

MILDOS Standard Results Report

Case Title: Disa HPSA Airborne

Version: MILDOS 4.21

File: C:\Users\brynerdmann\Environmental Restoration Group\Project Data - General\Disa\Radioactive Materials License\RAIs\MILDOS\Input\Disa_RAIs.mla

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Parameters

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Name	Value	Description
ambientT	283	Ambient temperature (K)
amMix	400	Annual average morning mixing height (m)
anemHeight	10	Anemometer height (m)
caseFile	place holder	not used
caseInfo	Sources are: feed pile, reject pile, Crusher (dry process), HPSA (wet process, but assuming its dry). Other assumptions include assuming these processes are all dry and open to the atmosphere (not enclosed in equipment in anyway). Weather data is default windrose from MILDOS. Sources are circular area sources equivalent to approximate surface area. Density of materials are 2.3 g/cc. No Th-232 or Th-232 progeny.	Additional user-specified information for the case under study
caseTitle	Disa HPSA Airborne	User-defined title for case under study
cowIngestRate	50	Ingestion rate (feed wet weight) of animals (beef cattle and milk cows) (kg/d)
cutoffHeight	50	Height above which to use Briggs urban dispersion coefficients (m)
decayPlants	14	Weathering decay half-life for loss of contamination from vegetation due to weathering processes (days)
fracEdibleLeafAnimal	1	Fraction of radionuclides reaching the edible portion of animal-consumed vegetation (unitless)
fracEdibleLeafHuman	1	Fraction of radionuclides reaching the edible portion of human-consumed leafy vegetables (unitless)
fracEdibleRoot	0.1	Fraction of radionuclides reaching the edible portion of human-consumed root vegetables (unitless)
fracHayInd	0.5	Fraction of livestock feed from stored hay for individual consumption (unitless)
fracHayPop	0.5	Fraction of livestock feed from stored hay for consumption by the general population (unitless)
fracMeatPrep	1	Fraction of radioactivity in meat remaining after food preparation (unitless)
fracMilkPrep	1	Fraction of radioactivity in milk remaining after food preparation (unitless)
fracPastureInd	0.5	Fraction of livestock feed from pasture grass for individual consumption (unitless)
fracPasturePop	0.5	Fraction of livestock feed from pasture grass for consumption by the general population (unitless)
fracRetain	0.2	Fraction of air-deposited radionuclides retained on vegetation (unitless)
fracVegPrep	0.5	Fraction of radioactivity in vegetables remaining after food preparation (unitless)
gridSize	5	Size of grid blocks to use when calculating air concentrations (m)
isPopExposure	False	Option to perform population ingestion calculations; true (1) or false (0)
isPopIngest	False	Option to perform population ingestion calculations; true (1) or false (0)
lfdNotes	Sample data	Stores user notes as needed
mapProj	Local Coordinates	Contains the current map projection being used for the map display; consists of a list of the UTM zone, the datum (WGS84 or NAD83), and the EPSG code for the projection (EPSG stands for what used to be the European Petroleum Survey Group)
mapState		String with serialized map state
maxDistCalcArea	1000	Maximum distance between an area source and receptor where the area source model will be used; the source will be treated as a point source beyond the specified distance (m)

meatProd	0	Farmland meat productivity (kg/yr)
metFreq	0	Frequency of time wind is blowing in a specific direction, under a specific stability category, at a given wind speed (unitless)
milkProd	0	Farmland milk productivity (kg/yr)
nPeople	0	Number of people in sector segment (persons)
partFrac	0	Fraction of particle size distribution for a given average particle size (unitless)
pmMix	1600	Annual afternoon mixing height (m)
rain	0	Rainfall rate (m/yr)
relRate	0	Nuclide release rate (Ci/yr)
resuspDepVel	0.01	Deposition velocity for particulates associated with the initial and final resuspension factors specified (m/s)
resuspFacFinal	1.00E-09	Final resuspension factor for determining resuspended air concentrations (1/m)
resuspFacInitial	1.00E-05	Initial resuspension factor for determining resuspended air concentrations (1/m)
resuspHalfLife	0.137	Resuspension factor decay half-life (yr)
soilArealDen	240	Areal surface density / effective surface soil density (kg/m ²)
soilConc	0	Nuclide soil concentration for area sources (pCi/g)
soilHalfLife	50	Environmental soil loss half-life (yr)
vegProd	0	Farmland vegetable productivity (kg/yr)
vGrow	60	Exposure time to radionuclides during the human-consumed vegetable growing season(d)
vGrowPasture	30	Exposure time to radionuclides during the animal-consumed vegetation growing season (d)
yieldMeat	3070	Farmland production rate of meat for population ingestion calculations (kg/km ² -yr)
yieldMilk	6710	Farmland production rate of milk for population ingestion calculations (kg/km ² -yr)
yieldVeg	55800	Farmland production rate of vegetation for population ingestion calculations (kg/km ² -yr)
yVeg	2	Yield density of human-consumed vegetation on farmland (kg/m ²)
yVegPasture	0.75	Yield density of animal-consumed vegetation on farmland (kg/m ²)
optOutTable	STD	Option that controls contents of the analysis output. STD - standard output only; STD_CUSTOM - standard and user specified custom output
optOutWho	1	Option that specifies what receptor type custom output to generate. 1 - individual receptors; 2 - population receptors; 3 - both individual and population receptors.

Receptors

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Name	x (m)	y (m)	z (m)	Age Group	Indoor Occupancy Fraction	Outdoor Occupancy Fraction	Indoor External Shielding Factor	Indoor Inhalation Shielding Factor	Consider Vegetation Pathway?	Vegetation Ingestion Rate (kg/yr)	Consider Meat Pathway?	Meat Ingestion Rate (kg/yr)	Consider Milk Pathway?	Milk Ingestion Rate (kg/yr)	No.	Rn-222 Indoor Fraction	User Input Rn-222 Outdoor Eq. Frac.?	Rn-222 Outdoor Eq. Fraction
Receptor 1	9.00E+01	2.60E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	1	5.00E-01	False	5.00E-01
Receptor 2	0.00E+00	9.00E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	2	5.00E-01	False	5.00E-01
Receptor 3	-5.00E+01	-7.00E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	3	5.00E-01	False	5.00E-01
Receptor 4	0.00E+00	-1.20E+02	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	4	5.00E-01	False	5.00E-01
Receptor 5	-2.50E+02	-1.50E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	5	5.00E-01	False	5.00E-01
Receptor 6	3.00E+02	-1.50E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	6	5.00E-01	False	5.00E-01
Receptor 7	0.00E+00	-2.50E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	7	5.00E-01	False	5.00E-01
Receptor 8	1.36E+02	2.00E+01	1.00E+00	Adult	0.00E+00	1.00E+00	0.00E+00	0.00E+00	False	1.05E+02	False	7.83E+01	False	1.30E+02	8	5.00E-01	False	5.00E-01

Sources

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Name	Source Type	Release Type	Particle Distribution Set	x (m)	y (m)	z (m)	Dispersion Coefficients	No.
Crusher	Area	Area	1	0.00E+00	0.00E+00	0.00E+00	Pasquill-Gifford	1
HPSA	Area	Area	1	0.00E+00	2.00E+01	0.00E+00	Pasquill-Gifford	2
Feed Pile	Area	Area	1	0.00E+00	-7.00E+01	0.00E+00	Pasquill-Gifford	3
Reject Pile	Area	Area	1	9.00E+01	2.00E+01	0.00E+00	Pasquill-Gifford	4

Source Release Terms Before Time Step Adjustment [Ci/y]

Source	Rn-222	U-238	Th-230	Ra-226	Pb-210	Rn-220	Th-232	Ra-228	Th-228
Crusher	0.00E+00	1.41E-05	1.41E-05	1.41E-05	1.41E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	0.00E+00	1.61E-05	1.61E-05	1.61E-05	1.61E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	0.00E+00	1.23E-04	1.23E-04	1.23E-04	1.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	0.00E+00	3.41E-05	3.41E-05	3.41E-05	3.41E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Source Type Specific Parameters

Area Sources

Name	Source Type	Area	Area Option	Radius	Rectangle Length	Rectangle Width	Rect Rotate	Rn-220 Release Rate	Rn-222 Release Rate	Particulate Release Rate	Erosion Option	Tailing Mass < 20 um (%)	Surface Roughness Height (m)	Particle Density (g/m3)	Water Content (wt.%)	Saltating Particle Diameter (m)	Water Volume	Soil Density	Contamination Depth	Water Content	Ra-226 Concentration in Ore (pCi/g)
Crusher	Area	415.47562843725	CIRC	11.5	N/A	N/A	N/A	0	0	0	True	3	0.1	2300000	0.1	0.0003	N/A	N/A	N/A	N/A	N/A
Feed Pile	Area	3631.6811075498	CIRC	34	N/A	N/A	N/A	0	0	0	True	3	0.1	2300000	0.1	0.0003	N/A	N/A	N/A	N/A	N/A
HPSA	Area	102.070345315132	CIRC	5.7	N/A	N/A	N/A	0	0	0	True	3	0.1	2300000	0.1	0.0003	N/A	N/A	N/A	N/A	N/A
Reject Pile	Area	3019.07054009979	CIRC	31	N/A	N/A	N/A	0	0	0	True	3	0.1	2300000	0.1	0.0003	N/A	N/A	N/A	N/A	N/A

Release Adjustments Over Time

Source	Particle Adjustment	Radon Adjustment
Time step	Time 1	Time 1
Duration (years)	1	1
Crusher	1	1
HPSA	1	1
Feed Pile	1	1
Reject Pile	1	1

Vegetable Ingestion Parameters

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Vegetation Type	Infant Vegetable Ingestion Fraction	Child Vegetable Ingestion Fraction	Teenager Vegetable Ingestion Fraction	Adult Vegetable Ingestion Fraction
Above Ground	0.00E+00	3.60E-01	3.80E-01	3.80E-01
Potatoes	0.00E+00	5.70E-01	5.50E-01	5.70E-01
Below Ground	0.00E+00	7.00E-02	7.00E-02	5.00E-02

Met JFD

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Direction	Stability Class	0.67 m/s	2.46 m/s	4.47 m/s	6.93 m/s	9.61 m/s	12.5 m/s
N	A	0.00024	0.00168	0.00120	0.00024	0.00000	0.00000
NNE	A	0.00048	0.00060	0.00084	0.00000	0.00000	0.00000
NE	A	0.00120	0.00277	0.00036	0.00012	0.00000	0.00000
ENE	A	0.00313	0.00192	0.00289	0.00108	0.00000	0.00000
E	A	0.00096	0.00373	0.00553	0.00096	0.00000	0.00000
ESE	A	0.00120	0.00649	0.00722	0.00084	0.00000	0.00000
SE	A	0.00072	0.01022	0.00337	0.00000	0.00000	0.00000
SSE	A	0.00132	0.00842	0.00433	0.00000	0.00000	0.00000
S	A	0.00108	0.00577	0.00132	0.00000	0.00000	0.00000

SSW	A	0.00144	0.00457	0.00517	0.00204	0.00000	0.00000
SW	A	0.00096	0.00120	0.00289	0.00096	0.00000	0.00000
WSW	A	0.00108	0.00349	0.00277	0.00000	0.00000	0.00000
W	A	0.00168	0.00661	0.00277	0.00000	0.00000	0.00000
WNW	A	0.00180	0.00673	0.00433	0.00036	0.00000	0.00000
NW	A	0.00192	0.00553	0.00216	0.00048	0.00000	0.00000
NNW	A	0.00084	0.00397	0.00228	0.00000	0.00000	0.00000
N	B	0.00024	0.00072	0.00060	0.00024	0.00000	0.00000
NNE	B	0.00000	0.00072	0.00012	0.00024	0.00000	0.00000
NE	B	0.00000	0.00060	0.00036	0.00012	0.00000	0.00000
ENE	B	0.00024	0.00048	0.00132	0.00036	0.00000	0.00000
E	B	0.00012	0.00060	0.00072	0.00024	0.00000	0.00000
ESE	B	0.00000	0.00180	0.00024	0.00012	0.00000	0.00000
SE	B	0.00072	0.00241	0.00012	0.00000	0.00000	0.00000
SSE	B	0.00060	0.00132	0.00048	0.00000	0.00000	0.00000
S	B	0.00060	0.00096	0.00036	0.00000	0.00000	0.00000
SSW	B	0.00084	0.00156	0.00253	0.00060	0.00000	0.00000
SW	B	0.00012	0.00108	0.00228	0.00108	0.00012	0.00000
WSW	B	0.00036	0.00204	0.00216	0.00024	0.00000	0.00000
W	B	0.00072	0.00144	0.00108	0.00012	0.00000	0.00000
WNW	B	0.00060	0.00156	0.00096	0.00048	0.00000	0.00000
NW	B	0.00072	0.00084	0.00048	0.00000	0.00000	0.00000
NNW	B	0.00096	0.00108	0.00072	0.00000	0.00000	0.00000
N	C	0.00024	0.00096	0.00024	0.00036	0.00000	0.00000
NNE	C	0.00036	0.00132	0.00060	0.00048	0.00000	0.00000
NE	C	0.00036	0.00036	0.00132	0.00012	0.00000	0.00000
ENE	C	0.00012	0.00048	0.00156	0.00048	0.00000	0.00000
E	C	0.00024	0.00060	0.00012	0.00000	0.00000	0.00000
ESE	C	0.00048	0.00060	0.00132	0.00000	0.00000	0.00000
SE	C	0.00024	0.00156	0.00024	0.00000	0.00000	0.00000
SSE	C	0.00060	0.00096	0.00024	0.00000	0.00000	0.00000
S	C	0.00000	0.00048	0.00036	0.00000	0.00000	0.00000
SSW	C	0.00048	0.00144	0.00216	0.00084	0.00000	0.00000
SW	C	0.00072	0.00204	0.00241	0.00096	0.00000	0.00000
WSW	C	0.00048	0.00180	0.00168	0.00060	0.00000	0.00000
W	C	0.00096	0.00265	0.00132	0.00012	0.00000	0.00000
WNW	C	0.00084	0.00084	0.00072	0.00036	0.00000	0.00000
NW	C	0.00036	0.00108	0.00072	0.00012	0.00000	0.00000
NNW	C	0.00048	0.00216	0.00048	0.00024	0.00000	0.00000
N	D	0.00241	0.00421	0.00277	0.00156	0.00000	0.00000
NNE	D	0.00325	0.00529	0.00349	0.00156	0.00000	0.00000
NE	D	0.00108	0.01058	0.01383	0.00216	0.00000	0.00000
ENE	D	0.00108	0.00589	0.00938	0.00289	0.00000	0.00000
E	D	0.00108	0.00445	0.00661	0.00180	0.00000	0.00000
ESE	D	0.00349	0.00577	0.00577	0.00096	0.00000	0.00000
SE	D	0.00216	0.00854	0.00445	0.00012	0.00000	0.00000
SSE	D	0.00265	0.00637	0.00397	0.00048	0.00012	0.00000

	D	0.00313	0.00541	0.00517	0.00024	0.00000	0.00000
SSW	D	0.00216	0.00818	0.00974	0.00313	0.00000	0.00000
SW	D	0.00385	0.01407	0.02044	0.01010	0.00108	0.00000
WSW	D	0.00830	0.01575	0.00746	0.00048	0.00000	0.00000
W	D	0.00770	0.01070	0.00685	0.00120	0.00000	0.00000
WNW	D	0.00746	0.00866	0.00890	0.00180	0.00000	0.00000
NW	D	0.00445	0.00818	0.00253	0.00012	0.00000	0.00000
NNW	D	0.00397	0.00746	0.00361	0.00060	0.00000	0.00000
N	E	0.00397	0.00637	0.00216	0.00012	0.00000	0.00000
NNE	E	0.00553	0.00529	0.00084	0.00036	0.00000	0.00000
NE	E	0.00228	0.00529	0.00277	0.00024	0.00000	0.00000
ENE	E	0.00204	0.00469	0.00385	0.00048	0.00000	0.00000
E	E	0.00216	0.00565	0.00349	0.00265	0.00120	0.00012
ESE	E	0.00253	0.00709	0.00469	0.00277	0.00000	0.00000
SE	E	0.00228	0.00445	0.00469	0.00024	0.00000	0.00000
SSE	E	0.00156	0.00649	0.00481	0.00036	0.00012	0.00000
S	E	0.00409	0.00697	0.00493	0.00060	0.00000	0.00000
SSW	E	0.00505	0.01118	0.00926	0.00228	0.00000	0.00000
SW	E	0.01022	0.01010	0.00349	0.00084	0.00012	0.00000
WSW	E	0.01575	0.00517	0.00084	0.00012	0.00000	0.00000
W	E	0.00770	0.00529	0.00120	0.00024	0.00012	0.00000
WNW	E	0.01094	0.00589	0.00265	0.00048	0.00024	0.00000
NW	E	0.00938	0.00577	0.00132	0.00036	0.00000	0.00000
NNW	E	0.00589	0.00625	0.00084	0.00024	0.00000	0.00000
N	F	0.00649	0.00541	0.00048	0.00000	0.00000	0.00000
NNE	F	0.00337	0.00313	0.00036	0.00000	0.00000	0.00000
NE	F	0.00060	0.00156	0.00000	0.00000	0.00000	0.00000
ENE	F	0.00084	0.00072	0.00132	0.00012	0.00000	0.00000
E	F	0.00180	0.00337	0.00156	0.00036	0.00000	0.00000
ESE	F	0.00325	0.00253	0.00108	0.00036	0.00000	0.00000
SE	F	0.00325	0.00589	0.00144	0.00000	0.00000	0.00000
SSE	F	0.00373	0.00397	0.00108	0.00000	0.00000	0.00000
S	F	0.00385	0.00228	0.00180	0.00060	0.00000	0.00000
SSW	F	0.00661	0.00445	0.00337	0.00060	0.00012	0.00000
SW	F	0.00902	0.00108	0.00168	0.00036	0.00000	0.00000
WSW	F	0.01443	0.00084	0.00096	0.00084	0.00024	0.00000
W	F	0.01299	0.00024	0.00000	0.00024	0.00012	0.00000
WNW	F	0.01804	0.00060	0.00000	0.00000	0.00000	0.00000
NW	F	0.01022	0.00048	0.00024	0.00000	0.00000	0.00000
NNW	F	0.00842	0.00313	0.00000	0.00000	0.00000	0.00000

Food Transfer Factors

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FOOD_TYPE	U	Th	Ra	Pb	Comments
Soil to Above Ground Vegetables	2.50E-03	4.20E-03	1.40E-02	4.00E-03	(pCi/kg plant - wet weight)/(pCi/kg soil - dry weight)
Soil to Potatoes	2.50E-03	4.20E-03	3.00E-03	4.00E-03	(pCi/kg plant - wet weight)/(pCi/kg soil - dry weight)
Soil to Below Ground Vegetables	2.50E-03	4.20E-03	1.40E-02	4.00E-03	(pCi/kg plant - wet weight)/(pCi/kg soil - dry weight)

Soil to Pasture Grass	2.50E-03	4.20E-03	1.80E-02	2.80E-02	(pCi/kg plant - wet weight)/(pCi/kg soil - dry weight)
Soil to Stored Animal Feed	2.50E-03	4.20E-03	8.20E-02	3.60E-02	(pCi/kg plant - wet weight)/(pCi/kg soil - dry weight)
Animal Feed to Meat	3.40E-04	2.00E-04	5.10E-04	7.10E-04	(pCi/kg per pCi/day)
Animal Feed to Milk	6.10E-04	5.00E-06	5.90E-04	1.20E-04	(pCi/L per pCi/day)

Normalized Air Concentrations (Chi/Q)

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Chi/Q values are in units of s/m³

Rcptr No.	Receptor	Gas	1.5	3	7.7	54	Distance (m)	Outdoor Rn-222 EF
Source: Crusher								
1	Receptor 1	4.88E-04	0.00E+00	1.60E-04	0.00E+00	0.00E+00	82	0
2	Receptor 2	2.00E-04	0.00E+00	9.14E-05	0.00E+00	0.00E+00	78	0
3	Receptor 3	1.59E-04	0.00E+00	8.39E-05	0.00E+00	0.00E+00	74	0
4	Receptor 4	1.35E-04	0.00E+00	4.95E-05	0.00E+00	0.00E+00	108	0
5	Receptor 5	1.99E-05	0.00E+00	9.30E-06	0.00E+00	0.00E+00	238	0
6	Receptor 6	4.58E-05	0.00E+00	1.12E-05	0.00E+00	0.00E+00	288	0
7	Receptor 7	2.72E-03	0.00E+00	1.55E-03	0.00E+00	0.00E+00	13	0
8	Receptor 8	2.01E-04	0.00E+00	6.30E-05	0.00E+00	0.00E+00	125	0
Source: HPSA								
1	Receptor 1	4.32E-04	0.00E+00	1.38E-04	0.00E+00	0.00E+00	95	0
2	Receptor 2	3.12E-04	0.00E+00	1.49E-04	0.00E+00	0.00E+00	64	0
3	Receptor 3	1.51E-04	0.00E+00	6.15E-05	0.00E+00	0.00E+00	97	0
4	Receptor 4	1.01E-04	0.00E+00	3.56E-05	0.00E+00	0.00E+00	134	0
5	Receptor 5	1.97E-05	0.00E+00	9.17E-06	0.00E+00	0.00E+00	246	0
6	Receptor 6	4.52E-05	0.00E+00	1.11E-05	0.00E+00	0.00E+00	296	0
7	Receptor 7	8.24E-04	0.00E+00	3.85E-04	0.00E+00	0.00E+00	39	0
8	Receptor 8	1.93E-04	0.00E+00	6.07E-05	0.00E+00	0.00E+00	130	0
Source: Feed Pile								
1	Receptor 1	4.32E-04	0.00E+00	1.57E-04	0.00E+00	0.00E+00	66	0
2	Receptor 2	7.04E-05	0.00E+00	2.88E-05	0.00E+00	0.00E+00	126	0
3	Receptor 3	5.37E-04	0.00E+00	3.39E-04	0.00E+00	0.00E+00	16	0
4	Receptor 4	8.77E-04	0.00E+00	4.42E-04	0.00E+00	0.00E+00	16	0
5	Receptor 5	2.37E-05	0.00E+00	1.01E-05	0.00E+00	0.00E+00	222	0
6	Receptor 6	5.04E-05	0.00E+00	1.23E-05	0.00E+00	0.00E+00	271	0
7	Receptor 7	1.24E-03	0.00E+00	7.58E-04	0.00E+00	0.00E+00	11	0
8	Receptor 8	1.61E-04	0.00E+00	5.30E-05	0.00E+00	0.00E+00	129	0
Source: Reject Pile								
1	Receptor 1	1.02E-03	0.00E+00	5.26E-04	0.00E+00	0.00E+00	15	0

2	Receptor 2	1.23E-04	0.00E+00	6.01E-05	0.00E+00	0.00E+00	83	0
3	Receptor 3	3.63E-05	0.00E+00	2.04E-05	0.00E+00	0.00E+00	135	0
4	Receptor 4	5.09E-05	0.00E+00	2.20E-05	0.00E+00	0.00E+00	135	0
5	Receptor 5	1.13E-05	0.00E+00	4.98E-06	0.00E+00	0.00E+00	310	0
6	Receptor 6	9.50E-05	0.00E+00	2.51E-05	0.00E+00	0.00E+00	181	0
7	Receptor 7	9.58E-05	0.00E+00	5.73E-05	0.00E+00	0.00E+00	69	0
8	Receptor 8	2.05E-03	0.00E+00	9.70E-04	0.00E+00	0.00E+00	15	0

Individual Receptor Pathway Doses : Time Step 1

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Receptor: Receptor 1

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	1.09E-04	2.41E-08	4.08E-01	0.00E+00	0.00E+00	0.00E+00	4.08E-01
2	HPSA	1.07E-04	2.36E-08	4.01E-01	0.00E+00	0.00E+00	0.00E+00	4.01E-01
3	Feed Pile	9.34E-04	2.06E-07	3.50E+00	0.00E+00	0.00E+00	0.00E+00	3.50E+00
4	Reject Pile	8.66E-04	1.91E-07	3.25E+00	0.00E+00	0.00E+00	0.00E+00	3.25E+00
-	Total	2.02E-03	4.45E-07	7.55E+00	0.00E+00	0.00E+00	0.00E+00	7.56E+00

Receptor: Receptor 2

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	6.21E-05	1.39E-08	2.35E-01	0.00E+00	0.00E+00	0.00E+00	2.35E-01
2	HPSA	1.16E-04	2.58E-08	4.38E-01	0.00E+00	0.00E+00	0.00E+00	4.38E-01
3	Feed Pile	1.71E-04	3.92E-08	6.58E-01	0.00E+00	0.00E+00	0.00E+00	6.58E-01
4	Reject Pile	9.90E-05	2.32E-08	3.88E-01	0.00E+00	0.00E+00	0.00E+00	3.88E-01
-	Total	4.48E-04	1.02E-07	1.72E+00	0.00E+00	0.00E+00	0.00E+00	1.72E+00

Receptor: Receptor 3

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	5.70E-05	1.29E-08	2.17E-01	0.00E+00	0.00E+00	0.00E+00	2.17E-01
2	HPSA	4.79E-05	1.09E-08	1.84E-01	0.00E+00	0.00E+00	0.00E+00	1.84E-01
3	Feed Pile	2.01E-03	4.46E-07	7.56E+00	0.00E+00	0.00E+00	0.00E+00	7.57E+00
4	Reject Pile	3.37E-05	8.94E-09	1.45E-01	0.00E+00	0.00E+00	0.00E+00	1.45E-01
-	Total	2.15E-03	4.79E-07	8.11E+00	0.00E+00	0.00E+00	0.00E+00	8.11E+00

Receptor: Receptor 4

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	3.36E-05	7.78E-09	1.30E-01	0.00E+00	0.00E+00	0.00E+00	1.31E-01
2	HPSA	2.77E-05	6.55E-09	1.09E-01	0.00E+00	0.00E+00	0.00E+00	1.09E-01
3	Feed Pile	2.63E-03	5.84E-07	9.90E+00	0.00E+00	0.00E+00	0.00E+00	9.90E+00
4	Reject Pile	3.63E-05	9.57E-09	1.56E-01	0.00E+00	0.00E+00	0.00E+00	1.56E-01
-	Total	2.72E-03	6.08E-07	1.03E+01	0.00E+00	0.00E+00	0.00E+00	1.03E+01

Receptor: Receptor 5

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	6.32E-06	1.81E-09	2.89E-02	0.00E+00	0.00E+00	0.00E+00	2.89E-02
2	HPSA	7.14E-06	2.05E-09	3.27E-02	0.00E+00	0.00E+00	0.00E+00	3.27E-02
3	Feed Pile	6.01E-05	2.23E-08	3.39E-01	0.00E+00	0.00E+00	0.00E+00	3.39E-01
4	Reject Pile	8.21E-06	3.44E-09	5.13E-02	0.00E+00	0.00E+00	0.00E+00	5.13E-02
-	Total	8.18E-05	2.96E-08	4.52E-01	0.00E+00	0.00E+00	0.00E+00	4.52E-01

Receptor: Receptor 6

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	7.64E-06	2.11E-09	3.39E-02	0.00E+00	0.00E+00	0.00E+00	3.39E-02
2	HPSA	8.63E-06	2.39E-09	3.84E-02	0.00E+00	0.00E+00	0.00E+00	3.84E-02
3	Feed Pile	7.28E-05	2.52E-08	3.88E-01	0.00E+00	0.00E+00	0.00E+00	3.88E-01
4	Reject Pile	4.13E-05	1.08E-08	1.75E-01	0.00E+00	0.00E+00	0.00E+00	1.75E-01
-	Total	1.30E-04	4.04E-08	6.36E-01	0.00E+00	0.00E+00	0.00E+00	6.36E-01

Receptor: Receptor 7

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	1.05E-03	2.33E-07	3.95E+00	0.00E+00	0.00E+00	0.00E+00	3.95E+00
2	HPSA	3.00E-04	6.67E-08	1.13E+00	0.00E+00	0.00E+00	0.00E+00	1.13E+00
3	Feed Pile	4.50E-03	1.00E-06	1.70E+01	0.00E+00	0.00E+00	0.00E+00	1.70E+01
4	Reject Pile	9.44E-05	2.25E-08	3.75E-01	0.00E+00	0.00E+00	0.00E+00	3.75E-01
-	Total	5.95E-03	1.32E-06	2.24E+01	0.00E+00	0.00E+00	0.00E+00	2.24E+01

Receptor: Receptor 8

Doses are in mrem

No.	Source	Groundshine	Cloudshine	Inhalation	Plant Ingestion	Meat Ingestion	Milk Ingestion	Total
1	Crusher	4.28E-05	1.15E-08	1.87E-01	0.00E+00	0.00E+00	0.00E+00	1.87E-01
2	HPSA	4.72E-05	1.14E-08	1.89E-01	0.00E+00	0.00E+00	0.00E+00	1.89E-01
3	Feed Pile	3.15E-04	8.58E-08	1.38E+00	0.00E+00	0.00E+00	0.00E+00	1.38E+00
4	Reject Pile	1.60E-03	3.55E-07	6.01E+00	0.00E+00	0.00E+00	0.00E+00	6.01E+00
-	Total	2.00E-03	4.63E-07	7.77E+00	0.00E+00	0.00E+00	0.00E+00	7.77E+00

40CFR190 Organ Doses

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40CFR190 Organ Doses: Time Step 1

Receptor: Receptor 1

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	2.02E-03	2.02E-03	2.02E-03	2.02E-03	2.02E-03
Cloudshine	4.45E-07	4.45E-07	4.45E-07	4.45E-07	4.45E-07
Inhalation	7.55E+00	1.33E+02	1.75E+01	1.22E+00	6.31E-01
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	7.56E+00	1.33E+02	1.75E+01	1.22E+00	6.33E-01

Receptor: Receptor 2

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	4.48E-04	4.48E-04	4.48E-04	4.48E-04	4.48E-04
Cloudshine	1.02E-07	1.02E-07	1.02E-07	1.02E-07	1.02E-07
Inhalation	1.72E+00	2.97E+01	4.05E+00	2.89E-01	2.48E-01
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.72E+00	2.97E+01	4.05E+00	2.89E-01	2.48E-01

Receptor: Receptor 3

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	2.15E-03	2.15E-03	2.15E-03	2.15E-03	2.15E-03
Cloudshine	4.79E-07	4.79E-07	4.79E-07	4.79E-07	4.79E-07
Inhalation	8.11E+00	1.42E+02	1.89E+01	1.33E+00	8.05E-01
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	8.11E+00	1.42E+02	1.89E+01	1.33E+00	8.07E-01

Receptor: Receptor 4

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	2.72E-03	2.72E-03	2.72E-03	2.72E-03	2.72E-03
Cloudshine	6.08E-07	6.08E-07	6.08E-07	6.08E-07	6.08E-07
Inhalation	1.03E+01	1.80E+02	2.40E+01	1.69E+00	1.10E+00
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.03E+01	1.80E+02	2.40E+01	1.69E+00	1.10E+00

Receptor: Receptor 5

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	8.18E-05	8.18E-05	8.18E-05	8.18E-05	8.18E-05
Cloudshine	2.96E-08	2.96E-08	2.96E-08	2.96E-08	2.96E-08
Inhalation	4.52E-01	5.43E+00	1.25E+00	1.11E-01	4.18E-01
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	4.52E-01	5.43E+00	1.25E+00	1.11E-01	4.18E-01

Receptor: Receptor 6

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
Cloudshine	4.04E-08	4.04E-08	4.04E-08	4.04E-08	4.04E-08
Inhalation	6.36E-01	8.64E+00	1.68E+00	1.41E-01	4.37E-01
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	6.36E-01	8.64E+00	1.68E+00	1.41E-01	4.37E-01

Receptor: Receptor 7

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03

Cloudshine	1.32E-06	1.32E-06	1.32E-06	1.32E-06	1.32E-06
Inhalation	2.24E+01	3.93E+02	5.23E+01	3.67E+00	2.26E+00
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	2.24E+01	3.93E+02	5.23E+01	3.67E+00	2.27E+00

Receptor: Receptor 8

Doses are in mrem

Pathway	Effective	Bone	Lung	Liver	Kidney
Groundshine	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03
Cloudshine	4.63E-07	4.63E-07	4.63E-07	4.63E-07	4.63E-07
Inhalation	7.77E+00	1.33E+02	1.84E+01	1.33E+00	1.35E+00
Plant Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Meat Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Milk Ingestion	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	7.77E+00	1.33E+02	1.84E+01	1.33E+00	1.35E+00

Effluent Concentration Limit (ECL) By Receptor Location

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(Ratio of Calculated Air Concentration with ECL)

ECL Ratios: Time Step 1

Receptor: Receptor 1

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.93E-03	2.32E-03	5.79E-03	1.29E-04	1.92E-04	1.10E-06	4.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	1.90E-03	2.28E-03	5.69E-03	1.26E-04	1.89E-04	1.08E-06	4.80E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	1.65E-02	1.98E-02	4.96E-02	1.10E-03	1.65E-03	9.42E-06	4.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	1.53E-02	1.84E-02	4.60E-02	1.02E-03	1.53E-03	8.73E-06	3.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	3.57E-02	4.28E-02	1.07E-01	2.38E-03	3.56E-03	2.03E-05	9.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 2

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.10E-03	1.32E-03	3.30E-03	7.33E-05	1.10E-04	1.73E-06	7.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	2.06E-03	2.47E-03	6.18E-03	1.37E-04	2.05E-04	2.25E-06	1.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	3.02E-03	3.63E-03	9.07E-03	2.02E-04	3.02E-04	1.11E-05	4.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	1.75E-03	2.10E-03	5.26E-03	1.17E-04	1.75E-04	9.73E-06	4.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	7.93E-03	9.52E-03	2.38E-02	5.29E-04	7.92E-04	2.49E-05	1.10E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 3

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.01E-03	1.21E-03	3.03E-03	6.73E-05	1.01E-04	2.30E-06	1.02E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	8.48E-04	1.02E-03	2.54E-03	5.65E-05	8.46E-05	2.74E-06	1.22E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	3.56E-02	4.28E-02	1.07E-01	2.38E-03	3.56E-03	3.14E-05	1.40E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	5.96E-04	7.15E-04	1.79E-03	3.97E-05	5.94E-05	1.01E-05	4.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Total	3.81E-02	4.57E-02	1.14E-01	2.54E-03	3.80E-03	4.65E-05	2.07E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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Receptor: Receptor 4

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	5.95E-04	7.14E-04	1.79E-03	3.97E-05	5.94E-05	2.64E-06	1.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	4.91E-04	5.89E-04	1.47E-03	3.27E-05	4.90E-05	3.02E-06	1.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	4.65E-02	5.58E-02	1.39E-01	3.10E-03	4.64E-03	5.79E-05	2.57E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	6.42E-04	7.70E-04	1.93E-03	4.28E-05	6.40E-05	1.04E-05	4.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	4.82E-02	5.78E-02	1.45E-01	3.21E-03	4.81E-03	7.40E-05	3.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 5

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.12E-04	1.34E-04	3.36E-04	7.46E-06	1.12E-05	2.70E-06	1.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	1.26E-04	1.52E-04	3.79E-04	8.42E-06	1.26E-05	3.09E-06	1.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	1.06E-03	1.28E-03	3.19E-03	7.09E-05	1.06E-04	5.85E-05	2.60E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	1.45E-04	1.74E-04	4.36E-04	9.69E-06	1.45E-05	1.05E-05	4.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.45E-03	1.74E-03	4.34E-03	9.65E-05	1.44E-04	7.48E-05	3.33E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 6

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.35E-04	1.62E-04	4.06E-04	9.01E-06	1.35E-05	2.78E-06	1.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	1.53E-04	1.83E-04	4.58E-04	1.02E-05	1.52E-05	3.17E-06	1.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	1.29E-03	1.55E-03	3.87E-03	8.59E-05	1.29E-04	5.92E-05	2.63E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	7.31E-04	8.77E-04	2.19E-03	4.87E-05	7.30E-05	1.09E-05	4.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	2.31E-03	2.77E-03	6.92E-03	1.54E-04	2.30E-04	7.61E-05	3.38E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 7

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	1.86E-02	2.24E-02	5.59E-02	1.24E-03	1.86E-03	1.34E-05	5.96E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	5.30E-03	6.37E-03	1.59E-02	3.54E-04	5.29E-04	6.20E-06	2.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	7.96E-02	9.56E-02	2.39E-01	5.31E-03	7.95E-03	1.05E-04	4.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	1.67E-03	2.00E-03	5.01E-03	1.11E-04	1.67E-04	1.19E-05	5.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	1.05E-01	1.26E-01	3.16E-01	7.02E-03	1.05E-02	1.36E-04	6.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Receptor: Receptor 8

ECL ratios are unitless

Source	U-238	U-234	Th-230	Ra-226	Pb-210	Bi-210	Po-210	Rn-222	Th-232	Th-228	Ra-228	Rn-220
Crusher	7.58E-04	9.10E-04	2.27E-03	5.05E-05	7.57E-05	1.38E-05	6.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
HPSA	8.36E-04	1.00E-03	2.51E-03	5.57E-05	8.34E-05	6.67E-06	2.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Feed Pile	5.57E-03	6.68E-03	1.67E-02	3.71E-04	5.56E-04	1.08E-04	4.79E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Reject Pile	2.83E-02	3.39E-02	8.49E-02	1.89E-03	2.82E-03	2.80E-05	1.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total	3.54E-02	4.25E-02	1.06E-01	2.36E-03	3.54E-03	1.56E-04	6.95E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00