z=    0.0M, DIST=
0.9KM, IRTYPE= 1

                                40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                AGE          PATHWAY        EFFECTIV       BONE           AVG.LUNG
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```
LIVER          KIDNEY         BRONCHI

------------------------------------------------------------------------------------
----------------------
               INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

------------------------------------------------------------------------------------
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                 AGE          PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

------------------------------------------------------------------------------------
----------------------
               INFANT         TOTALS         8.92E+00       9.27E-02       9.14E-02
9.86E-02       9.41E-02       1.47E+02
               CHILD          TOTALS         8.92E+00       9.36E-02       9.17E-02
9.49E-02       9.29E-02       1.47E+02
               TEENAGE        TOTALS         8.92E+00       9.60E-02       9.19E-02
9.33E-02       9.24E-02       1.47E+02
               ADULT          TOTALS         8.92E+00       9.58E-02       9.22E-02
9.33E-02       9.25E-02       1.47E+02

 NUMBER  2  NAME=AM-2                    X=  -0.3KM, Y=   1.2KM, Z=   0.0M, DIST=
1.3KM, IRTYPE= 1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                 AGE          PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

------------------------------------------------------------------------------------
----------------------
               INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR
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              AGE            PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER         KIDNEY         BRONCHI

---------------------------------------------------------------------------------
----------------------
              INFANT         TOTALS         2.09E+01       3.43E-01       3.36E-01
3.74E-01      3.51E-01       3.43E+02
              CHILD          TOTALS         2.09E+01       3.48E-01       3.38E-01
3.55E-01      3.44E-01       3.43E+02
              TEENAGE        TOTALS         2.09E+01       3.60E-01       3.39E-01
3.46E-01      3.42E-01       3.43E+02
              ADULT          TOTALS         2.09E+01       3.60E-01       3.41E-01
3.47E-01      3.43E-01       3.43E+02
1REGION:                               CODE: MILDOS-AREA (02/12)          PAGE  13
 METSET:                               DATA: Base.MIL                     06/17/14
                                TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER  3  NAME=AM-3                   X=   2.0KM, Y=  -0.7KM, Z=   0.0M, DIST=
2.1KM, IRTYPE= 1

                                   40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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----------------------
              AGE            PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER         KIDNEY         BRONCHI

---------------------------------------------------------------------------------
----------------------
              INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00      0.00E+00       0.00E+00
              CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00      0.00E+00       0.00E+00
              TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00      0.00E+00       0.00E+00
              ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00      0.00E+00       0.00E+00


                                TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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----------------------
              AGE            PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER         KIDNEY         BRONCHI

---------------------------------------------------------------------------------
----------------------
              INFANT         TOTALS         2.50E+00       8.41E-02       8.05E-02
1.01E-01      8.81E-02       4.03E+01
              CHILD          TOTALS         2.50E+00       8.67E-02       8.13E-02
9.03E-02      8.47E-02       4.03E+01
              TEENAGE        TOTALS         2.50E+00       9.35E-02       8.19E-02
8.58E-02      8.34E-02       4.03E+01
```

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            ADULT          TOTALS          2.50E+00       9.30E-02       8.27E-02
8.59E-02    8.37E-02       4.03E+01

 NUMBER  4  NAME=AM-4                    X=  -0.9KM, Y=  -0.9KM, Z=   0.0M, DIST=
1.3KM, IRTYPE= 1

                                   40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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               AGE          PATHWAY         EFFECTIV       BONE          AVG.LUNG
LIVER       KIDNEY          BRONCHI

------------------------------------------------------------------------------------
----------------------
            INFANT         TOTALS          0.00E+00       0.00E+00       0.00E+00
0.00E+00    0.00E+00       0.00E+00
            CHILD          TOTALS          0.00E+00       0.00E+00       0.00E+00
0.00E+00    0.00E+00       0.00E+00
            TEENAGE        TOTALS          0.00E+00       0.00E+00       0.00E+00
0.00E+00    0.00E+00       0.00E+00
            ADULT          TOTALS          0.00E+00       0.00E+00       0.00E+00
0.00E+00    0.00E+00       0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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               AGE          PATHWAY         EFFECTIV       BONE          AVG.LUNG
LIVER       KIDNEY          BRONCHI

------------------------------------------------------------------------------------
----------------------
            INFANT         TOTALS          1.06E+01       1.50E-01       1.47E-01
1.65E-01    1.54E-01       1.74E+02
            CHILD          TOTALS          1.06E+01       1.53E-01       1.48E-01
1.56E-01    1.51E-01       1.74E+02
            TEENAGE        TOTALS          1.06E+01       1.59E-01       1.49E-01
1.52E-01    1.50E-01       1.74E+02
            ADULT          TOTALS          1.06E+01       1.58E-01       1.49E-01
1.52E-01    1.50E-01       1.74E+02
1REGION:                             CODE: MILDOS-AREA (02/12)          PAGE  14
 METSET:                             DATA: Base.MIL                     06/17/14
                              TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER  5  NAME=AM-5                    X=  -1.4KM, Y=   2.6KM, Z=   0.0M, DIST=
3.0KM, IRTYPE= 1

                                   40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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               AGE          PATHWAY         EFFECTIV       BONE          AVG.LUNG
LIVER       KIDNEY          BRONCHI
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----------------------
                INFANT       TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                CHILD        TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                TEENAGE      TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                ADULT        TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00


                             TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE         PATHWAY      EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY       BRONCHI

-----------------------------------------------------------------------------------
----------------------
                INFANT       TOTALS       5.64E+00      2.27E-01      2.13E-01
2.93E-01        2.43E-01     9.05E+01
                CHILD        TOTALS       5.63E+00      2.38E-01      2.17E-01
2.52E-01        2.30E-01     9.05E+01
                TEENAGE      TOTALS       5.64E+00      2.64E-01      2.19E-01
2.34E-01        2.25E-01     9.05E+01
                ADULT        TOTALS       5.64E+00      2.62E-01      2.22E-01
2.35E-01        2.26E-01     9.05E+01

 NUMBER  6  NAME=AM-6                 X=  -3.9KM, Y=   4.8KM, Z=   0.0M, DIST=
6.2KM, IRTYPE= 1

                               40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                 AGE         PATHWAY      EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY       BRONCHI

-----------------------------------------------------------------------------------
----------------------
                INFANT       TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                CHILD        TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                TEENAGE      TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00
                ADULT        TOTALS       0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00     0.00E+00


                             TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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              AGE          PATHWAY       EFFECTIV      BONE         AVG.LUNG
LIVER         KIDNEY       BRONCHI

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----------------------
              INFANT       TOTALS        1.22E+00      1.09E-01     9.35E-02
1.83E-01      1.27E-01     1.87E+01
              CHILD        TOTALS        1.21E+00      1.21E-01     9.74E-02
1.37E-01      1.12E-01     1.87E+01
              TEENAGE      TOTALS        1.22E+00      1.51E-01     1.00E-01
1.17E-01      1.07E-01     1.87E+01
              ADULT        TOTALS        1.22E+00      1.49E-01     1.03E-01
1.18E-01      1.08E-01     1.87E+01
1REGION:                          CODE: MILDOS-AREA (02/12)          PAGE  15
 METSET:                          DATA: Base.MIL                     06/17/14
                            TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER  7  NAME=AM-8                 X=    0.7KM, Y=    0.4KM, Z=    0.0M, DIST=
0.8KM, IRTYPE= 1

                               40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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              AGE          PATHWAY       EFFECTIV      BONE         AVG.LUNG
LIVER         KIDNEY       BRONCHI

----------------------------------------------------------------------------------
----------------------
              INFANT       TOTALS        0.00E+00      0.00E+00     0.00E+00
0.00E+00      0.00E+00     0.00E+00
              CHILD        TOTALS        0.00E+00      0.00E+00     0.00E+00
0.00E+00      0.00E+00     0.00E+00
              TEENAGE      TOTALS        0.00E+00      0.00E+00     0.00E+00
0.00E+00      0.00E+00     0.00E+00
              ADULT        TOTALS        0.00E+00      0.00E+00     0.00E+00
0.00E+00      0.00E+00     0.00E+00


                            TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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              AGE          PATHWAY       EFFECTIV      BONE         AVG.LUNG
LIVER         KIDNEY       BRONCHI

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----------------------
              INFANT       TOTALS        2.19E+01      1.87E-01     1.85E-01
1.97E-01      1.89E-01     3.62E+02
              CHILD        TOTALS        2.19E+01      1.88E-01     1.85E-01
1.91E-01      1.87E-01     3.62E+02
              TEENAGE      TOTALS        2.19E+01      1.92E-01     1.86E-01
1.88E-01      1.87E-01     3.62E+02
              ADULT        TOTALS        2.19E+01      1.92E-01     1.86E-01
```

1.88E-01 1.87E-01 3.62E+02

NUMBER 8 NAME=AM-22 X= -0.7KM, Y= 1.1KM, Z= 0.0M, DIST= 1.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.01E+01	1.86E-01	1.82E-01	2.05E-01	1.91E-01	1.65E+02
CHILD	TOTALS	1.01E+01	1.89E-01	1.83E-01	1.93E-01	1.87E-01	1.65E+02
TEENAGE	TOTALS	1.01E+01	1.97E-01	1.84E-01	1.88E-01	1.86E-01	1.65E+02
ADULT	TOTALS	1.01E+01	1.96E-01	1.85E-01	1.88E-01	1.86E-01	1.65E+02

1REGION: CODE: MILDOS-AREA (02/12) PAGE 16
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 9 NAME=AM-23 X= -0.1KM, Y= 0.3KM, Z= 0.0M, DIST= 0.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI

INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	
0.00E+00	0.00E+00	0.00E+00			
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	
0.00E+00	0.00E+00	0.00E+00			
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	
0.00E+00	0.00E+00	0.00E+00			
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	
0.00E+00	0.00E+00	0.00E+00			

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	5.38E+01	9.17E-02	9.11E-02	9.41E-02	9.23E-02	8.96E+02
CHILD	TOTALS	5.38E+01	9.21E-02	9.13E-02	9.26E-02	9.18E-02	8.96E+02
TEENAGE	TOTALS	5.38E+01	9.31E-02	9.14E-02	9.19E-02	9.16E-02	8.96E+02
ADULT	TOTALS	5.38E+01	9.30E-02	9.15E-02	9.19E-02	9.16E-02	8.96E+02

NUMBER 10 NAME=AM-24 X= 0.0KM, Y= 0.0KM, Z= 0.0M, DIST= 0.1KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER           KIDNEY        BRONCHI

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                INFANT        TOTALS         3.01E+01       2.45E-02       2.41E-02
2.64E-02        2.49E-02      5.01E+02
                CHILD         TOTALS         3.01E+01       2.48E-02       2.42E-02
2.52E-02        2.46E-02      5.01E+02
                TEENAGE       TOTALS         3.01E+01       2.55E-02       2.42E-02
2.47E-02        2.44E-02      5.01E+02
                ADULT         TOTALS         3.01E+01       2.55E-02       2.43E-02
2.47E-02        2.44E-02      5.01E+02
1REGION:                               CODE: MILDOS-AREA (02/12)           PAGE  17
 METSET:                               DATA: Base.MIL                      06/17/14
                               TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER 11  NAME=AM-25                   X=    0.0KM, Y=    0.0KM, Z=    0.0M, DIST=
0.0KM, IRTYPE= 1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER           KIDNEY        BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00      0.00E+00
                CHILD         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00      0.00E+00
                TEENAGE       TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00      0.00E+00
                ADULT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00      0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER           KIDNEY        BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT        TOTALS         3.02E+01       2.12E-02       2.08E-02
2.29E-02        2.16E-02      5.02E+02
                CHILD         TOTALS         3.02E+01       2.14E-02       2.09E-02
2.18E-02        2.12E-02      5.02E+02
                TEENAGE       TOTALS         3.02E+01       2.22E-02       2.09E-02
2.13E-02        2.11E-02      5.02E+02
                ADULT         TOTALS         3.02E+01       2.21E-02       2.10E-02
2.14E-02        2.11E-02      5.02E+02
```

NUMBER 12 NAME=TE-1 X= -0.1KM, Y= 0.0KM, Z= 0.0M, DIST= 0.1KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	1.91E+01	2.23E-02	2.19E-02	2.41E-02	2.27E-02	3.17E+02
CHILD	TOTALS	1.91E+01	2.26E-02	2.20E-02	2.29E-02	2.23E-02	3.17E+02
TEENAGE	TOTALS	1.91E+01	2.33E-02	2.20E-02	2.24E-02	2.22E-02	3.17E+02
ADULT	TOTALS	1.91E+01	2.32E-02	2.21E-02	2.25E-02	2.22E-02	3.17E+02

1REGION: CODE: MILDOS-AREA (02/12) PAGE 18
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 13 NAME=TE-2 X= 0.0KM, Y= 0.0KM, Z= 0.0M, DIST= 0.0KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI

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----------------------
                INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00


                        TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER           KIDNEY         BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT         TOTALS         3.80E+00       1.75E-02       1.71E-02
1.93E-02        1.79E-02       6.31E+01
                CHILD          TOTALS         3.80E+00       1.78E-02       1.72E-02
1.82E-02        1.76E-02       6.31E+01
                TEENAGE        TOTALS         3.80E+00       1.85E-02       1.73E-02
1.77E-02        1.74E-02       6.31E+01
                ADULT          TOTALS         3.80E+00       1.85E-02       1.73E-02
1.77E-02        1.75E-02       6.31E+01

 NUMBER 14  NAME=TE-3                      X=   0.0KM, Y=    0.0KM, Z=    0.0M, DIST=
0.1KM, IRTYPE= 1

                          40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

------------------------------------------------------------------------------------
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                 AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER           KIDNEY         BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00
                ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00        0.00E+00       0.00E+00


                        TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                    AGE             PATHWAY         EFFECTIV        BONE            AVG.LUNG
LIVER               KIDNEY          BRONCHI

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----------------------
                    INFANT          TOTALS          2.24E+01        2.05E-02        2.01E-02
2.23E-02            2.09E-02        3.73E+02
                    CHILD           TOTALS          2.24E+01        2.08E-02        2.02E-02
2.12E-02            2.06E-02        3.73E+02
                    TEENAGE         TOTALS          2.24E+01        2.15E-02        2.03E-02
2.07E-02            2.04E-02        3.73E+02
                    ADULT           TOTALS          2.24E+01        2.15E-02        2.04E-02
2.07E-02            2.05E-02        3.73E+02
1REGION:                                       CODE: MILDOS-AREA (02/12)          PAGE  19
 METSET:                                       DATA: Base.MIL                     06/17/14
                                       TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

 NUMBER 15  NAME=TE-4                       X=    0.0KM, Y=    0.0KM, Z=    0.0M, DIST=
0.0KM, IRTYPE= 1

                                          40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                    AGE             PATHWAY         EFFECTIV        BONE            AVG.LUNG
LIVER               KIDNEY          BRONCHI

----------------------------------------------------------------------------------
----------------------
                    INFANT          TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00            0.00E+00        0.00E+00
                    CHILD           TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00            0.00E+00        0.00E+00
                    TEENAGE         TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00            0.00E+00        0.00E+00
                    ADULT           TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00            0.00E+00        0.00E+00


                                       TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                    AGE             PATHWAY         EFFECTIV        BONE            AVG.LUNG
LIVER               KIDNEY          BRONCHI

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----------------------
                    INFANT          TOTALS          6.32E+00        1.70E-02        1.66E-02
1.88E-02            1.74E-02        1.05E+02
                    CHILD           TOTALS          6.32E+00        1.73E-02        1.67E-02
1.76E-02            1.70E-02        1.05E+02
                    TEENAGE         TOTALS          6.32E+00        1.80E-02        1.67E-02
1.72E-02            1.69E-02        1.05E+02
                    ADULT           TOTALS          6.32E+00        1.79E-02        1.68E-02
1.72E-02            1.69E-02        1.05E+02
```

NUMBER 16 NAME=WH-9 X= 0.3KM, Y= -0.1KM, Z= 0.0M, DIST= 0.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.24E+01	4.72E-02	4.68E-02	4.93E-02	4.78E-02	3.72E+02
CHILD	TOTALS	2.24E+01	4.76E-02	4.69E-02	4.80E-02	4.73E-02	3.72E+02
TEENAGE	TOTALS	2.24E+01	4.84E-02	4.70E-02	4.75E-02	4.72E-02	3.72E+02
ADULT	TOTALS	2.24E+01	4.84E-02	4.71E-02	4.75E-02	4.72E-02	3.72E+02

1REGION: CODE: MILDOS-AREA (02/12) PAGE 20
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 17 NAME=WH-17 X= -0.4KM, Y= 0.4KM, Z= 0.0M, DIST= 0.5KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI

```
                 INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00


                       TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER            KIDNEY        BRONCHI

------------------------------------------------------------------------------------
----------------------
                 INFANT        TOTALS        1.34E+01      6.03E-02      5.97E-02
6.31E-02         6.10E-02      2.23E+02
                 CHILD         TOTALS        1.34E+01      6.07E-02      5.98E-02
6.13E-02         6.04E-02      2.23E+02
                 TEENAGE       TOTALS        1.34E+01      6.19E-02      5.99E-02
6.06E-02         6.02E-02      2.23E+02
                 ADULT         TOTALS        1.34E+01      6.18E-02      6.01E-02
6.06E-02         6.02E-02      2.23E+02

 NUMBER 18  NAME=WH-50                    X=  -2.3KM, Y=   2.9KM, Z=   0.0M, DIST=
3.7KM, IRTYPE= 1

                          40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER            KIDNEY        BRONCHI

------------------------------------------------------------------------------------
----------------------
                 INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00
                 ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00         0.00E+00      0.00E+00


                       TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

------------------------------------------------------------------------------------
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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
```

LIVER KIDNEY BRONCHI

	INFANT	TOTALS	2.88E+00	1.47E-01	1.35E-01
2.03E-01	1.61E-01	4.59E+01			
	CHILD	TOTALS	2.88E+00	1.56E-01	1.38E-01
1.68E-01	1.50E-01	4.59E+01			
	TEENAGE	TOTALS	2.88E+00	1.79E-01	1.40E-01
1.53E-01	1.45E-01	4.59E+01			
	ADULT	TOTALS	2.88E+00	1.77E-01	1.43E-01
1.54E-01	1.46E-01	4.59E+01			

1REGION: CODE: MILDOS-AREA (02/12) PAGE 21
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1,
DURATION IN YRS IS... 5.0

NUMBER 19 NAME=WH-47 X= 0.7KM, Y= -1.2KM, Z= 0.0M, DIST= 1.4KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

LIVER	AGE / KIDNEY	PATHWAY / BRONCHI	EFFECTIV	BONE	AVG.LUNG
	INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

LIVER	AGE / KIDNEY	PATHWAY / BRONCHI	EFFECTIV	BONE	AVG.LUNG
	INFANT	TOTALS	7.35E+00	1.05E-01	1.03E-01
1.17E-01	1.08E-01	1.21E+02			
	CHILD	TOTALS	7.35E+00	1.07E-01	1.04E-01
1.10E-01	1.06E-01	1.21E+02			
	TEENAGE	TOTALS	7.35E+00	1.12E-01	1.04E-01
1.07E-01	1.05E-01	1.21E+02			
	ADULT	TOTALS	7.35E+00	1.11E-01	1.04E-01
1.07E-01	1.05E-01	1.21E+02			

NUMBER 20 NAME=TCA-1 X= -8.4KM, Y= -1.7KM, Z= 0.0M, DIST=

8.5KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	4.68E-01	5.42E-02	4.28E-02	1.07E-01	6.70E-02	7.08E+00
CHILD	TOTALS	4.67E-01	6.26E-02	4.55E-02	7.40E-02	5.63E-02	7.08E+00
TEENAGE	TOTALS	4.67E-01	8.40E-02	4.74E-02	5.96E-02	5.21E-02	7.08E+00
ADULT	TOTALS	4.68E-01	8.24E-02	4.98E-02	6.00E-02	5.31E-02	7.08E+00

1REGION: CODE: MILDOS-AREA (02/12) PAGE 22
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 21 NAME=TCA-2 X= -8.3KM, Y= -0.4KM, Z= 0.0M, DIST= 8.3KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00			

```
0.00E+00       0.00E+00       0.00E+00
               CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

--------------------------------------------------------------------------------
---------------------
               INFANT         TOTALS         3.88E-01       4.44E-02       3.52E-02
8.72E-02       5.48E-02       5.88E+00
               CHILD          TOTALS         3.87E-01       5.13E-02       3.74E-02
6.05E-02       4.62E-02       5.88E+00
               TEENAGE        TOTALS         3.88E-01       6.86E-02       3.90E-02
4.89E-02       4.28E-02       5.88E+00
               ADULT          TOTALS         3.88E-01       6.74E-02       4.09E-02
4.92E-02       4.36E-02       5.88E+00

 NUMBER 22  NAME=TCA-3                    X=  -8.8KM, Y=  -0.4KM, Z=   0.0M, DIST=
8.8KM, IRTYPE= 1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

--------------------------------------------------------------------------------
---------------------
               INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                               TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI
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----------------------
                INFANT         TOTALS        3.56E-01     4.22E-02      3.29E-02
8.52E-02        5.27E-02       5.38E+00
                CHILD          TOTALS        3.55E-01     4.91E-02      3.52E-02
5.84E-02        4.40E-02       5.38E+00
                TEENAGE        TOTALS        3.56E-01     6.65E-02      3.67E-02
4.67E-02        4.06E-02       5.38E+00
                ADULT          TOTALS        3.56E-01     6.53E-02      3.87E-02
4.70E-02        4.13E-02       5.38E+00
1REGION:                              CODE: MILDOS-AREA (02/12)            PAGE  23
 METSET:                              DATA: Base.MIL                       06/17/14
                                TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER 23  NAME=TCA-4                 X=  -8.2KM, Y=  -1.2KM, Z=   0.0M, DIST=
8.2KM, IRTYPE= 1

                                  40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY       EFFECTIV     BONE          AVG.LUNG
LIVER           KIDNEY         BRONCHI

-------------------------------------------------------------------------------
----------------------
                INFANT         TOTALS        0.00E+00     0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                CHILD          TOTALS        0.00E+00     0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                TEENAGE        TOTALS        0.00E+00     0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                ADULT          TOTALS        0.00E+00     0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00


                                TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE           PATHWAY       EFFECTIV     BONE          AVG.LUNG
LIVER           KIDNEY         BRONCHI

-------------------------------------------------------------------------------
----------------------
                INFANT         TOTALS        4.61E-01     5.23E-02      4.16E-02
1.02E-01        6.43E-02       6.98E+00
                CHILD          TOTALS        4.60E-01     6.01E-02      4.42E-02
7.09E-02        5.43E-02       6.98E+00
                TEENAGE        TOTALS        4.60E-01     8.02E-02      4.60E-02
5.74E-02        5.04E-02       6.98E+00
                ADULT          TOTALS        4.61E-01     7.87E-02      4.82E-02
5.77E-02        5.13E-02       6.98E+00

 NUMBER 24  NAME=TCA-5                 X= -11.0KM, Y=  -0.8KM, Z=   0.0M, DIST=
11.0KM, IRTYPE= 1
```

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.91E-01	3.91E-02	2.89E-02	8.65E-02	5.06E-02	4.35E+00
CHILD	TOTALS	2.90E-01	4.67E-02	3.14E-02	5.70E-02	4.10E-02	4.35E+00
TEENAGE	TOTALS	2.91E-01	6.59E-02	3.31E-02	4.40E-02	3.73E-02	4.35E+00
ADULT	TOTALS	2.91E-01	6.46E-02	3.52E-02	4.44E-02	3.82E-02	4.35E+00

1REGION: CODE: MILDOS-AREA (02/12) PAGE 24
METSET: DATA: Base.MIL 06/17/14

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 25 NAME=Crawford X= -4.7KM, Y= 4.5KM, Z= 0.0M, DIST= 6.5KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

```
             CHILD        TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00
             TEENAGE      TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00
             ADULT        TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00


                          TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

------------------------------------------------------------------------------
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               AGE        PATHWAY      EFFECTIV     BONE         AVG.LUNG
LIVER        KIDNEY       BRONCHI

------------------------------------------------------------------------------
----------------------
             INFANT       TOTALS       7.69E-01     7.54E-02     6.33E-02
1.31E-01     8.89E-02     1.18E+01
             CHILD        TOTALS       7.68E-01     8.43E-02     6.62E-02
9.64E-02     7.76E-02     1.18E+01
             TEENAGE      TOTALS       7.69E-01     1.07E-01     6.83E-02
8.12E-02     7.32E-02     1.18E+01
             ADULT        TOTALS       7.69E-01     1.05E-01     7.08E-02
8.15E-02     7.43E-02     1.18E+01

 NUMBER 26  NAME=Ehlers                   X=   0.9KM, Y=  -0.2KM, Z=   0.0M, DIST=
0.9KM, IRTYPE= 1

                            40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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               AGE        PATHWAY      EFFECTIV     BONE         AVG.LUNG
LIVER        KIDNEY       BRONCHI

------------------------------------------------------------------------------
----------------------
             INFANT       TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00
             CHILD        TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00
             TEENAGE      TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00
             ADULT        TOTALS       0.00E+00     0.00E+00     0.00E+00
0.00E+00     0.00E+00     0.00E+00


                          TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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               AGE        PATHWAY      EFFECTIV     BONE         AVG.LUNG
LIVER        KIDNEY       BRONCHI
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------------------------------------------------------------------------------------
----------------------
                INFANT          TOTALS          9.03E+00        9.18E-02        9.06E-02
9.76E-02        9.32E-02        1.49E+02
                CHILD           TOTALS          9.03E+00        9.27E-02        9.09E-02
9.40E-02        9.21E-02        1.49E+02
                TEENAGE         TOTALS          9.03E+00        9.51E-02        9.11E-02
9.24E-02        9.16E-02        1.49E+02
                ADULT           TOTALS          9.03E+00        9.49E-02        9.13E-02
9.25E-02        9.17E-02        1.49E+02
1REGION:                                  CODE: MILDOS-AREA (02/12)          PAGE  25
 METSET:                                  DATA: Base.MIL                     06/17/14
                                   TIME STEP NUMBER 1,
DURATION IN YRS IS...  5.0

 NUMBER 27  NAME=Gibbons               X=   1.1KM, Y=   0.2KM, Z=   0.0M, DIST=
1.1KM, IRTYPE= 1

                                    40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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----------------------

                 AGE            PATHWAY         EFFECTIV        BONE            AVG.LUNG
LIVER           KIDNEY          BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT          TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00        0.00E+00        0.00E+00
                CHILD           TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00        0.00E+00        0.00E+00
                TEENAGE         TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00        0.00E+00        0.00E+00
                ADULT           TOTALS          0.00E+00        0.00E+00        0.00E+00
0.00E+00        0.00E+00        0.00E+00


                                 TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

------------------------------------------------------------------------------------
----------------------

                 AGE            PATHWAY         EFFECTIV        BONE            AVG.LUNG
LIVER           KIDNEY          BRONCHI

------------------------------------------------------------------------------------
----------------------
                INFANT          TOTALS          9.70E+00        1.53E-01        1.51E-01
1.66E-01        1.56E-01        1.59E+02
                CHILD           TOTALS          9.70E+00        1.55E-01        1.51E-01
1.58E-01        1.54E-01        1.59E+02
                TEENAGE         TOTALS          9.70E+00        1.60E-01        1.52E-01
1.55E-01        1.53E-01        1.59E+02
                ADULT           TOTALS          9.70E+00        1.60E-01        1.52E-01
1.55E-01        1.53E-01        1.59E+02

 NUMBER 28  NAME=Stetson               X=  -0.3KM, Y=   1.2KM, Z=   0.0M, DIST=
1.2KM, IRTYPE= 1
```

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.33E+01	3.45E-01	3.39E-01	3.73E-01	3.52E-01	3.83E+02
CHILD	TOTALS	2.33E+01	3.50E-01	3.41E-01	3.56E-01	3.46E-01	3.83E+02
TEENAGE	TOTALS	2.33E+01	3.61E-01	3.42E-01	3.48E-01	3.44E-01	3.83E+02
ADULT	TOTALS	2.33E+01	3.60E-01	3.43E-01	3.48E-01	3.45E-01	3.83E+02

1REGION: CODE: MILDOS-AREA (02/12) PAGE 26
METSET: DATA: Base.MIL 06/17/14

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 29 NAME=Knode X= -1.6KM, Y= 2.6KM, Z= 0.0M, DIST= 3.1KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00			

```
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

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----------------------
               INFANT         TOTALS         5.27E+00       2.08E-01       1.95E-01
2.69E-01       2.23E-01       8.47E+01
               CHILD          TOTALS         5.27E+00       2.18E-01       1.99E-01
2.31E-01       2.11E-01       8.47E+01
               TEENAGE        TOTALS         5.27E+00       2.43E-01       2.01E-01
2.15E-01       2.06E-01       8.47E+01
               ADULT          TOTALS         5.27E+00       2.41E-01       2.03E-01
2.15E-01       2.07E-01       8.47E+01

 NUMBER 30  NAME=Brott                  X=  -1.0KM, Y=   1.3KM, Z=   0.0M, DIST=
1.6KM, IRTYPE= 1

                                 40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

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               INFANT         TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               CHILD          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               TEENAGE        TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00
               ADULT          TOTALS         0.00E+00       0.00E+00       0.00E+00
0.00E+00       0.00E+00       0.00E+00


                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                AGE           PATHWAY        EFFECTIV       BONE           AVG.LUNG
LIVER          KIDNEY         BRONCHI

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	INFANT	TOTALS	6.50E+00	1.54E-01	1.50E-01
1.74E-01	1.59E-01	1.06E+02			
	CHILD	TOTALS	6.50E+00	1.57E-01	1.51E-01
1.62E-01	1.55E-01	1.06E+02			
	TEENAGE	TOTALS	6.50E+00	1.66E-01	1.51E-01
1.56E-01	1.53E-01	1.06E+02			
	ADULT	TOTALS	6.50E+00	1.65E-01	1.52E-01
1.56E-01	1.54E-01	1.06E+02			

1REGION: CODE: MILDOS-AREA (02/12) PAGE 27
METSET: DATA: Base.MIL 06/17/14
TIME STEP NUMBER 1,
DURATION IN YRS IS... 5.0

NUMBER 31 NAME=McDowell X= -1.8KM, Y= 4.3KM, Z= 0.0M, DIST=
4.6KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

	AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG
LIVER	KIDNEY	BRONCHI			
	INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			
	ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00			

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

	AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG
LIVER	KIDNEY	BRONCHI			
	INFANT	TOTALS	3.49E+00	2.36E-01	2.12E-01
3.50E-01	2.64E-01	5.48E+01			
	CHILD	TOTALS	3.49E+00	2.54E-01	2.18E-01
2.79E-01	2.41E-01	5.48E+01			
	TEENAGE	TOTALS	3.49E+00	3.01E-01	2.22E-01
2.48E-01	2.32E-01	5.48E+01			
	ADULT	TOTALS	3.49E+00	2.97E-01	2.27E-01
2.49E-01	2.34E-01	5.48E+01			

NUMBER 32 NAME=Taggart X= -1.5KM, Y= 4.4KM, Z= 0.0M, DIST=
4.6KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS

LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	3.67E+00	2.56E-01	2.29E-01	3.78E-01	2.85E-01	5.75E+01
CHILD	TOTALS	3.67E+00	2.75E-01	2.36E-01	3.02E-01	2.61E-01	5.75E+01
TEENAGE	TOTALS	3.67E+00	3.25E-01	2.40E-01	2.68E-01	2.51E-01	5.75E+01
ADULT	TOTALS	3.67E+00	3.21E-01	2.46E-01	2.69E-01	2.53E-01	5.75E+01

1REGION: CODE: MILDOS-AREA (02/12) PAGE 28
METSET: DATA: Base.MIL 06/17/14

TIME STEP NUMBER 1, DURATION IN YRS IS... 5.0

NUMBER 33 NAME=Franey X= -0.6KM, Y= 4.6KM, Z= 0.0M, DIST= 4.7KM, IRTYPE= 1

40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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                TEENAGE        TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                ADULT          TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00


                         TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY         BRONCHI

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                INFANT         TOTALS        4.77E+00      3.52E-01      3.14E-01
5.28E-01        3.95E-01       7.44E+01
                CHILD          TOTALS        4.77E+00      3.80E-01      3.24E-01
4.19E-01        3.60E-01       7.44E+01
                TEENAGE        TOTALS        4.77E+00      4.52E-01      3.30E-01
3.71E-01        3.46E-01       7.44E+01
                ADULT          TOTALS        4.77E+00      4.47E-01      3.38E-01
3.72E-01        3.49E-01       7.44E+01

 NUMBER 34  NAME=Bunch                  X=   1.4KM, Y=   4.0KM, Z=   0.0M, DIST=
4.3KM, IRTYPE= 1

                            40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY         BRONCHI

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----------------------
                INFANT         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                CHILD          TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                TEENAGE        TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00
                ADULT          TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00       0.00E+00


                         TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                  AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY         BRONCHI

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                INFANT        TOTALS        5.34E+00      3.92E-01      3.53E-01
5.73E-01        4.36E-01      8.32E+01
                CHILD         TOTALS        5.33E+00      4.21E-01      3.63E-01
4.60E-01        3.99E-01      8.32E+01
                TEENAGE       TOTALS        5.33E+00      4.94E-01      3.69E-01
4.11E-01        3.85E-01      8.32E+01
                ADULT         TOTALS        5.34E+00      4.89E-01      3.77E-01
4.12E-01        3.89E-01      8.32E+01
1REGION:                           CODE: MILDOS-AREA (02/12)         PAGE  29
 METSET:                           DATA: Base.MIL                    06/17/14
                              TIME STEP NUMBER 1,
DURATION IN YRS IS...   5.0

 NUMBER 35  NAME=Dyer                X=  -2.2KM, Y=   0.5KM, Z=   0.0M, DIST=
2.3KM, IRTYPE= 1

                                40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR

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                 AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY        BRONCHI

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                INFANT        TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00      0.00E+00
                CHILD         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00      0.00E+00
                TEENAGE       TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00      0.00E+00
                ADULT         TOTALS        0.00E+00      0.00E+00      0.00E+00
0.00E+00        0.00E+00      0.00E+00



                              TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR  THIS
LOCATION, MREM/YR

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                 AGE          PATHWAY       EFFECTIV      BONE          AVG.LUNG
LIVER           KIDNEY        BRONCHI

---------------------------------------------------------------------------------
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                INFANT        TOTALS        1.98E+00      9.31E-02      8.88E-02
1.13E-01        9.79E-02      3.16E+01
                CHILD         TOTALS        1.98E+00      9.63E-02      8.98E-02
1.01E-01        9.39E-02      3.16E+01
                TEENAGE       TOTALS        1.98E+00      1.04E-01      9.05E-02
9.52E-02        9.23E-02      3.16E+01
                ADULT         TOTALS        1.98E+00      1.04E-01      9.14E-02
9.53E-02        9.27E-02      3.16E+01

 NUMBER 36  NAME=Edelman             X=   0.9KM, Y=   1.1KM, Z=   0.0M, DIST=
1.4KM, IRTYPE= 1

                                40CFR190 ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS
LOCATION, MREM/YR
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AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEENAGE	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADULT	TOTALS	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TOTAL ANNUAL DOSE COMMITMENTS COMPUTED FOR THIS LOCATION, MREM/YR

AGE	PATHWAY	EFFECTIV	BONE	AVG.LUNG	LIVER	KIDNEY	BRONCHI
INFANT	TOTALS	2.13E+01	4.05E-01	3.95E-01	4.46E-01	4.15E-01	3.49E+02
CHILD	TOTALS	2.13E+01	4.11E-01	3.98E-01	4.20E-01	4.06E-01	3.49E+02
TEENAGE	TOTALS	2.13E+01	4.28E-01	3.99E-01	4.09E-01	4.03E-01	3.49E+02
ADULT	TOTALS	2.13E+01	4.27E-01	4.01E-01	4.09E-01	4.04E-01	3.49E+02

0Program execution time = 0.37 seconds

Attachment B
Smith Ranch/Highland
Proposed License Renewal Application Language

NEW APPENDIX XXX - Compliance with Public Dose Limits

Purpose

10 CFR 20.1302 (1) allows the applicant to demonstrate compliance with the public dose limits using either measurement or calculations. SRH will demonstrate compliance using one of the following two methods.

Method 1 - Dose Assessment

The first method is to perform a dose assessment using measured effluent concentrations at a monitoring location positioned near the maximum receptor. In regards to radon and radon progeny dose, the dose assessment will be performed using the following equation:

$$D = DCF \sum_{i} C_i F_i T_i$$

Where:

- D = annual dose (TEDE) (mrem/yr)
- DCF = dose conversion factor for Rn-222 with 100% equilibrium factor with its progeny from 10 CRF 20 Appendix B - 500 mrem/hr per pCi Rn/L
- C_i = annual average concentration of Rn-222 in air (pCi/L) measured at the receptor location
- F_i = radon equilibrium factor at the receptor
- T_i = occupancy factor for the receptor

In the event that a receptor is exposed in multiple locations, e.g. indoors and outdoors, applicable equilibrium and occupancy factors will be used for those locations. For this receptor, currently all exposure will be assumed to be indoors as this is the most conservative assumption. If multiple exposure locations are to be used in the future, the NRC will be notified prior to this change.

Dose conversion factor was established by taking the 10 CFR 10 Appendix B, Table 2, value for radon with daughters present in air, (1 × 10-10 µCi/mL or 0.1 pCi/L). The annual dose is 50 mrem/yr (0.5 mSv/yr). Therefore, the dose conversion factor for radon-222 with progeny at 100% equilibrium is determined as 50 mrem/yr (0.5 mSv/yr) divided by 0.1 pCi/L, or 500 mrem/yr per pCi Rn/L.

The annual radon concentration at the receptor will be determined by calculating the average net radon concentration at the receptor location based on semi-annual radon-222 measurements with track etch cups. As this is a private resident, measurements indoors on private property is not a feasible alternative. In an article published by Shiager (1974), it was shown that buildings immediately adjacent to tailing piles had indoor radon concentration in equilibrium with those found outdoors. In FSME-ISG-01 draft guidance, it is stated as acceptable to assume that the indoor radon concentration due to licensee activities is equal to the outdoor concentration.

The equilibrium factor between radon and radon progeny is assumed to be 50% for indoor exposure. This value is based on Regulatory Guide 3.51 and NCRP 160 and is mentioned in FSME-ISG-01 draft guidance as an acceptable default for indoor equilibrium factor.

The occupancy factor for this receptor will be determined.

Method 2 - MILDOS-Area Measurement and Calculation

Method 2 uses the MILDOS-Area atmospheric dispersion code and consists of three basic steps. First, Cameco will determine the source terms present at SRH. Second, environmental monitoring data will we used to adjust the model assumptions regarding radon venting rates. Third, the source terms and adjusted Mildos model will be used to prepare dose estimates for compliance demonstration.

Source Terms

Cameco will continue the particulate and gamma sampling at the current stations and, to address radon emissions, a combination of additional monitoring of radon source terms and modeling. It is important to point out that direct measurement of each point and diffuse source (e.g. well heads, header houses, tanks, etc.) for the purpose of quantifying the radionuclides released from it is not a feasible or realistic option at a large operating site for meeting of this license condition. Further, environmental monitoring capable of measuring emissions and detecting upset conditions does not provide sufficient information to actually quantify the emissions from each individual source; in reality there is no environmental monitoring program that would be capable of providing this information. Due to dispersion, a monitoring point measures portions of numerous sources but does not measure the entirety of the emissions from any single source. A further complication is the uncertainty associated with measurement of small amounts radioactivity in the environment, specifically, measurement uncertainty and to a greater degree background variability. However, a combination of modeling and measurement does provide a reasonable solution to the requirement to quantify emissions for each source.

In summary, to provide additional quantification of source terms, the measurements listed below will be performed for a period of one year. The emissions calculated from this information will compared with the modeled source terms using Regulatory Guide 3.59. The measurements will be used in combination with modeling to determine the most accurate emissions estimate for the site. SRH is a long-term operation that rarely has changes to process that would result is significantly differences in emissions. Therefore, this full set of measurements will be repeated once per license period or following a significant change to the process. Annually the predicted Rn-222 concentrations will be compared statistically to measurements at our environmental monitoring stations to ensure the emissions estimate remains accurate.

1) 5 track etch cups will be placed in the main plant semi-annually at locations of highest predicted radon gas concentrations;
2) 1 track etch cup per quarter will be placed in each of the 5(??) accessible exhaust ventilation streams from tanks that are considered the primary emitters of radon, e.g. IX columns, injection water storage tanks, etc.;
3) 5 track etch cups header houses randomly selected throughout the wellfield area semi-annually and varied for each 6-month period;
4) Quarterly 1 vented wellhead will be sampled for radon gas using scintillation cells.

Track etch cups have been chosen as the measurement method because they provide integrated sampling over a longer timeframe making them a more accurate measure of radon gas concentrations compared with short-term grab samples using a scintillation cell.

During consultations with the manufacturer, Landauer, it was determined that with the potential for humidity in the vents, track etch cups with a thoron filter will be used for this application to prevent deterioration of the paper filter used on the RADTRAK detectors typically used. It was also noted that the track etch cups have a radon saturation limit of 100,000 pCi/L-days. The vents will be sampled with scintillation cells to provide a preliminary estimate of the concentration of radon and determine the appropriate amount of time the detectors can remain in the vents to avoid reaching the saturation point. Track etch cups will be used as the ongoing means of measuring radon.

Main Plant Source Term

On a semi-annual basis 5 track etch cups will be placed in the main plant at locations of highest predicted radon gas concentrations. An engineering assessment of the main plant will be used to estimate the rate of release from the exhaust fans. Because the plant operates continuously, it will be assumed that this release rate is constant for the entire year. This is a reasonable, yet conservative assumption, because if a fan were temporarily non-operational, the actual release rate would be decreased somewhat from the calculated value. If an extended shut-down of a fan were to take place, the release rates will be adjusted accordingly. The total effluent from the plant will be estimated using the following formula:

*Plant activity (µCi) = Radon concentration (µCi/ml) * Release rate (ml/min)*Time (min)*

Releases of radon from ventilated tanks will be calculated by measuring the concentration of radon in the ventilated exhaust from tanks considered to be the primary emitters of radon, combined with the ventilation rate of the tank determined through an engineering analysis. It is important to note that not all vents are readily or safely accessible and some vents are not associated with key radon sources, therefore not all vents will be measured. The radon concentration will be measured using track etch cups placed semi-annually in the ventilation systems of tanks that are considered the primary emitters of radon. This method aligns with the "Continuous Method" for sampling of Rn-222 in underground uranium mine vents in 40 CFR 61 Appendix B Method 115. Though this method describes monitoring of underground mine ventilation , it can be applied to this situation. Again, track etch cups provide a more accurate means of determining the radon concentration when compared with grab sampling and as per the recommendations of 40 CFR 61, the continuous method is more applicable if there is an intermittent nature to the emissions. In this case, processes such as resin transfer could represent a transient increase in the radon concentration and it is more accurate to measure over a longer time frame rather than intermittently. The effluent from tanks will be calculated, as per the equation above, and reported semi-annually. Grab samples using scintillation cells may be collected for additional information as applicable.

Header House Source Terms

On a semi-annual basis track etch cups will be placed in a total of 5 header houses randomly selected throughout the wellfield area and varied for each 6-month period. The average concentration from these header houses will be calculated semi-annually and converted into a total activity emitted by multiplying this value by the actual number of header houses and the exhaust rate of the header houses as per the equation below. In the event that a header house is identified as having significantly higher radon gas concentration compared with the distribution of concentrations measured in the other locations, that header house result will be removed from the calculation of the average and the emissions from that header house calculated independently and added to the total activity.

*HH activity (µCi) = No. of HH * Average Radon concentration (µCi/ml) * Release rate (ml/min)*Time (min)*

Wellfield Source Terms

The only likely source of radon emitted from the wellheads and piping occurs when the wellheads are opened to the atmosphere to depressurize a wellhead that has become pressurized. Because this situation is transient and very short lived by nature, in addition to being highly localized, emissions from this situation will be measured through the use of grab samples collected with scintillation cells. Sampling of at least one well per quarter will be planned. These samples will be collected in the airstream being vented from the well. Currently, wells are vented at nominally 50 per month and venting lasts an average over about 10 minutes. This information will be used to estimate the release of radon from the wellfields using the following formula:

*Wellfield Activity ((μCi) = Average of semi-annual radon samples (μCi/ml) * Release rate (ml/min)*Nominal venting time (min) * No. wells per semi-annual period*

MILDOS-Area Estimate

In summary, the assessment of receptor doses will consider both actual and potential receptors. The actual receptors included local residents. Potential receptors were members of the public who may be at or near the site for greater than 50 hours per year. For the potential receptors an estimate was made of the hours spent at or near the site.

The estimate will include:

- Operations Summary
- Model Inputs and Assumptions
- Adjustment of Radon Venting Rate Using Environmental Data
- Meteorological Data
- Receptors and Identification of Maximally Exposed Individual
- Dose Estimate for Compliance Demonstration