

04008905570E

40-8905

QUIVIRA MINING COMPANY

POST OFFICE BOX 218 • GRANTS, NEW MEXICO 87020

RETURN ORIGINAL TO PDR, HQ.

January 31, 1991

Certified Mail
Return Receipt Requested # P 762 964 350

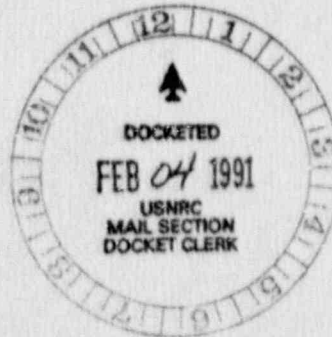
91

~~JAN 35~~

R.V. DRMA
RECEIVED

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

Re: License SUA-1473
Docket No. 40-8905
1990 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 1990 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 questions or need further information, please do not hesitate to call me at (505) 287-8851; extension 246.

Sincerely,

Peter Luthiger
Radiation Safety Officer

9102260191 910131
PDR ADOCK 04008905
C PDR

xc: R. Dauffenbach
M. Freeman
R. Luke
J. Ma
H. Whitacre
file

DESIGNATED ORIGINAL

Certified By Mary C. Ford

91-0235
[Handwritten initials]

250050

ALARA SUMMARY

January - December 1990

I. INTRODUCTION

The annual ALARA summary for Quivira Mining Company's Ambrosia Lake facility for calendar year 1990 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 31, 1991 by the facility ALARA audit committee. In attendance were Messrs. Hal Whitacre (General Manager), Ronnie Dauffenbach (Manager of Industrial Relations), Jonathan Ma (Mill Superintendent), Peter Lathiger (Radiation Safety Officer) and George Trujillo (Environmental Technician). 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 prescribed 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 fifty one (51) samples collected from yellowcake operators, foremen, and health physics personnel. All analytical results indicated that all sample 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.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 1

3. Airborne concentrations within the area are normally below 2% of the MPC for natural uranium.

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

Bioassay samples were also collected from reclamation personnel (11 samples) in February and personnel involved with the yellowcake drier project (8 samples) in April. Sample analyses indicated that all were below the lower detectable limit of < 5 ug/liter.

B. Personnel Alpha Contamination Checks

During the review period, there were a total of one hundred ninety four (194) 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.

With the exception of one survey, all checks were below the 1000 dpm/100 cm² guideline in Regulatory Guide 8.30. On January 5, one employee had indications of contamination on his clothes that was above the limit. As such, his clothes were laundered on site and resurveyed. The resurvey indicated that the contamination was successfully removed from the shirt. An investigation indicated that the contamination was an isolated incident, as a subsequent survey resulted in negligible contamination levels.

In addition to the random employee surveys by health physics personnel, there were 1017 self monitoring checks 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 486 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 1000 dpm/100 cm² and 1000 dpm/100 cm² respectively. However, a swipe of the women's yellowcake changeroom on

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 2

- March 13 yielded 270.3 dpm/100 cm², 27% of the action limit. A work order was issued to wash down the changeroom floor. A follow-up survey obtained results that were less than 25% of the action limit.

The women's yellowcake changeroom was removed in April, and substitute smear sampling locations were designated by Mr. Peter Garcia, NRC/UFRO. The new locations are the Slurry Loading Station and the Mill Office.

D. Radon Daughter Sampling

1. Mill IX Plant

The average weekly radon daughter concentration during 1990 was 0.032 wl as compared to 0.040 wl during 1989. This represents a 20 percent decrease in the yearly weekly average. The 1990 concentration is 9.7% of the annual MPC limit of 0.33 wl. There were a total of 284 sample determinations for the area. The highest annual exposure for employees during 1990 was 0.1 wlm or 2.5% of the annual limit. There was only one occasion during the year when the weekly radon daughter concentrations exceeded 25% of MPC or 0.083 working levels during the year. This occurred on January 17, 1990. The reason for the elevated levels was that the doors were closed due to cold weather. After opening some doors for additional ventilation, the building was resampled with the resultant average readings being below 0.083 wl.

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

2. Section 35 IX Plant

The 1990 average weekly radon daughter concentration was 0.038 wl as compared to 0.034 wl during 1989. This represents almost a 15% increase from the previous year. The 1990 working level average represents 11.5% of the annual MPC limit of 0.33 wl. There were a total of 176 sample determinations for the area.

Radon daughter sampling was discontinued at the Section 35 IX Plant due to the decommissioning of the plant

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 3

building. This decision was made after contacting Mr. Pete Garcia, NRC\UFRO.

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 slightly negative. This indicates that the working level concentrations were decreasing with time.

3. Yellowcake Area

During 1990, the yellowcake area had a weekly average radon daughter concentration of 0.022 wl. This was based on 261 sample determinations. This represents a 4.5% increase from the 1989 average weekly radon daughter concentration of 0.021 wl.

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 flat which indicates that the airborne concentrations are rather constant through time.

4. Chem Lab

The weekly radon daughter concentration average for the year was 0.022 wl based on 92 sample determinations. The 1989 average weekly radon concentration was 0.027 wl. This is a reduction of 18.5%.

As shown in the Appendix A, the trend line is flat, or in other words, the radon daughter concentrations are relatively constant through time.

5. Raffinate Building

Radon daughter samples were collected weekly within this area. These samples were used to determine radon daughter exposure due to the receiving raffinate material from Sequoyah Fuels. The 1990 weekly average radon daughter concentration was 0.010 wl, compared to 0.015 wl for 1989. A total of 52 samples were collected. This represents a 33% reduction from the previous year. Weekly samples will continue to be collected in the area

during the period in which raffinate shipments are received.

Contained in Appendix A is a trend line of the weekly concentrations for the raffinate building. The slope of the line is slightly negative which indicates the normally minimal airborne concentrations are decreasing through time.

6. General Shop

The weekly radon daughter concentration average at the shop was 0.015 wl. A total of 89 measurements were made during the year. The annual average at the shop during 1989 was 0.012 wl. This represents a 20% increase.

Presented in Appendix A is the trend line of weekly concentrations within the area. The line is slightly negative indicating that airborne concentrations are decreasing with time.

7. Leach Building

Quarterly radon daughter sampling indicated slightly elevated levels within the leach building. For this reason, weekly sampling was implemented on March 13, 1990. The average weekly radon daughter concentration was 0.033 wl. This represents 10% of the MPC limit.

Attached in Appendix A is a trend line of the weekly concentrations for the leach building. The slope of the line is positive, which indicates the concentrations are increasing through time. Because of the abnormal upward trend, the leach building will be closely monitored to ensure radon daughter concentrations are maintained to a minimum. In addition, methods designed to reduce radon concentrations within the leach building are being investigated.

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 4.1% of MPC.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 5

The weekly airborne concentrations are shown in Appendix A. As indicated from the graph, the line is slightly negative, or decreasing through time. The slightly elevated readings during April correspond to activities associated with the yellowcake dryer.

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

There were four (4) quarterly removable alpha contamination surveys conducted during the year with a total of 80 samples collected. These samples are taken to ensure that contamination has not accidentally been spread outside the confines of the controlled areas into uncontrolled areas. The results indicated that all samples were below the specified limits.

H. Gamma Surveys

There were two semiannual gamma surveys conducted during the year as suggested by Regulatory Guide 8.30. A total of 68 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.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 6

TABLE 1
1990 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	1	0	0	0	0	0	0	0
Mine	2	0	0	0	0	0	0	0

B. Gamma Dose

Gamma doses are determined by the results of individual 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 1990 gamma dose.

TABLE 2
1990 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	25	15	1	0	0
Mine	12	1	0	0	0

The highest annual gamma dose incurred was 0.32 rems. This represents 6.4% of the annual limit. Based on the annual dosages within the mill, and in accordance with 10 CFR 20.101(a) which requires gamma badging only if it is 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.

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 4.1 percent of the 40 hour MPC limit.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 7

IV. MISCELLANEOUS ALARA ACTIVITIES

A. Daily Inspections

During the year, daily inspections and sample surveys resulted in 24 mill corrective orders being issued. Mill corrective orders are normally issued when an area requires clean up and that item involves radiological conditions which are approaching or exceed the recommended regulatory guide limits. Mill corrective orders are issued when the job does not require a RWP.

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

B. Safety and Training Activities

During the year, there were five (5) new employees hired. All individuals were given the MSHA "Newly Hired Experienced Miner Training" course. Each of these individuals also received training as required by Quivira's "Radiation Safety Training Program".

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 Standard Operating Procedures (SOP) and Emergency Response Actions have been reviewed and updated.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 8

E. Miscellaneous Activities

The yellowcake dryer underwent retrofitting and performance testing in April 1990. All tests were performed under Radiation Work Permits (RWP's) and each test was performed under the supervision of the facility Radiation Safety Officer (RSO). During each test, extensive airborne sampling was performed, including high volume air samples and personnel lapel samples.

License No. SUA-1473

Docket No. 40-8905

Date 01/31/91

Page 9

APPENDIX A

License No. SUA-1473

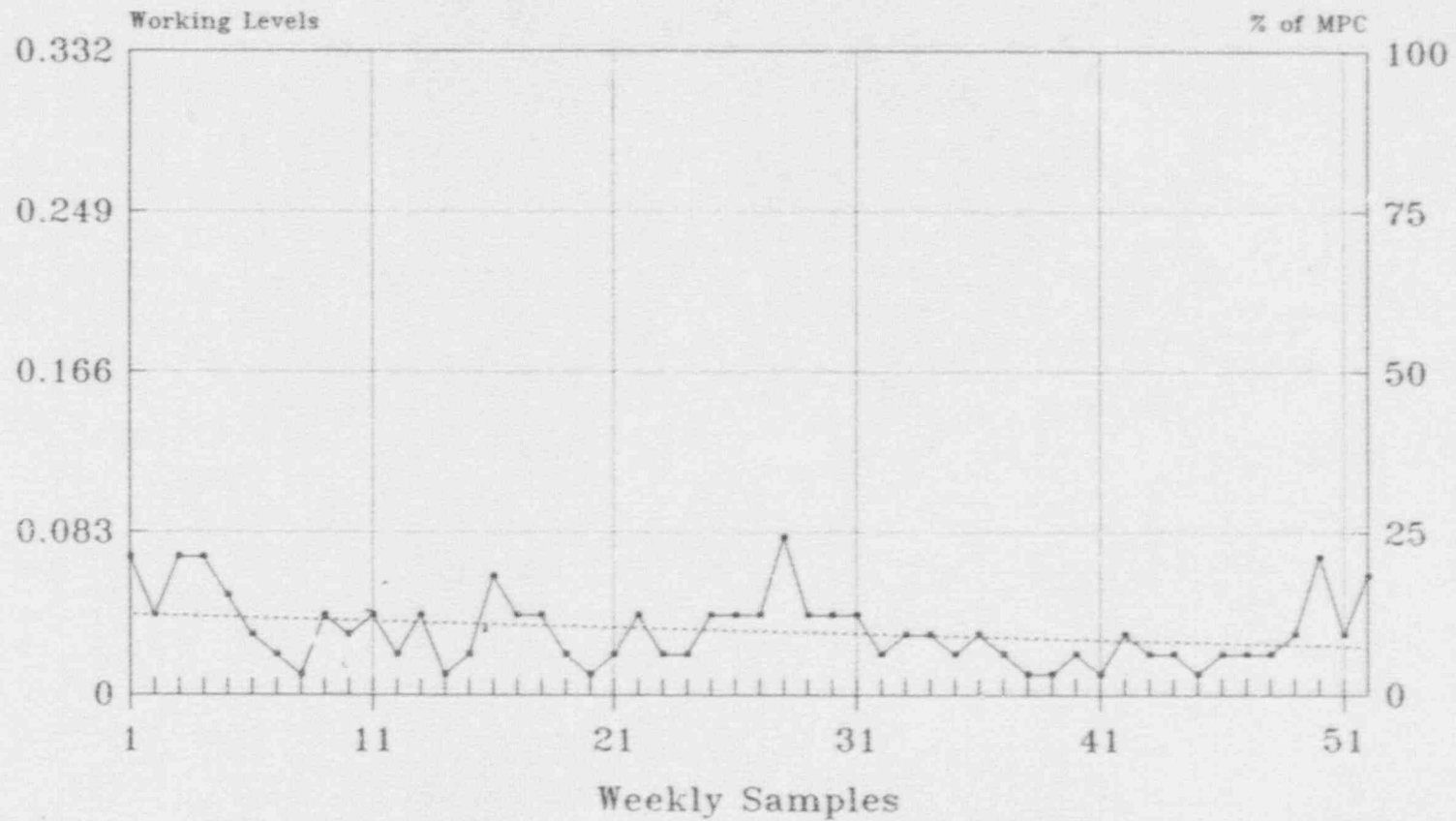
Docket No. 40-8905

Date 01/31/91

Page 10

MILL IX PLANT

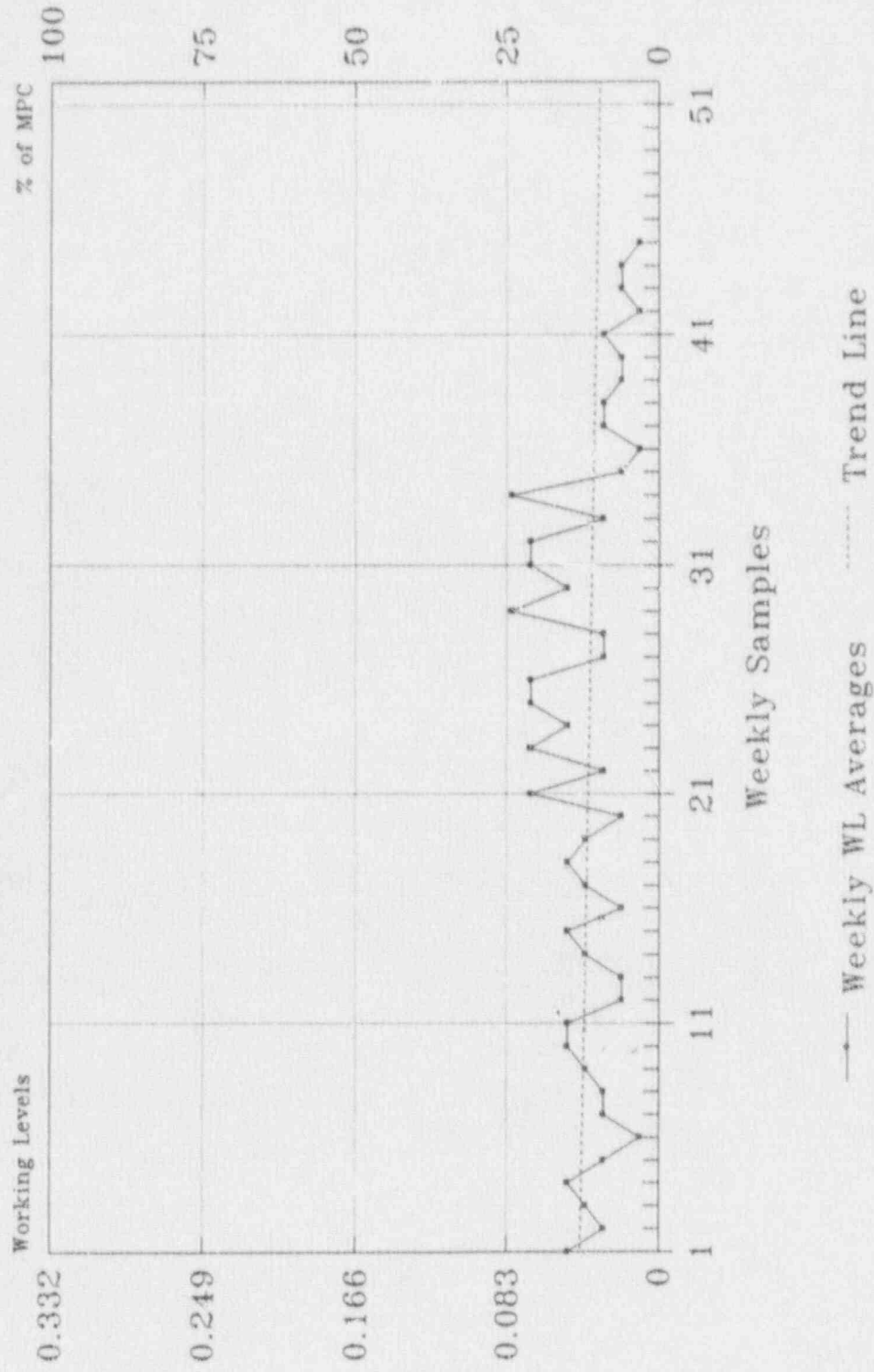
WL Concentrations - 1990



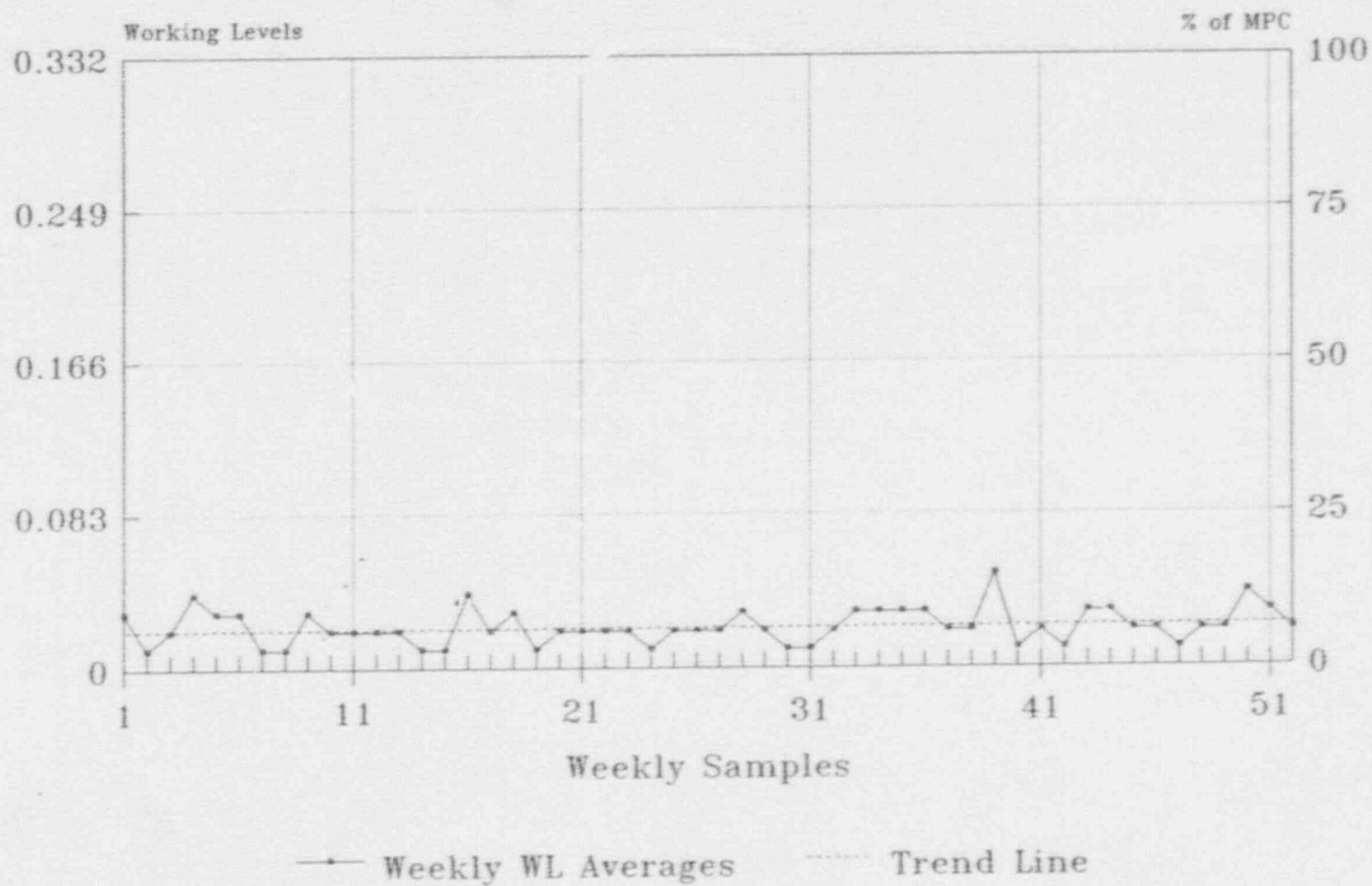
Weekly WL Averages Trend Line

SECTION 35-36 IX PLANT

WL Concentrations - 1990

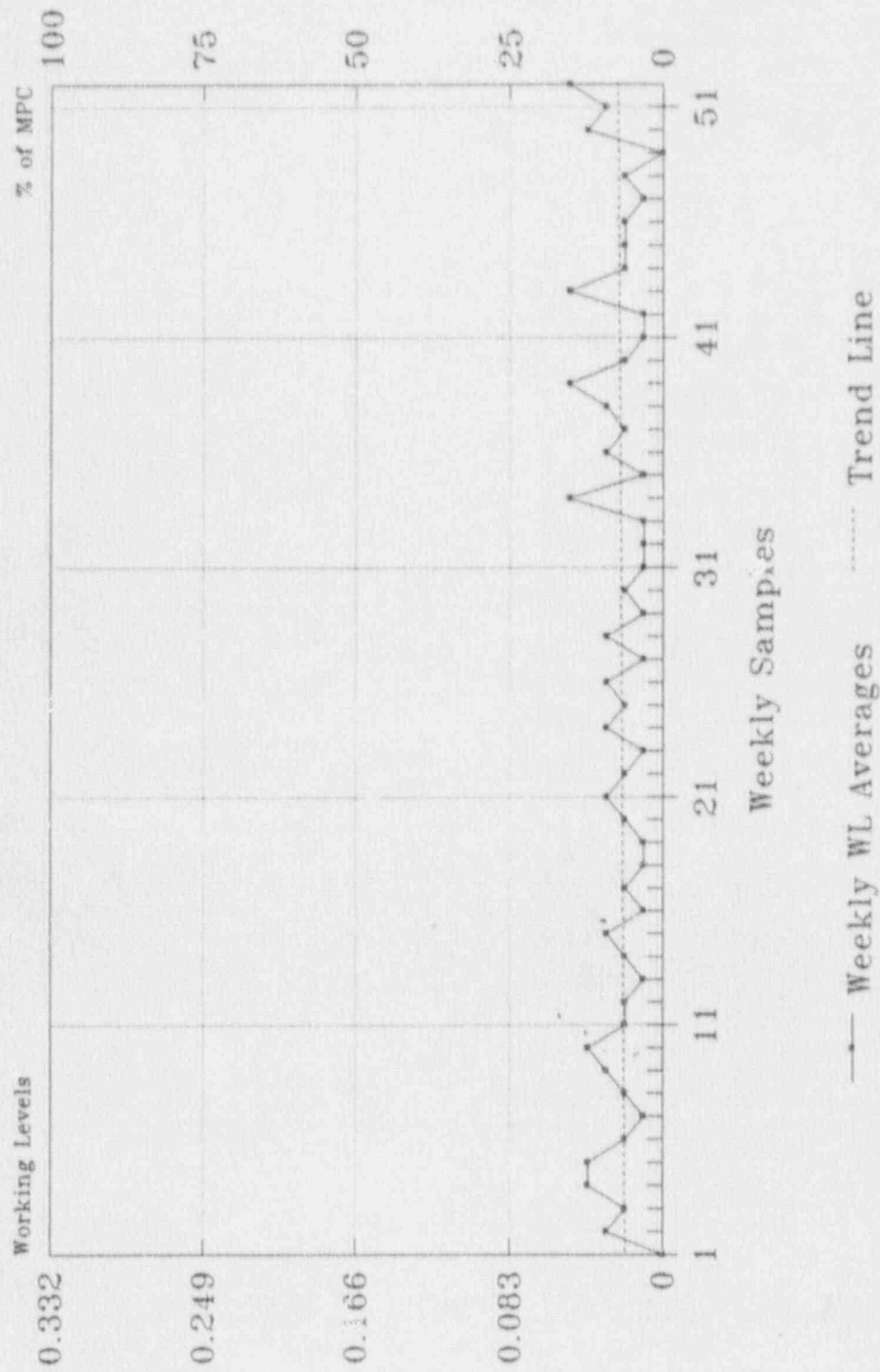


YELLOWCAKE AREA WL Concentrations - 1990

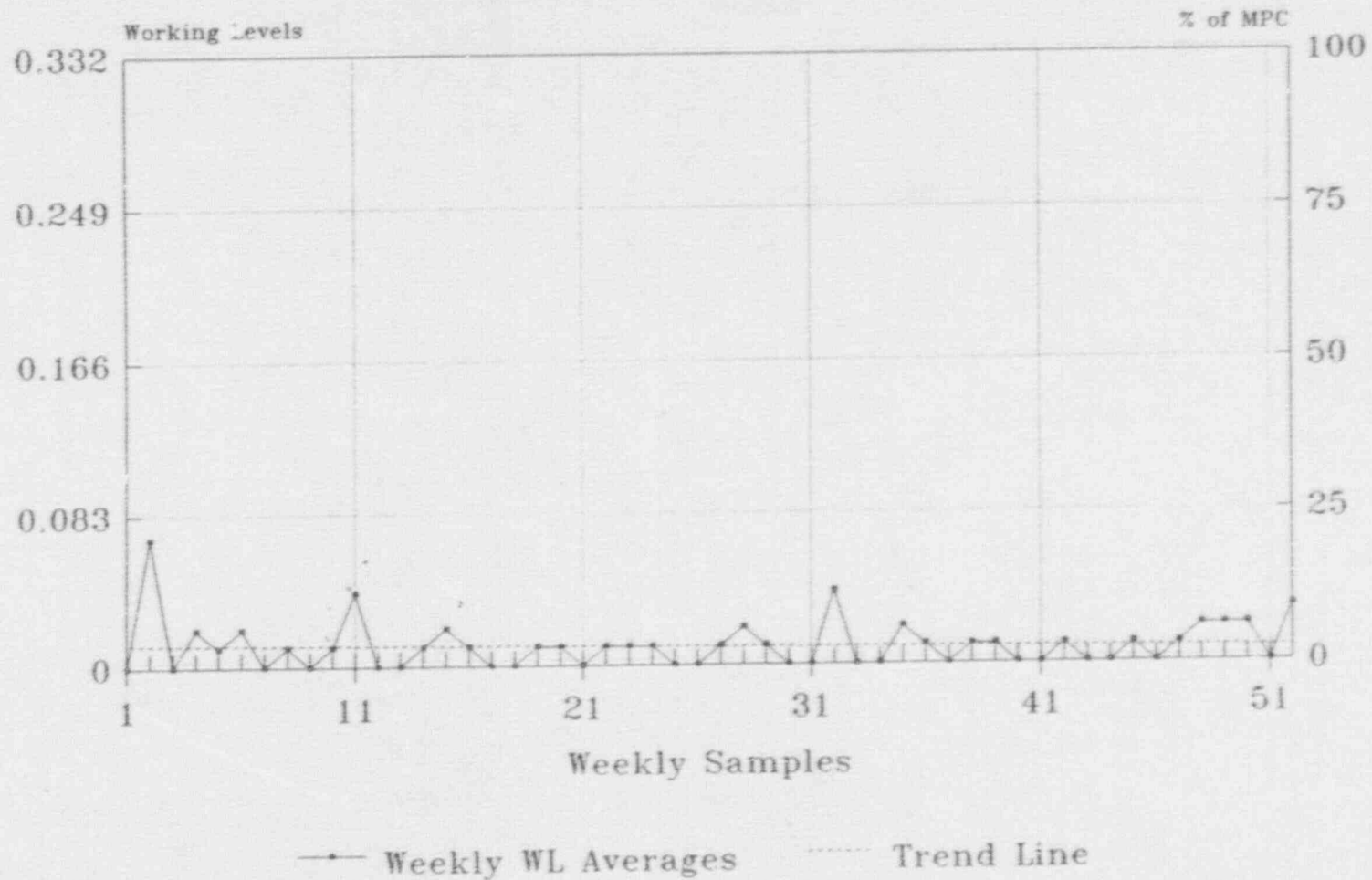


CHEM LAB

WL Concentrations - 1990

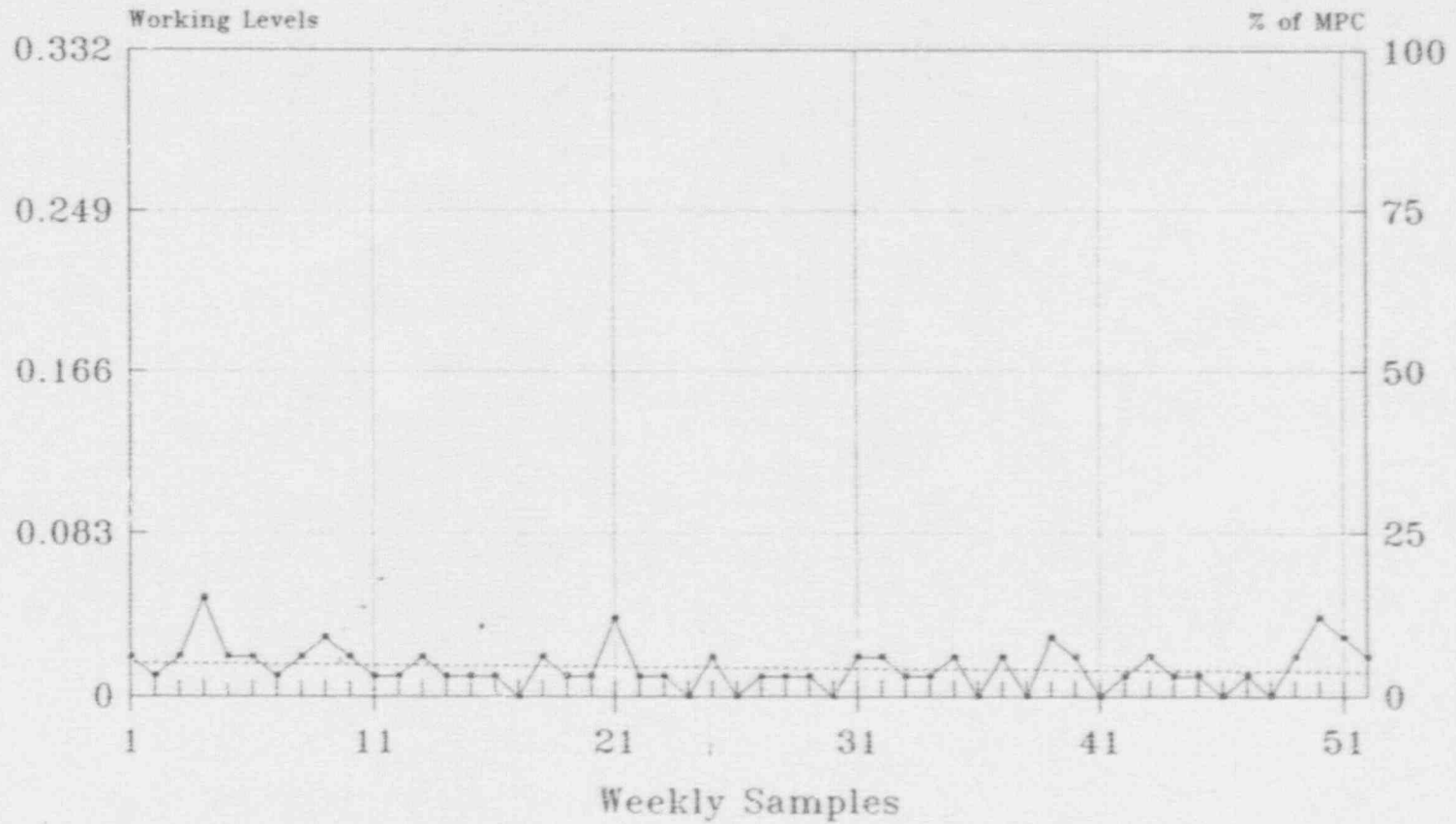


RAFFINATE BUILDING WL Concentrations - 1990



GENERAL SHOP

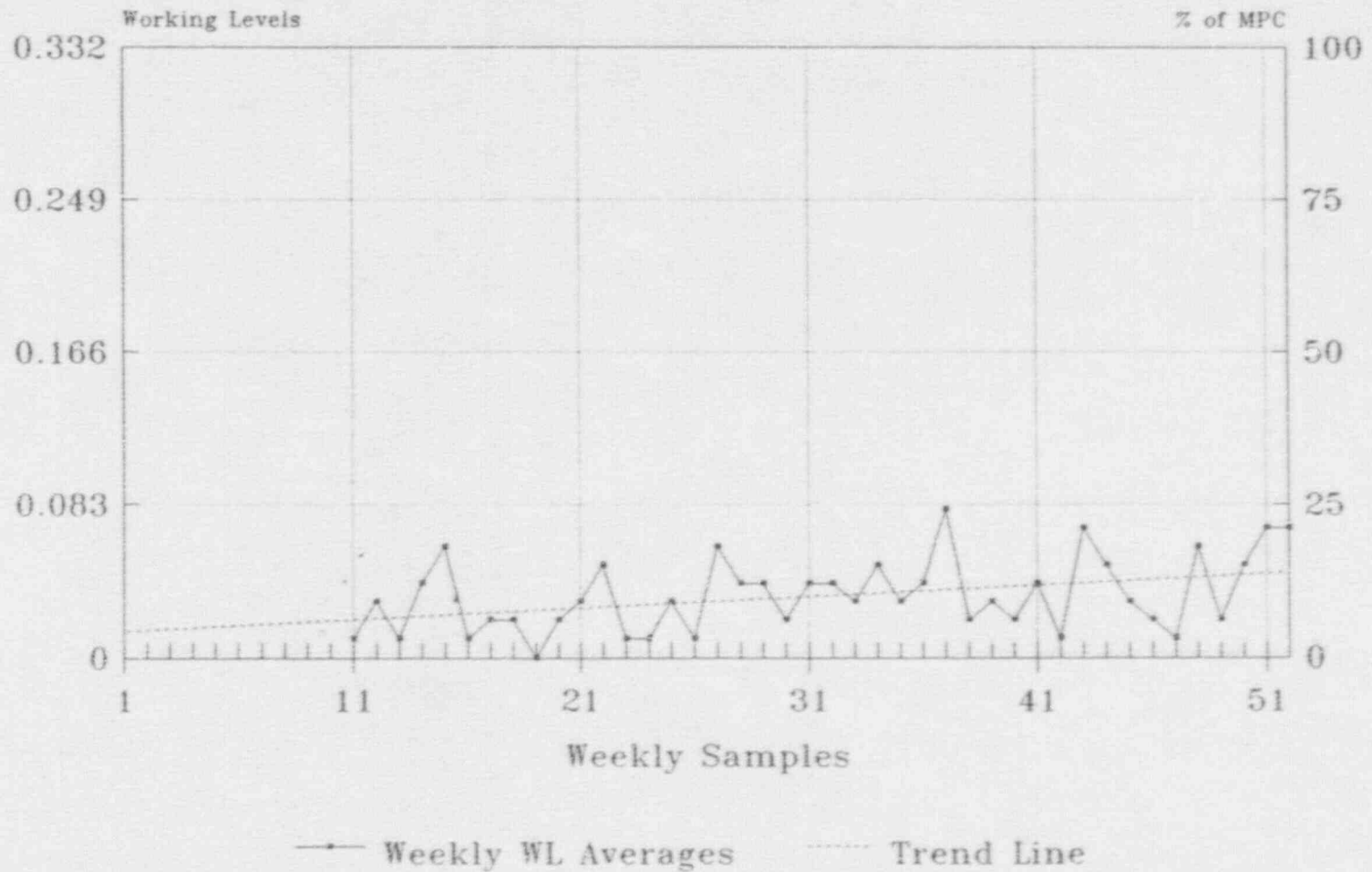
WL Concentrations - 1990



—•— Weekly WL Averages - - - - - Trend Line

LEACH BUILDING

WL Concentrations - 1990



YELLOWCAKE AREA

YC Concentrations - 1990

