

STATE OF NEW MEXICO

STATE ENGINEER OFFICE SANTA FE

S. E. PIEYNOLDS STATE ENGINEER

BATAAN MEMORIAL BUILDING STATE CAPITOL SANTA FE. NEW MEXICO 87503

Box. E



Certified-Return Receipt Requested

Re: File No. 2950

Dear Mr. Patrick:

Kerr-McGee Center

Mr. Roger B. Patrick, P.E. Quivira Mining Company

Ingineering Services Division

Oklahoma City, Oklahoma 73125

Reference is made to your July 18, 1984 letter wherein you furnished my staff, drawings and specifications for the Pond 2 construction as a part of the Ambrosia Lake Ultimate Tailings Pile. My staff has reviewed the submittal and a copy of their memorandum on the review is enclosed. I concur with their recommendations contained in the memorandum.

Please let me know if further discussion would be helpful.

Sincerely,

S. E. Reynolds State Engineer By

Eluid L. Martinez, Chief Technical Division

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cc/w/enclosures: Denise Fort, EID

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MEMORANDUM

September 25, 1984

State Engineer Office Santa F., New Mexico

TO Eluid L. Martinez, Chief, Technical Division

FROM Steve Schwebke, Water Resource Specialist Donald T. Lopez, P.E., Chief, Design & Construction Section

SUBJECT Review of Ultimate Tailings Dam Plans and Specifications at Quivira Mining Company's Uranium Mill Project, Ambrosia Lake, New Mexico, File #2950

We have reviewed the subject plans and specifications pertaining to Pond No. 2 in accordance with Nuclear Regulatory Commission (NRC) Guida 3.11 and current State Engineer criteria. State Engineer Office Engineering Review Project Checklists I and II are enclosed indicating those items yet to be added to the plans. In addition, the following comment is offered on Quivira Mining Company's (QNC) July 18, 1984 submittal, App. VII Fond 2 Construction Specifications.

Appendix VII, p. 4 "Freeboard" states:

"The reservoir capacity curves from the topo maps of 2950-12-83 and 2950-3-84 show that freeboards of 8.9' and 8.2' are necessary to contain the EMF series of 25.1" which is specified in N.R.C. Regulatory Guide 3.11.1. However, this has no practical significance until the spigotting dike crest becomes higher than the high flood stage caused by a EMP event. It was shown in the reservoir routing studies previously submitted that Pond 2 would be subjected to flooding until the crest on the south and west sides exceeds an elevation of at least 7009 feet. In other words, there is no point in maintaining freeboard to contain the NRC series until the dike crest is high enough to keep the pond separated from the channel under PMF conditions."

The above-quoted section proposes allowing a five-foot freeboard until construction raises the Pond 2 embandment to the nominal elevation of 7013. This proposal is offered under the assumption that the Pond 2 embandment will be overtopped during PMF conditions. Under current State Engineer Office criteria, overtopping and subsequent uncontrolled breaching is not acceptable. Therefore, it is recommended that the ultimate plans and specifications not be accepted until QMC provides some method for preventing overtopping of the Pond 2 embandment during the FMF event.

Steve, Schwebke Dona

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ENGINEERING REVIEW PROJECT CHECK LIST

Revised January 9, 1984

1. General, Plans and Specifications

(Job 1	Icant: Quivira Mining Company	110 # .	293	U Nut
	Ultimate Dam, Pond 2			Not
	Porningment	Vac	No	appil
	Filing sheet (original drawings or pylor perroductions) Size	162	INO	Cabit
1.	26" v 24"			1 7/
0	Plane (original drawings or mylar reproductions) Size 36" by 24	,		
2	Openingh margin on all sides of drawings			1/1
4	Shoets numbered in sequence		-	
5	Filing short separate from detail sheets			
6	Carefully and neatly prepared with waterproof India ink			1/
7	All signatures in waterproof black ink			1/
8	Rolled instead of folded	V		
9.	Standard engineer's scale of sufficient size	X		
10.	Distances and dimensions shown in feet and decimals thereof or			
	metric equivalent	x		
11.	Platted to true meridian	X	1	
12.	Area location map included	X		
13.	Map title and statements shown on the filing sheet	X	1	
14.	Engineer's stamp or seal impressed on filing sheet	X		
15.	Engineer's certificate of registration and preparation on filing			
	sheet	X		
16.	Claimant's certificate (special for corporations) on filing			
	sheet	X		
17.	Notary Public's signature and seal or stamp impressed on filing			
	sheet in acknowledgement to claimant's certificate	X		
18.	Certificate form for State Engineer's acceptance on filing sheet	X		
19.	Specifications included	X		
20.	Engineer's certification of registration and preparation on			
	specifications	X		
21.	Engineer's stamp or seal impressed on specifications	X		
62.	Certificate form for State Engineer's acceptance on			
0.0	Specifications	X		
60.	Statement in specifications recognizing the authority of the			
	full power to pat if specifications are not met	V		
24	Cost estimate	N		
25	Filing foos	A V		

Note: Stock-water reservoirs in excess of 10 acre-feet shall comply with State Engineer Order Number 68 dated March 10, 1957.

1/ Blueline original drawings

Date September 26, 1984

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Signature

ENGINEERING REVIEW PROJECT CHECK LIST Revised January 9, 1984



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	Ultimate Dam, Pond 2			Not
	Downinement	Vog	No	appii
	Men of ducinogo prop	X	110	CODAC
1.	Hazard classification (criteria in SCS TR-60 accentable)	-77		
2.	Average annual yield of drainage area in acre-feet 1/	X		
1	Topography of proposed reservoir 2/	X		
5	Area-capacity table or curve for the reservoir to the dam crest	81		
6	Detailed dam site topography	. X		
7.	Dam site profile along centerline showing foundation materials geology and construction features		X	
8.	Maximum dam section and dam section along outlet works		17/	
5.	Upstream slope not steeper than 2-3/4 to 1 (below spillway) 3/			21
0.	Downstream slope not steeper than 2 to 1 3/	· X		
1.	Minimum crest width = $2(h)^2 + 3'$ (minimum 8^{+}) $3/$		10	<u> </u>
2.	Freeboard above maximum high water elevation, minimum 5 feet 4/	-	15	
3.	Riprap and bedding gravel on face of dam 5/	•		X
14.	Analyses of construction materials submitted		44	1-27
15.	Foundation investigation 6/		11	12/
16.	Cutoff trench provided		12	
.7.	Outlet works design (complete with hydraulic properties); minimum 18" pipe	. 📃	13	/
.8.	Flood detention dams shall be ungated and the principal spillway (or outlet) of flood detention dams should be designed to empty the flood pool within 96 hours and to empty the sediment pool at the maximum practicable rate			X
9.	Make and type of gates		-77	A
20.	Detailed spillway topography	•	14.	ananita Crantan mate
21.	Spillway design hydrograph (criteria set forth in SCS 1R-60)		14	1
2.	Freeboard design hydrograph (are acceptable for items 21 & 22)		14	
3.	Spillway design hydraulics and capacity	115/		
4.	Normal and maximum water surface elevation	- the star	13	
. G.	Demonstrate hands mark astablished above high water line and tied		All of the second	
.0.	to a public survey corner or state coordinates		<u>16</u> ,	1

- 1/ Required for other than flood detention dams
- 2/ Contour interval shall be such as to provide the basis for an accurate areacapacity curve or table
- 3/ Where earthen dams are to be constructed having other than a low hazard classification, an analysis shall be prepared covering slope and foundation stability under steady seepage conditions and where applicable an appropriate seismic loading; design of the dam shall be based on these studies
- 4/ Not required for dams designed in accordance with item 22
- 5/ May be omitted on flood detention dams designed to be emptied in 96 hours or less
- 6/ Including logs and locations of core or auger holes; material characteristics including strength parameters; settlement or consolidation; and permeability

Date September 26, 1984

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Eilo # 2050

STATE ENGINEER OFFICE INGINEERING REVIEW PROJECT CHECK LIST

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11. Dam and Appurtenances (cont'd) Applicant: Quivira Mining Company Ultimate Dam, Pond 2

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File #2950

- 7/ Kerr McC e specifications, Section H states the Ultimate Tailings Dam is not considered to be a high hazard dam. In February 1980, the U.S. Army Corps of Engineers Phase I Inspection Report stated "Kerr-McGee Tailings Dam Pond #1 is classified as an intermediate-size structure and is considered to have high hazard potential because of the nuclear materials contained in the tailings and the acidity of the solution waters." On March 21, 1980 in letter to Kerr McCee, the State Engineer concurred with that high hazard classification.
- 8/ Contained in Appendix VI, the area-capacity curves for Pond 2 should be added to the plans.
- 9/ Tailing Impoundment Dam is proposed to be raised by the upstream method.
- 10/ Method of dike raise outlined in Kerr McGee submittal of November 21, 1983 satisfies stability requirements. Roadways at 15 to 20 foot vertical intervals should serve as alternative to crest width requirement.
- 11/ Albuquerque Testing Laboratories Geotechnical Investigation No. 4260-82, October 25, 1982. Should be added to the plans. Additional investigation is needed for verification of depth and character of the entire bedrock foundation of Pond 2 dam, and to determine if there is a need for appropriate foundation treatment.
- 12/ A cutoff trench should be provided unless additional subsurface investigations indicate that a cutoff trench is not required.
- 13/ Outlet works will be a decant (siphon) system.
- 14/ Probable Maximum Flood evaluation is contained in Appendices VI and VII. Temporary spillway is under consideration by Quivira Mining Company.
- 15/ Freeboard will limit water surface elevation during normal operation of embankment raise.
- 16/ Temporary benchmarks are established during normal operation of embandment raise.
- 17/ Sheet No. 17 containing additional sections to be added to the ultimate plans, were not included in the QMC 7/18/84 submittal.