

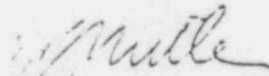
NOTE TO: Steve Eilperin  
Sheldon Trubatch

FROM: Hubert J. Miller

SUBJECT: ANALYSIS OF KERR MCGEE BRIEF

As indicated in the August 28, 1981, note from Kathleen Hamill, we are forwarding comments on the Kerr McGee brief. In order to avoid duplication we have referenced our previous comments on the AMC brief where appropriate. One general comment is appropriate. It is necessary to point out to the court that the petitioners have repeatedly misrepresented the regulations and/or the GEIS (see, for example, issue #40 in the enclosure); have made unsupported or unsubstantiated assertions (e.g., #12 attached); and have taken many statements out of context (e.g., #'s 30 and 31). If you have any questions regarding these comments, please call me.

We will forward additional comments via a mark up of the "detailed outline/initial draft respondents brief" shortly.

  
Hubert J. Miller

Attachments:  
As Stated

cc: John B. Martin  
R. A. Scarano  
R. Fonner

## ANALYSIS OF KERR MCGEE BRIEF

1. Linear non-threshold theory of questionable validity - reference to ASLB Perkins transcript. - page 5.
  - Ed Branagan
2. NRC's risks high by a factor of 9 - a factor of 3 due to overestimating the number of mills and another factor of three due to overestimating the risk per unit dose from radon. - page 6 F.N. 1.
  - Branagan - Martin
3. Discrepancy in the numbers quoted as the uranium milling radon releases as a percentage of the radon released from natural soils. - page 8 and F.N. 2.
  - Dan Martin
4. Characteristics of tailings - natural rock with radioactivity diluted - page 11.\*
  - milling process yields finely divided particulates disposed of on or near surface where they are subject to disruption and dispersion. The chemical leaching process which extracts the uranium from the ore mobilizes many radioactive and non-radioactive toxic elements.
  - \* It does not appear that former Chairman Hendrie ever made a statement in the hearings such as referenced in footnote 2.
5. History of NRC action - Industry tries to leave the impression that regulations and GEIS were nothing but a "rationalization" for prior decisions contained in Branch Position. - pages 14-15
  - Factual errors - NRC initial response to NRDC petition was "Intent to Prepare GEIS..." (6/76) not Branch position. It is no coincidence that branch position bears some resemblance to final regulations. The regulations, for the most part, are cast as performance objectives which address the same basic concerns as the branch technical position.
6. All requirements of the regulations, by their terms, are applicable to existing sites to the same extent that they are applicable to facilities still on the drawing board.

- Factually incorrect (e.g., Criterion 5 - underdrains)
  - See Statement of Considerations on application at existing sites.
7. NRC compelling Agreement States to adopt its regulations by late summer (8/1/81)
- No. The date was established by Congress as November 8, 1981.
8. NRC made previously undisclosed finding that regulations are practicable in Agreement States.
- Finding was not undisclosed. Numerous references in GEIS to consideration of Agreement State conditions. (See § 9.3.8, 12.3, etc., see also response to motion for stay - Pg. 28.)
9. NRC estimates \$340,000,000 to comply with Criterion 6. - page 18 and footnote 2.
- See response to Stratton question #17. Estimate is overly conservative due to assumptions concerning pile geometry. As depth increases - costs for covering a given volume will decrease proportionately.
10. Below grade disposal costs approximately twice as much. - page 18 footnote 2.
- See response to Stratton question #19.
11. Costs for complying with Criterion 5, groundwater protection, will nearly double total costs.
- See response to Stratton question #18. Assumptions made by Kerr McGee are incorrect. Costs quoted are an upper limit (in that it includes lining large areas with synthetic materials) for costs at a new mill.
12. Total compliance costs will be \$100,000,000/yr. (pg.19)
- The \$100,000,000/year figure is a wholly unsubstantiated assertion. Using GEIS assumptions concerning the model mill, costs for complying with the radon control requirements would result in approximately a \$13.1 million increase per year to the electricity consuming public (i.e., ~ 4.5¢/person/year). This assumes that cover costs are approximately 1% of the product price. The existing industry will not be able to amortize such costs over their entire life, thus the cost as a percent of product price for these operators would be somewhat higher. Based on information presented by Kerr McGee (the largest existing operator) at a recent hearing, it is calculated that the costs would be about 1.3% of the price of  $U_3O_8$  (assuming \$24/lb.) for the remaining facility life predicted by the operator.
  - See response to Stratton question #41.

13. NRC's responsibility is to promote use of atomic energy. (pg. 13)
  - See AMC analysis issue #18.
14. AEA does not contemplate elimination of any conceivable risk which application of the linear non-threshold hypothesis projects.
  - True -- nor does NRC require elimination of all risk. We followed the least arbitrary approach of reducing risk to a level equivalent to that risk associated with releases from natural background.
15. NRC failed to make a finding of significant risk. (pg. 31)
  - This is clearly not true. Regulations are based on a careful evaluation of potential health risks. See pg. 2 of the general comments on AMC brief.
16. NRC did not attempt to evaluate the risk which Criterion 5 was intended to address. (pg. 31)
  - See response to #32 below. Criterion 5 is intended to protect human health as well as the environment.
17. Citing of legislative history indicating Congress' intention not to require the elimination of long term maintenance. (pg. 34)
  - Suggest using Udall quote (from Congressional Record H 12969 - 10/14/78) that "The Commission and the States. . should begin with the premise that where steps can be taken to remove the necessity for long-term maintenance, they should be taken." Also we should make distinction, noted on page 33, between active ongoing maintenance and an absolute requirement for proof that over the long term maintenance will never be required. Legislative history quoted by Kerr McGee and requirements of Criteria 1 and 12 are significantly different.
18. NRC failed to determine cost-benefit relationship of the requirements. (pages 38-40)
  - See pages 6-9 in general comments on AMC brief.
19. NRC only addressed reasonableness of costs with respect to Criteria 5 and 6. (page 40)
  - Absolutely not true. We considered costs for all criteria (e.g., rip rap(4), operational controls (8), surety (9), etc.).
20. (A) Radon control cost estimates for above grade - below grade much more expensive (page 41)
  - Below grade would be somewhat more expensive if a specially excavated pit were required; however, in many cases

backfilling mines or placement in a natural basin may be equivalent to or cheaper than above grade disposal in that there would be no need to construct embankment. In fact, several operators in New Mexico place tailings back in deep mines resulting in economic benefit associated with the ability to more completely mine the ore reserve.

(B) Criterion 5 cost estimates only are based on new mills. (page 41)

- See response to Stratton question #18.

21. NRC excluded contingency costs, taxes and indirect costs. (page 41)

- As indicated, the value in GEIS tables do not include highly variable contingency costs or certain other indirect costs. However, NRC made no attempt to hide this fact - it is clearly stated in a footnote to the table. What Kerr McGee fails to mention however, is that GEIS costs are based on contractor costs and actual costs could be as much as 50% less when the operator performs the work himself. This would more than compensate for indirect costs. (This is noted in the following sentence of footnote b, Table 4.)

22. (A) Requirements equally applicable to existing facilities. (B) Impacts on existing sites not adequately analyzed. (C) Model mill, designed to correspond to future operations, markedly different from existing sites. (pages 42-44)

- (a) Not true. For example, see Criterion 5 - underdrains/liners Criterion 1 - siting, etc. See Statement of Considerations for complete discussion.
- (b) Not true - See section 12.4 of GEIS
- (c) Model mill based on operations in the 70's (as noted by AMC). Factors which may result in variability of costs are discussed in § 11.3, 12.3.4.5 and Appendix K-6.

23. Costs quoted are for moving an existing impoundment. (page 45)

- If a site has to be relocated - this would be an exceptional case. See response to Stratton question #19.

24. NRC failed to provide a variance mechanism even for the most egregious circumstances. (page 47)

- Regulations, written as performance objectives, permits flexibility for wide variation.
- Specific radon release limit and minimum cover basically considered necessary in all cases.
- Could refer to 10 CFR 40.14. Suggest language in Fonner letter to Hensley.

25. 2 pCi limit is NRC arbitrary policy to return sites to background.

- See general comments on AMC brief pages 2-8.



26. Sites will be under government control, thus exposure at fenced boundary is the significant variable. (page 49)
- See general comments on AMC brief page 8(A).
27. 2 pCi is 100 times as stringent as necessary according to the Surgeon General guidelines for a worst case situation. (page 50 F.N. 1)
- See general comments on AMC brief pages 2-5.
28. 3 meters not necessary in most cases to attain 2 pCi limit. (page 50)
- This is taken totally out of context. What we said is that although with covers containing artificially high moisture levels, such as a clay cap, the radon could be reduced with relatively thin coverings, it is not prudent to rely upon such coverings to retain their initial radon attenuation characteristics. (This notion is expanded upon in the FGEIS § 12.3.4.7 - pages 12-20 to 12-21.) The clear thrust of both the final and draft GEIS<sup>2</sup> that about 3 meters is required in all cases where artificial conditions are not relied upon.
29. No evidence in the record that 3 meters of cover will reduce the effects of root penetration or burrowing animals. (pg. 52)
- G. Gnugnoli is providing.
30. Bar on thin synthetic layers inhibits the development of new technology. Nothing in the record to support long term unreliability. Appropriate thin synthetic layers may be available in the future.
- Kerr McGee fails to quote the next sentence of Criterion 6 which states that "If non-soil materials are proposed to reduce tailings covers to less than 3 meters, it must be demonstrated that such materials will not crack or degrade by differential settlement, weathering, or other mechanism, over the long term time intervals. (See FGEIS § 12.3.4.7 and summary § 6.7). This obviously permits flexibility to incorporate the benefits of new technology, development and the fact that the staff plans to reexamine the criteria to determine if changes are appropriate in view of experience at inactive sites or research. (See specific comments and responses on pgs. A-80, A-81 and A-83 attached.)
31. Criterion 5 calls for isolation of tailings and tailings solutions from groundwater. pg. 54
- Kerr McGee fails to note the provision of Criterion 5 which states "While the primary method of protecting groundwater shall be isolation of tailings and tailings solutions, disposal

involving contact with groundwater will be considered provided supporting tests and analyses are presented demonstrating that the proposed disposal and treatment methods will not degrade groundwater from current or potential uses."

32. NRC fails to establish that mill tailings cause any significant deterioration of groundwater quality. pg. 55
  - Model mill analysis § 6.2.4.2.6 shows that seepage from unlined impoundment would limit the use of the groundwater as a drinking supply. (See Appendix E.)
33. Regulation bars any degradation of groundwater at all. pg. 55
  - This is factually incorrect. In fact some contamination or degradation could occur as long as the use of the water is not affected. (e.g., if water at a site is of a quality that it can be used for stock watering, some contamination could be permitted as long as it doesn't reduce the water quality to the point where it can only be used for industrial purposes or not used at all.
34. Protection for potential use basically boils down to "drinking water standards." pg. 55
  - Absolutely not. Potential uses refers to pre-milling conditions. The requirement reads "... and restore groundwater quality to its potential use before milling operations began to the maximum extent practicable."
35. Criterion 5 of the final regulations departs significantly from its proposed form in that the "restoration requirement" was added. pg. 56-57
  - See response to issue #14(b) on the detailed analysis of the AMC brief. Changes were a logical outgrowth of the rulemaking proceeding..
36. Cost of implementing Criterion 5 at existing sites could easily be astronomical. It may require the transfer of millions of tons of tailings.
  - Criterion 5 will not result in the transfer of tailings. Further the requirement is to restore groundwater quality to the maximum extent practicable - thus costs will obviously be considered on a case by case basis precluding unreasonable implementation and costs from becoming astronomical.
37. Criterion 10 is nothing but illegal taxation. (page 60)
  - Recognizing that this is a purely legal argument the only comment offered is that from the standpoint of common sense - this makes no sense. The long term monitoring charge is more than simply an "enforced contribution to provide for the support of government". The charge is intended to cover costs associated with waste disposal and the requirement is consistent "with the notion that the waste generator should pay all costs for waste disposal, including any long term costs incurred." (pg. 14-12 FGEIS)

38. Long term charge, if permitted, can only be required on a case-by-case basis. (Pg.61)
- NRC was able to make a determination of what the minimum monitoring cost would be on a generic basis. Flexibility exists to increase this amount on a case-by-case basis, if appropriate ("variance in funding requirements may be specified.") The uncertainties will probably be no less when examined on a site-specific basis. The GEIS approach assures some consistency in the application of long term fund requirements.
39. NRC fails to justify the \$2500 annual cost estimate for long term monitoring. (pg. 62)
- Appendix R contains an exhaustive description and cost estimates of a number of scenarios involving different levels of site surveillance.
40. Kerr McGee fails to mention the last element of the Criterion "(f) Combinations of the above or such other types of arrangements as may be approved by the Commission." (pg. 62)
41. Prohibition against self insurance is unreasonable. (pg. 63 - footnote 2).
- "proof of financial responsibility is quite different from self insurance as defined in the GEIS --- nothing other than bare promise."
42. SAI study recommended self-insurance.(pg. 64)
- The SAI study recommendations contained on page 61, state that indiscriminately allowing self-insurance, albeit easy for the regulatory body and economical for the mill operator, could lead to abandoned tailings piles..." Just providing matrix is misleading.
43. NRC failed to demonstrate availability of alternatives. (pg. 66)  
The record indicates bonds or letters of credit are not available.  
Reference to Surety association letter.
- NRC has repeatedly cited as evidence the fact that operators in Wyoming and Utah have obtained bonds and letters of credit with terms which satisfy Criterion 9.
  - We can refer to Lingo testimony (pg. 1135) from the NMEIB hearing that Kerr McGee was approved for a letter of credit.
  - Regarding the misunderstanding claim we should cite Energy Fuels letter (attached) which indicates "misunderstanding" referred on pg. A-107 (i.e., surety must cover specific plan rather than floating liability.



KMNC BRIEF - FOOTNOTE 1 (p. 6) - PROJECTED MILLING CAPACITY  
PARTIAL RESPONSE TO #2 ABOVE

- o KMNC claims that NRC prediction of 53 new mills by yr. 2000 is "inconsistent with reality" because not many new mills came on line in last 3 years, and thus NRC's risk estimate must be reduced by a factor of three  $((53 + 23)/23)$ .
  - o The U.S. milling capacity actually on line in 1979, considering the average ore grade processed that year, was equal to 29.3 model mills. This is 6.5 model mill equivalents more than projected to be required during 1979 based on reactor fuel needs, and it is not surprising that little additional capacity has come on line since that time.\* The actual 1979 capacity, in terms of model mill equivalents, exceeded the NRC projected 1982 capacity requirement.
  - o NRC's projection of 53 new model mill equivalents is based on the need for sufficient capacity to fuel 180 GWe of nuclear capacity in the year 2000, about a factor of three more than current U.S. nuclear capacity. Planned increases in U.S. nuclear power generation cannot be serviced by existing mill capacity. NRC's predicted year 2000 capacity is less than a factor of two above existing 1979 capacity, when expressed in effective model mill equivalents.
  - o NRC's predicted year 2000 requirement of 55 new model mills is likely to be 25% too low because the average feed ore grade projected for that year is only 0.08% rather than the 0.10% assumed for the model mill (more ore will have to be processed to get the same amount of uranium product).
  - o NRC's predicted risk is based on year 2000 milling requirements. Milling requirements in later years, in support of the future commercial nuclear power industry, may be considerably higher. Past projections of future U.S. light water nuclear generating capacity have exceeded NRC's assumed year 2000 figure of 180 GWe by wide margins, up to a factor of 5 or more.
- \* One 1800 MT/day mill went operational in 1980 and two NRC - licensed mills have asked for authorization to double production rates.

## TOTAL COSTS

Total costs for tailings disposal for the entire amount of tailings which will be generated through the year 2000 (assuming power projections in Table 3.9 of the FGEIS) are presented here. These estimates assume:

- o 23 existing mill impoundments will continue to be used until they reach an average depth of 15 meters and an average area of 80 ha.
- o cover and stabilization of existing impoundments will be in accordance with the scenario described in Appendix K-9. (E.g., 3 meters cover, .5 meter rock cover, etc.)
- o Costs are estimated to be approximately \$7.6 million per impoundment.
- o The balance of the tailings generated as a result of providing the required power (again, as projected...) will be disposed of in new impoundments. This will require 23 new impoundments.
- o New impoundments are assumed to be designed on the basis of model mill parameters.
- o Costs for new impoundments are taken to be an average of the central values for the passive monitoring mode alternatives (Table 12.1 - approximately \$14.2 million per impoundment.)
- o Total costs are approximately \$501,000,000.

23	existing impoundments x \$7,572,758 =	\$174,173,434
23	new impoundments X \$14,225,000 =	\$327,175,000
		<u>\$501,348,434</u>

KMNC Brief Page 8: Lines 1 and 2

- o The quotation from NUREG-0586 is taken out of context. In NUREG-0586 the statement is made with respect to what risk might be acceptable for people living on the site of a de-commissioned nuclear generating facility. This point is addressed in the paragraph preceding the quotation, where the limited population of risk is emphasized. The NUREG-0586 statement in no way indicates NRC blanket endorsement of the acceptability of any level of risk to the entire U.S. population.\*
- o NUREG-0586 does not indicate a risk of one in a million is de minimis, to be accepted without question. Rather, the explicit statement is made that the risk associated with a decommissioned facility, whatever value it is, must comply with the ALARA concept.
- o The NUREG-0586 quote is referenced to NUREG-0613 which was issued only in Draft form, and clearly marked so as to indicate that it represented only the views of the author (Enrico F. Conti). Inclusion in the NUREG publication series does not constitute Commission endorsement, or even uniform staff support.
- o Residual risks to the occupant of a decommissioned tails disposal site would exceed 1 in a million by a factor of more than 30 for each year of occupancy, provided the NRC radon limit was met.

KMNC Brief Page 8: Lines 3-8, and footnote 2

- o The figure of 0.0005% quoted is in error and should have been 0.5% (rounded up from 0.46%).
- o Radon releases attributable to uranium milling are not de minimis.

KMNC Brief Page 8: Lines 8-11

- o Radon is difficult to measure accurately, highly variable by time, weather conditions, etc., and highly plentiful in the natural environment. State-of-the-art measurement techniques can not "screen out" tails radon from background very far from a mill. Tailings emitted radon does not vanish or cease to exist merely because it cannot be measured.

\* If on site risk were limited to  $1 \times 10^{-6}$ , average U.S. risk would be less than  $1 \times 10^{-10}$ .

- o Elevated levels of other pollutants and tracer species have been detected very far from their points of release (100-600 km.). Radon is a noble gas, chemically inert, and will be carried by the wind until it decays.
- o Particulate debris from tailings piles has been measured at distances up to about 5 miles from at least one tailings pile.