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Atlas Minerals
Division of Atlas Corporation

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CERTIFIED P126 713 436

August 31, 1989

Mr. Ramon E. Hall, Director
Uranium Recovery Field Office
Region IV
U.S. Nuclear Regulatory Commission
P.O. Box 25325
Denver, Colorado 80225

Re: Source Material License SUA-917,
Docket No. 40-3453, License
Condition No. 29, 1988 Annual ALARA
Audit

Dear Mr. Hall:

This transmits five (5) copies of the Annual ALARA for calendar year 1988 as required by License Condition 29 of our renewed Source Material License No. SUA-917.

Please contact me at the above address or Dale Edwards at our Moab facility if you have any questions.

Sincerely,

Richard E. Blubaugh

Richard E. Blubaugh
Regulatory Affairs Manager

REB:bjg
Enclosures
cc: M. S. Davis
D. L. Edwards

89-0981

VAMD

1988 ALARA AUDIT REPORT

OF THE

ATLAS MINERALS

DIVISION OF ATLAS CORPORATION

RADIATION PROTECTION PROGRAM

AT THE

MOAB MILL

August 1989

D. L. Edwards
M. S. Davis
R. E. Blubaugh

89-0981

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EXECUTIVE SUMMARY

In compliance with Source Material License No. SUA-917, License Condition 29, an ALARA audit was conducted for calendar year 1988.

The findings of this audit are presented below.

1. As is shown by this audit, occupational exposure to radiation and radioactive materials is satisfactorily controlled, and in some cases being lowered.

2. There appears to be no significant differences in surface water quality from above the mill with that below the mill.

3. There were some increasing trends in Rn-222 in all of the environmental monitoring stations. Station 2 indicates an exceedance of 240% avg. MPC. Station 1 indicates an exceedance of 163% avg. MPC. Soil cover may be required to effectively reduce Rn-222 concentration.

   There is also an increasing trend in gamma radiation in #2 and #3 environmental TLD stations at the perimeters of the mill. A soil cover would also serve to reduce gamma radiation.

   Both Rn-222 concentrations and gamma radiation levels will continue to increase as the beach area increases due to evaporation.

4. Although the dose equivalent for all employees is very low, a TLD badge is worn at all times by each employee who is required to perform his work in the mill area.

   The dose equivalent shows a significant increasing trend for the high, and a weakly increasing trend for the average.

5. Breathing zone samples are taken each month of all employees who work in the mill area, and this practice will be continued during standby.

6. There seems to be a difference in vegetation, sampled at the nearest pasture and the background station. The pasture is lower in both Ra-226 and Pb-210 concentration.

7. The results from the soil samples showed either no trends or showed decreasing trends on all samples.

8. Trends in the ground water wells show the following:

   Radiological

   U-Nat shows significant increasing trend in three monitor wells, moderate increasing trend in two, and a weak increasing trend in one.

   Th^{230} shows variable decreasing trend in five monitor wells, and two show no trend.

   Ra^{226} shows variable decreasing trend in four monitor wells, with three wells showing no trend.

Pb^{210} shows variable decreasing trend in four monitor wells, with three showing no trend.

Po^{210} shows variable decreasing trend in all monitor wells, except one and it shows no trend.

Non-Radiological

SO_4 shows variable increasing trends for five wells, one well shows a weak decreasing trend and one shows no trend.

Cl shows none or variable decreasing trend.

NO_3 shows weak increasing or no trends.

As shows variable decreasing trend.

Se shows two wells with decreasing trends and the rest shows no trend.

TDS shows four wells with variable increasing trend, and three show none.

pH shows one well with an increasing trend, and the rest show variable decreasing trends.

Conductivity shows four wells with none and three wells with increasing trends.

9. Although the radon daughter samples are low, all areas showed variable increasing trends with the exception of one and it showed no trend.

10. In general, the radiation control and environmental monitoring programs continue to be functioning well. Efforts to improve will continue to be made where it is appropriate and reasonable to do so.

PROCEDURES FOR TREND ANALYSIS

The data was converted to a percentage of the applicable standard, guide limit, or maximum permissible concentration, and, also, linear regression analysis is applied using algorithm built into the Hewlett-Packard 11C hand calculator.

The designation of significance is based on the value of the coefficient of determination, which is used to determine how well the straight line fits the data. To aid in the interpretation and use of the coefficient of determination, the following assumptions were made.

Value of the Coefficient of Determination	Assumption
1.0 - 0.8	Significant linear trend
0.7 - 0.8	Moderate linear trend
0.5 - 0.7	Weak linear trend
0.0 - 0.5	No linear trend

I. SCOPE

In compliance with Source Material License No. SUA-917, License Condition 29, an ALARA (As Low As Reasonably Achievable) audit has been conducted for the calendar year 1988.

The audit was conducted using the guidelines presented in Regulatory Guide 8.31, "Information Relevant to Insuring that Occupational Radiation Exposures at Uranium Mills Will be as Low as Reasonably Achievable," and complies with Source Material License No. SUA-917, License Condition 29, which states:

> "A copy of the report documenting the annual ALARA audit in accordance to Section 5.1.4 of the renewal application dated May 31, 1984, shall be submitted to the U.S. NRC, Uranium Recovery Field Office, for review within 30 days of completion of the audit report."

II. REVIEW OF PREVIOUS AUDIT

The following is a follow-up of the items found in last year's audit:

Item 1

Although there is no problem with collecting urine samples during this standby period, additional emphasis will need to be focused on this procedure when the mill resumes operation. This attention will be in the form of training, supervisory surveillance and disciplinary action where appropriate. (Holdover item)

Action

Because the mill is not going to start-up again, this item is closed out.

Item 2

Close surveillance needs to be maintained on handling of drums to ensure a minimum of denting. (Holdover item)

Action

Because the mill is not going to resume operations this item is closed out.

Item 3

As is shown by this audit, occupational exposure to radiation and radioactive materials is satisfactorily controlled, and in some cases, being lowered. However, where reasonable, reductions will continue to be pursued.

Action

As is shown by this audit, exposure to radiation and radioactive materials is being controlled, and in some cases being lowered.

Item 4

There appears to be no significant differences in surface water quality from above the mill with that below the mill. The samples analyzed for NO_3 in 1987 indicated an increase below the mill. However this one sample is insufficient to establish a trend. Also, it is possible that the river is being impacted from the farming operation across the river.

Action

Additional sample results of NO_3 showed that there were no significant differences in NO_3 below the mill than that above the mill.

Item 5

There were some increasing trends in Rn-222 in all of the environmental monitoring stations, with the exception of station 3 which shows none. Station 2 indicates an exceedance of 232.5% avg. MPC. Soil cover may be required to effectively reduce Rn-222 concentration since NRC will not allow addition of water to the pond.

There is also an increasing trend in gamma radiation in #3 environmental TLD station at the perimeter of the mill. A soil cover would also serve to reduce gamma radiation. Both Rn-222 concentrations and gamma

radiation levels will continue to increase as the beach area increases due to evaporation.

Action

There is still an increasing trend in Rn-222. We did some more clean-up of blowing tailings around the pond, and #2 and #3 monitoring stations show an increasing trend in gamma radiation.

As the tailings pond evaporates more and more, there will be more exposed beach area that will produce higher Rn-222 and gamma levels. Arches and our background station have also seen an increasing trend in Rn-222.

We are evaluating placing an interim tailings cover of soil on the pond beach area to lower the Rn-222 and gamma concentrations.

Item 6

Although the dose equivalent for all employees is very low, the TLD badge is worn at all times by each employee who is required to perform his work in the mill area.

Action

There was a slight increasing trend in the dose equivalent dose, but they are so low no action is required.

Item 7

The results of the breathing zone samples taken each month of all employees who worked in the mill area are equivalent with the previous method and this practice will be continued during standby.

Action

No action warranted.

Item 8

There seems to be a slight difference in vegetation samples, sampled at the nearest pasture and the background station. The pasture is slightly higher in both Rn^{226} and Pb^{210}.

Action

The results of the 1988 vegetation samples showed that the background station samples were higher in both Ra^{226} and Pb^{210} than the nearest pasture. No action warranted.

Item 9

The results from the soil samples showed either no trends or showed decreasing trends on all samples.

Action

No action warranted.

Item 10

Trends in the ground water wells show the following:

Radiological

U-Nat shows significant increasing trend in three monitor wells, moderate increasing trend in two.

Th^{230} shows variable decreasing trend in six wells and none in another.

Ra^{226} shows one well with a weak increasing trend, and all others show decreasing trends or none.

Pb^{210} shows either weak decreasing trends or none.

Po^{210} shows one well with a weak increasing trend, and all others show none or variable decreasing trend.

Non-radiological

SO_4 shows variable increasing trends in five wells, and two show weak decreasing trends.

C_l shows none or weak decreasing trend.

NO_3 shows variable increasing or no trends.

As shows significant decreasing trend.

Se shows variable decreasing trend.

TDS shows five wells with increasing trend, and two with none.

pH shows none or variable decreasing trend.

Conductivity shows four wells with none and three wells with increasing trends.

Action

It is important to note that these apparent increasing trends are all below the MPC and should have no detrimental impact to human health or to the environment.

Monthly and quarterly sampling has been done, and quarterly sampling will continue to be done.

Trends will be discussed further in the ground water part of this audit.

Revisions have been done to our ground water monitoring program. We have three new monitor wells AMM-1, AMM-2, and AMM-3. These three new wells and ATP-2S will now be our ground water monitoring wells.

Item 11

In general, the radiation control and environmental monitoring programs continue to be functioning well. Efforts to improve will continue to be made where it is appropriate and reasonable to do so.

Action

We are still improving, and efforts will continue to be made where it is appropriate and reasonable to do so.

III. AUDIT RESULTS

The results of the ALARA audit are presented below and are divided into two groups:

(1) Mill Radiological Protection and Monitoring, and
(2) Environmental Monitoring.

A. Mill Radiological Protection and Monitoring

1. **Employee Exposure to U-Nat**

The exposures are determined on a monthly frequency, but are calculated on a weekly basis. Determinations of radiological exposures appear to be correctly calculated and complete.

The monthly averages of percent of the monthly ore guide limit range from 0.3 to 0.9%, and the monthly average for the year is 0.63%.

The presence or absence of trends is based on linear regression analysis.

There were no trends indicated on the U-Nat exposures in Table 1.

2. **Employee Exposure to Radon Daughters**

The exposures are determined on a monthly basis for all mill operational personnel. The monthly averages of percent of the monthly limit (0.33 WLM), range from 1.5 to 5.8%, and the average of the monthly averages is 3.36%.

The presence or absence of trends is based on linear regression analysis.

There were no trends indicated on the radon daughter exposures in Table 2.

3. **Bioassays (Indirect) Urine Analysis**
Since there was no soluble uranium work performed in 1988, there was no need to perform any urine analysis.

4. **Bioassays (Direct) In-vivo Lung Counting**
Since there has not been any soluble uranium or uranium ore processing done, in-vivo lung counting has not been necessary.

5. **Personnel Gamma-Beta Dose**
All mill operational personnel wear a TLD badge for the whole year. They are exchanged quarterly.

The presence or absence of trends, are based on linear regression analysis.

There was a weak increase trend indicated for the average gamma dose. The beta dose was zero. Table 3 summarizes this information.

6. **Mill Gamma Readings**
The mill gamma readings are taken on a quarterly frequency. Four areas show a decreasing trend, and two areas show a no trend. There is one area that shows a moderate increasing trend. The

presence or absence of trends are based on linear regression analysis. Tables 4 and 4A summarizes this information.

7. **Surface Contamination**
Surface contamination surveys are done every week in all eating areas throughout the mill. This now includes offices and lunchroom during the standby operations.

The presence or absence of trends is based on linear regression analysis.

The high and average measurements showed decreasing trend. Table 5 summarizes this data.

8. **Surface Contamination Surveys for Release of Equipment for Unrestricted Use**
All equipment that has been in the mill operation is checked for total and removable contamination. The presence or absence of trends is based on linear regression analysis. The measurements show no trend. Table 6 summarizes this data.

9. **Yellowcake Stack Samples**
Because of the shutdown status of the mill, there were no stacks sampled in 1988.

10. **Ore Stack Samples**
Because of the shutdown status of the mill, there were no stacks sampled in 1988.

11. **U-Nat General Air Samples (Area Samples)**
There were seven locations throughout the mill that were sampled. There were five locations sampled monthly and two locations sampled quarterly.

The presence or absence of trends is based on linear regression analysis.

All of the locations throughout the mill with the exception of two showed decreasing trends. The one showed no trend, one showed a weak increasing trend. The data is summarized in Tables 7 and 7A.

12. **Radon Daughter Air Samples**
Radon daughter air samples are sampled in the same locations throughout the mill as the U-Nat air samples are. The areas were sampled on a quarterly frequency.

The presence or absence of trends is based on linear regression analysis.

There were six areas that showed an increasing trend, one that showed no trend. The data is summarized in Tables 8 and 8A.

13. **Routine Breathing Zone Air Samples**
There were seven air samples taken each month.

The presence or absence of trends is based on linear regression analysis.

All analyses showed no trends. The data is summarized in Table 9.

14. **Visual Inspection Report**

The Radiation Control Coordinator conducts a weekly walk-through visual inspection of all areas in the mill to ensure that good radiation safety procedures and housekeeping and clean-up practices are being carried out in the mill. Copies of the weekly inspection report are distributed to the Manager of Moab Operations, and to the Regulatory Affairs Manager. Corrective action is specified on the report. The results of these inspections are summarized in the monthly report. The weekly inspections continue to appear to be achieving the desired ALARA results.

Also, all of the elements of the radiation protection program are summarized in the monthly report to the Manager of Moab Operations, and the Regulatory Affairs Manager.

Possible trends are noted for follow-up surveillance and corrective action if necessary.

15. Training

The topics covered in training sessions presented to operational personnel were compared to the radiation safety training outline in Regulatory Guide 8.31 and found to be equivalent in content.

16. Radiation Safety Meetings

Radiation safety meetings are not routinely held at the Atlas mill, nor are radiation safety topics routinely included in the industrial safety meetings held at the mill. When a specific radiation topic needs to be brought to the attention of individual mill workers, the Radiation Control Coordinator conveys the information to the mill supervisors, who then instruct their men on the radiation safety topic. This method of communication through the mill supervisors provides instruction and discipline directly from the same person who evaluates the performance of each mill worker. Although this method of communication is a variation to the use of safety meetings as recommended in Regulatory Guide 8.31, the system works well for Atlas.

17. Overexposure

No overexposures occurred in 1988.

18. Operating procedures

The Radiation Safety Procedures Manual presents all the procedures for the radiological and environmental sampling and monitoring programs. Under Source Material License No. SUA-917, Condition 23 of the latest license, the procedures are to be reviewed and revised every year by the Regulatory Affairs Manager, Manager of Moab Operations and Radiation Control Coordinator.

The mill operating procedures for specific tasks conducted by mill operators were reviewed by the Radiation Control Coordinator in June 1989. These operating procedures are now being revised to fit the shutdown status operation of the mill personnel. At the time they are finished, the Regulatory Affairs Manager, Manager of Moab Operations and Radiation Control Coordinator will review them for radiation safety.

19. **Radiological Control Equipment**

The air samplers are being calibrated at least quarterly. Many are being calibrated monthly and some are calibrated before each use. The counters and scalers are being calibrated at least quarterly and semi-annually.

The respiratory protection program is being conducted according to Regulatory Guide 8.15. The respirators are being maintained and inspected properly.

20. **Recommendations to Reduce Exposure ALARA**

Atlas has an ALARA Committee consisting of the Manager of Moab Operations, Regulatory Affairs Manager, and the Radiation Control Coordinator.

Even though the mill is down, the ALARA Committee has met on at least one occasion and discussed ways to reduce exposure and maintain good ALARA philosophy.

Atlas also has ALARA Work Order Forms which have worked out quite well for initiating corrective actions which will reduce exposures ALARA. The use of these forms is still in use, even though the mill is on standby.

In our radiation training classes, we are stressing good housekeeping, aimed at reducing contamination in accordance with ALARA philosophy. Also during the meeting, the Radiation Control Coordinator discussed where eating and smoking is permitted, such as offices and lunchrooms.

The Radiation Safety Department is maintaining a check-off sheet for all items completed by the department. It helps in spotting a specific test or survey to ensure it will be completed when required.

B. Environmental Monitoring

1. Environmental Continuous Air Samples

There are three continuous air samplers around the perimeter of the mill, one at Arches Headquarters, and also one down the river which is used as a background station. The filter papers are changed weekly and saved for quarterly composites, which are then sent off to a commercial laboratory for analysis.

The presence or absence of trends is based on linear regression analysis.

All of the air samplers showed an increasing trend in Rn^{222}.

All of the air samplers showed variable decreasing trends in TH^{230}.

Samplers, #1, #2, #3 and #4 showed variable decreasing trend in U-nat. Sampler #6 showed no trend.

Samplers #2, #3, #4 and #6 showed variable decreasing trends in Ra^{226}. Sampler #1 showed no trend. Table 10 summarizes data.

2. Surface Water

Surface water samples are collected from two locations. One, 1/4 mile above the mill, and the other just below the mill. The samples are collected on a quarterly frequency.

The presence or absence of trends is based on linear regression analysis.

1/4 Mile Above the Mill

There were variable increasing trends in Ra^{226}, Pb^{210}, SO_4, Cl, and TDS.

There were variable decreasing trends in Th^{230}, As, Cu, and Se. All other constituents showing none.

Downstream from the Mill

There were variable increasing trends in the Th^{230}, SO_4, Cl, and TDS.

There were variable decreasing trends in U-nat, and Pb^{210}. All other constituents showing none.

3. Ground Water

There are a total of seven old ground water well locations in six wells (one has a dual completion), from which ground water was collected in 1988. Wells designated as MW-1R, MW-2R, MW-3, ATP-1S, ATP-2S and ATP-2D are located between the tailings pond and the Colorado River. ATP-3 is located at the northwest boundary of the mill, upgradient from the tailings pond, and serves as the background well.

In the fall of 1988 we completed three new wells AMM-1, AMM-2, and AMM-3, but because of the only

one sampling we have nothing to compare them to, so they are not included in this report. They will be on next year's audit.

The presence or absence of trends is based on linear regression analysis.

MW-1R

There was a significant increasing trend in SO_4 and TDS. There was a moderate increasing trend in U-Nat. There was a weak increasing trend in NO_3 and conductivity. There was a significant decreasing trend in Po^{210}. There was a moderate decreasing trend in Ra^{226}, Cl, and As. There was a weak decreasing trend in Th^{230}, Pb^{210}, and pH. All other constituents showed none.

MW-2R

There was a significant increasing trend in U-Nat and SO_4. There was a moderate increasing trend in Pb^{210}. There was a weak increasing trend in NO_3 and TDS. There was a significant decreasing trend in Th^{230} and As. There was a weak decreasing trend in pH. All other constituents showed none.

MW-3

There was a significant increasing trend in U-Nat, SO_4, TDS and conductivity. There was a significant decreasing trend in Th^{230}. There was a moderate decreasing trend in Ra^{226}, and pH. There was a weak decreasing trend in gross beta

gamma, Po^{210}, and Cl, and As. All other constituents showed none.

MW-1S

There was a significant increasing trend in gross beta gamma. There was a moderate increasing trend in SO_4. There was a significant decreasing trend in U-nat, As, and pH. There was a weak decreasing trend in Pb^{210} and Se. All other constituents showed none.

ATP-2S

There was a weak increasing trend in U-Nat. There was a significant decreasing trend in Th^{230}, As, and pH. There was a weak decreasing trend in Po^{210}. All other constituents showed no trend.

ATP-2D

There was a moderate increasing trend in U-Nat. There was a weak increasing trend in SO_4 and TDS. There was a significant decreasing trend in Th^{230}, Po^{210}, and pH. There was a moderate decreasing trend in Pb^{210}, and As. There was a weak decreasing trend in Ra^{226}. All other constituents showed no trend.

ATP-3

There was a significant increasing trend in conductivity. There was a moderate increasing trend in pH. There was a moderate decreasing trend in Se. There was a weak decreasing trend in Ra^{226}, Po^{210}, SO_4, and As. All other constituents

showed no trend. Tables 12 and 12A summarize the ground water data.

4. **Vegetation Samples**

A vegetation sample was collected in the field closest to the mill and a background vegetation sample was also collected at the background station down river. Both samples are of the same type of vegetation.

A comparison of the two samples is shown in Table 13, and also shows that there were no trends identified.

5. **Soil Samples**

A soil sample was collected at each of the environmental continuous air sampling stations and compared with the soil at the background station. The presence or absence of trends is based on linear regression analysis.

There was a significant decreasing trends in Pb^{210} at S1 and a weak decreasing trend in Ra^{226} at S1. There was a weak decreasing trend in Pb^{210} at S2 and no trend for Ra^{226}. There was a moderate decreasing trend in Pb^{210} at S3, and no trend for Ra^{226}. There was no trends indicated at S4. There was a moderate decreasing trend for Pb^{210} at S6, and no trend for Ra^{226}.

6. **Environmental TLD Badge Results**

Six TLD badges are located at the air sampling stations and the guard house. S1, and S4 show no trends. S2 shows a significant increasing trend. S3 shows a weak increasing trend. S6 shows a moderate decreasing trend. The guard house shows a significant decreasing trend. The presence or absence of trends is based on linear regression analysis. Table 15 summarizes this data.

TABLE 1

EMPLOYEE EXPOSURE RECORDS
U-Nat 1988

% of Monthly Ore Guide Limit	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Yearly Coefficient of Determination	Trend
High	3.68	8.40	12.88	10.08	8.80	7.04	5.04	9.20	3.52	8.40	8.80	7.04	-0.114	None
%	.4	1.0	1.5	1.2	1.0	.8	.6	1.1	.4	1.0	1.0	.8		
Low	1.68	1.68	1.84	5.04	5.28	3.52	3.36	7.36	1.76	6.72	2.40	1.76	0.234	None
%	.2	.2	.2	.6	.6	.4	.4	.8	.2	.8	.	.2		
Average	2.88	4.80	5.52	7.92	6.79	4.27	4.56	8.15	3.23	7.56	6.85	3.32	0.122	None
%	.3	.6	.6	.9	.8	.5	.5	.9	.4	.9	.8	.4		

Ore Guide Limit - 867 X 10^{-11} uCi hr/ML/month.

TABLE 2

EMPLOYEE EXPOSURE RECORDS
RADON DAUGHTERS 1988

WLM % of Monthly Limit	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Yearly Coefficient of Determination	Trend
High	.010	.010	.011	.016	.016	.016	.008	.008	.008	.019	.008	.005	-0.26	None
%	3.0	3.0	3.3	4.8	4.8	4.8	2.4	2.4	2.4	5.8	2.4	1.5		
Low	.010	.010	.011	.016	.016	.016	.008	.008	.008	.019	.002	.005	-0.35	None
%	3.0	3.0	3.3	4.8	4.8	4.8	2.4	2.4	2.4	5.8	.6	1.5		
Average	.010	.010	.011	.016	.016	.016	.008	.008	.008	.019	.007	.005	-0.28	None
%	3.0	3.0	3.3	4.8	4.8	4.8	2.4	2.4	2.4	5.8	2.1	1.5		

Mo. Limit .33 WLM

TABLE 3

PERSONNEL GAMMA-BETA DOSE
1988

mrem/Quarter % of Limit	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Yearly Coefficient of Determination	Trend
Gamma Dose						
High	50	60	70	75	.990	Significant Increase
%	4.0	4.8	5.6	6.0		
Low	20	40	50	30	.400	None
%	1.6	3.2	4.0	2.4		
Average	35	52	60	59	.524	Weak Increase
%	2.8	4.2	4.8	4.7		
Beta Dose						
High	0	0	0	0	0	None
%	0	0	0	0		
Low	0	0	0	0	0	None
%	0	0	0	0		
Average	0	0	0	0	0	None
%	0	0	0	0		

Limit = 1250 mrem/Quarter

TABLE 4

MILL GAMMA TRENDS 1988
GUIDE LIMIT 2.4 MR/hr

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Coefficient of Determination Yearly	Coefficient of Determination Running	% Limit 1st Qtr.	% Limit 2nd Qtr.	% Limit 3rd Qtr.	% Limit 4th Qtr.
Ball Mill Area Classifiers	1.6	1.5	1.7	1.3	-0.530	-0.744	66.7	62.5	70.8	54.2
SX Area-U_3O_8 Extractors	1.2	1.0	1.5	1.0	-0.055	-0.641	50.0	41.7	62.5	41.7
U_3O_8 Hearth Dryer	.27	.27	.35	.26	0.154	-0.679	11.3	11.3	14.6	10.8
U_3O_8 Precipitation	.10	.09	.15	.09	0.135	-0.543	4.2	3.8	6.3	3.8
Y. C. Doghouse	.08	.08	.08	.07	-0.775	0.725	3.3	3.3	3.3	2.9
Y. C. Packaging Area	.37	.30	.42	.31	-0.138	0.449	15.4	12.5	17.5	12.9
Y. C. Storage	4.6	4.8			1.000	0.267	191.7	200.0		

TABLE 4A

MILL GAMMA TRENDS
YEARS 1983-1988

AREA	TREND
Ball Mill Area Classifiers	Moderate Decreasing
SX Area - U_3O_8 Extractors	Weak Decreasing
U_3O_8 Hearth Dryer	Weak Decreasing
U_3O_8 Precipitation	Weak Decreasing
Y. C. Doghouse	Moderate Increasing
Y. C. Packaging Area	None
Y. C. Storage	None

TABLE 5

SURFACE CONTAMINATION SURVEY
REMOVABLE ALPHA 1988

dpm/100cm² % of Limit	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Yearly Coefficient of Determination	Trend
High %	50 5.0	87 8.7	90 9.0	38 3.8	32 3.2	29 2.9	53 5.3	23 2.3	27 2.7	20 2.0	33 3.3	27 2.7	-0.685	Moderate Decreasing
Low %	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	None
Average %	20 2.0	24 2.4	17 1.7	9 .9	7 .7	6 .6	8 .8	6 .6	6 .6	6 .6	8 .8	7 .7	-0.762	Moderate Decreasing

Limit 1000dpm-100cm²

TABLE 6

EQUIPMENT RELEASE FOR UNRESTRICTED USE
SURFACE CONTAMINATION SURVEYS
REMOVABLE ALPHA 1988

dpm/100cm² % of Limit	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Yearly Coefficient of Determination	Trend
High	0	227	123	0	0	0	0	153	43	0	89	163	0.056	None
%	0	22.7	12.3	0	0	0	0	15.3	4.3	0	8.9	16.3		
Low	0	227	0	0	0	0	0	153	43	0	89	33	-0.035	None
%	0	22.7	0	0	0	0	0	15.3	4.3	0	8.9	3.3		
Average	0	227	62	0	0	0	0	153	43	0	89	116	0.054	None
%	0	22.7	6.2	0	0	0	0	15.3	4.3	0	8.9	11.6		

Limit 1000dpm/100cm²

TABLE 7

GENERAL AREA AIR SAMPLE 1988
U-Nat (X 10^{-11} uCi/ml)

Location	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MPC	Avg. % Limit	Coefficient of Determination Yearly	Coefficient of Determination Running
Tailings Pond	.04	.03	.03	.06	.09	.05	.02	.02	.10	.12	.09	.03	5.0	1.13	0.370	-0.629
Pump House	.02	.10	.02	.05	.09	.03	.01	.03	.12	.12	.09	.03	5.0	1.18	.262	-0.306
Yard	.04	.05	.03	.06	.06	.04	.02	.03	.13	.11	.10	.03	5.0	1.17	.400	-0.640
Air Compr. Room	.02	.04	.03	.06	.10	.02	.02	.04	.12	.12	.09	.03	5.0	1.15	.371	-0.709
Maint. Office	.04	.05	.03	.07	.14	.04	.05	.02	.12	.13	.10	.03	5.0	1.37	.082	.559
Lab*	.02			.03			.01			.12			5.0	.90	.714	-0.712
Front Office*	.05			.06			.01			.14			5.0	1.30	.522	-0.599

*Quarterly

TABLE 7A

GENERAL AREA AIR SAMPLE TRENDS
YEARS 1983 - 1988

AREA	TREND
Tailings Pond	Weak Decrease
Pump House	None
Yard	Weak Decrease
Air Compressor Room	Moderate Decrease
Maintenance Office	Weak Increase
Lab	Moderate Decrease
Front Office	Weak Decrease

TABLE 8

RADON DAUGHTERS
WORKING LEVELS
1988

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Control Guide Limit	Avg.% Limit	Coefficient of Determination Yearly	Coefficient of Determination Running
Compressor Room	.008	.023	.004	Oct =.041 Nov.=.009 Dec.=.003	.33	4.03	.162	.601
Front Office	.015	.026	.023	Oct.=.036 Nov.=.009 Dec.=.005	.33	6.1	.076	.800
Lab	.003	.011	.002	.008	.33	1.8	.183	.621
Maintenance Office	.012	.024	.022	Oct.=.039 Nov.=.012 Dec.=.008	.33	5.9	.540	.375
Pump House	.007	.016	.005	.025	.33	4.0	.605	.540
Tails Pond	.013	.006	0	.004	.33	2.0	-0.78	.79
Yard	.011	.004	.011	.006	.33	1.7	-0.553	.562

*1985-1988 only

TABLE 8A

RADON DAUGHTER TRENDS
YEARS 1983 - 1988

Area	Trend
Compressor Room	Weak Increase
Front Office	Moderate Increase
Lab	Weak Increase
Maintenance Office	None
Pump House	Weak Increase
Tails Pond	Moderate Increase
Yard	Weak Increase

TABLE 9

BREATHING ZONE SAMPLES 1988

Location	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	MPC 10^{-11} uCi/ml	Avg. % MPC	Coefficient of Determination Yearly	Coefficient of Determination Running	Trend
Ray Anderson	.02	.02	.03	.06	.03	.02	.03	.04	.02	.05	.05	.01	5.0	.63	0.172	0.330	None
Darrell Benson	.01	.02	.01	.04	.03	.03	.02	.05	.02	.05	.04	.01	5.0	.55	0.348	0.355	None
Syl Dominick	.02	.05	.07	.05	.05	.02	.03	.05	.02	.04	.05	-	5.0	.82	-0.110	0.219	None
Dale Edwards	.02	.02	.01	.04	.04	.02	.02	.04	.01	.04	.04	.01	5.0	.52	-0.113	0.233	None
Jerry Hale	.02	.03	.04	.05	.04	.02	.03	.04	-	-	-	-	5.0	.67	0.192	0.194	None
Joe Mitchell	.01	.01	.01	.06	.04	.04	.03	.04	.02	.04	.05	.04	5.0	.65	0.525	-0.371	None
James Sampson	.02	.05	.04	.03	.04	.02	.03	.05	.02	.05	.04	.03	5.0	.70	-0.218	0.273	None

TABLE 10

CONTINUOUS AIR SAMPLES
1983 - 1988 TREND ANALYSIS

CONTINUOUS AIR SAMPLER # S1

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1988 %MPC	Running Coefficient of Determination	Trend
U-Nat $x10^{-12}$ uCi/ml	.00063	.0014	.0034	.0035	.04	-.98	Significant Decreasing
Rn^{222} $X10^{-10}$ uCi/ml	21.0	33.0	15.0	127.0	163	.97	Significant Increasing
Ra^{226} $X10^{-12}$ uCi/ml	.0032	.0006	.0048	.0013	.06	-.48	None
Th^{230} $X10^{-14}$ uCi/ml	.016	.059	.16	.12	1.1	-.65	Weak Decreasing

TABLE 10

CONTINUOUS AIR SAMPLES
1983 - 1988 TREND ANALYSIS

CONTINUOUS AIR SAMPLER # S2

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1988 %MPC	Running Coefficient of Determination	Trend
U-Nat $X10^{-12}$ UCi/ml	.00088	.00013	.0019	.0036	.03	-.98	Significant Decreasing
Rn^{222} $X10^{-10}$ uCi/ml	22.0	57.0	51.0	159.0	240	.96	Significant Increasing
Ra^{226} $X10^{-12}$ uCi/ml	.00046	.00079	.00077	.00098	.02	-.67	Weak Decreasing
Th^{230} $X10^{-14}$ uCi/ml	.059	.059	.16	.26	1.68	-.68	Weak Decreasing

TABLE 10

CONTINUOUS AIR SAMPLES
1983 - 1988 TREND ANALYSIS

CONTINUOUS AIR SAMPLER # S3

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1988 %MPC	Running Coefficient of Determination	Trend
U-Nat $X10^{-12}$ uCi/Ml	.00046	.0014	.00068	.0033	.03	-.99	Significant Decreasing
Rn^{222} $X10^{-10}$ uCi/ml	14.0	7.0	19.0	46.0	71.7	.74	Moderate Increasing
Ra^{226} $X10^{-12}$ uCi/ml	.0092	.010	.0060	.0031	.23	-.79	Moderate Decreasing
Th^{230} $X10^{-14}$ uCi/ml	.12	1.57	1.06	.63	10.6	-.78	Moderate Decreasing

TABLE 10

CONTINUOUS AIR SAMPLES
1983 - 1988 TREND ANALYSIS

CONTINUOUS AIR SAMPLER # S4

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1988 %MPC	Running Coefficient of Determination	Trend
U-Nat $X10^{-12}$ uCi/ml	.00034	.00038	.00048	.00045	.008	-.69	Weak Decreasing
Rn^{222} $X10^{-10}$ uCi/ml	7.0	6.0	6.0	21.0	33.0	.85	Significant Increasing
Ra^{226} $X10^{-12}$ uCi/ml	.00025	.00076	.0031	.00016	.037	-.61	Weak Decreasing
Th^{230} $X10^{-14}$ uCi/ml	.021	.055	.52	.018	.019	-.51	Weak Decreasing

TABLE 10

CONTINUOUS AIR SAMPLES
1983 - 1988 TREND ANALYSIS

CONTINUOUS AIR SAMPLER # S6

	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1988 %MPC	Running Coefficient of Determination	Trend
U-Nat $X10^{-12}$ uCi/ml	.00046	.00051	.00051	.00032	.009	-.43	None
Rn^{222} $X10^{-10}$ uCi/ml	5.0	3.0	8.0	4.0	16.7	.92	Significant Increasing
Ra^{226} $X10^{-12}$ uCi/ml	.0004	.00015	.00035	.000059	.008	-.70	Moderate Decreasing
Th^{230} $X10^{-14}$ uCi/ml	.002	.028	.025	.034	.28	-.87	Significant Decreasing

TABLE 11

SURFACE WATER MONITORING 1988
LOCATION: DOWNSTREAM FROM MILL

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Coefficient of Determination Yearly	Coefficient of Determination Running	1981-88 Trend
U-Nat* ($3X10^{-5}$ uCi/ml	.00052	.000133	.000313	.000214	-0.570	-0.513	Weak Decrease
Th^{230} ($2X10^{-6}$ uCi/ml)	.0001					-0.92	Significant Increase
Ra^{226} (3X10-8 uCi/ml)	.01					0.308	None
Pb^{210} ($1X10^{-7}$ uCi/ml)	.001					-0.565	Weak Decrease
Po^{210} ($7X10^{-7}$ uCi/ml)	0					-0.225	None
So^{4} (PPM)	251					0.538	Weak Increase
Cl (PPM)	150					0.693	Weak Increase
NO_3 (PPM)	.6					0.290	None
As (PPM)	<0.001					0	None
Cu (PPM)	<0.01					0.283	None
TDS (PPM)	841					0.773	Moderate Increase
pH (PPM)	8.25					-0.473	None
Conductivity (UMHOS)*	1100	500	1,850	1,150	0.351	0.392	None
Se (PPM)	.002					-0.258	None

*Quarterly

TABLE 11A

SURFACE WATER MONITORING 1988
LOCATION: ABOVE MILL

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Coefficient of Determination Yearly	Coefficient of Determination Running	1981-88 Trend
U-Nat* ($3X10^{-5}$ uCi/ml	.00033	.000142	.000260	.000166	-.556	-0.430	None
Th^{230} ($2X10^{-6}$ uCi/ml)	.0004					-0.552	Weak Decrease
Ra^{226} (3X10-8 uCi/ml)	.01					-0.884	Significant Increase
Pb^{210} ($1X10^{-7}$ uCi/ml)	.004					-0.90	Significant Increase
Po^{210} ($7X10^{-7}$ uCi/ml)	0					-0.364	None
So^{4} (PPM)	248					0.597	Weak Increase
Cl (PPM)	160					0.698	Weak Increase
NO_3 (PPM)	.5					-0.342	None
As (PPM)	<.001					-0.680	Weak Decrease
Cu (PPM)	<.01					-0.572	Weak Decrease
TDS (PPM)	987					0.639	Weak Increase
pH (PPM)	8.27					0.455	None
Conductivity (UMHOS)*	1,100	500	1,950	1,250	.412	0.408	None
Se (PPM)	.002					-0.731	Moderate Decrease

*Quarterly - All others annually.

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: MW-1-R

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	.49	.44	.48	.52	.51	-.22				
U-Nat ($3x10^{-3}$ uCi/ml)	.15	.12	.13	.18	.49	.79	5.0	4.0	4.3	6.0
Th-230 ($2x10^{-6}$ uCi/ml)	0	0	.0003	.0001	.55	-.63	0	0	.015	.005
Ra-226 ($3X10^{-8}$ uCi/ml)	.03	.01	.29	.10	.50	-.74	1.0	.3	9.7	3.3
Pb-210 ($1X10^{-7}$ uCi/ml)	.009	0	.001	0	-.77	-.50	.9	0	.10	0
Po-210 ($7X10^{-7}$ uCi/ml)	.014	.007	.011	.004	-.76	-.85	.2	.1	.16	96
K PPM										
Na PPM										
SO4 PPM	22,300	8,440	20,000	25,400	.36	.95				
CL PPM	1,230	1,250	1,060	1,050	-.88	-.73				
NO3 PPM	240	280	322	343	.99	.66				
Fe PPM										
Mn PPM										
As PPM	.003	.005	<0.001	.035	.74	-.79				
Se PPM	.412	.372	<0.001	.063	-.87	.045				
Cu PPM										
TDS PPM	34,400	33,800	37,300	37,700	.87	.90				
pH	7.04	7.02	6.68	6.65	-.92	-.51				
Conductivity (UMHOS)	28,000	28,000	28,000	26,000	-.77	.69				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: MW-2-R

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	5.5	2.8	2.2	1.9	.90	-0.38				
U-Nat ($3x10^{-3}$ uCi/ml)	2.18	1.55	1.31	1.15	-.95	0.92	72.7	51.7	43.7	38.3
Th-230 ($2x10^{-6}$ uCi/ml)	0	.0013	0	.0002	-.14	-0.92	0	.065	0	.01
Ra-226 ($3X10^{-8}$ uCi/ml)	.04	.04	.23	.10	.53	-0.47	1.3	1.3	7.7	3.3
Pb-210 ($1X10^{-7}$ uCi/ml)	.024	.008	.005	.004	-.87	-0.69	2.4	.8	.50	.40
Po-210 ($7X10^{-7}$ uCi/ml)	-	.019	.009	.023	.28	-0.43	-	.27	.13	.33
K PPM										
Na PPM										
SO4 PPM	13,700	8,470	13,400	13,000	.15	.95				
CL PPM	2,450	2,460	2,110	2,130	-.87	-0.29				
NO3 PPM	450	360	458	242	-.67	.57				
Fe PPM										
Mn PPM										
As PPM	.003	.005	<0.001	0.001	.60	-0.88				
Se PPM	.293	.264	<0.001	<0.002	-.91	-0.177				
Cu PPM										
TDS PPM	27,500	25,800	35,900	23,000	-.08	.61				
pH	7.09	6.95	6.89	6.75	-.99	-0.61				
Conductivity (UMHOS)	24,500	22,000	21,500	18,000	-.96	-0.13				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: MW-3

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	1.1	.88	.82	.91	-.67	-0.59				
U-Nat ($3x10^{-5}$ uCi/ml)	.356	.31	.310	.308	-.80	0.93	11.9	10.3	10.3	10.3
Th-230 ($2x10^{-6}$ uCi/ml)	.0011	.0001	.0001	.0004	-.57	-0.87	.06	.005	.005	.02
Ra-226 ($3X10^{-8}$ uCi/ml)	.02	.01	.02	.02	.26	-0.70	.7	.3	.7	.7
Pb-210 ($1X10^{-7}$ uCi/ml)	.003	.006	0	0	-.67	-0.06	.3	.6	0	0
Po-210 ($7X10^{-7}$ uCi/ml)	.017	0	0	.005	-.58	-0.59	.24	0	0	.07
K PPM										
Na PPM										
SO4 PPM	19,800	8,600	19,500	19,600	.24	.94				
CL PPM	1,890	1,960	1,880	2,010	.59	-0.61				
NO3 PPM	59	14	68.9	.8	-.46	.25				
Fe PPM										
Mn PPM										
As PPM	.004	.007	<0.001	<0.001	-.67	-0.68				
Se PPM	.314	.298	<0.001	<0.002	-.90	-0.26				
Cu PPM										
TDS PPM	30,300	30,400	28,200	30,500	-.19	.95				
pH	6.99	6.91	6.69	6.65	-.97	-0.78				
Conductivity (UMHOS)	28,500	27,500	30,000	23,500	-.58	.95				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: ATP-1-S

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	.85	.53	-	.94	.21	1.0				
U-Nat ($3x10^{-5}$ uCi/ml)	.0000339	.00002	.0000271	.0000203	-.66	-.87	.001	.001	.0009	.0007
Th-230 ($2x10^{-6}$ uCi/ml)	0	.0001	.0008	0	.23	0.11	0	.005	.04	0
Ra-226 ($3X10^{-8}$ uCi/ml)	.09	.09	.14	.04	-.32	-0.06	3.0	3.0	4.7	1.3
Pb-210 ($1X10^{-7}$ uCi/ml)	.011	.005	.005	.002	-.92	-0.50	1.1	.5	.5	.2
Po-210 ($7X10^{-7}$ uCi/ml)	-	0	0	.003	.87	-0.71	-	0	0	.04
K PPM										
Na PPM										
SO4 PPM	4,880	4,310	4,880	4,980	.37	.78				
CL PPM	52,800	64,700	67,300	64,700	.76	-.17				
NO3 PPM	<.1	1.3	<.1	<.1	-.26	.24				
Fe PPM										
Mn PPM										
As PPM	.003	.007	<0.001	0.001	-.55	-.80				
Se PPM	.132	.132	<0.001	<0.002	-.89	-.57				
Cu PPM										
TDS PPM	112,000	112,000	11,200	111,000	-.27	-.14				
pH	6.53	6.52	6.08	6.19	-.82	-.94				
Conductivity (UMHOS)	140,000	170,000	230,000	170,000	.51	-.26				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: ATP-2-S

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	1.8	1.5	1.3	1.2	-.98	.095				
U-Nat ($3x10^{-5}$ uCi/ml)	.724	.643	.680	.00528	-.80	.54	24.1	21.4	22.7	.18
Th-230 ($2x10^{-6}$ uCi/ml)	0	0	.0001	.0005	.87	-.80	0	0	.005	.025
Ra-226 ($3X10^{-8}$ uCi/ml)	.05	.06	0	.01	-.79	-.40	1.6	2.0	0	.3
Pb-210 ($1X10^{-7}$ uCi/ml)	.008	0	.009	.005	0	-.30	.8	0	.9	.5
Po-210 ($7X10^{-7}$ uCi/ml)	.026	.007	.005	.009	-.71	-.61	.37	.1	.07	.13
K PPM										
Na PPM										
SO4 PPM	26,000	8,600	19,500	230	-.75	.218				
CL PPM	942	998	1,030	1,050	.97	.20				
NO3 PPM	58	65	92	<.1	-.49	-.03				
Fe PPM										
Mn PPM										
As PPM	.002	<.001	<0.001	<0.001	-.77	-.83				
Se PPM	.337	.278	<0.001	<0.002	-.93	-.24				
Cu PPM										
TDS PPM	37,200	34,900	37,700	1,370	-.77	.17				
pH	6.93	6.84	6.62	6.71	-.83	-.84				
Conductivity (UMHOS)	34,500	33,000	22,000	28,000	-.70	.23				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: ATP-2-D

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	.74	.74	.87	.87	.89	.30				
U-Nat ($3x10^{-5}$ uCi/ml)	.347	.236	.404	.456	.68	.77	11.6	7.9	13.5	15.2
Th-230 ($2x10^{-6}$ uCi/ml)	.0003	.0003	.0002	.0022	.75	-.82	.015	.015	.01	.11
Ra-226 ($3X10^{-8}$ uCi/ml)	.05	.04	.01	.02	-.85	-.64	1.7	1.3	.3	.7
Pb-210 ($1X10^{-7}$ uCi/ml)	0	.008	0	0	-.26	-.75	0	.8	0	0
Po-210 ($7X10^{-7}$ uCi/ml)	.026	.004	.003	.006	-.72	-.80	.37	.06	.04	.09
K PPM										
Na PPM										
SO4 PPM	26,000	8,280	20,200	25,900	.18	.68				
CL PPM	2,170	3,240	1,770	1,470	-.60	-.40				
NO3 PPM	49	37	72.7	.8	-.47	-.06				
Fe PPM										
Mn PPM										
As PPM	.009	.015	<0.001	<0.001	-.72	-.73				
Se PPM	.282	.015	<0.001	<0.002	-.80	-.11				
Cu PPM										
TDS PPM	39,900	40,600	38,800	38,400	-1.0	.67				
pH	7.0	6.83	6.76	6.80	-.81	-.98				
Conductivity (UMHOS)	35,500	34,500	34,000	19,000	-.82	.14				

TABLE 12
GROUNDWATER MONITORING 1988

LOCATION: ATP-3

	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	Coefficient of Determination		Percent of MPC			
					Yearly	Running	1st	2nd	3rd	4th
Gross Beta Gamma (10^{-6} uCi/ml)	.0075	.014	.014	.018	.94	-.14				
U-Nat ($3x10^{-5}$ uCi/ml)	.000948	.000833	.000664	.000596	-.99	-.40	.03	.03	.02	.02
Th-230 ($2x10^{-6}$ uCi/ml)	.0005	0	0	0	-.77	-.39	.03	0	0	0
Ra-226 ($3X10^{-8}$ uCi/ml)	0	.01	.01	0	0	-.59	0	.33	.33	0
Pb-210 ($1X10^{-7}$ uCi/ml)	.005	0	0	0	-.77	-.17	.5	0	0	0
Po-210 ($7X10^{-7}$ uCi/ml)	0	.002	0	0	-.26	-.56	0	.03	0	0
K PPM										
Na PPM										
SO4 PPM	237	235	248	185	-.66	-.62				
CL PPM	554	567	523	614	.46	.43				
NO3 PPM	<.1	.3	.1	<0.1	-.26	-.42				
Fe PPM										
Mn PPM										
As PPM	.009	.015	<0.001	<0.001	-.72	-.65				
Se PPM	.005	.016	<0.001	<0.002	-.45	-.74				
Cu PPM										
TDS PPM	1,380	1,400	1,340	1,370	-.46	-.46				
pH	7.95	7.84	7.91	7.99	.38	.71				
Conductivity (UMHOS)	3,500	2,700	3,400	2,900	-.37	.80				

TABLE 12A

1979-1988 GROUNDWATER MONITORING TREND ANALYSIS

	MW-1R	MW-2R	MW-3	ATP-1S	ATP-2S	ATP-2D	ATP-3
Gross Beta Gamma	None	None	Weak Decrease	Significant Increase	None	None	None
U-Nat	Moderate Increase	Significant Increase	Significant Increase	Significant Decrease	Weak Increase	Moderate Increase	None
Th-230	Weak Decrease	Significant Decrease	Significant Decrease	None	Significant Decrease	Significant Decrease	None
Ra-226	Moderate Decrease	None	Moderate Decrease	None	None	Weak Decrease	Weak Decrease
Pb-210	Weak Decrease	Moderate Increase	None	Weak Decrease	None	Moderate Decrease	None
Po-210	Significant Decrease	None	Weak Decrease	Moderate Decrease	Weak Decrease	Significant Decrease	Weak Decrease
K							
Na							
SO_4	Significant Increase	Significant Increase	Significant Increase	Moderate Increase	None	Weak Increase	Weak Decrease
Cl	Moderate Decrease	None	Weak Decrease	None	None	None	None
NO_3	Weak Increase	Weak Increase	None	None	None	None	None
Fe							
Mn							
As	Moderate Decrease	Significant Decrease	Weak Decrease	Significant Decrease	Significant Decrease	Moderate Decrease	Weak Decrease
Se	None	None	None	Weak Decrease	None	None	Moderate Decrease
Cu							
TDS	Significant Increase	Weak Increase	Significant Increase	None	None	Weak Increase	None
pH	Weak Decrease	Weak Decrease	Moderate Decrease	Significant Decrease	Significant Decrease	Significant Decrease	Moderate Increase
Conductivity	Weak Increase	None	Significant Increase	None	None	None	Significant Increase

TABLE 13

VEGETATION SAMPLES

Concentration in uCi X 10^{-6}/kg Wet	1988	Coefficient of Determination Running (81-88)	Trend
Ra^{226} Background	.86	-0.218	None
Pb^{210} Background	1.1	-0.321	None
Ra^{226} Near Mill	.22	-0.167	None
Pb^{210} Near Mill	.40	-0.295	None

The coefficient of determination is calculated on the assays from 1981 through 1988.

TABLE 14

SOIL SAMPLES

	1988	Coefficient of Determination Running (81-88)	Trend
#S1			
Ra^{226} (uCi X 10^{-6}/g) =	.4	-0.63	Weak Decrease
Pb^{210} (uCi X 10^{-6}/g) =	.5	-0.99	Signficant Decrease
#S2			
Ra^{226} (uCi X 10^{-6}/g) =	1.3	-0.04	None
Pb^{210} (uCi x 10^{-6}/g) =	2.3	-0.68	Weak Decrease
#S3			
Ra^{226} (uCi X 10^{-6}/g) =	16.0	0.242	None
Pb^{210} (uCi X 10^{-6}/g) =	13.0	-0.78	Moderate Decrease
#S4			
Ra^{226} (uCi X 10^{-6}/g) =	.4	-0.256	None
Pb^{210} (uCi X 10^{-6}/g) =	1.5	-0.328	None
#S6			
Ra^{226} (uCi X 10^{-6}/g) =	.8	0.080	None
Pb^{210} (uCi X 10^{-6}/g) =	1.8	-0.770	Moderate Decrease

TABLE 15

DIRECT RADIATION MEASUREMENTS
ENVIRONMENTAL BADGES (MR/hr)
1988

Location	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Coefficient of Determination Yearly	Coefficient of Determination 81 - 88 Running	Yearly Average	81 - 88 Trend
#1 Monitor	11	17	14	22	0.83	0.28	16	None
#2 Monitor	36	39	38	50	0.84	-0.86	41	Significant Increasing
#3 Monitor	72	Lost	56	116	0.708	.569	81	Weak Increasing
#4 Monitor	19	22	21	25	0.88	0.183	22	None
#6 Monitor	9	9	6	10	0	-0.640	9	Moderate Decreasing
Guard House	84	85	88	100	.894	-0.90	89	Significant Decreasing