Natural Resources Defense Council, Inc.

664 HAMILTON AVENUE
PALO ALTO, CALIF. 94301
415 327-1080

New York Office
15 WEST 44TH STREET
NEW YORK, N.Y. 10036
212 869-0150

Washington Office
917 15TH STREET, N.W.
WASHINGTON, D.C. 20005
202 737-5000

March 28, 1975

Mr. William A. Anders
Chairman
Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Generic Environmental Impact Statement on Uranium Milling

Dear Mr. Anders:

The Natural Resources Defense Council, Inc. (NRDC) a national environmental membership organization, has been concerned for some time about the health and safety problems posed by the radioactive wastes produced as by-products of the uranium fuel cycle. In particular, during the past several months, we have been studying the storage problems associated with uranium milling tailings, which contain large amounts of highly toxic radionuclides. These radionuclides must be prevented from entering human exposure pathways for the thousands of years required for them to decay naturally to innocuous levels.

The past lax regulatory policies of the Atomic Energy Commission (AEC) have resulted in the accumulation of tens of millions of tons of uranium mill tailings in unstabilized and potentially hazardous piles in eight western states. The failure of the AEC to regulate mill tailings storage effectively in the past has allowed the

occurrence of hazardous contamination of drinking and irrigation waters and significantly elevated concentrations of radioactive gas in homes and schools. While some steps have been taken to mitigate at least temporarily the more hazardous conditions associated with existing mill tailings, to our knowledge there is no coherent overall strategy or plan to prevent the critical radionuclides in existing and future mill tailings from entering the biosphere in toxic amounts. Indeed, the Nuclear Regulatory Commission (NRC) staff admits that current regulations are inadequate to provide for the safe storage of mill tailings throughout the toxic lives of contained radionuclides.[1/]

While the potential dangers associated with the existing 22 largely unstabilized, abandoned tailings piles are grave enough, the problems in the coming two or three decades will be much greater. The annual amount of natural uranium required to support the United States' commercial nuclear power industry is projected to increase more than 10-fold by the end of this century.[2/] Correspondingly, the accumulated volume of uranium mill tailings resulting from the operation of nuclear power plants is projected to increase from about 0.4 million cubic feet in 1975, to over 14 billion cubic feet -- an increase of over 30-fold -- by the year

---

1/ Letter to NRDC from Harold J. Larson, Director, Division of Materials and Fuel Cycle Facility Licensing, NRC, February 20, 1975 (p. 4 of the Enclosure). [Hereinafter, Larson letter to NRDC.]

2/ U.S.A.E.C., Nuclear Power Growth 1974-2000, WASH-1139, February 1974, p. 25.

2000.[1/] The bulk of this projected uranium mining and milling probably will be localized in relatively well-defined homogeneous regions in the Rocky Mountain states.

Because of the generic nature of the critical environmental and public health problems associated with uranium mill tailings, the imminent substantial increase in the size of the uranium milling industry, and the geographic localization of uranium mining and milling in the West, NRDC has concluded that a programmatic environmental analysis of the possible alternative approaches for regulating uranium milling operations at this time is appropriate and highly desirable in order to rectify inadequacies in current regulations and practices. In any event, a programmatic environmental impact statement (EIS) is, in our opinion, required by the provisions of the National Environmental Policy Act of 1969 (NEPA). The early completion of a comprehensive, detailed draft environmental impact statement is required, and particularly, before the currently anticipated rapid increase in milling operations is necessitated by a major national commitment to nuclear power.

In this letter, we will outline the major environmental and health hazards mill tailings pose, and trace the history of the federal government's totally inadequate efforts to deal with

---

1/ D. Bleiwas, C. Kei, J. Nichols, Projections of Radioactive Wastes to Be Generated by the U.S. Nuclear Industry, p. 97, February 1974 (ORNL-NSIC-88). The total accumulation of uranium mill tailings, including those resulting from the nuclear weapons production program, is about 2.7 billion cubic feet. Atomic Energy Commission "Summary Report: Phase I Study of Inactive Uranium Mine Sites and Tailing Piles", pp. 9-10, October 1974. (hereinafter referred to as "Summary Report".)

these hazards so far. We will discuss why an EIS is appropriate, both as a policy and a legal matter, and we will define in some detail the issues that it must explore. We conclude by requesting that the NRC take certain actions immediately, before preparation of the EIS is completed. These actions include adopting regulations requiring operators of existing mills to post bonds to cover the cost of interim stabilization and ultimate disposal of the tailings. Finally, we are attaching as appendices to this letter an outline of the programmatic EIS that must be prepared and the text of the proposed regulation requiring ongoing operators to post a bond.

I. Background

A. Existing and future Mill Tailings Piles Pose Serious Long-Term Environmental and Public Health Problems.

Uranium mill tailings are a sandlike waste product produced in the uranium milling process -- the first step in producing enriched uranium fuel for nuclear power plants. The ore -- usually from a nearby mine -- is crushed, ground and chemically treated in a mill to extract and concentrate the uranium. Because only a few pounds of uranium are contained per ton of ore, the dry weight of the tailings is approximately equivalent to the mined ore. However, during processing the ore undergoes expansion and, thus, the dry tailings are somewhat more voluminous than the mined ore.

The processed ore is discharged into a tailings pond as a solids-laden liquid. The water seeps into the ground or evaporates, eventually leaving a dry tailings pile after the pond is abandoned.

Uranium tailings contain most (about 85%) of the natural radioactivity associated with the ore. The critical radioactive constituents in the uranium tailings piles include, for instance, the relatively long-lived radionuclides radium-226, thorium-230, and lead-210.[4/] For comparison to the more widely recognized problem of storing high-level radioactive wastes for hundreds of thousands of years, we note that by one measure of relative toxicity -- the amount of water required to dilute the radionuclides to the radiation concentration guides (RCG's) in 10 C.F.R. Part 20 -- the uranium mill tailings will pose a greater potential hazard than the high-level wastes after only 1000 years following termination of the nuclear power program.[5/] That is, in one regard, the mill tailings pose a greater long-term environmental and health hazard than the high-level radioactive wastes.

The four basic potential routes of human radiation exposure from the radionuclide constituents of uranium mill tailings piles are as follows:[6/]

1. Inhalation of windblown tailings. No current stabilization technique is adequate to prevent significant wind erosion of surface piles during the thousands of years that the critical

---

4/ Blomeke, et al., op. cit., p. 7. (Thorium-230 has a half-life of 80,000 years. While the standard rule-of-thumb that radioactive wastes have to be contained for 20 half-lives of the longest lived hazardous constituent, uranium mill tailings will have to be stored safely for over a million years.)

5/ Id. at pp. 17, 47.

6/ "Summary Report, pp. 9-10.

radionuclides remain hazardous.7/ Also, the extraordinarily long period of time required for safe storage rules out reliance on periodic maintenance as a permanent solution to this problem. Once dispersed, the radionuclides could enter many different pathways leading to significant exposure to humans to hazardous radiation.

2. Inhalation of the progeny of radon. The inert gas radon, a spontaneous decay product of radium, can diffuse through soil, concrete and other materials. Therefore, radon can accumulate within structures built over tailings piles themselves or over structural material containing tailings. The highly toxic, alpha-emitting progeny of radon can then deposit in human lungs. Uranium miners exposed to concentrations of radon gas comparable to those found in buildings built over tailings show twice the normal rate of occurrence of lung cancer.8/

3. Exposure to gamma radiation, primarily from radon and its progeny. This problem occurs in the vicinity of tailings piles or sites where tailings have been used for fill or building materials.

The use of uranium mill tailings for construction purposes, a use which results in human exposure by inhalation and other exposure to radon and its progeny, has been a cause of some

---

7/ Id. at p. 14.

8/ Hearings on Use of Uranium Mill Tailings for Construction Purposes Before the Subcommittee on War Materials of the Joint Committee on Atomic Energy, 92d Cong., 1st Sess., pp. 270-277 (1971). (Hereinafter referred to as Hearings 1971.)

concern even to the AEC. In the Grand Junction, Colorado, area this use reached serious proportions. Between 1952 and 1966 hundreds of structures were built with radioactive tailings from the AEC-licensed Climax Uranium Co. mill in Grand Junction.[9/] The tailings were primarily used as construction fill underneath or against the buildings, though in at least one school the masonry itself was made from tailings.[10/] A 1971 survey in the Grand Junction area indicated that as many as 3300 buildings may be affected. In 1972, the U.S. Congress concluded that the situation in Grand Junction was unsafe and it appropriated five million dollars to aid the homeowners and schools in removing the tailings. However, the law passed only applied to the homes and schools in the Grand Junction area.[11/] Since the passage of that law, a joint AEC/Environmental Protection Agency (EPA) study of inactive mill tailings piles has revealed that conditions at a tailings pile located near the center of Salt Lake City are "completely unsatisfactory", present a hazard to the public and will almost certainly have to be removed.[12/] The same study also indicates that tailings piles at at least five other locations are a significant enough hazard to warrant a careful study of the

---

9/ Hearings 1971 at p. 106.

10/ Id. at p. 15.

11/ See, Pub. L. No. 92-314, Title II, 86 Stat. 222 (June 16, 1972) and 10 C.F.R. 12, "Grand Junction Remedial Action Criteria".

12/ "Summary Report" at p. 2.

possibility of moving these piles. That study is now being conducted.[13/]

4. Ingestion of ground or surface waters containing excessive amounts of radionuclides leached from tailings piles or food stuffs exposed to such contaminated water. The hazards associated with this potential exposure route were clearly demonstrated in 1950. In that year, a U.S. Public Health Service biologist was asked to collect fish samples from the Animas River downstream from an AEC-licensed uranium mill at Durango, Colorado.[14/] He found that not only the fish but all other river fauna had been virtually eliminated by radiation for a few miles below Durango and severe damage was found 50 miles downstream.[15/] The drinking water in the towns along the Animas below Durango -- Aztec and Farmington, New Mexico -- frequently contained radioactivity exceeding the Radiation Concentration Guide limits.[16/] Furthermore, the sequestration of minerals in the river food chains resulted in radium concentrations in the river flora and fauna of 100- to 10,000-fold the concentrations found in the river water itself.[17/] Grasses and alfalfa irrigated with the water concentrated radium on the order of 100-fold, and this was then passed on to

---

13/ Id. at pp. 6-7.

14/ H. Peter Metzger, The Atomic Establishment, p. 162 (1972).

15/ Union of Concerned Scientists, The Nuclear Fuel Cycle, p. 97, October 1973.

16/ Id.

17/ Id. at p. 91.

livestock.[18/]

The problems in the Animas River were by no means unique; similar concentrations of radium were found downstream from other Colorado uranium mills. After regulations were promulgated by the Public Health Service and the AEC, the radium contamination decreased considerably but the problem was not completely solved, as evidenced by the fact that the mean annual radium concentration in the San Miguel River below Uravan, Colorado, was about 12% above drinking water standards in 1968.[19/] The potential impact of radium in the rivers of the Colorado River Basin takes on added significance when one recognizes that the Colorado River supplies water for much of the Southwest, including the Los Angeles area.

B. The History of Regulation of Uranium Mill Tailings and the Inadequacy of the Current Regulatory Program.

The AEC (now the NRC) has been studying the radiation safety aspects of effluents from uranium mills since 1957 and of uranium mill tailings since 1963.[20/] The reason no solution has

---

18/ Id.

19/ U.S. Environmental Protection Agency, "Radium-226, Uranium and Other Radiological Data from Water Quality Surveillance Stations Located in the Colorado River Basin of Colorado, Utah, New Mexico, and Arizona, January 1961 through June 1972" (BNA/TIB-24), pp. 12, 15, 16 (July 1973).

20/ Hearings on the Problem of Radioactive Water Pollution in the Colorado River Basin Before the Subcommittee on Air and Water Pollution of the U.S. Senate Committee on Public Works, 90th Cong., 2d Sess., p. 106 (1968). [Hereinafter referred to as Radium 1968.] For example, in July 1966, the AEC's Director of Regulation informed the Colorado Director of Public Health that the AEC was "currently evaluating the long-term radiological safety aspects of uranium

(continued on next page)

been formulated in the ensuing years seems to be that for many years the AEC has steadfastly refused to concede that tailings pose a significant long-term health hazard. Other federal agencies, on the other hand, reached this conclusion years ago, as illustrated by the Federal Water Pollution Control Administration's position first taken in 1963 and restated in a 1966 report as follows:

> "Finally, it appears that we have reached a point at which the problem of ultimate disposal of uranium mill tailings should be given more serious consideration. Their radioactivity is very long-lived. Occasional questions as to their suitability for land-fill operations and for highway subgrade material have gone unanswered. Field studies are not proposed at this time, but rather it is proposed that the industry as well as the responsible local and Federal agencies attempt to develop a rational approach to the long-term protection containment of tailings piles as well as rational evaluation of proposals for their possible disposal . . . ."21/

The AEC steadfastly disagreed. At a May 1966 hearing before a U.S. Senate Subcommittee, the AEC dismissed the possibility that uranium mill tailings were hazardous with the following statement:

> "(2) We have considered speculation that, because of the long half lives of the radioactive material contained in the uranium piles, they may become hazardous at some future time. At the present time we find it difficult to conceive of any mechanism whereby the radioactive material which is now so widely dispersed, could become so concentrated as to exceed current applicable standards for protection against radiation."22/

"continued" tailings at closed mills" and that they expected the study to be completed "in the near future." Subsequent failure of the AEC to take effective regulatory action only manifested the willingness of the Commission to study the problem to death. Hearings 1971, p. 395.

21/ U.S. Dept. of HEW, Dispositior and Control of Uranium Mill Tailings in the Colorado River Basin, p. 1, March 1966.

22/ Hearings 1966 at pp. 10, 108.

At Joint Committee hearings earlier that same year, the AEC's position was outlined this way:

"Rep. Aspinall: I want to know . . . what we should do about these tailings piles.

"Mr. Henderson: [AEC spokesman] This problem has been under study for quite some time. In fact, our studies commenced on this several years ago, in cooperation with the Public Health Service. As a result of our studies we have concluded, based on our standards, that there is no radiological safety problem in connection with mill tailings piles."[23/]

Later another AEC spokesman discussed the AEC's recognition that a long-term solution to the problem must be found:

> "[W]e recognize that these tailings piles whether or not they pose a current or immediate radiological problem are a nuisance and may contribute to water and air pollution. We have been working with the companies [mill licensees] over a period of time and with the Public Health Service in an endeavor to devise proper means of stabilizing these tailings so that they do not pose a threat either long term or short term."[24/]

Of course, the radiation levels subsequently measured in Grand Junction homes built over tailings proved the above statements to be wrong, and the AEC's effort to come up with a solution dangerously inadequate.

After the discovery of the Grand Junction problem, the AEC seemed to devote its efforts to minimizing the hazard rather than

---

23/ Hearings on AEC Authorizing Legislation, Fiscal Year 1957, Before the Joint Committee on Atomic Energy, 84th Cong., 2d Sess., p. 13 (1956).

24/ Id.

attempting to find out more about it and come up with a solution. This attitude was illustrated by the AEC's recommendation in 1969 to the Public Health Service that they reject an application for funds by the Colorado State Department of Public Health for surveys necessary to define the extent and seriousness of the indoor radon problem.[25/] Similarly, in 1971, the AEC refused to grant funds requested by the University of Colorado Medical Center in Denver to study chromosomal breakage, an early indicator of radiation damage, among children from radon-contaminated homes.[26/] Instead, the AEC funded a research project to measure radon levels in Tennessee and Florida[27/] where the surface soils contain naturally high levels of radium; apparently in the hope that there would be a duplication of the Grand Junction conditions in these areas.[28/] The only possible explanation of these actions by the AEC is that it would rather generate data that seem to minimize radiological problems than to do research to define the problems.

The AEC's attitude did not change by October of 1971 when the Congressional hearings on the use of uranium mill tailings for construction purposes were held.[29/] Glenn D. Keller, President,

---

25/ H. P. Metzger, op. cit., p. 177.

26/ Id.

27/ U.S.A.E.C., "Indoor Radon Daughters and Radiation Measurements in East Tennessee and Central Florida", (HASL-TM-71-8), March 1971.

28/ H. P. Metzger, op. cit., p. 180.

29/ See generally, Hearings 1971.

Colorado State Board of Health in testimony at the hearings made the following observations about the AEC's efforts to "solve" the Grand Junction problem:

> "We have observed the efforts of the AEC first to deny the possibility of a problem, then to admit possibility but pooh, pooh probability, then to recognize a problem and deny responsibility and finally, in the last few weeks to engage frantically in behind-the-scenes efforts to avoid recommendations of the Interagency Steering Committee and the Medical Advisory Committee that the tailings be removed."30/

The position of the AEC seems to have changed only slightly since 1971. In March 1974, the AEC testimony before a Congressional Subcommittee about the nature of the uranium tailings problem was as follows:

> "The presence of naturally occurring radium in uranium mill tailings is the principal source of public health concern because of the radioactive gaseous radon which continuously emanates. Since radium has a half-life of 1600 years, the problem is a persistent one."31/

While the AEC thus seemed to have accepted the idea that tailings might pose a significant long-term hazard, the contrast between the position of the AEC and the EPA suggests that the AEC may only have been conceding that tailings were a problem worth studying, rather than solving. The EPA testified that it agreed with the concept of the proposed legislation though it said that further study was needed so the problem might be solved as a generic

---

30/ Hearings 1971 at p. 104.

31/ Statement of Dr. James L. Liverman testifying for the AEC before the Joint Committee on Atomic Energy, March 12, 1974.

issue.[32] The AEC's position, on the other hand, was simply that "any legislation . . . is premature until this study is completed."[33]

We fear that the newly-formed NRC will unthinkingly adopt the AEC's reluctance to face this problem head-on. The entire regulatory program of the AEC consisted solely of inserting a loosely-drafted and completely inadequate condition in active uranium mill licenses that restricts the use of the land on which tailings are located for "50 years or until government regulations are instituted to control disposition of uranium mill tailings."[34] When challenged on this relatively short period, given the thousands of years the hazards will remain, the AEC noted only that 50 years "would appear to provide sufficient time for new techniques in mining, milling and tailings disposition to be developed, which may eliminate the need for such restrictions."[35] Similarly, the NRC has defended this restriction, indicating that: "it is believed to be an adequate time period for the tailings problem to be fully studied and resolved."[36] When asked if this restriction was inserted in all uranium mill licenses, the NRC stated:

> "It is planned that restrictions similar to those for Exxon and Utah International Inc.

32/ Statement of W. D. Rowe, Ph.D. testifying for the EPA before the Joint Committee on Atomic Energy, March 12, 1974.

33/ Statement of James Liverman, see footnote 31.

34/ Letter from S. H. Smiley, AEC to NRDC, November 14, 1974, p. 2.

35/ Larson letter to NRDC, February 20, 1975 (at p. 1 of the Enclosure).

36/ Id. (at p. 2 of the Enclosure).

> will be included in the licenses now up for renewal for the mills of Kio Algom (Utah) and Atlas Minerals (Utah). As other licenses come up for renewal or termination, conditions pertaining to stabilization of tailings piles will be added. Since the restrictions apply to control of tailings after operations have ceased, there is no need to take special arrangements to add conditions to licenses before they come up for renewal or termination."37/

The above indicates that the NRC, like the AEC, will view the problem as one of dealing with the tailings at some comfortably distant time in the future, rather than a problem to be dealt with now at its source, the uranium milling process.

The failure of the AEC to deal with the treatment of the tailings problem in its December 1974, environmental impact statement for the Shirley Basin Uranium Mill in Wyoming is another example that shows how little the AEC's attitude has changed in the past 15 years. The EPA, in a letter to the AEC, had this to say about that environmental impact statement.

> "The storage and disposal of uranium mill tailings is, from an environmental impact standpoint, the Achilles heel of the uranium milling industry. The environmental statement, however, does not present a clear picture of how UI's tailings are to be handled. The final statement, written four years after the mill began operations, still lacks information on the storage and disposal of the presently projected volume of tailings to be generated by the mill. In future statements, the Commission should give greater priority to plans and details concerning long-term tailings disposal at any mill site under consideration. In this way, reviewing agencies can make substantive comments which will hopefully improve tailings disposal practices for future mill sites."38/

37/ Id. (at p. 3 of the Enclosure).

38/ Letter from John O. Green, Regional Administrator of the EPA, to A. G. Whitwood, Directorate of Licensing, AEC, January 23, 1975.

Even apart from the serious environmental and public health issues involved, the potential magnitude of the costs to the taxpayer to dispose of mill tailings, and the NRC's lack of concern about these potential costs, is disturbing. By the year 2000, the total volume of accumulated mill tailings from both commercial and governmental programs is projected to be about 20 billion cubic feet[39/] or enough to cover the entire state of Rhode Island with a seven inch layer of tailings. The cost of dealing with this amount of material can be expected to be quite high. In fact, using the order of magnitude estimates given in a joint AEC/EPA study,[40/] we place the estimated cost of moving the tailings from the abandoned mill sites to their ultimate disposal place at over one billion (1974) dollars.[41/] Furthermore, if the NRC maintains its current position that abandoned tailings piles are a state, rather than a federal, problem,[42/] then most of this cost will fall on the citizens of Colorado, New Mexico, Utah and Wyoming. If Congress is forced to pass remedial legislation on the Grand Junction model, 750 million dollars would be required from the federal treasury, and 250 million dollars from state treasuries.

When asked who will pay for the implementation of new techniques for uranium mill tailings disposal, the NRC responded as follows:

39/ Blomeke, op. cit., p. 97; and "Summary Report", p. 9.

40/ "Summary Report", p. 9.

41/ Copies of our calculations are available upon request.

42/ Larson letter to NRDC (at p. 3 of Enclosure).

> "When new techniques for disposing of mill tailings are adopted, the NRC will have to work out the arrangements for paying the cost of implementation. We do expect that licenses will be worded in such a way as to permit implementation of new tailings disposition techniques, but not to require the licensee to commit himself to perform some presently unknown action which may be decided in the future."43/

We strongly urge the NRC not to continue the AEC policy of waiting until a disposal technique is decided upon, before it will try to persuade the operator to assume the costs of disposing of the tailings his operations have generated. Unfortunately for the taxpayer, it is probable that, at the present rate, a good many mills will be abandoned and their operators gone from the scene before the ultimate disposal technique is determined. In short, the NRC should not be content, as was its predecessor, the AEC, to wait until it is faced with thousands more acres and many more million cubic feet of abandoned tailings before it will require the mill operators to clean up their own mess. Otherwise, we may expect that Congress will be forced to deal with the most flagrant situations on an *ad hoc*, piecemeal and retroactive basis, as in the Grand Junction situation.44/ Such a piecemeal solution is, we believe, neither sound policy nor compliance with NEPA.

43/ Id. (at p. 6 of Enclosure).

44/ Already such a pattern is, unfortunately, emerging. Besides the special 5 million dollar federal appropriation for Grand Junction (P.L. 92-314), Senator Moss and Congressman Owens of Utah last year introduced identical bills to require the federal treasury to pay three-quarters of the cleanup costs for the Vitro mill tailings pile, 1.7 million tons of mill tailings near the center of Salt Lake City. (See, S. 2566, H.R. 13778, 93d Cong., 2d Sess.)

II. Why an EIS Is Appropriate

From the above, it seems clear that the NRC must immediately begin a serious search for solutions that will prevent the present problem from becoming larger. The appropriate vehicle for such a search is a programmatic environmental impact statement (EIS) on the ongoing program of regulating and licensing uranium mills. While the EPA and the Energy Research and Development Agency (ERDA) are presently conducting a study directed toward mitigating the hazards associated with existing abandoned tailings piles,[45] this study does not seek to determine what measures, performed as an integral part of the milling process, might be taken to lessen the radiological hazard to the public posed by the tailings. Furthermore, this study now involves a primarily remedial analysis -- the preparation of detailed site-specific engineering assessments for appropriate remedial action at each site -- and is expressly limited to the 21 identified abandoned mill tailings sites.[46] The fact that this study is not yet completed is not, therefore, a valid reason for failing to begin immediately the drafting of an EIS which will determine the environmental desirability and feasibility of requiring modifications of the uranium milling process that would mitigate or avoid the problems posed by the disposal of tailings.

It must be emphasized that the environmental analysis proposed above will benefit everyone. The Agreement States will obtain firm data that will allow them to make wise decisions

---

45/ "Summary Report", p. 1.

46/ Id.

regarding the licensing of future, as well as currently operating, mills. The mill operator will be assured that the ultimate decisions made will be well thought out and carefully considered. The NRC will be provided with the basis for making principled decisions that will stand the close scrutiny of all interested parties -- the public as well as the mill operator. Finally, the general public will be assured that it will not, unknowingly at least, continue in the position it is now in, of subsidizing a major cost of milling uranium.

III. Description Of What The EIS Should Cover

At the present time the NRC is authorized by 10 C.F.R. § 40.41(e) to:

> ". . . incorporate in any license at the time of issuance, or thereafter . . . such additional requirements and conditions with respect to the licensee's . . . use . . . of source material as it deems appropriate or necessary in order to: . . . (2) Protect health or minimize danger to life or property; . . ."

Further, after the passage of NEPA, the Commission amended its regulations to authorize the Director of Regulation to insert "appropriate conditions to protect environmental values" in any licence for possession and use of source material for, among other things, uranium milling. See 10 C.F.R. § 40.32(e), 36 Fed. Reg. 22848 (December 1, 1971); 37 Fed. Reg. 5745 (March 21, 1972). Accordingly, the NRC initiated, and the NRC plans to continue, a policy of inserting conditions pertaining to the stabilization of tailings piles in all licenses as they come up for renewal or termination. These conditions restrict for 30 years the use of

the land on which tailings lie but do nothing to prevent the accumulation of radioactive tailings.

The proposed EIS must analyze the environmental impact of the continuation of the above-described program which will, in the next thirty years, result in the accumulation of an additional 18 billion cubic feet of tailings. The first element of the EIS is a description of the present problem and program. This description must explain the relationship of the programmatic EIS to the EIS's prepared for each mill license and other EIS's relating to radiation regulation, so as to clearly define the scope of the programmatic EIS and avoid unnecessary duplication. Similarly the milling industry and licensing program must be described in terms of projections for the future, as well as by surveying present and past milling operations and licensing programs. Only this will enable the public as well as the decisionmaker to understand clearly the nature of the problem and the types of solutions presently being applied.

This description of the status quo should be followed with a detailed statement of the environmental impacts of the program. The impacts include those effects already observed and those reasonably to be expected for the 50-plus years duration of the program. These expected effects might include the result of a 50-or 100-year flood on radium content in the rivers flowing by tailings piles, and the effect of the failure to develop acceptable disposal techniques for tailings in that time, such as the increased danger of human exposure caused by the increase in population density in western states expected to accompany the

development of western coal and oil shale fields.

The NRC's "program" of regulating uranium mills includes the NRC's supervision of state-administered mill licensing in Agreement States as well as the NRC-administered licensing in non-Agreement States. The supervision of the Agreement States' licensing requires the NRC to determine periodically the adequacy of Agreement State programs. Such a determination cannot be made in a manner complying with NEPA without a detailed analysis of the environmental impacts caused by the state licensing program. It should be noted that there are only four Agreement States with active uranium mills, so inclusion of their regulatory programs within the proposed programmatic EIS will not be burdensome.

Perhaps the most important element of the proposed programmatic EIS will be a discussion of the alternatives, their environmental impacts and a comparison of their impacts with the impacts of the present regulatory program. There are undoubtedly numerous feasible alternatives. Two regulatory options that must be discussed in detail are (a) requiring the removal of all critical radionuclides from the tailings, and (b) requiring that the tailings be returned to the geological strata in the mine from whence they came or some other mine. The range of alternative methods of accomplishing either of these alternatives must be fully explored. For example, the first alternative might be required in new plants only or in old plants after a certain date. Similarly, returning the tailings to the mine might be more easily accomplished if the tailings were dried to some extent or if the milling process were modified to reduce the concentration of slime in the tailings. The secondary

environmental impacts each of these alternatives would have due to an increase in the price of electricity generated by nuclear energy should also be determined and disclosed in the EIS.

Attached as Appendix V to this letter is an outline of the programmatic EIS that needs to be prepared. In our judgment, an adequate EIS might include topics not in the outline but must, at the very least, fully discuss the matters outlined.

IV. Why NEPA Requires That This EIS Be Prepared, and Prepared Forthwith

Section 102(2)(C) of the National Environmental Policy Act (NEPA) directs all federal agencies to prepare environmental impact statements for all "major Federal actions significantly affecting the quality of the human environment." Section 1500.5(a) of the guidelines promulgated by the Council on Environmental Quality (CEQ) states that:

> "'Actions' include but are not limited to:
> * * *
> (2) New and continuing . . . program activities: involving a Federal . . . permit, license certificate or other entitlement for use."

There can be no doubt that the NRC's decisions regarding the licensing of uranium mills require EIS's. Indeed, the AEC -- and we assume the NRC also -- has conceded as much by committing itself to filing individual EIS's on new and presently licensed uranium mills. The EIS's on the individual mills have, however, scarcely considered the questions of mill tailings disposal.[47/]

47/ See, the EPA's comments on the Shirley Basin EIS, above.

More importantly, they have not considered the possibility of changing the conditions inserted into all licenses and have not compared the various possible conditions that might be inserted with those presently included in licenses. These issues of generic applicability can reasonably, efficiently and effectively be fully explored in a programmatic EIS. NEPA itself requires such a result.

The courts have taken a dim view of agency arguments that they need not file EIS's that assess the overall environmental effects of, and alternatives to, federal programs. Judge Wright, writing for the Court in Scientists' Institute for Public Information, Inc. v. Atomic Energy Commission, 481 F.2d 1079 (D.C. Cir. 1973), firmly rejected such a notion:

> "The Commission takes an unnecessarily crabbed approach to NEPA in assuming that the impact statement process was designed only for particular facilities rather than for analysis of the overall effects of broad agency programs. Indeed, quite the contrary is true.
>
> "'Individual actions that are related either geographically or as logical parts in a chain of contemplated actions may be more appropriately evaluated in a single, program statement. Such a statement also appears appropriate in connection with * * * the development of a new program that contemplates a number of subsequent actions. * * * [T]he program statement has a number of advantages. It provides an occasion for a more exhaustive consideration of effects and alternatives than would be practicable for a statement on an individual action. It ensures consideration of cumulative impacts that might be slighted in a case-by-case analysis. And it avoids duplicative reconsideration of basic policy questions. * * *"

In that case the Court held that the AEC was required to issue an EIS for the LMFBR research and development program as a whole even though the AEC had prepared EIS's -- which the Court assumed to be adequate -- on individual facilities built for the program and proposed issuing EIS's on future commercial breeders on an individual basis.

Since the AEC conceded that the "placing of restrictions on uranium mill sites started with implementation of . . . NEPA,"[48] and since the present system of regulation desperately needs an overall assessment of long-term regulatory alternatives, the present situation seems made to order for a programmatic EIS.

It must be emphasized at this point that there is no legal justification for preparing a programmatic EIS which excludes that part of the mill licensing program administered by Agreement States. The NRC is required to, and does, periodically review the adequacy of Agreement State programs. See 42 U.S.C. § 2021(j), Atomic Energy Act § 274. In fact a recent GAO report noted that the AEC's policy was to maintain a continuing relationship with each Agreement State to help insure the continued adequacy of the state program and its compatibility with the AEC's program.[49] The continuous AEC certification of the Agreement State's radiological safety program is analogous to a federal permit. If the conditions of the permit -- adequacy and compatibility -- are not

---

48/ Letter to NRDC from S. H. Smiley, Deputy Director for Fuels and Materials, Directorate of Licensing, AEC, November 14, 1971, p. 1.

49/ Comptroller General, "Opportunities for Improving AEC's Administration of Agreements with States Regulating Uses of Radioactive Materials", (B-[illegible]), p. 11 (1970).

met, then the permit may be revoked.

Furthermore, the NRC retains the authority and responsibility to regulate the disposal of source material where the Commission determines that a license should be required because of the actual or potential hazards involved. See, 42 U.S.C. § 2021(c). The Commission could thus take over the entire milling and mill tailings licensing process should it so choose, and in fact may under certain circumstances be required to do so, given its general authority to establish such standards and instructions to govern the possession and use of source material[50/] as it believes necessary to "protect health or to minimize danger to life or property . . ." 42 U.S.C. § 2201(b).

Under section 1500.5(a) of the CEQ guidelines, cited above, as well as the case law,[51/] an EIS is therefore required for the Agreement State program. Since the supervision of licensing in non-Agreement States is more properly viewed as one program, it is appropriate that the programmatic EIS include both.

50/ Mill tailings contain uranium and thus are "source material" under the Atomic Energy Act and implementing regulations. See, 42 U.S.C. § 2014(z); 10 C.F.R. § 40.4h. (The latter defines source material as including "uranium or thorium or any combination thereof in any physical or chemical form.") While the NRC previously determined, pursuant to 42 U.S.C. § 2042, that any compound or mixture in which source material is by weight less than 0.05%, is "unimportant", and thus does not require a license for possession or use, the continuing validity of that determination must increasingly be regarded with skepticism. As the evidence of health and environmental hazards associated with tailings mounts, the NRC should, perhaps as part of its programmatic EIS, reevaluate this determination.

51/ See, Davis v. Morton, 469 F.2d 593 (10th Cir. 1972); Wilderness Society v. Hickel, 325 F. Supp. 422 (D.D.C. 1970); Wilson Gardens Buildings, Inc. v. National Capital Planning Comm'n, 4 ERC 2708, 4 ELR 20258 (D.D.C. 1972).

It should also be noted that the approval of the NRC required for the continuation of any Agreement State program does constitute a "major" federal action. This is demonstrated by the case of Davis v. Morton, 469 F.2d 593 (10th Cir. 1972), where the federal action held to be "major" was the Secretary of the Interior's approval of a 99 year lease entered into by an Indian tribe with a private corporation. The government argued in vain that there was no major federal action because:

> "The United States did not initiate the lease, was not a party, possessed no interest in either the lease or the development, did not participate financially or benefit from the lease in any way."

The NRC's involvement with the Agreement States' program is much greater than was the Interior Department's in Davis. Unlike Davis where the extent of government involvement was a one-time approval, the NRC, as noted above, periodically reviews each state's program for adequacy and compatibility. Also unlike Davis, the NRC receives a substantial benefit from the continuation of the state program by not expending funds for its own regulatory program in the Agreement state.

The requirement that this programmatic statement include Agreement States gains added force since the NRC, like the AEC, has refused to prepare an EIS on any of its agreements with states by which much of the federal authority to license and regulate radioactive materials is transferred to the states. It seems to us that such an agreement may well be a major federal action

V. Adoption Of Regulations Requiring All Mill Operators To Post Bonds That Will Cover The Cost Of Interim Stabilization And Ultimate Disposal Of Tailings

No matter what the ultimate decision is with regard to the proper approach to the tailings disposal problem, the NRC should delay no longer in adopting regulations that will put into effect the position expressed by the Regulatory Staff in Regulatory Guide 3.23. This position is that the criteria in ANSI N313-1974, "Stabilization of Uranium-Thorium Milling Waste Retention Systems," should be used to determine the acceptability of arrangements made by the licensees to plan for the control of mill tailings. Section 3.9 of ANSI N313-1974 states:

> "Positive, binding commitments (such as bonding, escrow accounts, etc.) shall be established to ensure that waste-retention systems are stabilized and maintained when milling operations are terminated, when long-term site access and use controls over tailings are established, and when long-term inspection and maintenance are performed in accordance with applicable regulatory requirements."

So far the AEC and the NRC have done nothing to implement this provision.

We therefore formally petition the NRC under 10 C.F.R. § 2.802 to issue regulations that will:

(1) require each NRC licensed uranium mill operator to post a bond;

(2) require each Agreement State to require mill operators licensed by them to post a bond; and

(3) issue or renew no licenses during the time the EIS is prepared that would permit a licensee to escape any new regulations promulgated as a result of the EIS.[55/]

The amount of bond to be posted should be the sum of two cost components. The first is the estimated cost to the government to stabilize and maintain tailings piles in the event the operator abandons operations without doing so. This component is basically that contemplated by the ANSI standard quoted above. The state[56/] and federal[57/] legislation and regulations governing surface mining already make use of a similar bonding requirement to ensure that the government is not burdened with the cost of the operator's obligation to rehabilitate the land his operations have affected.

The second component is the estimated cost to the government of ultimate disposition of the tailings by the most expensive, presently feasible method. The AEC proposed the use of a similar device in the context of management of high-level radioactive wastes produced in commercial nuclear power plants.[58/] In particular, the AEC proposed that a charge be levied on the generator of the high-level waste to "cover all costs to the AEC for all

---

55/ Appendix II contains the text of the proposed regulation.

56/ See, e.g., Wyoming Statutes §§ 35-502.1, et seq.

57/ See, 43 C.F.R. § 23.9(a)(1); 30 C.F.R. § 211.3(b)(12).

58/ U.S. A.E.C., Draft Environmental Statement, Management of Commercial High-Level and Transuranium-Contaminated Radioactive Waste, WASH-1539, S. D.A-8 (September 1974).

subsequent management activities which it will perform on the waste (storage, treatment, transport and disposal)".[59/] A similar approach is justified here in the absence of a conscious public decision to subsidize with tax dollars the uranium milling industry, by paying the cost of the ultimate disposal of mill tailings.[60/]

VI. Conclusion

For the reasons set forth above, we request the NRC to proceed immediately with the preparation of a draft programmatic EIS on its uranium milling regulatory program. We also formally petition the NRC to take immediately the steps we set forth in part V, above, by promulgating the proposed regulation we attach as Appendix II hereto.

We appreciate your prompt consideration of this matter. Should you have any questions about our position, or wish to discuss further any of the issues covered, do not hesitate to contact us.

Sincerely,

Mark Wilson

Mark Wilson, Staff Assistant

Jerry R. Kline

Jerry R. Kline, Esq.

John D. Leshy

John D. Leshy, Esq.

MW/JRK/JDL/ak
Enclosures
cc: The Honorable Robert C. Seamans, Jr.
The Honorable Russell E. Train
The Honorable Russell W. Peterson

59/ Id.

60/ See discussion above accompanying note 43.

APPENDIX I

Outline of Generic EIS on the Uranium Mill Licensing Program

I. Introduction - Brief "Executive Summary" describing the present program and alternatives to it, including advantages and disadvantages of the major alternatives.

II. Purpose of the EIS

A. A discussion of how this EIS will aid the formulation of policies for the licensing of uranium mills, and particularly the control of mill tailings.

B. Scope of the EIS

1. The relationship of this EIS to the EIS's prepared for each licensed uranium mill.

2. The relationship of this EIS to the EIS's related to the regulation of other radiation hazards produced by the nuclear energy program.

3. The relationship of this EIS to the NRC and state responsibilities in the Agreement State Program.

III. Description of the uranium milling industry in Agreement and non-Agreement States

A. The processes used to mill uranium

1. The processes presently used and the source of the radioactive tailings.

2. Chemical and radiological descriptions of mill tailings, including identification of "critical radionuclides".

3. The processes that are reasonably expected to be developed in the future.

4. The contribution of the cost of milling to the total cost/KW-hour of electricity generated by nuclear energy.

B. Description of the uranium milling in the past, including the amount of uranium milled, location of abandoned mills, quantity of mill tailings, relation of these tailings to population centers and stream drainage.

C. Present uranium milling operations

1. Amount of uranium milled each year.

2. Amount of waste being produced annually.

3. Location of active mills relative to population centers and stream drainage.

D. Future uranium milling

1. Amount of uranium to be milled under different degrees of nuclear development during the next 50 years.

2. Number of new plants expected to come on line and their expected locations.

3. Lengths of time presently operating mills are expected to continue in operation and projections as to their future outputs of mill tailings.

4. The relationship of future plant locations to projected population centers and stream drainage.

IV. Description of the present uranium milling regulatory program and the environmental impact of continuing it in its present form

A. Supervision of licensing in Agreement States - description of the periodic investigations and analysis of uranium milling regulation in Agreement States and processes for determining adequacy and compatibility.

B. Description and analysis of the various conditions being imposed on each active mill in Agreement States as well as non-Agreement States.

C. How the costs of the stabilization and ultimate disposal of the tailings is or will be allocated between the federal government, state governments, mill licensees and successors in interest to the lands having tailings on them.

D. An assessment of the effectiveness of the conditions presently imposed by the NRC and various Agreement States in preventing:

1. the washing away of major portions of tailings piles by cumulative rainfall over 50 or 100 years and a 50- or 100-year flood;

2. the leaching of radium and other radionuclides into ground and surface water over a 50- or 100-year period;

3. the use of the tailings for construction by an unknowing person or one who purposefully ignores the potential hazards;

4. the wind erosion of the tailings reasonably expected over a 50- or 100-year period and its effect on the buildup of radioactive dust downwind of the pile;

5. the ingestion of radioactive materials by wildlife drinking or settling on the tailings ponds; and

6. the concentration of radionuclides in vegetation growing on the tailings and the ingestion of the radionuclides by livestock grazing on the revegetated tailings piles.

E. The environmental impacts to be expected from the exposure of humans, flora and fauna to the release of radioactive materials by each of the six exposure routes listed in IV.D. above.

F. A description and evaluation of present inspection and monitoring procedures to assess the possibility of exposure to radioactivity from mill tailings.

V. Alternatives - discussion of the alternative regulatory programs and conditions and their environmental impacts.

A. No regulations in any state - the alternative already chosen by some Agreement States. Analysis of this alternative in practice in these states.

B. Removal of some or all of the "critical" radionuclides before disposing of the tailings, and then disposing of the concentrated radionuclides in the same manner that other high-level wastes are disposed of.

1. Require modification of all existing processes within a reasonable time.

2. Require only newly built or expanded mills to modify their processes.

3. Process tailings after being deposited in the retention systems.

C. Returning tailings to the mine

1. Returning tailings in the form they are presently in when they are discarded from the process.

2. Dry out the tailings before returning them to the mine.

3. Modify the process so the tailings are less slimy and therefore easier to handle.

4. Mix tailings with other overburden to help consolidate them before placing them in the mine.

D. Compare the environmental impacts of the alternatives with the impacts of the present program, including:

1. effectiveness of each in mitigating short-term and long-term environmental and public health hazards associated with uranium mill tailings;

2. impact on environment due to increase in cost/KW-hour of nuclear energy generated electricity.

3. other primary and secondary impacts.

APPENDIX II

TEXT OF A PROPOSED REGULATION REQUIRING ALL URANIUM MILL OPERATORS TO POST A PERFORMANCE BOND THAT WILL COVER THE ESTIMATED COSTS OF DISPOSING OF THE URANIUM MILL TAILINGS PRODUCED.

1) The purpose of the performance bond will be to assure that all uranium mill tailings shall be properly disposed and the mill sites decontaminated.

2) A performance bond shall be filed with the Commission within ninety days of the promulgation of this section, or, for new licenses, before the license to mill uranium is granted.

3) The amount of this bond shall be

a) sufficient to cover the cost of proper disposal of all mill tailings containing radionuclides on the mill site plus all tailings to be produced in the ensuing year of operation;

b) computed, until an ultimate disposal technique is decided upon, so as to include the cost of:

(i) stabilizing the tailings at the mill site for 50 years in accordance with Regulatory Guide 3.23;

(ii) monitoring for 50 years the environmental effects of retaining the mill tailings at the mill site;

(iii) loading and hauling all tailings back to the mine site;

(iv) burying the tailings at the mine site;

(v) grading, recontouring, and revegetating the mine site; and

(vi) decontaminating the mill site.

c) estimated initially by the operator in accordance with established engineering principles;

d) finally determined by the Commission after:

(i) inspecting the mill site to confirm the accuracy of the operator's estimate;

(ii) checking the method of computation used by the operator;

(iii) adding to the operator's estimate the cost to the Commission to bring in equipment and personnel to dispose properly of the tailings should the operator fail to do so; and

(iv) soliciting the comments of interested persons on the amount of bond and holding a public hearing upon the request of 5 or more interested persons; and

e) reestimated annually in accordance with the procedures of this section to adjust for inflation, tailings accumulated at the mill site in the prior year of operation, new projections of yearly output of tailings and new technical knowledge on the hazards of tailings and on proper disposal techniques.

4) The provisions of this section shall apply to:

a) operators of all uranium mills licensed by the NRC at the time these regulations are promulgated;

b) all operators with pending applications for uranium mill licenses at the time these regulations are promulgated; and

c) all operators who apply for uranium mill licenses after the promulgation of these regulations.

5) a) All states regulating uranium mills under state agreements shall promulgate regulations incorporating all provisions of this section within 90 days of the promulgation of this section. The Commission shall, every 12 months, review the enforcement of the state regulations incorporating this section to ensure that adequate bonds have been posted for all uranium mills in the state to which this section would apply if there were no agreement between the state and the Commission.

b) Any Agreement State regulatory program which fails to incorporate this section within 90 days or enforce its regulation, in accordance with subsection 5(a) above, will be considered inadequate to protect the public health and safety, and the state's authority to regulate uranium mill operations shall be suspended, in accordance with the procedures outlined in § 274j of the Atomic Energy Act, (42 U.S.C. § 2021(j)) until the state complies with subsection 5(a). The NRC shall require all uranium mill operators licensed under the suspended state program to comply with the provisions of this section and all other NRC regulations pertaining to uranium mills during the time of suspension.

6) Bond release and forfeiture

a) The performance bond required by this section shall be released only after the approval of the final environmental impact statement on the uranium milling program and after the changes needed in the uranium milling

process to eliminate the hazards of uranium mill tailings have been decided upon, and the licensee has:

(i) terminated the milling of uranium;

(ii) properly eliminated the hazards of uranium mill tailings; and

(iii) decontaminated the uranium mill area.

b) The bond shall be forfeited if the mill licensee fails to meet the conditions in subsection 6(a), above, within 180 days after:

(i) the termination of uranium milling operations; or

(ii) the revocation of the uranium mill license for any reason.

January 15, 1981

NOTE TO: Joel Lubenau, SP

FROM: John F. Klucsik, OELD

SUBJECT: UPDATE TO WASHINGTON STATE UMTRCA REVIEW

Attached please find the update to my review of the Washington State statutes and regulations we have discussed on several occasions. You will find that several of the citations and comments are changed from the earlier review as a result of the reorganization of Washington's regulations and the additions thereto resulting from the Statement of Rules and Rule Changes relating to Order Number 1459 of the Washington Department of Social and Health Services.

In addition to these new rules and changes to the old rules, the provisions of the Washington Mill Tailings and Perpetual Care Act of 1979 were considered in this review. The attached summary of state compliance supercedes the previous review performed by this office which should be disregarded.

If I may be of further assistance with respect to the review of the Washington State agreement program as it relates to uranium mills and mill tailings disposal, please do not hesitate to call.

John F. Klucsik

Attachment
As stated

8203090449