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Quivira Mining Company

January 31, 1991

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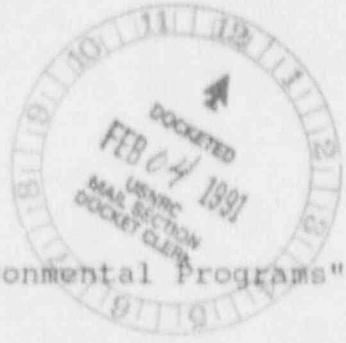

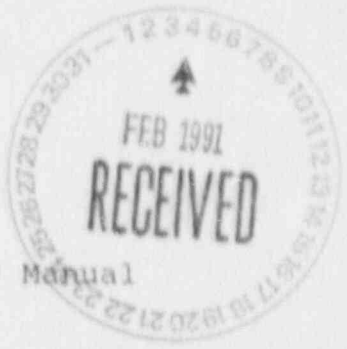

Mr. Ramon Hall, Director
Uranium Recovery Field Office
U. S. Nuclear Regulatory Commission
Box 25325
Denver, Colorado 80225

Re: Revised "Health Physics and Environmental Programs" Manual
License SUA-1473
Docket No. 40-8905

Dear Mr. Hall:

Attached are the necessary changes and addendum to Quivira Mining Company's August 20, 1990 submittal requesting revisions to its "Health Physics and Environmental Programs" Manual for its Ambrosia Lake, New Mexico facility.

The included changes and addendum within the"Health Physics and Environmental Program" Manual are described below.

Page	Change or Addendum
Page 2-18	Incorporating as Appendix A, the facility Bioassay Program;
Page 3-12	Changing the Lower Level of Detection (LLD) for alpha contamination to 100 dpm/100 cm^2;
Appendix A	Incorporation of the Bioassay Program into the manual.

These changes were made as per my telephone discussions with Mr. Pete Garcia of your staff on January 28, 1991. If you have any questions please call me at (405) 842-1773.

Sincerely,

Bill Ferdinand

Bill Ferdinand, Manager
Radiation Safety, Licensing
& Regulatory Compliance

Attachments: (5) Copies

xc: M. Freeman\file
P. Luthiger
H. Whitacre

Add Info
91-0233

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outlined in "Radioactivity in Effluents to Unrestricted Areas", 10 CFR 20.106 and "Environmental Radiation Standards for Nuclear Power Operations", 40 CFR 190.10.

2.4.10 **Respiratory Protection**

The RSO and health physics staff shall be responsible for the implementation, maintenance, and care of the facility respiratory protection program. The Quivira Mining Company, Ambrosia Lake Operations "Respiratory Protection Program" is hereby referenced and made part of the ALARA program.

2.4.11 **Bioassay Procedures**

The RSO and health physics staff shall be responsible for the implementation, maintenance, and care of the facility bioassay program. Quivira Mining Company's, Ambrosia Lake Operations "Bioassay Program" is attached in Appendix A.

2.4.12 **Daily Mill Inspection**

The mill inspection is conducted daily during normal scheduled work day of the Radiation Safety Officer (RSO) or designee. The purpose of the daily walk through inspection is to ensure proper implementation of radiation safety, hygiene, and standard operating procedures.

The inspection is primarily a visual inspection to ensure that process designs and procedural

the direct counts being displayed on a LED scaler. The net resultant counts are recorded with the appropriate action taken if needed.

The sampling and analytical methods used shall have a lower limit of detection (LLD) equal to those listed in Table 3-1.

Table 3-1
Lower Limit of Detection

Type of Survey	LLD
1. Uranium Ore Dust (Gross Alpha Activity)	1×10^{-11} pCi/ml
2. Yellowcake (Gross Alpha Activity)	1×10^{-11} pCi/ml
3. Radon Daughters	0.03 WL
4. Gamma Radiation	0.1 mR/hr.
5. Alpha Contamination	100 dpm/100 cm^2
6. Respirators	100 dpm/100 cm^2

QUIVIRA MINING COMPANY

AMBROSIA LAKE FACILITY

AMBROSIA LAKE, NEW MEXICO

BIOASSAY PROGRAM

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

The objective of the Bioassay Program is to determine internal exposures, limit the amount of internal exposure, ascertain the effectiveness of the health physics program, and to qualify the success of the respiratory protection program.

The bioassay program is to be used as an assistance to the air sampling program to insure that exposures are maintained As Low As Reasonably Achievable (ALARA). In those cases in which air sampling results indicate that an action level has been exceeded the bioassay program will ultimately help to decide the course of action to be taken by the Radiation Safety Officer (RSO).

In order to qualify those individuals required to submit bioassay samples, certain provisions must be set forth regarding the job assignment, circumstances involving potential exposures, and sampling results from the health physics program. These provisions are outlined in "Section 3.0 Policy Statement".

1.2 Scope

This manual provides general guidance for the dispensing, collecting, analyzing, reporting, and taking positive actions to prevent or to minimize exposures from ingestion or inhalation of yellowcake. The areas covered within this guide include policy statement, operating procedures,

sample preparation, quality assurance, action levels, and administration of the program. The program also defines the employees including yellowcake operators, maintenance personnel, respirator users, and other individuals deemed necessary by the RSO to submit a bioassay.

2.0 DEFINITIONS

Action Limits - Predefined limits which dictate a course of action based on analytical results from bioassay results.

ALARA - As Low As Reasonable Achievable

Bioassay - As used in this guide a sample of urine voided into a collection bottle and analyzed for uranium content.

Bioassay Sample Kit - This kit contains the items necessary to give a urine sample. Included is a plastic zip lock bag and within the bag is a sample collection bottle and sample collection form.

Contract Lab - An independent lab not associated with the company which performs the analytical work on the bioassay samples.

Control Sample - A sample which has a predefined quantity of contamination which is used for quality control comparisons.

Controlled Yellowcake Area - As used in this guide, it is the area in which yellowcake is precipitated through yellowcake drying-storage.

Health Physics - A branch of science dealing with the protection of the environment and workers from the hazards of radiological effects.

Radiation Safety Officer (RSO) - Individual assigned responsibility and is experienced in the implementation, maintenance, and direction of health physics programs within the confines of a restricted uranium fuel cycle operation.

3.0 POLICY STATEMENT

3.1 Routine Operations

It is the policy of Quivira Mining Company that all individuals who are assigned duties involving yellowcake precipitation and or packaging will be required to submit bioassay samples. Routine operations include normal production activities which are generally repetitive and are carried out under acceptable conditions. For such operations, potential airborne hazards should be maintained at acceptable concentrations through the utilization of engineering controls.

Yellowcake operator duties are considered a routine operation, and as such, bioassay samples are required from all yellowcake operators. During the use of the dryer to produce dried yellowcake material, bioassays will be collected and evaluated on a monthly basis. When yellowcake product is produced and maintained in slurry format, bioassays will be collected on a quarterly basis. In either event, when health surveys indicate a yellowcake operator(s) exposure to airborne concentrations of U-Nat exceeds 25 percent of MPC as listed in 10 CFR 20, Appendix B, Table 1, bioassay samples will be required for that operator(s) on a semimonthly basis. The semimonthly collection frequency will continue during yellowcake production activities until three consecutive routine health physics surveys indicate exposures to airborne concentrations are below 25 percent of the MPC.

3.2 Non-Routine Operations

Non-routine operations include non-production activities that occur infrequently or occur at times when engineering controls are impractical or inoperable. This includes maintenance activities which are required to maintain or regain control of normal production activities. For such operations, the use of respirators to avoid excessive exposure to airborne hazards may be appropriate.

Accordingly, all personnel performing duties within the confines of the controlled yellowcake area shall be required to submit bioassay samples if required by the Radiation Work Permit (RWP).

3.3 Emergency Operations

Emergencies are unexpected occurrences which may require the use of respirator protection to limit the inhalation of airborne material and which may potentially pose hazardous health consequences. These situations include but are not limited to shipping accidents, tailings failures, and process releases. In each of these cases the seriousness of the emergency, and the potential health hazard shall dictate the appropriateness of a bioassay sample. The final determination will be made by the RSO.

4.0 OPERATING PROCEDURES

4.1 General

All bioassay equipment used in this program shall be issued to individuals from the Respirator Room which is located adjacent to the mill guard house or other designated area as determined by the RSO. Only trained health physics personnel or their designees will be responsible for maintaining the equipment in proper working order, sample preparation, and sending samples out for analyses.

4.2 Mill Distribution and Collection

The mill supervisors have the ultimate responsibility for insuring that each employee who is required to submit a bioassay sample, does so.

Only health physics personnel, mill supervisors, or the security guard under the direction from either of the before mentioned titles may issue bioassay sample bottles to individuals. The sample bags containing the collection bottle will be marked with the individuals name.

The individual shall void into the bottle the morning he or she is scheduled to return to work after their regular scheduled days off. In any event, the collection should be between 48 and 96 hours.

Additionally, the employee will indicate on the paper enclosed within the sample kit bag, the date of voiding. The sample will be returned to the health physics department for processing. In the event an individual fails to return the bottle as scheduled, the individual shall submit a sample at the mill change rooms before proceeding to the job.

5.0 SAMPLE PREPARATION

Only trained health physics personnel or their designee will prepare the sample kit bags for distribution. The following procedures shall be used in preparing the kit:

1. Obtain clean plastic zip lock bags and legibly write the individuals name on the outside of the bag;
2. Enclose a clean sample bottle within the zip lock plastic bag;
3. Place within the bag written instructions which direct the employee on the procedures to give the sample;
4. Seal the bag to prevent contamination;
5. Store the bag in a clean environment;
6. Make arrangements that either you, or the supervisor, or the security guard will distribute the kit to the proper employee at the end of shift on last day before their scheduled days off;
7. Properly fill out the Bioassay Sample Record form with all pertinent information.

6.0 QUALITY ASSURANCE

Up to four quality control samples can be submitted with each batch of routine samples sent to the contract lab for analysis. The quantity amount of control samples to be sent will be dictated by the size of the batch sent in for analysis. It is recommended that one control sample be sent per three bioassay samples.

The quality control samples may be provided by Quivira Mining Company or an outside laboratory. The control samples should be divided into four concentrations, uncontaminated, 15, 30, and 45 micrograms per liter of uranium. Additionally, it is recommended that other urinalysis samples be periodically collected from individuals who are not connected or have dealings with the operations.

If the analyses of the quality control samples consistently are in error by more than 30 percent, the contract lab will be notified of the discrepancies and will be asked to investigate and correct the problem. Should it be discovered the problem exist at the contract lab and the problems continue to persist, then analytical services will be redirected towards another accredited lab.

7.0 ACTION LIMITS

Bioassay results shall be carefully reviewed and appropriate action will be taken if the results exceed predefined levels, and are determined to be correct. If there is doubt as to the correctness

of a bioassay result, an investigation will be initiated which may include a conference with the affected employee and or his/her immediate supervisors.

The following table describes the actions and levels which will be taken on those sample deem legitimate.

TABLE I - CORRECTIVE ACTIONS BASED ON URINARY URANIUM RESULTS

Urinary Uranium Concentration	Interpretation	Actions
Less than 15 µg/L	Uranium confinement and air sampling programs are indicated to be adequate.	None. Continue to review further bioassay results.
15 to 35 µg/L	Uranium confinement and air sampling may not provide an adequate margin of safety..	1. Confirm results (repeat urinalysis). 2. Identify the cause of elevated urinary uranium and initiate additional control measures if result confirmed. 3. Determine why air samples were not representative and did not warn of excessive concentrations of airborne uranium. Make corrections. 4. Determine whether other workers could have been exposed and perform bioassay measurements for them. 5. Consider work assignment limitations until the worker's urinary uranium concentration falls below 15 µg/L. 6. Improve engineered protection or respiratory protection program as investigation indicates.
Greater than 35 µg/L	Uranium confinement and perhaps air sampling programs are not acceptable.	1. Take the actions given above. 2. Continue operations only if it is virtually certain that no other worker will exceed a urinary uranium concentration of 35 µg/L. 3. Normal work assignments are applied until confirming sample results are reviewed. If the confirming sample is greater than 35 ug/l, immediate work restrictions would be applied.
Confirmed to be greater than 35 µg/L for two consecutive specimens, confirmed to be greater than 130 µg/L for any single specimen, or air sampling indication of more than a quarterly limit of intake	Worker may have exceeded regulatory limit on intake.	1. Take the actions given above. 2. Have urine specimen tested for albuminuria. 3. If any sample is greater than 130 ug/l immediate work restrictions would be applied until confirmation samples are less than 35 ug/l.

8.0 QUALIFICATIONS OF ADMINISTRATOR

Responsibility for the bioassay program shall be vested in one individual having experience in health physics and/or environmental engineering, and/or industrial hygiene. The responsible individual must have the authority, ability, training, and experience to:

1. Evaluate and interpret bioassay results including:
   a. Excessive levels are legitimate.
   b. Excessive levels caused by purposeful contamination.
   c. Excessive levels caused by problems with the respiratory protection equipment.

2. Ability to confer with affected employee(s) and supervisor(s) in order to ascertain and alleviate problems, and review corrective measures.

3. Require additional bioassay samples based on interpretations of bioassay and/or air sample results.

4. Recommend corrective Actions.