



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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MEMORANDUM FOR: Daniel T. Swanson
Office of the Executive Legal Director

THRU: Hubert J. Miller, Section Leader *H. Miller*
Uranium Recovery Licensing Branch
Division of Waste Management

FROM: Daniel E. Martin
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Division of Waste Management
Office of Nuclear Material Safety and Safeguards

SUBJECT: RESPONSES TO INTERVENOR SCANP'S OBJECTIONS TO
PERKINS RECORD - SKAGIT RADON PROCEEDING

Attached are the subject responses. Please inform me if any revision is desired or if further efforts are necessary.

Dan E. Martin

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cc: R. Gotchy, NRR/DSE
R. Wilde, NMSS/FCMS
H. Lowenberg, NMSS/FCMS
~~W.~~ Thompson, NMSS/FCMS

Enclosure: As stated

Note: Responses enclosed are "DRAFT" and should be recomposed prior to any board submittal. It is our understanding (from phone conversation between R. Block and H. Miller, 10/29) that this will not be needed for some time, if at all.

Dan M.
10/29/79

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SKAGIT RADON PROCEEDING
DRAFT STAFF RESPONSE

As part of intervenor SCANP's "Response to Partial Initial Decision in Perkins" several "specific objections to the Perkins record" are made with respect to "A. Faulty Assumptions Regarding Radon Releases" and "B. Inadequate Atmospheric Dispersion Model". The following responses to intervenor SCANP's specific objections are provided for consideration:

A. Faulty Assumptions Regarding Radon Releases

"...These estimates are questionable for a number of reasons:"

Objection

1. They assume ultimate stabilization of all tailings piles. This is not a supportable assumption, because many piles are located in arid areas like the Colorado Plateau (8 inches/year of rainfall or less). In such areas reclamation with natural vegetation is difficult or impossible, and tailings are like dry sand and are carried by the wind. The particulate background from dust in the air in such areas in the U.S. is 65 ug/m^3 , indicating the high natural dust level.

Findings 26-33 contain several inferences and conclusions respecting stabilization which are not warranted by the Perkins record. The Board's opinion that the situation with respect to tailings has changed greatly within the past years is without foundation, and is contrary to Findings 28-29, to the effect that abandoned mills and mills in Agreement States are not subject to 'new requirements'.

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Response

The staff's position is that all tailings piles associated with presently operational or future uranium mills will ultimately be stabilized, via reclamation in accordance with NRC regulations, in such a way as to minimize or eliminate the need for long-term maintenance, and reduce direct gamma radiation and radon emanation to levels as low as reasonably achievable. Reclamation plans achieving these objectives have been, or will be, committed to by all present NRC licensees.

Current NRC staff policy with regard to requirements for long term uranium tailings stabilization and control is best evidenced by regulation changes formally proposed in the Federal Register on August 24, 1979 (44 FR 50012). Particularly of note therein, with respect to loss of protective vegetation with subsequent loss of cover material through wind erosion, are Criteria 2, 4(b), and 4(d) of proposed Appendix A to 10 CFR Part 40 (attached as Exhibit A). Criteria 2 and 4(b) relate to preferential siting of tailings impoundments where natural erosional forces are minimized; Criterion 2 specifically stipulates that long term tailings isolation is to be given primary emphasis in site selection as opposed to short term convenience or benefits. Criterion 4(d) specifies acceptable erosion retarding cover surfaces, identifying riprap as an alternative to vegetation. Should reclamation using self-sustaining vegetative cover prove unworkable at a particular site, an alternative cover of riprap or gravel could be provided to yield the same stabilizing influence.

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Although the staff believes that current tailings reclamation plans, especially those including below-grade disposal, will result in adequate long term isolation without active maintenance, it recognizes the possibility that such isolation may not be preserved in all cases over indefinitely long periods of time. However, the staff notes that after reclamation activities are completed, the tailings materials and the land on which they are disposed are to be deeded to the Federal government, or to the Agreement State in which the tailings were produced, at the option of the State, in accordance with Title II of the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA).* The staff intends to require the owners of tailings reclamation sites to perform and report annual site inspections (as stipulated in Criterion 12 of proposed Appendix A to 10 CFR 40). On the basis of such annual reports, or such other reports as may be required, the staff is empowered under its specific authorities to protect the public health and safety under the Atomic Energy Act of 1954 and the UMTRCA to require the performance of any necessary remedial actions to redress degradation in any way of the physical isolation of tailings materials. Thus gradual erosion of protective covers or embankments induced by wind action, though not anticipated, would not go unnoticed and would be counteracted as necessary to preserve adequate isolation.

* In some instances it may not be possible for the owner to obtain and transfer clear title, and the transfer requirement may be waived by the Commission.

Catastrophic failure is a remote possibility, but would be subject to prompt restoration unless the event were to go unnoticed. Over the very long term, the temporary loss of isolation induced by such a failure would not markedly increase the previously estimated range of post-reclamation annual average radon releases of 1 to 10 Ci/yr per AFR. As calculated by Magno, the upper limit of this range, 10 Ci/yr per AFR, would account for the presence of completely bare tailings (complete loss of cover) on 8% of the model pile area all the time, or, alternatively, complete loss of cover on the entire pile 8% of the time. Thus, the previously estimated post-reclamation radon release rate range would account for the complete loss of cover for about 1 year per 12-year period. The staff considers this range to include all values which might realistically be expected to occur as an average over many sites and long periods of time.

With respect to the applicability of "new requirements" at mills in Agreement States, the staff notes that under the terms and conditions of the UMTRCA licensing authority is extended to such States by the Commission on condition that they require compliance with standards for the protection of the public health, safety, and the environment which are equivalent, to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose. Thus, Agreement State mills are subject to license requirements exercised by the Commission, although indirectly. In particular, Agreement State mills will be subject to regulation_λ substantially the same as those recently proposed by the staff, when issued in final form, as mandated by Section 204 of the UMTRCA. This law also specifically requires that at each Agreement State site the NRC must make a finding that all reclamation requirements have been met before the

operator can be absolved of further responsibility by transfer of title to the tailings and the land on which they are disposed to the government, or by license termination.

With respect to tailings materials at existing abandoned mill sites, the Commission has no present licensing authority. Such sites are subject to remedial action as necessary to meet EPA standards under Title I of the UMTRCA. The staff is, however, currently preparing an Environmental Impact Statement on the decommissioning of an inactive uranium milling facility at Edgemont, South Dakota, which is currently under NRC license to the Tennessee Valley Authority (TVA). Though the entire reclamation plan is not yet developed, the staff has insisted, and TVA has agreed, that the tailings materials on-site be moved from their present location to another location which would afford proper long term isolation. Notwithstanding the above, the staff firmly believes that releases of radon from the Edgemont tailings, or from tailings at any other inactive mill, cannot rightfully be attributed to the prospective production of fuel for the Skagit reactors.

Objection

2. Magno's figures assume a two-foot depth of overburden cover (Perkins ASLAB TR 2566). In the dry, windy climate of the Colorado Plateau, two feet of overburden will be stripped by wind action.

Response

The cited Magno reference to "two-foot of cover" was mentioned with respect to an estimate of radon releases made by Dr. Jordan. Magno's estimate of post-reclamation tailings radon releases was based on a conservative estimate of the average rate allowable under the staff's guideline which limits total radon exhalation to a rate equivalent to no more than twice background, as determined from the surrounding environs. Specifically, the Magno estimate is based on a

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release rate, from the buried tailings materials, of 2.5 pCi/m²-sec. That figure is 25% higher than the limit specified in Criterion 6 of proposed Appendix A to 10 CFR 40 of 2.0 pCi/m²-sec.

Also, the staff does not agree that a two-foot cover of overburden would be stripped by wind erosion on the Colorado Plateau, if that cover was properly protected by riprap or gravel. Such a cover, however, would be inadequate to adequately control radon releases to the proposed regulatory limit. Also, proposed as a regulatory requirement is a minimum cover thickness of 3 meters.

Objection

3. The contribution of old long-term unstabilized piles is not included (the testimony of M. Scinto, Perkins ASLAB TR 2514, indicates that there is "no information" on abandoned piles).

Response

The staff does not consider that radon releases from abandoned tailings piles at inactive mills can be attributed to the production of fuel for the Skagit reactors, nor does the staff believe that any such tailings piles will remain in an unreclaimed state over any time frame that could reasonably be considered long-term. Also, Mr. Scinto's testimony on the cited page does not indicate there is "no information" on abandoned piles. Indeed, there is a great deal of information on such piles.

Objection

4. There is some indication, elucidated in testimony (Perkins ASLAB TR 2518) that the numbers are derived from wet piles. Needless to say tailings ponds will not stay wet in the climate in which most of them are located.

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Response

A prior, erroneous staff estimate was based on radon emanation from operational, wet piles only and was under discussion at the time. The Magno estimates are based on a composite model tailings impoundment comprised of 106 acres of pond and wet beach and 34 acres of dry beach, during 26 years of operation. Also, a 5-year drying out period prior to reclamation was assumed during which the dry beach area was linearly increased from 34 acres to 140 acres, the entire pile area. Wet conditions are not assumed after reclamation.

Objection

5. There is no good estimate of the number of existing stabilized piles. In fact, Gotchy testified to the "large amount of unstabilized piles" (Perkins ASLAB TR 2584).

Response

At the present time, there are a number of inactive piles which are stabilized or partially stabilized. The staff does not now know of any inactive piles which have been stabilized in accordance with its branch position guidelines or proposed regulations, and considers past stabilization programs to be inadequate. Stabilization, by remedial action as necessary to satisfy EPA criteria, is provided for under Title I of the UMTRCA for presently inactive piles. Present indications are that EPA will require reduction of radon surface flux releases to the same level NRC has proposed as a regulatory limit, $2.0 \text{ pCi/m}^2\text{-sec}$. However, the staff maintains that all radon releases from presently inactive piles are not relevant with respect to radon releases occurring due to the future production of fuel for the Skagit reactors.

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Objection

6. There is no way to estimate how well reclamation legislation is enforced, nor has there been any attempt to estimate this. There is an admission that such legislation exists in only one state - Colorado (Perkins ASLAB TR 2523). Without an estimate of reclamation, responses about tailings piles are meaningless.

Response

With respect to the stabilization and control of uranium mill tailings the staff is required by law to carry out its responsibilities under the UMTRCA and has evidenced its intent and willingness to do so in a forceful and vigorous manner by the prompt issuance of proposed regulation changes and by the exercise of the full scope and power of its licensing authority in the processing of individual license reviews. The staff intends to actively surveil the adoption and implementation of standards, and the issuance, amendment, and renewal of uranium mill licenses in Agreement States for the purpose of assuring that such standards and licensing actions are consistent with Commission regulations and staff policy. As mentioned in the response to Objection 1 and as stipulated in Section 204 of the UMTRCA, Agreement States must require:

"Compliance with standards which shall be adopted by the State for the protection of the public health, safety, and the environment from hazards associated with such material which are equivalent, to the extent practicable, or more stringent than, standards adopted and enforced by the Commission for the same purpose."

Also, prior to license termination the NRC must make a finding that all reclamation requirements have been satisfied. Both NRC and Agreement State mill operators must comply fully with NRC regulatory requirements for reclamation before responsibility may be transferred to the government.

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Objection

7. The numbers generated by Magno appear to be based on "composite model tailings piles" (Gotchy affidavit of March 28, 1978, p. 3). Although this model is indeed conservative as to area and depth of tailings, and makes the conservative assumption of full activity over its 20-year buildup, it does not take into account unstabilized tailings, old and unmonitored tailings, or removal and shifting of overburden. Further, there is no evidence that precipitation and wind data have been considered quantitatively in this model. Consequently, the 780 Ci/RRY and 350 Ci/RRY could be incorrect by anywhere from a small factor to an order of magnitude.

Response

The composite model tailings impoundment used by Magno accounted for the presence of unstabilized tailings at an operational facility for a period of 26 years, followed by an additional period of 5 years during which time the tailings were assumed to dry out prior to reclamation (stabilization). Radon release rates after reclamation were estimated on an annual basis and were not integrated over any specific period of time. Although no specific account was taken for "removal and shifting of overburden", the calculated post-reclamation release rate of 1 Ci/yr per AFR was expressed as 1-10 Ci/yr per AFR "to provide additional conservatism and to account for uncertainty about the long-term stability of the tailings areas".

Precipitation and wind data were not considered quantitatively. Wind data would not affect the calculated radon exhalation rates but would affect short-range atmospheric transport. Precipitation data, if included, would have reduced the calculated radon fluxes by increasing the assumed tailings and soil moisture

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contents, which would have yielded reduced diffusion coefficient values. Also, no credit was taken for partial annual snow cover, which also would have reduced the release estimates.

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