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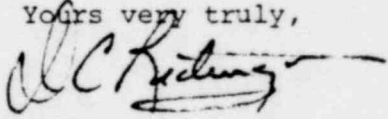
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Director,  
Division of Waste Management

Gentlemen:

On behalf of Dawn Mining Company and its parent, Newmont Mining Corporation, we submit for your consideration the enclosed comments on NRC's Draft Generic Environmental Impact Statement on Uranium Milling, and proposed changes in the regulations found necessary because of it.

We appreciate the opportunity afforded to us for written comments on this most important subject.

Yours very truly,  


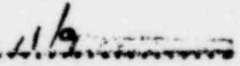
D. C. Ridinger

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Enclosure

cc: American Mining Congress

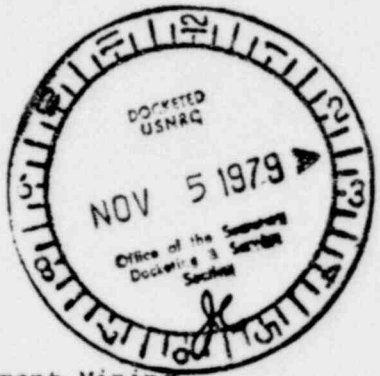
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COMMENTS TO  
THE U.S. NUCLEAR REGULATORY COMMISSION

CONCERNING  
THE DRAFT GENERIC ENVIRONMENTAL IMPACT STATEMENT  
ON URANIUM MILLING

ON BEHALF OF  
NEWMONT MINING CORPORATION  
AND DAWN MINING COMPANY

OCTOBER 24, 1979

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Dawn Mining Company, a subsidiary of Newmont Mining Corporation, owns and operates a uranium mill at Ford, Washington, which is about twenty-five miles northwest of Spokane. This mill was opened in August, 1957, to process ore from an open pit mine near Wellpinit, Washington, on the nearby Spokane Indian reservation.

In addressing the Commission's Draft Generic Environmental Impact Statement, Newmont and Dawn wish firstly to voice their strong support of, and agreement with, the position developed by the American Mining Congress, through that body's Uranium Environmental Subcommittee and Uranium Advisory Council, a detailed position which has been presented both at NRC's informal public hearings and by means of written commentary.

The comments we present now, however, have a somewhat different emphasis, and try to focus more narrowly on those issues which are particularly important to Dawn Mining Company.

The GEIS is assembled as a broad analytical framework examining environmental issues to which the uranium milling industry gives rise. Its objective is to determine whether the pattern of regulation of the industry is now adequate to deal with such issues, and in such areas where regulation is found lacking, or inappropriate to the hazard presented, it attempts to establish new performance criteria and financial guidelines for insuring their achievement. The GEIS states itself to be an assessment of the problems, and a support document for any rulemaking which emerges to correct practices judged defective.

In order to succeed in these tasks, we think the Commission's effort must present four types of information: (a) a properly formulated series of questions, (b) an accurate collection of relevant facts, (c) their logical, closely-reasoned application, and (d) in cases where the flow of thought proceeds from arbitrary choice of a scenario, incorporating numerical values for specific parameters, which also are chosen arbitrarily or as a matter of policy, to identify such postulated and hypothetical material, and to present the case for its selection.

We commend the Commission for its dedicated attempt to carry out this analysis, but regretfully, we find the GEIS contains many points, both major and minor, which are of doubtful validity, and which therefore fail to provide a sound basis for its conclusions.

The points we question fall into all four of the above-listed categories, and are sufficiently numerous to make full presentation a very arduous task. We will confine ourselves instead to discussion of those issues we believe to have central importance, or are of special concern to Dawn's mill. This is followed by an abbreviated listing of additional points we think NRC needs to re-assess.

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Problem I. Improperly Formulated Questions:  
The Model Mill Concept, in a Model Environment

As the operators of a small mill, geographically remote from most other producers, and climatically and environmentally different as well, we are especially aware of the unrealistic nature of NRC's Model Mill Concept, which is a fictitious generalization developed to simplify examination of environmental impacts of various management alternatives. GEIS acknowledges (page 3) that no attempt is made to analyze in detail those impacts which are highly site-specific, and says these must be evaluated for each mill, through the environmental impact statement prepared for each licensing action. But by proceeding to calculate radiological and non-radiological impacts for the model mill scenario and its set of alternatives, and using the results in cost-benefit comparisons to arrive at conclusions as to preferred practice for all mills, NRC implies that site-specific differences from the model mill conditions are not sufficiently important, or not sufficiently different, to affect the outcome of the analysis.

We would like to bring up a number of ways in which specific differences at our site are reasonably certain to influence the analysis:

(1)	<u>Size of the Mill</u>	The Model Mill	Dawn
	Ore Capacity, STPD	2000	450
	U <sub>3</sub> O <sub>8</sub> Produced, TPY	1000	160

Since Dawn's ore capacity is only 23% of that for the Model Mill, the radiological source term, other things being equal, should be smaller, though not proportionally smaller, at Dawn.

In like manner, the risk should be reduced.

But the size ratio of the above mills is 6.25, a much greater number, when the comparison is put in terms of annual U<sub>3</sub>O<sub>8</sub> production. Thus, the benefits available are less than proportionate, and the cost of new tailings disposal requirements is relatively more burdensome.

(2) Heap Leaching. Dawn now contemplates processing of low grade ore at its nearby Midnite Mine site, by heap leaching. This will be done as an ancillary operation, with the yellowcake production step at the existing mill. GEIS clearly classifies such processing as a form of conventional uranium milling, by stating (p. 24) that it gives rise to the same kind of environmental problems. But here the Model Mill analysis and its set of Alternative Methods are certainly inapplicable, both because the operations concerned are substantively different, (no crushing, and dry tailings) and especially because they have, by nature, a marginal set of economics. It makes a vital difference if major cost increments such as impermeable tailings pond liners and 10 foot thick covers are required.

The GEIS does indeed appear to recognize the unique position of heap leaching, but does little more than mention it. We think an examination in depth is required to provide valid regulatory guidance. Such an examination should face more squarely than does the GEIS any arbitrary or policy issues

which lead to economic roadblocks. Thus, if a radon flux limit of 2 pCi/m<sup>2</sup>/sec is imposed, for example, it might be expected to make some projects non-viable. Under these circumstances, we think a stronger justification than the GEIS supplies is required for the 2 pCi limit.

Problem II. Inaccurate Facts in Costing

Statement of estimated costs by NRC are generally on the low side and in some cases are grossly understated. This is especially apparent at Dawn because we are now in the process of designing a new tailings dam and have therefore obtained specific current data.

A set of unit costs is presented by GEIS in Appendix K-4, as Table K-4.1. The Table notes that these unit costs include only those common to many alternative methods of disposal, and qualifies the listings by pointing out that for particular alternative disposal methods, individual values are presented which differ from those in the Table. The subgrade disposal method selected by Dawn does not correspond exactly to any of the Alternative Methods evaluated by NRC, but it comes closest to Alternative 5, wherein a special pit has to be excavated and an impervious liner installed.

Excavation Costs

For Alternative 5, NRC uses (p. K-20) a unit cost of \$.48/yd<sup>3</sup>. Dawn has obtained an estimate from Kilborn/NUS of \$1.50yd<sup>3</sup>, and has made its own estimate of \$1.00/yd<sup>3</sup>. Taking \$1.25/yd<sup>3</sup> as a reasonably true value, and using 1.6 million yd<sup>3</sup> for our new tailings pond, the comparison of excavating costs becomes:

NRC:	1.6 MM x \$ .48	=	\$ 768,000
Dawn:	1.6 MM x \$1.25	=	<u>2,000,000</u>
	Difference	=	\$1,232,000

Liner Costs

(a) Hypalon Liner

Dawn requires 1.1 million sq. ft. of liner. Dawn's unit cost, confirmed by Kilborn/NUS is \$.94/ft<sup>2</sup>. The comparison is:

NRC:	1.1 MM x \$ .37	=	\$
Dawn:	1.1 MM x .94	=	<u>1,034,000</u>
	Difference	=	\$ 627,000

NRC acknowledges (p. K-10, footnote d) that its selected unit cost value was based on a range, with selection from the low end of the range because of presumed economics of scale.

We note, however, that the entire range is low, and further that the economy due to scale is not justified, at least for our own case.



(b) Clay Liner

The clay available to Lawn does not lend itself to compaction, unless mixed with sand. Basing our calculation on a 50-50 sand-clay mixture, whose density is 1.2 tons/yd<sup>3</sup>, and a 3 ft. thickness, the unit requirement is 0.133 tons/ft<sup>2</sup>. The unit cost for this mixture is in the range of \$.53 to \$.67/ft<sup>2</sup>; we will use \$.60 as a reasonable number. NRC uses \$1.00 yd<sup>2</sup> = \$.11/ft<sup>2</sup>. The comparison is:

NRC:	1.1 MM x \$.11	=	\$121,000
Dawn:	1.1 MM x \$.60	=	<u>660,000</u>
	Difference	=	\$539,000

Tailings Cover Cost

Alternative 5 specifies that the tailings be covered by 0.6 m of clay and 2.7 m of earth. We increase the clay slightly, from 0.6 m to 3 ft (= .91 m) because we will be using a 50-50 sand-clay mixture. At 1.2 tons/yd<sup>3</sup>, the clay layer will cost \$5.40/yd<sup>2</sup> with 600,000 yd<sup>3</sup> required.

Since our clay layer is thicker than that specified, we will reduce the earth to be placed above it, from 2.7 m to 2.4 m, so that the total thickness remains unchanged. The volume of such earth then becomes 1.58 million yd<sup>3</sup>. Anticipating costs similar to, but lower than, those encountered for excavation, we will use \$1.00/yd<sup>3</sup> for the earth portion of the backfill.

The cost comparison is then:

	<u>Clay Layer</u>	<u>Earth Layer</u>	<u>Entire Cap</u>
NRC:	0.6 MM yd <sup>3</sup> x \$1.00 = \$0.60 million	1.58 MM yd <sup>3</sup> x \$ .47 = \$0.74 million	= \$1.34 million
Dawn:	0.6 MM yd <sup>3</sup> x \$5.40 = \$3.24 million	1.58 MM yd <sup>3</sup> x \$1.00 = \$1.00 million	= \$4.82 million

Cost of Neutralization with Lime

NRC estimates a need for 24.2 lb. of lime per ton of ore. Dawn's estimate is 40 lb/ton. NRC's unit cost is \$.0123/lb of lime. Dawn currently pays \$.0260/lb. In a year, Dawn processes about 160,000 tons of ore.

The comparison, for lime alone, becomes:

NRC:	158,000 tons x 24.2 $\frac{\text{lb}}{\text{ton}}$ x $\frac{\$.0123}{\text{lb}}$	=	\$ 47,030/yr
Dawn:	158,000 tons x 40 $\frac{\text{lb}}{\text{ton}}$ x \$.0260	=	<u>\$164,320/yr</u>
	Difference	=	\$117,290/yr

Over the postulated 15 year life of the plant, the Dawn cost is then \$2.46 million, and the excess of Dawn's projected cost over NRC's estimate is \$1.76 million. We will say nothing of the associated capital and labor costs to carry out this process, except to emphasize that they are not included in our comparison.

It seems appropriate to end our cost comments by noting that the anticipated cost of Dawn's compliance with the GEIS, or rather with only the few items we have discussed, is not very different from Dawn's net income. It is far from a trivial item to us.

### Problem III. Invalid Reasoning, in Cost-Benefit Analysis

In its consideration of costs versus benefits for alternative tailings disposal modes, the Commission calculates what percentage the costs are, of the selling price of  $U_3O_8$ , and finding the result to be less than 2 percent for most modes, concludes their cost is reasonable and justified.

We consider it misleading to match the selling price of a product against only one component of the cost of its production. The mining industry is often characterized by cyclical market conditions, and it is generally known that some properties are periodically shut down because the total cost of production does not differ sufficiently from the product price to keep the enterprise viable. The uranium mining and milling industry certainly is different from others, but the uncertainties to which it is subject are, if anything, greater than those for the mining industry in general.

Dawn Mining Company shut down its mill in 1965 and re-opened it in 1969, due to market conditions. It is true that the price of yellowcake is now much higher than it was, and also true that NRC has used \$30/lb of  $U_3O_8$ , which at this moment seems to be on the low side. These statements balance our criticism to some degree, but they do not really justify the Commission's failure to do a more complete cost-benefit comparison. Doing it correctly would, we think, bring out that differences of one tailings disposal alternative from another represent substantial fractions of the yearly profits. From the Commission's point of view, we think a formal cost-benefit analysis would lend authority and weight to its conclusions. It might also change these conclusions, in such areas as the acceptability of Alternative I (above-grade disposal). NRC suggests flexibility which would permit such an alternative in some cases, but the present lack of cost-benefit analysis makes it more difficult to justify a flexible approach.

### Problem IV. Imposition of Limits as a Matter of Policy Instead of Technical Justification: The 2 pCi Radon Flux Limit

This most important example of the use of postulated rather than derived material appears on page 12-10:

"The proposed limit on radon flux was selected on the basis that it will assure exhalation rates directly

over mill tailings disposal areas will be within the range of those occurring naturally.

"The level of 2 pCi/m<sup>2</sup>/sec. was selected over other comparable control levels.....because this level appears best to meet the objectives of reducing fluxes to levels which are within the range occurring naturally from soils."

The justification presented for achieving the underlying objective, of exhalation rates similar to those for natural soils, is weak and inadequate. The primary stated reason for this objective is to return sites to a condition permitting reasonable uses of surface land. It seems to us necessary that NRC derive the 2 pCi limit by showing how, at successively higher flux limits, reasonable uses of surface land would be precluded. In a sense, this is attempted in Table 12.2, which compares doses and risks as a function of radon flux. A defect in this presentation is that only one type of land use is examined. The risks are estimated only for inhabitants of houses built on or near the tailings pile. Actually, there are other reasonable uses for land, where the presence of humans is minimal. In the area of Dawn Mining Company, for example, lumbering is a significant industry, and is one where we think human presence is ordinarily about two orders of magnitude less frequent than in NRC's inhabited dwelling; it follows that a flux limit of 200 pCi/m<sup>2</sup>/sec would not preclude beneficial use of the land in such a case.

Bypassing this shortcoming, and returning to the doses and risks of Table 12.2, we find the selection of 2 pCi/m<sup>2</sup>/sec as a flux limit does not leap forth as a clear choice, either from the table or from the five paragraphs of discussion of that table which constitute Section 12.3.3.3. To us, the mood of NRC's discussion is one of at least mild anguish in deciding upon the degree of conservatism warranted. In essence, they say: "Here is a conservative land use scenario based on occupancy of a structure directly over the tailings.. ..More conservation scenarios are unreasonable because they are uncertain... Less conservative scenarios are also unsuitable because of the uncertainties involved and because some conservatism is appropriate." We can only infer from this vagueness that the 2 pCi limit was set first, for otherwise there would be a more straightforward attempt to show how this value emerges logically and reasonably from the calculations.

The arrangement of the cases of Table 12.2 according to distance from the tailings site suggests NRC may wish to consider the permanent sacrifice of the use of the site, itself. This would resolve the incongruity, to this point ignored, of building a habitation on land which it is the purpose of the Uranium Mill Tailings Radiation Control Act to isolate, by requiring post-closure transfer of ownership to the United States or to a State.

In any event, if the column labelled "Fence Post Near Edge of Disposal Area" is chosen as the closest point of real interest, and if the decision criterion remains 64% of the risk from background, as was true for

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Application.....	\$ 21,000
New License.....	\$180,500
Renewal.....	\$194,600
Major Amendment.....	\$ 41,600

The corresponding sums for heap leach operations are:

Application.....	\$ 14,000
New License.....	\$112,000

To these must be added the applicant's own major costs for preparing the application and supporting it with appropriate environmental information.

Licensing fees do not vary significantly with mill size. One notes the trend toward large mills and cannot escape the conclusion that NRC policy encourages this. Certainly the frame of mind created by the 2000 tpd Model Mill concept leads the Commission to consider negligible many costs which to Dawn Mining Company are substantial. The net result will be to preclude many small uranium deposits from being worked.

Another example where fixed charges are unfairly set is criterion 10 (of Appendix A to Part 40), wherein a flat assessment of \$250,000 is required to be paid by each mill operator before license termination, to cover the cost of long term surveillance. We do not agree that the costs of surveillance are entirely independent of size, and recommend against adjustment of this charge to reflect such dependence.

Problem VII. Interfacing with Developing Technology

GEIS refers briefly (p. 24, p. 12-26) to research and development being sponsored now and over the next few years by DOE, NRC and EPA, on methods for tailings disposal. Although the discussion is terse, it conveys the expectation that methods superior to what is presently advocated may well emerge from such effort, and says the NRC staff plans to reexamine proposed tailings disposal criteria after remedial action has been undertaken at several of the designated inactive processing sites, to determine whether changes in the criteria are warranted.

Among specific concepts now under study, we note the use of a mixture of asphalt emulsion with tailings, to be compacted as a 3 inch layer over the tailings pile. Also, the testing of Calcilox, a calcium-based material developed by Dravo Lime Co., is in progress to determine whether a mixture of this substance with tailings slurry is capable of forming an impermeable tailings pond lining and also an impermeable cap.

It is evident that producers now starting new tailings ponds, like ourselves, cannot fully avail themselves of the benefits of developing technology, so far as the lining is concerned, since the lining must be placed before use,

the worst case "Above Tailings" column, then by interpolation NRC may wish to set the radon flux limit of 64 pCi/m<sup>2</sup>/sec, corresponding to 64% of background at the fencepost. This would be one reasonable type of tradeoff, wherein the flux limit is raised to recognize removal of the fenced site from use.

Problem V: Risks to Populations

GEIS estimates of the health effects of radon released from uncovered tailings piles indicate that these are trivial. Table 12.3 shows very forcefully that the annual dose to the population from radon daughters will not diminish at all if tailings are covered, simply because natural sources, and such every day benevolent activities as soil tillage, release annually a quantity of radon 100,000 times as large.

NRC's closing paragraph in Section 12.3.3.4 reluctantly acknowledges this point, noting that much higher levels of radon control "such as 10 or 100 pCi/m<sup>2</sup>/sec, could be argued as being small fractions of natural releases." Somewhat unclearly, it says "the risk perspective does support the proposed... level" (2 pCi/m<sup>2</sup>/sec) in that 2 pCi, just like 10 pCi or 100 pCi, "will result in minute (if not significant) increased....risks beyond those occurring from natural radon releases." We really cannot view this as support for the 2 pCi limit.

As to the 9800 premature cancer deaths predicted to occur over the next 1000 years because of radon released from all of the tailings generated in the U.S. until the year 2000, our reaction is that the number is fanciful at best, because of the unpredictability of medical advances over such a long period, and because radon is a co-carcinogen, acting strongly in concert with atmospheric pollutants and tobacco smoke. If levels of presence of these conventional air pollutants diminish over the next thousand years to what they were 50 years ago, we understand the 9800 calculated deaths would be about 40 times smaller. Further, it is inappropriate to consider the significance of such a number outside a reference framework of other risks. We believe the radon emission risks from the 82 mills projected by the year 2000 translate back to a basis of 4 fatalities per year in the current U.S. population. This is hardly noteworthy compared to the fatalities from the common risks in our society. A statistic more acceptable to many people than the number of fatalities per year is the reduction in life expectancy associated with a particular activity. The effect of radon from uncovered tailings piles would reduce life expectancy by 15 minutes. This is equivalent to the risk produced by smoking 1 1/2 cigarettes in a lifetime.

Problem VI. Discrimination of the Proposed Regulations against Small Mills.

The set of fees proposed in FR August 24, p. 50025, for licensee authorizing ownership of tailings, is very nearly equal to the existing license fees for ownership of source material in milling operations. In effect, therefore, the producer's total licensing costs will double. The sum of significant fees for source plus byproduct materials becomes, for a conventional mill:

and once placed becomes immediately unavailable for modification. The cap represents a very different situation, however. Given that the case for covering of tailings piles at all is a tenuous one, with health effects that are extremely small, we would recommend that the Commission modify its present cover criteria, limiting requirements for the present simply to that small thickness of any suitable material which is necessary to prevent spreading of windblown tailings dust. At Dawn Mining Company, wood chips have been employed for that purpose, in the past. Since the pace of tailings cover R and D is presently a vigorous one, it is reasonable to anticipate the availability of a superior covering process within very few years. By delaying the imposition of the present criteria for tailings cover until that time, NRC would permit industry to substitute for the very costly, 3-meter-thick cover prescribed by Criterion No. 6, and equally effective but more economical version of this major cost component. Should the present R & D program be unsuccessful, Criterion No. 6 might then be promulgated. In either case the public interest is protected, and the present industry has the opportunity to utilize the fruits of the development program.

#### Our Recommendation and Conclusion

Newmont and Dawn Mining Company believe the rules proposed in FR August 24, 1979 at 50015-50025 are unsound because their principal support document, the Draft GEIS, omits or distorts analysis of important issues, and fails to justify convincingly a number of its conclusions. The main areas which require re-assessment and presentation in a second draft of the GEIS include:

- . Evaluation of the impact of milling and waste disposal practices on public health, so that the criteria for radon flux limit and three meters of tailings cover may be derived with more specificity. Numbers based on policy should be identified as such with reasons for their selection over other possible choices. As pointed out by American Mining Congress in its written comments on the draft GEIS, NRC should consider the fact that, in certain land areas in the U.S. that would encompass at least ten times the total area of all uranium tailings piles projected to the year 2000, emanation of radon due to natural causes exceeds 30 pCi/m<sup>2</sup>/sec.
- . The Model Mill should be revised to make it more representative and a more accurate reflection of real mills. To the extent practical, it should be replaced by a range of models.
- . It is our understanding that the UDAD code presently in use is substantially different from the version employed in the GEIS calculations. The second draft GEIS should incorporate revised UDAD calculations, in the expectation that some uncertainties which led to compounding of conservative assumptions are now known, and new calculations will have greater validity.

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- . Cost estimating should be redone, and a formal cost-benefit analysis applied in criteria derivation.
- . Timing should be reconsidered to determine whether a code of new tailings disposal practice should not be postponed until the research and development program in progress at inactive tailings sites is completed. We are not aware of urgency toward establishing criteria now.
- . The second Draft GEIS should attempt to develop more flexibility of approach, to recognize a greater number of alternative situations. Heap leaching should be considered in detail.

# # #

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