

Rio Algom Mining Corp.

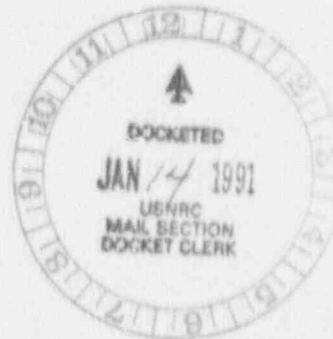
40-8905

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January 14, 1991

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Mr. Ramon E. Hall, Director
Uranium Recovery Field Office
U.S. Nuclear Regulatory Commission
Region IV
Lakewood Office Plaza
730 Simms St., Suite 100
Golden, Colorado 80401



91 JAN 15 11:01 AM

RIV DRMA RECEIVED

Re: Ambrosia Lake Facility
License SUA-147, Docket 40-8905
Detection Monitoring Plan

Dear Mr. Hall:

Quivira Mining Company submits the following proposed "Detection Monitoring Plan" for the Section 4 evaporation pond area in accordance with your letter dated November 16, 1990.

The attached "Detection Monitoring Plan" proposes groundwater monitoring locations both upgradient and downgradient of the Section 4 evaporation pond disposal area. The downgradient monitoring well is proposed as the point of compliance for the disposal area. In addition, Quivira proposes to monitor those Criteria 13 hazardous chemical constituents which are associated with the Ambrosia Lake milling solutions and previously reported to the NRC as being present in the alluvium.

However, Quivira requests a clarification of NRC's petition to propose a "Detection Monitoring Plan" for the Section 4 evaporation pond disposal area, as this area already has an approved point of compliance well, MW-24. The point of compliance well, MW-24, was proposed in our submittals of January 29 and June 10, 1988 to your office and subsequently approved as the point of compliance for the Section 4 evaporation pond area by NRC on September 7, 1988 in the form of licence amendment 9, condition #34, paragraph A.

In addition, groundwater protection standards have previously been established for the alluvium by NRC. NRC established alluvial groundwater standards within license amendment #11 on February 17, 1989. In light of these facts, it is not clear as to the necessity of proposing a new "Detection Monitoring Plan" for the Section 4 evaporation pond area.

DESIGNATED ORIGINAL

91-0189

6305 Waterford Boulevard, Suite 325, Oklahoma City, Oklahoma 73118 • (405) 848-1190 • FAX (405) 848-1208

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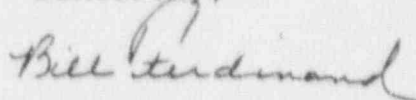
Mr. Ramon Hall
January 14, 1991
Page 2

Finally, Quivira does not concur with the conclusion within the NRC November 19, 1990 letter that elevated chloride and possibly sulfate and TDS concentrations in monitor well MW-20 are probably due to pond leakage. The analysis of the data does not support this conclusion. A review of the data indicates that the two year average chloride concentration is 164 mg/l while the evaporation ponds chloride concentration is historically approximately 37,000 mg/l. Since chloride is a conservative parameter, very soluble and relatively inert, Quivira believes that any leakage within the liners would be readily identifiable.

Quivira believes this is also true for the sulfates and TDS concentrations as the historical average for this well are 2,600 and 4,400 mg/l while the evaporation ponds contain 165,000 and 280,000 mg/l respectively. In addition, the evaporation ponds on either side of this well contain have an average pH near 1.0, and although there is some natural attenuation, if there was a leak in either pond, the pH of this well would not have remained relatively constant at 7.0.

These questions are being asked in order to clarify the issues and to reduce the potential for duplication and waste of resources that may be otherwise unnecessarily expended. If you have any questions or need further information please call me at (405) 842-1773.

Sincerely,



Bill Ferdinand, Manager
Radiation Safety, Licensing
& Regulatory Compliance

BF:
Attachments: (5 copies)

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

QUIVIRA MINING COMPANY

Source Material License SUA-1473

Docket No. 40-8905

Detection Monitoring Plan

Section 4 Evaporation Ponds Disposal Area

Introduction

Quivira Mining Company operates mill tailings impoundments and evaporation ponds management areas as shown in Appendix A. The evaporation pond management area includes the Section 4 evaporation ponds. The Section 4 evaporation ponds, numbered #11 through #21, are located approximately two miles east of the mill facility on Section 4, Township 13 North, Range 9 West. These lined ponds had been used in conjunction with the milling of conventionally mined ores to contain process solutions.

Evaporation ponds #11-#15 were initially built in 1976 and constructed using 10 mil PVC and 20 mil CPE for the bottom and side slopes respectively. A one foot thick cover of compacted alluvial soil was placed over the PVC bottom liners for additional protection. Evaporation ponds #16-#21 were built in 1979 and were constructed using a bottom liner composed of 20 mil PVC. The bottom liner was again covered with one foot of compacted alluvial soil cover. The side slopes were constructed using a reinforced

36 mil Hypalon liner. The liner was reinforced with nylon scrim. Section 4 evaporation ponds were permitted and constructed under the New Mexico Environmental Improvement Division (NMEID) Discharge Plan - 71 and the Agreement State source material license SUA-616.

Hydrogeology Setting

Although the lithologic units and hydrogeology of the area have been thoroughly described in previous submittals, Quivira believes it is useful to briefly discuss the geology underlying the Section 4 evaporation pond disposal area. For more in-depth and detailed description of the alluvium, Quivira wishes to incorporate for reference the Corrective Action Plan submittal dated September 25, 1989.

The geologic units underlying Section inclusive of mining activity range in age from the Jurassic to Recent. This lithologic section as shown in Figure 1 is representative of that found throughout the Ambrosia Lake mining district.

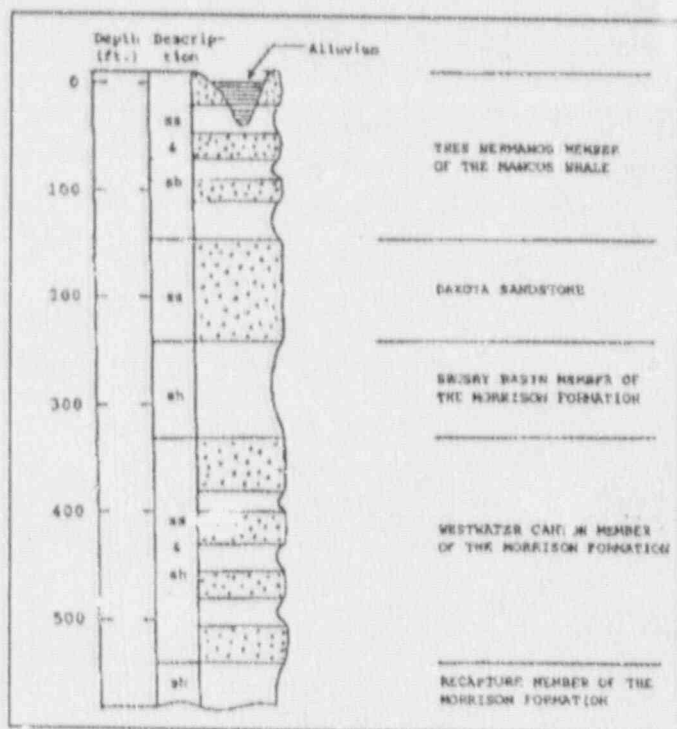


Figure 1 - Area Lithologic Units

The Morrison formation of the Jurassic age forms the lower most part of the units of interests in the area. The Morrison formation is composed of three distinct members including in ascending order the Recapture, the Westwater Canyon, and the Brushy Basin. The Recapture and Brushy Basin members are characterized as being fine grained, low permeability which confine the ground water to the Westwater formation. In the Ambrosia Lake area, the sands in the Westwater Canyon contains the uranium ore which is extracted primarily by conventional mining techniques

Above these members is the Dakota sandstone. It is characterized as a fine grained, clean sandstone with fair to good permeability.

In turn, this is overlain by the Mancos Shale formation. The Mancos Shale has a very low permeability and serves as an upper aquiclude to confine Dakota ground water. Within the Mancos Shale are three beds of silty sandstone known as the Tres Hermanos Sandstone member of the Mancos Shale. The three sandstone lenses are referred to as the A, B, and C in ascending order. The sandstone is characterized as being fine grained with low permeability.

This section is capped by alluvial material of clay, sand, silt with an occasional layer of gravel. Available information indicates that this unit was void of water prior to mining activity within the area and confirmed by subsequent drilling of monitoring wells in areas unaffected by mining or milling operations. The Section 4 evaporation ponds rest entirely upon alluvial material ranging in thickness from approximately 10 to 60 feet.

Location of Water Courses and Discharges

Several current and former water discharge point are noted which discharge into the alluvium within one mile of the Section 4 evaporation pond disposal area.

The first of these discharges is through an U.S. Environmental Protection Agency (EPA) issued National Pollution Discharge Elimination System (NPDES) permitted outfall associated with the

Ambrosia Lake facility. The NPDES discharge waters flow into an ephemeral stream bed, Arroyo Del Puerto, approximately 1/4 mile west of the disposal area.

The other water discharge into the area was from early mine dewatering and heap leach operations from several sites north and northeast of the Section 4 evaporation pond disposal area. These discharges were upgradient of the Section 4 disposal area. In addition to these upgradient water discharges, the land on Section 34, which is also upgradient of the disposal area, has been since 1987 used as irrigated farm land.

Detection Monitoring Plan

A. Background Monitoring Well

Quivira proposes that monitor well MW-29 be accepted as the background monitor well. This well is located upgradient of the disposal area and would represent typical background ground water quality for the disposal area. The well location is shown in Appendix A.

The well was completed to the bottom of the alluvium to a depth of 29 feet. The well was constructed by drilling a 7 7/8" hole to the total depth using compressed air to remove cuttings. A 20 foot section of pre-perforated 4 inch schedule 40 PVC casing was install to total depth.

The annulus was then sand-packed from total depth to within 10 feet of surface with clean, uniform, silica sand. The remaining annulus void is cemented to surface to provide an effective seal from incidental surface water.

B. Point of Compliance Well

Quivira requests that monitor well MW-24, as previously approved by NRC in license amendment #9, condition #34, paragraph A and dated September 27, 1988, be continue as a point of compliance well for the Section 4 evaporation pond disposal area. Quivira originally proposed this well as the point of compliance for this disposal area within its submittals of January 29 and June 10, 1988. This well is immediately downgradient of the Section 4 evaporation pond disposal area and is in an area in which there is no anticipated reclamation or operation work that will cause it to be damaged. The well location is identified on the map contained Appendix A.

Monitor well MW-24 is completed through the alluvium to a depth of 50 feet. The well was constructed using the same procedures as described in the previous section.

C. Hazardous Constituents

Quivira proposes the following parameters from the

Criteria 13 hazardous constituents lists to be monitored at the Section 4 evaporation pond disposal area. These hazardous constituents are consistent with previous NRC required alluvial monitoring program for the Ambrosia Lake facility and represents those parameters that are associated with the facility's milling solutions and that were previously detected and subsequently reported on page 3 of Quivira's Corrective Action Plan submittal dated December 21, 1989.

Antimony	Arsenic	Beryllium	Cadmium
Molybdenum	Nickel	Selenium	Thallium
Gross Alpha	Lead 210	Ra 226 & 228	Th-230
Uranium			

Due to the lack of recharge capability in the alluvium and to allow for seasonal variations which may occur resulting from the historical irrigation of upgradient land on Section 34, Quivira proposes to sample and analyze these constituents on a quarterly basis. The sampling program would be performed over a minimum of two years with semiannual monitoring after the completion of the initial year of quarterly sampling. Quivira believes this schedule will enable the alluvium unit to be adequately characterized due to these important factors.

APPENDIX "A"

SECTION 4 EVAPORATION POND

DISPOSAL AREA

**OVERSIZE
DOCUMENT
PAGE PULLED**

SEE APERTURE CARDS

NUMBER OF OVERSIZE PAGES FILMED ON APERTURE CARDS 1

**APERTURE CARD/HARD COPY AVAILABLE FROM
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