

Radiation Protection Section

June 22, 1979

Mr. Ross Scarsano, Chief
Uranium Mill Licensing Branch
Division of Waste Management
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Scarsano:

Attached is a copy of our summary of the New Mexico Environmental Improvement Division meeting with Gulf Mineral Resources Company and NRC representatives. This meeting concerned your technical assistance and consultation to NMEID on Gulf's Mt. Taylor Project tailings management proposal and radiological assessment. We are looking forward to your preliminary radiological assessment in the next few weeks.

Sincerely,

Gerald W. Stewart
Acting Program Manager
Uranium Licensing Unit

GWS/eh

cc: Bill Rodgers, Gulf

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PDR ADOCK 04008908
C PDR

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cc: Bill Rodgers, Gulf

Teru Con

6/22/79

22 June 1979

0815

FROM Bill Rogers BHRC

To RWS

1. GULF IS CONFIRMING STEVE HANCOCK ON DOSE ASSESSMENT CALCULATION. APPARENTLY NUTS MILLER STATED THAT BONE DOSES WERE EXCESSIVE.
2. NUTS MILLER STATED IN THE MEETING, ^{19 JUNE 79} THAT MEAT PATHWAY WAS GIVING HIGH DOSES. GULF ASKED ABOUT EXCLUSION AREA USED SINCE THIS IS SOMEWHAT FLEXIBLE AND DIDN'T GET A RESPONSE.

Table 2

Preoperational Surface Water
and
Airborn Particulates Measurements Since June 1975^(a)

(a) December 1976 airborn particulate measurements have not been completed by the commercial analytical laboratory.

TELECON

6/21/79

21 JUNE 1979

1500

FROM BOB BMM RMRC

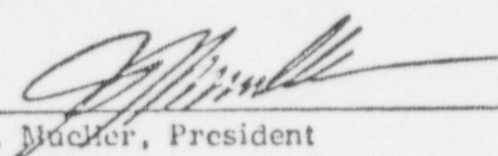
TO RWS

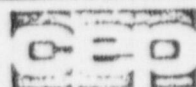
1. Attachment 2 Should read "... 50% of Total Tails" For both line 6 from top of page and line 2 from the bottom.
2. INFORMATION OF EIO's BIRMINGHAM TELECON

Note 50% of tails includes more (higher percentage) seeds for backfilling than the 50% of seeds as stated.

CUSTOMER United Nuclear
 ATTENTION John Abbiss cc: Gus Swanquist
 ADDRESS P.O. Box 3951
 CITY Albuquerque, NM 87110
 INVOICE NO. 607006

REPORT OF ANALYSIS

SAMPLES RECEIVED		6/14/76	CUSTOMER ORDER NUMBER	
TYPE OF ANALYSIS				
Air Filters Analysis -				
Sample Identification	Analysis	pCi/m ³	pCi/ Total Volume	
#1	Alpha	0.000+0.005		
Collected 6/11/76	Beta	0.010+0.014		
Total Vol m ³ 241.428	Thorium-230		0.00+0.02	
	Radium-226		1.00+0.18	
	Total Uranium		0.003 ugU/m ³	
#2	Alpha	0.000+0.005		
Collected 6/11/76	Beta	0.000+0.002		
Total Vol m ³ 188.328	Thorium-230		0.00+0.02	
	Radium-226		5.01+0.36	
	Total Uranium		0.032 ugU/m ³	
#3	Alpha	0.000+0.005		
Collected 6/11/76	Beta	0.000+0.002		
Total Vol m ³ 283.483	Thorium-230		0.00+0.02	
	Radium-226		0.51+0.10	
	Total Uranium		0.014 ugU/m ³	
#4	Alpha	0.000+0.005		
Collected 6/11/76	Beta	0.000+0.002		
Total Vol m ³ 231.658	Thorium-230		0.00+0.02	
	Radium-226		0.41+0.09	
	Total Uranium		0.001 ugU/m	
#5	Alpha	0.000+0.005		
Collected 6/11/76	Beta	0.000+0.002		
Total Vol m ³ 199.514	Thorium-230		0.00+0.02	
	Radium-226		0.98+0.15	
	Total Uranium		0.040 ugU/m ³	
APPROVED BY				
		James J. Mueker, President		
		7/7/76		
		PAGE 1 OF 1 PAGE		



Controls for Environmental Pollution, Inc.

1925 Blinn Rd. • P.O. Box 1571 • Santa Fe, New Mexico 87101 • Telephone 505 982-9841

Jim Mackin
6/20/79

Overall Summary of Joint Gulf/NRC/EID Review of Mt. Taylor

Mill Application - June 19-20, 1979

Attendance

Ted Wolff - EID
Jim Mackin - EID
Gerald W. Stewart - EID
William L. Rogers - GMRC
R.E. Bohm - GMRC
L.E. Lewis - GMRC

F.W. Gifford - GMRC
W.R. Hail - GMRC
Warren T. Slade - EID/AQS
Karen H. Rasmussen - GMRC
John J. Selters - GMRC
Donald Runnells - EID

Bruce Gallaher - EID
Charlie Nylander - EID
Frank Young - NRC/OSP
John D. Nelson - CSO (NRC)
Hubert J. Miller - NRC

In order of the agenda used at the meeting (Attachment One).

TAILINGS MANAGEMENT

1. Gulf has made a satisfactory assessment of potential tailings sites in the vicinity of the mine/mill complex. Eight sites have been identified and for various reasons it is possible to eliminate from further consideration all sites except 4 (La Polvadera) and 6 (Lower San Lucas Long Dam). Two sites on Forest Service Land were tabled not for any inherent technical reasons, but because they are on Forest Service Land (problems in acquiring land). Also they do not offer any unique features that make them any more desirable than 4 and 6 except perhaps land ownership. For sites 4 and 6 NRC recommends further analyses in order to fully evaluate the below grade option which NRC prefers whenever feasible. On this basis the answer to 1. is no.
2. NRC recommends further analyses of the type summarized by Attachment Two.
3. Concerning the preferred site at La Polvadera Canyon:

Siting and Design

- 3.1 NRC agrees that this should not be an issue at La Polvadera
- 3.2 NRC is not prepared to address in terms of the current plan involving the impoundment scheme behind an embankment. NRC feels the answer will be derived as a result of the analyses performed in accordance with Attachment Two.
- 3.3 NRC (Miller) did not take issue with the groundwater evaluation performed by Gulf, but not having completed its report in written form and pending completion of work on the below grade option could not take a definitive stand concerning the details of the proposal in regard to this objective.
- 3.4 No comment at this time - again pending the additional work on below grade option.

During Operations

- 3.5 Gulf proposal looks satisfactory. However, will want to see the results of the UDAD calculations now nearing completion. Preliminary calculations indicate potential problems by meat path (higher than 40 CFR 190) probably due to very conservative assumptions concerning inputs used. Additional work with Gulf will be needed to develop more realistic parameters.

Post Reclamation

- 3.6 Gulf will use the approximately 3 meter cover. NRC does not anticipate a problem with this objective.
- 3.7 NRC recommends that Gulf submit detailed calculations to EID for internal review and submission to NRC for an independent check. Specifically, information concerning the radon attenuation properties of soils to be used for cover will be provided by Gulf.
- 3.8 NRC feels this is highly related to the results of the Attachment Two analyses. Final determination will be made following a review of the results of the analyses.
4. As above at Items 3.2, 3.3, 3.4, 3.5, 3.7 and 3.8.
5. Not relevant in view of 4 above.

RADIOLOGICAL ASSESSMENT

- 1., 2., and 3. NRC is near completion of this assessment. The results will be forthcoming within a week or two to Gulf and EID. Preliminary calculations indicate potential problems by meat path (higher than 40 CFR 190) probably due to very conservative assumptions concerning inputs used. Additional work with Gulf will be needed to develop more realistic parameters.

FOLLOW-UP ACTIONS

- 1.a Gulf will make an overall assessment of the results of the meeting and will respond to EID by July 5 concerning their plan to achieve Attachment Two objectives.
- 1.b NRC will:
- a. Complete the preliminary radiological assessment estimates and forward the results to EID within two weeks. The results will respond to items 3.5 above and items 1, 2 and 3 under Radiological Assessment. The results will not be in the form of a report, but rather a tabulation of the results.
 - b. NRC will be available as required by telephone and in certain cases for meetings.
 - c. NRC is not prepared to make an overall recommendation to the EID concerning the Gulf application as currently proposed until the additional work described in Attachment Two is completed and until the draft EIS is complete.



Agenda for Joint Gulf/NRC/EID
Review of Mt. Taylor Mill Application

TAILINGS MANAGEMENT

1. Has the applicant satisfactorily addressed the matter of alternative site evaluations for tailings disposal, including the alternative of below grade disposal?
2. If no, what additional information and/or analyses are required to resolve these matters?
3. If yes or no, has the applicant satisfactorily addressed the following factors for the preferred site at La Polvadera Canyon:

Siting and Design

- 3.1 Remoteness from people to reduce exposures ALARA?
- 3.2 Disruption and dispersion by natural forces eliminated or reduced to the maximum extent reasonably achievable?
- 3.3 Seepage of toxic materials into the groundwater system eliminated or reduced to the maximum extent reasonably achievable?
- 3.4 Provided systems to contain potential releases during normal operation or as a result of realistic tailings release scenarios?

During Operations

- 3.5 Provided for reduction to the extent reasonably achievable the the blowing of tailings to unrestricted areas during normal operating conditions? (Part 4 & 40 CFR 190)

Post Reclamation

- 3.6 Provided for reduction of gamma radiation from the impoundment area to essentially background?
 - 3.7 Provided for reduction of the radon emanation rate from the impoundment area to about twice the emanation rate in the surrounding environs? (Alternate: 2pCi/m²-sec above Bkg.)
 - 3.8 Provided for elimination of the need for an ongoing monitoring and maintenance program following successful reclamation?
4. If the answer to 3 (or any part thereof) is no what issues were not satisfactorily addressed and what information and/or analyses are required to resolve the issues?
 5. If the answer to 3 is yes are there any recommendations for additional mitigation measures and/or license conditions?

RADIOLOGICAL ASSESSMENT

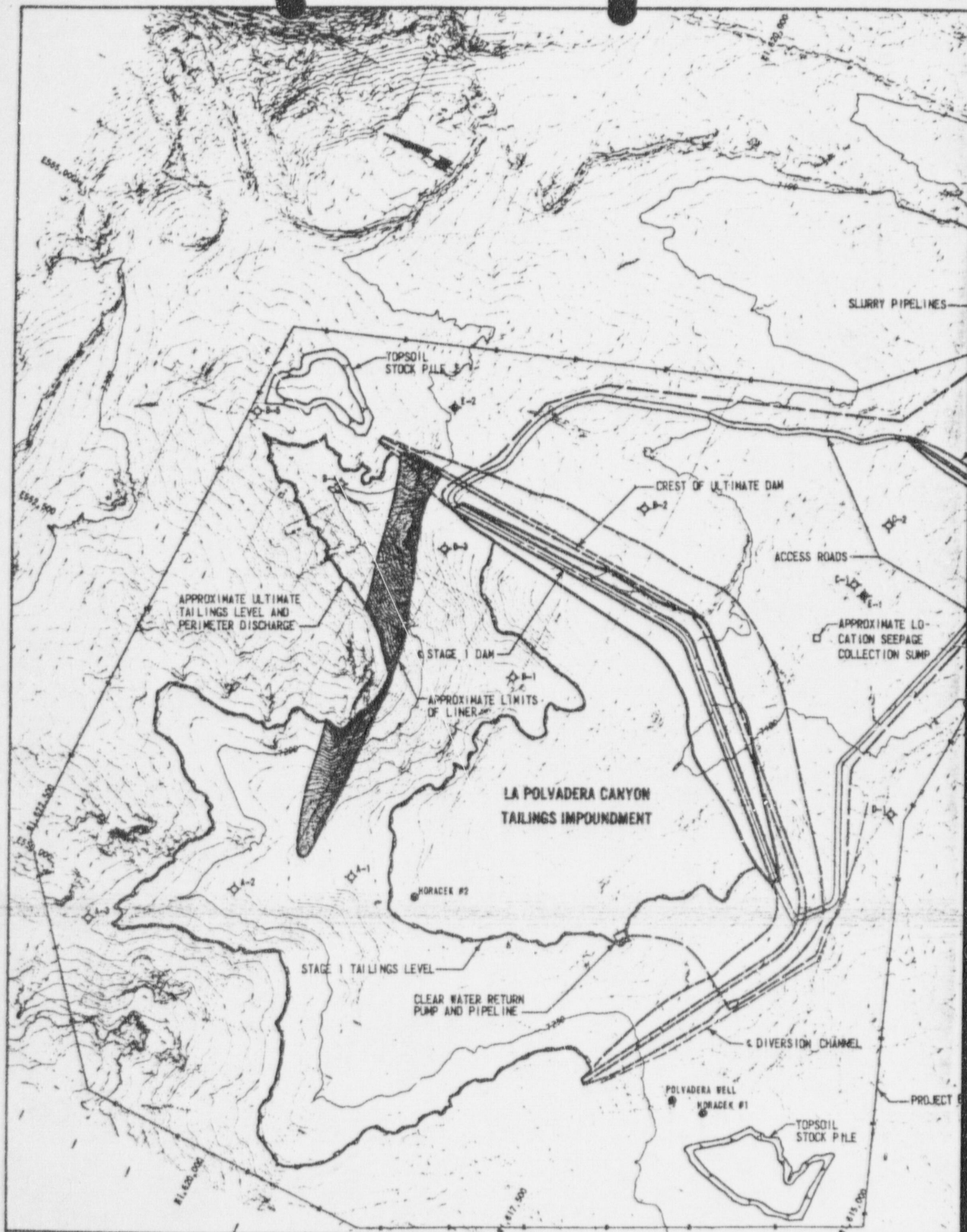
1. Has the applicant satisfactorily analysed and assessed population doses in the environs surrounding the mill and tailings impoundment?
2. If no, what additional information and/or analyses are required to resolve these matters?
3. If yes, are there any recommendations for additional mitigation measures and/or license conditions?

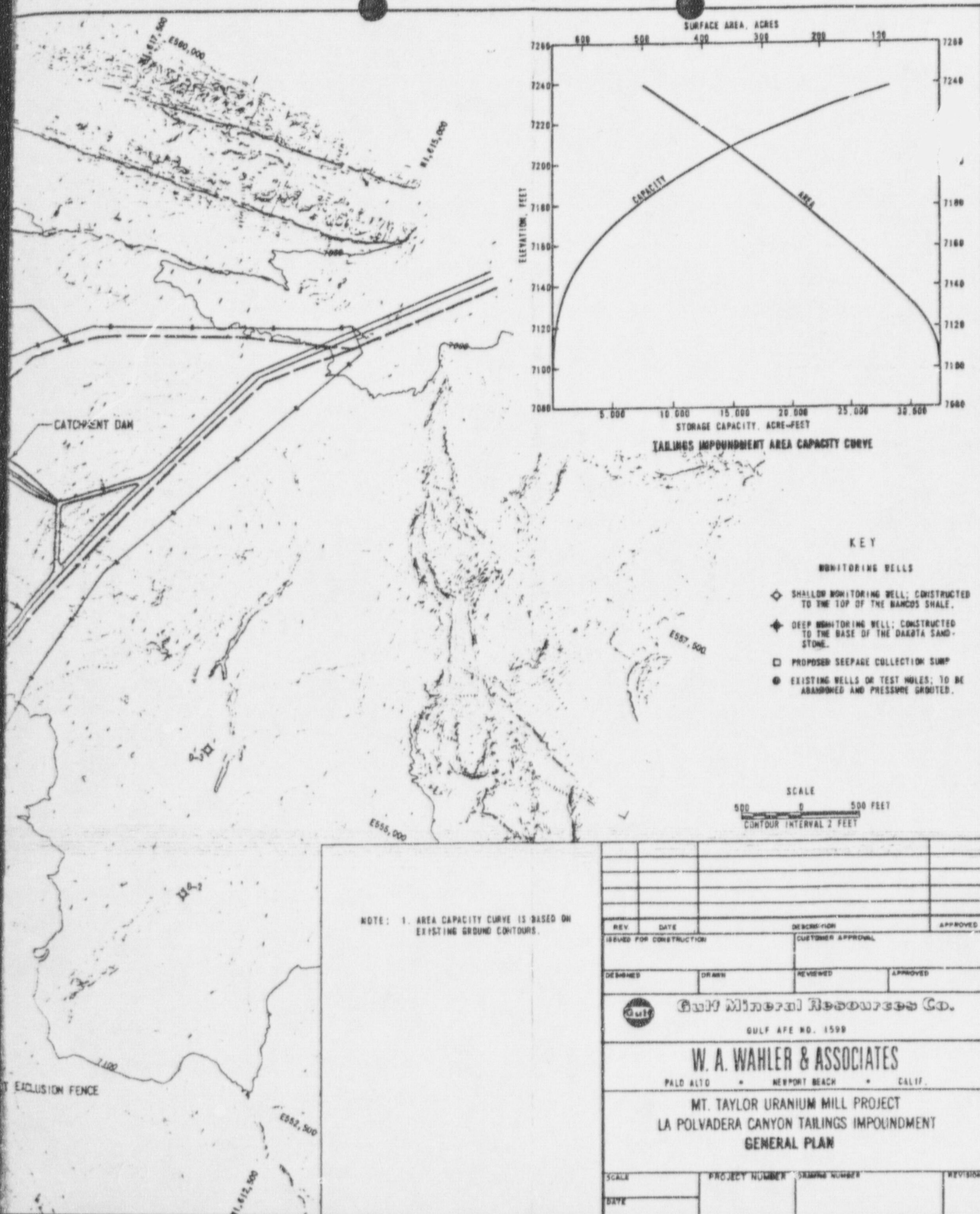
FOLLOW-UP ACTIONS


1. As a result of the above what specific immediate follow-up actions are required of:
 - a. The applicant?
 - b. NRC?
 - c. EID?
2. What deadlines are proposed for:
 - a. Completion of the above actions by:
 - (1) The applicant?
 - (2) NRC?
 - (3) EID?
 - b. Final resolution of all outstanding tailings management and radiological issues?

The following summarizes the advice given New Mexico EID by NRC on the Gulf Mineral Resources Co. Mt. Taylor Mill License Application tailings management plan.

- . Evaluate volume of tailings to be disposed for the life of the project based on realistic dry density of the slimes, sands and total tails. One estimate should assume backfill of 50% of sands.
- . Evaluate how this reworked volume of tailings will effect the size of the proposed dam.
- . For La Polvadera Canyon evaluate:
 - 1) the depth to which below grade cells can be excavated (alluvium and rippable bedrock);
 - 2) the cost of excavating this material;
 - 3) the staging or configuration of the cells;
 - 4) the effect of the cell configuration on seepage analyses;
 - 5) whether the revised seepage analyses requires that the cells be lined, and the cost associated therewith;
 - 6) disposal of tailings in an area which extends further towards the mouth of the canyon than the presently proposed dam site. This objective is consistent with NRC's desire to dispose of tailings below grade as a prime option.
- . For San Lucas (long dam, low site) the analysis performed in the ER amendment 1 will be reevaluated given: (a) revised assumptions on tailings density; (b) disposal of 50% of sands in deep mine; and (c) more efficient cell arrangements or configurations.





REV	DATE	DESCRIPTION	APPROVED
ISSUED FOR CONSTRUCTION		CUSTOMER APPROVAL	
DESIGNED	DRAWN	REVIEWED	APPROVED
 Gulf Mineral Resources Co. GULF AFE NO. 1599			
W. A. WAHLER & ASSOCIATES PALO ALTO • NEWPORT BEACH • CALIF.			
MT. TAYLOR URANIUM MILL PROJECT LA POLVADERA CANYON TAILINGS IMPOUNDMENT GENERAL PLAN			
SCALE	PROJECT NUMBER	DRAWING NUMBER	REVISION
DATE			



*Prepared 6/18/79 for
Joint Gulf/NRC/EID
meeting.*

Materials Related to NRC Technical
Assistance to EID on Gulf Application

5-15-78 Gulf's initial submission of application to EID.

8-30-78 Ltr. from P. Donahoe, EID, to R. Scarano, NRC, forwarding one copy of Gulf application.

10-23-78 Ltr. from R. Scarano, NRC, to T. Wolff, EID, forwarding
(NRC Questions questions on Gulf application.
No. 1)

10-31-78 Site visit to Gulf Mt, Taylor project area by S. Manger and J. Mackin, NRC, and J. Nelson, U. of Col.

11-15-78 Copy of ltr. from J. Nelson, U. Col. to S. Manger, NRC, with questions on Gulf application.

11-22-78 Ltr. from T. Wolff, EID, to R. Scarano, NRC, forwarding Gulf
(Gulf responses to NRC questions of 10-23-78.
responses No. 1)

12-1-78 Ltr. from J. Mackin, EID, to W. Rogers, GMRC, forwarding completeness review of Gulf application.

12-7-78 Ltr. from R. Scarano, NRC,, to T. Wolff, EID, enclosing copy of trip report by S. Manger, NRC, covering site visit of 10-31-78.

1-2-79 Ltr. from R. Scarano to T. Wolff, EID, forwarding additional
(NRC Ques- questions on the Gulf application.
tions No. 2)

1-9-79 Ltr. from T. Wolff, EID, to R. Scarano, NRC, responding to R. Scarano ltr. of 1-2-79.

2-7-79 Ltr. from F. S. Mooney, GMRC, to EID (Attn: J. Mackin) forwarding copies of Gulf responses and amendments in response to EID completeness review.

2-21-79 Memo from J. Mackin, EID, to T. Wolff, EID, recommending acceptance for review of Gulf application.

2-26-79 Ltr. from T. Baca, EID, to F. S. Mooney, GMRC, informing of EID acceptance for review of Gulf application.

2-26-79 Copy of Public Notice of application published in several New Mexico newspapers.

2-27-79 Ltr. from T. Wolff, EID, to R. Scarano, NRC, forwarding three
(Gulf Res- copies of Gulf's responses to EID completeness review (2/7/79)
ponses No. 2)

2-27-79 Ltr. from T. Wolff, EID, to J. Nelson, U. Col., forwarding one copy of Gulf's response to EID completeness review (2/7/79).

3-23-79 Ltr. from F. S. Mooney, GMRC, to J. M. Hendrie, NRC, informing of Gulf's plans, dependent on receipt of EID license, to commence mill construction on or about Jan 1., 1980.

4-5-79 Ltr. from T. Wolff, EID, to R. Scarano, NRC, forwarding three
(Gulf Responses No. 2) copies of Gulf responses to NRC questions of 12-28-78.

4-5-79 Ltr. from T. Wolff, EID, to J. Nelson, U. Col., forwarding one copy of Gulf responses to NRC questions of 12/28/78.

4-25-79 Memo from J. Mackin, EID, to S. Manger, NRC, enclosing copy of listing of Gulf documents submitted to EID as part of application.

5-18-79 Ltr. from K. Rasmussen, GMRC, to J. Mackin, EID, forwarding six copies of Gulf Groundwater Discharge Plan (formally submitted to Water Quality Section).

5-25-79 Ltr. from J. Mackin, EID, to W. Rogers, GMRC, enclosing copy of proposed agenda for a joint Gulf/NRC/EID meeting on tailings management and radiological aspects of Gulf application.

5-31-79 Copy of Public Notice for submission of GMRC of application for approval of Groundwater Discharge Plan.

6-4-79 Ltr. from T. Wolff, EID, to R. Scarano, NRC, enclosing copy of agenda for joint Gulf/NRC/EID meeting on June 12, 1979, in Santa Fe, N.M. to discuss tailings management and radiological aspects of Gulf application.



New Mexico Environmental Improvement Division,
Nuclear Regulatory Commission,
Gulf Mineral Resources Co.,
Mt. Taylor Uranium Mill Tailings Management Plan Site Visit
June 18, 1979

Left to Right: Forest Gifford, Wahler Associates; John Nelson, Colorado State University; Roger Hail, Earth Sciences Associates; Jerry Stewart, NMEID; Frank Young, NRC; Jim Mackin, NMEID, Bob Bohm, GMRC, Hub Miller, NRC; Ted Brough, NMEID; Jere Miller, NMEID; Hop Lewis, GMRC; Bruce Gallaher, NMEID; John Selters, GMRC; Bill Rogers, GMRC; Charlie Nylander, NMEID; and Don Runnells, University of Colorado.



June 18, 1979

Site visit - Gulf alternative sites in Mt. Taylor vicinity
Gulf, EIO, NRC

June 19, 1979

Ted - Introduction

Ted noted chronology of Gulf application

Jim Mackin - asked Hub for comments, if any - intent to stay on agenda

Hub - no preliminary comments

Bill Rogers - Need for license this year to begin construction on mill.

1972 - Initial studies

1974 - Woodward Clyde

~1976 - Wahler
etc.

1. Matter of alternative sites including below grade disposal.

Hub - Question of volume of tailings, configuration since related to rejection

Bill asked Forrest Gifford to respond

Questions on dry density of solids - Hub felt method used would give low density values because Wahler did not dry & settled material. Forrest agreed in the sense that the values were conservative for reasons of making sure sufficient storage capacity was available.

NRC would suggest that a high density figure could lead to a smaller volume requirement that permit below grade disposal at some of the alternative sites.

Gulf argues that it must use a conservative and smaller value to ensure sufficient storage capacity.

All of this (above) relates to the dilemma.

Finally agreed to approx. 12 to 15 thousand acre-feet as a value to be used for sizing storage capacity.

Even granting that use of density could lead to below grade disposal (on paper), are there are any other reasons to believe that below grade should be used?

Break - Agreed to continue discussion on below grade question until 11:45. If complete then O.K. If not then will defer until later and go on to Item 3 on La Poladera Canyon at 1:30

Hub brought up direct for EIS as example of configuration.
Decided to walk through all sites

1. Hub agrees that reasonable attempt has been made to locate available sites in the general area - i.e. the eight candidate sites represent the reasonably available sites.

x 1. Section 14 - No argument that this site should be eliminated.

2. Canada Las Vegas - Refer for now - not excluded but Forest Service ownership serious problem.

3. El Perrame Canyon - Refer for now - not excluded but Forest Service ownership serious problem.

4. La Polvadera - Obvious candidate site

x 5. Lower San Lucas - Eliminate - large PMF

6. Lower San Lucas Long Dam - Refer for now. Not desirable but not ruled out.

x 7. Las Yeguas Valley - Ruled out

x 8. Upper San Lucas - Ruled out

Bulls down to 2, 3, 4 and 6 with 2 & 3 having special problem of being on Forest Service land.

Forest Clifford came on to present general discussion of La Polvadera site.

3.1 NRC agrees that this issue is not a problem at La Polvadera

3.2 This requires further discussion - however, agree to defer for now and turn to 3.3

3.3 Bill agreed to begin with Roger Hale.

Roger made presentation covering geology and hydrology of La Polvadera site - basis for conclusions that liner would not be needed and overall conclusion that seepage will not be a problem in either the ~~long~~ long term or the short term.

Opened to questions from EID WA people and NRC people (primarily).

Don. Rannels asked whether the fault could be grouted and thus remove the issue from contention. Gulf receptive to idea if it is a feasible approach compared to the clay liner.

Don - Why lack of monitoring systems to the SW? ^{Lewis} Hop^r answered answered that monitoring well in Sec. 15 | 1800 ft due west of Polvadera well 1 ha: been planned and is in addition to Wahler's plan

Don - Matter of catchmen's dams along the pipe line to be used for catching any spills from a pipe break
Bob Bohm gave answer. Also said Jacobs is currently doing additional work on this question.

* Don - Capillary barrier at reclamation - Gulf should consider

took break until 3:30

Continued with questions on 3.3.

NRC continued on 3.3 including question of liners. Latter not pursued
But agreed that Gulf responses to NRC questions to date have been generally satisfactory - however, NRC certainly not ready to take overall position re tailings question.

Wanted to return to question of below grade disposal at La Polvadera.

NRC appears to feel that below grade disposal basically results in elimination of reliance on embankments ("3.11 dams") - and latter is really the issue.

Hub on below grade

"Realistic" volume (involves density and other factors)

Staging (cells)

Cost of ripping (excavation)

Seem to be heading for a request to Gulf to go back and take another look at below grade disposal

3.2 Not prepared to address in terms of current plan. Feels more analysis needed on below grade and other matters.
More to be done.

3.3 Feel reasonably comfortable but no commitment.

3.4 No comment from NRC. Feel will come out with the analysis done on 3.2 and 3.3

3.5 Answer will depend on results of UDAD calculations - not yet completed. In this case model uses particle source term.

Break for dinner

Post Reclamation

3.6 Gulf will use the 3 meter recommendation
Basically this is not a problem.

3.7 More important - Hub recommends Gulf submit detailed calculations to EID and then to NRC. Calculation based on windings as a source term and exhalation rate above a given thickness of snow. Background is ignored in the calculations.

3.8 Hub feels answer is tied to answer to 3.2. For La Polvadera, ~~at~~ with present plan, should not be a problem.

Radiological Assessment

NRC calculations not yet complete

Brief discussion of grazing in the area.

Will complete calculations and forward to EID and Gulf

1. Sites 2 & 3 not worth pursuing further.

Look again at Site 4 - below grade disposal (eliminate dam)

1. What is realistic estimate of volume - (density, tails to mine)
2. Staging (cells)
3. How much of the alluvium can be ripped - depth and cost.
4. Run through seepage (consider liner)

Use of above for Site 4

Site 6 - Gulf will have some data

Hub feels NRC will do a below grade disposal calculation as part of EIS on Gulf application.

Hub agreed that within one week can specify assumptions Gulf should follow through with some calculations at San Lucas as above for Site 4.

Forrest and Roger would need at least a month to scope out the effort required.

Turned to matter of trying to get down in writing what NRC is proposing for follow-up actions.

We will need to summarize what NRC is recommending Gulf should do to complete the below grade analysis for Sites 4 and 6. Then we make a technical and policy decision on our view of the need for this in our licensing action.

Gulf will have to decide whether they want to go ahead with it for NRC.

Adjourned around 10 AM. Agreed to meet again at 8 PM Wed. Aug. 20, 1974

Worked up a summary of my notes of 1st & 2nd at morning meeting