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40-8905

QUIVIRA MINING COMPANY

POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

February 1, 1989

RETURN ORIGINAL TO PDR, HQ.

Mr. Pete Garcia
Uranium Recovery Field Office
Region IV
U.S. Nuclear Regulatory Commission
P.O. Box 25325
Denver, Colorado 80225

Re: Docket 40-8905
License SUA-1473
ALARA Summary



Dear Mr. Garcia:

Attached in accordance with license condition #10 of the above referenced license and the Ambrosia Lake "Operations, Health Physics, Environmental and Emergency Response Programs" is the 1988 annual ALARA review for the Ambrosia Lake facility. This summary reviews the actions taken to maintain occupational exposures and environmental effluent exposures as low as reasonably achievable.

If you have any question or need further information please call me at (505) 287-8851, extension 246.

Sincerely,

QUIVIRA MINING COMPANY

Bill Ferdinand

Bill Ferdinand
Superintendent Environmental and
Industrial Hygiene

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PDR ADOCK 04008905
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DESIGNATED ORIGINAL

Certified By Mary C. Wood

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ALARA SUMMARY

January - December 1988

I. INTRODUCTION

The annual ALARA summary for Quivira Mining Company's Ambrosia Lake facility for calendar year 1988 is submitted for NRC's review in accordance with License Condition #10 and Quivira Mining Company's ALARA Statement and Policy. The formal management ALARA review was conducted on January 18, 1989 by the facility ALARA audit committee. In attendance were Messrs. Art Gebeau (General Manager), Ronnie Dauffenbach (Manager of Industrial Relations), Jonathan Ma (Mill Superintendent), Jim Cleveland (Corporate Environmental and Health Management) and Bill Ferdinand (Radiation Safety Officer). Copies of the review were also sent to corporate management.

II. HEALTH PHYSICS SAMPLING SUMMARY

A. Bioassay

The collection of bioassay samples continued during the year in accordance with the condition imposed in the "Bioassay Program" section of the facility "Operations, Health Physics, Environmental and Emergency Response Programs" during the 4th quarter of 1987 by NRC.

The condition requires yellowcake operators to submit samples at least quarterly with the frequency increasing to semimonthly should airborne concentrations within the area exceed 25 percent of natural uranium Maximum Permissible Concentration (MPC) listed in 10 CFR 20, Appendix B, Table 1.

During the year there were a total of 42 samples collected from yellowcake operators, foremen, and health physics personnel. All analytical results indicated that all samples concentrations were below the lower detectable limit of < 5 ug/liter. All quality assurance spike samples were within the Regulatory Guide 8.22 variance for acceptable spike results.

The reason for the negligible concentrations are:

1. The process is in slurry form.
2. The operators normally spend less than four (4) hours per week in the yellowcake area.
3. Airborne concentrations within the area are normally below 3% of the MPC for natural uranium.

These results verify the airborne yellowcake sampling program sampling results which show very low airborne

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concentrations.

B. Personnel Alpha Contamination Checks

During the review period, there were a total of two hundred seven (207) random alpha contamination surveys of employees leaving the restricted area. These checks were performed by health physics personnel. The contamination checks were performed at the end of work shift prior to employees leaving the mill facility.

The results indicated that one (1) check (0.5%) exceeded the 1000 dpm/100 cm² guideline in Regulatory Guide 8.30. The clothing was removed, laundered on site and resurveyed. The resurvey indicated that the contamination was successfully removed from the trouser leg.

In addition to the random employee surveys by health physics personnel, there were 808 self monitoring check by the employees. All checks indicated that contamination on personnel and their clothing were below Regulatory Guide 8.30 suggested limits.

C. Surface Contamination Checks

There were 515 surface contamination checks performed during the review period. The surface contamination checks were performed at various places throughout the restricted area including lunch rooms, change rooms, and the guard office. All sample results were below the respective action levels for both controlled and uncontrolled area activity limits of 5000 dpm/100 cm² and 1000 dpm/100 cm².

D. Radon Daughter Sampling

1. Mill IX Plant

The average weekly radon daughter concentration during 1988 was 0.043 wL as compared to 0.082 wL during 1987. This represent a almost a two fold decrease in the yearly weekly average. The 1988 concentration is 13.1% of the annual MPC limit of 0.33 wL. There were a total of 288 sample determinations for the area. The highest annual exposure for employees during 1988 was 0.2 wlm or 5% of the annual limit. The only instances when radon daughter concentrations exceeded 25% of MPC were during January and during one isolated spike in May. The high concentrations in January were due to weather inversions and mechanical failures of the shaft heater. However, once the heater was repaired, the airborne concentrations dropped to below 0.04 wL.

In an effort to maintain exposures ALARA, special monthly ALARA reviews were performed from January through May to ascertain the extent of personnel exposure and if necessary, to undertake further engineering controls to reduce airborne concentrations. The results of the special monthly ALARA reviews indicated that radon daughter exposures were negligible.

Attached in Appendix A is a graph plotting the weekly radon daughter concentrations average within the mill IX plant. The linear regression line or trend line is negative. This indicates that the working level concentrations are decreasing with time. The trend line y intercept is approximately 0.033 wl.

2. Section 35 IX Plant

The average weekly radon daughter concentration was 0.051 wl. This concentration is 15.4% of the annual MPC limit of 0.33 wl. The 1987 average weekly concentration was 0.093 wl or reduction of nearly half in the current airborne concentrations. There were a total of 218 sample determinations for the area. The highest annual exposure for employees during 1988 was 0.2 wlm or 5% of the annual limit.

In an effort to maintain exposures ALARA, special monthly ALARA reviews were performed from January through May to ascertain the extent of personnel exposure and if necessary, to undertake further engineering controls to reduce airborne concentrations. The results of the special monthly ALARA reviews indicated that radon daughter exposures were negligible within the area due to personnel being in the area on an average of only 14-16 hours per week. Additionally, a wall ventilator unit was installed to assist in providing additional fresh air source.

Attached in Appendix A is a graph plotting the weekly radon daughter concentrations average within the Section 35 IX plant. The linear regression line or trend line is negative. This indicates that the working level concentrations are decreasing with time. The y intercept of the regression line is approximately 0.0 wl.

3. Yellowcake Area

The yellowcake area during 1988 had a weekly average radon daughter concentration of 0.025 wl. This was based on 264 sample determinations. This represents a 28.0% reduction from the previous year average weekly radon daughter concentration.

The weekly airborne radon daughter concentrations normally range from 0.02 to 0.04 wl.

Attached in Appendix A is a graph plotting the weekly radon daughter concentrations average within the Yellowcake area. The linear regression line or trend line is slightly negative. However, due to the almost flat slope of the line, it indicates that the airborne concentrations are rather constant through time.

4. Chem Lab

The weekly radon daughter concentration average for the year was 0.030 wl based on 107 sample determinations. The 1987 average weekly radon concentration was 0.035 wl. This is a reduction of 16.7%.

Attached in Appendix A is a graph plotting the weekly radon daughter concentrations average within the Chem Lab. The linear regression line or trend line is negative. This indicates decreasing airborne radon daughter concentrations through time.

E. Yellowcake Samples

There were 624 routine air samples taken for airborne yellowcake activity. The samples were obtained weekly at random times at twelve locations within the precipitation area. The annual weekly average for the year was 1.0% of MPC. This is a reduction from the previous year average concentration of 4.9% of MPC.

The weekly airborne concentrations are shown in Appendix A. As indicated from the graph, the concentrations are relatively constant throughout the year.

F. Uranium Ore Dust

During the review period, there were no routine uranium ore dust samples taken as the crushing circuit has been shutdown with the area in standby.

G. Non-Routine Removable Alpha Contamination Surveys

Four quarterly surveys were conducted during the year with a total of 86 samples collected. There were 5 samples with radioactivity levels which required either a mill corrective order or work order to be issued. All area were subsequently cleaned with the activity reduced to minimal levels.

H. Gamma Surveys

There were two semiannual gamma surveys conducted during the year as suggested by Regulatory Guide 8.30. A total of 73 different locations were checked and all areas were properly posted in accordance with 10 CFR 20.203.

III. EXPOSURE SUMMARY

A. Radon Daughters

All radon daughter exposures for both the mill and the mine employees are calculated using a time weighted average format as outlined by the Mine Safety and Health Administration (MSHA) in 30 CFR 57.5040.

The annual results are presented in Table 1.

TABLE 1
1988 RADON DAUGHTER EXPOSURES
WLM

	<u><0.1</u>	<u>0.1-0.2</u>	<u>0.3-0.4</u>	<u>0.5-0.6</u>	<u>0.7-0.8</u>	<u>0.8-0.9</u>	<u>0.9-1.0</u>	<u>>1.0</u>
Mill	4	1	0	0	0	0	0	0
Mine	0	0	0	0	0	0	0	0

B. Gamma Dose

Gamma doses are determined by the results of individuals TLD badges worn by all employees and analyzed in accordance with NVLAP procedures and specifications by an accredited outside contract laboratory.

The following table summarizes the 1988 gamma dose through the first 3 calendar quarters.

TABLE 2
1988 GAMMA DOSE EXPOSURES
REM

	<u><0.1</u>	<u>0.1-0.29</u>	<u>0.3-0.49</u>	<u>0.5-0.69</u>	<u><0.7</u>
Mill	37	14	0	0	0
Mine	7	0	0	0	0

The highest annual gamma dose incurred was 0.35⁽¹⁾ rems. Based on the annual dosages within the mill, and in accordance with 10 CFR 20.101(a) which requires gamma badging only if it expected that an individual will receive 25 percent of the quarterly 1.25 rem limit or 0.31 rems, it will not be necessary to badge visitors.

(1) Prorated from the previous 3 quarters as the 4th quarter's results have not been received from vendor at audit time.

C. Yellowcake and Uranium Ore Dust

Due to the standby status and minimal airborne concentrations, all exposures to internal radionuclides are significantly below 25 percent of MPC. The average weekly yellowcake airborne concentration during the year was 1.0 percent of the 40 hour MPC limit.

IV. MISCELLANEOUS ALARA ACTIVITIES

A. Daily Inspections

During the year, daily inspections and sample surveys resulted in 16 mill corrective orders and 12 work orders being issued. Mill corrective orders are normally issued when a clean up item involves radiological conditions which are approaching or exceed the recommended regulatory guide limits. Work orders are issued when general house keeping is required or the activity is below regulatory guide limits.

Most of the orders involved clean up or the washing down of area contaminated by process spills. The orders have been filed for future reference and inspection.

B. Safety and Training Activities

During the year, there was one new employee hired. This individual was given a 60 hour training course including radiation safety.

The annual eight (8) hour refresher course was completed for all employees and included the topics as outlined in Quivira Mining Company's "Radiation Safety Training Program".

In conjunction with the annual refresher course, all employees completed the respirator fit test.

C. Performance of Emission Control Equipment

Due the standby status of the yellowcake facility and the change of the mill operations to a slurry process, the emission control equipment such as the wet scrubber and the baghouse were not operated.

D. Operational Procedures & Emergency Response Actions

During the year, all operational Standard Operating Procedures (SOP) and Emergency Response Actions have been reviewed and updated. One new SOP for the unloading of the raffinate from Sequoyah Fuels was completed, reviewed, and signed off. Two additional procedures are still in the stages of being developed. They include the SOP for loading the yellowcake slurry truck and for the burial of mill equipment as outlined in license condition #32 of SUA-1473.

In May, an accident involving Quivira Mining Company's yellowcake carrier occurred near Milagro, New Mexico. The Accident Response Team was notified and responded to the incident. There were no significant yellowcake exposures or contamination due to the accident. The area of the accident was cleaned to acceptable levels and released by NMEID officials at the scene.

E. Miscellaneous Activities

Modifications to the yellowcake change rooms continue from the preceding year. The modifications to the area was initiated to improve and minimize the spreading of possible contamination in conjunction with future operations.

APPENDIX A

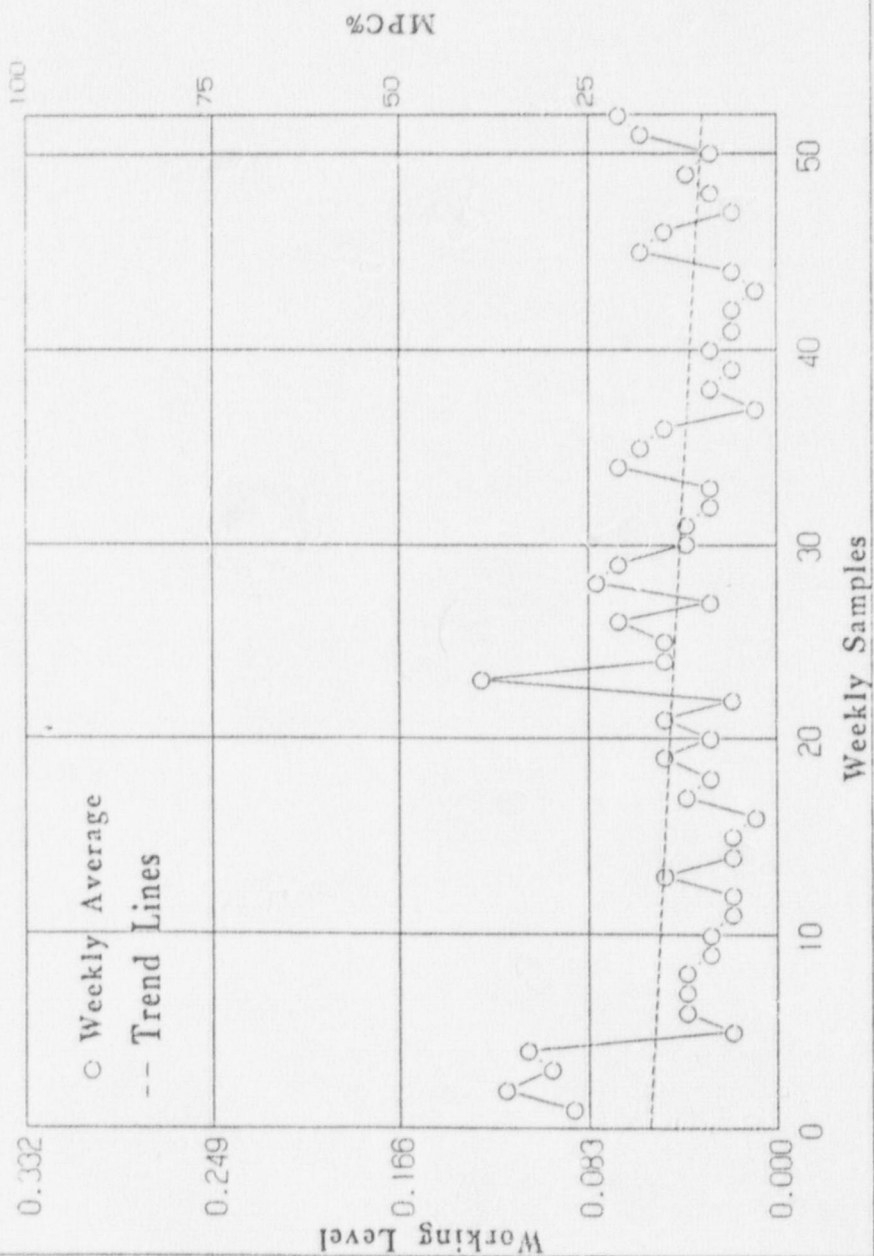
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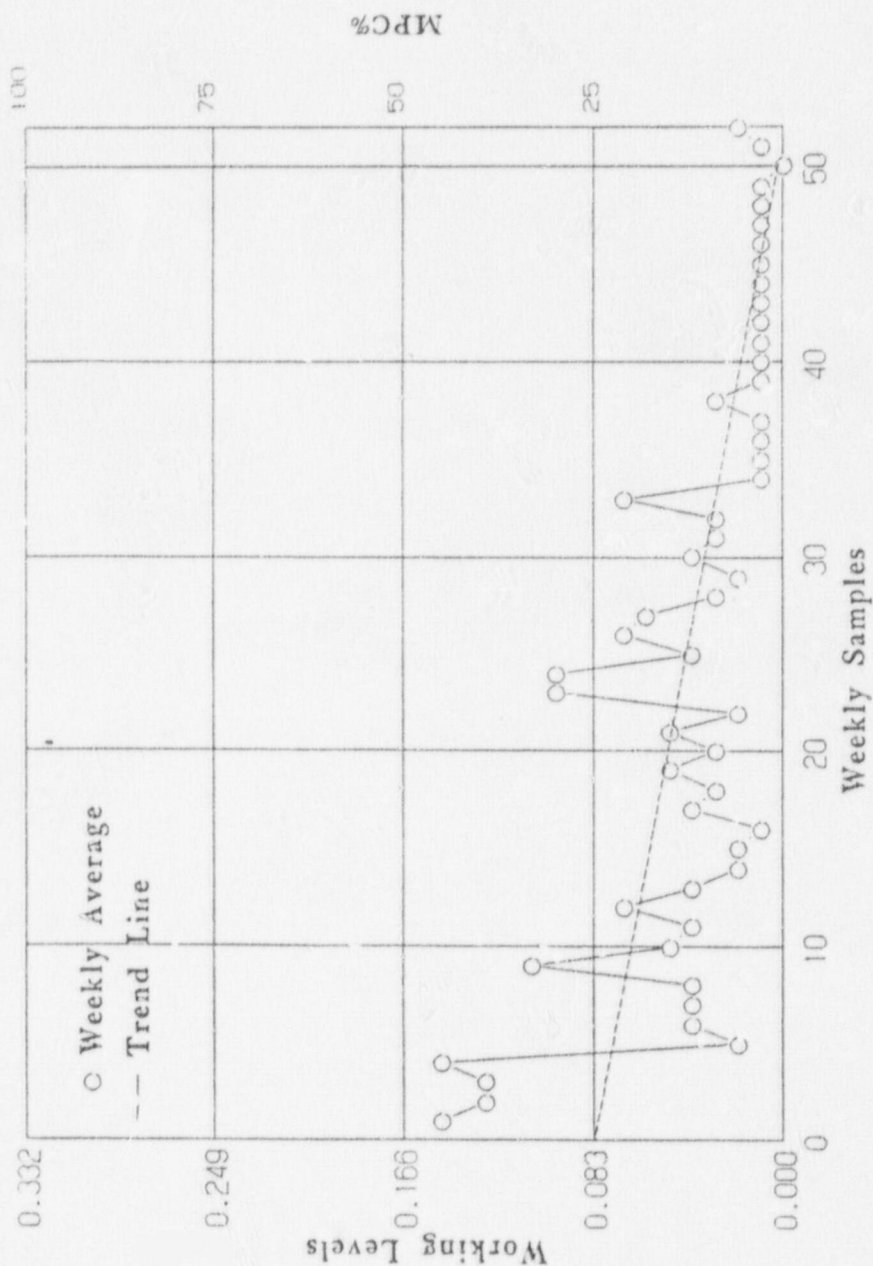
Date 01/16/89

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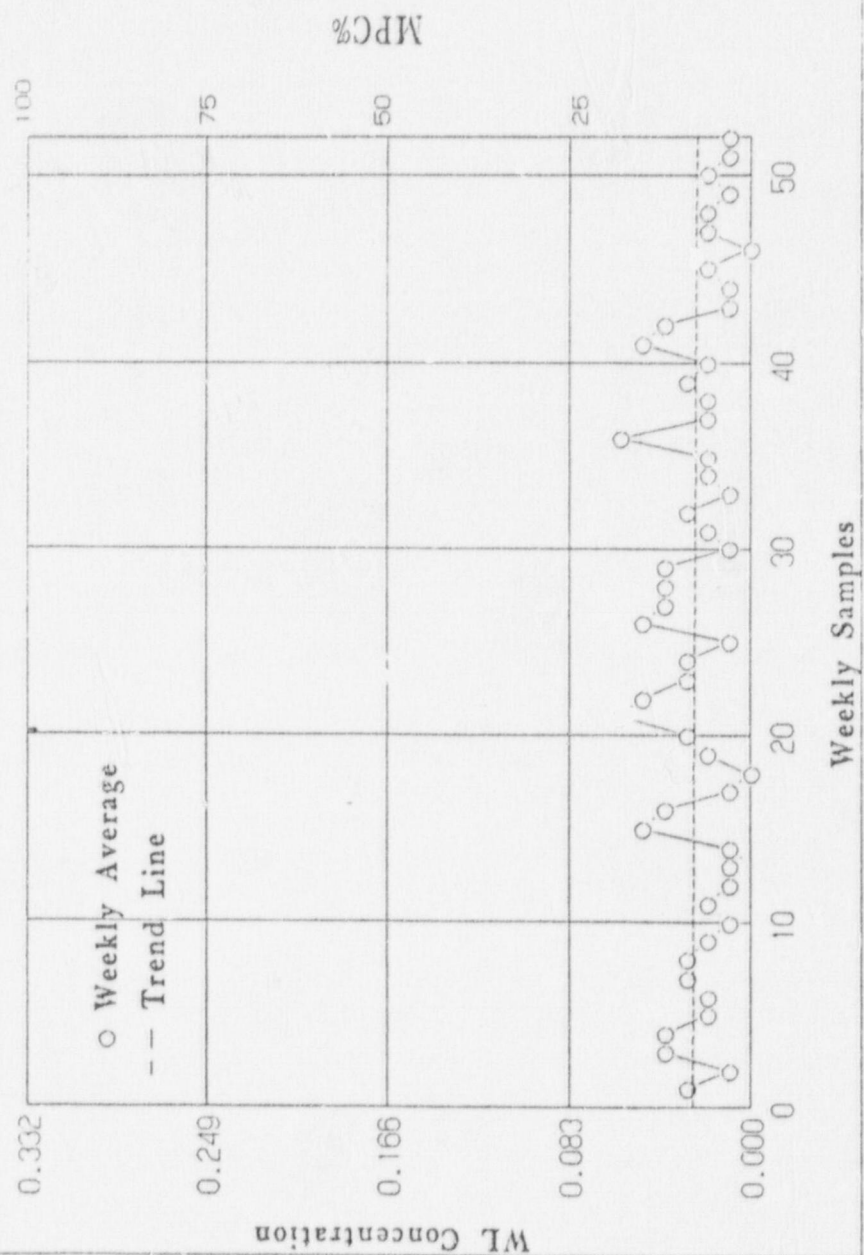
MILL IX PLANT - WL Concentration (1988)



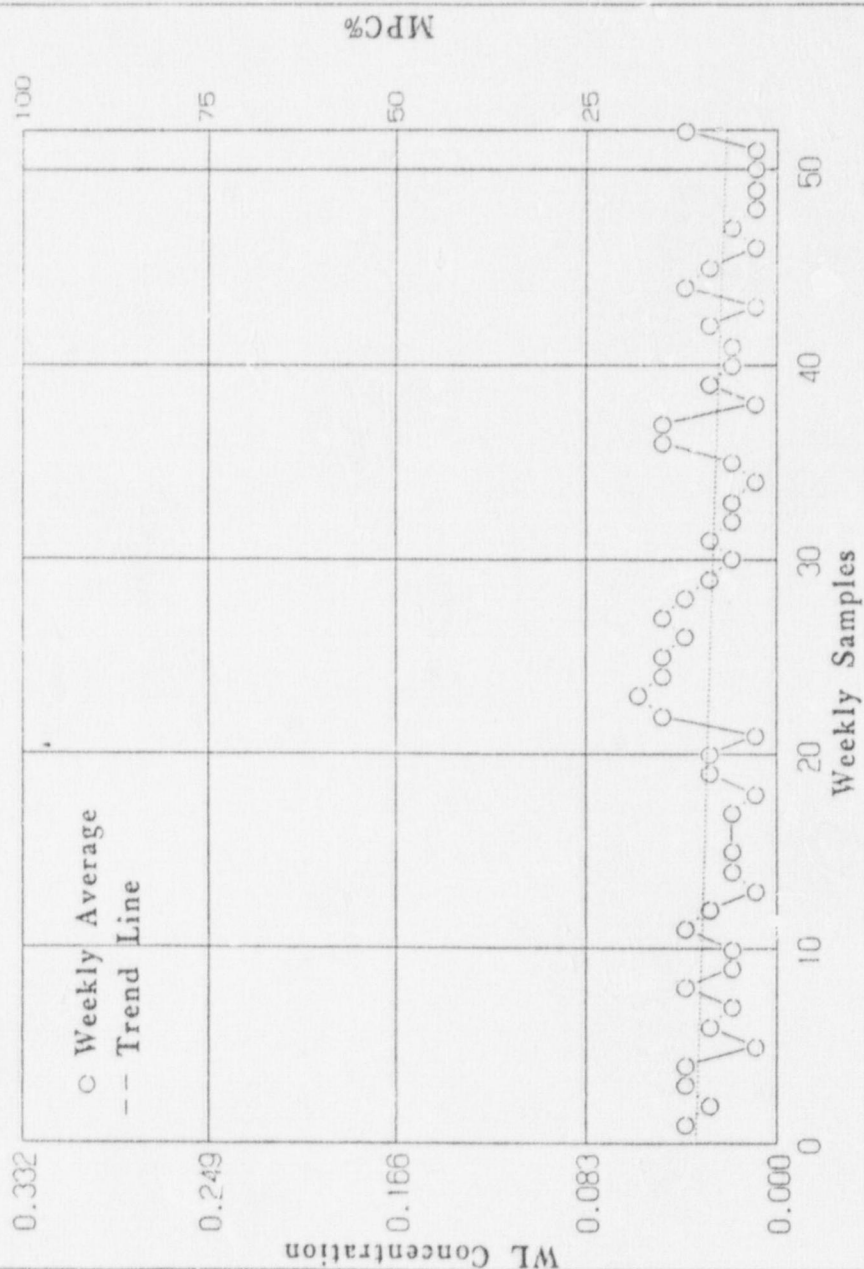
SECTION 35 IX PLANT - WL Conc. (1988)



YELLOWCAKE AREA - WL Conc. (1988)



CHEM LAB -- WL Concentration (1988)



YELLOWCAKE AREA - Gross Alpha (1988)

