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LAND QUALITY DIVISION

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MEMORANDUM

TO: Getty Petrotoomics Uranium Operation
Permit No's 342, 351C and TFN 1 4/388

FROM: Susan Hogg, Hydrologist *SH*

DATE: August 23, 1985

SUBJECT: Review of Pit 4 Reclamation Reservoir

CHECKED BY: *Greg Smith*



INTRODUCTION

The Petrotoomics Company is planning final reclamation of their open pit uranium mining and milling operation located in the Shirley Basin. The original Permit 342 was approved May 28, 1975 with a permanent impoundment in the Pit 4 area. Due to termination of mining earlier than anticipated, however, the Pit 4 impoundment will now be located approximately one half mile to the south of the original planned location. Petrotoomics submitted to Land Quality the document "Pit 4 Reclamation Reservoir" June 5, 1985 which contains a hydrologic evaluation for the Pit 4 impoundment. This memo reviews the above document.

DISCUSSION

The Pit 4 impoundment is proposed as a livestock and wildlife watering reservoir located approximately two miles from the Little Medicine Bow River. Other reservoirs exist in the area (Area 2 and Area 3 impoundments, Jenkins, Dave and Sullivan pits) but apparently are not dependable in dry seasons. The Pit 4 impoundment will have a surface area of approximately 9.5 acres and contain water approximately 100 feet deep. The Pit 4 impoundment will contain water from the Wind River Aquifer. Water level elevations for the Wind River are shown on Exhibit 2-2 of the document. The Wind River Aquifer discharges into the Little Medicine Bow River to the southeast of the Pit 4 area. Recharge occurs to the north and west of the mine site. In the area of the Pit 4 impoundment the Wind River Aquifer is unconfined.

Review of the Pit 4 Reclamation Reservoir document raises the following concerns:

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Typed By *Mary C. Hood*

FREE EXEMPT

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1. Re: Pump tests

- i) Pump tests were performed on wells P4-1 through P4-7 and well 3A-2. Completion data could not be found for these wells. To properly evaluate the pump tests conducted, the applicant should provide the depth, and completion interval, and casing type and diameter of each well. This information is also required for proper evaluation of water quality.
- ii) The impermeable area in the NW 1/4 of Section 34, SW 1/4, Section 27 should be explained.

2. Reservoir and Aquifer Simulation

- i) A discussion as to how the model was calibrated and what it was calibrated against should be included.
- ii) A discussion as to how the model was verified should be included.
- iii) A sensitivity analysis should be presented to properly evaluate the modelling predictions as described in the report. Variations in storage coefficients, specific yield, transmissivity and head estimates should be investigated.
- iv) A list of assumptions and a discussion of their applicability to the Pit 4 impoundment and their effect on the modelling results should be provided.

3. Water Quality

- i) Water in all the pits sampled including Pit 4 has radium-226 values which exceed (up to 102 pCi/l) livestock standards of 5 pCi/l. The applicant should further justify how water of this quality may be suitable for livestock watering purposes.
- ii) Groundwater quality data in wells around the Pit 4 area show water quality exceeding livestock standards in some cases by a wide margin. Parameters of concern include TDS, sulfate, pH, aluminum, lead, and especially radium-226. Further justification is required as to the geochemical changes this water will undergo in the Pit 4 impoundment to be suitable for livestock purposes.
- iii) Some surface water samples indicate high (above 5 pCi/l) values for radium-226 and pH (above 8.5). The applicant should clarify whether these values reflect mining effects or are "background", naturally occurring values in this area.
- iv) It is stated on page 2.3 of the document that mine water discharged to Phase 10 reservoir is artificially recharging the Wind River Aquifer. An evaluation of water quality impacts, if any, to the Wind River Aquifer should be provided by the applicant.
- v) The tailings pond at Petrotonics has been and is seeping tailings effluent resulting in contamination plumes moving to the south and to the north of the tailings reservoir. It appears that the north

moving plume may be intercepted by the Pit 4 impoundment. An evaluation of this contaminated water entering the Pit 4 impoundment should be provided by the applicant.

4. Monitoring

- i) The late summer samplings should include the full list of parameters contained in LQD Guideline No. 8 for at least the first five years of monitoring.
- ii) A diagram should be provided to show approximate sampling locations on an area and depth basis.
- iii) Success of the reservoir should be judged on an evaluation of the full suite of parameters contained in WQD Guideline No. 8.

5. Alternate Plan

The applicant should provide an alternative plan in the event that the Pit 4 reservoir is not successful.

CONCLUSION AND RECOMMENDATIONS

At this time there are some unresolved problems with the Pit 4 impoundment. Approval is not recommended until the above issues are resolved.

SH:klr

cc: Bill Kearney
Roy Spears
Cindy Bosco
Kathy Ogle for NRC